Maharshi Dayanand Saraswati University
Ajmer 305009 Rajasthan

SYLLABUS

SCHEME OF EXAMINATION AND
COURSES OF STUDY

B.Sc. Food Science and Nutrition

3 years (6 semesters) of UGDP

CBCS as per NEP-2020 and as per University Ordinance w.e.f. 2023-24

Semester wise presentation of scheme(s):

S. N.	Course Code	Course Title for Paper	Credits	Contact Teaching Hours per week	EOT- End of Term Assessment	ITC- In term of continuous Assessment	Total
		Semester –I					
1	FSN5101T-C	Fundamental of Food and Nutrition	4	4	70	30	100
2	FSN5102P-C	Fundamental of Food and Nutrition Practical	2	4	35	15	50
3	FSN5103T-C	Nutrition through life cycle	4	4	70	30	100
4	FSN5104P-C	Nutrition through life cycle Practical	2	4	35	15	50
5	FSN5105T-C	Introduction to Physiology and Anatomy	6	6	70	30	100
6	FSN5106T-A	Hindi/English	2	4	70	30	100
	Total		**20(16+4)**	**26**	**350**	**150**	**500**
		Semester –II					
1	FSN5201T-C	Food Commodity and Preparation	4	4	70	30	100
2	FSN5202P-C	Food Commodity and Preparation Practical	2	4	35	15	50
3	FSN5203T-C	Basics of Biochemistry	4	4	70	30	100
4	FSN5204P-C	Basics of Biochemistry Practical	2	4	35	15	50
5	FSN5205T-C	Principles of Human Nutrition	6	6	70	30	100
6	FSN5206T-A	Communication in Hindi/ Communication in English	2	4	70	30	100
	Total		**20(16+4)**	**26**	**350**	**150**	**500**

S. N.	Course Code	Course Title for Paper	Credits	Contact Teaching Hours per week	EOT- End of Term Assessment	ITC- In term of continuous Assessment	Total
		Semester –III					
1	FSN6301T-C	Nutrition Assessment for Health	4	4	70	30	100
2	FSN6302P-C	Nutrition Assessment for Health Practical	2	4	35	15	50
3	FSN6303T-C	Community Nutrition	4	4	70	30	100
4	FSN6304P-C	Community Nutrition Practical	2	4	35	15	50
5	FSN6305T-C	Problems in Human Nutrition	6	6	70	30	100
6	FSN6306P-S	Traditional Indian Foods	2	4	70	30	100
	Total		**20(14+6)**	**26**	**350**	**150**	**500**
		Semester –IV					
1	FSN6401T-C	Food Science	4	4	70	30	100
2	FSN6402P-C	Food Science Practical	2	4	35	15	50
3	FSN6403T-C	Basics of Diet Therapy	4	4	70	30	100
4	FSN6404P-C	Basics of Diet Therapy Practical	2	4	35	15	50
5	FSN6405T-C	Food Microbiology Hygiene and Sanitation	6	6	70	30	100
6	FSN6406P-S	Food Preservation and Storage	2	4	70	30	100
	Total		**20(14+6)**	**26**	**350**	**150**	**500**

S. N.	Course Code	Course Title for Paper	Credits	Contact Teaching Hours per week	EOT- End of Term Assessment	ITC- In term of continuous Assessment	Total
		Semester –V					
1	FSN7501T-E	Advances in Diet Therapy	4	4	70	30	100
2	FSN7502P-E	Advances in Diet Therapy Practical	2	4	35	15	50
3	FSN7503T-E	Sports Nutrition	4	4	70	30	100
4	FSN7504P-E	Sports Nutrition Practical	2	4	35	15	50
5	FSN7505T-E	Food Processing and Technology	6	6	70	30	100
6	FSN7506T-S	Research Methodology and Scientific Writing	2	4	70	30	100
	Total		**20(14+6)**	**26**	**350**	**150**	**500**
		Semester –VI					
1	FSN7601T-E	Institutional Food Service Management	4	4	70	30	100
2	FSN7602P-E	Institutional Food Service Management Practical	2	4	35	15	50
3	FSN7603T-E	Nutrition and Health Communication	4	4	70	30	100
4	FSN7604P-E	Nutrition and Health Communication Practical	2	4	35	15	50
5	FSN7605T-E	Public Health and Epidemiology	6	6	70	30	100
6	FSN7606T-S	Introduction to Food and Nutrition Entrepreneurship	2	4	70	30	100
	Total		**20(14+6)**	**26**	**350**	**150**	**500**

Scheme of Examination

All Question Papers for the End Semester will be set out of a maximum of 70 marks.
Scheme of examination for end of semester examination applicable to undergraduate courses (Pass course):

The question paper of semester Exam for the Discipline Specific Core Courses (DSC), Discipline specific elective (DSE), Ability Enhancement Course (AEC), Value Added Course (VAC) and Skill Enhancement Course (SEC) will be of 70 marks and it will be divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

i. B.Sc. (Bachelor of Science) in Food Science and Nutrition

3 years (6 semesters) of UGDP

ii. Introduction about the Program

Nutrition is the science of the relationship between diet and health. The purpose of the discipline of Nutrition Science is to explain the metabolic and physiological responses of the body to the diet. Nutritionists are health professionals who specialize in this area of study and students are trained to provide safe and evidence-based dietary advice and interventions in healthy and diseased persons of all ages.

At the interface between Food and Nutrition, students are familiarized on an advanced level with the development of new healthy eating trends. They are trained to tackle issues such as the nutritional significance of processed food in the diet, functional food items, the main effects of nutrition labelling and nutrition claims, catering technology and nutritional quality. Alongside developing current techniques in food analysis, food structure, and food processing, they are imparted advanced lessons in current health topics such as heart disease, antioxidants and their health benefits, functions of food and nutrients, and their relationship to health and disease. In view of the COVID -19 Pandemic the course lays special emphasis on immunity and health, essential nutrients which are immune boosters and Lifestyle modification for healthy living. The course offers a comprehensive multidisciplinary study of the nature and quality of food supply and the nutritional requirements for health during the life span. It includes coursework in areas of Nutrition, Food Service Management, Therapeutic Nutrition, Food Science, Biochemistry, Physiology, Food Analysis, Public Nutrition etc.

iii. Objectives of the Program:

The B.Sc. in Food Science and Nutrition program mainly focuses on the interface between Human Nutrition, Dietetics and FoodScience. The mission of the program is to generate knowledge about foods through research, and to apply and disseminate knowledge through teaching and outreach, with the goal of ensuring the availability of safe, nutritious, appealing food, with minimum environmental impact, for the benefit of all people.

iv. **Employment and Entrepreneurial Scope or Benefits of studying the subject of the program:**The B.Sc. Food Science and Nutrition course graduates can work as a Fitness Trainer & Aerobics Instructor, Food Research Analyst, Food Services Manager, Food Technologist, Nutritionist & Dietician, Teacher & Lecturer etc.

v. **Learning Outcomes of the Program:**

- Students will be able to understand the science underlying the properties and reactions of various food components.
- Students will learn to apply fundamental knowledge of food science and chemistry, microbiology, nutrition, processing, and food analysis towards developing new food products and evaluating their quality using objective and subjective methodologies.
- Students will be able to understand the principles of food quality control management systems and the national and international standards that are used in the food industry.
- Students will be able to apply critical thinking and analyze current issues relevant to food science and quality control and apply the principles of food science in practical, real-world situations and problems.
- Students will be able to understand the underlying principles and the process of scientific research as a precursor to undertaking nutrition science research for establishing and utilizing the functional properties of various foods for optimal health and wellbeing.
- Students will able to apply various principles of nutrition in the treatment of different disease condition.
- Students will understand about classification, pathogenesis, diagnosis, aetiology and dietary management of various diseases.
- Students will be able to understand the laws used in food labelling regulation for food safety.
- Students will be able to apply critical thinking and analyze food labels.
- Students will learn to apply fundamental knowledge of food science and chemistry, microbiology, nutrition, processing, and food analysis towards developing new food products and evaluating their quality using objective and subjective methodologies.
- Students will be able to utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease.

vi. **Minimum Eligibility: For the UG Programs (Level 5):** Senior Secondary School Leaving Certificate or Higher Secondary (12th Grade) Certificate obtained after successful completion of Grade 12 or equivalent stage of education corresponding to Level-4 with minimum 50% of OGPA/CGPA on any Grade Point Scale. It will be 5% lower for SC / ST /OBC/SBC category and Persons with Different Abilities.

vii. **Criteria for Selection of Students for Admission:** Merit list as per the prospectus of Current Session

viii. **Permissible Number of Seats for one section**: **30**

ix. **Concepts:**

Academic Year: Two consecutive (one odd + one even) semesters constitute one academic year.

Assessment: The process of determining a student's achievement of expected learning outcomes involving the use of a range of methods and practices.

Award of a qualification: Award of qualification occurs when a student has met the requirements of the qualification and the qualification is certified by a competent body the

provision of qualification.

Choice-Based Credit System (CBCS): The CBCS provides choice for students to select from the prescribed courses.

A course is a component of a program of learning which was earlier called 'paper'. It may comprise lectures/tutorials/laboratory work/field work/outreach activities/project work/vocational training/ viva/seminars/term papers/assignments/presentations/e-content/self-study etc. or a combination of some of these. Courses are categorised as

1. **Core Course**-Series of essential and fundamental courses without which the certificate/diploma/degree cannot be awarded, so a student will have to register all Core courses in the chosen discipline(s) mentioned for any semester to qualify for a certified academic qualification under a specific scheme.
2. **Elective course** -Courses of different categories that are offered at any Department out of which a student may pick courses of required credits.

   A Department or Centre of the University or an affiliated college will offer elective courses on the basis of availability of infrastructure and expertise of the faculty. The list of electives being offered must be displayed on the Notice Board of the Department/Centre/College.

   2.1 **Discipline Specific Electives**: Elective courses offered under the specific discipline/subject of study shall be referred to as Discipline Specific Electives (DSE). This also includes course on Dissertation/Projects/Field Studies and Seminars (1 credit).

   2.2 **Minor discipline:** Courses in this category mayhelp a student to gain a broader understanding beyond the major discipline. For example, if a student pursuing an Economics major obtains a minimum of 16 credits from a bunch of courses in Statistics, then the student will be awarded a B.A. degree in Economics with a Minor in Statistics.

   Students will have the option to choose courses from specific disciplines (Discipline specific electives)/interdisciplinary minors and skill-based courses relating to a chosen vocational education program. Students who take enough courses of 16 credits or more, 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 and vocational stream at the end of the second semester, after exploring various courses.

   2.3 **Ability Enhancement Courses**: Courses based on content that leads to enhancement of personal abilities of the student. English/Hindi/Modern Indian Language Communication may be chosen in all Bachelor's Degree programs.

   2.4 **Skill Enhancement Courses**: Courses are skill-based and are aimed at providing hands-on training, competencies, soft skills, and practical skills to enhance the employability of students. These courses may be chosen from a pool of courses designed to provide skill-based knowledge and should contain both theory and lab/hands-on/training/fieldwork. The main purpose of these courses is to increase their employability. It includes Internship of 1, 1.5 or 2 months (2, 3 or 4 credits, respectively) and Vocational Courses.

   2.5 **Multidisciplinary/Interdisciplinary Elective Courses**: Courses from a discipline of interest that has not been chosen by the student as major or minor discipline.

   2.6 **Value Added Courses**: Courses on Understanding India, Environmental Science/Education, Digital and Technological Solutions, Health, Wellness, Yog education, Sports, and Fitness. Community Engagement Courses, Participation in activities related to National Service Scheme (NCC), National Cadet Corps (NCC), adult education/literacy initiatives, mentoring school students, and other similar

activities.

3. **Course Leader**: A teacher, who is in charge of managing a course for the entire semester. The duties include registration of students, arrangement of class, delivery of lectures or other academic activities, assessments, tabulating awards and communicating them to the Head of the Department.
4. **Credit or Academic credit** is a unit by which the course work is measured. It determines the number of hours of instructions required per week. For example- a three-credit course in a semester means three one-hour lectures per week with each one-hour lecture counted as one credit.
5. **Credit** is assigned to a particular course with due regard to specified Learning Outcomes, Educational Components and Workload requirements including 1 hour/week of tutorials. It also includes time for attendance, 10 minutes of discussion for each credit and time for continuous assessment.
6. **Each course** may be of different size and credit allowing student to pick specific courses and add on to their desired scheme of specialization in an easy and comfortable manner. Experiments taking longer, do not get extra weightage based on duration.
7. **Credit allocations for different academic activities**

	Credit	**Classes per week**	**Hours Per week**	**Hours Per Semester**	**Credit limits**
Theory (Lecture)	1	1	1	15	Max 5
Tutorial	1	1	1	15	Max 5
Practical	1	1	2*	30	Max 3
Dissertation/Project/Field Study	1	1	2*	30 (includes 5 contact hours with guide for discussion and guidance)	Min 4
Seminar	1	1	2		1 or 2
Internship or On-Job Experience or Community Engagement [Max 8 weeks (380 hours Min 4 weeks (96 hours)]	1	1	3	45	2-4

*Includes 0.5 h/week for preparation beforehand, writing report, assessment preparation and undergoing assessment.

8. **Credit Point**: It is the product of grade point and number of credits for a course
9. **Cumulative Grade Point Average (CGPA)**: It is a measure of overall cumulative performance of a student over all semesters. The CGPA is the ratio of total credit points secured by a student in various courses in all semesters and the sum of the total credits of all courses in all semesters. It is expressed in up to two decimal places.
10. **Exit qualification:** A qualification that may be awarded on completion of an intermediate point of studies, that is after two semesters or four semesters of study in a six-semester Bachelor's degree program
11. **Grade Point:** A numerical weightage allotted to each letter grade on a 10-point scale. Letter Grade represents an index of the performance of students in a specific course.
12. **Graduate attributes:** The quality and features or characteristics of an individual, including the knowledge, skills, attitudes, and values that are expected to be acquired by a graduate through studies at the HEI such as a college or university. The graduate attributes include capabilities that help strengthen abilities for widening current

knowledge base and skills, gaining new knowledge and skills, undertaking future studies, performing well in a chosen career, and playing a constructive role as a responsible citizen in society. The graduate attributes also describe a set of characteristics/competencies that are transferable beyond the study of a particular subject area and program contexts in which they have been developed. Graduate attributes are fostered through meaningful learning experiences made available through the curriculum, the total college/university experiences, and a process of critical and reflective thinking.

13. **Internship:** A course requiring students to participate in a professional activity or work experience, or cooperative education activity with an entity external to the education institution, normally under the supervision of an expert of the given external entity. A key aspect of the internship is induction into actual work situations**.** Internships involve working with local industry, government or private organizations, business organizations, artists, crafts persons, and similar entities to provide opportunities for students to actively engage in on-site experiential learning.
14. **Learning outcomes:** Statements of what a learner knows, understands, and can do on completion of a learning process and a program/course of study.
15. **Letter Grade:** It is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P and F.
16. **Programor Program of Learning:**An educational program leading to the award of a Degree, Diploma or Certificate is a **Program of Learning**.
17. **Program learning outcomes:** Statements of what a learner is expected to know, understand and/or be able to do after completion of a designated program of study/ learning which leads to the award of a qualification. Program learning outcomes include subject-specific and generic learning outcomes, the achievement of which the students of a specific program of study/learning should be able to demonstrate for the award of a certificate/Diploma/Degree, as well as the knowledge and skills that prepare students for further study, employment, and responsible citizenship. Program learning outcomes help ensure comparability of learning levels and academic standards across colleges/universities and provide a broad picture of the level of competence of graduates of a given program of study. A program of study may be mono-disciplinary, multi-disciplinary, inter-disciplinary or trans-disciplinary.
18. **Qualification types:** Sequential levels of qualifications such as the
    Certificate (Higher education) awarded on completion of the first year of undergraduate education program,
    Diploma (Higher education) awarded on completion of the second year of undergraduate education program,
    3-year Bachelor's degree,
19. **Semester**: Each semester will consist of 15-18 weeks of academic work equivalent to 90 actual teaching days. The odd semester may be scheduled from July to December and even semester from January to June.
20. **Semester Grade Point Average (SGPA)**: It is a measure of performance of work done in a semester. It is ratio of total credit points secured by a student in various courses registered in a semester and the total course credits taken during that semester. It shall be expressed up to two decimal places.
21. **Skills:** Skillsrefer to what a graduate can do. The ability to use the acquired knowledge and know-how to perform and accomplish the assigned tasks related to the chosen field(s) of study and/or work or professional practice. It refers to what a learner should be able to do. Skills could be described in terms of their kinds and complexity such as (a) cognitive and creative skills involving the use of logical, intuitive, and critical

thinking; (b) practical skills involving manual dexterity and the use of methods, materials, tools and instruments that are required to complete the tasks associated with the chosen fields of study, work or professional practice, including basic skills involving dexterity and the use of methods, materials, tools, and instruments used for performing the job, including digital literacy and skills needed for that level; (c) communication skills involving the ability to listen, read texts analytically and present ideas and thoughts in writing and orally; (d) interpersonal skills; (e) soft skills that enable an individual to fit in at a workplace, and (f) generic skills (high-order transferable skills) that are common to almost all complex endeavours and apply across all specific fields of study.

22. **Summer term**: A summer term is for eight weeks during summer vacation. Internship/apprenticeship/work-based vocational education and training can be carried out during the summer term, especially by students who wish to exit after two semesters or four semesters of study.
23. **Transcript or Grade Card or Certificate:** Based on the grades earned, a graded certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (code, title, number of credits, grade secured) along with the SGPA of that semester and CGPA earned till that semester.
24. **Types of qualifications, minimum credit requirement, qualification title/nomenclature and NHEQF levels**

Level of Course	**Type of qualification**	**Program duration and exit**	**Minimum required credits**	**Qualification title/nomenclature and program duration**
5	Undergraduate Certificate	1 year (2 semesters) of UGDP + An Exit 4 credit SEC	40	Undergraduate Certificate Food Science and Nutrition
6	Undergraduate Diploma	2 years (4 semesters) of UGDP + An Exit 4 credit SEC	80	Undergraduate Diploma Food Science and Nutrition
7	Bachelor's Degree	3 years (6 semesters) of UGDP	120	Bachelor of Science (B.Sc.) Food Science and Nutrition

25. Credit registration

On the first working day of each semester, all new admittees must be given an orientation explaining the new scheme of teaching and learning, resources of the institute, the process of registration of courses, adjustment of timetable, etc.

Students once registered will be allowed to appear in subsequent Even and Odd semesters for accumulation of credits and ultimately the award of certificate/ diploma/ degree on an accumulation of minimum credit required for such award.

A student will NOT be required to earn minimum credit from earlier semesters for admission and appearance in subsequent semesters.

As such declaration of the last semester's examination result will have no bearing on admission in the subsequent semester and its commencement.

The maximum number of students to be registered in each course shall depend upon the physical facilities available while a minimum must be decided by the respective Board of studies/Committee of course.

The maximum number of credits that a student may opt in a Semester shall not exceed 36 hours per week of teaching, and he/she shall be required to register for such number of courses accordingly.

If any course shows another course(s) as **pre-requisite**, then it must be opted only when the course listed as pre-requisite has been completed. Similarly, there may be courses with **co-requisites**, i.e. they are complete when the co-requisites are also completed and thus cannot be opted in isolation.

26. **Time for credit registration:** Credit registration shall be over within seven days of the commencement of a Semester and no change except Withdrawal shall be permissible after that date.
27. **Admission fee**: As per prospectus of Current Session
28. **Membership of Students' Union:** Only those students who have registered 20 or more credits in a semester, will be eligible for the membership of Students' Union. The membership may further be modified in the light of this scheme of imparting knowledge.

x. Semester wise presentation of scheme(s): Mentioned in first page of the scheme.

xi. Unique Course Code (UCC)

A course shall be identified by a unique course code (UCC) designated by a string of nine alphanumeric characters and a course title. In a course code, the first three alphabetic characters of the string indicate the core subject or disciplines or inter-disciplines.

The fourth alphanumeric character will be a digit indicating the level of course as below:

Level Code I year (1 and 2 Sem.)	Level Code II year (3 and 4 Sem.)	Level Code III year (5 and 6 Sem.)
5	6	7

The Fifth character will be '0' zero for ability enhancement courses in English/Hindi/Modern Indian Languages and Value-Added Courses in Environment. For all others, this digit must indicate the number of semesters (1 to 8) in which a core course will be offered or an elective course may be offered. (As elective courses may be grouped odd or even semester-wise for reducing the workload despite offering a good number of elective courses).

The Sixth and Seventh characters (01 to 99) taken together will indicate the unique ID of the component for the group defined by the first five characters.

The eighth character shall indicate type as T for Theory and Tutorial, P for Practical or Fieldwork, and O for Others.

Following this, it must be marked with a dash and either A, C, E, S or V to indicate Ability Enhancement Course (A), Discipline Specific Core Course (C), Discipline Specific Elective Course (E), Skill Enhancement Course (S) or Value-Added Course (V), respectively. S, E and V may also be added after C or E, if the disciplinary courses qualify for them.

xii. Scheme for assessment

All courses except for the Seminars/Workshop/Training in a UG program shall have continuous assessment which would include In Term Continuous (ITC) assessment (30% marks) by the course leader and an End of the Term (EOT) examination (70%) at the level of the University. Students have to pass End of the Term (EOT) examination and In Term Continuous (ITC) assessment separately.

No student shall be permitted to repeat any course only for the purpose of improving the

grade.

In-Term Continuous (ITC) Assessment: It is mandatory for all students to participate in all the in-term continuous assessment and course-related activities for award of the marks. Therefore, a schedule of ITC assessment shall be prepared by the Course Leader and informed to the students at the very beginning of the semester.

Method(s) of the ITC assessment must be such that they evaluate those learning outcomes of the course that might not be assessed in the End of the Term Examination. The process may include formative assessment followed by Test and/or Term paper and/or quizzes and/or assignments and/or case demos/study and/or presentations and/or write ups and/or reflections on a field trip/excursion/educational tour and/or viva voce and/or attendance etc.

The BoS/CoC may provide the distribution of such assessment activities separately for each course.

In-term Continuous Assessment marks shall be displayed within a week from the date of conduct of examination and all corrected answer books with comments if any, shall be shown to students.

S. No.	Item	Max Marks
1	Tests/Term Papers/Quizzes	10
2	Assignments (May include Case Demos/Presentations/Write ups/ Viva voce, reflections etc.)	10
3	Attendance (It helps in developing discipline amongst students)	10
	Total	30

Marks for attendance may be given as below:

Attendance (%)	Marks out of 5	Marks out of 10	Attendance (%)	Marks out of 5	Marks out of 10
75	0.5	1	86-88	3	6
76	1	2	89-91	3.5	7
77-79	1.5	3	92-94	4	8
80-82	2	4	95-97	4.5	9
83-85	2.5	5	98-100	5	10

Seminars (Tentative guideline may be as below):

A seminar leader nominated by the Head of the Department to act as a guide to the students will assign topics for the seminars to the students. The seminar leader will give schedule for providing abstracts, showing presentations to him/her, date and time of the final presentation and submission of the write-up of the seminar. Student will present an Abstract not exceeding 500 words along with a few important references. Students will present their seminars Presentations in front of the faculty, research scholars and students of the Department as per the schedule provided by the seminar leader under information to the Head of the Department and faculty and displayed on the Notice Board.

The attendance, abstract and write up will be assessed by the seminar leader (30 marks). Final presentation (70) of the seminar will be assessed by the seminar leader and Head of the Department or a faculty member nominated by the Head of the Department.

After the End of the Term Examination, the records of evidence for continuous assessment

in each course must be maintained for one year by the Department concerned, after which it must be destroyed.
End of the Term Assessment: A schedule of EOT examinations be prepared by the Examination Section, uploaded on the website and displayed at the departments/colleges at least one-month ahead of the conduct of the examination.
BOS/CoC must mention about the requirement of Evaluator or Evaluator panels, wherever required.
No student who has less than 75% attendance in any course shall be permitted to attend the end-semester examination and s/he shall be given grade of FA-failure due to lack of attendance. S/He may repeat such course the next time it is offered.
Conduct of End of the Term Examination and Evaluation
EOT Examination shall be conducted by the University by inviting Question Papers from the External Examiners except for the Seminars/Skill based training/workshop courses.
An alternative Question paper may also be made available for any contingency.
Scheme of the End Semester question paper
The duration of the end semester examination shall be 3 hours.
All Question Papers for the End Semester will be set out of a maximum of 70 marks.
Scheme of examination for end of semester examination applicable to undergraduate courses (Pass course).

The question paper of semester Exam for the Discipline Specific Core Courses (DSC), Discipline specific elective (DSE), Ability Enhancement Course (AEC), Value Added Course (VAC) and Skill Enhancement Course (SEC) will be of 70 marks and it will be divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Except for the Seminars/skill-based training/workshop-based courses, the answer books of end-term examination (theory) should be evaluated by the External Examiner must be assessed by the examiner nominated by the Head of the Department concerned.
Practical examinations: There will be a panel of examiners consisting of one external and one internal examiner. Only practical of core papers will be conducted and evaluated by external Examiner and practical of all other papers will be conducted and evaluated by Internal examiner.
Following may be the distribution of marks in practical courses:

S. No.	Item	Maximum marks
1	Experimental work assigned during examination	25
2	Attendance	5
3	Record	10
4	Viva voce	10

xiii. Grading and Grade Card

The Examination Section shall prepare two copies of the results, one with marks to be sent to the Department and another for the University Office, not later than 15 days after the last day of semester examinations.

In this system, **grade Point** is a numerical weight allotted to each letter grade on a 10-point scale. **Credit Point** is the product of grade point and number of credits for a course and **Letter Grade** is an index of the performance of students in a said course. Grades are denoted by letters O, A+, A, B+, B, C, P, F and FA.

Performances of students in each course are expressed in terms of marks as well as in Letter Grades. In case of fractions the marks shall be rounded off to nearest integer. The class interval for the purpose of awarding the grades can be arrived at by dividing the difference between the highest mark secured and the minimum pass mark by 7 as there are seven passing grades. The formula is given below:

K = (X-40)/7

Where, K = class interval, X= the highest mark in the subject.

The grades will be awarded as shown in the following table:

Range of Marks in %	Letter Grade	Points for Calculation of GPA/ C
X to (X-K)+1	O	10
(X-K) to (X-2K)+1	A+	9
(X-2K) to (X-3K)+1	A	8
(X-3K) to (X-4K)+1	B+	7
(X-4K) to (X-5K)+1	B	6
(X-5K) to (X-6K)+1	C	5
(X-6K) to 40	P	4
Below 40	F	0
Failure due to lack of attendance	FA	0

K should not be rounded off to less than two decimal places. The numbers given in Range of Marks column, (X-K), (X-2K), (X-3K), etc., can be rounded off to the nearest whole number.

Absolute grading may be done as below :

Range of Marks in %	**Letter Grades**	**Points for Calculation of GPA/ CGPA**
81-100	O	10
71-80	A+	9
66-70	A	8
61-65	B+	7
56-60	B	6
50-55	C	5
40-50	P	4
<40	F	0
Failure due to lack of attendance	FA	0

The GPA and CGPA will be calculated as weighted average of points secured by the student in all the courses registered by him/her. The weights are the number of credits for each course. For example, a student getting an A+ grade in 4 credit course, A grade in 2 credit course, O grade in a 3 credit course and F grade in a 3 credit course will have a GPA as (9x4 + 8x2 +10x3 + 0x3)/(4+2+3+3)=(36+16+30+0)/12=82/12 = 6.83 out of 10.0; GPA = 6.83. The CGPA shall also be calculated on similar lines taking all subjects taken by the

students in all semesters.
Student with a CGPA of 9.0 and above and who did not fail in any of the courses taken by him/her shall be awarded Distinction.
A CGPA of 6.0 and above shall be placed in First class.
A student who has secured less than 40% marks in any course gets F Grade and he is treated as failed in that course.

Conditions for the Award of the Degree/Diploma/Certificate

Students opting out with the UG Certificate/UG Diploma/UG Degree may be permitted to get entry into the Program within a maximum period of seven years to complete their Bachelor's Degree.

Exit and Re-entry: Student has the freedom of learning at his/her own pace to complete the degree. S/he will have to register him/herself on Academic Bank of Credits where his/her courses and grades will go on accumulating.
The validity of credits earned and kept in the Academic Credit Account for the purpose of re-entry will be to a maximum period of **seven yearsor as specified by the ABC for different disciplinary or fields of learning to allow the redemption of credits after the date of earning such credits**.
After seven years, re-entry into a program of study will be based on the validation of prior learning outcomes.
Lateral entry into the program of study at a particular NHEQF level will be based on the validation of prior learning outcomes including those achieved outside of formal learning or through learning and training in the workplace or in the community, through continuing professional development activities, or through independent/self-directed/self-managed learning activities.
Credits once earned will stand EARNED in the student's record at the University.

Grade Card

The University Office shall issue a Grade card for the students containing the marks and grades obtained by the student in the previous semester and Grade Point Average (GPA) and Cumulative Grade Point Average (CGPA).

SEMESTER I

FSN5101T-C	**Fundamental of Food and Nutrition**	Credit: 4 4Hrs/Week
Duration of Exam: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

divided into three parts, Part- A, Part B and Part C.

Course outcome:

1. Students will impart knowledge pertaining to different food groups, its nutritive value and importance in daily diet.
2. Students will understand the functions of food and the role of various nutrients, their requirements, effect of deficiency and excess.
3. Students will be familiarized with different methods of cooking, their advantages and disadvantages.

Topics

UNIT I

1. **Introduction to various terms used in Foods and Nutrition Terms**
   Health , Food ,Nutrients ,Nutrition, Under nutrition and Over nutrition , Estimated Average Requirement (EAR), Recommended Dietary Allowances (RDA), Tolerable Upper limit (TUL) Recommended Daily Intake (RDI)
   Total Energy Requirement (TER) , Basal Metabolic Rate (BMR)
2. Classification of Foods based on Food Groups, Functions of Foods, Balanced and healthy diet
3. Methods of Cooking: 1. Introduction to various cooking terms 2. Modes of heat transfer 3. Moist heat methods cooking 4. Dry heat methods: a) Air as medium of cooking b) Fat as medium of cooking frying 5. Combined (Moist and dry) Methods 6. Other cooking methods like Germination, Fermentation, Braising, Microwave cooking, Solar cooking.7. Advantages and Disadvantages (Nutrient Losses) of Cooking and methods to prevent nutrient loss

UNIT II

4. Food Groups- Farm Foods
   1. Cereals and Products a) Types of cereals and cereal products: wheat, rice, millets, maize, oats, flaked rice, puffed rice, wheat flour and types c) Composition and nutritive value d) Principles and properties: Germination (Amylase Rich Foods ARF), Parboiling, Gelatinization, Dextrinization, Gluten formation e) Anti-nutritional factors present and methods to eliminate them

2. Pulses and Legumes a) Classification b) Composition and nutritive value c) Methods of cooking: Germination, Fermentation, Boiling d) Anti-Nutritional factors and methods to eliminate them

3. Fruits, Vegetables, Roots and Tubers a) Classification b) Composition, Nutritive value and Role in cookery c) Conservation of nutrients in fruits and vegetables d) Plant pigments and antioxidants from plants: Chlorophyll, Carotenoids, Anthocyanins, Anthoxanthins, Lycopene

4. Salt, Sugar and Jaggery a) Culinary role b) Nutritive value

5. Nuts and Oil seeds a) Composition and Nutritive value b) Importance in the daily diet

c) Role of Nuts and oilseeds in Cookery

5. Introduction to Food Groups- Animal Foods

1. Milk and Milk Products: a) Composition and Nutritive value b) Fortified milk c) Role of milk and its products in cookery

2. Eggs a) Basic structure of an egg b) Composition and Nutritive value c) Quality evaluation and grading of eggs

3. Meat a) Definition b) Sources and classification c) Nutritive value d) Post mortem changes in Meat: Rigor mortis, ageing

UNIT III

6. Introduction to Macro and Micro Nutrients

A. Macronutrients

1. Carbohydrates a) Definition and classification of carbohydrates b) Functions of carbohydrates c) RDA, sources and concept of glycemic index d) Consequences of excess of carbohydrates in diet (overweight, obesity and diabetes)

2. Proteins a) Definition and classification of proteins b) Functions of proteins c) Concept of Biological value/ complete protein d) RDA and sources of proteins e) Deficiency disorders of protein (Protein Energy Malnutrition)

3. Lipids a) Definition and classification of lipids b) Functions of lipids f) RDA and sources of lipids g) Consequences of excess of lipids in diet - heart diseases

B. Micronutrients

1. Fat soluble vitamins: Vitamin A, D, E, K a) Properties and Functions b) Dietary sources and RDA c) Deficiency Disorders of fat soluble vitamins

2. Water soluble vitamins: Vitamin B complex (B1, B2, B3, B6, B12) and Vitamin C a) Properties and Functions b) Dietary sources and RDA c) Deficiency Disorders of water soluble vitamins

3. Minerals: Calcium, Phosphorus, Iron, Iodine a) Properties and Functions b) Dietary sources and RDA c) Deficiency Disorders of water soluble vitamins

References:

1. Sunetra Roday (2017). Food Science and Nutrition, Oxford University Press, ISBN-13: 978-0-19-807886-9/ ISBN-10: 0-19-807886-2 2.
2. T. Longvah R. Ananthan K. Bhaskarachary K. Venkaiah (2017). Indian Food Composition Tables (IFCT),, Indian Council of Medical Research, National Institute of Nutrition, ASIN: B076NMYR4P
3. Srilakshmi B (2015). Food Science. Sixth edition, New Age International, New Delhi, ISBN 10: 8122438091 ISBN 13: 978812243809
4. Sethi Mohini, Eram Rao (2013). Food Science Experiments and Applications. Second edition. CBS Publishers, New Delhi, ISBN 978-81-239- 1693-4
5. Swaminathan M (2010). Handbook of Foods and Nutrition. Published by: Ganesh and Co. Pvt. Ltd. Madras, ISBN-10: 812041795X / ISBN13: 978-8120417953

6. Maney S (2008). Foods, Facts and Principles, 3rd Edition Published by Wiley Eastern, New Delhi. ISBN- 9788122422153 / ISBN 8122422152
7. Robinson , C.H., Lawler, M.R. Chenoweth W.L. and Garwick A.E. (1986): Novel and Therapeutic Nutrition, 17th Edition, Macmillan Publishing Co.
8. Swaminathan. M.S. (1985): Essentials of Food and Nutrition VI: Fundamentals Aspects, VII Applied Aspects.
9. Hughes, O, Bennion, M. (1970) : Introductory Foods, 5th Edition, Macmillan Company .
10. Williams, S.R. (1989): Nutritional Diet Therapy, 4th Edition, C.B. Mosby C

FSN5102P-C	**Fundamental of Food and Nutrition Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

1. Students will acquire skills in Food Preparation Techniques
2. Students will understand appropriate method of cooking for preparation of specific food products

Contents:

1. Use and care of Kitchen Equipment
2. Controlling techniques
    a) Weight and Measures Standard and Household Measures for Raw and Cooked Foods.
    b) Recipe Evaluation of a Product
3. Food preparation and Classifying Recipes as Good, Moderate or Poor sources of specific Nutrients. Amount of ingredients to be used in standard recipe in reference to portion size.
    a) Beverages – Tea, Coffee, Cocoa, Fruit juice, Milk , Milk shakes
    b) Cereal and flour mixtures – Basic preparations.
        i. Boiled rice and Rice Pulao
        ii. Chapatti, Poori and Paratha
        iii. Sandwiches
        iv. Pastas
        v. Pancakes
        vi. Biscuits
        vii. Cookies
        viii. Cakes
4. Vegetables
    a) Simple Salads
    b) Dry Vegetables
    c) Curries
5. Fruits
    a) Fruit Salad
    b) Fruit Preparations using Fresh and Dried Stewed Fruits.
6. Milk
    a) Curds, Paneer and their commonly made preparations.

b) Milk based simple desserts and Puddings – Custards, Kheer, Ice-cream.

7. Soups – Basic Clear and Cream Soup.
8. Snacks.
9. Peanut Chikki, Til Laddoo.

FSN5103T-C	**Nutrition Through Life Cycle**	Credit: 4 2Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Students will enable to understand the basics principles of meal and its applications
2. Students will enable to understand planning of meal using food exchange system through life cycle
3. To improve the understanding level stages pregnancy and lactation & their growth and development
4. To enhance skill practical knowledge of students regarding meal planning
5. Students will enable to understand the process of growth and development from birth until adulthood.

Topics

UNIT I

1. **Concept of nutritionally adequate diet and meal planning**
   a. Importance of meal planning
   b. Factors affecting meal planning.-Nutritional, Socio-cultural, Religious, Geographic, Economic, Availability of time and material resources

2. Nutrition During Pregnancy- Physiology of pregnancy, factors (non-nutritional) affecting pregnancy outcome, importance of adequate weight gain during pregnancy, antenatal care and its schedule, Nutritional requirements during pregnancy and modification of existing diet and supplementation, nutritional factors affecting breast-feeding. Deficiency of nutrients and impact- energy, protein iron, folic acid, calcium, iodine. Common problems of pregnancy and their management- nausea, vomiting, pica, food aversions, pregnancy induced hypertension, obesity, diabetes. Adolescent pregnancy.

UNIT II

3. Nutrition during Lactation- Physiology of Lactation, Human milk composition, factors affecting breastfeeding, Nutritional requirements during lactation and dietary management, food supplements, Galactogogues, preparation for lactation (prenatal breastfeeding skill education), feeding of problems due to- sore nipples, engorged breast, inverted nipples etc.

4. Nutrition during Infancy- Infant physiology relevant to feeding and care. Breast feeding- Colostrum, its composition and importance in feeding. Initiation of breast feeding. Nutritional and other advantages of breastfeeding. Introduction of complementary foods, initiation and management of weaning, breast feeding etc. Bottle feeding- circumstances under which bottle feeding is to be given. Care and sterilization of bottles. Preparation of formula. Mixed feeding- breast feeding and artificial feeding. Teething. Immunization.

UNIT III

5. Management of preterm and low birth weight children.
6. Nutritional needs, Dietary management and nutritional problems of Toddlers, Preschool and School going children .
7. Nutritional needs, Dietary management and nutritional problems of Adolescents and Adulthood.

References

1. Gosh, S. (1992): The Feeding and Care of Infants and Young Children VHAI, 6th Ed., New Delhi
2. Swaminathan , M. (1985): Esssentials of Food and Nutrition, Vol. I and II. Ganesh & Co. Madaras.
3. King, M.H., King, F.M.A., Morley, D., Burgess, A.P. (1972): Nutrition for Developing Countries, ELBS Oxford University Press.
4. Indian National Code for Protection and Promotion of breast feeding, Govt. of India. Ministry of Social Welfare, New Delhi, 1983.
5. Indian Council of Medical Research (1989): Recommended Dietary Intakes for Indians.
6. Waterlow, J.C.(1992): Protein Energy Malnutrition, Edward Arnoid.
7. WHO, (1978): A Growth Chart for International Use in maternal and Child Health Care,Geneva.

FSN5104P-C	**Nutrition Through Life Cycle Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

1. Students will able to Apply the knowledge regarding the nutritional requirements of mothers and children in various circumstances.
2. Students will able to Plan appropriate diets to fulfil nutritional needs in pregnancy, lactation and for children of different ages.

3. Students will able to Monitor growth of children.
4. Students will able to Counsel mothers to take appropriate action to prevent growth faltering and to rehabilitate malnourished children.
5. Students will able to Train health workers for growth monitoring and promotion.

Contents

Planning and preparation of diets for different age groups at different socio-economic and activity levels in relation to special nutrient requirements.

a. Pregnancy
b. Lactation
c. Infancy
d. Pre-school Child
e. School Child
f. Adolescence
g. Adult

FSN5105T-C	**Introduction to Physiology and Anatomy**	Credit: 6 6Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 35 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 10 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 5 Marks. Total 25 Marks.

Course Outcomes:

1. To sensitize the students about the Surface Anatomy and the directional terms related to the human body
2. To make the students aware about the Basic structural and functional units of life
3. To update the students about the various Organs and its systems with emphasis to its importance and role
4. To improve the understanding regarding the output and role of organ systems in the human body
5. To develop skills of the students about the physiology during exercise theoretically and practically

Topics

UNIT I

1. **Structure and Function of cell**
2. **Cardiovascular system**
    a) Blood and its composition
    b) Blood groups

c) Coagulation of blood, Bleeding time, clotting time, Erythrocyte Sedimentation rate
d) Structure and functions of heart
e) Heart rate, Cardiac output, blood pressure and its regulation. Measurement of blood pressure

3. Musculoskeletal System

a) Type of muscles, functions
b) Skeletal system- formation of bone and teeth.

UNIT II

4. Reproductive system

a) Structure and functions of sex glands and organs including hormones
b) Menstrual cycle
c) Physiology of pregnancy, Parturition, Lactation and Menopause

5. Excretory System

a) Structure and function of kidney, bladder, formation of urine
b) Normal and abnormal constituents of urine
c) Structure and function of skin
d) Regulation of temperature of body

6. Respiratory system

a) Structure of lungs
b) Mechanism of respiration and its regulation
c) O_2 and CO_2 transport in blood
d) Vital capacity and other volumes

UNIT III

7. Gastrointestinal System

a) Structure and function of various organs of GI Tract
b) Digestion and absorption of food and the role of enzymes and hormones.

8. Nervous System

a) Elementary anatomy of nervous system
b) Functions of different parts of brain in brief
c) Autonomic, Sympathetic and Parasympathetic nervous system.
d) Special senses

9. Human Genetics

a) Human chromosomes, the inheritance and variation in man
b) The genetics basis of human disease- Sickle cell anaemia, Haemophilia, Colour Blindness and Diabetes
c) Genetic counselling.

References:

1) Guyton, A.C., Hall, J.E. (1996): Textbook of Medical Physiology, 9th Ed. Prism Books (Pvt.) Ltd., Bangalore.
2) Winwood (1998): Anatomy and Physiology for Nurses, London, Edward, Arnold.
3) Wilson(1989): Anatomy and Physiology in health and illness, Edinburgh, Churchill Living Stone.
4) Chatterjee, C.C., (1988): A Textbook of Medical Physiology, London W.B. Sounder's Co.

FSN5106T-A	**Hindi/ English**	Credit: 2 2Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Course content of this paper as per syllabus provided by University

SEMESTER II

FSN5201T-C	**Food Commodity and Preparation**	Credit: 4 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course Outcome:

1. Students will be able to Understand factors to be considered during selection of basic commodities, raw and processed, and various aspects of their production and distribution.
2. Students will Know the qualities and standards of available commodities and their suitability for different purposes.
3. Students will Understand use of different commodities in various food preparations.

Topics

UNIT I

1. **Cereals and Millets - Cereal** Products Types of millets and uses, breakfast cereals.

    a) Structure, nutritional composition, processing, use in various preparations, selection and storage.
2. **Pulses and Legumes -** Structure nutritional composition and .Processing.Use in various preparations, selection and storage , .Anti nutritional factors.

UNIT II

3. **Milk and Milk Products - Types and nutritional** Composition,, quality assessment and cost:
    a. Processing, and uses in different preparations. .
    b. Shelf life and spoilage.

4. **Eggs -** Structure andnutritional composition, grade, quality, selection, storage and spoilage and use in different preparations.

5. **Meat, Fish and Poultry -** Structure and Nutritional composition, types, selection, purchase, storage, uses, Spoilage of fish, poultry and meat, uses in various preparations.

UNIT III

6. **Vegetables and Fruits -** types, selection, purchase, storage, nutritional aspects of raw and processed products and use in different preparations.
7. **Sugar and Sugar Products** - Types of natural sweeteners,,nutritional composition and processing selection, storage and use in cookery.
8. **Fats and Oils** - Types and sources (animal and vegetable), processing, uses in different preparations, storage, cost and nutritional aspects.Fat substitutes.
9. **Food Adjuncts** -Spices, Condiments, Herbs, Extracts, Concentrates, Essences, Food colours. Origin, classification, description, uses, specifications, procurement and storage.

FSN5202P-C	**Food Commodity and Preparation Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

1. Students will impart knowledge pertaining to different food groups, its nutritive value and importance in daily diet.
2. Students will understand the principles underlying changes in food characteristics during cooking.
3. To provide the students with basic knowledge of food groups. CO2: To train students different lab procedures in context to chemical properties of food.

Topics:

1. Introduction to practical - Weights and measures- their equivalents.
   a) Use and care of kitchen equipment. Table setting and service.

2. Preparing, Serving and evaluating food items

   a) Beverages - Fruit and milk based, punches, juices etc.
   b) Millet Cookery.
   c) Cereals - Variations in Paranthas, Purees, Rice pulao, Biryani, Lemon rice, Tamarind Rice, Dosa, Idli, preparations using Noodles, Macaroni, Spaghetti.
   d) Pulses - KhattaChanna, Rajmah, Sambhar etc. Vadas, Dhokla, Khandvi, Kadhi.
   e) Vegetables - Vegetable Koftas, Cutlets, Baked Vegetable dishes and Fancy preparations.
   f) Soups - Variations in soups.
   g) Salads & Salad dressings - Vegetable salads, whole meal salads, Frozen salads.
   h) Milk, Paneer, Cheese and Khoa preparations - Indian sweets: Barfis, GulabJamun, chennamurki Sandesh, Rasgulla.
   i) Desserts - Halwas, variations in ice cream, soufflé, baked and steamed desserts, other hot and cold desserts.
   j) Cakes - Variations: Creamed, Sponge-pastries, Swiss rolls etc.

k) Biscuits/Cookies and their variations, short crust pastry, Choux pastry, flaky pastry and their preparations.
l) Sandwiches - Open and Toasted.
m) Snacks - Savoury: Mathri, Kachoris, Samosa. Sweets: Ladoos, Gujiya, Malpua

References

1. Lavies, S. (1988): Food Commodities, Heinemann Ltd. London.
2. Hughes, 0. andBennion, M. (1970): Introductory Foods, MacMillan & Co. New York. Pyke, M. (1974): Catering Service and Technology, John MurreyPube, London.
3. Dowell, P., Bailey, A. (1980): The Book of Ingredients, Dorling Kinderley Ltd., London.
4. Phillip, T.E. (1988): Modern Cookery for Teaching and the Trade, 4th Ed., Orient Longman, Bombay. Pruthi, J.S. (1979): Spices and Condiments, National Book Trust, New Delhi.
5. Prevention of Food Adulteration Act (1994): Govt. of Indi

FSN5203T-C	**Basics of Biochemistry**	Credit: 4 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course Outcome:

1. Students will develop an understanding of the principles of biochemistry (as applicable to human nutrition).
2. Students will Obtain an insight into the chemistry of major nutrients and physiologically important compounds.
3. Students will understand the biological processes and systems as applicable to human nutrition.
4. Students will apply the knowledge acquired to human nutrition and dietetics.

Topics

UNIT I

1. Introduction to Biochemistry – Definition, objectives.
2. **Carbohydrates**- Definition, classification, structure and properties of
   a. Monosaccharides- glucose, fructose, galactose
   b. Disaccharides- maltose, lactose, sucrose
   c. Polysaccharides- dextrin, starch, glycogen.

2. **Proteins**- Amino acids, essential and non- essential amino acids
   a. Definition, classification, structure, properties and functions of proteins.

3.**Lipids**- Definition and classification of lipids, types of
   a. Fatty acids, significance of Acid value, Iodine value and saponification value,
   b. Classification and structure of phospholipids, structure of glycolipids, types and structure of sterols.
   c. Lipoproteins- definition and types

UNIT II

5.**Enzymes**- definition, types and classification of enzymes

   a. Definition and types of coenzymes
   b. Enzyme inhibition

6 Hormones- Biological role of hormones.

7 Nucleic Acid components of nucleic acid, structural of nucleic acid, mechanism of protein synthesis

UNIT III

8 Intermediary metabolism- general consideration.
- Carbohydrates- glycolysis, gluconeogenesis, glycogenesis, glycogenolysis, Citric acid cycle,
- Lipids- oxidation and biosynthesis of fatty acids.
- Proteins- deamination , transamination

9. **Biological oxidation**-
- Electron transport chain,
- Oxidative phosphorylation,

References-

1. West, E.S., Todd, W.R., Mason, H.S. and Van Bruggen, J.T. (1974): 4th Ed. Text book of biochemistry, Amerind Publishing Co. Pvt. Ltd.
2. White, A., Handlar, P., Smith E.L., Stelten, D.W. (1959): 2nd Ed. Principles of biochemistry, McGraw Hill Book Co.
3. Murray, R.K., Granner, D.K., Mayes, P.A. and Rodwell, V.W. (1993): 23rd Ed. Harper's Biochemistry. Lange medical book.
4. Lehinger, A.L., Nelson, D.L. and Cox, M.M. (1993): 2nd Ed. Principles of Biochemistry, CBS Publishers and distributors.
5. Devlin, T.M. (1986): 2nd Ed. Text book of Biochemistry with Clinical Correlations, John Wiley and sons.
6. Stryer, L. (1995): Biochemistry, Freeman WH and Co.

FSN5204P-C	**Basics of Biochemistry Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome

This course will enable the students to-

Be familiar with qualitative tests and quantitative determinations.

1. pH determination by pH meter
2. Collection of blood and serum
3. Estimation of the following parameters in blood
    a. Haemoglobin
    b. Blood group
    c. Recording of pulse rate and blood pressure
    d. Bleeding time, clotting time and erythrocyte sedimentation rate

4. Carbohydrates
    a. Qualitative analysis of carbohydrates, Molisch test, iodine test, benedict's test, Barfoed's test, Seliwanoff's test, phenyl hydrazine test
    b. Estimation of serum glucose
5. Fats
    a. Qualitative analysis of fats, solubility test, grease spot test, saponification test, Acrolein test, Salkowski and Liebermann Burchad's test
6. Proteins
    a. Qualitative analysis of protein – Biuret test, Ninhydrin test, Mulder test, Millon-Nasse's test, Hopkin cole's test, Aldehyde test, Sulphur test, Nitroprusside test
    b. Technique of electrophoresis
7. Colorimetry- general principle

References-

1. Oser, B.L. (1965): 14th Ed. Hawk's physiological chemistry, McGraw Hill book Co.
2. William, S.: 16th Ed. JAOAC, Official methods of analysis of the association of Official Analytical Chemists.
3. Indian Standards Institution, (1985): ISI Hand book of food analysis, Part I to XI. ManakBhawan, New Delhi.
4. Varley, H., Gowenlock, A.H. and Bell, M. (1980): 5h Ed. Practical and clinical chemistry, Vol-I, William Heinemann medical books Ltd.
5. Sundararaj, P. and Siddhu, A., (1995): Qualitative tests and quantitative procedures in biochemistry – a practical manual, Wheeler Publishing.

FSN5205T-C	**Principles of Human Nutrition**	Credit: 6 6Hrs/Week
Duration of Examination: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course Outcome:

1. Students will able to Understand the functions and sources of nutrients.
2. Students will be able to Apply the knowledge in maintenance of good health for the individual and the community
3. Students will Be familiar with factors affecting availability and requirements.

Topics

UNIT I

Concept and definition of terms Nutrition, Malnutrition and Health

1. Brief History of Nutritional Science. Scope of Nutrition.
2. Minimal Nutritional Requirements and RDA — Formulation of RDA and Dietary Guidelines - Reference Man and Reference woman.
3. **Energy in Human Nutrition** - Components of energy requirement, Energy Balance, Assessment of Energy Requirements, Deficiency and Excess.
4. **Carbohydrates** - Classification, Digestion and Absorption, Blood glucose and effect of different carbohydrates on blood glucose, Glycemic Index.
5. **Dietary Fibre** - Classification, composition, properties and nutritional significance

UNIT II

6.. **Proteins** - Brief classification, functions of protein, Assessment of Protein quality (BV, PER, NPU), Digestion and Absorption. Factors affecting protein bio-availability including anti-nutritional factors, Requirements, Deficiency.
7. **Lipids** - Digestion and Absorption, functions, Intestinal re-synthesis of triglycerides. Types of fatty acids, role and nutritional significance (SFA, MUFA, PUFA, Essential fatty acids).

UNIT III

8. **Minerals and Trace Elements** - Physiological role, bio-availability and requirements, sources, Deficiency and Excess (Calcium, Phosphorus, Magnesium, Iron, Fluoride, Zinc, Selenium, Iodine, Chromium).
9. **Vitamins** - Physiological role, bio availability and requirements, sources, deficiency and excess (Fat Soluble and Water soluble)
10. **Water** - Functions, requirements.

References

1. Guthrie, A.H. (1986): Introductory Nutrition, 6th Ed., The C.V. Mosby Company.
2. Robinson, C.H., Lawler, M.R., Chenoweth, W.L. and Garwick, A.E. (1986): Normal and Therapeutic Nutrition, 17th Ed. MacMillan Publishing Co.
3. Swaminathan, M. (1985): Essentials of Food and Nutrition, Vols. I and II. Ganesh and Co. Madras.
4. Gopalan, C. et al., (1991): Nutritive value of Indian Foods, Indian Council of Medical Research.
5. Indian Council of Medical Research (1989): Nutrient Requirements and Recommended Dietary Allowances for Indians, New Delhi.
6. FAO/VVHO/UNU: Technical Report Series, 724(1985) Energy and Protein Requirements, Geneva.

FSN5206T-A	**Hindi Communication/ English Communication**	Credit: 2 2Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Course content of this paper as per syllabus provided by University

Semester III

FSN6301T-	**Nutrition Assessment for Health**	Credit: 4 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Students can understand the various methods for assessing the nutritional status of individuals and groups
2. Gain an idea of the role of nutrients in specific nutrient deficiency states

Contents:

UNIT I

1) Nutritional status assessment

Definition of nutritional status, stages of nutritional status, importance of nutritional status

2) Direct nutritional assessment of human groups

Nutritional Anthropometry, biochemical tests, Clinical examination and Dietary survey.

3) Nutritional anthropometry
Need and importance, standards for reference, techniques of measuring and interpretation of these measurements

4) Biochemical Examination- Importance and relevance. Biochemical tests for the assessment of nutritional status with respect to Protein, vitamins and minerals**.**

UNIT II

5) Clinical Examination
Need and importance, identifying signs of commonly seen nutrient deficiency diseases. Grouping of clinical signs, description of clinical signs.

6) Diet Surveys

Need and importance, if diet surveys. Methods of diet surveys. Procedure, advantages and limitations of each. Adequacy of diet with respect to RDA, concept of family food security.

7) **Rapid Assessment Procedures**- need and importance, technique, interpretation

UNIT III

8) Indirect parameters for the assessment of nutritional status - Secondary sources of community health data Sources of relevant vital statistics, importance of infant, child and maternal mortality rates.

9) Sociological Factors in the aetiology and prevention of Malnutrition

Food Production and availability, socioeconomic factors, food consumption, medical and educational services, emergency/ disaster conditions, famine, floods and war.

10) Surveillance Systems

Surveillance- need of Surveillance, steps of any surveillance activity. Surveillance in India.

References:

1) Jelliffe, D.B. (1966): Assessment of the Nutritional Status of the Community, World Health Organisation.
2) Sain, D.R., Lockwood, R., Scrimshaw, N.S. (1981): Methods for the evaluation of the impact of Food and Nutrition Programmes, United Nations University.
3) Ritchie, J.A.S.(1967): Learning Better Nutrition, FAO, Rome.
4) Gopalan, C: Nutrition and Health Care, Nutrition Foundation of India. Special Publication Series.
5) Beghin, I, Cap, M., Dujardan, B.(1988): A guide to Nutritional Status Assessment, W. H.O., Geneva.
6) Gopaldas, T. and Seshadri, S. (1987): Nutrition Monitoring and assessment, Oxford University Press.
7) Mason, J.B., Habicht, J.P., Tabatabai, H., Valverde, V. (1984): Nutritional Surveillance, W.H.O.

FSN6302P-C	**Nutrition Assessment for Health Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

This course should enable students to-

1. Take various anthropometric measurements for individuals of different ages.
2. Assess the nutritional status of individuals and the communities.
3. Know the merits and limitations of various parameters used to assess nutritional status.
4. Collect data on food and nutrient intake.
5. Know the significance and importance of various biochemical parameters.
6. Train grassroots level workers in anthropometry and its interpretation.

Note: Each student should be given the opportunity to do the measurements individually such that they develop necessary skills.

Contents:

1. Measurements of height, weight, circumference measurements- head, chest, mid upper arm, waist, hip and waist to hip ratio for assessment of Obesity.
2. Body Composition analysis through Body Composition Analyser.
3. Growth Charts- plotting growth charts. Growth monitoring and promotion
4. Preparing suitable nutritious dishes for
    a) Protein Deficiency and Energy deficiency
    b) Iron deficiency
    c) Vitamin A deficiency
    d) Calcium and vitamin D deficiency
5. Estimating food and nutrient intake of individuals.

Reference:

1) FAO, Dietary Assessment (2018).A resource guide to method selection and application in low resource settings.
2) Park K (2017). Park's Textbook of Preventive and Social Medicine."Nutrition and Health." 24 th ed., Banarsidas Bhanot publishers, Jabalpur.
3) Tanita Corporation. Body composition Analyser BC 420 MA. Instruction manual 2005.
4) Beghin I, Cap M, Dujardin B. A Guide to Nutritional Assessment. Geneva: WHO Press; 1988.

FSN6303T-C	**Community Nutrition**	Credit: 4 4Hrs/Week
Duration of Exam: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Understand the factors that determine the availability and consumption of food.
2. Be familiar with the common nutritional problems of the community, their causes, symptoms, treatment and prevention.
3. Get exposed to the schemes, programmes and policies of Government of India to combat Malnutrition.
4. Be aware of the health hazards related to food and water.

Contents:

UNIT I

1. Concept and scope of Community Nutrition

2. Food availability and factors affecting food availability and its consumption.

- **a.** Agricultural Production
- **b.** Post–harvest handling, marketing and distribution
- **c.** Population
- **d.** Economic
- **e.** Regional
- **f.** Socio-cultural
- **g.** Industrialization

UNIT II

3. Nutritional problems of the community and implications for public health

- **a.** Common problems in India
- **b.** Causes(Nutritional and non-nutritional)
- **c.** Incidence of nutritional problems. Signs and symptoms, treatment
  - **i.** PEM
  - ii. Micro- nutrient deficiencies (Vitamin A, Vitamin D, Iron, Iodine)
  - iii. Fluorosis

4. Schemes and programmes to combat nutritional problems in India

- **a.** Prophylaxis programmes
- **b.** Mid-day meal programmes
- **c.** ICDS

UNIT III

5. Hazards to Community Health and Nutritional Status

- **a.** Adulteration in food
- **b.** Pollution of water
- **c.** Industrial Offensive sewage
- **d.** Pesticide residues in Food

6. Nutritional Policy in India and Plan of Action

References:

1) Agarwal,A.N.(1981):Indianeconomyproblemsofdevelopmentandplanning. Jelliffe,D.B.(1968):ChildHealthinthetropics.
2) Ghosh, S.K. and Puri, V.K. (1992): Indian Economy. Shukla, P.K. (1982): Nutritional Problems of India. Thankkamma Jacob (1976): Food adulteration.
3) Park,J.E.andPark,K.(1994):Textbookofpreventiveandsocialmedicine.Preventionof FoodAdulteration Act(1994):Govt.ofIndia

FSN6304P-C	**Community Nutrition Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

1. To understand the common nutritional problems of the community, their causes, symptoms, treatment and prevention.
2. Students to get informed about the schemes, programmes and policies of Government of India to combat Malnutrition.
3. Develop ability to give nutrition and health education to specific target groups.

Contents:

1. Conducting surveys for dietary patterns of different socio economic and comparison of the same based on economical, agricultural, production, marketing and distribution regional, socio-cultural and rural urban variances.
2. Planning and Preparation of low cost recipes for - Protein Calorie Malnutrion, Iron and Folic acid Deficiency, Vitamin A deficiency, Complementary Foods (emphases of premixes and ARF), Pregnant and lactation women
3. Use of growth charts for nutrition assessment of child
4. Planning a nutrition Health Education activity using various teaching aids

References:

1) Hughes R and Margetts M.B.2011. Practical Public Health Nutrition. Wiley-Blackwell
2) Jelliffe. D.B. 1966. The Assessment of The Nutritional Status of the Community. WHO, Geneva
3) McLaren, D.S. 1977. Nutrition in the community. John Wiley and Sons, Chichest

FSN6305T-C	**Problems in Human Nutrition**	Credit: 6 6Hrs/Week

Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. **Understand the nutrient deficiency diseases**
2. **Gain an insight into the cause of each nutrient deficiency disease , its identification and management.**

Contents:

UNIT I

1) **Pathogenesis of Nutritional Deficiency diseases development-** Primary and secondary nutritional inadequacies. Concept of acute and chronic deficiency disease.

2) **Prevalence, aetiology, biochemical, clinical manifestations, preventive and therapeutic measures for**

a. Protein Energy Malnutrition
b. Vitamin A deficiency
c. Fluorosis

3) **Prevalence, aetiology, pathology, biochemical, clinical manifestations, preventive and therapeutic measures for**

a. Rickets
b. Beri- Beri
c. Scurvy
d. Anaemia
e. Iodine Deficiency disorders.

UNIT II

4)**Nutritional problems of affluence**- aetiology, biochemical and clinical manifestations, preventive and therapeutic measures for

a. Obesity
b. Diabetes

c. Cardio vascular diseases

5) **Incidence, aetiology, Clinical changes, treatment of**-Haemoglobinopathies- Sickle cell Anaemia, Thalassemia.

UNIT III

6) **Idiosyncrasies-** food intolerance, food allergies- definition, symptoms, mechanism of food allergy, diagnosis, history, food record, elimination diets, food selection.

7) **Malabsorption Syndrome**- Celiac Sprue, intestinal brush border deficiency, acquired disaccharide intolerance, dietary care in these conditions.

References:

1) McCollum E.V. (1957): History of nutrition, Houghton Mifflin Co.
2) Waterlow J.C. (1992): Protein Energy Malnutrition, Edward Arnold, A division of Hoddeand Stoughton.
3) Gopalan, C(1993): Recent trends in nutrition, oxford university press.
4) De Maeyer, E.M.(1989): Preventing and controlling iron deficiency anaemia through primary health care, WHO.
5) Sachdeva, H.P.S., Chaudhary, P(1994) Nutrition in children developing country concerns, dept of paediatrics, Maulana Azad Medical College, New Delhi.
6) Shills, M.E. Olson, J.A. Shike, N and Ross, A.C.(1999): Modern nutrition in health and disease 9 th edition Williams and Willikins.
7) Mahan L.K. and Escott- Stump (2000): Krause's food, nutrition and diet therapy 10 th edition W.B. saunders Ltd.
8) Bamji M.S., Roa P.N., and Reddy, V.(2003): Textbook of human nutrition 2 nd Edition Oxford and IBH Publishing Co Pvt Ltd.
9) Passmore, R and Eastwood, M.A. (1986): Human Nutrition and Dietetics EIBS/ Churchill Livingstone.
10) Swaminathan, M.S.(1995): Essentials of Food and Nutrition Vol I Fundamental Aspects Vol II Applied Aspects, The Banglore Printing and Publishing Co Banglore.
11) Shukla, P.K., (1990): Nutritional Problems of India.
12) Robinson C.H., Lawler, M.R. Chenoweth, W.L. and Garwick, A.W(1986): Normal and Therapeutic Nutrition16 th edition Macmillan Publishing Co. New Delhi.
13) Brigg's G.M. nad Calloway, D.H. (1984): Nutrition and Physical fitness 1st edition Rinichart and Winston, New York, Chicago, san Fransisco.

FSN6306P-S	**Traditional Indian Foods Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Course outcome:

3. Students will acquire skills in Food Preparation Techniques
4. Students will understand appropriate method of cooking for preparation of specific food products

Contents:

1. Philosophy of Indian Food

    a. Pre Ancient Era
    b. Ancient Era
2. The great Indian Cuisine:
    a. Classification of Food Based on Nature
    b. Classification of Food Based on Vargas
    c. Classification of Foods Based on Nutrients
3. Survey of region-specific traditional food products having therapeutic / medicinal values.
4. Indian Regional Cuisine at a glance
    a. South India
    b. North-east
    c. North India
    d. Western India
    e. Eastern India
5. Planning and preparation of characteristic recipes of different states.
6. Standardization of common recipes of North, East, South and West-Zone of the country.
7. Calculation of nutritive value of traditional recipes and meals of the state.
8. Preparation of nutritionally significant foods for physiological conditions in India.
9. Preparation of festive food of the country.
10. Condiments, Herbs and Spices Used in Indian Cuisine
11. Masalas, Pastes and Gravies in Indian Cooking
12. Commodities and Their Usage in Indian Kitchens

References:

1) Arora, K. Theory of cookery; First Edition, Frank Brothers Company (Pub) Pvt. Ltd., 2008 ISBN: 9788184095036, 8184095031
2) Philip, Thangam . E., Modern Cookery: Vol. 1; Sixth Edition, Orient BlackSwan., 2008 ISBN: 9788125040446, 8125040447ali
3) Parvinder S;Quantity Food Production Operations and Indian Cuisine (Oxford Higher Education); First Edition; Oxford University Press, 2011 ISBN 10: 0198068492 ISBN 13: 9780198068495
4) Singh, Yogesh; A Culinary Tour of India; First Edition I.K. International Publishing House Pvt. Ltd. ISBN 978-93-84588-48-9
5) Singh Shakesh;Simplifying Indian Cuisine;First Edition, Aman Publications, ISBN81-8204-054-X
6) Dubey Krishna Gopal; The Indian Cuisine;PHI Learning Pvt. Ltd.ISBN978-81-203-4170-8
7) Jaffery, Madhur; A Taste of India; Pan Books, 1987; ISBN 10: 033029394X ISBN 13: 9780330293945
8) Kalra J Inder Singh, Gupta, Pradeep Das; Prashad Cooking with Indian Masters; Allied publishers Pvt. Ltd. ISBN 10: 8170230063
9) Pant Puspesh, Kalra Jiggs; Zayke ka safar ; Allied publishers Pvt. Ltd.;ISBN 10:9798184241234
10) Dubey, Krishna Gopal; The Indian Cuisine;PHI Learning ,2011; ISBN10 :9381735077
11) K. T. Farrell: Spices, Condiments, and Seasonings. 415 Seiten, zahlr. Abb. Und Tab. AVI Publishing Company, Inc., Westport, Connecticut, 1985. FSSAI pinkbook for reference 2011.

Semester IV

FSN6401T-C	**Food Science**	Credit: 4 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Gain knowledge regarding the constituents of foods and their physical and chemical properties
2. Understand the changes each constituent undergoes during cooking and processing and its impact on the final product.

Contents: UNIT I

1. **Introduction to Food Science and Chemistry-** Chemical and biochemical reactions, effect of reactions on quality and safety of food.

2. **Physical Foundation of Food Science-** Colloidal Systems in foods. Sols, gels, foams and emulsions.

3. **Carbohydrates-** Role and Applications of Sugars in foods.

4. **Cereals and Cereal Products-** Starch- types and structure (Modified and Unmodified). Functional properties of starch. Gelatinization and Dextrinization - factors affecting gelatinization. Gelation- factors affecting gelation.

UNIT II

5. **Lipids (Fats and Oils) -** Chemistry of lipids. Role of fat and applications in food preparation. Role of Fat as a Shortening agent. Types of Fats and Oils. Deterioration of fats and oils- rancidity.

6. **Proteins-**Physiochemical properties of amino acids and proteins. Hydrolysis. Denaturation of proteins. Functional properties of proteins- hydration, solubility, viscosity, gelation, texturization, emulsification, binding, foaming,

7. **Milk and Milk Products-Nutritive value of milk.** Uses in cookery. Milk products (Milk Powder, Condensed milk, Khoa, Cheese). Effect of heat, enzymes, acid on milk.

UNIT III

1. **Fruits and Vegetables**- Pigments- types and effect of heat, pH and cooking. Browning and its prevention. Pectin, gums and application in food industry.

2. **Food Additives**- Permitted substances, types and uses in food industry.

3. **Enzymes in food processing-** role of amylases, proteases, lipases, pectinase, cellulases, glucose oxidase, etc.

4. **Preparation of foods by using microbial cultures**- vinegar, beer, wine, breads, cheese

References:

1) Baianu,I.C.(Editor): Physical Chemistry of Food Processes, Vol. 1. Fundamental Aspects, AVI Books, New York.
2) Fennema, O.R.(Editor)(1885): Food Chemistry, 2nd Edition, Marcel Dekker Inc., New York.
3) Wong, D.W.S. (1898): Mechanism and Theory in Food Chemistry, AVI Books, van NostrandReinhold,New York.
4) Ronsivalli, L.J. and Vieira, E.R. (1992): Elementary Food Science, 3rd Ed. Chapman & Hall, New York.

FSN6402P-C	**Food Science Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

1. The students can understand how to prepare food products using the functional properties of food constituent
2. The students can also know what changes each constituent undergoes during cooking.

Contents:

1. Estimation of protein and fat in food stuff -
2. **Sugar Cookery**- stages, Browning reactions of sugar in foods
3. **Starch Cookery-** Gelatinisation, Dextrinisation and its relevance in the preparation of food products.
4. **Use of fat in cooking-** test to assess the characteristics and quality of fats**,** use of fat in cooking -shallow frying, deep frying, fat as a shortner,

5. **Milk Cookery-** estimation of milk proteins and milk sugar, Preparation of nutritious desserts using milk.
6. **Test for adulterants in common foods**

References:

1) Sharma, S. Practical biochemistry, classic publishing house, Jaipur, 1993.
2) Mody, N.I. Experimental food chemistry, Avi publishing company, INC, Westport, connectional.
3) A manual of laboratory techniques, National Institute of Nutrition. 1983.
4) Sathe, A.V.(1999) A first course in food analysis, New age International (p) limited Publishers, New Delhi.
5) Sethi M. and Rao, E.S. (2001) Food Science Experiments and Applications, CBS Publishers & Distributors, New Delhi.

FSN6403T-C	**Basics of Diet Therapy**	Credit: 4 4Hrs/Week
Duration of Exam: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five questions, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Students will know the principles of diet therapy.
2. Students will understand the modifications of normal diets for therapeutic purposes.
3. Students will understand the role of the dietician

Contents:

UNIT I

1. **Basic concepts of diet therapy-**
   Therapeutic adaptations of normal diet, principles and classification of therapeutic diets. Routine hospital diets- Regular, light, soft, fluid, Parenteral and enteral feeding.
2. **Energy modifications and nutritional care for weight management-**

Identifying the overweight and obese, etiological factors contributing to obesity, prevention and treatment, low energy diets, balanced energy reduction and behavioural modification. Underweight – aetiology and assessment, anorexia nervosa and bulimia.

UNIT II

3. **Etiological factors, symptoms, diagnostic tests and dietary management of-**
   Upper GI tract disease- Oesophagitis, Gastro Oesophageal Reflux Disease (GERD) , Gastric and duodenal ulcers and dietary management.
4. **Aetiology, symptoms and dietary management of-**
   Intestinal diseases- Diarrhoea, Steatorrhoea, Ulcerative Colitis. Constipation,
5. **Aetiology, symptoms and Dietary management of-**
   Malabsorption Syndrome, Celiac sprue, Tropical sprue. Intestinal brush border deficiencies (Acquired Disaccharide Intolerance).

UNIT III

6. **Anemia-**
   Pathogenesis and dietary management of Nutritional Deficiency Anemia-
   Pernicious, megaloblastic and Iron deficiency anemia.
7. **Diseases of the Liver, Exocrine Pancreas and Gall Bladder**-
   i. Dietary care and management in- Viral Hepatitis, Cirrhosis of liver, Hepatic Encephalopathy, Wilson's disease.
   ii. Dietary care and management in diseases of Gall Bladder - Cholelithiasis, Cholecystitis
   iii. Dietary care and management in diseases of Pancreas- pancreatitis etc.

References-

1. Anderson, L., Dibble, M.V., Turkki, P.R., Mitchall, H.S., and Rynbergin, H.J. (1982): Nutrition in Health and disease, 17th Ed., J.B. Lippincott & Co. Philadelphia.
2. Antia, F.P. (1973): Clinical Dietetics and Nutrition, Second Edition, Oxford University Press, Delhi.
3. Mahan, L.K., Arlin, M.T., (1992): Krause's Food Nutrition and Diet Therapy, 8th Ed. W.B. Saunders Company, London.
4. Robinson, C.H., Lawler, M.R., Chenoweth, W.L., and Garwick, A.E. (1986): Normal and Therapeutic Nutrition, 17TH Ed., MacMillan Publishing Co.
5. Williams, S.R. (1989): Nutrition and Diet Therapy, 6th Ed. Times Mirror/ Mosby College Publishing, St. Louis.
6. Raheena, Begum (1989): A Textbook of foods, nutrition and dietetics. Sterling Publishers, New Delhi.
7. Joshi, S.A. (1992): Nutrition and Dietetics, Tata McGraw Hill Publications, New Delhi.

FSN6404P-C	**Basics of Diet Therapy Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:
To enable students to-

1. Students will know the normal routine diet served in hospitals and for whom these would be served.
2. Students will be able to plan diets for therapeutic purposes.

Content-

1. Planning and preparation of fluid food preparations- clear fluid preparations, full fluid preparations. Planning and preparation of fluid diet- clear and full fluid.
2. Planning and preparation of recipes for soft/ semisolid diet- mechanical, pureed. Planning and preparation of soft diet.
3. Planning and preparation of low fat and low calorie recipes.
4. Planning and preparation of High fibre recipes.
5. Planning and preparation of Low fibre and low residue recipes.
6. Planning and preparation of Bland diet recipes.
7. Planning and preparation of Diets for the following conditions-
    - Overweight and obesity,
    - Ulcers,
    - Diarrhoea,
    - Constipation,
    - Viral hepatitis,
    - Liver cirrhosis,
    - Nutritional anaemia.

References:

1. Hart BE. Hamada AC. and Chen D (2018): Clinical Diet Manual: A Handbook of Medical Nutrition Therapy 18th Edition,12345 Oxford Street, North Hollywood, Ca 91606.
2. Vimla V. (2009): Advances in Diet Therapy: Practical Manual. New Age International Publishers, New Delhi.
3. NYS DOCCS Therapeutic Diet Manual- February 2021. Office of Nutritional Services, New York State.
4. Lenka C. (2017): Guidelines for Planning Therapeutic Diets. AkiNik Publications, New Delhi

FSN6405T-C	**Food microbiology, hygiene and sanitation**	Credit: 4 2Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Understand the nature of microorganisms involved in food- spoilage, food-infections and intoxications.
2. Understand the importance of microorganisms in food biotechnology.
3. Understand the principles of various methods used in the prevention and control of the microorganisms in foods.
4. Understand the criteria for microbiological safety in various food operations to avoid public health hazards due to contaminated foods.

Contents:

UNIT I

1. Brief history of food microbiology and introduction to important microorganisms in foods.
2. Primary sources of microorganisms in foods, methods of detection and isolation.
3. **Fundamentals of control of microorganisms in food-**Extrinsic and intrinsic parameters affecting growth and survival of microbes- use of high and low temperature, dehydration, freezing, freeze-drying, irradiation and preservatives in food preservation.

UNIT II

4. **General principles underlying spoilage-**
    a. Contamination and microorganisms in the spoilage of different kinds of foods and their prevention.
    b. Cereals and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and milk products, canned foods.
5. **Food borne infections and intoxications-** symptoms, mode and source of transmission and methods of prevention. Investigation and detection of food borne disease outbreak.

UNIT III

6. **Microbes used in food biotechnology.** Fermented foods and their benefits- Bread, Vinegar, Cheese and Sauerkraut.
7. Microbiology in food sanitation.
8. Food control and enforcement agencies.

References:

1) Frazier,W.C. and Westholf, D.C. (1988): Fourth Edition, Food Microbiology, McGraw Hill Inc.
2) Jay James, M. (1986): Third Edition, Modern Food Microbiology, Van Nostarnd Reinhold Company Inc.
3) Pelezar, M.I. and Reid, R.D. (1978): Microbiology, McGraw Hill book Company, New York.
4) Benson Herold, J. (1990): Microbiological applications, Wn. C. Brown Publishers, U.S.A.
5) Collins, C.H. and Lyne, P.M. (1976): Microbiological methods, Buttersworth, London.

FSN6406P-S	**Food Preservation and Storage Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Course outcome:

5. Students should be able to identify and explain various methods of food preservation, such as canning, drying, freezing, pickling, and fermenting.
6. Students will acquire skills in Food Preservation and storage Techniques
7. students will acquire should equip with the knowledge and skills necessary to safely and effectively preserve and store food, thereby reducing waste, ensuring food security, and promoting sustainable practices.

Contents:

1. Market survey of raw and preserved foods. Selection, purchase and storage of perishable, non -perishable and semi perishable foods for preservation.
2. Preparation of Jam, Jellies, Preserves , Murabba, Candies, Marmlades,
3. Preservation by using Oil, Salt and Vinegar, Pickles with and without oil – Mango, amla, lemon, green chilli, mix vegetables, fresh turmeric , garlic, gonda, carrot.
4. Pickles using other chemical preservatives – Chutneys, purees. Fermented pickles. Ketchups and sauces.
5. Freezing of fruits and vegetables, Concentration of fruit juices. Hurdle technology. Use of anti microbial agents, food additives and preservatives.
6. Preservation of products using pulses: Papads: mung dal, chana dal, urad dal or other pulses, badi , mungodi etc. and other regional preparation. Drying of fruits and vegetables: Leafy vegetables: spinach, fenugreek leaves, coriander, bathua, Other vegetables: peas, beans, tomatoes, lady fingers, cluster beans, bitter gourd etc., Roots and tubers : potato chips, onion flakes . Fruits: ber, grapes, raw mangoes, banana powder. Sterilization, bottling, corking, blanching.
7. Methods of storing preserved foods, prevention of food spoilage.
8. Packaging and packaging material.
9. Labelling and costing of the product.
10. Demonstration on bottling, pasteurization, canning, ultra heating. Demonstration on ionizing and non ionizing Irradiation in foods, ohmic heating. Visit to food processing plant.

References:

1) Handbook of Food Preservation by M. Shafiur Rahman, New York, 1999, World wide
2) Web http:// www.dekker.com, ISBN :0-8247-0209-3.
3) Preservation of Fruits and Vegetables by Giridhari Lal,G. Siddappa& G.L. Tandon, 1998. Refer the latest edition
4) Post -harvest Management and Processing of Fruits and Vegetables by NS
5) Rathore,G.K. Mathur & SS Chasta JCAR, New Delhi.July 2012.

6) Five Stages of The Wine Making Process, by Kim Myers on November 14,2014 in Blog Post Home scale processing and preservation of fruits and vegetables by CFTRI, Mysore,
7) Enzymes in food and beverage processing by Angelo A.J. and Ory R.L., 2008. Cocktails- Encyclopaedia- refer latest version.

Semester V

FSN7501T-E	**Advances in Diet Therapy**	Credit: 4 4Hrs/Week
Duration of Exam: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:
1.Students will understand the role of the dietician in preventive and curative health care.
2. Students will be able to make appropriate dietary modification s for various disease conditions based on the pathophysiology.

Content-

UNIT I

1. **Diet in disease of the endocrine pancreas-Diabetes Mellitus-**
   - Classification, symptoms, diagnosis of diabetes mellitus.
   - Insulin therapy, oral hypoglycaemic agents, glucose monitoring at home.
   - Dietary care and nutritional therapy, meal plan (with and without insulin).
   - Special Dietetic foods, Sweeteners and sugar substitutes. Gestational Diabetes, Juvenile Diabetes, Diabetic coma Hypoglycaemia.

2. **Diseases of the cardiovascular System-**

Etiology, risk factors and nutritional management of Atherosclerosis, Hyperlipidemias, Hypertension and Ischemic Heart Disease.

UNIT II

3. **Renal diseases-**
   - Classification, etiology, characteristic symptoms and dietary management of glomerulonephritis-acute and chronic, Nephrotic syndrome, renal failure and Uraemia, acute and chronic renal failure.
   - Dietary management in renal dialysis and renal transplant

4. **Allergies**
   Definition, symptoms, diagnosis and dietary management.

UNIT III

5. **Cancer-nutritional and non nutritional etiological factors**
   Management of cancer patients in relation to the clinical treatment and cachexia.

6. **Surgery, trauma and burns-**
   - Assessment of the nutritional status in surgical and burn patients
   - Pre-operative and post -operative nutritional care.
   - Nutritional care in trauma and burn patients.

References:

1) Anderson,L.,Dibble,M.V., Turkki, P.R.,Mitchell. H.S. and Rynbergin, H.J.(1982): Nutrition in Health and Disease,17th Ed J.B.Lippincott&Co.Philadelphia.
2) Antia,F.P.(1973):Clinical Dietetics and Nutrition, Second Edition,Oxford University Press, Delhi.
3) Mahan,L.k.,Arlin,M.T.(1992):Krause's Food, Nutrition and Diet Therapy, 8th Ed,W.B.Saunders Company, London.
4) Robinson,C.H.,Lawler,M.R.,Chenoweth, W.L., and Garwick, A.E.(1986):Normal and Therapeutic Nutrition, 17th Ed.MacMillan Publishing Co.
5) Williams,S.R.(1989):Nutrition and Diet Therapy,6th Ed.,Times Mirror/Mosby College Publishing, St.Louis.

FSN7502P-E	**Advances in Diet Therapy Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

To enable students to apply the principles of planning therapeutic diets for various disease conditions.

Content-

1. **High Risk Management (hospital based) Nutrition Assessment**
   Oral supplements home based and commercial. Management of patients with feeding problems. Tube feeds- all forms, elemental and Parenteral.

2. **Planning and Preparation of Therapeutic Diet-**
   a. Diabetes Mellitus and hypoglycaemia
   b. Hypertension
   c. Coronary heart disease
   d. Coronary heart failure
   e. Cardiac surgery
   f. Glomerulonephritis -acute and chronic,
   g. Nephrotic syndrome,
   h. Renal failure and Uraemia,
   i. Acute and chronic renal failure.
   j. Burns

References:

1) Hart BE. Hamada AC. and Chen D (2018): Clinical Diet Manual: A Handbook of Medical Nutrition Therapy 18th Edition,12345 Oxford Street, North Hollywood, Ca 91606.
2) Vimla V. (2009): Advances in Diet Therapy: Practical Manual. New Age International Publishers, New Delhi.
3) NYS DOCCS Therapeutic Diet Manual- February 2021. Office of Nutritional Services, New York State.
4) Lenka C. (2017): Guidelines for Planning Therapeutic Diets. AkiNik Publications, New Delhi

FSN7503T-E	**Sports Nutrition**	Credit: 4 4Hrs/Week
Duration of Exam: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course Outcome:

1. Students will gain knowledge and understanding about physical activity, health and fitness.
2. Studentswill gain knowledge about sports physiology and nutrition.
3. Studentswill understand relationship between fitness and wellness

UNIT I

1. **Concept of physical education and health**
    a. Definition, aims and objectives of nutrition and fitness
    b. Importance and scope
    c. Modern concept of health, physical fitness and wellness
2. **Components of physical fitness**
    a. Speed, strength, endurance, flexibility and coordinative abilities
    b. Types of physical fitness
    c. Fitness Balance

3. **Demands of various nutrients (macro and micro nutrients during sports activities)**
    a. Carbohydrates, proteins and fats
    b. Vitamins and minerals
    c. Water requirement and fluid balance

UNIT II

4. **Body composition, energy balance and weight management**
    a. Body composition assessment
    b. Factors affecting fatigue, reduced performance, muscle wasting
    c. Concept and method of energy metabolism and expenditure – Energy expenditure during rest and during physical activity (BMR, RMR, PAL, TEF during sports activities)
    d. Energy system – ATP-CP energy system, lactic acid energy system, oxygen energy system, glycogen depletion
5. **Role of nutritional supplements**
    a. Types and role in sports nutrition
    b. Ergogenic Aids

UNIT III

6. **Recovery andrehabilitation**
    a. Principles
    b. General test for assessing fitness (Muscle strength and endurance, cardiovascular endurance)

7. **Nutritional problems in Athletes**
    a. Eating disorders
    b. Triad syndrome
    c. Nutritional deficiencies

References:

1) AAPHERD. "Health Related Physical Fitness Test Mannual". 1980 Published by Association drive Reston Virginia
2) ACSM Fitness Book, Leisure Press Campaign, Illions, 1996, Leisure Press, Canada http://www.pitt.edu/-gsphhome
3) ACSM's "Health Related Physical Fitness Assessment Manual Lippincott Williams and Walkins USA, 2005.
4) B.C.Rai Health Education and Hygiene Published by Prakashan Kendra, Lucknow - Bucher.C.A. (1979). Foundation of Physical Education (Saedition Missouri C.V.Mosby co.
5) California: Mayfield Publishing Company
6) Corbin Charles Beetal. C.A., (2004) Concepts of Fitness and Welfare Boston McGraw Hill.
7) Frank V.M. (2003). Sports & education CA: ABC-CLIO
8) Les Snowdan, Maggie Humphrey's Fitness walking, Maggie Humphery Orient Paper Books 2002 New Delhi.
9) Principles of Physical Education: Com. Philadelphia: W.B.Sounders

10) Puri. K.Chandra.S.S. (2005). Health and Physical Education. New Delhi: Surjeet Publications
11) Ralph S. Paffer Barger, Jr. and Eric Leolson, Life fit, 1991 Human Kinetics USA
12) Rob James. Graham Thompson. Nesta Wiggins - James complete A-Z Physical Education Hand Book 2 edition, 2003 Hodder and Stoughton England
13) Ziegler. E.F. (2007). An Introduction to Sports &Phy. Edn. Philosophy Delhi
14) Harrold M Barrow "Man and Movement: Principles of Physical Education" published in Great Britain by Henry Kimpton Publishers, London.
15) Jesse Peoring Williams "The Principles of Physical Education" Published by College Book House, Shivaji Road, Meerut.
16) William D McArdle, Frank I Katch and Vitor I Katch, Essential of Exercise Physiology, Second edition, New York: LipincoffWelliams and wilkins, 2000
17) Arthar C. Guyton, Physiology of Human Body, Philadelphia: Saunders Company, 1972. Melwin H. Williams. Nutrition for Health Fitness and sport. McGraw Hill Company, Newyork: 1995
18) Bradfird B, Strand and Others. Fitness Education Arizona GorsuchSeani; sbrick Publishers, 1997.

FSN7504P-E	**Sports Nutrition Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course Outcome:

1. Develop insight Nutrition and health education related to sports and fitness
2. Develop ability to give nutrition and health education to specific target groups (athletes).
3. Be able to select appropriate communication media and strategies which are situation specific, need based and target group oriented.

Content:

1. Determination of energy intake and expenditure
2. Assessment of anthropometric measures for Sports Person
3. Prepare the following recipe and calculate their nutritive value
    a. Pre-Workout Meals
    b. Post-Workout Meals
    c. High protein, high energy recipe
    d. Electrolyte rich beverages
4. Visit to a fitness club/gym/sports academy
5. Development and demonstration of IEC material for fitness enthusiasts
6. Body composition analysis of athletes/sports persons

References:

1) Butryn, M.L., Phelan, S., &Hill, J. O.(2007). Consistent self-monitoring of weight: a key component of successful weight loss maintenance. Obesity (Silver Spring). 15(12), 30913096.
2) Scott K. Powers and Stephen L. Dodd. Total Fitness: Exercise, Nutrition and wellness, Boston: Allyn and Bacon, 1999.
3) Norman Bezzant Help! First Aid for everyday emergencies. Jaico Publishing House Bombay, Delhi
4) Siedentop.D. (1994) Introduction to Physical Education and Sports (2aed.) Sp. Educational Technology
5) Sports nutrition : A practice manual for professionals. AMERICAN DIETITETIC ASSOCIATION

FSN7505T-E	**Food Processing and Technology**	Credit: 6 6Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. At least three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1.Understand the various techniques of processing and preserving foods

Contents:

UNIT I

1) **Foods and their nutritional importance -**
   Cereals, pulses and legumes, nuts and oil seeds, fruits, vegetables, milk, meat, poultry, fish.
2) **Food and its preservation –**
   In relation to the composition of foods, needs and benefits of food processing and technology for food preservation.
3) **Methods of processing cereals and pulses-**
   Products such as parboiled rice, rice flakes, puffed rice, chana etc.

UNIT II

4) **Use of heat for food processing and preservation-**

a) **Canning** – principles and methodology, influence of canning on food quality.
b) **Pasteurization and applications**- effect on food quality, UHT – methodology and applications.

5) **Drying and dehydration-**

Types of foods- traditional and new food products, home, community and commercial operations. Methods used and effect on food quality. Solar driers- applications and potential for community. Storage and deterioration of dehydrated food products.

6) **Use of low temperatures-**

Refrigeration and freezing –methods, principles and applications. Preparation of foods for freezing. Problems with freezing (nutritional and textural) and thawing of bulk foods. Shelf life of frozen foods.

7) **Food irradiation-** technology and application.

8) **Use of food additives and preservatives.**

UNIT III

9) **Pickling, curing and fermentations-**

Pickles, chutneys, ketchups, sauces. Principles and methods used for various products. Fermentation – types, products and methods used. Home and commercial operations.

10) **Manufacture of fruit juices, squashes, fruit syrups, cordials-**

Food products with high concentration of sugars- common defects. Preparation, uses of crystallized and glazed fruits.

11) **Nutritional implications of food processing-**

Causes for loss of vitamins and minerals. Enrichment, restoration and Fortification.

References:

1) Salunkhe, D.K. (1947): Storage, processing and nutritional quality of fruits and vegetables, CRC Press. Ohio. Encyclopaedia of Food Technology, AVI Publication.
2) GirdhariLal (1967): Preservation of Fruits and Vegetables, ICAR, New Delhi.
3) Desrosier, N.W., and Desrosier, J.N. (1977): The Technology of Food Preservation, AVI Publication Co. Connecticut.
4) Joslyn, M.A. and Heid, J.L. (1964): Food Processing Operations, their management, machines, materials and methods, AVI Publishing Co. Connecticut.

FSN7506T-S	**Research Methodology and Scientific Writing**	Credit: 4 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. To understand the importance of research methodology in Food Science and Nutrition.
2. To develop knowledge of different research methods and study designs.
3. To acquire skills in data collection, analysis, and interpretation.
4. To learn how to critically evaluate research literature.
5. To gain proficiency in scientific writing and reporting.

Content:

UNIT I

1. **Introduction to Research Methodology**
    a. Definition of research
    b. Importance of research in Food Science and Nutrition
    c. Types of research
2. **Research Design**
    a. Experimental vs. observational studies
    b. Cross-sectional, cohort, case-control studies
    c. Randomized controlled trials (RCTs)
    d. Quasi-experimental designs
3. **Sampling Techniques**
    a. Types of sampling methods
    b. Sample size determination
    c. Sampling bias and its control

UNIT II

4. **Data Collection Methods**
    a. Surveys/questionnaires
    b. Interviews
    c. Focus groups
    d. Observation
    e. Laboratory experiments

5. **Data Analysis**
    a. Descriptive statistics
    b. Inferential statistics
    c. Parametric vs. non-parametric tests
    d. Statistical software applications
6. **Interpretation of Results**
    a. Drawing conclusions from data
    b. Identifying limitations and biases
    c. Generalizability of findings

UNIT III

7. **Ethical Considerations in Research**
    a. Informed consent
    b. Confidentiality
    c. Conflict of interest
    d. Research misconduct
8. **Scientific Writing and Reporting**
    a. Structure of research papers
    b. Citation styles (APA, MLA, etc.)
    c. Writing abstracts, introductions, methods, results, and discussions
    d. Peer review process

References:

1) Research Methods in Nutritional Sciences: Principles, Methods, and Applications by Karen E. Drummond and Alison Murphy-Reyes
2) Research Design and Methods: A Process Approach by Kenneth S. Bordens and Bruce B. Abbott
3) Nutrition Research Methodologies by Julie A. Lovegrove and Leanne Hodson

Semester VI

FSN7601T-E	**Institutional Food Service Management**	Credit: 4 4Hrs/Week
Duration of Exam: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Gain knowledge of the types of Food services in India and the Factors which have led to their development.
2. Understand the special characteristics of food service establishments.
3. Know the types of resources required for managing food outlets.
4. Maximize resource use.
5. Learn manpower management techniques.
6. Understand human relations and behavior at work.
7. Know the types of costs involved and how to control them.
8. Maintain and analyze accounting information for decision making.
9. Think of starting a foodservice.

Contents:

UNIT I

1. **Introduction to Food Service Institutions**
   Development of Food Service Institutions in India. Characteristics of Food Service Establishments.Effects of environmental changes on different types of Establishments.

2. **Food Service Management**–Definitions, principles and functions, Tools of Management, Resources.

UNIT II

3. **Approaches to Management**
   Traditional Management, Systems approach, management by objectives, Total Quality Management.

4. **Management of Resources**
   Finance, spaces, Equipment and furniture, materials, staff, time and energy, procedures.

5. Menu planning purchasing and storage of food for quantity purchase production

UNIT III

6. **Personnel Management**–Definition, Development and policies.

   Recruitment, selectionandinduction, Employeebenefits, traininganddevelopment, humanrelations, Trade Union Negotiation and settlement.

7. **Cost and Management accounting**

   Definition and scope, costs and their control, management accounting, profit planning.

References:

1) Boella, M.J. (1983): Personnel Management in Hotel and Catering Industry, 3rd Ed., Hutchinson, London.
2) Drucker, P.F. (1975): Management, Allied Publishers, New Delhi.
3) Fearn,D.(1969):ManagementSystemsfortheHotelCateringandAlliedIndustries.
4) Hitchcock,M.J.(1980):FoodServiceSystemsAdministration,MacMillan,NewYork. Kotas, R. (1972): Accounting in the Hotel and Catering industry, Intertext Books, 3rd ed. Butler and Tanner, London.
5) Moore, C.L. and Jaedicke, R.K. : Managerial Accounting, South Western Publishing Co.
6) Sethi, M. MAlhan, S. (1993) : Catering Management : An integrated approach, Wiley Eastern, New Delhi.
7) Terry, G.R. (1972) : Principles of Management , 6th Ed. Irwin Dorsey Inter-national: London.
8) West, B.B., Wood, L., Revised by Hargar, V.F., Shugart, G.S., Payne – Palacio, J. (1989) : Food Service in Institutions, 6th Ed., MacMillan Publishing Co., New York.
9) Kahri, W.L.(1977): Advances Modern Food and Beverage service. Prentice Hall, New Jersey. Kinder, F., Green, N.R., Harris, N. (1984): Meal Management, 6 th Ed., MacMillan, New York.
10) Kotschevar, L.H. (1975): Quantity food production, Cahners publishing, Massachusets.
11) Sethi, M., Malhan, S. (1993): Catering Management: an integrated approach, Wiley, Eatern. New Delhi.
12) Walley, B.H.(1980): Production Management Handbook, Gower Publishing,U.K.
13) Watson, O.B. (1968): School and Institutional Lunchroom management, Parker, NewYork

FSN7602P-E	**Institutional Food Service Management Practical**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50
	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

1. Understand the special characteristics of food service establishments.
2. Know the types of resources required for managing food outlets.
3. Maximize resource use.
4. Know the types of costs involved and how to control them in different food institutions.
5. Maintain and analyze accounting information for decision making.

Contents:

1. **Kitchen Production and Service- Quantity food production project.**
   Planning, Organization, Presentation and service of Meals for different occasions and age groups. Table setting and Service Techniques for different types of establishments.
2. **Work Experience through visit in**
   Hotel, Restaurant, Canteen , Nursery School, Hostel , Hospital, Orphanage or other social institution.
3. **Formulation of menu card for different catering institution with budget breakup.**
   Restaurant, hotels, café, hostel canteen, etc.

References:

1) Boella, M.J. (1983): Personnel Management in Hotel and Catering Industry, 3rd Ed., Hutchinson, London.
2) Koontz,H.,O.Donnel,C.,Weihrich,H.(1983):EssentialsofManagement,Indianed.
3) West, B.B., Wood, L., Revised by Hargar, V.F., Shugart, G.S., Payne – Palacio, J. (1989) : Food Service in Institutions, 6th Ed., MacMillan Publishing Co., New York.
4) Doswell, R., Gamble, P.R. (1979) : Marketing and planning hotels and tourism projects, Barrie and Jenkins,London.
5) Kotshevar L.N. Terrekk M.E., 1967: Food Service Planning, Layout and Equipment.

FSN7603T-E	**Nutrition and Health Communication**	Credit: 4 2Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.
Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Understand thought diffusion processes of the individual and the community.
2. Know effective communication techniques/methods.
3. Be able to plan and develop health/nutrition education, communication messages and strategies.
4. Be able to communicate on various issues related to health and nutritional status of individuals and the community.

Contents:

UNIT I

1. **Objectives, principles and scope of nutrition and health education and promotion.**
2. **The diffusion process – limitation and utility.**
   a. Two step rates of diffusion and exposure. Models at communication.
   b. Behaviouristic and cognitive theories.
3. **Communication media used/useful in nutrition and Health education**- Role and relative importance of spoken word, interpersonal communication, visual and audio visual aids. Mass media-print media, radio and recording, television, films, video, advertising, social marketing, folk media, satellite, multimedia.

UNIT II

5. **Attitudes and opinions**
   Attitude change and principles of congruity, communication, public opinion and propaganda. Role of opinion leaders.
6. **Determinants of communication effectiveness**
   Age, sex, power/status, educational levels of source and receiver, credibility, group norms, referent value, affiliation
7. **Teaching methods formal and non formal-**
   Individual, group and mass approach. Expository, discovery, participatory, evaluative, simulation Games, Brain storming. Selection, use, advantages and limitations..

UNIT III

8. **Development in India-rural and Urban**

a. Philosophy, strategies, achievements and problems various Governmental and Non-Governmental schemes.
b. Concept of rural communication, relationship with development and development support communication.
c. Acceptability and credibility of communication in rural and urban environment.

9. A. Role of opinion builders and opinion leaders. Barriers and accelerators in effective communication with reference to different communication media. selection, use, advantage and limitations.
B. Communication and Social Development
C. Education, health, Nutrition, Hygiene, Family planning, environment.

References:

1. WillburSchramm(1953): Process and Effects of Mass Community- Urbana, University of Illinois Press.
2. Lee Richardson (1962):Dimension of Communication-Appleton Century Crofts, NewYork.
3. Kenneth, K,.Anderson (1972):Introduction to Communication Theory and Practice, Cummings Pub.CO.,Menlo Park, Philippines.
4. Eapen,K.E.:The media and development.
5. Barry W.Collins (1970): Social Psychology, social Influence, Attitude Change,Group Pressures and Prejudices.AddisonWesley,Reading.
6. Dunn,S.W.,Barban,A.M.(1978):Advertising, it's Role in Modern Marketing, 4th Ed.
7. Joshi,P.C.(1992):Culture ,Communication and Social Change.
8. Shah.A.andJoshi,U.(1992):puppetry and Folk Dances for Non-formal Education, Sterling Publications.
9. Dahama,O.P. and Bhatnagar,O.P.(1991): Education and Communication for Development, Oxford and I.B.H.PublishingCO.Pvt.Ltd.
10. Agee,W.,Ault,P., Emery,E.:Introduction to Mass Communications,Oxford and IBH Publishing Co., New Delhi.
11. World Health Organization (1987):Health Promotion-Concept and Principles in Action, policy Framework,WHO Regional Office for Europe,Copenhagen.
12. Sutherland,I.(Ed) (1987): Health Education Perspectives and Choices,(2nd WD).George,Allen and Unwin,London.
13. Leathas,D.S.,Hastings, G.B.,Davies,J.K.(1986):Health Education and the Media, Pergammon,London.
14. Israel,R.C.(Ed)(1984): Using Communications to solve Nutrition Problems,Education Development Centre,Newton,Massachusetts.
15. Nutrition Education Series-UNESCO,Paris.
16. Manoff,R.K.(1985): Social Marketing, New Imperatives for Public Health,Praeger,New York.

FSN7604P-E	**Nutrition and health communication**	Credit: 2 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	50

	End of Term Exam	35
	Continuous Assessment	15

Course outcome:

4. Develop insight into planning and organization of Nutrition and health education.
5. Develop ability to give nutrition and health education to specific target groups.
6. Be able to select appropriate communication media and strategies which are situation specific, need based and target group oriented.

Contents:

1. Use of visual media

Development of charts, posters, flash cards and flip charts for health and nutrition communication.

2. Demonstration as technique of communication

3. Visit to a institution for health education and awareness using appropriate communication tools

Street play, role play, puppet show in nutrition and health communication.

4. Use of print media

Development of leaflets/booklets, Newspaper/magazine articles.

5. Use of media in social marketing

Campaign planning, writing and production of jingles.

6. **Training of grass root level workers**

Identifying issue/area which requires interventions using participatory training. Setting learner objectives, teaching objectives. Developing a training Module/questionnaire, conducting the training, evaluating the training.

References:

1. Rao,Y.V.L:Communication and Development.
2. Allgood,M.B.(1995):Demonstration Techniques,PrenticeHall,New Delhi.
3. Mayor,M(Ed).(1981): Health Education by Television and Radio K.G.Saur,Munchen.
4. International journal of Nutrition : Health Communication in nutrition

FSN7605T-E	**Public Health and Epidemiology**	Credit: 6 6Hrs/Week
Duration of Exam: 3 hrs	Max. Marks: 100	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course outcome:

1. Students will understand the concept of health from the individual and community perspective.
2. Students will know the importance of epidemiology and demography in health.
3. Students will be able to assess the health and nutritional status, and analyse the situation.
4. Students will know the factors affecting health and nutritional status of individuals and community.

Content:

UNIT I

1. **Health and Dimensions of Health**
   Positive health versus absence of disease.
2. **Community and its Organization**
   Concept of community, types of community, factors affecting health of the community – environmental, social, cultural, dietary, organizational, economic, political. Vulnerable groups/ needs of special populations.
3. **Public Health, Demography and Epidemiology**
   Demography and its applications. Epidemiology – study of the epidemiologic approach – time distribution, place, person, determinants of disease, preventive and social means.

UNIT II

4. **Communicable and Infectious disease Control**
   Nature of communicable and infectious diseases, infection, contamination, disinfections, decontamination, Transmission – direct and indirect, vector borne disease, epidemiology of infection, infecting organisms and causative agents
5. **Community Water and Waste Management**
   Importance of water to the community, etiology and effects of toxic agents (metals, chemicals) Important water borne infectious diseases, safe drinking water, solid waste and liquid waste disposal.

UNIT III

6. **Life Style and Community Health**
   Preventive aspects, public education and action for alcohol, cigarette smoking, AIDS, STD.
7. **Immunization**
   Importance and schedule for children, Adults and for foreign travel, importance of cold chain.

References

1. Smith, G.W. (1957): Preventive Medicine and Public Health, 2nd edition, Macmillan Co., New York.
2. Park, K. (1994): Park's Textbook of Preventive and Social medicine, 9thedition.M/s Banarasidas Bhanot. Jabalpur.

3. Cassens, B. (1990): Preventive Medicine and Public Health, Wiley Medical Publication, John Wiley and Sons
4. Asten, G. Tiffney, J. (1981):Guide to improving food Hygiene. North World, London.
5. Saha, A. ,Shattock, F., Moustafa, T. (1989): Epidemiology in Primary Health Care. Interprint.
6. Mittal,S.K, Kukreja,S.(1983):Immunisation in Practice. Indian Academy of Pediatrics.
7. Beaglehole,R.,Bonita,R.,Kjellstrom,T. (1993): Basic epidemiology. World Health Organisation,Geneva.
8. Clark, J., Henderson, J. (1983): Community Health, Churchill Livingstone.

FSN7606T-S	**Introduction to Food and Nutrition Entrepreneurship**	Credit: 4 4Hrs/Week
Duration of Examination: 3 hrs	Max. Marks:	100
	End of Term Exam	70
	Continuous Assessment	30

Note: Examiner is requested to set the question paper of 70 marks only. Each question paper divided in two parts i.e. Part A and Part-B.

Part-A will consist of 10 compulsory questions. There will be at least three questions from each unit and answer to each question shall be limited upto 50 words. Each question will carry two marks. Total 20 Marks.

Part-B will consist of 10 questions. Atleast three questions from each unit be set and student will have to answer five question, selecting atleast one question from each unit. The answer to each question shall be limited to 400 words. Each question carries 10 Marks. Total 50 Marks.

Course Outcome:

1. Develop entrepreneurship skills in the field of foods and nutrition
2. Understand the process and procedure of setting up small enterprises with special reference to food products.
3. Develop management skills for entrepreneurship development.
4. To understand the fundamentals of entrepreneurship in the food and nutrition industry.
5. To identify and evaluate business opportunities in the food and nutrition sector.
6. To develop skills in business planning, product development, and marketing strategies tailored to food and nutrition ventures.
7. To gain insights into financial management and legal aspects relevant to food and nutrition entrepreneurship.
8. To apply entrepreneurial concepts and tools to real-world scenarios in the food and nutrition industry.

UNIT - 1

1. Entrepreneurship and Identifying Market Opportunities

- Definitions, need, scope and characteristics of entrepreneurship
- Market analysis and research techniques
- Consumer behaviour and trends in food and nutrition
- Identifying niche markets and target audiences

2. Business Planning

- Elements of a business plan
- Feasibility analysis and risk assessment
- Developing a business model canvas for food and nutrition ventures

3. Product Development

- Idea generation and concept development
- Food product innovation and design
- Food safety and quality assurance

UNIT - I1

4. Marketing Strategies

- Branding and positioning in the food industry
- Marketing mix strategies (product, price, place, promotion)
- Digital marketing and social media for food and nutrition ventures

5. Financial Management

- Financial planning and budgeting
- Pricing strategies and cost analysis
- Funding sources for food and nutrition startups

6. Legal Considerations

- Regulations and compliance in the food industry
- Intellectual property protection
- Contracts and agreements specific to food and nutrition entrepreneurship

UNIT - III

7. Case Studies and Guest Lectures

- Analysis of successful food and nutrition startups
- Guest lectures from industry professionals

8. Final Project Presentations

- Students present their business plans or projects
- Feedback

References:

1) Deshpande, M.V. (1984): Entrepreneurship of small scale industries, concept, Growth and Management, Deep and Deep Publication, D-1/24, R- Garden, New Delhi.
2) Meredith, G.G., Nelson, Re et al. (1982): Practice of Entrepreneurship, ILO Geneva
3) Parekh, U and Rao, T.V. (1978): Personal Efficacy in Developing Entrepreneurship, Learning System, New Delhi.
4) Rao, T.V. & Parekh, L.U. (1982): Developing Entrepreneurship, A Handbook, Learning Systems, New Delhi.

5) Entrepreneurship Development (1982): Institute of India. A Handbook for New Entrepreneurs, Entrepreneurship Development Institute of India.