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| B.Sc., Nutrition and Dietetics |
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| **SYLLABUS** |
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| **FROM THE ACADEMIC YEAR**  **2023-2024** |
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| **TAMILNADU STATE COUNCIL FOR HIGHER EDUCATION, CHENNAI – 600 005** |
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| **TANSCHE REGULATIONS ON LEARNING OUTCOMES-BASED CURRICULUM FRAMEWORK GUIDELINES BASED REGULATIONS FOR UNDER GRADUATE PROGRAMME** | |
| **Programme:** | **B.Sc., Nutrition and Dietetics** |
| **Programme Code:** |  |
| **Duration:** | **UG - 3 years** |
| **Programme Outcomes:** | **PO1: Disciplinary knowledge:** Capable of demonstrating comprehensive knowledge and understanding of one or more disciplines that form a part of an undergraduate Programme of study  **PO2: Communication Skills:** Ability to express thoughts and ideas effectively in writing and orally; Communicate with others using appropriate media; confidently share one’s views and express herself/himself; demonstrate the ability to listen carefully, read and write analytically, and present complex information in a clear and concise manner to different groups.  **PO3: Critical thinking:** Capability to apply analytic thought to a body of knowledge; analyse and evaluate evidence, arguments, claims, beliefs on the basis of empirical evidence; identify relevant assumptions or implications; formulate coherent arguments; critically evaluate practices, policies and theories by following scientific approach to knowledge development.  **PO4: Problem solving: Capacity** to extrapolate from what one has learned and apply their competencies to solve different kinds of non-familiar problems, rather than replicate curriculum content knowledge; and apply one’s learning to real life situations.  **PO5: Analytical reasoning**: Ability to evaluate the reliability and relevance of evidence; identify logical flaws and holes in the arguments of others; analyze and synthesize data from a variety of sources; draw valid conclusions and support them with evidence and examples, and addressing opposing viewpoints.  **PO6: Research-related skills**: A sense of inquiry and capability for asking relevant/appropriate questions, problem arising, synthesising and articulating; Ability to recognise cause-and-effect relationships, define problems, formulate hypotheses, test hypotheses, analyse, interpret and draw conclusions from data, establish hypotheses, predict cause-and-effect relationships; ability to plan, execute and report the results of an experiment or investigation  **PO7: Cooperation/Team work:** Ability to work effectively and respectfully with diverse teams; facilitate cooperative or coordinated effort on the part of a group, and act together as a group or a team in the interests of a common cause and work efficiently as a member of a team  **PO8: Scientific reasoning**: Ability to analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.  **PO9: Reflective thinking**: Critical sensibility to lived experiences, with self awareness and reflexivity of both self and society.  **PO10 Information/digital literacy:** Capability to use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources; and use appropriate software for analysis of data.  **PO 11 Self-directed learning**: Ability to work independently, identify appropriate resources required for a project, and manage a project through to completion.  **PO 12 Multicultural competence:** Possess knowledge of the values and beliefs of multiple cultures and a global perspective; and capability to effectively engage in a multicultural society and interact respectfully with diverse groups.  **PO 13: Moral and ethical awareness/reasoning**: Ability toembrace moral/ethical values in conducting one’s life, formulate a position/argument about an ethical issue from multiple perspectives, and use ethical practices in all work. Capable of demonstratingthe ability to identify ethical issues related to one‟s work, avoid unethical behaviour such as fabrication, falsification or misrepresentation of data or committing plagiarism, not adhering to intellectual property rights; appreciating environmental and sustainability issues; and adopting objective, unbiased and truthful actions in all aspects of work.  **PO 14: Leadership readiness/qualities:** Capability for mapping out the tasks of a team or an organization, and setting direction, formulating an inspiring vision, building a team who can help achieve the vision, motivating and inspiring team members to engage with that vision, and using management skills to guide people to the right destination, in a smooth and efficient way.  **PO 15: Lifelong learning:** Ability to acquire knowledge and skills, including „learning how to learn‟, that are necessary for participating in learning activities throughout life, through self-paced and self-directed learning aimed at personal development, meeting economic, social and cultural objectives, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling. |

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| **Programme Specific Outcomes:** | **PSO1 – Placement:**  To prepare the students who will demonstrate respectful engagement with others’ ideas, behaviors, beliefs and apply diverse frames of reference to decisions and actions.  **PSO 2 - Entrepreneur:**  To create effective entrepreneurs by enhancing their critical thinking, problem solving, decision making and leadership skill that will facilitate startups and high potential organizations  **PSO3 – Research and Development:**  Design and implement HR systems and practices grounded in research that comply with employment laws, leading the organization towards growth and development.  **PSO4 – Contribution to Business World:**  To produce employable, ethical and innovative professionals to sustain in the dynamic business world.  **PSO 5 – Contribution to the Society:**  To contribute to the development of the society by collaborating with stakeholders for mutual benefit |

**Credit Distribution for UG Programmes**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sem I** | **Credit** | **H** | **Sem II** | **Credit** | **H** | **Sem III** | **Credit** | **H** | **Sem IV** | **Credit** | **H** | **Sem V** | **Credit** | **H** | **Sem VI** | **Credit** | **H** |
| Part 1. Language – Tamil | 3 | 6 | Part..1. Language – Tamil | 3 | 6 | Part..1. Language – Tamil | 3 | 6 | Part..1. Language – Tamil | 3 | 6 | 5.1 Core Course –\CC IX | 4 | 5 | 6.1 Core Course –  CC XIII | 4 | 6 |
| Part.2 English | 3 | 6 | Part..2 English | 3 | 6 | Part..2 English | 3 | 6 | Part..2 English | 3 | 6 | 5.2 Core Course – CC X | 4 | 5 | 6.2 Core Course –  CC XIV | 4 | 6 |
| 1.3 Core Course – CC I | 5 | 5 | 2..3 Core Course – CC III | 5 | 5 | 3.3 Core Course – CC V | 5 | 5 | 4.3 Core Course – CC VII  Core Industry Module | 5 | 5 | 5. 3.Core Course CC -XI | 4 | 5 | 6.3 Core Course –  CC XV | 4 | 6 |
| 1.4 Core Course – CC II | 5 | 5 | 2.4 Core Course – CC IV | 5 | 5 | 3.4 Core Course – CC VI | 5 | 5 | 4.4 Core Course –  CC VIII | 5 | 5 | 5. 4.Core Course –/ Project with viva- voce  CC -XII | 4 | 5 | 6.4 Elective -VII Generic/ Discipline Specific | 3 | 5 |
| 1.5 Elective I Generic/ Discipline Specific | 3 | 4 | 2.5 Elective II Generic/ Discipline Specific | 3 | 4 | 3.5 Elective III Generic/ Discipline Specific | 3 | 4 | 4.5 Elective IV Generic/ Discipline Specific | 3 | 3 | 5.5 Elective V Generic/ Discipline Specific | 3 | 4 | 6.5 Elective VIII  Generic/ Discipline Specific | 3 | 5 |
| 1.6 Skill Enhancement Course SEC-1 | 2 | 2 | 2.6 Skill Enhancement Course SEC-2 | 2 | 2 | 3.6 Skill Enhancement Course SEC-4,  (Entrepreneurial Skill) | 1 | 1 | 4.6 Skill Enhancement Course SEC-6 | 2 | 2 | 5.6 Elective VI Generic/ Discipline Specific | 3 | 4 | 6.6 Extension Activity | 1 | - |
| 1.7 Skill Enhancement -(Foundation Course) | 2 | 2 | 2.7 Skill Enhancement Course –SEC-3 | 2 | 2 | 3.7 Skill Enhancement Course SEC-5 | 2 | 2 | 4.7 Skill Enhancement Course SEC-7 | 2 | 2 | 5.7 Value Education | 2 | 2 | 6.7 Professional Competency Skill | 2 | 2 |
|  |  |  |  |  |  | 3.8 E.V.S. | - | 1 | 4.8 E.V.S | 2 | 1 | 5.8 Summer Internship /Industrial Training | 2 |  |  |  |  |
|  | **23** | **30** |  | **23** | **30** |  | **22** | **30** |  | **25** | **30** |  | **26** | **30** |  | **21** | **30** |
| **Total – 140 Credits** | | | | | | | | | | | | | | | | | |

**Choice Based Credit System (CBCS), Learning Outcomes Based Curriculum Framework (LOCF) Guideline Based Credit and Hours Distribution System**

**for all UG courses including Lab Hours**

**First Year – Semester-I**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **List of Courses** | **Credit** | **No. of Hours** |
| Part-1 | Language – Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses [in Total] | 13 | 14 |
| Part-4 | Skill Enhancement Course SEC-1 | 2 | 2 |
| Foundation Course | 2 | 2 |
|  |  | **23** | **30** |

**Semester-II**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **List of Courses** | **Credit** | **No. of Hours** |
| Part-1 | Language – Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses including laboratory [in Total] | 13 | 14 |
| Part-4 | Skill Enhancement Course -SEC-2 | 2 | 2 |
| Skill Enhancement Course -SEC-3 (Discipline / Subject Specific) | 2 | 2 |
|  |  | **23** | **30** |

**Second Year – Semester-III**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **List of Courses** | **Credit** | **No. of Hours** |
| Part-1 | Language - Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses including laboratory [in Total] | 13 | 14 |
| Part-4 | Skill Enhancement Course -SEC-4 (Entrepreneurial Based) | 1 | 1 |
| Skill Enhancement Course -SEC-5 (Discipline / Subject Specific) | 2 | 2 |
| E.V.S | - | 1 |
|  |  | **22** | **30** |

**Semester-IV**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **List of Courses** | **Credit** | **No. of Hours** |
| Part-1 | Language - Tamil | 3 | 6 |
| Part-2 | English | 3 | 6 |
| Part-3 | Core Courses & Elective Courses including laboratory [in Total] | 13 | 13 |
| Part-4 | Skill Enhancement Course -SEC-6 (Discipline / Subject Specific) | 2 | 2 |
| Skill Enhancement Course -SEC-7 (Discipline / Subject Specific) | 2 | 2 |
| E.V.S | 2 | 1 |
|  |  | **25** | **30** |

**Third Year**

**Semester-V**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **List of Courses** | **Credit** | **No. of Hours** |
| **Part-3** | Core Courses including Project / Elective Based | 22 | 26 |
| **Part-4** | Value Education | 2 | 2 |
| Internship / Industrial Visit / Field Visit | 2 | 2 |
|  |  | **26** | **30** |

**Semester-VI**

|  |  |  |  |
| --- | --- | --- | --- |
| **Part** | **List of Courses** | **Credit** | **No. of Hours** |
| **Part-3** | Core Courses including Project / Elective Based & LAB | 18 | 28 |
| **Part-4** | Extension Activity | 1 | - |
| Professional Competency Skill | 2 | 2 |
|  |  | **21** | **30** |

**Consolidated Semester wise and Component wise Credit distribution**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Parts** | **Sem I** | **Sem II** | **Sem III** | **Sem IV** | **Sem V** | **Sem VI** | **Total Credits** |
| **Part I** | 3 | 3 | 3 | 3 | - | - | 12 |
| **Part II** | 3 | 3 | 3 | 3 | - | - | 12 |
| **Part III** | 13 | 13 | 13 | 13 | 22 | 18 | 92 |
| **Part IV** | 4 | 4 | 3 | 6 | 4 | 1 | 22 |
| **Part V** | - | - | - | - | - | 2 | 2 |
| **Total** | 23 | 23 | 22 | 25 | 26 | 21 | **140** |

**\*Part I. II, and Part III components will be separately taken into account for CGPA calculation and classification for the under graduate programme and the other components. IV, V have to be completed during the duration of the programme as per the norms, to be eligible for obtaining the UG degree.**

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| **METHODS OF EVALUATION** | | | |
| **Internal Evaluation** | Continuous Internal Assessment Test | | **25 Marks** |
| Assignments / Snap Test / Quiz | |
| Seminars | |
| Attendance and Class Participation | |
| **External Evaluation** | End Semester Examination | | **75 Marks** |
| **Total** | | | **100 Marks** |
| **METHODS OF ASSESSMENT** | | | |
| **Remembering (K1)** | | * Thelowestlevelofquestionsrequirestudentstorecallinformationfromthecoursecontent * Knowledgequestionsusuallyrequirestudentstoidentifyinformationinthetextbook. | |
| **Understanding (K2)** | | * Understandingoffactsandideasbycomprehendingorganizing,comparing,translating,interpolatingandinterpretingintheirownwords. * Thequestionsgobeyondsimplerecallandrequirestudentstocombinedatatogether | |
| **Application (K3)** | | * Studentshavetosolveproblemsbyusing/applyingaconceptlearnedintheclassroom. * Studentsmust usetheir knowledgetodetermineaexactresponse. | |
| **Analyze (K4)** | | * Analyzingthequestionisonethatasksthestudentstobreakdownsomethingintoitscomponentparts. * Analyzingrequiresstudentstoidentifyreasonscausesormotivesandreachconclusionsorgeneralizations. | |
| **Evaluate (K5)** | | * Evaluationrequiresanindividualtomakejudgmentonsomething. * Questionstobeaskedtojudgethevalueofanidea,acharacter,aworkofart,orasolutiontoaproblem. * Studentsareengagedindecision-makingandproblem–solving. * Evaluationquestionsdonothavesinglerightanswers. | |
| **Create (K6)** | | * Thequestionsofthiscategorychallengestudentstogetengagedincreativeandoriginalthinking. * Developingoriginalideasandproblemsolvingskills | |

**Highlights of the Revamped Curriculum**:

1. Student-centric, meeting the demands of industry & society, incorporating industrial components, hands-on training, skill enhancement modules, industrial project, project with viva-voce, exposure to entrepreneurial skills, training for competitive examinations, sustaining the quality of the core components and incorporating application oriented content wherever required.
2. The Core subjects include latest developments in the education and scientific front, advanced programming packages allied with the discipline topics, practical training, devising statistical models and algorithms for providing solutions to industry / real life situations. The curriculum also facilitates peer learning with advanced statistical topics in the final semester, catering to the needs of stakeholders with research aptitude.
3. The General Studies and Statistics based problem solving skills are included as mandatory components in the ‘Training for Competitive Examinations’ course at the final semester, a first of its kind.
4. The curriculum is designed so as to strengthen the Industry-Academia interface and provide more job opportunities for the students.
5. The Statistical Quality Control course is included to expose the students to real life problems and train the students on designing a mathematical model to provide solutions to the industrial problems.
6. The Internship during the second year vacation will help the students gain valuable work experience, that connects classroom knowledge to real world experience and to narrow down and focus on the career path.
7. Project with viva-voce component in the fifth semester enables the student, application of conceptual knowledge to practical situations. The state of art technologies in conducting a Explain in a scientific and systematic way and arriving at a precise solution is ensured. Such innovative provisions of the industrial training, project and internships will give students an edge over the counterparts in the job market.
8. State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature are incorporated as Elective courses, covering conventional topics to the latest DBMS and Computer software for Analytics.

**Value additions in the Revamped Curriculum:**

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| Semester | Newly introduced Components | Outcome / Benefits |
| I | **Foundation Course**  To ease the transition of learning from higher secondary to higher education, providing an overview of the pedagogy of learning abstract Statistics and simulating mathematical concepts to real world. | * Instil confidence among students * Create interest for the subject |
| I, II, III, IV | **Skill Enhancement papers** (Discipline centric / Generic / Entrepreneurial) | * Industry ready graduates * Skilled human resource * Students are equipped with essential skills to make them employable |
| * Training on Computing / Computational skills enable the students gain knowledge and exposure on latest computational aspects |
| * Data analytical skills will enable students gain internships, apprenticeships, field work involving data collection, compilation, analysis etc. |
| * Entrepreneurial skill training will provide an opportunity for independent livelihood * Generates self – employment * Create small scale entrepreneurs * Training to girls leads to women empowerment |
| * Discipline centric skill will improve the Technical knowhow of solving real life problems using ICT tools |
| III, IV, V & VI | Elective papers-  An open choice of topics categorized under Generic and Discipline Centric | * Strengthening the domain knowledge * Introducing the stakeholders to the State-of Art techniques from the streams of multi-disciplinary, cross disciplinary and inter disciplinary nature * Students are exposed to Latest topics on Computer Science / IT, that require strong statistical background * Emerging topics in higher education / industry / communication network / health sector etc. are introduced with hands-on-training, facilitates designing of statistical models in the respective sectors |
| IV | DBMS and Programming skill, Biostatistics, Statistical Quality Control, Official Statistics, Operations Research | * Exposure to industry moulds students into solution providers * Generates Industry ready graduates * Employment opportunities enhanced |
| II year Vacation activity | Internship / Industrial Training | * Practical training at the Industry/ Banking Sector / Private/ Public sector organizations / Educational institutions, enable the students gain professional experience and also become responsible citizens. |
| V Semester | Project with Viva – voce | * Self-learning is enhanced * Application of the concept to real situation is conceived resulting in tangible outcome |
| VI Semester | Introduction of  Professional Competency component | * Curriculum design accommodates all category of learners; ‘Statistics for Advanced Explain’ component will comprise of advanced topics in Statistics and allied fields, for those in the peer group / aspiring researchers; * ‘Training for Competitive Examinations’ –caters to the needs of the aspirants towards most sought - after services of the nation viz, UPSC, ISS, CDS, NDA, Banking Services, CAT, TNPSC group services, etc. |
| Extra Credits:  For Advanced Learners / Honors degree | | * To cater to the needs of peer learners / research aspirants |

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| **Skills acquired from the Courses** | Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill |

**COURSE OF STUDY AND SCHEME OF EXAMINATION**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **SEMESTER I** | | | | | | | | |
| **Part** | **Study Component** | **CourseTitle** | **Credit** | **Exam** | | | | **Hrs/ week** |
| **Dur. Hrs** | **CIA** | **Uni. exam** | **Total** |
| **I** | **Language** | **Language - Tamil** | **3** | **6** | **25** | **75** | **100** | **6** |
| **II** | **Language** | **English** | **3** | **6** | **25** | **75** | **100** | **6** |
| **III** | **Core I** | **Human Physiology** | **5** | **5** | **25** | **75** | **100** | **6** |
| **III** | **Core Practical I** | **Human Physiology** | **5** | **5** | **-** | **-** | **-** | **3** |
| **III** | **Allied I** | **Chemistry I** | **3** | **4** | **25** | **75** | **100** | **4** |
| **III** | **Allied PracticalI** | **Chemistry** | **2** | **2** | **-** | **-** | **-** | **3** |
| **IV** | **Add-on course** | **Professional English-I** | **2** | **2** | **25** | **75** | **100** | **6** |
|  |  | **TOTAL** |  |  | **150** | **450** | **600** | **36** |

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| **SEMESTER II** | | | | | | | | |
| **Part** | **Study Component** | **CourseTitle** | **Credits** | **Exam** | | | | **Hrs/ week** |
| **Dur. Hrs** | **CIA** | **Uni. exam** | **Total** |
| **I** | **Language** | **Language - Tamil** | **3** | **6** | **25** | **75** | **100** | **6** |
| **II** | **Language** | **English** | **3** | **6** | **25** | **75** | **100** | **6** |
| **III** | **Core II** | **FoodScience** | **5** | **5** | **25** | **75** | **100** | **6** |
| **III** | **Core Practical II** | **FoodScience** | **5** | **5** | **40** | **60** | **100** | **3** |
| **III** | **Allied I** | **Chemistry II** | **3** | **4** | **25** | **75** | **100** | **4** |
| **III** | **Allied Practical I** | **Chemistry** | **2** | **2** | **40** | **60** | **100** | **3** |
| **IV** | **Add-on course** | **Professional English-II** | **2** | **2** | **25** | **75** | **100** | **6** |
|  |  | **TOTAL** |  |  | **270** | **630** | **900** | **36** |

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| **SEMESTER III** | | | | | | | | |
| **Part** | **Study Component** | **CourseTitle** | **Credits** | **Exam** | | | | **Hrs/ week** |
| **Dur. Hrs** | **CIA** | **Uni. exam** | **Total** |
| **I** | **Language** | **Language - Tamil** | **3** | **6** | **25** | **75** | **100** | **6** |
| **II** | **Language** | **English** | **3** | **6** | **25** | **75** | **100** | **6** |
| **III** | **Core III** | **Nutritional Biochemistry** | **5** | **5** | **25** | **75** | **100** | **4** |
| **III** | **Core PracticalIII** | **Nutritional Biochemistry** | **5** | **5** | **-** | **-** | **-** | **3** |
| **III** | **Allied II** | **GeneralHome Science I** | **3** | **4** | **25** | **75** | **100** | **4** |
| **III** | **Allied Practical II** | **GeneralHome Science** | **1** | **1** | **-** | **-** | **-** | **3** |
| **IV** | **SBECI** | **Foodpreservation**  **and processing** | **2** | **2** | **25** | **75** | **100** | **2** |
| **IV** | **NMEC I** | **Other Major** | **-** | **1** | **25** | **75** | **100** | **2** |
|  |  | **TOTAL** |  |  | **150** | **450** | **600** | **30** |

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| **SEMESTER IV** | | | | | | | | |
| **Part** | **Study Component** | **CourseTitle** | **Credits** | **Exam** | | | | **Hrs/ week** |
| **Dur. Hrs** | **CIA** | **Uni. exam** | **Total** |
| **I** | **Language** | **Language - Tamil** | **3** | **6** | **25** | **75** | **100** | **6** |
| **II** | **Language** | **English** | **3** | **6** | **25** | **75** | **100** | **6** |
| **III** | **Core IV** | **Principle of HumanNutrition** | **5** | **5** | **25** | **75** | **100** | **4** |
| **III** | **Core Practical III** | **Nutritional Biochemistry** | **5** | **5** | **40** | **60** | **100** | **3** |
| **III** | **Allied II** | **GeneralHome Science II** | **3** | **3** | **25** | **75** | **100** | **4** |
| **III** | **Allied PracticalII** | **GeneralHome Science** | **2** | **2** | **40** | **60** | **100** | **3** |
| **IV** | **SBECII** | **FoodStandardand Quality Control** | **2** | **2** | **25** | **75** | **100** | **2** |
| **IV** | **NMEC II** | **Other Major** | **2** | **1** | **25** | **75** | **100** | **2** |
|  |  | **TOTAL** |  |  | **270** | **630** | **900** | **30** |

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| **SEMESTER V** | | | | | | | | |
| **Part** | **Study Component** | **CourseTitle** | **Credits** | **Exam** | | | | **Hrs/ week** |
| **Dur. Hrs** | **CIA** | **Uni. exam** | **Total** |
| **III** | **Core V** | **NutritioninLife Cycle** | 4 | 5 | **25** | **75** | **100** | **5** |
| **III** | **Core VI** | **AdvancedDietetics** | 4 | 5 | **25** | **75** | **100** | **5** |
| **III** | **Core PracticalV** | **NutritioninLife Cycle** | 4 | 5 | **-** | **-** | **-** | **3** |
| **III** | **ElectiveI** | **PublicHealth Nutrition** | 3 | 4 | **25** | **75** | **100** | **4** |
| **III** | **ElectiveII** | **BasicinResearch Methodology** | 3 | 4 | **25** | **75** | **100** | **4** |
| **IV** | **SBECIII** | **BakeryScience** | 2 | 2 | **25** | **75** | **100** | **3** |
| **III** | **Core VII** | **Institutional Training** | 4 | 5 | **-** | **-** | **-** | **3** |
|  |  | **TOTAL** |  |  | **125** | **375** | **500** | **30** |

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| **SEMESTER VI** | | | | | | | | |
| **Part** | **Study Component** | **CourseTitle** | **Credits** | **Exam** | | | | **Hrs/ week** |
| **Dur. Hrs** | **CIA** | **Uni. exam** | **Total** |
| **III** | **Core VII** | **Institutional Training** | **4** | **6** | **40** | **60** | **100** | **3** |
| **III** | **Core VIII** | **FoodMicrobiology** | **4** | **6** | **25** | **75** | **100** | **6** |
| **III** | **Core IX** | **Quantity Food Service and PhysicalFacilities** | **4** | **6** | **25** | **75** | **100** | **6** |
| **III** | **ElectiveIII** | **NutritionforSports and Fitness** | **3** | **5** | **25** | **75** | **100** | **4** |
| **IV** | **SBEC VI** | **Entrepreneurship Development** | **2** | **2** | **25** | **75** | **100** | **4** |
| **V** |  | **Extension Activities** | **1** |  |  |  |  |  |
|  |  | **TOTAL** |  |  | **285** | **615** | **900** | **30** |
|  |  | **OVERALL TOTAL** |  |  |  |  | **4400** |  |

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| **SEMESTER I** | |
| **Core/MajorCourseI** | **Human Physiology** |
| **PaperCode:** | **Theory:6hrs/week** |

## **CourseLearningOutcomes:**

1. Gainthebasicknowledgeofhumananatomyandphysiology.
2. Definethemain structurescomposinghumanbody.
3. Explains structure and functions of cells, tissues and organs, systems of the human body.
4. Relatesstructureandfunctionsoftissue.
5. Providesexcellentpreparationforcareersinthehealthprofessions and/or biomedical research.

## **CourseContent**

**Unit-I**

Cell–Structureoforganellesandfunctions.Tissues–Structure,

classificationandfunctions.

**Unit-II**

Blood – Composition, functions, coagulation, factors affecting coagulation, blood groups.Gastrointestinal and Hepto biliary system – Structure, physiology and functions for different organs and role of hormones and enzymes.

**Unit-III**

Immune system – Innate, acquired and active immunity, cell mediated immunity, humoral immunity and complement system.

Heart and circulation – Structure, cardiac cycle, cardiac output, factors affecting cardiac output, normal ECG, heart failure, blood pressure, control and factors affecting blood pressure.

**Unit-IV**

Respiratory system – Structure and functions, Lung volumes andlung capacities, Factors affecting efficacy of respiration.

Excretorysystem -(A)UrinarySystem:-Structureandfunctionsof organs of urinary system ( In brief), Mechanism of urine formation. (B)Skin:- Structure and functions, Regulation of body temperature.

**Unit-V**

Reproductivesystem–(A)Femalereproductivesystem--Structure and functions,menstrual cycle, menarche and menopause.

1. MaleReproductivesystem--Structureandfunctions.

Endocrine system - Thyroid, Parathyroid, Adrenal gland, Pituitary and Sex glands – Structure and functions.

**References**

* 1. RossandWilson(2011),AnatomyandphysiologyinHealthand Illness,11th Edition, Church Hill Livingstone.
  2. West,J.B.(2007),BestandTaylor’sPhysiologicalBasisofMedical

Practice,11thEdition.

* 1. Gyton(1996),TestBookofMedicalPhysiology,9thEdition,Prism Books Pvt. Ltd.,W.B. Sanders Company, USA.
  2. ChatterjeeC.C(2016),HumanPhysiologyVolumeI,MedicalAllied Agency, Kolkata.
  3. Chatterjee C.C (2004), Human Physiology Volume II, Medical AlliedAgency, Kolkata.
  4. Sembulingam,K.(2000)EssentialsofMedicalPhysiology,JaypeeBrothers Medical Publishers (P) Ltd., New Delhi.
  5. Chaudhri,K.(1993)ConciseMedicalPhysiology,NewCentralBook Agency (Parentral) Ltd., Calcutta.

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| **SEMESTERI** | |
| **Core/MajorPracticalI** | **Human Physiology** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1. Gainthebasicknowledgeofthedifferentvitalorgans,glandsand tissues under a microscope.
2. Toestimatethebloodparameterslikehemoglobin,bloodgroup, bleeding time, clotting time and platelet count

## **Coursecontent**

1. Microscopicstudy oftissues- epithelial,connective and muscular.
2. Collectionofbloodsample-Capillarybloodfromfingertipsand venous blood.
3. Separationofbloodcomponents(Centrifugation).
4. Estimationofhemoglobin-Sahli’sAcidhematinmethod.
5. Determinationof Hematocrit (Wintrobemethod).
6. Preparation and examination of stained blood smear (Wedge or glass slide method).
7. DeterminationofErythrocyteSedimentationRate(Wintrobemethod).
8. Determinationofblood group.
9. Determination of bleeding time (Duke method) and coagulation time(Capillary tube method).
10. Plateletcount(ReesEckermethodby hemocytometry).
11. Clinicalexaminationofradialpulse(pulse rate).
12. Measurementofbloodpressure(Sphygmomanometry).
13. Effectofexerciseonbloodpressureandheartrate.
14. Microscopicstructureofheart,digestivesystemand kidney.
15. Microscopicstructureofreproductiveorgans-ovary,uterus, mammary glands and testis.
16. Microscopicstructureofendocrineglands-thyroid,pituitaryand adrenal.

**Reference:** G.K.Pal and Pravati pal, Text book of practical physiology, Orient Longman Ltd. 2001.

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| **SEMESTERII** | |
| **Core/MajorCourseI** | **FoodScience** |
| **PaperCode:** | **Theory:6hrs/week** |

## **CourseLearningOutcomes:**

1. Summarize and critically discuss and understand both fundamental and applied aspects of FoodScience.
2. Identifying nutrient specific force and apply the principles from the various factors of foods and related disciplines to solve practical as well as real world problems.
3. Understand the food groups and their functions, acquire knowledgeon different methods of cooking and apply process of different foods.
4. Use combination of foods in the development of food products. 5. Identify and control adulterants in various foods and evaluate food quality.
5. Use current information Technologies to locate and apply evidence- based guidelines and protocol and get imported with critical thinking to take leadership roles in the field of health, diet and special nutritional needs.

## **CourseContent**

**Unit-I**

Food: Definition, functional classification, groups (4, 5,7 and 11), food pyramid.

Cooking: Definition and objectives; Methods- Moist heat methods, dry heat methods, combination of both and micro wave cooking; Effect of cooking on nutrients.

Beverages: Classification; Coffee beverage- Constituents and methodof preparation; Tea-Types, preparation; Cocoa- Composition, nutritive value and preparation of cocoa beverage; Fruit beverages- Types; Introduction to vegetable juices, milk based beverages, malted beverages, carbonated non alcoholic beverages and alcoholic beverages.

**Unit-II**

Cerealsandmillets: Structure,compositionandnutritivevalueofrice, wheat and oats; Nutritive value of maize, jowar, ragi and bajra. Cereal cookery:Effectofmoistheat-Hydrolysis,Gelatinisationand factorsaffecting gelatinization,gelformation,retrogradationandsyneresis;Effectofdryheat; Role of cereals in cookery.

Pulses: Composition, nutritive value, toxic constituents; Pulsecookery- Effect of cooking, factors affecting cooking quality, role of pulses in cookery, germination and its advantages.

**Unit-III**

Milk and milk products: Composition and nutritive value of milk; Milk cookery- Effect of heat, effect of acid and effect of enzymes; Milk products- Non fermented and fermented products (does not include preparation); Role of milk in cookery.

Egg: Structure, composition, nutritive value; Egg cookery- Effect of heat, factors affecting coagulation of egg proteins and effect of other ingredients on egg protein; Role of egg in cookery; Home scale method for detecting egg quality.

Meat: Classification, composition, nutritive value, rigor mortis, ageing and tenderizing; Meat cookery- Changes during cooking.

Poultry:Classification,compositionandnutritivevalue.

Fish: Classification, composition, nutritive value, selection and principles of fish cookery.

**Unit-IV**

Vegetables: Classification (nutritional), composition, nutritive value; Pigments in vegetables- Water soluble and water insoluble; Enzymes, flavor compounds and bitter compounds; Vegetable cookery- Preliminary preparation, changes during cooking, loss of nutrients during cooking, effect of cooking on pigments, role of vegetables in cookery.

Fruits: Classification, composition, nutritive value, ripening of fruits; Browning- Types and preventive measures.

Spices: General functions, role in cookery; Medicinal value of commonly used spices.

**Unit-V**

Fats and oils: Composition and nutritive value, basic knowledge about commonly used fats and oils (lard, butter, margarine, cotton seed oil,ground nut oil, coconut oil, soya bean oil, olive oil, rice bran oil, sesame oil, rape seed oil, mustard oil and palm oil); Spoilage of fat- Types and prevention; Effect of heating, role of fats and oils in cookery.

Sugar and related products: Nutritive value, characteristics and uses of various types of sugars; Sugar cookery- Crystallization and factors affecting crystallization; Stages of sugar cookery; Role of sugar in cookery.

## **Reference**

* 1. Maney S (2008). Foods, Facts and Principles, 3 rd Edition Publishedby Wiley Eastern, New Delhi.
  2. Usha Chandrasekhar (2002) Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., NewDelhi.
  3. Raina U, Kashyap S, Narula V, Thomas S Suvira, VirS, Chopra S (2010) Basic Food Preparation: A CompleteManual, 4th Edition, Orient Black Swan Ltd, Mumbai.
  4. Srilakshmi, B. (2017) Nutrition Science, New Age International (P) Ltd., New Delhi,.
  5. Mahtab, S. Bamji, Kamala Krishnasamy, Brahmam G.N.V (2012) Text Book of Human Nutrition, Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi.
  6. SunetraRoday (2017). Food Science and Nutrition, Oxford University Press, New Delhi.

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| **SEMESTERII** | |
| **Core/MajorPracticalI** | **FoodScience** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1. Demonstrateskillsondeterminationofedibleportion,effectofcooking on volume and weight.
2. Chooseappropriatecookingmethodtoconservenutrients.
3. Acquire skills on different methods of cooking. Understand experimental cookery.
4. Developrecipesbyapplyingknowledgeoncookingmethodsand properties of food

## **CourseContent**

1. GroupingoffoodsaccordingtoICMRclassification.
2. Measurementoffoodmaterialsusingstandardmeasuringcups, spoons and weighing.
3. Findthepercentageofedibleportionof foods.
4. Observethemicroscopicstructureofdifferentstarchesbeforeand after gelatinization (rice, wheat and corn).
5. Studytheeffectoftemperature,timeofheating,concentration,addition of sugar and acid on gelatinization of starch.
6. Preparerecipesusingthefollowingprocesses-Gelatinization,gluten formation and gel formation.
7. Demonstratethebestmethodofcooking rice.
8. Demonstratetheeffectofsoaking,hardwater,sodiumbicarbonate and papaya on cooking quality of pulses.
9. Prepare recipes using whole gram, dhal, pulse flours, sprouted pulses and cereal pulse combination.
10. Demonstratethefactorsaffectingcoagulationofmilkprotein.
11. Preparerecipesusingmilkandits products.
12. Demonstrate the formation of ferrous sulphide in boiling egg and itspreventive measures.
13. Demonstratetheeffectofadditionofacid,fat,salt,waterandsugar on the texture of omelettes.
14. Prepare recipes where egg acts as – thickening agent, binding agent,emulsifying agent and enriching agent.
15. Demonstrate the effect of acid, alkali and over cooking on vegetablescontaining different pigments.
16. Demonstratetheeffectsofdifferentamountsofwateraddedto vegetables during cooking on flavor and appearance.
17. Demonstrateenzymaticbrowninginvegetablesandfruitsandany four methods of preventing it.
18. Prepare the following using fruits and vegetables- salads, soups andcurries.
19. Determinethesmokingpointofany4cooking oils.
20. Preparerecipesusingshallowfatanddeepfatfryingmethods.
21. Demonstratethe stages of sugar cookery
22. Preparerecipesusingvariousstagesofsugarcookery andjaggery.
23. Preparation of any one beverage under the following types- refreshing, nourishing, stimulating, soothing and appetizing.

## **Reference**

* 1. Srilakshmi. B. Food Science, New Age International (P) Ltd. Publishers, Sixth edition. 2016.
  2. Khanna K, Gupta S, Seth R, Mahna R, Rekhi T (2004). The Art and Science of Cooking: A Practical Manual, Revised Edition. Elite Publishing House Pvt Ltd.
  3. Raina U, Kashyap S, Narula V, Thomas S, Suvira, Vir S, Chopra S (2010). Basic Food Preparation: A Complete Manual, Fourth Edition. Orient Black Swan Ltd.
  4. Bamji MS, Krishnaswamy K, Brahmam GNV (2009). Textbook of Human Nutrition, 3rd edition. Oxford and IBH Publishing Co. Pvt. Ltd.

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| **SEMESTERIII** | |
| **Core/MajorCourse III** | **NutritionalBiochemistry** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. ToacquireknowledgerelatedtotheroleofTCAcycleincentralcarbon metabolism.
2. Tounderstandtheimportanceoflipidasstoragemoleculesandas structural component of bio membranes.
3. Capableofdescribingbiochemicalpathwaysrelevantinnutrient metabolism.
4. Tounderstandtheconceptsofpreparationofbuffers
5. To acquire fundamental knowledge on enzymes and their importance in biological reactions.

## **CourseContent**

**Unit-I**

Fundamentals of Biochemistry, Biological Membranes and Transport. Carbohydrates- Definition, classification.Structure (linear) of Monosaccharides- Glucose, fructose and galactose; Disaccharides- Maltose, lactose and sucrose; Polysaccharides- Starch and glycogen. Definition of Glycolysis, glycogenesis,glycogenolysis and gluconeogenesis. Metabolism- Glycolytic pathway, oxidation of pyruvic acid, Citric Acid Cycle. Pentose Phosphate Pathway

**Unit-II**

Lipids- Definition, classification and properties. Metabolism- Beta - Oxidation and biosynthesis of fatty acids. Cholestrol metabolism. Definitions- Ketone bodies, ketogenesis and ketosis.

**Unit-III**

Protein- Definition, classification, structure, physical properties, chemical properties and utilization. Amino acids- Types, Definition - deamination, transamination and decarboxylation. Urea production Enzymes and co- enzymes- Definition, types, classification and factors affecting velocity of enzyme catalyzed reactions.

**Unit-IV**

Introduction to genetic control of metabolism- Nucleic acids-Types, composition,structure, functions, replication. Elementary knowledge of biosynthesis of protein Electron transport chain and oxidative phosphorylation. Bioenergetics.

**Unit-V**

Acid – base balance: Acid-base balance in normal health, definition of buffers, principles of buffers, major sources of acid produced in the body, physiological buffer system and role of different buffer systems. Fluid and electrolyte balance- Maintenance in normal health.

## **Reference**

1. 1.Pattabiraman.T.N.ConciseTextBookofBio-chemistry,2ndedition, All India Publishers and Distributors , 1998.
2. Deb.A.C.,FundamentalofBiochemistry,NewCentruyBookAgency

(P)Ltd,Reprint2004.

1. AmbikaShanmugam,FundamentalsofbiochemistryforMedicalstudents,
2. KarthikPprinters,7thedition,1992.
3. U.SathyanarayanaandU.Chakrabani,Biochemistry,ThirdEdition, Uppala- Author Publishers, 2007.
4. Mahtab. S.Bamji, Kamala Krishnaswamy and G.N.V Brahmam, Text Bookof Human Nutrition, Oxford and IBH Publishing Company, Third Edition.2009
5. Ramadevi K, Ed: Ambika Shanmugam’s Fundamentals ofbiochemistryformedicalstudents,8thedition,WoltersKluwerHealth, India, 2016.
6. RodwellV,BenderD,BothamKM,KennellyPJ,WeilPA,Harper’s

IllustratedBiochemistry,30thEdition,McGrawhillEducation,2015.

1. SulochanaH,PrinciplesofBiochemistry,PBSenterprises,Chennai, 2010.
2. CoxMMandNelsonDL,LehningerPrinciplesofbiochemistry,5thedition, EH Freman&Company, New york, 2008
3. VasudevanDM,SreekumariS,TextbookofBiochemistry,5thedition, Jaypee Publishers, New Delhi, 2007
4. VeerakumariL,Biochemistry,1stedition,MJPPublishers, 2005
5. Murray RK, Granner DK, Mayes PA, Rodwell VW, Harper’s IllustratedBiochemistry,26th edition, Mcgraw hill publishing house,.,2003

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| **SEMESTERIII** | |
| **Core/MajorPracticalIII** | **NutritionalBiochemistry** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1. To learn qualitative and quantitative analysis of biological fluidssuch as urine, blood and their estimation using standard methods.

## **CourseContent**

1. Qualitative analysis of carbohydrate-glucose, fructose, lactose,sucrose and maltose.
2. Qualitativeanalysisofaminoacids-histidine,methionine,tryptophan tyrosine, arginine and cysteine
3. Determinationofurinaryphosphorusandurea.
4. Estimationofbloodcholesterol,ironandglucose.

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| **SEMESTERIII** | |
| **SBECI** | **Foodpreservation and**  **Processing** |
| **PaperCode:** | **Theory:2hrs/week** |

## **CourseLearningOutcomes:**

1. Describetheprinciplesoffood preservation
2. Suggesttheapplicationofthepreservationprocessdependingonthe type of food.
3. To understand theprinciples of processing plant foods and to studythe need for processing foods.
4. Choosetheappropriateapplicationofcertainconservationprocesses with regard to the preservation of quality and the satisfactory durability of food products.
5. 0ptimize process parameters for selected conservation processes takingintoaccountthephysico-chemicalpropertiesoffoodproducts.

## **CourseContent Unit I**

Introduction of food preservation - Definition and scope of food preservation, Principles of preservation, Food Preservation by high temperature - Sterilization Pasteurization Blanching and Canning.

**Unit II**

Food preservation by drying and dehydration: Definition, drying as a means of preservation, Differences between sun drying and types of driers used in the food industry. Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry.

**Unit III**

Food Preservation by Low temperature - Introduction to refrigeration, cool storage and freezing- Definition, Principle of freezing, changes occurring during freezing, Types of freezing.

PreservativesanditstypesandShelflifeoffood products.

**Unit IV**

Food Processing- Definition, Importance, Scope of food processing industry. Classificationofplantfoodprocessing-Fruitandvegetableprocessing,Cereal and legume processing and Oil seeds processing.

**Unit V**

Classification of animal food processing - Milk processing, Meat processing, Fish processing, Poultry processing.

IntroductiontoFoodPackaging-Objectivesandfunctionsoffoodpackaging,

* TypesofpackagingMaterials (briefly).

## **Reference**

* 1. Potter NN (2013) Food science. 2. Brennan JG and Grandison AS (2012) Food processing handbook. 2nd Edition, John Wiley.
  2. ManoranjanKalia(2014)Food Quality Management Second Edition, Aggrotech Publishing Academy, Udaipur.
  3. Walter A. Mercer, (1988) Advances in Food Research First Edition, Academic Press, University of California, U.S.A. 3. Potter N (1995) Food Technology, 5th Edition, Cornell University, Ithaca, New York.
  4. Coles R, McDowell D and Kirwan MJ, Food Packaging Technology, CRC Press, 2003
  5. FrazierWCandWesthoffDC,FoodMicrobiology,TMHPublication, New Delhi, 2004.
  6. MeyerLH,FoodChemistry,CBSPublication,NewDelhi,19878. Potter NH, Food Science, CBS Publication, New Delhi,
  7. Ranganna S, Handbook of Analysis and Quality Control for Fruits and Vegetable, Products, 2 nd ed.

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| **SEMESTERIV** | |
| **Core/MajorCourseIV** | **PrincipleofHumanNutrition** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. Summarize and critically discuss and understand both fundamental and applied aspects of nutrition.
2. Abletoexplainfunctionsofspecificnutrientsinmaintaininghealth
3. Identifyingnutrientspecificforceandapplytheprinciplesfromthe various factors of foods.
4. Gaininbasicknowledgeofthedifferentnutrientsandtheirrolein maintaining health of the community
5. Developskillsinqualitativeanalysisandquantitativeestimationof nutrients.

## **CourseContent**

**Unit-I**

Science of Nutrition, Concept of Nutrition- Definition of nutrition, health, nutritional status and malnutrition. RDA- Definition, factors affecting RDA and methods used for deriving RDA.

Carbohydrates- Definition ,composition, functions, maintenance of blood sugar levels, requirement, sources, digestion and absorption; Dietary fiber- Definition, classification, physiological effects and sources.

**Unit-II**

Proteins- Definition, composition, nutritional classification of proteins and amino acids, functions, sources, requirements, digestion and absorption. Evaluation of protein quality:PER, BV, NPU and Chemical score.

Lipids- Definition, composition, functions, sources, requirements, digestion and absorption. Essential fatty acids – Definition, functions, sources and effects of deficiency.

**Unit-III**

Energy- Definition, units of measurement, direct and indirect calorimetry; Determination of energy value of food, Total Energy requirement, Factors affecting physical activity, Factors affecting Basal Metabolic Rate, factors affecting Thermic effect of food, Recommended Dietary Allowances and Sources

**Unit-IV**

Macro Minerals- Calcium and Phosphorous: Functions, requirements, sources and effects of deficiency. Micro minerals- Iron, Iodine, Copper, Fluorine and Zinc: Functions, sources, requirements and effects of deficiency. Sodium and Potassium : Functions, sources, requirements and effects of imbalances.

**Unit-V**

Fat soluble Vitamins – Vitamin A, D, E and K: Functions, requirements, sources and effects of deficiency. Water Soluble Vitamins – Thiamine, riboflavin, niacin, ascorbic acid, folic acid, vitamin B6 and vitamin B12: Functions, requirements, sources and effects of deficiency.

## **Reference**

1. Sumathi R. Mudambi, Rajagopal, M.V., Fundametals of Foods and Nutrition, New Age International (P) Ltd, Publishers, Third edition, 1997.
2. SrilakshmiB.,Nutrition Science, New Age International (P) Ltd, Publishers, Fifth ,multi colour edition,2016.
3. Mangala Kango, Normal Nutrition, Curing diseases through diet, CBS Publications, First edition, 2005.
4. Sue Rodwell Williams, Nutrition and Diet Therapy, C.V. Melskey Co., 6thedition, 2000.
5. Mahtab. S.Bamji, Kamala Krishnaswamy and G.N.V Brahmam, Text BookofHumanNutrition,OxfordandIBHPublishingCompany,Third Edition.2009.

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| **SEMESTERIV** | |
| **Core/MajorPracticalIV** | **FoodAnalysisandQuality**  **Control** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1. To understand different sampling techniques employed in chemical analysis of foods
2. To understanding on the quality attributes, their measurement principle and instrumentation of various instruments used in food quality analysis.
3. To learn about the importance of various methods to identify any adulteration aspect of food.

## **CourseContent**

1. Determinationofmoisture,ash andfiberin food.
2. Estimationofcalcium,phosphorous,ironandascorbicacidinfood.
3. Estimationoftotalnitrogeninfood.
4. Estimationoftitrableacidity,pectincontentoffoodsand lactose.
5. Estimationofspecificgravityofmilkusinglactometer.
6. Determinationofgluten content.
7. Determination of sugar concentration of food products using refractometer.
8. Sensitivitytestsforfourbasictastes.
9. Isolation of microorganisms by Pure Culture Technique and Microbial count by Standard Plate Count Method.

10.Morphologyandstructuralfeaturesofvariousbacteriaandfungi commonly associated with Foods.

11.Testsforidentificationofadulterantspresentincommonlyused foods.

## **Reference**

Ranganna S. 2001. Handbook of Analysis and Quality Control for Fruit and Vegetable Products. 2nd Ed. Tata-McGraw-Hill. Govt. of India.

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| **SEMESTERIV** | |
| **SBECII** | **FoodStandardandQuality**  **Control** |
| **PaperCode:** | **Theory:2hrs/week** |

## **CourseLearningOutcomes:**

1. Toprovideanopportunitytolearnfoodqualitystandards.
2. To develop the skills on the standardization of food products with respect to quality maintain according to universal food standards worldwide.
3. Tounderstandtheprinciplesofsensoryevaluation
4. To develop skills to carry out sensory evaluation of a newly developed product
5. Tounderstandthetermsfoodadulterationandadulterant.

## **CourseContent**

**Unit I**

Standardization of Foods; Definition, Standards of Quality, for cereals, starchy foods, spices and condiments, sweetening agents, meat and meat products, vinegar, sugar and confectionary, beverages-alcoholic and non alcoholic , carbonated water etc., Milk and milk products , oils and fats , Canned foods , fruits and vegetables products.

**Unit II**

Food laws and regulation: Mandatory and voluntary food laws,International quality systems and standards like ISO and Food Codex, BRC; International trades & federal agencies, Indian act-Food Safety and Standards Act, 2006.

**Unit III**

Various food acts- PFA, FPO, AGMARK, MMPO, MFPO, edible oil acts, standard weight acts. HACCP AND WTO (briefly).

**Unit IV**

Concept of quality: quality attributes: physical, chemical, nutritional and microbial evaluation and measurement. Sensory evaluation- Types of sensory evaluation.

**Unit V**

Microbialqualitycontrol-determinationofmicroorganismsinfoodsby cultural, microscopic, physical, chemical methods. Food adulteration- Definition, types of adulteration and toxic constitutes.

## **Reference**

1. Siddappaa,G.S.,GirdhariLalandTandon,G.L.1998.Preservationof Fruits and Vegetables. ICAR, New Delhi
2. Sivasankar,B.2002.FoodProcessingandPreservation.PHILearning Pvt. Ltd. Delhi
3. Srilakshmi.2010.FoodScience.NewageInternational978-81-224-

2724-0.

1. Srivastava,R.P.&SanjeevKumar.2002.Fruitsandvegetable Preservation – Principles and Practice. International Book DistributingCo., Lucknow.
2. Swaminathan,M.1988.HandbookofFoodScience&Experimental Foods. Bappco publishers, Bangalore
3. U.D.ChavanandJ.V.Patil.2013.IndustrialProcessingoffruitsand vegetables. Astral International Pvt Ltd. New Delhi.
4. Vijay,K.2001.TextBookofFoodSciencesandTechnology.ICAR, New Delhi.

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| **SEMESTERV** | |
| **Core/MajorCourseV** | **NutritioninLifeCycle** |
| **PaperCode:** | **Theory:5hrs/week** |

## **CourseLearningOutcomes:**

1. To apply knowledgeof the science of nutrition to human health across the lifespan.
2. Relate foods and nutrients to the biological requirements of humansat different stages of the life cycle.
3. Explain,compareandcontrastthenutritionalrequirementsof humans during different stages of the life cycle.
4. Apply collaboration and team work skills through shared learning in nutritional disease topics.
5. To formulate a dietary intervention plan to address nutritional deficiencies or excesses according to the health needs of individuals relative to age, developmental and disease status.

**Unit-I**

Menuplanning–Objectives,planningbalanceddiets,foodexchangelists.

Nutrition in pregnancy – Food and nutrient requirements, physiological changes during pregnancy, developmental stages of the embryo, physiological cost of pregnancy and complications in pregnancy.

Nutrition in lactation – Food and nutrient requirements, physiology of lactation, composition of breast milk, influence of mother’s diet on the quality and quantity of milk production.

**Unit-II**

Nutrition during infancy – Growth and development during infancy, food and nutrient requirements, advantages of breast feeding, artificial feeding, preterm baby –nutritional requirements, weaning- types of weaning foods and supplementary foods, problems in weaning.

**Unit III**

Nutrition during preschool age – Food and nutrient requirements, eating habits and behaviour, growth and development and factors inhibiting growth.

Nutrition for school going children – Food and nutrient requirement, growth pattern, packed lunches, school lunch programmes.

**Unit IV**

Nutrition during adolescence – Food and nutrient requirements, changes in growth pattern, puberty, menarche, changes in food habits, binge eating disorder, predisposition to osteoporosis, anaemia, under nutrition, premenstrual syndrome, malnutrition due to early marriage, nutritional programmes.

**Unit V**

Nutrition in adulthood – Food and nutrient requirements, changes in consumption pattern - physical, mental and social changes influencing meal pattern.

Nutrition in old age – Food and nutrient requirements, physical, physiological,biologicalandpsychologicalchangesinfluencingmealpattern.

## **Reference**

1. Wardlaw G.M, Hampi J.S, DiSilvestro R.A, Perspectives in Nutrition, 6thedition, McGraw Hill, 2004.
2. Chadha R and Mathur P, Nutrition: A Lifecycle Approach. Orient BlackswanNew Delhi, 2015.
3. Seth V and Singh K, Diet Planning through the Life Cycle: Part 1 Normal Nutrition. A Practical Manual. Elite Publishing House Pvt. Ltd. New Delhi,2006.
4. Robinson,Normalandtherapeuticnutrition.:MacmillanPub. Company New York , 2006.
5. Sumati R. Mudambi,M.V. Rajagopal., Fundamental of food, nutrition and diet therapy. New age international publishers, New Delhi, 2015.
6. Srilakshmi B., Dietetics, New age international publishers, New Delhi, 2014.

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| **SEMESTERV** | |
| **Core/MajorCourseVI** | **AdvancedDietetics** |
| **PaperCode:** | **Theory:5hrs/week** |

## **CourseLearningOutcomes:**

1. Integrate knowledge of research principles and methods associated with nutrition and dietetics practice.
2. Use effective and appropriate communication skills in providing information, advice and professional opinion to individuals, groups and communities.
3. Collect,organizeandassessdatarelatingtothehealthandnutritional status of individuals, groups and populations.
4. Demonstrate initiative and judgment using a professional, ethical and entrepreneurial approach advocating for excellence in nutrition and dietetics.
5. Independently plan and execute a research project in regard to nutrition and dietetics practice.

## **CourseContent**

**Unit-I**

Concepts in diet therapy - Growth and Scope of Dietetics, Purposes and Principles of Therapeutic Diets, Modifications of Normal Diets, Classification of the Therapeutic Diets.

**Unit-II**

Diet Therapy in Obesity, Underweight and Diabetes Mellitus Etiology, Pathophysiology, Clinical symptoms, metabolic alterations, Assessment/Indicators, Lifestyle & Dietary guidelines for the following conditions- Obesity (Bariatric Surgery: types, Management), Underweigh, Diabetes Mellitus (Acute and Chronic Complications of Diabetes Diet Modifications, Use of Food Exchange Lists, Insulin-Types and Use, Oral Hypoglycemic Agents, Carbohydrate counting, Glycemic Index, Glycemic Load).

**Unit-III**

Diet Therapy in Gastrointestinal Disorders and Diseases of the liverEtiology, Pathophysiology, Clinical Symptoms, Assessment/Indicators, Lifestyle & Dietary guidelines for the following conditions- Diarrhea, Dysentery, Constipation, Peptic Ulcer, Jaundice, Hepatitis, Fatty Liver, Cirrhosis.

**Unit IV**

Diet Therapy in Diseases of the Cardio Vascular System and KidneyDiseases Etiology, Pathophysiology, Clinical Symptoms, Lifestyle & Dietary guidelines for the following conditions- Atherosclerosis, Hyperlipidemia, Hypertension, Nephrotic Syndrome, Nephrolithiasis, Acute and Chronic Renal Failure, Dialysis and Kidney Stones.

**Unit-V**

Diet Therapy for Fever -Acute and chronic infectious disease-Typhoid, Tuberculosis And HIV and AIDS a. Guidelines for management of tuberculosis and infectious diseases. Cancer- Etiology, Metabolicalterations, Types of Cancer, Dietary Recommendation for Cancer Survivors. Nutritional therapy for Cancer.

## **Reference**

* 1. Srilakshmi, B. Dietetics ,New Age International P. Ltd., New Delhi, 2018.
  2. Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2015
  3. Garg, M. Diet, Nutrition and Health, ABD Publishers, 2006. • Krause, M.V. and Mahan, L.K. Food, Nutrition and DietTherapy, 9th Ed., W.B. Saunders Company, Philadelphia, 2019.
  4. Maimun Nisha, Diet Planning for Diseases, Kalpaz Publishers, 2016. • Dietary Guidelines of Indians – A Manual, National Institute of Nutrition, Hyderabad, 2011.
  5. Brown, J (2014).Nutrition now (7thed). Wadsworth, USA, ISBN- 13:978-1-133-93653-4,ISBN10:1-133-93653-9•NelmsM,

Sucher K (2015). Nutrition Therapy and Pathophysiology. (3rd edition) Cengage Learning, USA. ISBN-13: 978-1305111967, ISBN-10: 130511196

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| **SEMESTERV** | |
| **Core/MajorPracticalV** | **NutritioninLifeCycle** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1.Nutrition in life cycle focuses on food management through proper planning,preparation,monitoring,implementationandsupervision of different age groups and to develop basic counseling skills as dietitian.

## **CourseContent**

1. Display raw and cooked food materials according to exchange lists given below. Record their nutritive value. Milk exchange list, Meat exchange list, Pulse exchange list, Cereal exchange list, Vegetable-A exchange list, Vegetable-B exchange list, Fruit exchange list and Fat exchange list.
2. Prepare and display one serving of common cooked foods given below. Record their weight and nutritive value. Cereal preparations, pulse preparations, vegetable preparations, fried snacks, non vegetarian preparations, bakery products, chutneys and sweets.
3. Planning, preparing and serving a meal for low income family, middle income family and high income family.
4. Planning, preparing and serving a meal for a pregnant woman in first second and third trimesters.
5. Planning, preparing and serving a meal for a lactating woman (0-6 months and 6-12 months).
6. (a).Planning,preparingandservingamealforan infant.

(b).Planningandpreparinganindigenousweaningmixes.

1. Planning,preparingandservingamealfora preschooler.
2. Planning,preparingandservingamealforaschoolgoingchild (a boy and agirl).
3. (a).Planning,preparingandservingamealforan adolescent.

(b).Planningandpreparationofanyfivepackedlunches.

1. Planning,preparingandservingamealforanadult (sedentary, moderate and heavy worker).
2. Planning,preparingandservingamealforanoldage person.

## **Reference**

* 1. Srilakshmi,B.Dietetics,NewAgeInternationalP.Ltd.,NewDelhi, 2018.
  2. Dietary Guidelines of Indians – A Manual, National Institute ofNutrition, Hyderabad, 2015.
  3. Dietary Guidelines of Indians – A Manual, National Institute ofNutrition, Hyderabad, 2011

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| **SEMESTERV** | |
| **ElectiveCourseI** | **PublicHealthNutrition** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. Finally, the concepts and knowledge required for the delivery of community nutrition services will be applied to program planning, intervention and program evaluation.
2. Gaining knowledge on nutritional programmes and policies overcoming malnutrition.
3. Understanding the national, international and voluntary nutritional organizations to combat malnutrition.
4. Able to organize community nutrition education programmewith the application of computers.
5. Apply immunological intervention programmes to overcome epidemic of communicable diseases.

## **CourseContent**

**Unit-I**

Introduction to public health nutrition a National development- Meaning and Scope of Public Health Nutrition,Roles and responsibilities of public health nutritionists, Definitions of optimum health, malnutrition (under nutrition, overweight, obesity, micronutrient deficiency ), nutritional status, nutritionintervention,foodandnutrient supplements,,nutritioneducation, morbidity, mortality rates.

Malnutrition - Ecology Consequences and of Malnutrition,Strategies To Overcome Malnutrition. Relation of nutrition to national development, Nutrition and food security.

**Unit-II**

Nutritional assessment Introduction, Definition of Nutritional Status, Instruments, Standard of Reference, Age Assessment, Measurement Techniques, Weight, Linear Measurement/Height, Circumferences, Soft Tissue Subcutaneous Fat, Objective and Classification of nutritional assessment Methods Overview of nutritional status assessment methods: Direct Nutritional Assessment parameters -Anthropometry, clinical signs and symptoms, dietary assessment and biochemical parameters. Indirect Nutritional Assessment parameters- a)Vital Statistics: Age Specific Mortality Rate, Morbidity and Cause of Specific Mortality, b) Ecological variables including crop production and c)Economic factors i.e. per capita income, population density & social habits

**Unit-III**

Social & behavior change communication Concepts, components and process of communication for nutrition health promotion • Definitions of Formal – non-formal communication, Participatory communication • Components of BCC(Sender, Message, Channel, Receiver) • Various types of communication – interpersonal, mass media, visual, verbal/ non-verbal. • need of SBCC in India. • Training workers in nutrition education programmes • Methods of education when to teach, whom to teach.

**Unit–IV**

National, international and voluntary organizations to combat malnutrition Role of Nutrition in Achieving Global Targets • Optimal Infant and Young Child Feeding: Significance of the first 1000 days of life • Improving maternal, infant and young child nutrition – WHO Global Targets 2025 • Nutrition Intervention programmes in India –ICDS , Mid-Day Meal (MDM) program. Fortification program National Programs to Combat Micronutrient Malnutrition: NIPI, VAPP and NIDDCP.

National and international agencies in combating malnutrition: International- WHO, FAO, UNICEF- Aim and functions. National- ICAR, ICMR, NIN, NFI, FNB, CFTRI, NNMB, NSI, DFRL- Aim and functions.

**Unit-V**

Epidemiology of communicable diseases • Definition, causes, signs and symptoms,treatmentandpreventionofcommunicablediseases,Respiratory infections and intestinal infections, • Other infections- dengue, Flu • Types of immunity- active, passive and herd-group protection • Immunization agents- vaccines, immunoglobulin • Immunization schedules - National and WHO Expanded Programme on ImmunizationUniversal Passive, Combined, Chemoprophylaxis, non-specific measures.

## **Reference**

1. ParkA.(2007),Park’sTextbookofPreventiveandSocialMedicineXIX Edition M/S Banarasidas, Bharat Publishers, 1167, Prem Nagar, Jabalpur, 428 001(India)
2. Bamji M.S, Prahlad Rao N, Reddy V (2004). Textbook of Human NutritionIIEdition,OxfordandPBHPublishingCo.Pvt.Ltd,New Delhi
3. BhattD.P(2008),HealthEducation,KhelSahityaKendra,NewDelhi• Gibney MJ, Margetts BM, Kearney JM, Arab L (2004) Public Health Nutrition Blackwell Publishing Co. UK
4. Swaminathan M (2007), Essentials of Food and Nutrition. An AdvancedTextbookVol.I,TheBangalorePrintingandPublishingCo. Ltd, Bangalore
5. UNICEF.<https://www.unicef.org/>
6. [WHO.http://www.who.int/](http://www.who.int/)
7. NationalGuidelinesonInfantandYoungChildFeeding. wcd.nic.in
8. WHONon-communicablediseasesandriskfactors. <http://www.who.int/ncds/en/>
9. NationalNutrition Mission –ICDS. icds-wcd.nic.in •Ministry of Health

&FamilyWelfare,[www.mohfw.nic.in](http://www.mohfw.nic.in/)

1. Fieldguidetodesigningcommunicationstrategy,WHOpublication- 2007
2. CommunicationforDevelopment(C4D)CapabilityDevelopment Framework, UNICEF and 3D Change, 2009

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| **SEMESTERV** | |
| **ElectiveCourseII** | **BasicinReaserch**  **Methodology** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. Basicknowledgeontheroleandimportanceofresearchinscience.
2. Criticallyanalyseresearchmethodologiesidentifiedinexisting literature.
3. Understanding the complex issues inherent in selecting a research problem,selectinganappropriateresearchdesign,andimplementinga research project.
4. Developaresearchproposalorindustryprojectplan.
5. Searchfor,selectandcriticallyanalyseresearcharticlesand paper

## **CourseContent**

**Unit I**

Research-Meaning,Definition,Characteristics,Objectives,Motivation Importance and types. Research Methods and Research Methodology, Criteria of a good research.

**Unit II**

Literaturereview-Definition,PurposeandImportance.

ResearchDesign-Definition,Essential,Element,CharacteristicsandTypes.

**Unit III**

Sample Design- Definition and Types. DataCollection-DefinitionandTypes. **Unit IV**

ProcessingofData-Editing,Coding,Classificationand Tabulation.

Analysisi of Data(Theory)- A)Measures of central tendency-Mode, Median andMean.B)Measuresofdispersion-Range,MeanDeviationandStandard Deviation.

**Unit V**

LayoutoftheResearchReport-PreliminaryPage,MainTextandEnd Matter.

Types of Reports - Technical and Popular OralPresentation-StructureofPresentation.

SampleResearchProposalinScience-Introduction,ProblemStatement, Objectives, Preliminary Literature Review, Methodology and Reference.

## **Reference**

* 1. Kothari, C.R., (2004), Research Methodology, Methods and Techniques, Second Revised Edition, New Age International Publishers, New Delhi.
  2. Ranjit Kumar, (2011), Research Methodology: a step-by-step Guide for Beginners, Third Edition, SAGE Publications, New Delhi.
  3. Beverley Moriarty, (2018), Research Skills for Teachers – From Research Question to Research Design, Allen & Unwin Publishers, Australia.
  4. Rajendra Kumar, C. (2008), Research Methodology, APH Publishing Corporation, New Delhi.
  5. PagadalaSuganda Devi (2017), Research Methodology: A Handbookfor Beginners, Notion Press, Chennai.
  6. Vijayalakshmi Ponnuraj and Sivaprakasam, C. (2008), Research Methods: Tips and Techniques, MJP Publishers.

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| **SEMESTERV** | |
| **SBECIII** | **BakeryScience** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1. Resizerecipestomeetproductionneedsandequipment capacities.
2. Scale,mix,mold,proofandbakeyeastraised goods.
3. Prepare cookies using various common dividing and panning techniques.
4. Prepareproductfinishessuchaswashes,glazes,icingsand fillings.
5. Todevelopskillsforsettingupabakeryunit.Andtoenhance entrepreneurial skills in bakery and confectionery.

## **CourseContent**

**Unit-I**

Baking: Meaning, process and scientific principles involved. Basic plan and layout of a bakery unit.

Equipments used in bakery: Large equipments, small equipments and tools; types of ovens.

Ingredients used in bakery: Functional classification of ingredients- structure builders, tenderizers, moisteners, driers and flavors.

**Unit-II**

Flour:Composition,typesandquality characteristics.

Sugar:Sources,usesandtypesofcommerciallyavailablesugars.

Fats:Fatsusedasshortenings-Butter,margarineemulsifiedfatsand flavored oils; properties and uses of shortenings.

**Unit-III**

Leavening agents: Definition and classification- physical; chemical-baking powder and its types, baking soda; biological- yeast- types and role in baking.

Moisturizingagents:Egg,waterandmilk-theirroleinbaking.

**Unit-IV**

Bread: Ingredients used, steps in bread making process, processing methods, characteristics of good bread (external and internal), faults in shape, texture, crust and flavor of bread.

Cakes: Ingredients, types, cake making methods, test for doneness, characteristics of good cake (external and internal), cake faults and remedies.

Icing:Meaning,types,ingredientsusedandpreparationguidelines.

**Unit-V**

Cookies:Characteristics,preparationmethodsandproblemsincookie making.

Biscuits: Steps involved in biscuit making. Pastries:Typesandmethodofpreparation.

## **Reference**

* 1. Neelam Khetarpaul, Raj Bala Grewal and Sudesh Jood, Bakery science and cereal technology, Daya publishing house. 2013.
  2. John Kingslee, A professional text to Bakery and Confectionary, New Age International (P) Limited. 2014.
  3. NIIR Board of consultants and engineers, The complete technology book on bakery products, second edition, National Institute of Industrial Research, Delhi. 2009.
  4. ManayShakunthala, N and Shadaksharaswamy M. Food Facts and Principles, New Age International (P) Ltd Publishers, Reprint 2005.
  5. Vijaya Khader**,** Text book of Food Science and Technology, Indian Council of Agricultural Research, New Delhi, 2001

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| **SEMESTERV** | |
| **SBECIVPracticalI** | **FoodPreservationandBakery** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1. Applymajorfoodpreservationtechniquesandexplainunderlying principles.
2. Designcommonbakeryandconfectioneryrecipes.

## **CourseContent**

1. PreparationofJam,JellyandMarmalade.
2. PreparationofFruitjuicesandSquashes.
3. PreparationofPickles.
4. PreparationofFruitpreserves–Tuityfruitywithpapaya,pethawith white pumpkin and murabha with ginger.
5. Preparationofvathalandvadagam.
6. Preparationbread,bun,cakes,biscuits,cookies,pastryandicing.
7. Preparationofsandwichesanddesserts.

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| **SEMESTERV&VI** | |
| **Core/MajorCourseVII** | **InstitutionalTraining** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

* 1. Explorecareeralternativespriortograduation.
  2. Integratetheoryand practice.
  3. Developworkhabitsandattitudesnecessaryforjob success.
  4. Developcommunication,interpersonalandothercriticalskillsinthe job interview process.
  5. Builda record of work experience.

## **CourseContent**

It is compulsory for all the students to complete the 2 given institutional training programs in a reputed institution for a period of 15 days each. At the end of the final year, each student has to submit a report of the training and undergo a viva voce examination. Marking system is as follows:

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| **Component** | **Marks** |
| InternalEvaluation(Reportwriting  partsandviva)\*\* | 40 |
| External Evaluation(Two Questions (20marks\*\*\*),TrainingReports(20  marks)and vivavoce (20 marks)) | 60 |
| **Total** | **100** |

\*\*Internalmarkswillbeawardedbythefacultyofthe department.

\*\*\*ExternalExaminerwillsetthe questions

**Aspectstobecoveredintheinstitutionaltrainingprograms**

1. **Dietary internship training**
   1. Assessingthenutritionalstatusanddiethistoryofpatients.
   2. Planningdietsheets,preparingandprovidingguidanceinthe production of therapeutic diet.
   3. Supervisingthepreparationofdiets.
   4. Supervisingthedeliveryoftraystothe patient.
   5. Gettingfeedbackfrompatientsregardingdiets.
   6. Understandingthelayoutofhospitaldietaryunit.
   7. Acquiringpracticalknowledgeindietcounseling.
   8. Undertaking2casestudiesathospital situation.
2. **Foodprocessingtraining**
   1. Studyingthetypeofprocessingtechniquesusedbythe industry.
   2. Gainingknowledgeonequipmentsusedin processing.
   3. Understandingthepackagingprocess.
   4. Obtainingexperienceinqualitycontroloperations.
   5. Studyingthewastedisposalmethods.
   6. Marketsurveyforthedemandfortheproductinthemarket.

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| **SEMESTERVI** | |
| **Core/MajorCourseVIII** | **FoodMicrobiology** |
| **PaperCode:** | **Theory:6hrs/week** |

## **CourseLearningOutcomes:**

1. Explain the interactions between microorganisms and the food environment, and factors influencing their growth and survival.
2. Explainthesignificanceandactivitiesofmicroorganismsin food.
3. Describe the characteristics of food borne, waterborne and spoilage microorganisms, and methods for their isolation, detection and identification.
4. Understandthe role of microorganisms in environment.
5. Applypreservationtechniquestoavoidfoodspoilage.

## **CourseContent**

**Unit-I**

Microorganisms important in food microbiology – Mold, Fungi, Algae, Bacteria and Virus – general characteristics. Contamination of foods – green plants and fruits, animals, sewage, soil, water, air during handling and processing. Spoilage – cause, classification, factors affecting kinds and numbers of microorganisms in food.

**Unit-II**

Spoilageofdifferentgroupsoffoods–cerealandcerealproducts,vegetables andfruits,meatsandmeatproducts,fishandothersea foods,eggs,poultry, milk and milk products and canned foods.

**Unit III**

Food preservation – Methods and principles of food preservation, delay of microbial decomposition, prevention of microbial decomposition, removal of micro organisms.

Preservation by use of high temperatures – Factors affecting heat resistance of microorganisms, commercial heat preservation methods –sterilization, canning, pasteurization, blanching.

Preservation by use of low temperatures – Growth of microorganisms at low temperatures, low temperatures storage – cellar, chilling and frozen.

**Unit IV**

Preservation by drying - Methods of drying, factors in control of drying, treatments of foods before after drying. Preservation by chemicals,

Preservation by Irradiation – Microware radiation, Ultraviolet radiationand ionizing radiation.

**Unit V**

Food borne Illness – Food hazards, significance of food borne disease, incidence of food borne illness, risk factors associated with food borne illness.

Bacterial agents of food borne illness – Clostridium botulinum, Escherichia coli, Salmonella, Shigella and Staphylococcus- The organism, pathogenesis and clinical features and association with foods.

## **Reference**

1. AdamsM.R.,MossM.O.,FoodMicrobiology,Newageinternational publishers, New Delhi, 2015.
2. William C Frazier., Dennis C Westhoff., Food Microbiology, McGraw Hill education private limited, New delhi, 2014.
3. Sivasankar., Food Processing and Preservation, PHI Learning private limited New delhi, 2015.
4. BranenA.L.andDavidson,P.M..AntimicrobialsinFoods.Marcel Dekker, New Delhi, 1983.
5. JayJ.M.,ModernFoodMicrobiology.3rdEdn.VNR,NewYork.utta. 1980 9th Edition, Prism Books Pvt. Ltd.,1986

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| **SEMESTERVI** | |
| **Core/MajorCourseIX** | **QuantityFoodService**  **PhysicalFacilities** |
| **PaperCode:** | **Theory:6hrs/week** |

## **CourseLearningOutcomes:**

1. Managethehumanresourceswithinafoodservicesorganizationor department.
2. Communicateappropriatelywithclients,staffand management.
3. Applyfoodservicestechnologyandoperateindustryequipment.
4. Developnutritionalmenusforfoodserviceproduction.
5. Designandrunaquantityfoodserviceestablishment.

## **CourseContent**

**Unit-I**

Quantity food service: Meaning and evolution. Classification of food service institutions according to a). Function: Profit oriented, service oriented and public health facility oriented b) Processing method: Conventional system, commissary system and fast food service systems.c)Service of food: Self service, tray service and waiter-waitress service.

**Unit-II**

Space organization: Kitchen- Size and type; developing kitchen plan; work simplification- work area, worker’s area of reach, work space, equipment materials and supplies and movement at work; features to be considered in designing kitchen; kitchen lay out.

Storage space: Location, planning, lay out, safety and security. Service area: Location, planning, dimensions and decor.

Equipments: Classification, selection, design, installation, operation, care and maintenance of commonly used equipments.

**Unit-III**

Food purchasing: Food buyer- Knowledge, quality and functions of a food buyer; methods of buying food.

Receiving and storage of food: Delivery methods, delivery procedure; Receiving; Storage- organization of storages, general procedure for storage; Store keeping- store records, order form and goods received book.

**Unit-IV**

Menu planning: Menu- Definition, functions, need for and factors to be considered in menu planning, procedure for writing menu, types and construction of menu, menu display.

Standardization of recipe: Definition, methods of standardization, standard recipe format and uses.

Standard portion sizes: Definition, portioning equipments and portion control.

**Unit-V**

Food production: Meaning, types of food production system, process of food production (briefly), large quantity cooking techniques, use of leftover food and holding techniques.

Foodservice:Meaning, styles-waiter service,self serviceand vending.

## **Reference**

* 1. Mohini Sethi and Surjeet Malhan, Catering management- An integrated approach, Third edition, New Age International publishers. 2015.
  2. Mohini Sethi, Institutional food management, Second edition, New Age International publishers.2016.
  3. Kinton, R and Cesarani, V., The Theory of Catering ELBS, VII Edition, 1992.
  4. Lillicap, D.R and Cousins, J.A. Food and Beverage Service, ELBS, IV Edition, 1994.

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| **SEMESTERVI** | |
| **CorePracticalVI** | **Dietetics** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseLearningOutcomes:**

1. Understanding of the conditions where nutrition plays a significant role in disease management.
2. Develop the knowledge to provide nutrition and dietetic care for individuals, groups and populations who have or already are at risk of developing long-term health conditions.

## **CourseContent**

1. Preparation of any 5 recipes for the following therapeutic hospital diets- clear liquid, full liquid, semi solid, bland, soft and regular diets.
2. Planning and preparation of diets for the following conditions using SOAP formatfornutritionalmanagement.[Studentshaveto analyzethegiven case history, prepare SOAP note, plan a day’s menu and calculate the nutritional requirements. Record must include Food plan (total exchanges/ day), meal pattern and menu (distribution of exchange into meals and snacks)].
   1. Obesityandunder weight
   2. Gastrointestinaldisorders–Pepticulcer,diarrhoeaandconstipation
   3. Febrilecondition-typhoidandTB
   4. Diseasesofliverandgallbladder-Hepatitisand cirrhosis.
3. Diabetes mellitus
4. Diseasesofcardiovascularsystem–Atherosclerosisand Hypertension
5. Diseasesofkidneyandurinarytract–Nephrolithiasis,Nephrotic syndrome and kidney stones
6. CancerandAIDS.

**Reference** V.Vimala, Advances in diettherapy- Practical manual, New Age International Publishers, 2010.

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| **SEMESTERVI** | |
| **ElectiveCourseIII** | **NutritionforSportsand**  **Fitness** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

Uponsuccessful completionof thecourse studentsshall beable to:

* 1. Explain the principles of physical fitness and nutrition (such as body composition, energy intake, energy expenditure, and the acute and chronic physical changes related to exercise and nutrition) complement each other in helping to develop physiological well-being and overall health.
  2. Explaintheprinciplesoffitnessandnutrition(suchassettingrealistic short-term behavior change goals and the relationship of exercise and diet to stress reduction) complement each other in helping to develop psychological well-being and overall health.
  3. Identify some of the social and cultural influences on food habits and exercise/activity patterns.
  4. Evaluate current nutritional information with regard to its contribution to Health and physical fitness.
  5. Applytheknowledgeacquiredforplanningdietforathletes.

## **CourseContent**

**Unit-I**

Physical fitness: Definition; benefits of physical activity; Physiology and biochemistry of exercise: Muscle contraction; weight and body composition of athletes; adaptation of muscle and body physiology to exercise; effect of excessive physical exercise on cardio vascular and pulmonary system.

**Unit-II**

Energy sources for muscle use- ATP, phospho creatine, glucose, fat and protein; anaerobic metabolism for high intensity bursts and power; aerobic metabolism for endurance. Nutritional assessment and counseling for athletes.

**Unit-III**

Nutritional requirement: Effect of differential intakes of macro nutrients (carbohydrates, protein and fat) on the athletic endeavor; hydration strategies to optimize physical activity capacity; importance of timing the nutrient and fluid intake to match tissue requirements.

**Unit-IV**

Nutritional needs and plans for sports requiring power and speed before, during and after exercise; Nutritional needs and plans for sports requiring endurance before, during and after exercise; Nutrition plan for sports requiring combined power and endurance.

**Unit-V**

Nutrition needs of male, female, younger and older athletes. Ergogenic aids: Effect of ergogenic aids and other substances on physical activity; sports drinks for endurance activities; nutrition supplements available for athletes. **Reference**

1. Gordan.M.Wardlaw,PerspectivesinNutrition,fourthedition,Mc. Graw Hillcompanies. 1999.
2. Antia.F.P.andPhilipAbraham,ClinicaldieteticsandNutrition,fourth edition, Oxford University Press. 2002.
3. Srilakshmi.B.,Dietetics,seventhedition,Newageinternational(P) Limited. 2014.
4. L.KathleenMahan,SylviaEscott-stump,Krause’sFood,Nutritionand

Diettherapy,ninthedition,W.B.Saunderscompany.,1996.

1. DonBenordot,Advancedsportsnutrition,secondedition,HumanKinetics, 2012.

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| **SEMESTERVI** | |
| **SBECV** | **DietCounselling** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. Understandingthedietcounselingskillsandacquaintthemwith basic principle.
2. Determineandtranslatenutrientneedsintomenusforindividuals and groups across the lifespan, in diverse cultures and religions.
3. Students will be able to interpret and apply nutrition concepts to evaluate and improve the nutritional health of individuals withmedical conditions
4. Produceoralandwrittencommunicationsforagroupeducation session.
5. InterviewindividualsfordiethistoriesandCounselindividuals.

## **CourseContent**

**Unit I**

Dietetitian – Classification, code of ethics, responsibilities. Computer application - Useofcomputersbydietitian,dietarycomputations,dieteticmanagement,education/ training, information storage andadministrations. Teaching aids used by dietitians - charts, leaflets, posters etc., preparation of teaching material for patients.

**Unit II**

DietCounselling-meaning,significance,process, types.

Goalsofcounselling,individuals,groupandfamilycounseling. Basic sequence in counselling.

Communicationprocessincounsellingandlinguisticsinclinicaldietary practices, problems in communication.

**Unit III**

Techniquesofobtainingrelevantinformation-Retrospectiveinformation, DietaryDiagnosis,Assessingfoodandnutrientintakes,Lifestyles,Physical

activity,Stress,NutritionalStatus.CorrelatingRelevantInformationand identifying areas of need.

TheCareProcess-Settinggoalsandobjectivesshorttermandlongterm, Counselling and Patient Education, Dietary Prescription.

Motivation-HospitalizedpatientsandOutpatients.

**Unit IV**

Counselling Skills Approaches to counselling –Psycho analytic approach, Behaviouristic, Humanistic approach Pre – Helping phase: Rapport building skills, Attending and listening skills. Stage I skills: Empathy, respect, Genuineness and concreteness. Stage II skills: Advanced empathy, self disclosure, Immediacy and Confrontation. Stage III skills : Goal setting, Action plan Programme and Brainstorming.

**Unit V**

Teaching aids usedby dietitians- charts,leaflets, postersetc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis.

## **Reference**

1. Gibson,R.L.,Mitchell,M.H.(2005).Introductiontocounsellingand guidance (6th Ed) 
2. Gelso,C.J.,Fretz,B.R.(1995).CounsellingPsychology,Bangalore,Prism Books Pvt Ltd.
3. Sharma,T.C.(2002).ModernMethodsofGuidanceandCounseling, New Delhi, sarup& sons
4. MahanLKandEscottStumpS(2013).Krause’sFood&Nutrition

Therapy,13thed.Saunders-Elsevier.

1. StacyNix(2009).William’sBasicNutritionandDietTherapy,13th

Edition.ElsevierMos

1. ThomasBriony;(1995).BlackwellManualofDieteticpractise.(2nd Ed.) Oxford: New York .,1995.

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| **SEMESTER VI** | |
| **SBECVI** | **EntrepreneurshipDevelopment** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. Understandthe concept of entrepreneurship.
2. IdentifywaystoapproachsupportiveInstitutionsandBanksfor starting an enterprise.
3. Analyzethestepsinproductselectionandformofownership.
4. Focusontheformationofprojectproposalandpracticeeffective accounting processes.
5. Understandtherequirementstobecomeanentrepreneur.

## **CourseContent**

**Unit-I**

Entrepreneur: Definition, qualities and essential skills of an

entrepreneur, communication and presentation skill; innovativeness; idea generation and SWOT analysis. Steps to start a small enterprise, learning journey of a successful entrepreneur.

**Unit-II**

Business plan for small enterprises: Importance of business plan, purpose, contents and benefits of business plan; business plan creation process, benefits of business plan, preparation of sample business plan. Business ethics and etiquettes.

**Unit-III**

Market survey: Meaning, process of conducting market survey, points to be considered for effective market research; steps to register a company; regulatory requirements.

**Unit-IV**

Management process and policies: Importance of policy creation, corporate governance, management process, management functions- production and operation management, marketing management, financial management and human resource management.

Pricingpolicyandmethodsof pricing.

**Unit-V**

Marketing management- Concept of marketing, market assessment, market regulation, market targeting, marketing mix, promotional strategies and tips for successful marketing.

Financial needs: Types of financial needs- fixed and working capital; methods of raising capital, working capital management, working capital cycle.

## **Reference**

1. Entrepreneurship development- Your gateway to the journey of entrepreneurship, ICT Academy of Tamil Nadu, Chennai. 2015.
2. S.S.Khanka,Entrepreneurialdevelopment,S.ChandPublications, 2007.
3. Vasant Desai, Entrepreneurial development, Vol-1, Himalaya Publishing House, 2009.

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| **SEMESTERIII** | |
| **AlliedCourseII** | **GeneralHomeScienceI** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. Developanunderstandingofconceptsandbasicsof textiles.
2. Understandsanddefinethekeytextileterms.
3. Understandbasicprinciplesofclothing construction.
4. Concept, definition, universality and scope of family resource management.
5. Practicing knowledge gained on selection of site and building principles in real life situations.

## **CourseContent**

**Unit I**

Textile – Definition, Terminology and Classification of textile fibers. Basic unit and Polymer bonds in textile fiber, Physical and Chemical Properties of fibers.

Processing of Manufacture of all Natural and Man-Made Fibers – Plant, Protein, Man-Made, Cellulosic, Synthetic, Metallic, Mineral and Elastomeric Fibers.

**Unit II**

Clothing:OriginofClothing,Principlesof Clothing,ClothingConstruction–

Draftingflatpatternand Dapping.

Textile Designing, Fashion Designing – Influence Factors, Fashion Cycle, Broken fashion cycles, Fashion adoption theories and Business and Merchandizing.

**Unit III**

Home Management : Definition, Characteristic of Management , Importance of Home Management, Motivation Factors of Management (Values,Goals,Standards) , Home Management Process

**Unit IV**

Family Resource Management: Types and Characteristics of Family Resource.

FamilyDecisionMaking–DefinitionandTypesofDecisionMaking.

Housing – Definition, Importance and Functions ofa House , Principles of Planning, Space Allocation and Organization in Independent Houses, Apartments and Flats.

SymbolsusedinDraftingPlans,ReadingPlansandBlueprint.

**Unit V**

InteriorDesign:Definition,PrinciplesandClassification. Household Equipments

Colors–Definition,Classification,FactorsInfluencingChoiceofColors Furniture and Lighting – Definition and Types.

## **Reference**

1. SunitaMishra(2018),SelectiveandScientificBooks,NewDelhi.
2. Bhargava, B. (2001).Family Resource Management and Interior Decoration, Delhi: University Book House. Bhargava, B. (2001).
3. HousingandSpaceManagement.Jaipur:UniversityBookHouseLtd.
4. Seetharaman, P., Batra, S., &Mehra, P. (2005). An Introduction to Family Resource Management. New Delhi: CBS Publishers &Distributors (ISBN 13: 9788123911861)
5. Shukul, M., and Gandotra,V . (2006). Home Management and Family Finance. New Delhi: Dominant Publishers and Distributors.(ISBN No. 81-7888-403-8.

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| **SEMESTERIII&IV** | |
| **AlliedPracticalII** | **GeneralHomeScience** |
| **PaperCode:** | **Theory:3hrs/week** |

## **CourseContent**

1. Topreparefirstaidkit.
2. Preparationbudgetforlow,middleandhighincomegroup family
3. Learning to fill different bank forms- Fill form to withdraw and deposit money, Open account in bank, Recurring deposit.
4. Drawinghouseplansforlow,middleandhighincomegroups.
5. Drawingkitchenlayoutfordifferentfamilieswithplumbingand wiring.
6. Preparationofanalbumondevelopmentmilestonesofchildren.
7. Marketstudyon–Costofdifferenttypesoffurnitures
8. Designinggreetingcardsfordifferentoccasion(anyfive occasions).
9. Tablesetting-Fruitandvegetable carving.
10. Toidentifyvarioustypesoffibresusing-burningtestand visualinspection.
11. Basicstitches.
12. Useofwastematerialformakingdecorativeandutility materials.
13. Papercuttingfordecoratingahouseforspecial occasions.
14. Prepareoneposter/chartonenvironmental/personalhygience and sanitation.
15. Preparationandevaluationoflabel-Evaluationoflabelon different type of food products, Prepare label.
16. Methodsof strain removal.
17. Methodsofsoapanddetergentpreparation.
18. Kitchengardns-usethewastecontainer(anyfourgreens).
19. Topreparesimpledishesusingdifferentgerminationmethods (any five food).

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| **SEMESTERIV** | |
| **AlliedCourseII** | **GeneralHomeScience II** |
| **PaperCode:** | **Theory:4hrs/week** |

## **CourseLearningOutcomes:**

1. Providesituationstounderstandsignificanceoffamilyincomeand expenditure and saving for future.
2. Knowtheimportanceofearlychildhoodyearsandsignificanceofintervention programs for early childhood development.
3. Learnaboutwomen’shumanrightsandlawsrelatedtowomenin

India.

1. GainknowledgeonconsumerprotectionLawsandActsandreflect upon personal rights and responsibilities
2. Learnabouttheconceptofextension,extensionapproachesand models

## **CourseContent**

**Unit I**

Family: Meaning and Characteristics of Family, Types of Family, Family Life Cycle , Family Wants, Family Income , Family Expenditure and House Hold Accounts , Family Budgets , Economics , Consumer Protection – Definition , Importance , Law , Consumer Education and Advertisement.

**Unit II**

Child Development: Principles of Development, Stages of Growth and Development.

Life Span Development – Psychodynamic Theory – Psycho – Analytic Theory ofFreud–ErickEricksons,Psycho–SocialTheory,LearningTheory,Social Learning Theory , Cognitive Developmental Theory , Kohlberg’s Moral Reasoning Theory , Information : Processing Theory . BronfenBrenners Theory, Life – Span and Life – Cycle Theory.

**Unit III**

Early Childhood Care and Education : Emerging Trends – Trends , Issues and Concern , Development Problems , Mental Sub normality – Mental Retardation – Learning Disabilities , Behavior Difficulties – Speech and Language Disorders – Hearing Impairment – Visual Impairment – Physical Handicap – Giftedness, Guidance and Counseling.

**Unit IV**

ChildandHumanDevelopment:EarlyChildhoodCareandDevelopment–

PrinciplesofDevelopment,TypesofChangeinDevelopment.

Socialization in various Family Contexts Across Different Cultures – Process in Socialization, Social and Non- Social People , Difficulties in Conforming to Social Expectations , Foundations of Social Behavior laid by Babyhood , Behavior patterns in social situations during early childhood.

Womenstudies-Women’sEquality,ViolenceagainstWomen,Women

Health,WomenEmpowerment,WomenandHuman Rights.

**UnitV**

Extension Education: Non Formal Education and Extension Education, HistoryandDevelopmentofHomeScience Extension,ConceptsofExtension Education, Philosophy of Extension Education, Principles of Extension Education, Difference between Formal and Extension Education, Extension Education: A Developed discipline.

CurriculumPlanningandDevelopment:Objectivesofnonformaleducation

,Planning non formal education Programme, Management and Administrationofformal/nonformalandextensioneducation,Monitoring, Supervision and evaluation formal, non formal and extension education, Major types of test, Qualities of a good test.

## **Reference**

1. Bhargava,B.(2005).FamilyResourceManagementandInterior Decoration, Jaipur: Apple Printer and V. R. Printers.
2. Deacon,R.F.,andFirebaugh,F.M.(1975).HomeManagement: Contexts and Concepts. Boston: Houghton Mifflin Company.
3. Nisha,M.(2006).UnderstandingExtensionEducation.NewDelhi: Kalpay Publications.
4. Reddy,A.A.(2001).ExtensionEducation.Bapatla:SriLakshmiPress.
5. Singh,U.KandNayak,A.K.(2007).ExtensionEducation.NewDelhi: Common Wealth Publishers.
6. SunitaMishra(2018),SelectiveandScientificBooks,NewDelhi.

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| **SEMESTER III(othermajor)** | |
| **NMECI** | **BasicFoodScience** |
| **PaperCode:** | **Theory:2hrs/week** |

## **CourseLearningOutcomes**

Thestudentswillbeableto

* 1. Knowthecompositionofvarious foods.
  2. Understandtheeffectsofcookingonnutritive value.

**UNIT- I**

**IntroductiontoFoodScience-**Functionsoffood;foodguidebasedon basic five food groups, cooking – objectives and methods.

**UNIT– II**

**Cereals-** Composition and nutritive value of rice and wheat. Best method of cooking, loss of nutrients during cooking; Advantages of par boiling.

**UNIT- III**

**Pulses**-Composition,nutritivevalue,bestmethodofcooking,lossof nutrients during cooking, germination and its advantages.

**UNIT– IV**

**Vegetables –** Classification, nutritive value, loss of nutrients during cooking and methods of reducing nutrient loss during cooking**.**

**UNIT– V**

**Fruits-**Classification,nutritivevalueandchangesduringripening.

**Fleshyfoods-**Meat,fish,eggandmilk:Nutritive value.

**Reference**

1. Sumathi R. Mudambi, Shalini M. Rao, M.V. Rajagopal Food Science, revised second edition, New Age International (p) Limited, Publishers New Delhi, reprint. 2006.
2. N. Swaminathan, Food Science and Experimental foods, The Bangalore printing and publishing Co. Ltd. Bangalore, 1992.
3. B.Srilakshmi,Food Science,NewAgeinternational(P)Ltd,NewDelhi, Reprint 2006.
4. N. Shakuntala Manay, M. Shadaksharaswamy, Foods – Facts and Principles. 2ndEdition. New Age International (P) Ltd, New Delhi, Reprint 2005.

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| **SEMESTER IV(othermajor)** | |
| **NMECII** | **BasicNutrition** |
| **PaperCode:** | **Theory:2hrs/week** |

## **CourseLearningOutcomes**

Thestudentswillbeableto

1. Understandtheprinciplesof nutrition
2. Learnaboutthenutrientsanddeficiency

**UNIT– I**

**Carbohydrate –** Classification, functions, blood sugar regulation and sources. Importance and sources of fiber.

**Energy:** Definition, Units for measuring energy, Energy value of foods andRDA.

**UNIT– II**

**Lipids** – Composition, classification, functions and sources. Role of lipids in causing heart diseases.

**UNIT– III**

**Protein -** Composition, classification (nutritional and biological), functions, sources andRDA.

**UNIT– IV**

**Minerals**

**Calcium,Phosphorus,Iron,ZincandIodine**–Functions,sources, requirement and effect of deficiency.

**UNIT– V**

**Vitamins**

**VitaminA,D,E,K,B1,B2&VitaminC**-Functions,sources, requirement and effect of deficiency.

**Reference**

1. MangalaKangoNormalNutrition(Fundamental&Management)RBSA Publishers S.M.S Highway Jaipur – 302003 L, 2003.
2. M. Raheena Begum, Text book of Foods, Nutrition and Dietetics, Second Revised Edition, Sterling Publishers Private Ltd, New Delhi, 2005.
3. B. Srilakshmi, Nutrition Science, New Age International (P) Ltd, New Delhi, 2002.
4. Mahtab S. Bamji, N. Pralhad Rao, Vinodini Reddy, Text Book of Human Nutrition Oxford and IBH Publishing Co. Pvt. Ltd, New Delhi, Reprint 1999.