ROYAL GLOBAL UNIVERSITY
GUWAHATI

ROYAL SCHOOL OF MEDICAL & ALLIED SCIENCES (RSMAS)

DEPARTMENT OF NUTRITION & DIETETICS

COURSE STRUCTURE & SYLLABUS

(BASED ON NATIONAL EDUCATION POLICY 2020)

FOR

B.Sc. IN NUTRITION & DIETETICS
(4 YEARS SINGLE MAJOR)

W.E.F

AY - 2023 – 24

Preamble

The National Education Policy (NEP) 2020 conceives a new vision for India's higher education system. It recognizes that higher education plays an extremely important role in promoting equity, human as well as societal well-being and in developing India as envisioned in its Constitution. It is desired that higher education will significantly contribute towards sustainable livelihoods and economic development of the nation as India moves towards becoming a knowledge economy and society.

If we focus on the 21st century requirements, the higher education framework of the nation must aim to develop good, thoughtful, well-rounded, and creative individuals and must enable an individual to study one or more specialized areas of interest at a deep level, and also develop character, ethical and Constitutional values, intellectual curiosity, scientific temper, creativity, spirit of service, and twenty-first-century capabilities across a range of disciplines including sciences, social sciences, arts, humanities, languages, as well as professional, technical, and vocational subjects. A quality higher education should be capable enough to enable personal accomplishment and enlightenment, constructive public engagement, and productive contribution to the society. Overall, it should focus on preparing students for more meaningful and satisfying lives and work roles and enable economic independence.

Towards the attainment of holistic and multidisciplinary education, the flexible curricula of the University will include credit-based courses, projects in the areas of community engagement and service, environmental education, and value-based education. As part of holistic education, students will also be provided with opportunities for internships with local industries, businesses, artists, crafts persons, and so on, as well as research internships with faculty and researchers at the University, so that students may actively engage with the practical aspects of their learning and thereby improve their employability.

The undergraduate curriculums are diverse and have varied subjects to be covered to meet the needs of the programs. As per the recommendations from the UGC, introduction of courses related to Indian Knowledge System (IKS) is being incorporated in the curriculum structure which encompasses all of the systematized disciplines of Knowledge which were developed to a high degree of sophistication in India from ancient times and all of the traditions and practises that the various communities of India—including the tribal communities—have evolved, refined and preserved over generations, like for example Vedic Mathematics, Vedangas, Indian Astronomy, Fine Arts, Metallurgy, etc.

At RGU, we are committed that at the societal level, higher education will enable each student to develop themselves to be an enlightened, socially conscious, knowledgeable, and skilled citizen who can find and implement robust solutions to its own problems. For the students at the University, Higher education is expected to form the basis for knowledge creation and innovation thereby contributing to a more vibrant, socially engaged, cooperative community leading towards a happier, cohesive, cultured, productive, innovative, progressive, and prosperous nation."

OVERVIEW:

1.1 Introduction

The National Education Policy (NEP) 2020 clearly indicates that higher education plays an extremely important role in promoting human as well as societal well-being in India. As envisioned in the 21st-century requirements, quality higher education must aim to develop good, thoughtful, well-rounded, and creative individuals. According to the new education policy, assessments of educational approaches in undergraduate education will integrate the humanities and arts with Science, Technology, Engineering and Mathematics (STEM) that will lead to positive learning outcomes. This will lead to develop creativity and innovation, critical thinking and higher-order thinking capacities, problem-solving abilities, teamwork, communication skills, more in-depth learning, and mastery of curricula across fields, increases in social and moral awareness, etc., besides general engagement and enjoyment of learning. and more in-depth learning.

The NEP highlights that the following fundamental principles that have a direct bearing on the curricula would guide the education system at large, viz.

i. Recognizing, identifying, and fostering the unique capabilities of each student to promote her/his holistic development.

ii. Flexibility, so that learners can select their learning trajectories and programmes, and thereby choose their own paths in life according to their talents and interests.

iii. Multidisciplinary and holistic education across the sciences, social sciences, arts, humanities, and sports for a multidisciplinary world.

iv. Emphasis on conceptual understanding rather than rote learning, critical thinking to encourage logical decision-making and innovation; ethics and human & constitutional values, and life skills such as communication, teamwork, leadership, and resilience.

v. Extensive use of technology in teaching and learning, removing language barriers, increasing access for Divyang students, and educational planning and management.

vi. Respect for diversity and respect for the local context in all curricula, pedagogy, and policy.

vii. Equity and inclusion as the cornerstone of all educational decisions to ensure that all students can thrive in the education system and the institutional environment are responsive to differences to ensure that high-quality education is available for all.

viii. Rootedness and pride in India, and its rich, diverse, ancient, and modern culture, languages, knowledge systems, and traditions.

Food is the most sought-after substance related to world peace. Human beings are able to survive due to innovations in development of agriculture and its products. The B.Sc. programme in Food Nutrition & Dietetics is conceived with the idea of development of Human Resource for engagement in the society and in health sector. The man power generated through the programme may be engaged in the ever-increasing and very important field of health sciences.

The major objective of the programme is as follows:

- Impart theoretical and practical knowledge in the area of food science, nutrition & dietetics so as to enable them to work in hospitals, government programme like NHM & research organizations etc.
- To develop healthy citizens who are competent in their chosen fields
- To instill confidence in the students for overall development of their professional expertise and traits.

Career Opportunities: Various scopes of career opportunities await graduates in Food Nutrition and Dietetics. Some such are as follows.

- Nutritionists
- Dieticians
- Nutrition counsellor
- Nutrition programme planner
- Food Biochemists
- Food Microbiologists
- Food Quality Control Managers
- Food Inspector
- Production Manager
- Academics
- Entrepreneurs in the field

Students can also pursue higher studies such as PG/PhD programme in food technology or other areas in biological sciences

1.2. Credits in Indian Context:

1.2.1. Choice Based Credit System (CBCS) By UGC

Under the CBCS system, the requirement for awarding a degree or diploma or certificate is prescribed in terms of number of credits to be earned by the students. This framework is being implemented in several universities across States in India. The main highlights of CBCS are as below :

- The CBCS provides flexibility in designing curriculum and assigning credits based on the course content and learning hours.
- The CBCS provides for a system wherein students can take courses of their choice, learn at their own pace, undergo additional courses and acquire more than the required credits, and adopt an interdisciplinary approach to learning.
- CBCS also provides opportunity for vertical mobility to students from a bachelor's degree programme to masters and research degree programmes.

1.3 Definitions

1.3.1. Academic Credit:

An academic credit is a unit by which a course is weighted. It is fixed by the number of hours of instructions offered per week. As per the National Credit Framework

1 Credit = 30 NOTIONAL CREDIT HOURS (NCH)
Yearly Learning Hours = 1200 Notional Hours (@40 Credits x 30 NCH)

30 NOTIONAL CREDIT HOURS		
Lecture/Tutorial	Practicum	Experiential Learning
1 Credit = 15 -22 Lecture Hours	10-15 Practicum Hours	0-8 Experiential Learning Hours

1.3.2.Course of Study:

Course of study indicate pursuance of study in a particular discipline/programme.
Discipline/Programmes shall offer Major Courses (Core), Minor Courses, Skill Enhancement

Courses (SEC), Value Added Courses (VAC), Ability Enhancement Compulsory Courses (AECCs) and Interdisciplinary courses.

1.3.3. Disciplinary Major:

The major would provide the opportunity for a student to pursue in-depth study of a particular subject or discipline. Students may be allowed to change major within the broad discipline at the end of the second semester by giving her/him sufficient time to explore interdisciplinary courses during the first year. Advanced-level disciplinary/interdisciplinary courses, a course in research methodology, and a project/dissertation will be conducted in the seventh semester. The final semester will be devoted to seminar presentation, preparation, and submission of project report/dissertation. The project work/dissertation will be on a topic in the disciplinary programme of study or an interdisciplinary topic.

1.3.4. Disciplinary/interdisciplinary minors:

Students will have the option to choose courses from disciplinary/interdisciplinary minors and skill-based courses. Students who take a sufficient number of courses in a discipline or an interdisciplinary area of study other than the chosen major will qualify for a minor in that discipline or in the chosen interdisciplinary area of study. A student may declare the choice of the minor at the end of the second semester, after exploring various courses.

1.3.5. Courses from Other Disciplines (Interdisciplinary):

All UG students are required to undergo 3 introductory-level courses relating to any of the broad disciplines given below. These courses are intended to broaden the intellectual experience and form part of liberal arts and science education. Students are

not allowed to choose or repeat courses already undergone at the higher secondary level (12^{th} class) in the proposed major and minor stream under this category.

i. Natural and Physical Sciences: Students can choose basic courses from disciplines such as Natural Science, for example, Biology, Botany, Zoology, Biotechnology, Biochemistry, Chemistry, Physics, Biophysics, Astronomy and Astrophysics, Earth and Environmental Sciences, etc.

ii. Mathematics, Statistics, and Computer Applications: Courses under this category will facilitate the students to use and apply tools and techniques in their major and minor disciplines. The course may include training in programming software like Python among others and applications software

like STATA, SPSS, Tally, etc. Basic courses under this category will be helpful for science and social science in data analysis and the application of quantitative tools.

iii. Library, Information, and Media Sciences: Courses from this category will help the students to understand the recent developments in information and media science (journalism, mass media, and communication)

iv. Commerce and Management: Courses include business management, accountancy, finance, financial institutions, fintech, etc.,

v. Humanities and Social Sciences: The courses relating to Social Sciences, for example, Anthropology, Communication and Media, Economics, History, Linguistics, Political Science, Psychology, Social Work, Sociology, etc. will enable students to understand the individuals and their social behaviour, society, and nation. Students be introduced to survey methodology and available large-scale databases for India. The courses under humanities include, for example, Archaeology, History, Comparative Literature, Arts & Creative expressions, Creative Writing and Literature, language(s), Philosophy, etc., and interdisciplinary courses relating to humanities. The list of Courses can include interdisciplinary subjects such as Cognitive Science, Environmental Science, Gender Studies, Global Environment & Health, International Relations, Political Economy and Development, Sustainable Development, Women's, and Gender Studies, etc. will be useful to understand society.

1.3.6. Ability Enhancement Courses (AEC): Modern Indian Language (MIL) & English language focused on language and communication skills. Students are required to achieve competency in a Modern Indian Language (MIL) and in the

English language with special emphasis on language and communication skills. The courses aim at enabling the students to acquire and demonstrate the core linguistic skills, including critical reading and expository and academic writing skills, that help students articulate their arguments and present their thinking clearly and coherently and recognize the importance of language as a mediator of knowledge and identity. They would also enable students to acquaint themselves with the cultural and intellectual heritage of the chosen MIL and English language, as well as to provide a reflective understanding of the structure and complexity of the language/literature related to both the MIL and English language. The courses will also emphasize the development and enhancement of skills such as communication, and the ability to participate/conduct discussion and debate.

1.3.7. Skill Enhancement Course (SEC): These courses are aimed at imparting practical skills, hands-on training, soft skills, etc., to enhance the employability of students and should be related to

Major Discipline. They will aim at providing hands- on training, competencies, proficiency, and skill to students. SEC course will be a basket course to provide skill-based instruction. For example, SEC of English Discipline may include Public Speaking, Translation & Editing and Content writing.

A student shall have the choice to choose from a list, a defined track of courses offered from 1st to 3rd semester.

i. Understanding India: The course aims at enabling the students to acquire and demonstrate the knowledge and understanding of contemporary India with its historical perspective, the basic framework of the goals and policies of national development, and the constitutional obligations with special emphasis on constitutional values and fundamental rights and duties. The course would also focus on developing an understanding among student-teachers of the Indian knowledge systems, the Indian education system, and the roles and obligations of teachers to the nation in general and to the school/community/society. The course will attempt to deepen knowledge about and understanding of India's freedom struggle and of the values and ideals that it represented to develop an appreciation of the contributions made by people of all sections and regions of the

country, and help learners understand and cherish the values enshrined in the Indian Constitution and to prepare them for their roles and responsibilities as effective citizens of a democratic society. ***ii. Environmental science/education:*** The course seeks to equip students with the ability to apply the acquired knowledge, skills, attitudes, and values required to take appropriate actions for mitigating the effects of environmental degradation, climate change, and pollution, effective waste management, conservation of biological diversity, management of biological resources, forest and wildlife conservation, and sustainable development and living. The course will also deepen the knowledge and understanding of India's environment in its totality, its interactive processes, and its effects on the future quality of people's lives.

iii. Digital and technological solutions: Courses in cutting-edge areas that are fast gaining prominences, such as Artificial Intelligence (AI), 3-D machining, big data analysis, machine learning, drone technologies, and Deep learning with important applications to health, environment, and sustainable living that will be woven into undergraduate education for enhancing the employability of the youth. ***iv. Health & Wellness, Yoga education, sports, and fitness:*** Course components relating to health and wellness seek to promote an optimal state of physical, emotional, intellectual, social, spiritual, and environmental well-being of a person. Sports and fitness activities will be organized outside the regular institutional working hours. Yoga education would focus on preparing the students physically and mentally for the integration of their physical, mental, and spiritual faculties, and

equipping them with basic knowledge about one's personality, maintaining self-discipline and self-control, to learn to handle oneself well in all life situations. The focus of sports and fitness components of the courses will be on the improvement of physical fitness including the improvement of various components of physical and skills-related fitness like strength, speed, coordination, endurance, and flexibility; acquisition of sports skills including motor skills as well as basic movement skills relevant to a particular sport; improvement of tactical abilities; and impro These are a common pool of courses offered by different disciplines and aimed towards embedding ethical, cultural and constitutional values; promote critical thinking. Indian knowledge systems; scientific temperament of students.

1.3.9. Summer Internship /Apprenticeship:

The intention is induction into actual work situations**.** All students must undergo internships / Apprenticeships in a firm, industry, or organization or Training in labs with faculty and researchers in their own or other HEIs/research institutions during the ***summer term***. Students should take up opportunities for internships with local industry, business organizations, health and allied areas, local governments (such as panchayats, municipalities), Parliament or elected representatives, media organizations, artists, crafts persons, and a wide variety of organizations so that students may actively engage with the practical side of their learning and, as a by-product, further improve their employability. Students who wish to exit after the first two semesters will undergo a 4-credit work-based learning/internship during the summer term to get a UG Certificate.

1.3.9.1. Community engagement and service: The curricular component of 'community engagement and service' seeks to expose students to the socio- economic issues in society so that the theoretical learnings can be supplemented by actual life experiences to generate solutions to real-life problems. This can be part of summer term activity or part of a major or minor course depending upon the major discipline.

1.3.9.2. Field-based learning/minor project: The field-based learning/minor project will attempt to provide opportunities for students to understand the different socio-economic contexts. It will aim at giving students exposure to development-related issues in rural and urban settings. It will provide opportunities for students to observe situations in rural and urban contexts, and to observe and study actual field situations regarding issues related to socioeconomic development. Students will be given opportunities to gain a first- hand understanding of the policies, regulations, organizational structures, processes, and programmes that guide the development process. They would have the opportunity to gain an understanding of the complex socio-economic problems in the community, and innovative

practices required to generate solutions to the identified problems. This may be a summer term project or part of a major or minor course depending on the subject of study.

1.3.10. Indian Knowledge System:

In view of the importance accorded in the NEP 2020 to rooting our curricula and pedagogy in the Indian context all the students who are enrolled in the four-year UG programmes should be encouraged to take an adequate number of courses in IKS so that the ***total credits of the courses taken in IKS amount to at least five per cent of the total mandated credits*** *(i.e. min. 8 credits for a 4 yr. UGP & 6 credits for a 3 yr. UGP)***.** The students may be encouraged to take these courses, preferably *during the first four semesters of the UG programme*. At least half of these mandated credits should be in courses in disciplines which are part of IKS and are related to the major field of specialization that the student is pursuing in the UG programme. They will be included as a part of the total mandated credits that the student is expected to take in the major field of specialization. The rest of the mandated credits in IKS can be included as a part of the mandated Multidisciplinary courses that are to be taken by every student. All the students should take a Foundational Course in Indian Knowledge System, which is designed to present an overall introduction to all the streams of IKS relevant to the UG programme. The foundational IKS course should be broad-based and cover introductory material on all aspects.

Wherever possible, the students may be encouraged to choose a suitable topic related to IKS for their project work in the 7/8th semesters of the UG programme.

1.3.11. Experiential Learning:

One of the most unique, practical & beneficial features of the National Credit Framework is assignment of credits/credit points/ weightage to the experiential learning including relevant experience and professional levels acquired/ proficiency/ professional levels of a learner/student. Experiential learning is of two types:

a. Experiential learning as part of the curricular structure of academic or vocational program. E.g., projects/OJT/internship/industrial attachments etc. This could be either within the Program-internship/ summer project undertaken relevant to the program being studied or as a part time employment (not relevant to the program being studied- up to certain NSQF level only). In case where

experiential learning is a part of the curricular structure the credits would be calculated and assigned as per basic principles of NCrF i.e., 40 credits for 1200 hours of notional learning.

b. Experiential learning as active employment (both wage and self) post completion of an academic or vocational program. This means that the experience attained by a person after undergoing a particular educational program shall be considered for assignment of credits. This could be either Full or Part time employment after undertaking an academic/ Vocation program.

In case where experiential learning is as a part of employment the learner would earn credits as weightage. The maximum credit points earned in this case shall be double of the credit points earned with respect to the qualification/ course completed. The credit earned and assigned by virtue of relevant experience would enable learners to progress in their career through the work hours put in during a job/employment.

Learning Outcomes-Based Approach to Curricular Planning:

The learning outcomes-based curriculum framework is based on the premise that every student and graduate is unique. Each student or graduate has his/her own characteristics in terms of previous learning levels and experiences, life experiences, learning styles and approaches to future career- 2 related actions. The quality, depth and breadth of the learning experiences made available to the students while at the higher education institutions help develop their characteristic attributes.

The key objectives that underpin curriculum planning and development at the undergraduate level include Programme Learning Outcomes, and Course Learning Outcomes. For the B.Sc. (H) Food Nutrition & Dietetics course it includes:

- To demonstrate comprehensive knowledge and understanding of the food nutrition & dietetics curriculum.
- To apply the principles of food nutrition & dietetics and work in health science sector
- To understand that the real-world problems in the field of nutrition and health
- To analyse, interpret and draw conclusions from quantitative/qualitative data; and critically evaluate ideas, evidence and experiences from an open-minded and reasoned perspective.
- 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, and adapting to changing trades and demands of work place through knowledge/skill development/reskilling.

- To use ICT in a variety of learning situations, demonstrate ability to access, evaluate, and use a variety of relevant information sources.
- To acquire professional competency and entrepreneurial skills for economic empowerment.
- To demonstrate the ability to acquire, analyze, interpret and appropriately present laboratory data

2. Award of Degree

The structure and duration of undergraduate programmes of study offered by the University as per NEP 2020 include:

2.1. Undergraduate programmes of either 3 or 4-year duration with Single Major, with multiple entry and exit options, with appropriate certifications:

2.1.1. UG Certificate: Students who opt to exit after completion of the first year and have secured 40 credits will be awarded a UG certificate if, in addition, they complete one vocational course of 4 credits during the summer vacation of the first year. These students are allowed to re-enter the degree programme within three years and complete the degree programme within the stipulated maximum period of seven years.

2.1.2. UG Diploma: Students who opt to exit after completion of the second year and have secured 80 credits will be awarded the UG diploma if, in addition, they complete one vocational course of 4 credits during the summer vacation of the second year. These students are allowed to re-enter within a period of three years and complete the degree programme within the maximum period of seven years.

2.1.3. 3-year UG Degree: Students who will undergo a 3-year UG programme will be awarded UG Degree in the Major discipline after successful completion of three years, securing 120 credits and satisfying the minimum credit requirement.

2.1.4. 4-year UG Degree (Honours): A four-year UG Honours degree in the major discipline will be awarded to those who complete a four-year degree programme with 160 credits and have satisfied the credit requirements as given in Table 6 in Section 5.

2.1.5. 4-year UG Degree (Honours with Research): Students who secure 75% marks and above in the first six semesters and wish to undertake research at the undergraduate level can choose a research stream in the fourth year. They should do a research project or dissertation under the guidance of a Faculty Member of the University. The research project/dissertation will be in the major discipline. The students who secure 160 credits,

including 12 credits from a research project/dissertation, will be awarded UG Degree (Honours with Research).

Table: 1: Award of Degree and Credit Structure with ME-ME

Award	**Year**	**Credits to earn**	**Additional Credits**	**Re-entry allowed within (yrs)**	**Years to Complete**
UG Certificate	1	40	4	3	7
UG Diploma	2	80	4	3	7
3-year UG Degree (Major)	3	120	x	x	x
4-year UG Degree (Honours)	4	160	x	x	x
4-year UG Degree (Honors with Research):	4	160	Students who secure cumulative 75% marks and above in the first six semesters		

3. Graduate Attributes:

Table: 7: The Learning Outcomes Descriptors and Graduate Attributes

Sl.no.	Graduate Attribute	The Learning Outcomes Descriptors *(The graduates should be able to demonstrate the capability to:)*
GA1	Disciplinary Knowledge	acquire knowledge and coherent understanding of the chosen disciplinary/interdisciplinary areas of study.
GA 2	Complex problem solving	solve different kinds of problems in familiar and non-familiar contexts and apply the learning to real-life situations.
GA 3	Analytical & Critical thinking	apply analytical thought including the analysis and evaluation of policies, and practices. Able to identify relevant assumptions or implications. Identify logical flaws and holes in the arguments of others. Analyse and synthesize data from a variety of sources and draw valid conclusions and support them with evidence and examples.
GA 4	Creativity	create, perform, or think in different and diverse ways about the same objects or scenarios and deal with problems and situations that do not have simple solutions. Think 'out of the box' and generate solutions to complex problems in unfamiliar contexts by adopting innovative, imaginative, lateral thinking, interpersonal skills, and emotional intelligence.
GA 5	Communication Skills	listen carefully, read texts and research papers analytically, and present complex information in a clear and concise manner to different groups/audiences. Express thoughts and ideas effectively in writing and orally and communicate with others using appropriate media.

GA 6	Research-related skills	develop a keen sense of observation, inquiry, and capability for asking relevant/ appropriate questions. Should acquire the ability to problematize, synthesize and articulate issues and design research proposals, define problems, formulate appropriate and relevant research questions, formulate hypotheses, test hypotheses using quantitative and qualitative data, establish hypotheses, make inferences based on the analysis and interpretation of data, and predict cause-and-effect relationships. Should develop the ability to acquire the understanding of basic research ethics and skills in practicing/doing ethics in the field/ in personal research work.
GA 7	Collaboration	work effectively and respectfully with diverse teams in the interests of a common cause and work efficiently as a member of a team.
GA 8	Leadership readiness/qualities	plan the tasks of a team or an organization and setting direction by formulating an inspiring vision and building a team that can help achieve the vision.
GA 9	Digital and technological skills	use ICT in a variety of learning and work situations. Access, evaluate, and use a variety of relevant information sources and use appropriate software for analysis of data.
GA 10	Environmental awareness and action	mitigate the effects of environmental degradation, climate change, and pollution. Should develop the technique of effective waste management, conservation of biological diversity, management of biological resources and biodiversity, forest and wildlife conservation, and sustainable development and living.

4. Programme Learning Outcomes relating to B.Sc (Honours) degree programme in Nutrition & Dietetics

Students graduating with the degree B.Sc. Food Nutrition & Dietetics will be able to achieve the following:

PLO1 : Knowledge of Nutrition and Dietetics : Students are able to demonstrate comprehensive knowledge and understanding of one or more disciplines such as chemistry, bio-chemistry, statistics, microbiology, regulations with support of different allied subjects of Health and Nutritional Science

PLO2 : Develop Complex Problem solving Skills: Communicate effectively and write effective reports and design documentation, make effective presentations through seminars, project dissertations

PLO3 : **Develop Critical Thinking and Analytical Skills:** Recognize the need for, and havethe preparation and ability to engage in independent/as an entrepreneur and life-long learning in the broadest context of technological change logical reasoning and capability of recognizing and distinguishing the various aspects of real-life problems.

PLO4 : Develop the Ability to Create: Identify, formulate, review research literature, and analyze complex. Nutrition and Dietetics/applications problems and design solutions for health system and managing health through diet and nutrition

PLO5: Develop Effective Communication Skills: Acquire the practical knowledge and demonstrate the ability to design,conduct/trouble shoot experiments and analyze data in the field of nutrition & dietetics

PLO6: Develop Research Related Skills: The completion of this programme will enable the learner to use appropriate software's to apply for bulk scale/industrial production of technology-based health food products

PLO7: Develop the Ability of Team Building: Recognize new skills, ideas and technologies and its implementation in new product developments**.**

PLO8: Develop Leadership Qualities: Work effectively with health sciences, laboratories and production processing team to build the technical and practical learning aspects.

PLO9:. **Develop Digital and Technological Skills:** Work effectively with the team work and building capabilities and leadership qualities for achieving the vision**.**

PLO10: Environmental awareness and action: Examining the role of health consciousness, environmental awareness and intention on purchase of organic food.

5. B.Sc. Nutrition & Dietetics Programme Specific Outcomes

The programme specific outcomes of the course are-

PSO 1: Knowledge of various areas related to Food Nutrition & Dietetics
PSO 2: Understanding the science behind foods, its physico-chemical, nutritional, microbiological aspects
PSO 3: Knowledge of processing and preservation techniques of pulses, oilseeds, spices, fruits and vegetables, meat, fish, poultry, milk & milk products
PSO4: Knowledge on meal planning for normal and therapeutic conditions

6. Teaching Learning Process

Teaching and learning in this programme involve classroom lectures as well as tutorial and remedial classes.

Tutorial classes: Tutorials allow closer interaction between students and teacher as each student gets individual attention. The tutorials are conducted for students who are unable to achieve average grades in their weekly assessments. Tutorials are divided into three categories, viz. discussion-based tutorials (focusing on deeper exploration of course content through discussions and debates), problem-solving tutorials (focusing on problem solving processes and quantitative reasoning), and Q&A tutorials (students ask questions about course content and assignments and consolidate their learning in the guiding presence of the tutor).

Remedial classes: The remedial classes are conducted for students who achieve average and above average grades in their weekly assessments. The focus is laid to equip the students to perform better in the exams/assessments. The students are divided into small groups to provide dedicated learning support. Tutors are assigned to provide extra time and resources to help them understand concepts with advanced nuances. Small groups allow tutors to address their specific needs and monitor them. Following methods are adopted for tutorial and remedial classes:

- Written assignments and projects submitted by students
- Project-based learning
- Group discussions
- Home assignments

- Class tests, quizzes, debates organised in the department
- PPT (Presentation), Seminars and conferences
- Extra-curricular activities like cultural activities, community outreach programmes etc.
- Industrial tour / field visit

7. Assessment Methods

	Component of Evaluation	**Marks**	**Frequency**	**Code**	**Weightage (%)**
A	**Continuous Evaluation**				
I	Analysis/Class test	Combination of any three from (i) to (v)with 5 marks each	1-3	C	25 %
Ii	Home Assignment		1-3	H	
Iii	Project		1	P	
Iv	Seminar		1-2	S	
V	Viva-Voce/Presentation		1-2	V	
Vi	MSE	MSE shallbe of 10 Marks	1-3	Q/CT	
vii	Attendance	Attendance shall be of 5marks	100%	A	5%
B	Semester End Examination		1	SEE	70%
	Project				**100%**

Course Structure

B.Sc. in Nutrition & Dietetics

Ist Semester				
Sl. No.	**Subject Code**	**Names of Subject**	**Level of courses**	**Credits**
		Major		
1	NDC152C101	Nutritional Biochemistry	100	3
2	NDC152C111	Practical on Nutritional Biochemistry	100	3
		Minor		
3	NDC152M101	Fundamentals of Food Science	100	3
		Interdisciplinary		
4	IDC 1	IKS I(Introduction to Indian Knowledge System- I)	100	3
		AEC (Ability Enhancement Courses)		
5	AEC982A101	Communicative English and Behavioural Science –I	100	2
		SEC (Skill Enhancement Courses)		
6	NDC152S111	Fruits and Vegetables Processing	100	3
		VAC (Value Added Courses)		
7	VAC 1	Basket Course	3	3
		TOTAL CREDIT		**20**

2nd semester				
Sl. No.	**Subject Code**	**Names of Subject**	**Level of courses**	**C**
		Major		
1	NDC152C201	Elementary Human Physiology	100	3
2	NDC152C211	Practical on Elementary Human Physiology	100	3
		Minor		
3	NDC152M201	Basic Microbiology	100	3
		Interdisciplinary		
4	IDC 2	IKS II (Introduction to Indian Knowledge System- II)	100	3

		AEC(Ability Enhancement Courses)		
5	AEC982A201	Communicative English and Behavioural Science –II	100	2
		SEC (Skill Enhancement Courses)		
6	NDC152S211	Methods of cookery	100	3
		VAC(Value Added Courses)		
7	VAC 2	Basket Course	100	3
		TOTAL CREDIT		**20**

3rd semester				
Sl. No.	**Subject Code**	**Names of Subject**	**Level of courses**	**C**
		Major		
1	NDC152C301	Principles of Human Nutrition	200	4
2	NDC152C311	Normal Nutrition and Meal Planning	200	4
		Minor		
3	NDC152M301	Practical on Meal planning	200	4
		Interdisciplinary/Indian Knowledge System		
4	IDC 3	Basket Course	200	3
		AEC		
5	AEC982A301	Communicative English and Behavioural Science –III	200	2
		SEC		
6	NDC152S311	Basic Technique in Food Analysis	200	3
		TOTAL CREDIT		**20**

4th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152C401	Cereals, Pulses and Oilseeds Processing, Preparation and utilization	200	4
2	NDC152C402	Food Service Management	200	4
3	NDC152C411	Practical on Cereals, Pulses and	200	4

		Oilseeds Processings and Food Service Management		
		Minor		
4	NDC152M401	Food Product Development	200	3
5	NDC152M402	Sensory Evaluation	200	3
		AEC		
6	AEC982A401	Communicative English and Behavioural Science –IV	200	2
		TOTAL CREDIT		**20**
5th semester				
Sl.No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152C501	Therapeutic Nutrition I	300	4
2	NDC152C502	Introduction to Clinical Nutrition	300	4
3	NDC152C511	Practical on Therapeutic & Clinical Nutrition	300	4
		Minor		
4	NDC152M501	Food Toxicology	300	4
		Internship		
5	Internship		300	4
		TOTAL CREDIT		**20**

6th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152C601	Nutrition Through life Cycle	300	4
2	NDC152C602	Community Nutrition	300	4
3	NDC152C603	Therapeutic nutrition II	300	4
4	NDC152C611	Practical on Life cycle Nutrition, community Nutrition, Therapeutic Nutrition	300	4
		Minor		
5	NDC152M601	Animal Products Processing & Utilization	300	4
		TOTAL CREDIT		**20**

7th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152C701	Public Health Nutrition	400	4
2	NDC152C702	Food Hygiene & Sanitation	400	4
3	NDC152C703	Food Standards & Quality Control	400	4
4	NDC152C711	Practical on Public Health Nutrition,Food hygiene,Food Standards & Quality Control	400	4
		Minor		
5	NDC152M701	Food Business Management	400	4
		TOTAL CREDIT		**20**

8th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152C801	Nutraceuticals and Functional Foods	400	4
		Minor		
2	NDC152M802	Research Methodology	400	4
		Dissertation		
3	NDC152M812	Research Project	400	12
		OR		
4	NDC152M803	Nutrition in Fitness & Sports	400	4
5	NDC152M804	Nutrition in Emergencies	400	4
6	NDC152M805	Geriatric Nutrition	400	4
		TOTAL CREDIT		**20**

Detailed Syllabus

Semester I

Course: Major
Course Level-100 **Scheme Evaluation: (T)**

Title of Paper: Nutritional Biochemistry

Subject Code: NDC152C101

L-T-P-C: 3-0-0-3 **Total credits:3**

Course Objectives

To train the students with basic knowledge of biochemistry of different major nutrients – carbohydrates, lipids, proteins and related aspects.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**relate** the classifications and functions of major macro nutrients	**BT 1**
CO 2	**explain** different metabolic pathways	**BT 2**
CO 3	**develop** different concept of food functions	**BT 3**
CO 4	**analyse** the significance of the nutrients and health	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	Introduction to biochemistry - Definition, objectives, scope and inter relationship between biochemistry and other biological science	**15**
II.	Definition, types and classification of enzymes, definition and types of coenzymes, specificity of enzymes, isozymes, enzyme, kinetics including factors affecting enzyme action, velocity of enzyme catalyzed reactions, enzyme inhibitions	**15**
III.	Intermediary metabolism - Carbohydrate metabolism, glycolysis, TCA cycle and energy generation, gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation, Lipids - Oxidation and biosynthesis of fatty acids (saturated and mono-unsaturated) - Synthesis and utilization of ketone bodies, ketosis, fatty livers,	**15**
IV.	Proteins - General reaction of amino acid metabolism, urea cycle, lipoproteins - Types, composition, role and significance in disease.	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Texts:

1. West, E. S., Todd, W. R.; Mason. H.S. and Van Bruggen J.T.: 4th Ed. Text book of Biochemistry.Amerind Publishing Co. Pvt. Ltd.
2. Murray, R. K. Grannen, D. K.; Mayes, P. A. and Rodwell. V. W.: Harper's biochemistry. Lange Medical Book.

References:

1. Handler, P.: Smith E.I.; Stelten, D. W. : Principles of biochemistry, Me. Grew Hill Book Co.
2. Lehninger, A.L.; Nelson, D. L. and Cox, M. M. Principles of biochemistry. CBS Publishers and Distributors.
3. Devlin, T. M. : Text Book of biochemistry with clinical corelations. John Wiley and Sons.

Credit Distribution		
Theory	**Practical**	**Experimental Learning**
60	**-**	**30**
		Handling & conducting estimation of human fluids for biochemical parameters

Semester I

Course: Major
Level of Course: 100 **Scheme of Evaluation: (P)**

Title of Paper: Practical on Nutritional Biochemistry

Subject Code: NDC152C111

L-T-P-C: 0-0-6-3 **Total credits: 3**

Course Objectives

Understanding the techniques, handling equipments/apparatus and carry out the experiments

Course Outcomes

On successful completion of the course the students will be able to:		
SI No.	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**define** basic sample and solution preparations	**BT 1**
CO 2	**classify** the different categories of techniques	**BT 2**
CO 3	**construct** the procedures of biochemical analysis	**BT 3**
CO 4	**analyse** the process of concentration in biological fluids/samples	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**
I.	Introduction to handling of equipment and instruments, preparation of samples, solutions and buffers	**24**
II	Blood constituents: Estimation of haemoglobin, serum protein, blood glucose	**22**
III	Estimation of different serum constituents	**22**

IV	Urine constituents: Estimation of protein levels, glucose levels in urine, ketone bodies in urine, urine constituents	**22**
	Total	**90**
	Pedagogy: Lectures, Experiments, Laboratory sessions	

Recommended Texts: As suggested under the theory papers

Semester I

Course: SEC 1
Level of Course: 100 **Scheme of Evaluation: (P)**

Title of Paper: Fruits and Vegetables Processing

Subject Code: NDC152S111

L-T-P-C: 0-0-3-3 **Total credits: 3**

Course Objectives

Understanding the physiological parameters for fruits and vegetables processing

Course Outcomes

On successful completion of the course the students will be able to:		
SI No.	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**define** basic fruits and vegetable varieties and identify their maturity indices	**BT 1**
CO 2	**classify** the TSS, acidity , firmness of different fruits and vegetables	**BT 2**
CO 3	**construct** the process for identification of spices and additives in different fruits and vegetables	**BT 3**
CO 4	**analyse** the procedures for equipment maintenance in a controlled atmospheric unit	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**

I.	1. Identification of various fruit and vegetable varieties 2. Determination of maturity indices of fruits and vegetables: Days from full bloom (DFFB), Starchiodine ratio, Brics-acid ratio	**24**
II	1.Determination of moisture content, 2.Determination of TSS, 3.Determination of acidity and firmness of fruits and vegetables	**22**
III	1.Identification of spices and additives in fruits and vegetables. 2.Physiological loss in fruits and vegetables	**22**
IV	1. Cleaning and maintenance of equipment 2. Visit to Controlled atmosphere store / banana ripening unit	**22**
	Total	**90**
	Pedagogy: Lectures, Experiments, Laboratory sessions	

Recommended Texts: As suggested under the theory papers

Semester I

Course: Minor
Level of Course: 100 **Scheme of Evaluation: (T)**

Title of Paper: Fundamentals of Food Science

Subject Code: NDC152M101

L-T-P-C: 3-0-0-3 **Total credits: 3**

Course Objectives To train the students with introductory knowledge of food science, scope of food science and its applications in food industries

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**relate** the principle of food science, and food constituents- its properties and functions	**BT 1**
CO 2	**explain** the basic preservation techniques used in food science	**BT 2**

CO 3	**develop** different types of non thermal processing techniques used in food Industry	**BT 3**
CO 4	**analyse** the different advantages and disadvantages of different preservation techniques in terms of increasing shelf life	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	**Introduction:** Introduction to Food Science, Different kinds of Food Industries, Components of Food industries. Scope of food processing and technology. **Food constituents:** Carbohydrates, lipids, proteins, vitamins and minerals, water. Nutritional and chemical properties of food constituents and its function.	**15**
II.	**Introduction to Food preservation techniques:** Pasteurization, Sterilization, Ultra High temperature, Blanching, etc. Low temperature preservation techniques: Cooling, Evaporation, refrigeration and freezing, Drying and their importance in the food processing.	**15**
III.	**Introduction to non thermal food preservation techniques:** Introduction to new techniques in preservation of food like High Pressure Processing, Ohmic heating, Pulse electric field processing, Irradiation etc.	**15**
IV.	**Basic introduction** : Unit operations in Food Processing , Cleaning, dry cleaning methods, wet cleaning methods, peeling, grading, sorting.	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Texts:

1. Food Science by Norman N Potter and Joseph H. Hotchkiss, CBS Publishers and Distributors.
2. Advanced Textbook on Food and Nutrition by Dr. M. Swaminathan Vol: I & II, The Bangalore Printing and Publishing Co. Ltd.

References:

1.Fellows PJ, 2016. Food Processing Technology, Principles and Practice. Fourth Edition. Woodhead Publishing
2.Sivasankar B. Latest edition. *Food Processing and Preservation.* First Edition. PHILearning

Credit Distribution		
Theory	**Practical**	**Experimental Learning**
60	**-**	**30**
		Food processing techniques of different foods

Semester II

Course: Major
Level of Course: 100 **Scheme of Evaluation: (T)**

Title of Paper: Elementary Human Physiology

Subject Code: NDC152C201

L-T-P-C: 3-0-0-3 **Total credits: 3**

Course Objectives

To understand the human anatomy and physiology with different systems of the body

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms TaxonomyLevel**
CO 1	**explain** the human anatomy and physiology	**BT 1**
CO 2	**identify** different body systems	**BT 2**
CO 3	**apply** knowledge in understanding how the systems works	**BT 3**
CO 4	**analyse** the conditions which may occur due to abnormal functioning of the systems	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**

I.	Introduction to anatomy and physiology and structural organization of body. The cell – Structure, its organelles, functions and multiplications, different types of cells and their functions, movement of particles across cell membrane - Active transport and passive transport ,Body fluids and its compartments and functions	**15**
II.	Water output and input into the body and maintenance of water balance in human body , the tissues – Types, structure and their functions, the skeletal system - Anatomy and functions, structure, formation and development of bones, different types of bones and types of joints and their movements,	**15**
III.	Circulatory system - The blood - Composition and function, blood clotting and blood grouping, Heart – Structure, functions, types of circulatory systems, blood pressure and heart rate and factors affecting it, electrocardiogram, the respiratory system - anatomy, functions, mechanism of breathing and respiratory volumes, gas transport and respiratory adaptation, the digestive system - anatomy and functions of alimentary tract and accessory organs, process of digestion of food, absorption and assimilation of digested food, enzymes involved in digestion of food, liver - Structure and functions,	**15**
IV	Pancreas – Structure and functions, the urinary system - Anatomy and functions, formation and composition of urine, the endocrine system - important ductless glands of the body and their functions, the reproductive system - Male reproductive system – Anatomy and functions, female reproductive system – Anatomy and functions, menstrual cycle, the nervous system - elementary study of (anatomy and functions), sensory organs – (anatomy and functions). Glossary of terms used in physiology	**15**
	TOTAL	**60**
Pedagogy: Lectures, Assignments, Seminars		

Texts:

Arthur J. V. Human physiology- The mechanisms of body function, Tata McGraw Hill Publishing Company, New Delhi.

Samson, Applied physiology 10th edn. Revised by Keele, C.A. and Neil, B. Oxford University Press, New York.

Guyton C. Text Book of medical physiology 5th edn. W.B. Saunders Company- Philadelphia, London.

References:

1.Text book of Human Physiology by Sathya P & Viji Devanand
2.Textbook of Medical Physiology by GK Pal

Credit Distribution		
Theory	**Practical**	**Experimental Learning**
60	**-**	**30**
		Laboratory experience of conducting assessment on human physiology

Semester II

Course: Major
Level of Course: 100 **Scheme of Evaluation: (P)**

Title of Paper: Practical on Human Physiology

Subject Code: NDC152C211

L-T-P-C: 0-0-6-3 **Total credits: 3**

Course Objectives

Understanding the human anatomy and physiology in

Course Outcomes

On successful completion of the course the students will be able to:		
SI No.	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**define** the human physiological system practically using models	**BT 1**
CO 2	**classify** the systems	**BT 2**
CO 3	**construct** the slides, solutions and other prepararations required for estimations	**BT 3**
CO 4	**analyse** different constituents in fluids	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods

I.	Demonstration of animal viscera, identification of systems and organs, identification of cells – epithelial, muscle, nerve etc	**24**
II	Transverse section of stomach , intestine – small and large demonstration of specimens of spleen, kidney and brain models of excretory and reproductive organs and their histology	**22**
III	Colorimetric estimation of RBC count by heamocytometer, estimation of WBC count by heamocytometer, differential counting of WBC using peripheral smear,	**22**
IV	Estimation of PCV, ESR, micro and macro heamatocrit, estimation of bleeding and clotting time and blood groups, measurement of pulse rate and blood pressure, its variation with exercise, testing for sensation, special sensors, measurement of body temperature, diurnal variations.	**22**
	Total	**90**
	Pedagogy: Lectures, Experiments, Laboratory sessions	

Recommended Texts: As suggested under the theory papers

Semester II

Course: SEC 2
Level of Course: 100 **Scheme of Evaluation: (P)**

Title of Paper: Methods of cookery

Subject Code: NDC152S211

L-T-P-C: 0-0-6-3 **Total credits: 3**

Course Objectives

Understanding the various methods of cookery and resultant products

Course Outcomes

On successful completion of the course the students will be able to:		
SI No.	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**define** the different methods of cookery	**BT 1**

CO 2	**classify** the cookery methods and procedural details	**BT 2**
CO 3	**construct** the products out of different cooking methods	**BT 3**
CO 4	**analyse** the changes and quality of the output with different methods	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**
I.	Introduction to kitchen equipment and apparatus Handling and care of the equipment and apparatus Sanitization of the equipment and apparatus	**24**
II	Demonstration on basic cooking methods using different categories of foods- cereals, pulses, fruits, vegetables, animal foods	**22**
III	Conduction of different practical using the different methods of cookery and different foods	**22**
IV	Quantity production using different methods and foods	**22**
	Total	**90**
	Pedagogy: Lectures, Experiments, Laboratory sessions	

Recommended Texts: As suggested under the theory papers

Semester II

Course: Minor
Level of Course: 100 **Scheme of Evaluation: (T)**

Title of Paper: Basic Microbiology

Subject Code: NDC152M201

L-T-P-C: 3-0-0-3 **Total credits: 3**

Course Objectives

To train the students with various microbial growth control techniques in food preparation

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**relate** the scope, importance, basic techniques of microbiology	**BT 1**
CO 2	**explain** the various sterilization- both physical and chemical methods	**BT 2**
CO 3	**develop** the different methods for isolation and preservation of food microbes	**BT 3**
CO 4	**analyse** the application of food microbiology and its comparision to other fields of microbiology	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**
I.	History and scope of Microbiology, discovery, importance and relevance of microorganisms. Microscopy: basic techniques of Microscopy optical and electron techniques of microscopy staining and its types.	**15**
II.	**Microbial Control:** sterilization and disinfection techniques. Physical and chemical methods of sterilization. **Important cultural characteristics** of Bactaria, Virus, Fungus and algae. Culture of micro-organisms culture media natural complex, semi defined, synthetic media, minimal media. General and selective media, Anaerobic cultures.	**15**

III.	**Isolation and preservation** of pure cultures. Pour plate method, streak plate spread plate and single cell isolation, micromani pulator and capillary pipette method.	**15**
IV.	**Applications –** Food microbiology, Agriculture microbiology, Medical microbiology, Industrial microbiology Environmental and Biotechnology microbiology.	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Texts:

1. Microbiology (5th Ed) by M. J. Pelczar, E. C. S. Chan and Noel R. Krieg. Tata McGraw-Hill.
2. Microbiology by R. P. Singh Kalyani Publishers.

References:

1. Fellows PJ, 2016. Food Processing Technology, Principles and Practice. Fourth Edition. Woodhead Publishing
2. Sivasankar B. Latest edition. *Food Processing and Preservation*. First Edition. PHI Learning

Credit Distribution		
Theory	**Practical**	**Experimental Learning**
60	**-**	**30**
		Laboratory experience on microbial techniques

Course Structure

B.Sc. in Nutrition & Dietetics

Ist Semester				
Sl. No.	**Subject Code**	**Names of Subject**	**Level of courses**	**Credits**
		Major		
1	NDC152M101	Nutritional Biochemistry	100	3
2	NDC152M111	Practical on Nutritional Biochemistry	100	3
		Minor		
3	NDC152N101	Fundamentals of Food Science	100	3
		Interdisciplinary		
4	IDC 1	IKS I(Introduction to Indian Knowledge System- I)	100	3
		AEC (Ability Enhancement Courses)		
5	CEN982A101	Communicative English		1
6	BHS982A102	Behavioural Science –I		1
		SEC (Skill Enhancement Courses)		
7	NDC152S111	Fruits and Vegetables Processing	100	3
		VAC (Value Added Courses)		
8	VAC 1	Basket Course	3	3
		TOTAL CREDIT		**20**

2nd semester				
Sl. No.	**Subject Code**	**Names of Subject**	**Level of courses**	**C**
		Major		
1	NDC152M201	Elementary Human Physiology	100	3
2	NDC152M211	Practical on Elementary Human Physiology	100	3
		Minor		
3	NDC152N201	Basic Microbiology	100	3

		Interdisciplinary		
4	IDC 2	IKS II (Introduction to Indian Knowledge System- II)	100	3
		AEC(Ability Enhancement Courses)		
5	CEN982A201	Communicative English		1
6	BHS982A202	Behavioural Science –II		1
		SEC (Skill Enhancement Courses)		
7	NDC152S211	Methods of cookery	100	3
		VAC(Value Added Courses)		
8	VAC 2	Basket Course	100	3
		TOTAL CREDIT		**20**

3rd semester				
Sl. No.	**Subject Code**	**Names of Subject**	**Level of courses**	**C**
		Major		
1	NDC152M301	Principles of Human Nutrition	200	4
2	NDC152M311	Practical on Human Nutrition	200	4
		Minor		
3	NDC152N301	Menu Planning	200	4
		Interdisciplinary/Indian Knowledge System		
4	IDC 3	Basket Course	200	3
		AEC		
5	CEN982A301	Communicative English		1
6	BHS982A302	Behavioural Science –III		1
		SEC		
7	NDC152S311	Food Quality Evaluation	200	3
		TOTAL CREDIT		**20**

4th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**

		Major		
1	NDC152M401	Principles of Food Processing	200	4
2	NDC152M402	Therapeutic Nutrition I	200	4
3	NDC152M411	Practical on Food Processing and Therapeutic Nutrition	200	4
		Minor		
4	NDC152N401	Food Product Development	200	3
5	NDC152N402	Sensory Evaluation	200	3
		AEC		
6	CEN982A401	Communicative English		1
7	BHS982A402	Behavioural Science –IV		1
		TOTAL CREDIT		**20**
5th semester				
Sl.No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152M501	Therapeutic Nutrition II	300	4
2	NDC152M502	Introduction to Clinical Nutrition	300	4
3	NDC152M511	Practical on Therapeutic & Clinical Nutrition	300	4
		Minor		
4	NDC152N501	Food Toxicology	300	4
		Internship		
5	Internship		300	4
		TOTAL CREDIT		**20**

6th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152M601	Nutrition Through life Cycle	300	4
2	NDC152M602	Community Nutrition	300	4
3	NDC152M603	Food Service Management	300	4
4	NDC152M611	Practical on Life cycle Nutrition, community Nutrition, Therapeutic Nutrition	300	4

		Minor		
5	NDC152N601	Animal Products Processing & Utilization	300	4
		TOTAL CREDIT		**20**

7th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152M701	Public Health Nutrition	400	4
2	NDC152M702	Food Hygiene & Sanitation	400	4
3	NDC152M703	Food Standards & Quality Control	400	4
4	NDC152M711	Practical on Public Health Nutrition,Food hygiene,Food Standards & Quality Control	400	4
		Minor		
5	NDC152N701	Food Business Management	400	4
		TOTAL CREDIT		**20**

8th semester				
Sl. No.	**Subject Code**	**Names of Subject**	**L**	**C**
		Major		
1	NDC152M801	Nutraceuticals and Functional Foods	400	4
		Minor		
2	NDC152N802	Research Methodology	400	4
		Dissertation		
3	NDC152M812	Research Project	400	12
		OR		
4	NDC152M803	Nutrition in Fitness & Sports	400	4
5	NDC152M804	Nutrition in Emergencies	400	4
6	NDC152M805	Geriatric Nutrition	400	4
		TOTAL CREDIT		**20**

Semester III

Course: Major	**Level of Course: 200**	**Scheme of Evaluation: (T)**
Title of Paper: Principles of Human Nutrition		**Subject Code: NDC152M301**
L-T-P-C: 4-0-0-4		**Total credits: 4**

Course Objectives

To introduce the students the basics of nutrition, importance of food.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Relate** the functions of nutrients in terms of disease condition	**BT 1**
CO 2	**Explain** the functioning of nutrients in details	**BT 2**
CO 3	**Develop** understanding related to function of digestion, absorption and the sources of nutrients	**BT 3**
CO 4	**Analyse** the symptoms of the deficiency disease	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**
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.	**15**
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.	**15**
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	**15**

IV.	**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. **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.	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Text Books:

1. Gordon. M. Wardlaw et.al; Contemporary Nutrition, 2nd edition, Publishing by Mosby, 2004.
2. Srilakshmi. B; Dietetics, 7th edition,New Age International (P) Limited Publishers, 2014.

Reference Books:

1. William's Nix; Basic Nutrition and Diet therapy, 14th edition, Published by Mosby, 2013.
2. MahtabS.Bamji, Prasad Rao, N.Vinodini Reddy; Textbook of Human Nutrition, Second Edition Oxford and IBH Publishing Co. Pvt .Ltd, 2003.
3. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad.

Credit Distribution		
Theory	**Practical**	**Experiential Learning**
88	**-**	**32**
		Effect of different components of food on human health

Course: Major	**Level of Course: 200**	**Scheme of Evaluation: (T)**
Title of Paper: Practical on Human Nutrition		**Subject Code: NDC152M311**
L-T-P-C: 4-0-0-4		**Total credits: 4**

Course Objectives

To develop knowledge and apply skill of the students in formulation of healthy diet plans.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Define** the basic terms related to human nutrition	**BT 1**
CO 2	**Classify** the different nutrients based on their function	**BT 2**
CO 3	**Construct** the diet plans related to different condition/ requirement	**BT 3**
CO 4	**Analyse** the role of different food constituents in protecting human health	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	Introduction to food groups, nutritive value and their role in planning diets, concept of "My Plate".	**22**
II.	RDA Table, Menu Planning Planning and calculation one day menu for different age and sex groups mentioning the portion size and nutritive value of each.	**24**
III.	Planning, preparation and calculation of nutritive values of low cost complementary foods.	**22**
IV.	Planning, preparation and calculation of low cost nutritious recipes.	**22**
	TOTAL	**90**
	Pedagogy: Lectures, Assignments, Seminars	

Text Books:

1. Gordon. M. Wardlaw et.al; Contemporary Nutrition, 2nd edition, Publishing by Mosby, 2004.
2. Srilakshmi. B; Dietetics, 7th edition,New Age International (P) Limited Publishers, 2014.

Reference Books:

1. William's Nix; Basic Nutrition and Diet therapy, 14th edition, Published by Mosby, 2013.
2. MahtabS.Bamji, Prasad Rao, N.Vinodini Reddy; Textbook of Human Nutrition, Second Edition Oxford and IBH Publishing Co. Pvt .Ltd, 2003.
3. Nutrient Requirement and Recommend Dietary Allowances for Indians by Indian council of Medical research, National Institute of nutrition, Hyderabad.

Course: Minor	Level of Course: 200	Scheme of Evaluation: (T)
Title of Paper: Menu Planning		Subject Code: NDC152N301
L-T-P-C: 4-0-0-4		Total credits: 4

Course Objectives

To introduce the students with basics of menu planning based on the required condition.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Relate** the principle of menu planning and its role in daily life	**BT 1**
CO 2	**Explain** the functioning of different types of menus.	**BT 2**
CO 3	**Develop** menus for personal and industrial application.	**BT 3**
CO 4	**Analyse** the hygiene and sanitation of institutional food service.	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	**Introduction to terms related to menu planning-** RDA, nutritive value and its calculation, evolution of the food service industry, food management, factors affecting food choice.	**15**
II.	**Types of menu**– a la carte menus, static menus, du jour menus, cycle menus, and fixed menus, function of different menus, food groups, food exchange list, benefits and limitations of exchange list, menuplanning according to income groups.	**15**
III.	**Financial Management** – Introduction to financial management, costing and budgeting, pricing, accounting. **Planning menu for different institutions** - schools, college canteen, hostel, hotels/restaurants, celebrations/parties.	**15**
IV.	**Food hygiene, sanitation and safety:** general principle of food hygiene and sanitation, personal hygiene and food handling habits, definition and meaning, deteriorative effects of microorganisms- physical and chemical changes.	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Text Books:

1. Paul J. *et al*; Fundamentals of Menu Planning, 3rd edition, Wiley; 3rd edition (28 March 2008).

2. Sethi M. *et al*; Entrepreneurship and Food Service Management, IGNOU, 2022.

Reference Books:

1. Mohini Seth; Institutional Food Management, 2nd edition, New Age International Publishers, 2016

Credit Distribution		
Theory	**Practical**	**Experiential Learning**
88	**-**	**32**
		Steps and procedures for setting a food court in different institutions

Course: SEC	**Level of Course: 200**	**Scheme of Evaluation: (T)**
Title of Paper: Food Quality Evaluation		**Subject Code: NDC152S311**
L-T-P-C: 3-0-0-3		**Total credits: 3**

Course Objectives

To develop the students with practical skills required to work in food laboratory and analyse the nutrient aspects of food.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Define** the basic terms related to food analysis	**BT 1**
CO 2	**Classify** the different methods used for analysis of food sample	**BT 2**
CO 3	**Construct** the idea to characterize food products in terms of chemical composition, safety, quality, sensory perception and nutritional value.	**BT 3**
CO 4	**Analyse** the nutrient content of the food sample	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	**Nature and concepts of food analysis**; Different principles of analytical techniques based on colorimetry, spectrophotometry, atomic absorption of spectrophotometry, flame photometry, separation techniques by chromatography.	**22**
II.	**Chemical analysis lab:** need and requirements of a chemical analysis laboratory Proximate analysis of different food groups in terms of moisture, ash, carbohydrate, fibre.	**24**
III.	**Sensory evaluation lab:** introduction to sensory lab, need and requirements, Identification and differentiation of colour, flavour, texture, etc., threshold test using different taste samples like sugar, salt, citric acid and monosodium glutamate. **Sensory panel:** types, criteria for panel selection.	**22**
IV.	**Methods for Sensory Evaluation:** Classification of test methods; discrimination tests: paired-comparison, duo-trio and triangle tests; affective tests: qualitative (interview and focus group) and quantitative tests (paired preference and acceptance tests); Two sample test, Ranking test, Two sample difference test, numeric scoring test, hedonic ranking test.	**22**
	TOTAL	**90**
	Pedagogy: Lectures, Assignments, Seminars	

Texts books:

1. A Manual of Laboratory Techniques. Eds. N. Raghuramulu, K Madhavan Nair, S Kalyansundaram, 1983.National Institute of Nutrition, ICMA, Hyderabad,
2. S. Ranganna (2011) Handbook of Analysis and Quality Control for Fruits & Vegetable Products. Tata McGraw - Hill Publishing Company Ltd. New Delhi.

Reference book :

1. Y. Pomeranz, C.E Meloan (2000) Food Analysis Theory & Practice. Springer

Semester IV

Course: Major	**Level of Course: 200**	**Scheme of Evaluation: (T)**
Title of Paper: Principles of Food Processing		**Subject Code: NDC152M401**
L-T-P-C: 4-0-0-4		**Total credits: 4**

Course Objectives

To understand the importance, principles and need of food processing and learn different processing techniques.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Relate** the significance of different food processing techniques.	**BT 1**
CO 2	**Explain** the various food processing techniques and their impact on nutritional value of food.	**BT 2**
CO 3	**Develop** understanding of different preservation techniques and additives used in them.	**BT 3**
CO 4	**Analyse** the significance of preservative techniques.	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**
I.	**Principles of food processing and preservation-** Preservation by low and high temperatures, canning, osmotic pressure, dehydration & drying, irradiation. & use of preservatives, food additives, definition, types, importance and industrial uses of food additives.	**15**
II.	**Methods of processing of cereals, legumes, and oilseeds:** Composition and nutritive value, milling, parboiling, gelatinization, dextrinization, rancidity. **Methods of processing of fruits and vegetables–**different methods of processing of pickles, juice, squash, canned products etc.	**15**
III.	**Methods of processing of milk & milk products–** composition, fermentation, different methods of processing of pasteurized milk, ghee, butter, curd, cheese etc.	**15**
IV.	**Methods of processing of animal foods–**salting, smoking, curing and fermentation, pickling. **Food fortification and enrichment -**current trends & applications, fermented	**15**

	food products.	
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Text Books:

Desrosier NW and Desrusier JN (1987) The Technology of Food Preservation, CBS Publishers and Distributors New Delhi

Reference Books:

Srivastava, R P and Kumar S (1998) Fruit and Vegetable preservation-Principles and practices. CBS Publishers and Distributors, New Delhi

Credit Distribution		
Theory	**Practical**	**Experiential Learning**
88	**-**	**32**
		Learning the techniques for handling a food processing industry

Course: Major	**Level of Course: 200**	**Scheme of Evaluation: (T)**
Title of Paper: Therapeutic Nutrition I		**Subject Code: NDC152M402**
L-T-P-C: 4-0-0-4		**Total credits: 4**

Course Objectives

To understand the role of therapeutic nutrition and types of therapeutic diets.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Relate** the significance of therapeutic nutrition.	**BT 1**
CO 2	**Explain** the need for therapeutic diet based on requirement.	**BT 2**
CO 3	**Develop** understanding of different therapeutic diets and their relation with improving and maintain health.	**BT 3**
CO 4	**Analyse** the effects of therapeutic diets on different health conditions.	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	**Introduction to medical nutrition therapy-** definition and role of dietician in healthcare, nutrition care process (nutritional assessment, nutritional diagnosis, nutritional intervention, nutrition monitoring and evaluation, documentation), patient care and counselling.	**15**
II.	**Adaptation of therapeutic diets-** routine hospital diet (normal or general diets, liquid diets, soft diets, bland diets), mode of feeding (oral feeding, tube or enteral feeding, peripheral vein feeding, total parental nutrition).	**15**
III.	**Therapeutic diets for gastrointestinal diseases-** gastroesophageal reflux disorder (GERD), indigestion, peptic ulcer, constipation, diarrhoea, inflammatory bowel diseases.	**15**
IV.	**Therapeutic diets for metabolic disorders-** diabetes mellitus (type I DM, type II DM, gestational DM), hypertension, gout, risk factors, management and prevention.	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Text books:

1. Joshi, S.A., Nutrition and Dietetics, Tata McGraw Hill Publications, New Delhi, 2004. 2. Srilakshmi B.,Dietetics, New Age International (P) limited Publications, 2004
2. Amy E. Galena, Msh Rd. 2013. Eat to Your Good Health: Exchange Lists and Meal Planning for Eating Disorders. USA

Reference books:

1. Peggy S. Stanfield, Peggy Stanfield, Y. H. Hui. 2010. Nutrition and Diet Therapy: Self- Instructional Approaches. 5th edition. Jones and Bartlett publishers. Canada.
2. B Srilakshmi. 2014. Dietetics. 9th edition, New Age International publishers.

Credit Distribution		
Theory	**Practical**	**Experiential Learning**
88	**-**	**32**
		Planning diets for therapeutic conditions in hospital setup

Course: Major	**Level of Course: 100**	**Scheme of Evaluation: (T)**
Title of Paper: Practical on Food Processing and Therapeutic Nutrition		
Subject Code: NDC152M411		
L-T-P-C: 4-0-0-4		**Total credits: 4**

Course Objectives

To develop practical skills of the students required to work in food processing industry and be able to plan diets for therapeutic conditions.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Define** the basic terms related to food processing and therapeutic nutrition.	**BT 1**
CO 2	**Classify** the different methods used for food processing	**BT 2**
CO 3	**Construct** different therapeutic diets based on heath condition.	**BT 3**
CO 4	**Analyse** the nutritive value of the planned diets	**BT 4**

Course Outline

Modules	**Topics (if applicable) & Course Contents**	**Periods**
I.	**Processing of cereals, pulses and their products-** soaking, drying, grinding, parboiling, boiling, malting, fermentation.	**22**
II.	**Processing of fruits, vegetables and their products-** blanching, , canning, drying, dehydration, freezing, frying. **Processing of milk and milk products-** fermentation, pasteurization.	**24**
III.	**Planning diet for gastrointestinal diseases-** gastroesophageal reflux disorder (GERD), indigestion, peptic ulcer, constipation, diarrhoea, inflammatory bowel diseases.	**22**
IV.	**Planning diet for metabolic disorders-** diabetes mellitus (type I DM, type II DM, gestational DM), hypertension, gout.	**22**
	TOTAL	**90**
	Pedagogy: Lectures, Assignments, Seminars	

Text books:

1. Srivastava, R P and Kumar S (1998) Fruit and Vegetable preservation-Principles and practices. CBS Publishers and Distributors, New Delhi
2. Joshi, S.A., Nutrition and Dietetics, Tata McGraw Hill Publications, New Delhi, 2004. 2. Srilakshmi B.,Dietetics, New Age International (P) limited Publications, 2004

Reference books:

1. Desrosier NW and Desrusier JN (1987) The Technology of Food Preservation, CBS Publishers and Distributors New Delhi
2. Peggy S. Stanfield, Peggy Stanfield, Y. H. Hui. 2010. Nutrition and Diet Therapy: Self- Instructional Approaches. 5thedition. Jones and Bartlett publishers. Canada.
3. B Srilakshmi. 2014. Dietetics. 9th edition, New Age International publishers.

Course: Minor	**Level of Course: 100**	**Scheme of Evaluation: (T)**
Title of Paper: Food Product Development		**Subject Code: NDC152N401**
L-T-P-C: 3-0-0-3		**Total credits: 3**

Course Objectives

To introduce the students with insight for design, development, standardization, regulatory aspects and commercialization of food products.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Relate** the principle of food product development	**BT 1**
CO 2	**Explain** the importance of quality control and food safety.	**BT 2**
CO 3	**Develop** novel nutrient dense food products.	**BT 3**
CO 4	**Analyse** the different government scheme and regulations for food safety.	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	**New food products development-** Introduction to new products, customers and consumers, value addition, and market; **Designing new products-** New Food Product Development (NPD) process and activities;Recipe development; Use of traditional recipe and modification;Selection of materials/ingredients for specific purposes; Modifications for production on large scale, cost-effectiveness, nutritional needs or uniqueness; Use of novel food ingredients and novel processing technologies.	**15**
II.	**Standardization and large scale production-** Process design; Sensory evaluation; Food testing lab requirements; Comparison of market samples.	**15**
III.	**Quality, Safety & Regulatory aspects-** Product stability; Evaluation of shelf life; Changes in sensory attributes and effects of environmental conditions; Developing packaging systems for maximum stability and cost effectiveness; Regulatory aspects: regulatory aspects of FSSAI for a food product.	**15**
IV.	**Marketing characteristics of new products-**product life cycle and profit picture: Opportunities in the marketplace for new product development, technological advances driving new product development, government's role in new product development.	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Text Books:

Gordon W Fuller, "New Food Product Development: From Concept to Marketplace",3rd Edition, CRC press, Taylor and Francis Group, UK, 2016.

Reference Books:

Catherine Side., "Food Product Development: Based on Experience", 2nd Edition, Iowa State Press, Blackwell publications, 2008.

Credit Distribution		
Theory	**Practical**	**Experiential Learning**
88	**-**	**32**
		Developing and evaluating new nutrient rich food products

Course: Minor	Level of Course: 100	Scheme of Evaluation: (T)
Title of Paper: Sensory Evaluation		Subject Code: NDC152N402
L-T-P-C: 3-0-0-3		Total credits: 3

Course Objectives

To introduce the students with insight for development, standardization and evaluating sensory aspects of food products.

Course Outcomes

On successful completion of the course the students will be able to:		
SI No	**Course Outcome**	**Blooms Taxonomy Level**
CO 1	**Relate** thebasic anatomy and physiology of the sensory organs used to evaluate food.	**BT 1**
CO 2	**Explain** the practical skills and techniques used to analyse the sensory properties of food	**BT 2**
CO 3	**Develop** sensory methods to product development and communicating sensory messages.	**BT 3**
CO 4	**Analyse** the ability to identify solutions to problems related to the sensory analysis of food.	**BT 4**

Course Outline

Modules	Topics (if applicable) & Course Contents	Periods
I.	**Introduction:** Definition of sensory evaluation; basic tastes; human senses and sensory perception; threshold; psychophysics, Tongue surface	**15**
II.	**Arrangements for Sensory Evaluation Test controls:** Environment and test room design; product controls: sample preparation and presentation; panelist controls; factors influencing measurements: psychological and physiological errors	**15**
III.	**Methods for Sensory Evaluation:** Classification of test methods; discrimination tests: paired-comparison, duo-trio and triangle tests; affective tests: qualitative (interview and focus group) and quantitative tests (paired preference and acceptance tests); Two sample test, Ranking test, Two sample difference test, numeric scoring test, hedonic ranking test	**15**
IV.	**Subjective and objective methods:** Texture analyser- mechanical characteristics-chewiness, brittleness, and geometric characteristics, Sensory panel-types-criteria for panel selection	**15**
	TOTAL	**60**
	Pedagogy: Lectures, Assignments, Seminars	

Text Books:

Gordon W Fuller, "New Food Product Development: From Concept to Marketplace",3rd Edition, CRC press, Taylor and Francis Group, UK, 2016.

Reference Books:

Catherine Side., "Food Product Development: Based on Experience", 2nd Edition, Iowa State Press, Blackwell publications, 2008

Credit Distribution		
Theory	**Practical**	**Experiential Learning**
88	**-**	**32**
		Learning evaluation process and using sensory evaluation for evaluating a food product