YENEPOYA

(DEEMED TO BE UNIVERSITY)
Recognized under Sec 3(A) of the UGC Act 1956
Accredited by NAAC with 'A' Grade

# YENEPOYA (DEEMED TO BE UNIVERSITY)

**Deralakatte, Mangaluru -575018**

## REGULATIONS AND CURRICULUM GOVERNING

## UNDERGRADUATE PROGRAM

## BACHELOR OF SCIENCE

## FOOD SCIENCE AND NUTRITION STUDIES

**(CURRICULUM - EFFECTIVE FROM 2020-21)**

**Structure of the program clearly indicating courses, credits/Electives** **Click Here**

ATTESTED

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Ref: No. Y/REG/ACA/ACM-34/2019 . . . 20.03.2019

**NOTIFICATION**

Sub: Starting of B.Sc. Food Science and Nutrition program under the Yenepoya Institute of Arts, Science, Commerce & Management and approval of the Curriculum and Regulations - Reg

Ref: Minutes of the 34th Academic Council meeting held on 08.02.2019, vide agenda - 39

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The Academic Council at its 34th meeting held on 08.02.2019 and subsequently the Board of Management at its 45th meeting held on 09.02.2019 have resolved to approve the proposal for starting of B.Sc. Food Science and Nutrition Program (Choice Based Credit System) under the Yenepoya Institute of Arts, Science, Commerce & Management.

The Curriculum and Regulations for the B.Sc. Food Science and Nutrition program have been approved.

**REGISTRAR**

Copy to:

1. Controller of Examinations
2. Principal, YIASC&M
3. Program Coordinator
4. File copy

**B.Sc.Food Science and Nutrition**

**Preamble:**

The University Grants Commission, New Delhi in its tenth plan guidelines directed the Universities in the country to implement the credit based semester scheme in both under-graduate and post-graduate programmes. The Credit Based Semester Scheme, makes the product of a University at par with the global practices in terms of academic standards and evaluation strategies. In the emerging scenario of Internationalization of Indian Higher Education, it is imperative that the Universities in India should follow this system so that the mobility of their products both within and across the geographical jurisdiction becomes possible. Hence the Yenepoya University is adopting the credit based semester scheme in its undergraduate degree programme of B.Sc. Food Science and Nutrition effective from the academic year 2019- 20.

B.Sc. degree holders get a better chance for pursuing masters in Food Science and Nutrition or may concentrate on research in industry or academia. The science of Food and Nutrition integrates the relation between the production and consumption aspects of Food. B.Sc. Food Science and Nutrition course bring together the study of understanding the biological and chemical composition of food and how its preservation can affect the level of nutrition. The students are rendered with the knowledge of understanding the importance of hygiene and maintenance in order to know how food can be made worthy of consumption.

The program concentrates on the aspects of nutrition, the techniques of preservation and it's importance to health. Learning the different aspects related to healthy intake of food, the program throws light on the level of nutritional components of the food. Candidates are skilled to conduct research about the nutritional value, conservation of food products and the aspects that leads to rotting of food materials.

The curriculum is a divided between theory and practical study. The project work and research help students gain a deeper insight into the subject. Students are trained to conduct experiments and detect the nutritional proportion of elements. They are also taught the fundamentals of food intake helping them gain knowledge about diet and fitness. Candidates are required to possess evaluative thinking, and analytical skills to broaden their knowledge about Diet, Fitness, Food, and Nutrition.

Food Science is a vast field. Off late it has been booming tremendously. Food is a basic necessity for humans. So you can be assured that this industry will never face the drawbacks of recession. When it comes to food science, there are two major divisions. One is the Food Science and Nutrition, and the other Food Science in the Food Industry. Both the fields are expanding in India and abroad. Food choices and lifestyles have changed over time. Diseases and Disorders have spread rapidly. Weight loss and Healthy Body goal are gaining popularity. This way a Nutritionist can help the vast amount of people and can cater to their needs. The Food Industry is another sector closely related to the Nutritional Sector as they deal with Nutritional Value of the Products sold in Markets. Food Industry requires you to work with a company to improve, innovate and protect food products. This is a field where many external industries come in contact as well, like management, packaging, etc. Fresh graduates could be employed in food companies and most

Packed food brands (Nestle, etc) employs Food science graduates in various departments (Research, production, quality etc).

After internship with a registered dietitian (RD) after graduation and attempting an exam to get certified as an RD, young graduates have good chances of getting employed at hospitals. Every good hospital employs a few clinical nutritionists and dieticians to check on patients. Entrepreneurship opportunities are also available in plenty as there is a high scope of Independent *consultation and practice*. That is, becoming a consultant for health centers (Diabetic centre, fitness, weight loss etc) depending on various areas of expertise. Also, hotels, food safety, quality control, et cetera are the other areas where these graduates are hired.

Bachelor of Food Science and Nutrition is a very popular degree in the world. Our curriculum is one such that a student can choose self employment also as a sports nutritionist. Leading employment portal, Shine, suggests that market size of FMCG in India is estimated to grow from US$ 30 billion in 2011 to US$ 74 billion in 2018. Food products are the leading segment, accounting for 43 per cent of the overall market. Moreover, the curriculum is also designed in such a way that it provides further scope for research in ingredient- flavour network and molecular gastronomy. Students may explore their creativity to design new foods and incorporate regional flavours into modern food practices. A combination of Food Science, Nutrition, Dietetics, Exercise schemes, diet therapy, nutrition counselling, obesity control, food processing and preserving technology are taking place in the degrees that we propose to offer. This sector is predicted to become the world's largest industry by the year 2020, generating enormous opportunities for well qualified individuals armed with credentials from an elite institute like Yenepoya University. These Graduates will be in great demand to assume exciting and rewarding positions anywhere in the World. Many foreign countries prefer hiring people from India to manage their most difficult asset – human resource. High earning jobs are spread in US, UK, Canada and Middle East markets, and our specializations would offer our students a better chance at gaining employment abroad. Seekers of all these programmes have the lowest injury rates while in employment.

**OBJECTIVES:**

Yenepoya University proposes to conduct B.Sc. (Hon.) Food Science and Nutrition programme with the following objectives;

1) To provide a strong foundation and understanding of the functioning of food commodities, Food Science, Nutrition, Dietetics, Exercise schemes, diet therapy, nutrition counselling, obesity control, food processing and preserving technology etc. by offering a comprehensive curriculum.
2) To develop professional knowledge and skills in Food Science, Nutrition, Dietetics, Exercise schemes, diet therapy, nutrition counselling, obesity control, food processing and preserving technology etc. by adopting learner centered pedagogical practices.
3) To develop competency in students to pursue higher level programmes such as MS, M.Sc, PhD or other Master Programmes in Food Science and Nutrition.
4) To enhance employability and to be able to take up challenging job assignments.

5) To develop the conceptual and practical skills of the students aimed at the intellectual pursuit of knowledge of Food Science and Nutrition.
6) To help understand methods and processes of food technology in every area of activity.
7) To expose them to the areas of application of knowledge in business firms and industrial organizations.
8) To enable them to acquire complete basic and intermediate practical knowledge of various food science and nutrition related subjects with the sole purpose of making them self-dependent and easily employable.

**DURATION OF THE COURSE:**

The duration of the course shall be three years. Each academic year shall be divided into two semesters. The first academic year shall comprise the first and second semesters, the second academic year, the third and fourth semesters, and the third academic year as the fifth and sixth semesters.

**ELIGIBILITY FOR ADMISSION:**

A candidate who has passed the two years Pre-University Examination conducted by the PreUniversity Education Board in the State of Karnataka or any other examination considered as equivalent thereto by University is eligible for admission to these programmes.

* Passed Class XII from a recognized Board in science stream.
* The admission will be done on merit basis taking into consideration the aggregate marks obtained in the following subjects:

**(i)** Chemistry
**(ii)** Biology

In whichever subject the candidate has scored higher mark

**SELECTION PROCESS:**

Application forms will be available in the official website of Yenepoya University (www.yenepoya.edu.in) and the college office for the applicants. A merit list will be prepared of selected candidates based on the $12^{th}$ class marks /PUC marks. Reservation of seats will be followed as per the university Bye Laws.

**TOTAL INTAKE OF STUDENTS:**

70 students will be registered per year for the course.

**MEDIUM OF INSTRUCTION:**

The medium of instruction and examination shall be English.

**REFERENCES:**

**The latest editions of books/ journals would be used as references, wherever applicable.**

**CHOICE BASED CREDIT SYSTEM (CBCS):**

The CBCS provides an opportunity for the students to choose courses from the prescribed courses comprising core, elective/minor or skill based courses. The courses can be evaluated following the grading system, which is considered to be better than the conventional marks system. Therefore, it is necessary to introduce a uniform grading system in the entire higher education system in India. This will benefit the students to move across institutions within India to begin with and across countries. The uniform grading system will also enable potential employers in assessing the performance of the candidates. In order to bring uniformity in the evaluation system and computation of the Cumulative Grade Point Average (CGPA) based on student's performance in examinations, the UGC has formulated the guidelines to be followed.

**Outline of Choice Based Credit System:**

**1. Core Course:** A course, which should compulsorily be studied by a candidate as a core requirement is termed as a Core course.

**2. Elective Course:** Generally a course which can be chosen from a pool of courses and which may be very specific or specialized or advanced or supportive to the discipline/ subject of study or which provides an extended scope or which enables an exposure to some other discipline/subject/domain or nurtures the candidate's proficiency/skill is called an Elective Course.

**2.1 Discipline Specific Elective (DSE) Course:** Elective courses may be offered by the main discipline/subject of study referred to as Discipline Specific Elective. The University/Institute may also offer discipline related Elective courses of interdisciplinary nature (to be offered by the main discipline/subject of study).

**2.2 Dissertation/Project:** An elective course designed to acquire special/advanced knowledge, such as supplement study/support study to a project work, and a candidate studies such a course on his own with an advisory support by a teacher/faculty member is called dissertation/project.

**2.3 Generic Elective (GE) Course:** An elective course chosen generally from an unrelated discipline/subject, with an intention to seek exposure is called a Generic Elective. P.S.: A core course offered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective.

**3. Ability Enhancement Courses (AEC)/Competency Improvement Courses/Skill Development Courses/Foundation Course:** The Ability Enhancement (AE) Courses may be of two kinds: AE Compulsory Course (AECC) and AE Elective Course (AEEC). "AECC" courses are the courses based upon the content that leads to Knowledge enhancement. They ((i)

Environmental Science, (ii) English/MIL Communication) are mandatory for all disciplines. AEEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.

**3.1 AE Compulsory Course (AECC):** Environmental Science, English Communication/MIL Communication.

**3.2 AE Elective Course (AEEC):** These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based instruction. Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem.

**A Project/Dissertation work** would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

# Program outcomes- BSc. Food Science & Nutrition

**PO1** Understand the concept of food science, nutrition and dietetics
**PO2** Analyze the relationships between various nutrients and physiological disorders and various diet therapies
**PO3** Apply the knowledge of processing and preservation techniques in increasing the shelf life of food products
**PO4** Combine the knowledge of food science, nutrition and dietetics to overcome food wastage, malnutrition and lifestyle disorders
**PO5** Using domain knowledge and procedural assertiveness of clinical nutrition and dietetics and relevant disciplines to develop a robust society.
**PO6** Applying principles of diet when planning food and nutrition programmes and supervising meal preparations in hospitals and other food service establishments
**PO7** Educating the community on recommended dietary modifications based on the severity of illness and complications of disease.
**PO8** Exhibiting constant enhancement in their profession through life-long learning thereby escalating human wellness either as sovereign patient counsellors or as a team with multidisciplinary healthcare approach.

## COURSE OUTCOMES UNDERGRADUATE PROGRAM
## BACHELOR OF FOOD SCIENCE & NUTRITION

The Basic Food Science

**CO1** - Explain the nutritional aspects of carbohydrates
**CO2**- Explain the nutritional aspects of lipids and proteins
**CO3**- Explain carbohydrate chemistry and its metabolism
**CO4**- Explain lipid chemistry and its metabolism
**CO5**- Explain protein chemistry and its metabolism
**CO6**- Cite and explain the chemistry, structure and composition underlying the properties of various food components.
**CO7**- Ascertain the major chemical reactions that occur during food preparation and storage.
**CO8**- Apply food science knowledge to describe functions of ingredients in food.

**CO9**- Plan appropriate sensory evaluation tests to answer specific questions regarding food attributes or consumer preferences.
**CO10**- Describe techniques that can be used to monitor quality of raw ingredients and final packaged products.

Human Physiology-I

**CO1**- Describe basic aspects of physiology
**CO2**- classify different functions of digestive and respiratory system of human body
**CO3**- Identify different blood groups, endocrine glands
**CO4**- Outline the vital concepts of physiology and their applications in normal body maintenance.
**CO5**-: Discuss the Cellular functions and explain its importance in healthy life
**CO6**- Explain and analyse the functions of hormones and their implications in disease conditions.

Human Physiology Practical

**CO1**: Identify and functionally describe the different tissues and blood vessels.
**CO2**: Utilise core instrumentation and equipment for the measurement of blood pressure.
**CO3**: Review, analyse, assess and interpret independently generated results from blood and urine samples.

Clinical Nutrition and Dietetics Practical

**CO1**: Assess the nutritional status using various nutritional assessment tools.
**CO2**: Develop a ready –reckoner for calculating nutrient content of various foods in normal persons and the ability to modify for given disease conditions.
**CO3**: Apply the principles of diet and determine the dietary essentials for recovery from critical illness.
**CO4**: Plan menu for the given disease condition and compare and contrast with R.D.A using Software.

Sports Nutrition

**CO1**: Apply the art and science of sports nutrition for the wellness of sports personnel.
**CO2**: Relate the role and importance of macro and micro nutrients in body maintenance of sports enthusiastic.
**CO3**: Describe the dietary supplements for different sports activities.

**CO4**: Discuss the role of nutrition in physical performance, recovery and adaptations to exercise.

Hospital Internship

**CO1**: Identify the different disease conditions.
**CO2**: Interpret the relevance of food and nutrition for the disease.
**CO3**: Devise an individualized diet plan for patients.
**CO4**: Compare and contrast the derived nutritive values with R.D.A using software.
**CO5**: Persuade the patients with appropriate diet counseling techniques.

Community Nutrition

**CO1**: Assess the nutritional status of individuals. 8.
**CO2**: Relate health, nutrition and population dynamics of a community.
**CO3**: Compile the nutritional interventions provided by the government.
**CO4**: Describe the public nutritional problems and appraise strategies to combat.

Project and Viva-voce

**CO1**: State a nutritional problem prevalent in local community settings and draft a research design for solving.
**CO2**: Determine the etiological factors. CO3: Plan and design tools for data collection.
**CO4**: Apply the appropriate nutritional concepts to research techniques.
**CO5**: Conceive solutions to the defined problems.

Nutritional Biochemistry

**CO1**: Summarize the basic concepts of biochemistry.
**CO2**: Explain the metabolism of macro and micro nutrients.
**CO3**: Describe the mechanism of body fluids and bioenergetics.
**CO4**: Determine the inborn errors of metabolism.
**CO5**: Discuss the bioavailability, excess and deficiency conditions of all nutrients.

Geriatric Nutrition

**CO1**: understand the special nutritional requirements of children
**CO2**: provide comprehensive and essentially practical guidance on all aspects of geriatric nutrition - from the promotion of nutrition/health to the management of deficiency/diseases
**CO3**: develop a knowledge base in key areas of geriatric nutrition (such as physiology of aging; theories of aging; clinical, psychological and social challenges and health concerns of elderly)

**CO4**- comprehend and analyse the causes, consequences and preventive strategies for geriatric nutritional problems
**CO5**- design nutritional status assessment and management protocols /strategies

**Details of courses under B.Sc. Food Science & Nutrition**

| Course | | *Credits | |
|---|---|---|---|
| | | **Theory+ Practical** | **Theory + Tutorial** |
| **I.** | **Core Course (14 Papers)** | 14X4= 56 | 14X5=70 |
| | **Core Course Practical / Tutorial* (14 Papers)** | 14X2=28 | 14X1=14 |
| **II.** | **Elective Course (8 Papers)** | | |
| | **A.1. Discipline Specific Elective (4 Papers)** | 4X4=16 | 4X5=20 |
| | **A.2. Discipline Specific Elective Practical / Tutorials* (4 Papers)** | 4 X 2=8 | 4X1=4 |
| | **B.1. Generic Elective/ Interdisciplinary (4 Papers)** | 4X4=16 | 4X5=20 |
| | **B.2. Generic Elective Practical / Tutorials*** **(4 Papers)** | 4 X 2=8 | 4X1=4 |
| | ***Optional Dissertation or project work in place of one Discipline Specific elective paper (6 credits) in 6th Semester** | | |
| **III.** | **Ability Enhancement Courses** | | |
| | **1. Ability Enhancement Compulsory Courses (AECC) (2 Papers of 4 credits each)** Environmental Science English Communication/MIL | 2 X 2=4 | 2 X 2=4 |
| | **2. Skill Enhancement Courses (SEC) (Minimum 2, Max. 4) (2 Papers of 4 credits each)** | 2 X 2=4 | 2 X 2=4 |
| | | **Total credit= 140** | **Total credit= 140** |

Institute should evolve a system/policy about ECA/ General Interest/Hobby/Sports/NCC/NSS/related courses on its own. *wherever there is a practical there will be no tutorial and vice-versa.

**MINIMUM COURSE CURRICULUM FOR UNDERGRADUATE COURSES UNDER CHOICE BASED CREDIT SYSTEM**

**B. S.c. Food Science and Nutrition**

| Semester | Subject Code | Course Name | Course Type | Credit | | | |
|---|---|---|---|---|---|---|---|
| | | | | Theory | Tutorial | Practical | Total |
| I | DC01FS1C1 | The Basic Food Science - I (Theory) | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS1P1 | The Basic Food Science - I (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS1C2 | Human Physiology - I | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS1P2 | Human Physiology – I (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS1C3 | Environmental Studies | Ability Enhancement Compulsory Course | 2 | 0 | 0 | 2 |
| | DC01FS1C4 | Management Theory and Practice | Generic Elective Course | 5 | 1 | 0 | 6 |
| | Total | | | 15 | 1 | 8 | 20 |
| II | DC01FS2C1 | Basic Food Science - II | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS2P1 | Basic Food Science – II (Practical) | Core Course | 0 | 0 | 0 | 2 |
| | DC01FS2C2 | Human Physiology – II | Core Course | 4 | 0 | 0 | 6 |
| | DC01FS2P2 | Human Physiology – II (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS2C3<br>DC01FS2C5<br>DC01FS2C4 | Any ONE of the following<br>a) English<br>b) Hindi<br>c) Kannada | Ability Enhancement Compulsory Course | 2 | 0 | 0 | 2 |
| | DC01FS2C6 | Managerial Economics | Generic Elective Course | 5 | 1 | 0 | 6 |
| | Total | | | 15 | 1 | 8 | 20 |
| III | DC01FS3C1 | Human Nutrition - Theory | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS3P1 | Human Nutrition- Practical | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS3C2 | Community Nutrition – I | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS3P2 | Community Nutrition – I (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS3C3 | Food Commodities | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS3P3 | Food Commodities (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS3C4<br>DC01FS3C5 | a) Sports Nutrition<br>b) Food Service Management | Skill Enhancement Course | 2 | 0 | 0 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | DC01FS3C6 | Business Mathematics | Generic Elective Course | 5 | 1 | 0 | 6 |
| | DC01FS3C7 | Social Responsibility and community engagement | Ability Enhancement Compulsory Course | 1 | 0 | 1 | 2 |
| | Total | | | 20 | 1 | 7 | 28 |
| IV | DC01FS4C1 | Diet Therapy - I | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS4P1 | Diet Therapy – I (Practical) | Core Course | 0 | 0 | 0 | 2 |
| | DC01FS4C2 | Nutritional Biochemistry- I | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS4P2 | Nutritional Biochemistry- I ( Practical) | Core Course | 0 | 0 | 0 | 2 |
| | DC01FS4C3 | Diet Therapy - II | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS4P3 | Diet Therapy – II (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS4C4<br>DC01FS4C5 | a) Nutrition and Health Education<br>b) Bakery Science | Skill Enhancement Course | 2 | 0 | 0 | 2 |
| | DC01FS4C6 | Summer Internship Project | Generic Elective Course | 0 | 0 | 6 | 6 |
| | Total | | | 16 | 0 | 18 | 26 |
| | DC01FS5C1 | Nutritional Biochemistry- II | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS5P1 | Nutritional Biochemistry- II (Practical) | Core Course | 0 | 0 | 2 | 2 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| V | DC01FS5C2 | Food Microbiology | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS5P2 | Food Microbiology (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS5C3<br>DC01FS5C4 | Any ONE of the following<br>(a) Public Health<br>(b)Mushroom Culture | Discipline Specific Elective Course | 5 | 1 | 0 | 6 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | DC01FS5C5<br>DC01FS5C6 | Any ONE of the following<br>(a) Diet Counseling and Patient Care<br>(b) Geriatric Nutrition | Discipline Specific Elective Course | 5 | 1 | 0 | 6 |
| | Total | | | 18 | 2 | 8 | 24 |
| VI | DC01FS6C1 | Food Preservation and Safety Regulations - | Core Course | 4 | 0 | 0 | 4 |
| | DC01FS6P1 | Food Preservation and Safety Regulations (Practical) | Core Course | 0 | 0 | 2 | 2 |
| | DC01FS6P2 | Project cum Internship (practical) | Core Course | 0 | 0 | 4 | 6 |
| | DC01FS6C2<br>DC01FS6C3 | Any ONE of the following<br>(a) Theories of Human Development<br>(b) Non formal Adult and Lifelong Education | Discipline Specific Elective Course | 5 | 1 | 0 | 6 |
| | DC01FS6C4<br>DC01FS6C5 | Any ONE of the following<br>a) Childhood Disability and Social Action<br>b)Child Rights and Gender Justice | Discipline Specific Elective Course | 5 | 1 | 0 | 6 |
| | Total | | | 14 | 10 | 6 | 24 |
| Grand total credits of (I,II,III,IV,V and VI Semester ) | | | | | | | 142 |

**THE COURSE CONTENT, INSTRUCTION HOURS AND ASSESSMENT DETAILS: B.Sc. Food Science and Nutrition**

| Semester | Course Offered | Course Name | Marks Distribution | Hours per week | Credit |
|---|---|---|---|---|---|

| | | | Internal | External | Total | Theory | Tutorial | Practical | |
|---|---|---|---|---|---|---|---|---|---|
| I | C1 | The Basic Food Science - I (Theory) | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | The Basic Food Science - I (Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | C2 | Human Physiology - I | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Human Physiology – I (Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | AEC C 1 | Environmental Studies | 25 | 75 | 100 | 2 | 0 | 0 | 2 |
| | GE 1 | Management Theory and Practice | 25 | 75 | 100 | 5 | 1 | 0 | 6 |
| | Total | | | | 600 | 15 | 1 | 8 | 20 |
| II | C3 | Basic Food Science - II | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Basic Food Science – II (Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | C4 | Human Physiology – II | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Human Physiology – II (Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | AEC C 2 | Any ONE of the following<br>a)English<br>b)Hindi<br>c) Kannada | 25 | 75 | 100 | 2 | 0 | 0 | 2 |
| | GE 2 | Managerial Economics | 25 | 75 | 100 | 5 | 1 | 0 | 6 |
| | Total | | | | 600 | 15 | 1 | 8 | 20 |
| III | C5 | Human Nutrition | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Human Nutrition-Practical | CIA | | 100 | 0 | 0 | 4 | 2 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | C6 | Community Nutrition – I | 25 | 75 | 100 | 4 | 0 | 4 | 6 |
| | | Community Nutrition – I (Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | C7 | Food Commodities | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Food Commodities | CIA | | 100 | 0 | 0 | 4 | 2 |
| | SEC - 1 | c) Sports Nutrition<br>d) Food Service Management | 25 | 75 | 100 | 2 | 0 | 0 | 2 |
| | GE 3 | Business Mathematics | 25 | 75 | 100 | 5 | 1 | 0 | 6 |
| | AEC C 3 | Social Responsibility and community Engagement | CIA | | 100 | 1 | 0 | 2 | 2 |
| | | Total | | | 800 | 20 | 1 | 14 | 26 |
| IV | C8 | Diet Therapy - I | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Diet Therapy – I (Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | C9 | Nutritional Biochemistry- I | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Nutritional Biochemistry- I ( Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | C10 | Diet Therapy - II | 25 | 75 | 100 | 4 | 0 | 0 | 4 |
| | | Diet Therapy – II (Practical) | CIA | | 100 | 0 | 0 | 4 | 2 |
| | SEC 2 | c) Nutrition and Health Education<br>d) Bakery Science | 25 | 75 | 100 | 2 | 0 | 0 | 2 |
| | GE 4 | Summer Internship Project | CIA | | 100 | 0 | 0 | 6 | 6 |
| | | Total | | | 800 | 16 | 0 | 18 | 26 |
| | C11 | Nutritional Biochemistry- II | 25 | 75 | 100 | 4 | 0 | 0 | 4 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | **Nutritional Biochemistry-II (Practical)** | **CIA** | | **100** | **0** | **0** | **4** | **2** |
| **V** | **C12** | **Food Microbiology** | **25** | **75** | **100** | **4** | **0** | **0** | **4** |
| | | **Food Microbiology ( Practical)** | **CIA** | | **100** | **0** | **0** | **4** | **2** |
| | **DSE - 1** | **Any ONE of the following (a) Public Health (b)Mushroom Culture** | **25** | **75** | **100** | **5** | **1** | **0** | **6** |
| | **DSE - 2** | **Any ONE of the following (c) Diet Counselling and Patient Care (d) Geriatric Nutrition** | **25** | **75** | **100** | **5** | **1** | **0** | **6** |
| | | **Total** | | | **600** | **18** | **2** | **8** | **24** |
| **VI** | **C13** | **Food Preservation and Safety Regulations -** | **25** | **75** | **100** | **4** | **0** | **0** | **2** |
| | | **Food Preservation and Safety Regulations – ( Practicals)** | **CIA** | | **100** | **0** | **0** | **4** | **2** |
| | **C14** | **Project cum Internship (practical)** | **CIA** | | **100** | **0** | **0** | **6** | **6** |
| | **DSE - 3** | **Any ONE of the following (c) Theories of Human Development (d) Non formal Adult and Lifelong Education** | **25** | **75** | **100** | **5** | **1** | **0** | **6** |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | **DSE - 4** | **Any ONE of the following a) Childhood Disability and Social Action b)Child Rights and Gender Justice** | **25** | **75** | **100** | **5** | **1** | **0** | **6** |
| | | **Total** | | | **500** | **14** | **2** | **10** | **24** |
| **Grand total credits of (I,II,III,IV,V and VI Semester )** | | | | | **3800** | | | | **142** |

## B. Sc.Food Science and Nutrition

**Semester I:**

| Semester | Course Offered | Course Name | Hours per week | | | Credit |
|---|---|---|---|---|---|---|
| | | | Theory | Tutorial | Practical | |
| I | C1 | The Basic Food Science - I | 4 | 0 | 4 | 6 |
| | C2 | Human Physiology - I | 4 | 0 | 4 | 6 |
| | AECC 1 | AECC 1 - Environmental Studies | 2 | 0 | 0 | 2 |
| | GE 1 | GE 1- Management Theory and Practice | 5 | 1 | 0 | 6 |
| | | Total | 17 | 3 | 0 | 20 |

## DC01FS1C1 BASIC FOOD SCIENCE – I

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Course Contents:**

**Unit 1:** Basic concept on Food, Nutrition and Nutrients. Classification of Food, Classification of Nutrients.

**Unit 2:** Carbohydrates - Definition, Classification, Structure and properties. Monosaccharides - glucose, fructose, galactose.

**Unit 3:** Disaccharides - Maltose, lactose, sucrose; Polysaccharides - Dextrin, starch, glycogen, resistant starch.

**Unit 4:** Carbohydrates - Sources, daily requirements, functions. Effects of too high and too Low carbohydrates on health. Digestion and absorption of carbohydrate.

**Unit 5:** Lipids -Definition, Classification & Properties. Fatty acids-composition, properties, types. Lipids - sources, daily requirements, functions. Digestion & Absorption of nutrients. Role & nutritional significances of PUFA, MUFA, SFA, W-3 fatty acid.

**Unit 6:** Proteins- Definition, Classification, Structure & properties. Amino acids-Classification, types, functions. Proteins - Sources, daily requirements, functions. Effect of too high - too low proteins on health. Digestion & absorption. Assessment of Protein quality (BV, PER, NPU). Factors affecting protein bio-availability including anti-nutritional factors.

**DC01FS1P1 BASIC FOOD SCIENCE (PRACTICAL)**

1. Identification of Mono, Di and polysaccharides
2. Identification of Proteins
3. Identification of glycerol.

**Suggested Reading:**


1. Chattopadhyay Ghosh S and Base N. (2015). UcchaMadhaymikKhadda O Pusti,
2. Calcutta Book House.
3. Raut SK, Mitra K and Chowdhury P. AdhunikPustibigyan, Book India Academic Publishers.
4. Arora K (2008). Theory Of Cookery, Frank Brothers.
5. Srilakshmi B.( 2018).Nutrition Science. New Delhi: New Age International. Sahoo S and Sahoo SK. (2016). Pustibigyan, Kolkata: ChayaPrakashani.
6. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
7. Mudambi SR and Rajagopal MV.(2012). Fundamentals of Foods, Nutrition and Diet Therapy. 6thed. New Delhi: New Age International.
8. Mudambi SR, Rao SM and Rajagopal MV.(2006). Food Science, 2nded. New Delhi. New Age International.
9. Roday S. Food Science &Nutrition,Oxford University Press.
10. Mann and Truswell: Essentials of Human Nutrition, Oxford University Press


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## DC01FS1C2- HUMAN PHYSIOLOGY-I

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60hours**

**Unit 1:** Unit of Life: Structure and functions of cell with special reference to Plasma membrane (Fluid Mosaic Model), Mitochondria, Ribosome, Endoplasmic reticulum. Nucleus (nuclear membrane, nuclear chromatin and nucleolus).Nucleotide, Homeostasis, Positive and negative feed back

**Unit 2:** Circulatory and Cardiovascular system: Blood and its composition, formed elements, Blood groups, Mechanism of blood coagulation, Introduction to immune system, Erythropoiesis and anaemia, Structure and functions of heart, Cardiac cycle, cardiac output, blood pressure and its regulation.

**Unit 3:** Digestive System: Structure and functions of G.I. tract, Process of digestion and absorption of food, Structure and functions of liver, gallbladder and pancreas.

**Unit 4:** Respiratory System: Structure of Lungs and gaseous exchange (oxygen and carbon dioxide transport).

**Unit 5:** Musculoskeletal System: Formation and functions of muscles, bones. Mechinism of muscle contraction, isometric and isotonic muscle contraction.

## DC01FS1P2 HUMAN PHYSIOLOGY-I (PRACTICAL)

1. Determination of pulse rate in Resting condition and after exercise (30 beats/10 beats method)
2. Determination of blood pressure by Sphygmomanometer (Auscultatory method).
3. Measurement of Peak Expiratory flow rate.
4. Determination of Bleeding Time (BT) and Clotting Time (CT).
5. Detection of Blood group (Slide method).
6. Measurement of Haemoglobin level (Sahli`s or Drabkin method ).

**Suggested Reading:**


1. Chatterjee CC (1988). Text Book of Physiology – Vol I & II.
2. Chaudhuri SK (2000). Concise Medical Physiology.New Central Book Agency (P) Ltd.
3. Guyton AC, Hall JE (1966). Text book of Medical Physiology.9th Ed. Prism Books (Pvt.) Ltd. Bangalore.
4. Wilson (1989). Anatomy and Physiology in Health and Illness. Edinburgh, Churchill Livingstone.
5. Winword (1988). Sear's Anatomy and Physiology for Nurses. London, Edward Arno.
6. Koeppen BM and Stanton BA(2017): Berne and Levy Physiology, 7th Ed. Elsevier
7. Rhoades R and PflanzerR (2003): Human Physiology, 4th ed. Thomson.
8. Eroschenko VP(2007): diFore's Atlas of Histology, diFiore's Atlas of Histology with Functional Correlations, 11th Edition. Lippincott Williams & Wilkins.
9. McLaughlin D, Stamford J and White D(2006): Bios Instant Notes on Human Physiology,1st Ed. Taylor & Francis;

## DC01FS1C3 - ENVIRONMENTAL STUDIES

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Lectures: 30Hrs**

(UGC Ability Enhancement Compulsory Course (AECC – Environment Studies)

**Unit 1**: Introduction to environmental studies • Multidisciplinary nature of environmental studies; • Scope and importance; Concept of sustainability and sustainable development. (2 lectures)

**Unit 2:** Ecosystems • What is an ecosystem? Structure and function of ecosystem; Energy flow in an ecosystem: food chains, food webs and ecological succession. Case studies of the following ecosystems : a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

**Unit 3**: Natural Resources : Renewable and Non-renewable Resources • Land resources and land use change; Land degradation, soil erosion and desertification. • Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. • Water : Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). • Energy resources : Renewable and non renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

**Unit 4**: Biodiversity and Conservation • Levels of biological diversity : genetic, species and ecosystem diversity; Biogeographic zones of India; Biodiversity patterns and global biodiversity hot spots • India as a mega-biodiversity nation; Endangered and endemic species of India • Threats to biodiversity : Habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity. • Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.

**Unit 5**: Environmental Pollution • Environmental pollution : types, causes, effects and controls; Air, water, soil and noise pollution • Nuclear hazards and human health risks • Solid waste management : Control measures of urban and industrial waste. • Pollution case studies.

**Unit 6**: Environmental Policies & Practices • Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture 2/2 • Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act. International agreements: Montreal and Kyoto protocols and Convention on Biological Diversity (CBD). • Nature reserves, tribal populations and rights, and human wildlife conflicts in Indian context.

**Unit 7**: Human Communities and the Environment • Human population growth: Impacts on environment, human health and welfare. • Resettlement and rehabilitation of project affected persons; case studies. • Disaster management: floods, earthquake, cyclones and landslides. • Environmental movements : Chipko, Silent valley, Bishnois of Rajasthan. • Environmental ethics: Role of Indian and other religions and cultures in environmental conservation. • Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

**Unit 8**: Field work • Visit to an area to document environmental assets: river/ forest/ flora/fauna, etc.
•
Visit to a local polluted site-Urban/Rural/Industrial/Agricultural. • Study of common plants, insects, birds and basic principles of identification.
• Study of simple ecosystems-pond, river, Delhi Ridge, etc. (Equal to 5 lectures)

**Suggested Readings:**


1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P. H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J., Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books.
8. McNeill, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, H.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia: Saunders.
10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M. L. 2001. Environmental law and policy in India. Tripathi 1992.
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
17. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren, C. E. 1971. Biology and Water Pollution Control. WB Saunders.
19. Wilson, E. O. 2006. The Creation: An appeal to save life on earth. New York: Norton.
20. World Commission on Environment and Development. 1987. Our Common Future. Oxford University Pres

**DC01FS1C4 - MANAGEMENT THEORY AND PRACTICE**

| L | T | P | C |
|---|---|---|---|
| 5 | 1 | 0 | 6 |

**Theory + Tutorial: 90 hours**

**Paper objective:**
To introduce knowledge and understanding of the business and its environment and the influence this has on how organizations are structured and on the role of the accounting and other key business functions in contributing to the efficient, effective and ethical management and development of an organization and its people and systems.

**Learning outcome:**

1. On successful completion of this paper, candidates should be able to:
2. Understand the purpose and types of businesses and how they interact with key stakeholders and the external environment.
3. Understand business organisation structure, functions and the role of corporate governance
4. Recognize the function of accountancy and audit in communicating, reporting and assuring financial information and in effective financial control and compliance
5. Recognise the principles of authority and leadership and how teams and individuals are recruited, managed, motivated and developed.
6. Understand the importance of personal effectiveness as the basis for effective team and organizational behaviour.
7. Recognise that all aspects of business and finance should be conducted in a manner which complies with and is in the spirit of accepted professional ethics and professional values.

**Pedagogy:**
Combination of lectures, assignments and group discussions.

**Unit I:** The Business Organization, Its Stakeholders and The External Environment:
The purpose and types of business organisation - Stakeholders in business organisations - Political and legal factors affecting business - Macroeconomic factors - Social and demographic factors - Technological factors -Environmental factors - Competitive factors.

**Unit II:** Business Organization Structure, Functions And Governance:
The formal and informal business organization- Business organisational structure and design - Organisational culture in business - Committees in business organisations - Governance and social responsibility in business.

**Unit III:** Accounting And Reporting Systems, Controls and Compliance:
The relationship between accounting and other business functions - Accounting and finance functions within business organisations - Principles of law and regulation governing accounting and auditing -The sources and purpose of internal and external financial information, provided by business - Financial systems, procedures and related IT applications - Internal controls, authorisation, security of data and compliance within business - Fraud and fraudulent behaviour

and their prevention in business, including money laundering.

**Unit IV:** Leading And Managing Individuals and Team:.
Leadership, management and supervision - Recruitment and selection of employees - Individual and group behaviour in business organisations -Team formation, development and management - Motivating individuals and groups - Learning and training at work -Review and appraisal of individual performance.

**Unit V:** Personal Effectiveness and Communication:
Personal effectiveness techniques - Consequences of ineffectiveness at work - Competence frameworks and personal development -Sources of conflicts and techniques for conflict resolution and referral- Communicating in business.

**Unit VI:** Professional Ethics in Accounting and Business:
Fundamental principles of ethical behaviour - The role of regulatory and professional bodies in promoting ethical and professional standards in the accountancy profession - Corporate codes of ethics - Ethical conflicts and dilemmas

**Suggested Reading:**


1. L M Prasad , Principles of Management, New Delhi: Sulthan Chand & Sons; 2015
2. ACCA Study Material, Latest Edition, United Kingdom: Becker Professional Education ; 2018
3. ACCA Study Material, Latest Edition, London: Kaplan Publishers Ltd; 2018
4. ACCA Study Material, Latest Edition, London: BPP ; 2018

**Semester II:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Semester<br><br>II | C3 | Basic Food Science - II | 4 | 0 | 2 | 6 |
| | C4 | Human Physiology - II | 4 | 0 | 2 | 6 |
| | AECC 2 | Any ONE of the following<br>a)English<br>b)Hindi<br>c) Kannada | 2 | 0 | 0 | 2 |
| | GE 2 | Managerial Economics | 5 | 1 | 0 | 6 |
| | Total | | 15 | 1 | 4 | 20 |

## DC01FS2C1- BASIC FOOD SCIENCE-II (THEORY)

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Dietary Fibre-Classification, sources, composition, properties & nutritional significance. Minerals & Trace Elements, Bio-Chemical and Physiological Role, bio-availability & requirements, sources, deficiency & excess (Calcium, Sodium, Potassium Phosphorus, Iron, Fluoride, Zinc, Selenium, Iodine, Chromium)

**Unit 2:** Vitamins - Bio-Chemical and Physiological Role Physiological role, bio-availability and requirements, sources, deficiency & excess.

**Unit 3:** Water - Functions, daily requirements, Water balance.

## DC01FS2P1 BASIC FOOD SCIENCE-II (PRACTICAL)

1. Determination of Ash content in food
2. Determination of Moisture content in food
3. Determination of calcium, iron, and Vitamin C content in foods.

**Suggested Reading:**

1. SrilakshmiB( 2017): Nutrition Science,6th Multicolour Ed. New Age International (P) Ltd.
2. RodayS(2012): Food Science and Nutrition, 2nd Ed. Oxford University Press.
3. Mann J and TruswellS(2017) : Essentials of Human Nutrition, 5th Ed. Oxford University Press.
4. Wilson K and Walker J(2000): Principles and Techniques of Practical Biochemistry, 5th Ed. Oxford University Press.
5. Sadasivan S and ManikamK(2007): Biochemical Methods, 3rd Ed. New Age International (P) Ltd.
6. Oser B L(1965). Hawk's Physiological Chemistry, 14th Ed. McGraw-Hill Book
7. Nath RL and NathRK(1990). Practical biochemistry in clinical medicine, 2nd Ed. Academic Publishers.
8. Sen AR, Pramanik NK and Roy SK(2001): A treatise on analysis of food fat and oil, Oil Technologists Association of India (EZ), Kolkata, 76, 119.
9.Plummer D( 2017): An introduction of Practical Biochemistry, 3rd Ed. McGraw Hill Education.
10.SwaminathanM(2007): Essentials of Food and Nutrition(Vol. I & II), 2nd Ed. Bappco.
11.Meyer LH (2004): Food Chemistry, CBS Publishers & Distributors.

## DC01FS2C2- HUMAN PHYSIOLOGY-II

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit1:** Excretory system: Structure and function of skin, regulation of temperature of the body, Structure and functions of kidney in special reference to nephron, Physiology of urine formation.

**Unit 2:** Reproductive system: Structure and functions of gonads, concept on menstrual cycle, Brief idea of pregnancy, parturition, lactation and menopause. Brief concept on spermatogenesis and Oogenesis process.

**Unit 3:** Nervous System: Concept on sympathetic and parasympathetic nervous system, Brief anatomy and functions of cerebrum, cerebellum, hypothalamus and neuron, Concept on synapse and synaptic transmission. Reflexes, Special senses.

**Unit 4:** Endocrine system: Structure and functions of pituitary, thyroid, parathyroid and adrenal gland, Structure and functions of pancreas.

## DC01FS2P2 HUMAN PHYSIOLOGY-II (PRACTICAL)

1. Harvard Step test
2. Identification with reasons of histological slides (Lung, Liver, Kidney, Small intestine, Stomach, Thyroid, Adrenal, Pancreas, Testis, Ovary and Muscle of mammals).
3. Qualitative determination of glucose acetone in urine.
4. Blood film staining and identification of different types of blood cells.

**Suggested Reading:**


1.Chatterjee CC (1988). Text Book of Physiology – Vol I & II.
2.Chaudhuri SK (2000). Concise Medical Physiology.New Central Book Agency (P) Ltd. 3.Guyton AC, Hall JE (1966). Text book of Medical Physiology.9th Ed. Prism Books (Pvt.) Ltd., Bangalore..
4.Wilson (1989). Anatomy and Physiology in Health and Illness. Edinburgh, Churchill Livingstone.
5. Winword (1988). Sear's Anatomy and Physiology for Nurses.London, Edward Arno.
6. Koeppen BM and Stanton BA(2017): Berne and Levy Physiology, 7th Ed. Elsevier
7. Rhoades R and PflanzerR. (2003): Human Physiology, 4th ed. Thomson. 8.Eroschenko VP(2007): diFore's Atlas of Histology, diFiore's Atlas of Histology with Functional Correlations, 11th Edition. Lippincott Williams & Wilkins.
9.McLaughlin D, Stamford J and White D(2006): Bios Instant Notes on Human Physiology,1st Ed. Taylor & Francis;

## DC01FS2C3- ENGLISH COMMUNICATION

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Theory: 30 hours**

AECC: English Communication English Communication Credits: 2 Preamble: The purpose of this course is to introduce students to the theory, fundamentals and tools of communication and to develop in them vital communication skills which should be integral to personal, social and professional interactions. One of the critical links among human beings and an important thread that binds society together is the ability to share thoughts, emotions and ideas through various means of communication: both verbal and non-verbal. In the context of rapid globalization and increasing recognition of social and cultural pluralities, the significance of clear and effective communication has substantially enhanced. The present course hopes to address some of these aspects through an interactive mode of teaching-learning process and by focusing on various dimensions of communication skills. Some of these are: Language of communication, various speaking skills such as personal communication, social interactions and communication in professional situations such as interviews, group discussions and office environments, important reading skills as well as writing skills such as report writing, notetaking etc. While, to an extent, the art of communication is natural to all living beings, in today's world of complexities, it has also acquired some elements of science. It is hoped that after studying this course, students will find a difference in their personal and professional interactions. The recommended readings given at the end are only suggestive; the students and teachers have the freedom to consult other materials on various units/topics given below. Similarly, the questions in the examination will be aimed towards assessing the skills learnt by the students rather than the textual content of the recommended books.

1. Introduction: Theory of Communication, Types and modes of Communication
2. Language of Communication: Verbal and Non-verbal (Spoken and Written) Personal, Social and Business Barriers and Strategies Intra-personal, Inter-personal and Group communication
3. Speaking Skills: Monologue Dialogue Group Discussion Effective Communication/ Mis-Communication Interview Public Speech
4. Reading and Understanding Close Reading Comprehension Summary Paraphrasing Analysis and Interpretation Translation (from Indian language to English and vice-versa) Literary/Knowledge Texts
5. Writing Skills Documenting Report Writing Making notes Letter writing

**Suggested Reading:**


1. Fluency in English - Part II, Oxford University Press, 2006.
2. Business English, Pearson, 2008.
3. Language, Literature and Creativity, Orient Blackswan, 2013.
4. Language through Literature (forthcoming) ed. Dr. Gauri Mishra, Dr Ranjana Kaul, Dr Brati Biswas

**DC01FS2C5 HINDI**

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Theory-30hours**

xÉÏZÉlÉå Måü E¬åzrÉ

- oÉÑÌlÉrÉÉSÏ ÍxÉkSÉÇiÉ mÉëSÉlÉ MüUlÉÉ, pÉÉwÉÉ MüÐ iÉMülÉÏMüÐ MüÉå xÉqÉfÉlÉÉ |
- pÉÉwÉÉ MüÐ rÉÉåarÉiÉÉ MüÉå xÉÇcÉÉU ÃmÉÏ EmÉrÉÉåaÉ qÉå sÉÉlÉÉ |
- ÍqÉ§ÉuÉiÉ xÉÇuÉÉS MüÐ rÉÉåarÉiÉÉ AÉæmÉcÉÉËUMü iÉjÉÉ AlÉÉæmÉcÉÉËUMü Måü ÃmÉ qÉå|

UNIT- I

- pÉÉwÉÉ MüÉ mÉËUcÉrÉ
- qÉÔsÉ zÉoS MüÉ AuÉkÉÉUhÉ
- uÉÉYrÉ MüÐ xÉÇMüsmÉlÉÉ
- pÉÉwÉÉ MüÉ xÉWûÏ EmÉrÉÉåaÉ (oÉÉiÉ cÉÏiÉ)

UNIT- II

- qÉÉæÎZÉMü ÃmÉ xÉå AÉæmÉcÉÉËUMü xÉÇuÉÉS pÉÉaÉ – I
- qÉÉæÎZÉMü ÃmÉ xÉå AlÉÉæmÉcÉÉËUMü xÉÇuÉÉS pÉÉaÉ – II

UNIT- III

- pÉÉwÉÉ MüÐ xÉÇUcÉlÉÉ pÉÉaÉ – I
- pÉÉwÉÉ MüÐ xÉÇUcÉlÉÉ pÉÉaÉ – II

UNIT- IV

ÍsÉZÉlÉå MüÐ MüÉæzÉsÉ

- AlÉÑuÉÉS - pÉÉaÉ – I
- AlÉÑuÉÉS - pÉÉaÉ – II
- AlÉÑuÉÉS MüÉ ÌuÉiÉUhÉ – AçaÉëåÄeÉÏ xÉå ÌWÇûSÏ qÉå AlÉÑuÉÉS, ÌWÇûSÏ xÉå AÇaÉëåeÉÏ qÉåÇ AlÉÑuÉÉS

xÉÇSpÉï mÉÑxiÉMåÇü :


1. Krishna Kumar Agarwal, Teach your self hindi, 4th edn : Manoj Publications ; New Delhi ; 2018
2. Kavitha Kumar, Hindi for Non hindi speaking people, 3rd edn : Rupa Publications India Pvt Ltd ; New Delhi ; 2016

## DC01FS2C4 MIL(KANNADA)

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Theory: 30 hours**

Unit – 1 - Kannada letters
Kannada Alphabet, Swaragalu, Vyanjanasalu

Unit – 2 - Technical Terms Business
related words

Unit – 3 - Business letters
Types of formal letters, job application

Unit – 4 - Administrative Kannada
Memos, Report writing

Unit – 5 - Communicative Kannada
Basic Managerial speaking skills, Listening skills

## DC01FS2C6- MANAGERIAL ECONOMICS

| L | T | P | C |
|---|---|---|---|
| 5 | 1 | 0 | 6 |

**Theory + Tutorial: 90 hours**

**Paper objectives:**
To enable the students to use micro economic principles and quantitative tools to making sound managerial decisions
To present business topics using graphs, equations and numerical insight

**Learning Outcome:**
Develop the conceptual foundations and analytical methods used in micro economics
Familiarize the students with the basic consumer behaviour, behaviour of firms, and market equilibrium.

**Pedagogy:**
Combination of lectures, assignments and group discussion

**Unit I**-Introduction to Managerial Economics:
Meaning, nature and scope of managerial economics- Basic Economics tools in Managerial Economics -Role and Responsibility of managerial Economist- Importance of Managerial Economics.

**Unit II**-Theory of Consumption:
Utility-Meaning & feature, Cardinal approach- law of diminishing Marginal utility-Law of demand-Determinants of demand- movement vs shift in demand curve, Elasticity of demand. Ordinal utility-Indifference curve- Properties of Indifference curve – Budget line, consumers equilibrium ,Income and substitution effect.

**Unit III**-Theory of Production and Cost: Meaning of production-Production function; supply - meaning and law of supply – Law of variable proportions; Law of returns, Gross profit and net profit- Profit maximization vs sales maximisation, Baumols sales maximisation model, capital Budgeting- Importance.

**Unit IV**-Market structures :
Price and output determination under different forms of market- Perfect competition, Monopoly-Monopolistic Competition – Price discrimination – Monopsony, Oligopoly,Oligopsony

**Unit V**-Demand Forecasting:
Factors involved – Objectives of short run and Long run Demand Forecasting-Determinents of demand – forecasting of demand for new products- Overseas demandanalysis -criteria of good forecasting method- techniques of demand forecasting

**Suggested Reading:**

1. Peterson, Lewis and Jain, Managerial Economics : Pearson Publication, NewDelhi ; 2001
2. D M Mithan, Managerial Economics: Theory and Practice, Himalaya Publication, New Delhi ; 2005
3. K KDewett, Modern Economic Theory, Chand Publication, New Delhi ; 1999
4. ACCA Study Material, Latest Edition, London: Kaplan Publishers Ltd; 2018
5. ACCA Study Material, Latest Edition, London: BPP ; 2018

**Semester III:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Semester III | C5 | Human Nutrition | 4 | 0 | 2 | 6 |
| | C6 | Community Nutrition - I | 5 | 1 | 0 | 6 |
| | C7 | Food Commodities | 4 | 0 | 2 | 6 |
| | SEC -1 | Sports Nutrition<br>Food Service Management | 2 | 0 | 0 | 2 |
| | GE 3 | Business Mathematics | 5 | 1 | 0 | 6 |
| | | Social Responsibility and Community Engagement | 2 | 0 | 0 | 2 |
| | Total | | 22 | 2 | 4 | 28 |

## DC01FS3C1 - HUMAN NUTRITION

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Concept and definition of terms-Nutrition, Malnutrition and Health: Scope of Nutrition.

**Unit 2:** Minimum Nutritional Requirement and RDA: formulation of RDA and Dietary Guidelines Reference Man and Reference Woman, Adult consumption unit.

**Unit 3:** Energy in Human Nutrition: Idea of Energy and its unit, Energy Balance, Assessment of Energy Requirements—deficiency and excess, Determination of Energy in food, B.M.R. and its regulation, S.D.A.

**Unit 4:** Growth & Development from infancy to adulthood: Somatic, physical, brain and mental development, puberty, menarch, pre-pubertal and pubertal changes, Factors affecting growth and development. Importance of Nutrition for ensuring adequate development.

**Unit 5:** Growth monitoring and promotion: Use of growth charts and standards, Prevention of growth faltering.

**DC01FS3P1HUMAN NUTRITION ( PRACTICAL)**

1. Process involved in cooking: pressure cooking, microwave ,steaming, grilling ,deep fat frying.
2. General concepts of weights and measures. Eye estimation of raw and cooked foods.
3. Preparation of food from different food groups and their significance in relation to health.
4. Preparation of supplementary food for different age group and their nutritional significance.
5. Planning and preparation of low cost diet for Grade I and Grade II malnourished child.

**Suggested Reading:**


1. SrilakshmiB( 2017): Nutrition Science,6th Multicolour Ed. New Age International (P) Ltd.
2. RodayS(2012): Food Science and Nutrition, 2nd Ed. Oxford University Press.
3. Mann J and TruswellS(2017) : Essentials of Human Nutrition, 5th Ed. Oxford University Press.
4. Wilson K and Walker J(2000): Principles and Techniques of Practical Biochemistry, 5th Ed. Oxford University Press.
5. Sadasivan S and ManikamK(2007): Biochemical Methods, 3rd Ed. New Age International (P) Ltd.
6. Oser B L(1965). Hawk's Physiological Chemistry, 14th Ed. McGraw-Hill Book
7. Nath RL and NathRK(1990). Practical biochemistry in clinical medicine, 2nd Ed. Academic Publishers.
8. Sen AR, Pramanik NK and Roy SK(2001): A treatise on analysis of food fat and oil, Oil Technologists Association of India (EZ), Kolkata, 76, 119.
9. Plummer D( 2017): An introduction of Practical Biochemistry, 3rd Ed. McGraw Hill Education.
10. SwaminathanM(2007): Essentials of Food and Nutrition(Vol. I & II), 2nd Ed. Bappco.
11. Meyer LH (2004): Food Chemistry, CBS Publishers & Distributors.

## DC01FS3C2 -COMMUNITY NUTRITION

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Concept of Community, types of Community, Factors affecting health of the Community. Nutritional Assessment and Surveillance: Meaning, need, objectives and importance

**Unit 2:** Nutritional assessment of human: Clinical findings, nutritional anthropometry, biochemical tests, biophysical methods.Diet survey: Need and importance, methods of dietary survey, Interpretation - concept of consumption unit, individual and total distribution of food in family, adequacy of diet in respect to RDA, concept of family food security.

**Unit 3:** Clinical Signs: Need & Importance's, identifying signs of PEM, vitamin A deficiency and iodine deficiency, Interpretation of descriptive list of clinical signs.

**Unit 4:** Nutritional anthropometry: Need and importance, measuring height, weight, head, chest and arm measurements. Use of growth chart.

**Unit 5:** Standard for reference, techniques of circumference, interpretation of these intenational, national regional agencies and organisations. Nutritional intervention programmes to combat malnutrition. Maternal child nutrition, Nutrition Assessing, Nutrition Counselling, Community surveys of nutrition.

## DC01FS3P2 COMMUNITY NUTRITION (PRACTICAL)

1. Anthropometric Measurement of infant - Length, weight, circumference of chest, mid-upper arm circumference, precautions to be taken.
2. Comparison with norms and interpretation of the nutritional assessment data and its significance. Weight for age, height for age, weight for height, body Mass Index (BMI) Waist - Hip Ratio (WHR). Skin fold thickness.
3. Growth charts - plotting of growth charts, growth monitoring and promotion.
4. Clinical assessment and signs of nutrient deficiencies specially PEM (Kwashiorkor, marasmus) I vitamin A deficiencies, Anaemia, Rickets, B-Complex deficiencies.
5. Estimation of food and nutrient intake: Household food consumption data, adult consumption unit, 24 hours dietary recall 24 hours record, Weighment method, food diaries, food frequency data, use of each of the above, information available through each individual, collection of data, estimation of intakes.

**Suggested Reading:**


1. Jelliffe DB. Assessment of the Nutritional Status of the Community; World Health Organisation.
2. Sahn DE, Lockwood R,Scrimshaw NS(1988): Methods the Evaluation of the Impact of Food and Nutrition Programmes, 2nd Printing, United Nations University.
3. Ritchie, JAS(1979): Learning Better Nutrition , Nutritional Studies number 20, FAO, Rome.
4. Gopaldas T and Seshadri S(1988): Nutrition Monitoring and Assessment, Oxford University Press.
5. Mason JB, Habicht, JP, Tabatabai H and Valverde V(1984): Nutritional Surveillance, World Health Organisation.
6. Park K(2017): Textbook of Preventive and Social Medicine,24th Ed. BanarsidasBhanot Publishers.
7. King MH, King PMA, Morley D and AP Burgess(2015):Nutrition for Developing Countries, ELBS Oxford University Press.
8. Passmore R and Eastwood MA (1986): Davidson and Passmore's Human Nutrition & Dietetics , 8th Revised Ed. Churchill Livingstone.
9. SeshubabuVVR(2011): Review in Community Medicine, 2nd Ed, Paras Medical Books Pvt Ltd.
10. Mahajan BK, Roy RN , Saha I, Gupta, MC (2013):Text book of Preventive and Social Medicine, 4th Ed. Japee Brothers.
11. Vir SC(2011): Public Health Nutrition in Developing Countries, Woodhead Publishing India.
12. Bamji MS, Krishnaswamy K and BrahmamGNV(2017): Textbook of Human Nutrition , 4th Ed. Oxford & IBH Publishing Co. Pvt. Ltd.

## DC01FS3C3 - FOOD COMMODITIES

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Cereals and Millets: Structure, processing, storage, use in various preparation, variety, selection and cost. Cereal products, breakfast cereals, fast food.

**Unit 2:** Pulses and Legumes: Structures, Selection and variety. Storage, Processing and use in different preparations, Nutritional aspects and cost.

**Unit 3:** Milk and Milk products : Composition, Classification, Selection Quality and Cost, Processing, Storage and uses in different preparations, Nutritional aspects, shelf life and spoilage.

**Unit 4:** Eggs: Production, grade, quality selection, storage and spoilage, cost nutritional aspects and use in different preparations.

**Unit 5:** Meat, Fish and Poultry: Types, Selection, Purchase, Storage, Uses, preparations Cost, Spoilage of fish Poultry and meat.

**Unit 6:** Vegetables and Fruits: Variety, Selection, purchase, storage, availability causes and nutritional aspects of raw and processed products and use in different preparations.

**Unit 7:** Sugar and sugar Products: Types of natural, sweeteners, manufacture, selection, storage and use as preserves, stages in sugar cookery.

**Unit 8:** Fats and Oils: Types and sources (animal and vegetable), Processing, uses in different preparations, storage, cost and nutritional aspects.

**Unit 9**: Raising and Leavening agents: Types, constituents, uses in cookery and bakery, storage.

Unit 10: Food Adjuncts: Spices, condiments, herbs, extracts; concentrates essences, food colours, origin, classification, description,uses, specifications, procurements and storage.
Convenience Foods: Role, types, advantages, uses, cost and contribution to diet.

**Unit 11:** Salt: Types and uses.

**Unit 12:** Beverages: Tea; Coffee. Chocolate and Cocoa Powder-Processing, cost and nutritional aspects, other beverages-Aerated beverages, juices.

**DC01FS3P3 FOOD COMMODITIES (PRACTICAL)**

**Detection of starch, sucrose, sucrose, formalin, boric acid, and urea in milk.**

1. Detection of urea in puffed rice.
2. Detection of Vanaspati in Ghee/Butter.
3. Detection of Khesari flour in besan.
4. Detection of Metanil yellow in turmeric/coloured sweet products.
5. Detection of Argemone oil in edible oil.
6. Detection of artificially colour / foreign matter in tea (dust/leaves).

**Suggested Reading:**


1. Swaminathan MS Food Science, Chemistry and Experimental Foods, Bangalore Print &Publishing Company.
2. SrilakshmiB(2018): Food Science, 7th Colour Ed. New Age International (P) Ltd.
3. Lavies, S (1998): Food Commodities Ltd. London.
4. Hughes O and Bennion, M (1970): Introductory Foods, 5th Ed. Macrnillan& Co., New York.
5. Parker R and Pace M(2016):Introduction to Food Science and Food Systems, 2nd Ed. Delmar Cengage Learning.
6. Meyer LH(2004): Food Chemistry, 1st Ed. CBS Publishers and Distributors, New Delhi.
7. Mudambi SR, Rao SM and Rajagopal MV(2006): Food Science, 2nd Ed. New Age International (P) Ltd.
8. Manay SN and ShadaksharaswamyM( 2008): Foods: facts and principles , 3rd Ed. New Age International (P) Ltd.
9. Potter NN and Hotchkiss JH(1999): Food science,5th Ed , Spinger.
10. PruthiJS(2011):Spices and Condiments, National Book trust, New Delhi.
11. Pyke M and Murrey J (1974): Catering Service and Technology, John MurreyPube, London.

## DC01FS3C4 – SPORTS NUTRITION

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Theory: 30 Hours**

1. Definition of physical activity, exercise, physical fitness, sports physiology and sports nutrition.
2. Benefits of physical activity and exercise.
3. Classification of Sports activities.
4. Nutritional requirements of sports person.
5. Pre- event meal.

**Suggested Reading:**


1. Campbell BI. (2014). Sports Nutrition: Enhancing Athletic Performance, CRC Press, Taylor& Francis,
2. Haff GG. (2008). Essentials of Sports Nutrition Study Guide, Humana Press.
3. Dunford M and Doyle JA. (2008). Nutrition for Sport and Exercise, Thomson Wadsworth.
4. Srilakshmi B. (2018). Dietetics, New Delhi: New Age International.

## DC01FS3C5 - FOOD SERVICE MANAGEMENT

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Theory: 30 Hours**

**Unit 1:** Organization of food service management: Definition, Various types of Food Service institutions, their characteristics and functions.

**Unit 2:** Planning a food service unit, layout design, planning of different work areas – preparation, cleaning, storing, serving and dining areas. Lighting and ventilation, working heights in relation to equipment.

**Unit 3:** Institutional Menu Planning: Factors influencing menu planning, principles of menu planning, different kinds of menus.

**Unit 4:** Quality food Service – types-Centralized, de-centralized objectives. Styles of service.

**Unit 5:** Importance of sanitation and hygiene in food, kitchen hygiene, Hygienic handling of Food, employee's health, hygiene of food service unit.

**Unit 6:** Personnel Management- selection, training and supervision of personnel, criteria for selection of Dietitian and Food Service staff.

**Suggested Reading:**


1.Khan MA (1987):Food Service Operations, Avi Publication Co.
2.Tompkins D(1969):Table Layout and Decoration, Ward Lock Co. Ltd.
3.Kinton R and CaseraniV(1989): The Theory of Catering, 6th Ed. ELBS.
4.Edward K(1997): Food Service Facilities Planning 3rd Ed, John Wiley & Sons.
5. Sethi M (2015):Catering Management: An Integrated Approach,3rd Ed. New Age International(P) Ltd.
6.RodayS(2017): Food Hygiene and Sanitation with Case Studies, 2nd Ed. McGraw Hill Education.

## DC01FS3C6 - BUSINESS MATHEMATICS

| L | T | P | C |
|---|---|---|---|
| 5 | 1 | 0 | 6 |

**Theory+ Tutorial: 90 Hrs**

**Paper objective:**
To enable the students to have grasp of simple arithmetical calculations relating to topics on commerce and economics.
To develop students analytical ability.

**Learning Outcome:**
Students should be able to define basic terms in the areas of business calculus and financial mathematics.
To learn the basic concepts of limits and differentiation and to use them to pose, solve and interpret application problems in business.
To get acquired knowledge and skills with practical problems in economic practice.

**Pedagogy:**
Combination of lectures, assignments and group discussion.

**Unit I:** Evaluation of Business Choices:
Definition of a matrix, types of matrices, Algebra of matrices. Transpose, minors and co-factors, Inverse of a matrix, solving simultaneous equation by matrix method.

**Unit II:** Evolution of Business choice through determinants:
Meaning of determinants and its properties, evolution of determinants
Solving simultaneous equations by cramer's Rule.

**Unit III:** PortitanelLoss :
Terms and Formula- Trade discount- cash discount- production involving cost price, selling price, trade discount and cash discount. Introduction to commission and brokerage – Problems on commission and brokerage.

**Unit IV-**Interest Application:
Simple interest – compound interest- equated due date – equated monthly instalments (EMI).

**Unit V:** Introduction to Differentiation:
Functions( Concepts only) ,Application in commerce- cost functions, revenue functions, profit function, Break- Even Point( Simple problems).

**Suggested Reading:**


1. S.P Gupta (2014) Business Mathematics : 40thedn, Sulthan Chand & Sons ; New Delhi
2. B.V. Raghunandan-(2014) Business Statistics and Mathematics :Vol I, Vol II, B C Road, Vyshanvi Books.
3. Rajmohan (2014) Business Statistics and Mathematics, Udupi ;Benak Books.
4. P R Vittal ; 2001 Business Statistics; Margham Publications
5. M Ragavachary2017 : Mathematics for Management; M C Graw Hill education.
6. Sancheti&Kapoor 2014 Business Mathematics : New Delhi ; Sulthan Chand & Sons.

**DC01FS3C7 Social Responsibility and Community Engagement**

**(Total Hours:30)**

**Goal**:

This paper will help the students

- To develop an appreciation of rural culture, life-style and wisdom amongst students
- To learn about the status of various agricultural and rural development programmes
- Tounderstandcausesforruraldistressandpovertyandexploresolutionsforthe same
- To apply classroom knowledge of courses to field realities and thereby improve quality of learning

**Learning Outcomes**:

After completing this course, student will be able to

- Gain an understanding of rural life, culture and social realities
- Develop a sense of empathy and bonds of mutuality with local community
- Appreciate significant contributions of local communities to Indian society and economy
- Learn to value the local knowledge and wisdom of the community
- Identify opportunities for contributing to community's socio-economic Improvements

**Course Content:**

**Unit 1: Appreciation of Rural Society (08 hours)**

Rural lifestyle, rural society, caste and gender relations, rural values with respect to community, nature and resources, elaboration of "soul of India lies in villages' (Gandhi), rural infrastructure.

**Assignment:** Prepare a map (physical, visual or digital) of the village you visited and write an essay about inter-family relations in that village.

**Teaching/ Learning Methodology**

1. Interactive Lectures (03 hours)
2. Self directed learning (03 hours)
3. Field activities (02 hours)

**Unit 2: Understanding rural economy & livelihood (08 hours)**

Agriculture, farming, landownership, water management, animal husbandry, non-farm livelihoods and artisans, rural entrepreneurs, rural markets.

**Assignment:** Describe your analysis of rural household economy, its challenges and possible pathways to address them.

**Teaching/ Learning Methodology**

1. Interactive Lectures (02 hours)
2. Self-directed learning (02 hours)
3. Field activities (04 hours)

**Unit 3: Rural Institutions (07 hours)**

Traditional rural organizations, Self-help Groups, Panchayati raj institutions (Gram Sabha, Gram Panchayat, Standing Committees), local civil society, local administration

**Assignment:** How effectively are Panchayat raj institutions functioning in the village? What would you suggest to improve their effectiveness? Present a case study (written or audio-visual)

**Teaching/ Learning Methodology**

1. Interactive Lectures (02 hours)
2. Field activities (05 hours)

**Unit 4: Rural Development Programmes (07 hours)**

History of rural development in India, current national programmes: Sarva Shiksha Abhiyan, Beti Bachao, Beti Padhao, Ayushman Bharat, Swatch Bharat, PM AwaasYojana, Skill India, Gram Panchayat Decentralized Planning, NRLM, MNREGA, etc.

**Assignment:** Describe the benefits received and challenges faced in the delivery of one of these programmes in the rural community; give suggestions about improving implementation of the programme for the rural poor.

**Teaching/ Learning Methodology**

1. Interactive Lectures (01 hour)
2. Field activities (04 hours)
3. Assignment (02 hours)

**Assessment: -** Feedback, MCQs, Submission & presentation of project work/Survey findings

**Continuous Internal Assessment (CIA)**

Internal Assessment is continuous and details are notified well in advance. CIA consists of the following

| SN | Assessment for 100 marks | Marks |
|---|---|---|
| 1 | Objective type questions | 20 |
| 2 | Presentation / Survey Findings | 50 |
| 3 | Assignment/Seminars/Viva-voce/ Class Interaction/Attitude | 20 |
| 4 | Log Book | 10 |

**Recommended** field-based practical activities:

- Interaction with SHG women members and study of their functions and challenges; planning for their skill building and livelihood activities
- Visit MGNREGS project sites interact with beneficiaries and interview functionaries at the work site
- Field visit to Swatch Bharat project sites conduct analysis and initiate problem solving measures
- Conduct Mission Antyodaya surveys to support under Gram Panchayat Development Plan(GPDP)
- Interactive community exercise with local leaders, panchayat functionaries, grass-root officials and local institutions regarding village development plan preparation and resource embolization
- Visit Rural Schools/mid-day meal centres study Academic and infrastructural resources and gaps
- Participation Gram Sabha meetings and study community participation
- Associate with Social audit exercise at the Gram Panchayat level, and interact with programme beneficiaries
- Attend Parent Teacher Association meetings and interview school drop outs
- Visit local Anganwadi Centre and observe the services being provided
- Visit local NGOs civil society organizations and interact with their staff and beneficiaries,
- Organize awareness programmes health camps Disability camps and cleanliness camps
- Conducts oil health test drinking water analysis energy use and fuel efficiency surveys
- Raise understanding of people's impacts of climate change building up community's Disaster preparedness

- Organize orientation programmes for farmers regarding organic cultivation rational use of irrigation and fertilizers and promotion of traditional species of crops and plants
- Formation of committees for common property resource management village pond Maintenance and fishing

**Credit:** 2 credit, 30 hours, at least 50% in field, compulsory for all students

**Contents:** Divided into four Modules, field immersion is part of each Unit

**Course Structure**: 2Credits Course (1Credit for Class room and Tutorials and 1Credit for Field Engagement)

**Suggested Readings**

**Books:**


1. Singh, Katar, Rural Development: Principles, Policies and Management, Sage Publications, New Delhi, 2015.
2. A Hand book on Village Panchayat Administration Rajiv Gandhi Chair for Panchayat Raj Studies,2002.
3. United Nations, Sustainable Development Goals, 2015un.org/sdgs/
4. M.P. Boraian,Best Practices in Rural Development,ShanlaxPublishers,2016.


**Journals:**


1. Journals of Rural development, (published by NIRD &PR Hyderabad)
2. Indian Journal of Social Work, (by TISS,Bombay)
3. Indian Journal of Extension Education(byIndianSocietyofExtensionEducation)
4. Journal of Extension Education (by Extension EducationSociety)
5. Kurukshetra (Ministry of Rural Development,GoI)
6. Yojana (Ministry of Information and Broadcasting,GoI

**Semester IV:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Semester IV | C8 | Diet Therapy - I | 4 | 0 | 2 | 6 |
| | C9 | Nutritional Biochemistry- I | 4 | 0 | 2 | 6 |
| | C10 | Diet Therapy - II | 4 | 0 | 2 | 6 |
| | SEC 2 | Nutrition and Health Education<br>Bakery Science | 2 | 0 | 0 | 2 |
| | GE 4 | Summer Internship Project | 0 | 0 | 6 | 6 |
| | Total | | 16 | 0 | 12 | 26 |

## DC01FS4C1 - DIET THERAPY-I

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Basic concepts of diet therapy: Therapeutic adaptations of normal diet, principles and classification of the therapeutic diets. Team approach to health care. Assessment of Patient's needs. Routine Hospital Diets: Regular, light, soft, fluid, parenteral and enteral feeding.

**Unit 2:** Diets for different febrile conditions: influenza, malaria and typhoid. Etiological factors, symptoms, and management of common diseases of stomach-Gastritis and Peptic ulcer. Etiology, symptoms, and management of intestinal diseases: Diarrhoea, steatorrhoea, Diverticular disease, inflammatory bowel disease, Ulcerative Colitis, Flatulence, Constipation, Irritable Bowel Syndrome.

**Unit 3:** Diseases of the liver and Biliary System: Liver function tests. Etiology, symptoms, dietary care and general management of Viral Hepatitis and Cirrhosis of liver. Dietary care and management of Gall Bladder diseases –Cholecystitis and Cholelithiasis, Kidney stone deseases etc.

**Unit 4:** Anaemias: General concept, aetiology, classification, and dietary management of Nutritional anaemia.

## DC01FS4P1 DIET THERAPY-I (PRACTICAL)

1. Planning and preparation of normal diets.
2. Planning and preparation of fluid diets.
3. Planning and preparation of soft/semi solid diets.
4. Planning and preparation of Diets for the following diseases:
5. Peptic ulcer
6. Viral hepatitis
7. Anaemia

**Suggested Reading:**


1. Anderson L, Dibble MV, Turkki PR, Mitchall HS, and Rynbergin HJ(1983): Nutrition in Health and Disease, 17th Ed. J. B. Lipincott& Co. Philadelphia.
2. Anita FP and Abraham P: Clinical Dietetics and Nutrition, 4th Ed. Oxford University Press, Delhi.
3. Mahan LK and Escott-Stump S(2007): Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
4. Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE(1986): Normal and Therapeutic Nutrition. 17th Ed.,Macmilian Publishing Co.
5. Williams SR (1989): Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis.
6. Begum RM (2009): A textbook of Food, Nutrition and Dietetics, 3rd Ed. Sterling Publishers, New Delhi.
7. Joshi SA(2017): Nutrition and Dietetics, 4th Ed. Tata McGraw Hill Publications, New Delhi. 8.Hutchison, R(2010)Food And The Principles Of Dietetics , Kessinger Publishing, LLC.

## DC01FS4C2 - NUTRITIONAL BIOCHEMISTRY-I

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Introduction to Biochemistry: Definition, objectives, scope and inter relationship between biochemistry and other biological science.

**Unit 2:** Enzymes: Definition, types and classification of enzymes, definition and types of coenzymes, Functions of coenzymes and cofactors, Specificity of enzymes, Isozymes, enzyme Kinetics including factors affecting enzyme action, velocity of enzyme catalysed reactions, regulations of enzyme activity, zymogen, allosteric enzymes, enzyme inhibition.

**Unit 3:** Intermediarymetabolism: Carbohydrate Metabolism, Glycolysis, TCA cycle & energy generation, HMP Shunt pathway, gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation.

**Unit 4:** Lipids: Oxidation and biosynthesis of fatty acids (saturated & mono-unsaturated), Synthesis and utilization of ketone bodies, Ketosis, fatty livers, Essential Fatty acids, Cholesterol and its clinical significance.

### DC01FS4P2 NUTRITIONAL BIOCHEMISTRY-I (PRACTICAL)

1. Quantitative estimation of Sugars (Glucose, lactose, starch)
2. Estimation of acid value, iodine value, Saponification value of fats
3. Estimation of blood Glucose
4. Estimation of serum cholesterol

### Suggested Reading:


1. Murray RK, Bender DA, Botham KA, Mayes PA and RodwellVW(2015):Harper's Biochemistry, 30th Ed. Lange Medical Book.
2. Handler P, Smith EI, Stelten DW: Principles of Biochemistry, McGraw Hill Book Co.
3. Nelson DL and Cox MM (2017): Lehninger Principles of Biochemistry. 7th Ed. WH Freeman.
4. Devlin TM (2010): Text Book of Biochemistry with Clinical Correlations. John Wiley and Sons.
5. Berg JM,Tymoczko JL, Gatto GJ and Stryer L(2015): Biochemistry, 8th Ed WH Freeman and Co.

## DC01FS4C3 - DIET THERAPY-II

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Energy modifications and nutritional care for weight management: Assessment, etiology, complications, prevention and treatment of obesity and underweight.

**Unit 2:** Diet in disease of the endocrine pancreas: Diabetes Mellitus: Classification, symptoms, diagnosis, management -insulin therapy, oral hypoglycaemic agents, glucose monitoring at home, dietary care and nutrition therapy, meal plan (with and without insulin), special diabetic foods and artificial sweeteners.

**Unit 3:** Hypertension: classification, aetiology, symptoms and dietary management.
Diseases of the cardiovascular system: Definition of infarct, ischemia, angina pectoris, myocardial infarction, heart attack and stroke.

**Unit 4:** Atherosclerosis and hyperlipidaemias – classification, symptoms, dietary and lifestyle management.Prevention of cardiovascular diseases.

**Unit 5:** Renal Diseases: Etiology, symptoms and dietary management of acute and chronic Glomerulonephritis. Nephrotic syndrome - dietary management. Uraemia – dietary Nephrolithiasis - dietary management. Use of sodium and potassium exchange list.
Excercise requirements for successful diet therapy.

## DC01FS4P3 DIET THERAPY-II (PRACTICAL)

1. Planning and preparation of Diets for the following diseases:
2. Obesity and Underweight
3. Diabetes mellitus
4. Hypertension and Atherosclerosis
5. Acute and chronic glomerulonephritis

**Suggested Reading:**


1. Anderson L, Dibble MV, Turkki PR, Mitchall HS, and Rynbergin HJ(1983): Nutrition in Health and Disease, 17th Ed. J. B. Lipincott& Co. Philadelphia.
2. Anita FP and Abraham P: Clinical Dietetics and Nutrition, 4th Ed. Oxford University Press, Delhi.
3. Mahan LK and Escott-Stump S(2007): Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
4. Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE(1986): Normal and Therapeutic Nutrition. 17th Ed.,Macmilian Publishing Co.
5. Williams SR (1989): Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis.
6. Begum RM (2009): A textbook of Food, Nutrition and Dietetics, 3rd Ed. Sterling Publishers, New Delhi.
7. Joshi SA(2017): Nutrition and Dietetics, 4th Ed. Tata McGraw Hill Publications, New Delhi. 8.Hutchison, R(2010)Food And The Principles Of Dietetics , Kessinger Publishing, LLC.

## DC01FS4C4 - NUTRITION AND HEALTH EDUCATION

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Theory: 30 hours**

1. Concept, objectives and importance of nutrition and health education
2. Principles of health education.
3. Nutrition and health education communication process.
4. Steps in planning health and nutrition education.
5. Methods involved in nutrition and health education
6. Evaluation of nutrition and health education programmes.

**Suggested Reading:**


1. Park K(2017): Textbook of Preventive and Social Medicine,24th Ed. BanarsidasBhanot Publishers
2. Mahajan BK, Roy RN , Saha I, Gupta, MC (2013):Text book of Preventive and Social Medicine, 4th Ed. Japee Brothers
3. Pandya R(2010):Community Health Education, Rawat Publications.

## DC01FS4C5 - BAKERY SCIENCE

| L | T | P | C |
|---|---|---|---|
| 2 | 0 | 0 | 2 |

**Theory: 30 hours**

1. Introduction and scope of bakery science
2. Common bakery terms
3. Flours: Constituents of flour, water absorption power, gluten, grades of flour.
4. Raw materials required for bread and cake making.
5. Role of flour, water , yeast, salt, sugar, milk and fats in bakery.
6. Bread improver.
7. Knowledge of oven and baking temperatures.
8. Preparation of basic cookies, biscuits and pastries

**Suggested Reading:**

1.Edwards WP(2006): The Science of Bakery Products, 1st Ed. Royal Society of Chemistry.
2.Khetarpaul N, GrewalRajbala and Jood S(2005):Bakery Science and Cereal Technology, Daya Publishing House.
3.Hui YH(2005): Bakery Products: Science and Technology, 1st Ed. Wiley India.

## DC01FS4C6 - Summer Internship Project

| L | T | P | C |
|---|---|---|---|
| **0** | **0** | **12** | **6** |

The student shall work for 80 hours in industry under the guidance of a faculty member of his/ her department on a particular topic agreed mutually by them which would be called as a project. A report has to be submitted which shall be assessed followed by a viva voce examination. The student would also have to do a presentation before submitting the report on the completion of the project. The total number of hours for the project submission, presentation and viva is ten hours.

| Sl. No. | Details | Hours |
|---|---|---|
| 1. | Working on a project | 80 |
| 2. | Report, Presentation, Viva | 10 |
| | Total | 90 |

**Semester V:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Semester V | C11 | Nutritional Biochemistry-II | 4 | 0 | 2 | 6 |
| | C12 | Food Microbiology | 4 | 0 | 2 | 6 |
| | DSE -1 | Any ONE of the following<br>(a) Public Health<br>(b)Mushroom Culture | 5 | 1 | 0 | 6 |
| | DSE -2 | Any ONE of the following<br>(a) Diet Counselling and Patient Care<br>(b) Geriatric Nutrition | 5 | 1 | 0 | 6 |
| | Total | | 18 | 2 | 4 | 24 |

## DC01FS5C1 -NUTRITIONAL BIOCHEMISTRY-II

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Brief Introduction of biological membranes to understand molecular transport, Transport of Large molecules, Receptor mediated endocytosis, exocytosis, Molecular aspects of transport; Passive diffusion, facilitated diffusion, active transport.

**Unit 2:** Introduction to Nucleic acids: Structure, replication, transcription, genetic code (in brief) elementary knowledge of biosynthesis of proteins.

**Unit 3:** Proteins: General reaction of amino acid metabolism, urea cycle. Lipoproteins: Types, composition, role and significance in disease(in brief).

**Unit 4:** Vitamins: Chemistry and biochemical role of fat soluble vitamins. A. D. E. and K. Water soluble vitamins – B1, B2, B6 niacin and C. Minerals: Biochemical role of inorganic elements.

## DC01FS5P1 NUTRITIONAL BIOCHEMISTRY-II (PRACTICAL)

1. Qualitative analysis of amino acids
2. Qualitative analysis of proteins
3. Estimation of serum Protein
4. Estimation of serum creatinine
5. Estimation of serum Urea
6. Estimation of serum Iron, phosphorus, calcium

**Suggested Reading:**

1.Murray RK, Bender DA, Botham KA, Mayes PA and RodwellVW(2015):Harper's Biochemistry, 30th Ed. Lange Medical Book.
2.Handler P, Smith EI, Stelten DW: Principles of Biochemistry, McGraw Hill Book Co.
3.Nelson DL and Cox MM (2017): Lehninger Principles of Biochemistry. 7th Ed. WH Freeman. 4.Devlin TM (2010): Text Book of Biochemistry with Clinical Correlations. John Wiley and Sons.
5.Berg JM,Tymoczko JL, Gatto GJ and Stryer L(2015): Biochemistry, 8th Ed WH Freeman and Co.

## DC01FS5C2 -FOOD MICROBIOLOGY

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Brief history of food microbiology and introduction to important microorganisms in foods. Cultivation of microorganisms, Nutritional requirements of microorganisms, types of media used, methods of isolation.

**Unit 2:** Primary sources of microorganisms in foods, physical and chemical methods used in the destruction of microorganism in foods: (Sterilisation & Disinfection).

**Unit 3:** Fundamentals of control of microorganism in foods: 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 4:** Food Spoilage: Contamination and microorganisms in the spoilage of different kinds of foods and such as cereal and cereal products, vegetable and fruits, fish and other sea foods, meat and meat products, eggs and poultry, milk and products, canned foods.

## DC01FS5P2 FOOD MICROBIOLOGY (PRACTICAL)

1. Introduction to microbiology:
2. Use of equipment
3. Understanding and use of compound microscope
4. Use of Autoclave
5. Use of Incubator and Inoculation chamber
6. Microscopic identification of microorganisms (prepared slides) : Bacterial, fungal strains
7. Preparation of liquid and solid media for culture of microorganisms.
8. Staining Techniques to study of Morphology of bacterial cells:
9. Simple staining with methylene blue, methyl violet, carbolfuschin, etc.
10. Differential staining with Gram stain technique
11. Microbiological techniques: Pure culture technique-Spread plate, Pour plate and Streak plate.

**Suggested Reading:**


1. Frazier WC and Westhoff D C and Vanitha NM (2017): Food Microbiology, 5th Ed. MaGraw Hill Education..
2. Jay JM (2005): Modern Food Microbiology, 3rd Ed. CBS Publishers & Distributors. 3.Pelczar M, Chan ECS, Krieg N(2009): Microbiology : Application Based Approach, Tata McGraw Hill Education.
3. Benson HJ(2001): Microbiological Applications: Complete Version: A Laboratory Manual in General Microbiology, 8th Ed. McGraw-Hill Publishing Co.
4. Colling CE and Lyne PM (1976): Microbiological Methods, Butterworth. London.
5. Bamrart G(2012): Basic food Microbiology, 2nd Ed. (Reprint), Spinger.
6. Wood BJ(1998):Microbiology of Fermented Foods, Vol I & II, 2nd Ed. Spinger.
7. Joshi VK(2009): Biotechnology: Food Fermentation Microbiology, Biochemistry & Technology, Vol I &Vol II , Educational Publishers & Distributors.
8. Tortora GJ, FunkeBR and Case CL(2016): Microbiology, 11th Ed. Pearson Education India.
9. Black JG (2008): Microbiology: Principles and Explorations, 7th Ed. John Wiley & Sons.

## DC01FS5C3 PUBLIC HEALTH

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Health and Dimension of Health: Positive health Versus Absence of disease; Secondary Sources of Community Health data: sources of relevant vital statistics of infant, child & maternal mortality rates

**Unit 2:** Immunization: Importance and Immunization schedule for children, adults and for foreign travellers. Community Water and Waste Management: Importance of water to the community, etiology and effects of toxic agents, water borne infectious agents, sources of water, safe drinking water, potable water, waste and waste disposal, sewage disposal and treatment, solid waste and disposal, liquid waste disposal.

**Unit 3:** Concept of Epidemiology: Study of the epidemiologic approach-determinants of disease preventive & social means.

**Unit 4:** Communicable and infective disease control: Nature of communicable and infectious diseases, infection, contamination, disinfections, decontamination, transmission-direct & indirect, vector borne disease infecting organisms and positive agents, environmental agents and epidemiological principles of disease control.

**Unit 5:** Public health hazards due to contaminated foods: Food borne infections and intoxications: symptoms, mode of transmission and methods of prevention, investigation and detection of food borne disease out-break.

## DC01FS5P3 PUBLIC HEALTH (PRACTICAL)

1. Preparation of 3 audio visual aids like charts, posters, models related to health and nutrition education.
2. Formulation and preparation of low cost and medium cost nutritious/ supplementary recipe.
3. Field visit ( health centre, immunization centre, ICDS, MCH centre, NGOs etc.).

**Suggested Reading:**

1.Smith, G.W.: Preventive Medicine and public health. 2nd edition. McMillan Co. New York.
2.Park: Park's Textbook of preventive and Social Medicine. 9th edition.M/s. BanarasidasBhanot. Jabalpur.
3.SeshubabuVVR(2011): Review in Community Medicine, 2nd Ed, Paras Medical Books Pvt Ltd.
4.Mahajan BK, Roy RN , Saha I, Gupta, MC (2013):Text book of Preventive and Social Medicine, 4th Ed. Japee Brothers.
5.Vir SC(2011): Public Health Nutrition in Developing Countries, Woodhead Publishing India. 6.Willett W(2012): Nutritional Epidemiology, 3rd Ed. Oxford University Press,USA.

## DC01FS5C4 - MUSHROOM CULTURE

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

1. Definition and characteristics of mushroom.
2. Morphology and life cycle of Mushroom.
3. Identification and classification of mushroom
4. Nutritional and medicinal value of edible mushrooms; poisonous mushrooms
5. Types of edible mushrooms available in India- Volvariella volvacea, Pleurotus citrinopileatus, Agaricus bisporus.
6. Process of mushroom cultivation.
7. Storage and nutrition: short term storage (Refrigeration- upto 24 hours), long term storage (canning, pickles, papads), drying, storage in salt solutions.

## DC01FS5P4 MUSHROOM CULTURE (PRACTICAL)

1. Visit to Mushroom Culture Centers/ Farms for:
2. Process involved in mushroom cultivation A) Types and varieties of mushroom
3. Visual Identification of edible and poisonous mushroom Marketing
4. Different Food preparation from mushroom

**Suggested Reading:**

1. Staff E(2007):Hand Book of Mushroom Cultivation, Processing and Packaging Import, Educa Books.
2. Pandey RK and Ghosh SK(1999): A Handbook Of Mushroom Cultivation, Emkay Publications.
3. PatilNN(2010): Mushroom : Cultivation, Processing and Uses, 1st Ed. Universal Prakashan.

## DC01FS5C5 DIET COUNSELING AND PATIENT CARE

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

1. Introduction to term Dietician: Definition of Dietician , Difference between registered dietician & Nutrition; Role of dietician in hospital : work area of hospital dietician, role of dietician in hospital

2. Role of dietician in community :- work area of community dietician, role of community dietician
3. Introduction to Nutrition Care Process: Definition of Nutrition Care Process .Steps of Nutrition Care Process
4. Nutrition Assessment:-Definition , Nutrition assessment component, Critical thinking
5. Nutrition Diagnosis: nutrition diagnosis domain:- intake, clinical, behavioral – environmental
6. Nutrition diagnosis component• nutrition vs. medical diagnosis
7. Nutrition Interventions: Definition and objectives
8. Nutrition Monitoring & Evaluation : Definition, Nutrition monitoring & evaluation components, nutrition goals & objectives. Evaluation of nutrition care

## DC01FS5P5 DIET COUNSELING AND PATIENT CARE (PRACTICAL)

1. Visit and training to hospitals/nursing homes for 7-15 days:
2. Taking Case history and study
3. Routine Hospital diet
4. Distribution of food from kitchen to individual patient with specific diet. 4
5. Dietary management of patient in different diseases and diet chart for the particular patient.
6. 5 Role of dietitian /nutritionist in diet counselling

**Suggested Reading:**

1. Mahan LK and Escott-Stump S(2007): Krause's Food and Nutrition Therapy. 12th Ed. WB Saunders Company, London.
2. Robinson. CH, Lawler MR, Chenoweth WL and Garwick, AE(1986): Normal and Therapeutic Nutrition. 17th Ed.,Macmilian Publishing Co.
3.Williams SR (1989): Nutrition & Diet Therapy, 6th Ed. Times Mirror/Mosby College Publishing, St. Louis

## DC01FS5C6 GERIATRIC NUTRITION

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

1. Definition of ageing, senescence, old age or aged people, gerontology, geriatrics, and Geriatric nutrition. Classification of old population.

2. .Physiological and biochemical changes during old age.
3. Assessment of nutritional status of older adults.

4. Nutritional requirements and general dietary guidelines for elderly .
5. Major nutritional and health problems during old age.

## DC01FS5P6 GERIATRIC NUTRITION (PRACTICAL)

1. Visit to old- age homes.

2. Preparation of dishes suitable for older person- soft, semisolid and easily digestible balanced diet.

**Suggested Reading:**

1.Human Nutrition by H. Guthrie and M.F. Piccianom, WCB McGrawHill,1995.
2.Robinson CH, Lawler MR, Chenoweth WL, GarwickAE(199!): Normal And Therapeutic Nutrition, 17th Ed, MacMillan Publishing Company, New York,
3.Insel PM, Turner RE and RossD (2004): Nutrition ,Jones & Bartlett Learning,
4. Morley JE and Thomas DR(2007): Geriatric Nutrition, 1st Ed. CRC Press.
5.Watson RR (2008):Handbook of Nutrition in the Aged, 4th Ed. CRC Press.
6.Chernoff R(2013):Geriatric Nutrition : The Health Professional's Handbook, 4th Revised Ed. Jones and Bartlett Publishers.

**Semester VI:**

| | | | | | | |
|---|---|---|---|---|---|---|
| Semester VI | C13 | Food Preservation and Safety Regulations - I | 4 | 0 | 2 | 6 |
| | C14 | Project cum Internship (practical) | 0 | 0 | 6 | 6 |
| | DSE -3 | Any ONE of the following<br>(a) Theories of Human Development<br>(b) Non formal Adult and Lifelong Education | 5 | 1 | 0 | 6 |
| | DSE -4 | Any ONE of the following<br>a) Childhood Disability and Social Action<br>b)Child Rights and Gender Justice | 5 | 1 | 0 | 6 |
| | Total | | 14 | 2 | 8 | 24 |

## DC01FS6C1 FOOD PRESERVATION & SAFETY REGULATIONS

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Food preservation: definition, objectives and principles of food preservation. Different methods of food preservation.

**Unit 2:** Preserved Products: Jam, Jelly, Marmalade, Sauces, Pickles, Squashes, Syrups-types, composition and manufacture, selection, cost, storage, uses and nutritional aspects.

**Unit 3:** Food Standards : ISI, Agmark, FPO, MPO, PFA, FSSAI.

**Unit 4:** Food Safety Regulations, food packaging.

### DC01FS6P1 FOOD PRESERVATION (PRACTICAL)

1. Different methods of Food preservation – Drying, Freezing, Frying, canning, bottling etc.
2. Aseptic handling: Sources of contamination of foods.
3. Preparation of pickles, tomato sauce, chili sauce, jelly, tomato puree, squashes etc.

### Suggested Reading:


1. Subalakshmi, G and Udipi, SA(2006):Food processing and preservation, 1st Ed. New Age International (P)Ltd.
2. SrilakshmiB(2018): Food Science, 7th Colour Ed. New Age International (P) Lt
3. Potter NN and Hotchkiss JH(1999): Food science,5th Ed , Spinger.
4. Srivastava RPO and Kumar S (2014): Fruit and Vegetable Preservation Principles and Practices, 3rd Ed. International Book distribution Company.
5. McWilliamsM and Paine H(1984): Modern Food preservation. Surjeet Publications,.
6. CruessWV(2004):Commercial Fruits and Vegetable Products, Agrobios India.
7. Desrosier NW and Desrosier JN(2006):The Technology Of Food Preservation, 4th Ed. CBS Publishers and Distributors, New Delhi.
8. Adams M and NoutMJR(2001): Fermentation and Food Safety, Spinger.

## DC01FS6P2 - PROJECT CUM INTERNSHIP

| L | T | P | C |
|---|---|---|---|
| 0 | 0 | 12 | 6 |

**Practical: 10 weeks**

The students with the assistance of their faculty –in- charge/ course coordinators will do the project (which can be a continuation of their mini project/ an altogether new project) individually in collaboration with industry which would be continuously assessed. The students would consider The total credits would be 6. The students have to submit a project report and also have to attend a viva at the end of the semester after they do a project presentation. The valuation of this project would be strictly internal. Marks would be computed out of a total of 100.

The Marks divisions are as follows:

| Courses | Details | Total Marks |
|---|---|---|
| BFN602 Project | Successful completion of project - 50 marks<br>Presentation - 15 marks<br>Project Report - 20 marks<br>Viva - 15 marks | 100 marks |

## DC01FS6C2 - THEORIES OF HUMAN DEVELOPMENT

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Introduction to theories in Human Development: Key themes in the study of Human Development- Nature/nurture, active/ passive, continuity/discontinuity, individual differences and similarities. Understanding a theory, Role of theories in understanding Human Development.

**Unit 2:** Perspectives on Human Development : Evolutionary and Ethological /Biological:

**Unit 3:** Darwin, Lorenz, Bowlby, Ecological: Bronfenbrenner, Behavioural: Pavlov, Skinner, Bandura, Selected theories of human development: Psychodynamic; psychosexual and psychosocial theories; Freud, Erikson, Cognition: Piaget, Vygotsky, Models and Theories of Intelligence: Guilford, Spearman and Gardener, Humanistic: Maslow and Rogers.

**Unit 4:** Theories in everyday life: Eclectic theoretical orientation, Ethno theories.

## DC01FS6P2 THEORIES OF HUMAN DEVELOPMENT ( PRACTICAL)

1. Biography of a theorist with a focus on his/her family life and childhood experiences.
2. Depict the 'eco-cultural' network for a child using the ecological model of Bronfenbrenne .
3. Verification of selected theories using multiple methods
4. Observe/ analyze creation of media product for children or product such as toys/ clothes using theoretical base.
5. Locate a tool/ scale of psychometric tests and administer it
6. Autobiography

**Suggested Reading:**


1. Berger JM (2010): Personality, 8th Ed. Thomson-Wadswort: Berger Belmont, CA.
2. Allen BP (2006): Personality theories: Development, growth and diversity , 5th Ed. Pearson Education / Allyn& Bacon.
3. Santrock JW(2007): Lifespan Development, 3rd Ed. Tata- McGraw Hill, New Delhi.
4. Rice FP(1995): Human Development: A Lifespan Approach. New Jersey, Prentice-Hall

## DC01FS6C3 - NON-FORMAL ADULT AND LIFE LONG EDUCATION

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Non Formal Education, Difference between formal & Non-Formal Education, Significance of Non-Formal Education in India New education policy & NFE Scope of NFE in communities- Techniques of community study, Domains of Non-Formal Education

**Unit 2:** Organizing NFE programmes- target group; Physical aspects; organizing and implementation Publicity of Non-Formal Programme; Planning and implementing publicity plan.

**Unit 3**AdultEducation: Meaning, concept and scope of Adult Education, Adult Education programme in India, Adult Education and Extension, Characteristics of Adult Learners, Difference between Adult & Child learning Learning theories; Characteristics of Adult learning, developmental tasks of Adults, Factors associated with Adult learning, Motivating and sustaining Adult learners.

**Unit 4:** Life Long Education : Definition, meaning and concept of Life Long Education, Life Long Education: Historical and contemporary perspectives, Components and objectives of Life Long

**Unit 5:** Education, Significance of Life Long Education in contemporary society, Forms and domains of Life Long Education, Principles of Life Long Education

**Unit 6:** Methods and Material for Non Formal/Adult/ Life Long Education: Methods and approaches for organizing NFE programmes for different target groups, Scope of communication methods and materials for NFE objectives

**Unit 7:** Programmes of Non Formal/Adult/ Life Long and Continuing Education: National and international programmes. Local, State, National and international agencies- policy and programmes, Monitoring and evaluation of NFE /Adult/ Life Long and Continuing Education programmes .

## DC01FS6P3 NON-FORMAL ADULT AND LIFE LONG EDUCATION (PRACTICAL)

1. Inviting experts from Government/Universities/ NGO's to share their experience of Non Formal/Adult/Life Long Education.
2. Reporting of Literacy news, events from periodicals and news papers.
3. Planning and organizing NFE/ continuing education programmes
4. Monitoring and Evaluation of programmes.

**Suggested Reading:**

1. Mishra L(2010):Adult Education, A study of the trials, APH Publishing Corporation, New Delhi.
2. Chandra A and Shah A(1987): Non Formal Education for All, Sterling Publishers, New Delhi.

3. Singh M (2007):New Companion to Adult Educators, International Institute of Adult and Life Long Education, New Delhi.
4. Singh NK( 2010): Adult Education, Saurabh Publishing House, New Delhi.
5. KhajuriaDP:New Trends in Indian Education, Narendra Publishing House, Jalandhar.

## DC01FS6C4 - CHILDHOOD DISABILITY AND SOCIAL ACTION

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Understanding Disability and Inclusion: Defining and understanding disability, Rights of persons with disability and UNCRPD, Perspective on disability: Individual and social, Attitudes towards disability- family, school, society and media

**Unit 2:** Types of Disability: Identification, assessment and etiology with reference to:

**Unit 3:** Physical disabilities, Intellectual disability, Sensory disabilities- Visual and auditory IV. Learning disability, Autism

**Unit 4:** Disability and society: Overview of practices and provisioning related to addressing disability in India, Prevention, therapy, education and management, Families of children with disabilities, Policy and laws.

## DC01FS6P4 CHILDHOOD DISABILITY AND SOCIAL ACTION (PRACTICAL)

1. Visits- Government and Private Institutions and Organisations (CGC, schools, NGO's, Hospitals)
2. Observe the context
3. Case profile of child with disability
4. Program planning
5. Planning developmentally appropriate material for children with disability.

**Suggested Reading:**


1.Chopra G (2012): Early Detection of Disabilities and persons with disabilities in the community, Engage publications , New Delhi.
2.Chopra G (2012): Stimulating Development of Young Children with Disabilities At Anganwadi and at Home: A Practical Guide, Engage publications,New Delhi.
3.Sharma N (2010): The Social Ecology of Disability-Technical Series -3, Academic Excellence, Lady Irwin College, Delhi.
4.Mangal SK (2007):Exceptional children: An introduction to special education, Prentice Hall of India, New Delhi.

5.Jangira NK(1997): “Special Educational Needs of Children and Young Adults: AnUnfinished Agenda,” Education and Children with Special Needs: From Segregationto Inclusion, Ed.
Seamus Hegarty, MithuAlur, Thousand Oaks: Sage Publications Inc.
5.Karna GN (1999): United Nations and rights of disabled persons: A study in IndianPerspective, APH Publishing Corporation,New Delhi.
6.Mani R(1988): Physically handicapped in India, Ashish Publishing House, Delhi.

## DC01FS6C5- CHILD RIGHTS AND GENDER JUSTICE

| L | T | P | C |
|---|---|---|---|
| 4 | 0 | 4 | 6 |

**Theory: 60 hours**
**Practical: 60 hours**

**Unit 1:** Introduction to Child Rights: Concept of Child rights, Demographic profile of Indian children, Disadvantage, deprivation and social exclusion with reference to children, Laws, policies and programmes for children in India, UNCRC.

**Unit 2:** Children in need of care and protection: Vulnerable groups: causes and consequences. Street, homeless, institutionalized and working children

**Unit 3:** Child Abuse, Child Trafficking, Children in conflict with the law, Children living with: chronic illness, HIV.

**Unit 4:** Social construction of gender Socialization for gender: gender roles, stereotypes and identity, Gender in the workplace and in public spaces, Contemporary influences: media and popular culture, Demographic profile of women and children in India.

**Unit 5:** Gender and Indian society : Sex and Gender, Masculinity and Femininity, biological and cultural determinants, Patriarchy and social institutions, Being male and female in Indian society-social traditions and contemporary issues, Exploring the issues of violence against females, Laws, policies and programmes for children and women.

### DC01FS6C5 CHILD RIGHTS AND GENDER JUSTICE (PRACTICAL)

1. Visits to organizations working in the area of Child Rights and Gender to understand their objectives programmes and experiences.
2. Workshops on relevant issues like Gender, domestic violence, gendering of public spaces.
3. Understanding child rights and gender issues in diverse social groups through field visits and interactions
4. Media portrayals of women and children.

**Suggested Reading:**

1. Agarwal A and Rao BV (2007): Education of Disabled Children, Eastern Book Corporation, New Delhi.
2. Agnes F(1999):Law and Gender Inequality: The politics of Women's Rights in India. Oxford University Press.
3. Bajpai A(2006):Child Rights in India: Law, Policy and Practice. Oxford University Press.
4. KishwarM(1999): Off the Beaten Track: Rethinking Gender Justice for Indian Women Oxford University Press, New Delhi.
5. Satyarthi K and Zutshi B(Ed) (2006):Globalization, Development and Child Rights. Shipra Publication, New Delhi.
6. Saikia N (2008): Indian women: A socio-legal perspective, Serials Publication India, New Delhi.