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

Scheme of Examination of B.Sc. Food Science and Nutrition

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	2	70	30	100
	Total		**20(16+4)**	**24**	**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	2	70	30	100
	Total		**20(16+4)**	**24**	**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 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.

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 Food Science .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 may help 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. **Program or 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:** Skills refer 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 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.

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/ CGPA
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 years or 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
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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 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 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 and nutritional 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 - Khatta Channa, 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, chenna murki 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 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 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.
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
4. **Proteins**- Amino acids, essential and non- essential amino acids
   a. Definition, classification, structure, properties and functions of proteins.

UNIT II

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

b. Enzyme inhibition

6.**Intermediary metabolism**- general consideration.

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

7. **Biological oxidation**-

- Electron transport chain,
- Oxidative phosphorylation,

UNIT III

9. **Vitamins**- Biochemical role of fat soluble vitamins- A, D, K & E. Water soluble vitamins- B Complex & C.

10. **Minerals**- Biochemical role of Inorganic elements.

11.**Hormones**- Biological role of hormones

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-

1. Be familiar with qualitative tests and quantitative determinations.

1. **Carbohydrates**

- Estimation of reducing and total sugars in foods.
- Estimation of lactose in milk.

2.**Fats**

- Determination of Acid value, Saponification value and Iodine number of natural fats & oils.
- Estimation of crude fat content of foods by Soxhlet's method.

3. **Proteins**

- Electrophoresis
- Estimation of total N of foods by Kjeldahl method.

4. **Vitamins**

- Estimation of ascorbic acid content of foods by titrimetric method

5. **Minerals**

- Fluorimetry- general principle
- Estimation of calcium
- Estimation of chloride
- Estimation of phosphorus

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