# B. K. BIRLA COLLEGE (AUTONOMOUS), KALYAN

**Conducted by Kalyan Citizens' Education Society**

**Affiliated to University of Mumbai**

***'College of Excellence'*** status by UGC (2015 - 2020)

Reaccredited by ***NAAC (3rd Cycle)*** with ***'A' Grade (CGPA 3.58)*** (2014 - 2021)

***'Performance Excellence Trophy*** – 2011 in ***Education***' by IMC RBNQA Trust

***'Best College Award'*** by University of Mumbai (2009)

***DBT 'Star Status'*** (Department of Botany, Chemistry, Microbiology, Physics and Zoology)

***DBT 'Star Scheme'*** (Department of Mathematics, I.T. & C.S.)

***ISO 9001: 2015 Certified***

## B.Sc. (Hons.)
## in Integrative Nutrition & Dietetics

## Three Year Integrated Programme- Six Semesters

Course Structure

## Under Choice based Credit Grading Semester System

# INDEX

# 1. Preamble

The industry is experiencing accelerated growth in several sectors amid a burgeoning global shift in consumer behavior regarding what we put in our bodies, aging population desiring improved muscle, joint, and cognitive health, and emerging middle and affluent classes in key markets.

The growth in this industry is driven by the increasing focus on personal health and wellbeing. With a shift in urban lifestyle towards sedentary, there is a renewed focus on fitness to avoid lifestyle-related diseases and deal with stress. Seeking professional guidance for fitness and slimming are no longer considered a luxury, but an elementary part of a healthy lifestyle. This change in consumer behavior and preferences will continue to provide an impetus to the industry.

Recruitment and retention of skilled manpower is the biggest challenge faced by the industry today. There is a dearth of good training institutes, with standardized and accredited courses.
The vocational training programs often impart theoretical knowledge with little hands-on experience. Hence, in-house training becomes the only option for companies to equip the workforce with the relevant skill set. There is a very limited pool of skilled professionals available in the country whereas the demand is huge. The attrition rate in the industry is high and retaining experienced professionals has become a key challenge. There are no dedicated government institutes or training centers to equip people with desired skills. Hence, there is a need for Recognized Degree programs in Integrative Nutrition & Dietetics.

## 2. Programme Objectives & Outcomes

## 2.1 Programme Objectives

1. To provide intensive theoretical & practical knowledge.
2. To provide an integrated perspective of nutrition & dietetics along with a good amount of exposure to real life cases / technical knowhow.
3. To effectively communicate to people- health and industry professionals, and the media.
4. To know the chemical, biochemical, and biological principles of nutrition and dietetics.
5. To design, develop, and assess individual training methods related to nutrition and dietetics that meet patients' needs.
6. To identify and classify food and food products. To analyse and establish their composition, qualities, nutritional value, nutrients' bioavailability, organoleptic properties, and the alterations experienced as a result of technological and culinary processes.
7. To know the basic processes of production, transformation, and preservation of animal and vegetable-based food.
8. To identify nutrients, their function in the human body, their bioavailability, the requirements and recommendations, and the basis of nutritional balance.

## 2.2 Programme Outcomes

## After successful completion of the B.Sc. (Hons.) in Integrative Nutrition & Dietetics the learner will be able to:

1. Exhibit effective oral communication through personal interaction as well as classroom presentations, individually or as part of a group, to a larger audience.
2. Possess skills and experience relating to health & nutrition consulting in a professional setting.
3. Identify and classify food and foodstuffs. Determine their composition, properties, nutritive value, bioavailability, organoleptic, sensory and gastronomic characteristics, and the changes they undergo as a consequence of technological and culinary processes.
4. Understanding the basic processes involved in the preparation, transformation and conservation of foods of both animal and vegetable origin.
5. Interpret and use food composition tables and databases properly.
6. Understand the microbiology, parasitology and toxicology of food.

## 3. Eligibility, Selection and Admission Criterion

Candidates for being eligible for the admission to the three-year course leading to the Degree of B.Sc. (Honours) in Integrative Nutrition & Dietetics, shall be required to have passed the Higher Secondary School Certificate Examination (10+2) or equivalent qualification from a recognized Board/ University or Body recognized as equivalent thereof by the Senate of the University.

### 3.1 Eligibility Criterion:

The student must be passed a two year Pre-University examination/ 12th / Grade 12/ HSC/A level/O level/IBDP/IBCP or equivalent, education with English as one of the subjects and also Physics, Chemistry, Biology or Mathematics as optional subjects. Subjects such as Botany, Zoology, Biotechnology, Biochemistry, etc. and related subject at the 10+2 level are accepted. Lateral Entry shall be applicable for students who have pursued similar or related Programmes from any University. Eligibility Criteria shall be applicable for lateral entry.

### 3.2 Selection and Admission Criterion for Eligible Candidates:

The interested students shall register for Aptitude Test and Interview.
Reservations as per University rules will be applicable.

**The admission of students shall be based on:**

- Academic and non- academic credentials till date.
- The candidate must fulfil all the prescribed admission requirements / norms of the College.
- In all the matters relating to the admission to the programme, the decision of the Management of institute/college shall be final.
- At any time after the admission, if found that a candidate has not fulfilled one or many of the requirements stipulated by the College, or submitted forged certificates, the College has the right to revoke the admission and will forfeit the fee paid. In addition, legal action may be taken against the candidate as decided by the Management of institute/college.

### 3.3 Eligibility for the award of the degree:

- A candidate shall be eligible for the award of the Degree only if he/she has undergone the prescribed course of study for a period of not less than three academic years, passed the examinations of all the Six Semesters earning 160 credits, and letter grade of at least D or above (i.e. O/ A+/A/ B+/B/C/D) in core.
- No dues to the Institute, Libraries etc.; and
- No disciplinary action is pending against him / her.

### 3.4 Faculty under which the Degree is awarded:

B.Sc. (Hons.) in Integrative Nutrition & Dietetics programme is awarded under the Faculty of Science.

### 3.5 Intake and Fees

Intake of 60 Students in the first year with an additional division of 60 students from the second year onwards. Additional 15% shall be permitted to make provision for any cancellation of Admissions. Additional admissions to the extent of 15% will be permitted for foreign students every year.

Programme Fees for each Semester - Rs. 75,000/- . The fees can be increased by 12% every year.

### 3.6 Attendance

- A student has to obtain a minimum of 75% cumulative attendance for the theory lectures, practical and tutorial (wherever prescribed) separately will be required out of the total number of lectures, practical and tutorials on the subject conducted in the term.
- 25% allowance in attendance is given to account for activities under NCC / NSS / Cultural / Sports / Minor Medical conditions etc.
- A student with a cumulative attendance of less than 75%, will not be permitted to appear for the end semester examination for all the courses in that semester and will be categorized as "DE", meaning Detained due to shortage of attendance. The students with the "DE" category cannot proceed to the subsequent semester.
- Such students shall register for all the courses of the semester in which DE has occurred, in the subsequent year by paying the prescribed fee.
- Additional condonation may be considered in rare and genuine cases which includes, approved leave for attending select NCC / Sports Camps, Internships, Training, cases requiring prolonged medical treatment and critical illness involving hospitalization.
- For medical cases, submission of complete medical history and records with prior information from the parent / guardian to the institute is mandatory. Such condonation is permitted only twice for a student in the entire duration of the programme.

## 4. Scheme of Examination

The Examination shall be divided into parts i.e. Continuous Internal Evaluation including Assignments, Projects, Seminars, Case Studies and Class Tests which will be of 40 marks and the Semester End Examinations which will be of 60 marks. The semester wise Credit Points will be varied from course to course but the value of Credits for Under-Graduate Programme shall be of 160 Credits. The examinations can be conducted in online/offline mode. The institute may decide the examination pattern - written, oral, practical, presentation, project etc. for any or all courses/subjects as appropriate.

The Credits are defined in terms of the learner's hours which are divided into two parts such as Actual and Notional. The value of a particular course can be measured in number of Credit Points. The value of One (01) Credit is equal to 15 Hours of learners' load. Notional learning hours include direct contact hours with teachers and trainers, time spent in self learning, preparation for assignments, carrying out assignments and assessments etc.

**Scheme of Total Credits**

| Sr. No. | Year | Credits |
|---|---|---|
| 1 | Year 1 | 52 |
| 2 | Year 2 | 52 |
| 3 | Year 3 | 56 |
| | Total Credits for Award of Degree | 160 |
| | Maximum Credits for Award of Degree | 160 |

### 4.1 Credit Based Evaluation System Scheme of Examination

Semester End Examination will be organized after all modules of the course are taught in the class. It will be a written examination / or as per the needs of the course a practical examination or a combination of both. This examination will be for 60 marks.

For all 6 semesters, the performance of the learners shall be evaluated into two components. The first component shall carry 40% marks which will be a Continuous Internal Evaluation while the second component shall carry 60% marks at semester end examination.

The allocation of marks for the Continuous Internal Evaluation 40% and Semester End Examination 60% are as shown below.

### 4.2 Structure of Continuous Internal Evaluation (40%) = 40 marks

| Sr. No. | Particulars | Marks |
|---|---|---|
| 1 | Class test held in the given semester | 15 marks |
| 2 | Subject specific Term Work Module/assessment modes – as decided by the department in the beginning of the semester (like Extension/field/experimental work, Short Quiz; Objective test, open book test etc. and written assignments, Case studies, Projects, Posters and exhibits etc. for which the assessment is to be based on class presentations wherever applicable) | 15 marks |
| 3 | Attendance & Active participation in routine class instructional deliveries (and in practical work, tutorial, field work, cultural activities etc. as the case may be) | 10 marks |

### 4.3 Structure of End Examination (60%) = 60 marks

The End Semester Examinations for each course through semesters I to VI shall be conducted by the college except for the subjects with Asterix symbol (*) for which assignments/assessments for 100 marks shall be evaluated by the subject experts at department level and the marks/grades shall be submitted to the College.

The assessment of Continuous Internal Evaluation and Semester End Examination as mentioned above for the Semesters I to VI shall be processed by the College – 'Institutions of their Learners' and issue the grade cards to them after the conversion of marks into grades as the procedure mentioned below.

The learners to pass a course shall have to obtain a minimum of 35% marks in aggregate for each course where the course consists of Continuous Internal Evaluation & Semester End Examination. The learner shall obtain a minimum of 35% marks (i.e. 14 out of 40) in the Continuous Internal Evaluation and 35% marks in Semester End Examination (i.e. 21 out of 60) separately, to pass the course and a minimum of Grade D in each project, wherever applicable, to pass a particular semester. A learner will be said to have passed the course if the learner passes the Continuous Internal Evaluation & Semester End Examination together.

**4.4** Suggested **Question Paper Pattern**
**A) Written Class Test (15Marks) - 30 mins**

| | | |
|---|---|---|
| 1. | Match the Column / Fill in the Blanks/ Multiple Choice Questions (1 Marks each) (Any Six out of Eight) | 06 Marks |
| 2. | Answers the following (Attempt Any Two out of Three) (Concept based Questions) (2 Marks each) | 04 Marks |
| 3. | Answer in Brief (Attempt Any One out of Two) (5 Marks each) | 05 Marks |

**B) Semester End Examinations (60 Marks) - 2hrs**

| | | |
|---|---|---|
| QI | Match the Column / Fill in the Blanks/ Multiple Choice Questions/True or False (Any 10 out of 15) (1 Marks each) | 10 Marks |
| QII A | *(Concept based Questions)* Answer in Brief (Any Three out of Five) (5 Marks each) | 15 Marks |
| | OR | |
| QII B | *(Concept based Questions)* Answer in Brief (Any Three out of Five) (5 Marks each) | 15 Marks |
| QIII A | (Application based/Scenario based Questions) Answer in Detail (Attempt Any Four of Six) (5 Marks each) | 20 Marks |
| | OR | |
| QIII B | (Application based/Scenario based Questions) Answer in Detail (Attempt Any Four of Six) (5 Marks each) | 20 Marks |
| QIV | Long Answer Type Question (Any One out of Two) | 15 Marks |

**4.5 Passing Standards**

| Grade | Marks | Grade Points |
|---|---|---|
| O | 80 & Above | 10 |
| A+ | 70 to 79.99 | 9 |
| A | 60 to 69.99 | 8 |
| B+ | 55 to 59.99 | 7 |
| B | 50 to 54.99 | 6 |
| C | 45 to 49.99 | 5 |
| D | 40 to 44.99 | 4 |
| F | Less than 40 | 0 |

- The learner shall obtain a minimum of 35% marks (i.e. 14 out of 40) in the Continuous Internal Evaluation and 35% marks in Semester End Examination (i.e. 21 Out of 60) separately, to pass the course and a minimum of Grade D in each project, wherever applicable, to pass a particular semester.
- Learners who fail to clear Class Test I or were unable to appear for Class Test I on account of Medical grounds, Bereavement of a family member, Internships/Training or Positioned at Events by the Institute can appear for Class Test II
- If a student fails in Class Test I, he/she shall have the opportunity to appear for Class Test II to improve his/her performance only once in the Semester. The re-conduct of the Class Test shall be completed before the commencement of Semester End Examinations.
- If just prior to or during the CIE a bereavement (of an immediate family member) occurs. (Note: In this case the Death Certificate of the departed and the Parent's note will have to be given to the College within 2 days of returning to College, for this clause to hold).
- A learner will be said to have passed the course if the learner passes the Continuous Internal Evaluation (CIE) and Semester End Examination.

**4.6 Failure in Class Test II**

Students failing to clear the Class Test II will have to submit a project on a topic approved by the subject teacher.

The allocation of marks will be as follows:

- Written Assignment -10 marks
- Presentation - 5 marks

**4.7 Semester Abroad Programme**

Students who are allowed to undergo internship or Training in Industries in India or abroad during their course work or attend any National / International Institute under semester abroad programme (SAP) up to a maximum of 1 semesters will be granted credit equivalence for the Course Work/project work done by them in the Industry /Foreign Institute as per the recommendations of the Equivalence committee.

**4.8 Eligibility for Faculty**

Master 's degree with 55% marks (or an equivalent grade in a point scale wherever grading system is followed) in a relevant/allied subject OR Relevant work experience in the industry or related areas.

**4.9 Academic Flexibility**

To enable multiple exit for students there is a provision for "Academic Flexibility".

**Levels of Awards**

The certification levels will lead to Diploma/Advanced Diploma/Degree at the respective exits upon successful completion of the academic requirements. Details as outlined in the table below.

| **Award of Qualification at respective Exit** | **Timing** |
|---|---|
| Diploma | 1 year (upon successful completion of First Year Degree Programme) |
| Advanced Diploma | 2 years (upon successful completion of Second Year Degree Programme) |
| Degree | 3 years (upon successful completion of Third Year Degree Programme) |

## 5. Teaching Methodology

1. **Classroom Sessions**
   - **Lectures:** Lectures shall be delivered by experienced faculties along with visiting faculties and experts from the Industry in online/offline or blended mode.
   - **Assignments and Projects:** Shall be assigned at regular intervals of the course. It offers an opportunity for students to meet, interact and collaborate with experienced people from the industry.
   - **Knowledge Workshops and Industry Seminars:** Shall be organized at regular intervals to keep the students informed about the latest developments in the Health & Lifestyle sector, these workshops are uniquely designed with a focus on practical industry – relevant topics**.**

2. **Guest Lectures and Case Studies**
   - **Guest Lecture:** Eminent people from the Health & Lifestyle sector shall be invited as guest speakers to impart lessons and their rich experiences on various fields related to this industry to the students. They also focus on imparting training around management concepts that have today become essential skills to carve a niche in the industry.
   - **Case Studies:** Case studies highlighting various practical and situational issues shall be regularly discussed during classroom sessions. The discussion caters towards identifying what went wrong in the case and what could have been done in a better manner, this helps train students to handle such situations in the future. The exercise also improves the analysing and analytical capabilities of our students.

3. **Innovative and Interactive Learning Technology**
    - **Educational wikis:** It keeps track of education-oriented wikis, establishes constructive interactions with them, and researches their technology, activity, culture, processes, and impact.
    - **Creative Presentation Ideas:** Gone are the days when Microsoft Presentation was the only means to make academic training interactive and engaging. Enliven your material and engage the students with these simple and easy to implement methodologies:

        - **Prezi Presentation:** Prezi is a powerful communication and presentation tool that aims to replace PowerPoint presentation. Equipping students with the knowledge of this tool helps in preparing them to adapt easily to the ever-changing dynamics of the corporate world.

    - **Create through Technology:**
        - **YouTube Broadcasting:** Harness the power of YouTube as an effective broadcasting medium to create and share your ideas and thoughts with diverse audiences.

        - **Communication and Collaboration:** Google Apps provides students a chance to learn how to use webmail services, calendar (shared calendaring), Hangouts (instant messaging and voice/video chat) and Drive (online document creation and sharing).

        - **Education through Blogs:** A powerful and interactive medium for learning. Ideal to educate, discuss and share innovative ideas across a large and diverse set of audiences.

4. **Unparalleled Internships and Practical Training**
    - **Internships and Practical Training:** These opportunities act like great learning platforms giving them the live experience of handling clients and understanding cases.
    - **In-House Events:** Students shall be provided an opportunity to work on the in-house events right from the start to finish, to provide them with hands-on experience, which helps to gain excellent organising & management skills

# Three Year Integrated Programme -

# Six Semesters

# Basic Structure: Distribution of Courses

| | | | |
|---|---|---|---|
| 1 | **Ability Enhancement Compulsory Course (AECC) Ability Enhancement Elective Course (AEEC)** | 2 Papers of 2 Credits Hrs. each (Total Credits Hrs. 2*2) = 4<br>1 Papers of 2 Credits Hrs. each (Total Credits Hrs. 1*2) = 2 | 06 |
| 2 | **Skill Enhancement Compulsory Course (SEC)** | 8 Papers of 2 Credits Hrs. each (Total Credits Hrs. 8*2) | 16 |
| 3 | **Core Course (CC)** | 13 Papers of 4 Credits Hrs. each (Total Credits Hrs. 13*4)<br>7 Papers of 3 Credits Hrs. each (Total Credits Hrs. 7*3) | 73 |
| 4 | **Core Course - Practical (CC-P)** | 10 Papers of 2 Credits Hrs. each (Total Credits Hrs. 10*2) | 20 |
| 5 | **Discipline Specific Compulsory Course (DSC)** | 4 Papers of 4 Credits Hr. each (Total Credits Hrs. 4*4)<br>1 Papers of 6 Credits Hr. each (Total Credits Hrs. 1*6)<br>1 Papers of 3 Credits Hr. each (Total Credits Hrs. 1*3)<br>2 Papers of 2 Credits Hr. each (Total Credits Hrs. 2*2)<br>2 Papers of 8 Credits Hr. each (Total Credits Hrs. 2*8) | 45 |
| | **Total Credits Hrs** | | **160** |

**B.Sc. (Hons.) in Integrative Nutrition & Dietetics**
***Under Choice Based Credit, Grading and Semester System***
**Curriculum Framework**
**FIRST YEAR**

| Sr. No | Semester I | Subject code | Credits | Sr. No | Semester II | Subject code | Credits |
|---|---|---|---|---|---|---|---|
| | ***Core Course (CC)*** | | | | ***Core Course (CC)*** | | |
| 1 | CC-1<br>Food Nutrition - I | | 4 | 1 | CC-4<br>Food Nutrition - II | | 4 |
| 2 | CC-2<br>Nutrition Science - I | | 4 | 2 | CC-5<br>Nutrition Science - II | | 4 |
| 3 | CC-3<br>Community Nutrition - I | | 4 | 3 | CC-6<br>Community Nutrition - II | | 4 |
| | ***Core Course - Practical (CC-P)*** | | | | ***Core Course - Practical (CC-P)*** | | |
| 4 | CC-P-1<br>Food Nutrition - I (Practicals) | | 2 | 4 | CC-P-4<br>Food Nutrition - II (Practicals) | | 2 |
| 5 | CC-P-2<br>Nutrition Science - I (Practicals) | | 2 | 5 | CC-P-5<br>Nutrition Science - II (Practicals) | | 2 |
| 6 | CC-P-3<br>Community Nutrition - I (Practicals) | | 2 | | | | |
| | ***General Elective (GE) (Any one)*** | | | | ***General Elective (GE) (Any one)*** | | |
| 7 | GE-1<br>Healthy Cooking | | 4 | 6 | GE-2<br>Physiology - I | | 4 |
| | GE-1<br>Management Fundamentals | | | | GE-2<br>Human Resource Management | | |
| | | | | | ***Discipline Specific Compulsory Course (DSC)*** | | |
| | | | | 7 | DSC-1<br>Physiology - I(Practicals) | | 2 |
| | ***Ability Enhancement Course (AEC)*** | | | | ***Ability Enhancement Course (AEC)*** | | |
| 8 | AEC-1<br>Functional English | | 2 | 8 | AEC-2<br>Communication & Counselling Skills - I | | 2 |
| | ***Skill Enhancement Course (SEC)*** | | | | ***Skill Enhancement Course (SEC)*** | | |
| 9 | SEC-1<br>Sanskrit/ Allied / Other related course | | 2 | 9 | SEC-2<br>Yoga & Ethics | | 2 |
| | | **TOTAL** | **26** | | | **TOTAL** | **26** |

## SECOND YEAR

| Sr. No | Semester III | Subject code | Credits | Sr. No | Semester IV | Subject code | Credits |
|---|---|---|---|---|---|---|---|
| | ***Core Course (CC)*** | | | | ***Core Course (CC)*** | | |
| 1 | CC-7<br>Introduction to Food Planning | | 3 | 1 | CC-10<br>Fundamentals of Biochemistry | | 3 |
| 2 | CC-8<br>Food Chemistry | | 3 | 2 | CC-11<br>Clinical Biochemistry | | 4 |
| 3 | CC-9<br>Physiology - II | | 4 | 3 | CC-12<br>Physiology - III | | 4 |
| | | | | 4 | CC-13<br>Nutrition across Lifecycle | | 4 |
| | | | | | ***Core Course - Practical (CC-P)*** | | |
| | | | | 5 | CC-P-6<br>Food Processing & Preservation - II (Practicals) | | 2 |
| | | | | 6 | CC-P-7<br>Nutrition across Lifecycle (Practicals) | | 2 |
| | ***General Elective (GE) (Any One)*** | | | | ***General Elective (GE) (Any One)*** | | |
| 4 | GE-3<br>Food Processing & Preservation - I | | 4 | 7 | GE-4<br>Food Processing & Preservation – II | | 3 |
| | GE-3<br>Marketing Fundamentals | | | | GE-4<br>Introduction to Accounts & Finance | | |
| | ***Ability Enhancement Course (AEC)*** | | | | | | |
| 5 | AEC-3<br>Communication & Counselling Skills - II | | 2 | | | | |
| | ***Skill Enhancement Course (SEC)*** | | | | ***Skill Enhancement Course (SEC)*** | | |
| 6 | SEC-3<br>Foundation Course-1Information Communication & Technology | | 2 | 8 | SEC-5<br>Foundation Course - 2<br>Entrepreneurship & Management | | 2 |
| 7 | SEC-4<br>Sanskrit /Allied/<br>Other Related Course | | 2 | 9 | SEC-6<br>Environmental Studies | | 2 |
| | ***Discipline Specific Compulsory Course (DSC)*** | | | | | | |
| 8 | DSC -2<br>Practical Training/Internship | | 6 | | | | |
| | **TOTAL** | | **26** | | **TOTAL** | | **26** |

## THIRD YEAR

| Sr No | Semester V | Subject code | Credits | Sr. No. | Semester VI | Subject code | Credits |
|---|---|---|---|---|---|---|---|
| | ***Core Course (CC)*** | | | | ***Core Course (CC)*** | | |
| 1 | CC-14<br>Clinical Nutrition - I | | 4 | 1 | CC–17<br>Lifestyle Pillars | | 3 |
| 2 | CC-15<br>Diet Therapy - I | | 4 | 2 | CC–18<br>Diet Therapy - II | | 4 |
| 3 | CC – 16<br>Nutrition, Exercise and Fitness - I | | 3 | 3 | CC–19<br>Nutrition, Exercise and Fitness - II | | 3 |
| | ***Core Course Practical (CC-P)*** | | | | ***Core Course Practical (CC-P)*** | | |
| 4 | CC-P-8<br>Clinical Nutrition - I (Practicals) | | 2 | 4 | CC-P-10<br>Diet Therapy - II (Practicals) | | 2 |
| 5 | CC-P-9<br>Diet Therapy - I (Practicals) | | 2 | | | | |
| | ***Discipline Specific Elective (DSE) (Any One)*** | | | | ***Discipline Specific Elective (DSE) (Any One)*** | | |
| 6 | DSE-1<br>Physiology - IV | | 3 | 5 | DSE-2<br>Clinical Nutrition - II | | 4 |
| | DSE-1<br>Sports Nutrition | | | | DSE-2<br>Alternative Health Strategies & Therapies | | |
| | | | | | ***Discipline Specific Elective (DSE) (Any One)*** | | |
| | | | | 6 | DSE-3<br>Yoga and Exercise | | 2 |
| | | | | | DSE-3<br>Global Leadership & Culture | | |
| | ***Discipline Specific Compulsory Course (DSC)*** | | | | ***Discipline Specific Compulsory Course (DSC)*** | | |
| 7 | DSC-3<br>Practical Training/Internship | | 8 | 7 | DSC-4<br>Practical Training/Internship | | 8 |
| | ***Skill Enhancement Course (SEC)*** | | | | ***Skill Enhancement Course (SEC)*** | | |
| 8 | SEC-7<br>Sanskrit/ Allied / Other related course | | 2 | 8 | SEC-8<br>Human Rights & Indian Constitutions | | 2 |
| | | **TOTAL** | **28** | | | **TOTAL** | **28** |

**The syllabus can be updated/revised/modified from time to time to meet industry requirements.**

# Syllabus and Question Paper Pattern of Courses of

# B.Sc. (Honours) in Integrative Nutrition & Dietetics
# First Year
## *Semester I and II*

**Under Choice Based Credit, Grading and Semester System**

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester I*

## 1. Food Nutrition - I

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction | 15 |
| Module 2 | Cereals and pulses | 15 |
| Module 3 | Nuts and seeds | 15 |
| Module 4 | Fruits and veggies | 15 |
| | **Total** | **60** |

## Course Objectives

1. Acquire knowledge of the food composition and chemistry of different food products.
2. Understand various food processing techniques, nutritional and physicochemical changes that occur during processing of foods.
3. Gain knowledge of various food additives and its application in food processing.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Apply scientific thinking in the analysis, synthesis and evaluation of knowledge within the discipline of food science.
2. Apply ethical reasoning within the discipline of food science.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction** | **15** |
| | ● Introduction to Food science, definitions, functions of food, food groups, solar cooking<br>● Water - structure and function, impact of dry heat and moist heat on cooking<br>● Role of water in cooking, different forms of cooking method using water | |
| 2 | **Cereals and Pulses** | **15** |
| | ● Composition<br>● Nutritive value<br>● Classification<br>● Structure<br>● Processed / refined / polished grains<br>● Toxin constituents of pulses | |
| 3 | **Nuts and Seeds** | **15** |
| | ● Composition<br>● Nutritive value<br>● Classification<br>● Structure<br>● Sources of nuts and seeds its significance - almonds, walnuts, flaxseeds, pumpkin seeds, sunflower seeds | |
| 4 | **Fruits and Veggies** | **15** |
| | ● Composition<br>● Nutritive value<br>● Classification<br>● Structure<br>● Types of veggies - Type A, B, C, carbohydrate content in different types, vegetable cookery, storage of vegetables, algae as food – spirulina | |

## Reference Books


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2. Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
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6. Brow, A., Understanding Food, Thomson Learning Publications, Wadsworth, 2000.
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# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester I*

## 2. Nutrition Science - I

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Carbohydrates | 15 |
| Module 2 | Proteins | 15 |
| Module 3 | Fats | 15 |
| Module 4 | Energy balance | 15 |
| | **Total** | **60** |

## Course Objectives

1. Understand the Composition and structure of carbs, proteins & fats
2. Relate the Physiology of the human body with Food and Nutritional requirements

## Course Outcome

After successful completion of the course the learner will be able to:

1. Gain critical understanding of principal aspects in nutrition, health and well-being, including acquisition of detailed and coherent knowledge.
2. Gain knowledge on different nutrients in food.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Carbohydrates** | 15 |
| | ● Introduction to Nutrition Science<br>● Carbohydrates- structure, composition, function, sources<br>● Nutritive value of Wheat, rice, oats, barley, jowar | |
| 2 | **Proteins** | 15 |
| | ● Proteins - Structure, composition, function, sources<br>● Nutritive value of dals- tur dal, moong dal, masoor dal, moong, matki, rajma, chhole | |
| 3 | **Fats** | 15 |
| | ● Fats - Structure, composition, function, sources<br>● Nutritive value of ghee, coconut oil, mustard oil, sunflower oil, flaxseeds, nuts and seeds | |
| 4 | **Energy Balance** | 15 |
| | ● Energy balance – BMR- factors affecting Basal Metabolic Rate, Resting Metabolic Rate<br>● Energy value of foods , nutritive value of different food groups<br>● Resting Energy Expenditure, physical activity , impact of activity on nutrition intake | |

## Reference Books


1. Swaminathan, M., Essentials of food and Nutrition, Vol I & II, Bappco Publishers, Madras 2000.
2. Srilakshmi. B., Nutrition Science, New age International (p) ltd, publishers, 2004.
3. Frances Sizer and Ellie Whitney, Nutrition Concepts and Controversies, Thomson wadsworth Publisher, New York, 2006.
4. Mangale Kango, Normal Nutrition, Curing Diseases through Diet, CBS publication, First edition, 2005.
5. Bonnie, Worthington – Roberts and Sue Rodwell Williams, Nutrition throughout the life cycle, 3rd edition, WCB/MCGraw Hill Publisher, New York, 1996.
6. Paul. S., Text of Bio Nutrition Fundamental and Management, RBSA Publishers, 2003
7. Journal of Nutritional science
8. American Society for Nutrition
9. Journal of Nutritional biochemistry
10. Journal of Nutrition
11. Indian Journal of Nutrition and dietetics
12. Nutrition Review


**Assignment :**

1. Different sources of omega 3 and omega 6, and its pros and cons
2. Market survey of protein rich products
3. Myths on ghee and coconut oil - its benefits

## 3. Community Nutrition - I

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Assessment of Health Status | 15 |
| Module 2 | Nutritional Intervention Programmes | 15 |
| Module 3 | International organizations and Voluntary Services | 15 |
| Module 4 | Education | 15 |
| | **Total** | **60** |

## Course Objectives

1. Get acquainted with special cultural and political characteristics of various communities.
2. Understand the status and health problems in rural areas.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Define nutritional epidemiology and understand its role in health and disease.
2. Gain an understanding about the food and nutrition security in India.
3. Develop and prepare different types of visual aids suitable to community nutrition programmes.
4. Acquire practical experience in imparting the knowledge of nutrition to the community.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Assessment of Health Status** | **15** |
| | ● Assessment of Nutritional status – Anthropometric method, Biochemical, Clinical Examination and Dietary survey.<br>● Malnutrition – Etiology, measures to overcome malnutrition | |
| 2 | **Nutritional Intervention Programmes** | **15** |
| | ● School Lunch Programmes – ICDS, TINP<br>● National Research Institutions – ICMR, CFTRI, NIN - its role and contribution in nutrition science | |
| 3 | **International organizations and Voluntary Services** | **15** |
| | ● International organizations – WHO, FAO, UNICEF, World Bank<br>● Voluntary services – AIWC, AFPRO, HSAI | |
| 4 | **Education** | **15** |
| | ● Nutrition education<br>● Counseling – meaning, aims, objectives, training programs<br>● Approaches and methods of socio – economic analysis, Rapid Assessment Procedures, rapid rural appraisal, surveys<br>● Case studies, observation and participant observations. | |
| | **TOTAL** | **60** |

## Reference Books


1. Wal Ruchi Mishra. S, Encyclopedia of Health Nutrition and Family welfare, Published by Sarup and Sons, new Delhi 2000.
2. Srilakshmi, B. Nutrition Science, New Age International (P) Ltd, New Delhi, 2012
3. Swaminathan, M. Handbook of Food and Nutrition, The Bangalore Printing and Publishing Co. Ltd, Fifth Edition, 2003
4. Reddy, R.s. Nutrition Education, CommonWealth Publisher, First Edition, 2004
5. Park & park, Parks Textbook of Prevention and Social Medicine, 18th edition, M/S Banarasids Bhanot, Jabalpur.


# *Syllabus of Courses of B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester I*

# *4. Food Nutrition - I Practicals*

**Practicals**

1. Identification of foods and food groups , types of vegetables , nutritive value of fruits and vegetables
2. Detection of toxins and adulterants of some of the common foods
3. Demonstration of different cooking techniques with nutrient loss, grilling, poaching, steaming, tandoor etc
4. Prepare one recipe in each food group indicating best method of cooking
5. Survey of marketed processed and labelling of processed food items

## Course Objectives

1. Acquire knowledge of the food composition and chemistry of different food products.
2. Understand various food processing techniques, nutritional and physicochemical changes that occur during processing of foods.
3. Gain knowledge of various food additives and its application in food processing.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Apply scientific thinking in the analysis, synthesis and evaluation of knowledge within the discipline of food science.
2. Apply ethical reasoning within the discipline of food science.

## Reference Books


1. Shakuntala Manay, Shadakshara Swamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
2. Usha Chandrasekhar, Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi, 2002.
3. Srilakshmi, B. Food Science, New Age International Publishers, New Delhi, 2010
4. Swaminathan, M, HandBook of Food Science and Experimental Foods, BAPPCO, Bangalore, 1992
5. Brow, A., Understanding Food, Thomson Learning Publications, Wadsworth, 2000.
6. Mehas, K.Y. and Rodgers, S.L. Food Science and You, MacMillan McGraw Company, New York, 2000.
7. Parker, R. Introduction to food Science, Delmer, Thomson Learning Co., Delma, 2000.

## *5. Nutrition Science I Practicals*

**Practicals**

Estimation of carbohydrate in fruits and vegetables

1. Estimation of protein by biuret method
2. Qualitative analysis of oils and fats in pulses/food & carbohydrates
3. Demonstration of measuring BMR, RMR, use of calipers
4. Checking the pH of foods

### Course Objectives

1. Understand the Composition and structure of carbs, proteins & fats
2. Relate the Physiology of the human body with Food and Nutritional requirements

### Course Outcome

After successful completion of the course the learner will be able to:

1. Gain critical understanding of principal aspects in nutrition, health and well-being, including acquisition of detailed and coherent knowledge
2. Gain knowledge on the qualitative analysis

### Reference Books

1. Swaminathan, M., Essentials of food and Nutrition, Vol I & II, Bappco Publishers, Madras 2000.
2. Srilakshmi. B., Nutrition Science, New age International (p) ltd, publishers, 2004.
3. Frances sizer and Ellie whitney, Nutrition Concepts and Controversies, Thomson wadsworth Publisher, New York, 2006.
4. Mangale Kango, Normal Nutrition, Curing Diseases through Diet, CBS publication, First edition, 2005.
5. Paul. S., Text of Bio Nutrition Fundamental and Management, RBSA Publishers, 2003
6. Journal of Nutritional science
7. American Society for Nutrition
8. Journal of Nutritional biochemistry
9. Indian Journal of Nutrition and dietetics
10. Nutrition Review

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester I*

## *6. Community Nutrition I Practicals*

**Practicals**

1. Assessment of nutritional status of an individual community using anthropometry and dietary survey.
2. Visit to local health centers to identify clinical signs and symptoms of nutritional problems.
3. Visit to an ICDS block.
4. Development of audio visual aids.
5. Planning, implementation and evaluation of nutrition education for a target group.

## Course Objectives

1. Get acquainted with special cultural and political characteristics of various communities.
2. Understand the status and health problems in rural areas.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Define nutritional epidemiology and understand its role in health and disease.
2. To gain understanding about the food and nutrition security in India.
3. To develop and prepare different types of visual aids suitable to community nutrition programmes.
4. To gain practical experience in imparting the knowledge of nutrition to the community.

**Reference Books**


1. Wal Ruchi Mishra. S, Encyclopedia of Health Nutrition and Family welfare, Published by Sarup
2. and Sons, new Delhi 2000.
3. Srilakshmi, B. Nutrition Science, New Age International (P) Ltd, New Delhi, 2012
4. Swaminathan, M. Handbook of Food and Nutrition, The Bangalore Printing and Publishing Co.
5. Ltd, Fifth Edition, 2003
6. Reddy, R.s. Nutrition Education, Common Wealth Publisher, First Edition, 2004
7. Park & park, Parks Textbook of Prevention and Social Medicine, 18th edition, M/S Banarasids
8. Bhanot, Jabalpur.

## 7. Healthy Cooking

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction | 15 |
| Module 2 | Techniques, Myths and Facts | 15 |
| Module 3 | Healthy Baking | 15 |
| Module 4 | Microgreens and organic foods | 15 |
| | **Total** | **60** |

## Course Objectives

1. Acquire knowledge on different methods of cooking
2. Apply process of different foods
3. Use a combination of foods in the development of food products.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of healthy baking, microgreens and organic foods.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Introduction** | **15** |
| | Introduction to various cooking methods, utensils and materials-<br>● Baking,<br>● Roasting,<br>● Dextrinisation,<br>● Steam,<br>● Poach,<br>● Stir fry/ sauté,<br>● Deep fry and shallow frying,<br>● Tandoor,<br>● Microwave,<br>● Air fryer,<br>● Gelatinisation,<br>● Blanching,<br>● Broiling etc | |
| **2** | **Techniques, Myths and Facts** | **15** |
| | ● Objective of cooking and preliminary techniques- eg Folding, cutting. Grinding, chopping, julienne, cube chopping etc.<br>● Right way of cooking- how to retain nutrients while cooking,<br>● Myths and facts of cooking- pertaining to different cooking techniques and methods | |
| **3** | **Healthy Baking** | **15** |
| | ● Healthy Baking - Concept of Sourdough, gluten free biscuits and cookies,<br>● Benefits and breaking the myths, | |
| **4** | **Microgreens and organic foods** | **15** |
| | ● Microgreens and organic foods- how to grow your microgreens,<br>● Benefits,<br>● Correct way of utilising microgreens<br>● Which microgreen to be used in which condition<br>● Organic foods- organic farming, biopesticide, side effects of pesticides | |

## Application for Theory.

1. Demonstration of different cooking techniques
2. Healthy baking- biscuits, cookies
3. How to make sourdough bread and pizza base
4. How to bake healthy cakes
5. How to grow your microgreens

## *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester I*

## 7.Management Fundamentals

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | **Basic Concepts** | 12 |
| Module 2 | **Planning** | 12 |
| Module 3 | **Organizing** | 12 |
| Module 4 | **Decision Making** | 12 |
| Module 5 | **Controlling** | 12 |
| | **Total** | **60** |

## Course Objectives

1. To understand the basic concepts of management.

## Course Outcome

After successful completion of the course, the learner will be able to:

1. Understand the concepts related to Business.
2. Demonstrate the roles, skills and functions of management.

**Detailed Syllabus**

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Basic Concepts** | **12** |
| | Manager, Managing, Workplace, Organization, Management Functions, Mintzberg's Managerial Roles, The Universality of Management, Approaches to Management - Early Management, Classical Approach, Behavioral Approach, Quantitative Approach, Contemporary Approaches. Managerial Competencies: Communication, team work, planning and administrative, strategic and global competencies; Managerial Skills; How Is the Manager's Job Changing? Importance of Customers to the Manager's Job, Importance of Innovation to the Manager's Job, Importance of Sustainability to the Manager's Job. | |
| **2** | **Planning** | **12** |
| | Concept, need, nature, Management By Objectives (MBO) - Process of MBO - Benefits of MBO, Planning and Performance, Goals and Plans, Types of Goals, Types of Plans, Setting Goals and Developing Plans, Approaches to Setting Goals, Developing Plans, Approaches to Planning, Planning Effectively in Dynamic Environments. | |
| **3** | **Organizing** | **12** |
| | Organization, Organizing, Organizational Structures, Principles of Work Specialization, Departmentalization, Chain of Command, Span of Control, Centralization and Decentralization, Formalization. Mechanistic and Organic Structures, Factors Affecting Structural Choice - Strategy, Size, Technology, Environmental Uncertainty. Traditional Organizational Designs - Simple Structure, Functional Structure, Divisional Structure, Matrix Structure, Team Structures, Project Structure, Adaptive Organizations – Boundary less Organization, Virtual Organizations, Learning Organization, Flexi Work, Tele-working, Global Organizations. | |
| **4** | **Decision Making** | **12** |
| | The Decision-Making Process - Identifying a Problem - Identifying Decision Criteria - Allocating Weights to the Criteria - Developing Alternatives - Analyzing Alternatives - Selecting an Alternative - Implementing the Alternative - Evaluating Decision Effectiveness. Making Decisions: Rationality, Bounded Rationality, The Role of Intuition, The Role of Evidence-Based Management. Types of Decisions & Decision-Making Conditions. Decision-Making approaches - Quantitative approach, Environmental Approach, System Approach, Ethical Approach, Intuitive Approach, Case Study Approach Decision-Making Styles - Linear–Nonlinear Thinking Style Profile, Decision Making Biases and Errors. | |

| | | |
|---|---|---|
| | Effective Decision Making in Today's World - Correctness of decision, Decision environment, Timing of decision, Effective communication of Decision, Participation in decision Making-Implementation of decision. | |
| **5** | **Controlling** | 12 |
| | Controlling, Definition, need and Importance, The Control Process, Managerial Decisions in Controlling, Feed-forward / Concurrent / Feedback Controls. Financial Controls, Information Controls, Benchmarking of Best Practices | |

**Reference Books:**

1. Management, Hellregel, Thomson Learning, Bombay
2. Management, Robbins & Coulter, Prentice Hall of Hall of India, New Delhi.
3. Management - Text & Cases, Satya Raju, PHI, New Delhi.
4. Management, Richard L. Draft, Thomson South-Western

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester I*

## 8.Functional English

| | Modules/Units |
|---|---|
| 1 | **Word Class** |
| | Articles, Prepositions, Verbs, Adverbs, Conjunctions, Interjections |
| 2 | **Tenses, Concord, Voice** |
| | Tense and Aspect, Subject and Verb Agreement, Person and Number, Active and Passive<br>Voice |
| 3 | **Spelling and Punctuation** |
| | Rules of Punctuation, Basic Rules of Spelling |
| 4 | **Sentences** |
| | Types of Sentences, Conversion of Sentences |

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester I*

## 9.Sanskrit/Allied/Other related course

Structure of Language

- Nouns and various cases
- Ten conjugations
- Voices
- Causal
- Absolute Locative
- Frequentatives
- Desideratives
- Sandhis
- Compounds
- Gerunds
- Infinitives
- History of Sanskrit Literature

**Or**

**Personality Development Skills**

Module I Interpersonal Skills
Module II Phone Etiquette & Professional Communication
Module III Email Etiquette
Sem IV Time Management

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester II*

## 1. Food Nutrition - II

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Milk and Egg | 15 |
| Module 2 | Fish and Meat | 15 |
| Module 3 | Health Foods | 15 |
| Module 4 | Sugar | 15 |
| | **Total** | **60** |

## Course Objectives

1. Acquire knowledge on nutritive value, understand the cooking quality factors and develop skills in the preparation and storage of milk and egg products.
2. Acquire knowledge on the structure and nutritive value, understand the processing factors and acquire skills in processing and storage of flesh foods.
3. Acquire knowledge on the myths & ill-effects if sugar

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of milk, fish, meat and health foods.
2. Understand the nutritive value of milk, fish, meat and health foods.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Milk and Egg** | **15** |
| | ● Milk- milk and milk products, its composition, impact on quality of milk and eggs during mass production ,<br>● Egg - Structure, composition, uses in diet | |
| 2 | **Fish and Meat** | **15** |
| | Fish and meat -<br>● Composition<br>● Types<br>● Nutritive value<br>● Impact on human health<br>● Classification<br>● Fish cookery<br>● spoilage, storage and preservation | |
| 3 | **Health Foods** | **15** |
| | ● Health foods- pre-probiotic<br>● Functional foods- spices and condiments<br>● Emerging trends in food technology- bio tech, bio fortification, organic foods, genetically modified food | |
| 4 | **Sugar** | **15** |
| | ● Myth<br>● Alternatives<br>● Ill effects of sugar on health<br>● Hidden names<br>● Related products<br>● Nutritive value<br>● Properties<br>● Artificial sweeteners and its impact on health<br>● Sugar cookery | |

## Reference Books


1. Potter, N. and Hotchkiss, J.H. Food Science, 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.
2. Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
3. Usha Chandrasekhar, Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi, 2002.
4. Srilakshmi, B. Food Science, New Age International Publishers, New Delhi, 2010
5. Swaminathan, M, Hand Book of Food Science and Experimental Foods, BAPPCO, Bangalore, 1992
6. Brow, A., Understanding Food, Thomson Learning Publications, Wadsworth, 2000.
7. Mehas, K.Y. and Rodgers, S.L. Food Science and You, McMillan McGraw Company, New York, 2000.
8. Parker, R. Introduction to food Science, Delmer, Thomson Learning Co., Delma, 2000.

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester II*

## 2. Nutrition Science - II

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Fat soluble Vitamins | 15 |
| Module 2 | Water soluble | 15 |
| Module 3 | Minerals | 15 |
| Module 4 | Antioxidants and anti-inflammatories | 15 |
| | **Total** | **60** |

## Course Objectives

1. To gain in depth knowledge on the physiological and metabolic role of Vitamins
2. To acquire in depth knowledge of macro and micro minerals

## Course Outcome

After successful completion of the course the learner will be able to:

1.Understand the importance of vitamins, minerals & antioxidants.
2. Understand the functions of vitamins, minerals and antioxidants.
3. Understand the composition and structure of vitamins, minerals and antioxidants.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Fat soluble Vitamins** | 15 |
| | ● Fat soluble Vitamin<br>○ Vitamin A-structure, composition, function, sources RDA, toxicity<br>○ Vitamin D- structure, composition, function, sources RDA, toxicity<br>○ Vitamin E- structure, composition, function, sources RDA, toxicity<br>○ Vitamin K- structure, composition, function, sources RDA, toxicity | |
| 2 | **Water soluble** | 15 |
| | ● Water soluble- B complex<br>○ B1- structure, composition, function, sources-toxicity and RDA<br>○ B2- structure, composition, function, sources-toxicity and RDA<br>○ B3- structure, composition, function, sources-toxicity and RDA<br>○ B5- structure, composition, function, sources-toxicity and RDA<br>○ B6- structure, composition, function, sources-toxicity and RDA<br>○ B7- structure, composition, function, sources-toxicity and RDA<br>○ B9- structure, composition, function, sources-toxicity and RDA<br>○ B12- structure, composition, function, sources-toxicity and RDA<br>○ C- structure, composition, function, sources-toxicity and RDA | |
| 3 | **Minerals** | 15 |
| | ○ Minerals<br>○ zinc- structure, composition, function, sources, RDA, toxicity<br>○ selenium- structure, composition, function, sources, RDA, toxicity<br>○ copper - structure, composition, function, sources, RDA, toxicity<br>○ mag- structure, composition, function, sources, RDA, toxicity<br>○ iron- structure, composition, function, sources, RDA, toxicity | |

| | | |
|---|---|---|
| | ○ iodine- structure, composition, function, sources, RDA, toxicity<br>○ calcium - structure, composition, function, sources, RDA, toxicity<br>○ phosphorus- structure, composition, function, sources , RDA, toxicity | |
| **4** | **Antioxidants and anti-inflammatories** | **15** |
| | ● Antioxidants and anti-inflammatories<br>○ Beta carotene<br>○ anthocyanins<br>○ polyphenols<br>○ curcumin<br>○ isoflavones<br>○ quercetin<br>○ Sulphur containing foods<br>○ ellagic acid<br>○ glutathione<br>○ L glutamine | |

**Assignments:**

1. Low sodium recipes
2. Low potassium recipes
3. Iron rich recipes
4. Calcium rich foods
5. Magnesium rich sources

## Reference Books


1. Swaminathan, M., Essentials of food and Nutrition, Vol I & II, Bappco Publishers, Madras 2000.
2. Srilakshmi. B., Nutrition Science, New age International (p) ltd, publishers, 2004.
3. Frances sizer and Ellie whitney, Nutrition Concepts and Controversies, Thomson wadsworth Publisher, New York, 2006.
4. Mangale Kango, Normal Nutrition, Curing Diseases through Diet, CBS publication, First edition, 2005.
5. Bonnie, Worthington – Roberts and Sue Rodwell Williams, Nutrition throughout the life cycle, 3rd edition, WCB/MC Graw Hill Publisher, New York, 1996.
6. Paul. S., Text of Bio Nutrition Fundamental and Management, RBSA Publishers, 2003
7. Journal of Nutritional science
8. American Society for Nutrition
9. Journal of Nutritional biochemistry
10. Journal of Nutrition
11. Indian Journal of Nutrition and dietetics
12. Nutrition Reviews

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester II*

## 3. Community Nutrition- II

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Community Water and Waste Management | 15 |
| Module 2 | Concept of Epidemiology | 15 |
| Module 3 | Challenges faced by women | 15 |
| Module 4 | White revolution and green revolutions | 15 |
| | **Total** | **60** |

## Course Objectives

1. To address issues related to waste management and find solutions
2. To acquire knowledge and analyze the challenges faced by women

## Course Outcome

After successful completion of the course the learner will be able to:

1. State the importance of Epidemiology of communicable diseases and its control

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Community Water and Waste Management** | 15 |
| | ● Importance of water to the community,<br>● Etiology and effects of toxic agents,<br>● Water borne infectious agents,<br>● Sources of water,<br>● Safe drinking water,<br>● Potable water,<br>● Waste and waste disposal,<br>● Sewage disposal and treatment,<br>● Solid waste and disposal, liquid waste disposal. | |
| 2 | **Concept of Epidemiology** | 15 |
| | ● Concept of Epidemiology: Study of the epidemiologic approach-determinants of disease preventive & social means.<br>● Communicable and infectious disease control: Nature of communicable and infectious diseases, infection, contamination, disinfection, decontamination,<br>● Transmission-direct & indirect, vector borne disease infecting organisms and positive agents, environmental agents and epidemiological principles of disease control. | |
| 3 | **Challenges faced by women** | 15 |
| | Challenges faced by women<br>● Anemia- causes, symptoms, tests, types of anemia, management,<br>● Menses- sanitary pads, hygiene, early conception, psychological changes, hormonal imbalance | |
| 4 | **White revolution and green revolutions** | 15 |
| | ● White revolution and green revolutions- poultry, fishing- revolutions,<br>● What can we do differently to benefit our community – eg Different organizations / clubs that can be open to benefit the community-<br>● Practical- pros of cons of each that the students come up with eg laughter clubs, gyms and park | |

## Reference Books


1. Wal Ruchi Mishra. S, Encyclopedia of Health Nutrition and Family welfare, Published by Sarup and Sons, new Delhi 2000.
2. Srilakshmi, B. Nutrition Science, New Age International (P) Ltd, New Delhi, 2012
3. Swaminathan, M. Handbook of Food and Nutrition, The Bangalore Printing and

Publishing Co. Ltd, Fifth Edition, 2003
4. Reddy, R.s. Nutrition Education, Common Wealth Publisher, First Edition, 2004
5. Park & park, Parks Textbook of Prevention and Social Medicine, 18th edition, M/S Banarasids Bhanot, Jabalpur.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester II*

## *4. Food Nutrition - II Practicals*

**Practicals:**

1. Different cooking techniques used in industry
2. Market survey of different food items and additives present in them
3. Visit to food manufacturing units

**Assignments:**

1. Role of additives in food industry
2. Different preservatives used - their classes and its impact on human body

## Course Objectives

1. Acquire knowledge of the food composition and chemistry of different food products.
2. Understand various food processing techniques, nutritional and physicochemical changes that occur during processing of foods
3. Gain knowledge of various food additives and its application in food processing.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Apply scientific thinking in the analysis, synthesis and evaluation of knowledge within the discipline of food science.
2. Apply ethical reasoning within the discipline of food science

## References


1. Potter, N. and Hotchkiss, J.H. Food Science, 5th Ed., CBS Publications and Distributors, Daryaganji, New Delhi, 1998.
2. Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
3. Usha Chandrasekhar, Food Science and Application in Indian Cookery, Phoenix Publishing House P. Ltd., New Delhi, 2002.
4. Srilakshmi, B. Food Science, New Age International Publishers, New Delhi, 2010
5. Swaminathan, M, Hand Book of Food Science and Experimental Foods, BAPPCO, Bangalore, 1992

## *5. Nutrition Science II Practicals*

**Nutrition Science Practicals:**

1. Determination of egg quality
2. Estimation of calcium, phosphorous iron, iodine

**Assignments:**

1. Low sodium recipes
2. Low potassium recipes
3. Iron rich recipes
4. Calcium rich foods

## Course Objectives

1. Understand the Composition and structure of carbs, proteins & fats
2. Relate the Physiology of the human body with Food and Nutritional requirements

## Course Outcome

After successful completion of the course the learner will be able to:\

1. Gain critical understanding of principal aspects in nutrition, health and well-being, including acquisition of detailed and coherent knowledge.
2. Gain knowledge on different nutrients in food.

## References

1. Frances sizer and Ellie whitney, Nutrition Concepts and Controversies, Thomson wadsworth Publisher, New York, 2006.
2. Mangale Kango, Normal Nutrition, Curing Diseases through Diet, CBS publication, First edition, 2005.
3. Bonnie, Worthington – Roberts and Sue Rodwell Williams, Nutrition throughout the life cycle, 3rd edition, WCB/MC Graw Hill Publisher, New York, 1996.
4. Paul. S., Text of Bio Nutrition Fundamental and Management, RBSA Publishers, 2003

## Journals

1. Journal of Nutritional science
2. American Society for Nutrition
3. Journal of Nutritional biochemistry
4. Journal of Nutrition
5. Indian Journal of Nutrition and dietetics
6. Nutrition Reviews

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester II*

## 6. Physiology-I

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction to Human Physiology | 15 |
| Module 2 | Cells and Tissues | 15 |
| Module 3 | Blood | 15 |
| Module 4 | Heart | 15 |
| | **Total** | **60** |

## Course Objectives

1. To understand the basic tenets of human physiology
2. To understand the basics of cells & tissue
3. To provide students insight into normal physiology of the Cardiovascular System

## Course Outcome

After successful completion of the course the learner will be able to:

1. Appreciation of the complex and diverse nature of life processes and a basic understanding of how various disciplines can come together.
2. Gain an understanding of the basic concepts related to cells and tissues, blood and heart.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Introduction to Human Physiology** | **15** |
| | Introduction to Human Physiology -<br>● Define anatomy and physiology,<br>● Basic life processes,<br>● Homeostasis and body fluid,<br>● Basic anatomical terminologies | |
| **2** | **Cells and Tissues** | **15** |
| | ● Cell organelles, structure and function,<br>● Types of tissues , structure and function ,<br>● Cytoplasm and its organelles,<br>● Nucleus,<br>● Functional system of cell digestion of cells,<br>● Function of cells extraction of energy from nutrients ,<br>● Cell motility. | |
| **3** | **Blood** | **15** |
| | ● Blood - functions and properties of blood,<br>● Blood components,<br>● Physical characteristics of blood,<br>● Formation of blood cells,<br>● Blood clotting,<br>● Blood groups and types,<br>● Structure | |
| **4** | **Heart** | **15** |
| | ● Heart- physiology of heart, heart valves and circulation of blood,<br>● Arteries,<br>● Blood pressure and blood flow,<br>● Cardiac cycle,<br>● Circulatory system, | |

## Reference Books


1. Meyer B J, Meij H S and Meyer A C., Human Physiology, AITBS Publishers and Distributors.
2. Wilson, K.J.W and Waugh, A. (1996): Ross and Wilson, Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
3. Ranganathan, T.S. (2004): A Textbook of Human Anatomy, Chand & Co. N. Delhi.
4. Jain, A.K., Textbook of Physiology, Vol. I and II, Avichal Publishing Co., New Delhi.
5. Chatterjee C.C. (1987): Human Physiology, Vol. I & II, Medical Allied Agency, Calcutta.
6. Guyton, A.G. and Hall, J.B. (1996): Text Book of Medical Physiology, (9th Edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester II*

## *6.*Human Resource Management

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction to HRM | 15 |
| Module 2 | Job Analysis & Recruitment | 15 |
| Module 3 | Performance Appraisal | 15 |
| Module 4 | Participative management | 15 |
| | **Total** | **60** |

## Course Objectives

1. To acquaint students with various issues related to Human Resource Management.
2. To give an overview on Organisation Behaviour as an area of Management.
3. To introduce basic concepts, functions & processes and to create an awareness on the role, functioning of HRM

## Course Outcome

After successful completion of the course the learner will be able to

1. Develop, implement, and evaluate organizational development strategies aimed at promoting organizational effectiveness
2. Collaborate with others, in the development, implementation, and evaluation of organizational and health and safety policies and practices
3. Contribute to the development, implementation, and evaluation of employee recruitment, selection, and retention plans and processes
4. Develop, implement, and evaluate employee orientation, training, and development programs

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction** | 15 |
| | ● Introduction to HRM Definition, Features, Scope/Functions of HRM.<br>● Evolution of HRM, Trends in HRM, Difference between HRM and PM, Challenges before the HR Manager, Role of the HR manager, Traits/Characteristics of the workforce, Personnel Philosophy, Personnel Manual.<br>● Human Resource Planning: Definition of HRP, Process of HRP along with brief coverage of personnel demand and supply, Forecasting techniques, Factors affecting HRP, HRIS, VRS, Outsourcing, Pink slip/termination/retrenchment/downsizing/ Separation Contracting and Sub-Contracting, Promotions and Transfers. | |
| 2 | **Job Analysis & Recruitment** | 15 |
| | ● Job analysis: Definition, Method of collecting job data, Merits and demerits/ limitations.<br>● Job Design: Definition, Factors affecting job design, Approaches to job design.<br>● Job evaluation: Definition, Methods of job evaluation, Process of job evaluation.<br>● Recruitment: Definition, Sources of recruitment, Merits and demerits.<br>● Selection: Definition, Process of selection, Types of selection tests, Types of interviews.<br>● Induction/orientation: Definition, Methods, Process, Placement.<br>● Training and Development: Definition of training and development, Methods of training Managers, Process/ Procedure of conducting training programs, How to evaluate effectiveness of training program, Advantages of T & D. | |
| 3 | **Performance Evaluation** | 15 |
| | ● Performance Appraisal: Definition, Methods of appraisal for managers, Traditional and Modern, Process/procedure of conducting performance appraisal, Advantages of performance appraisal, Limitations of performance appraisal.<br>● Compensation management, Definition of compensation Components of salary/ salary slip. | |

| | | |
|---|---|---|
| | ● Fringe benefits, Definition and Types Performance linked incentives/incentives, Advantages and Disadvantages.<br>● Career planning and Development: Definition of career planning and career development, Process /procedure Career stages/career life cycle and how to handle personnel at each stage, Essentials to make career planning successful, Career counselling, Employee Retention techniques, Succession planning. | |
| **4** | **Participative Management & Industrial Relations** | **15** |
| | ● Participative Management: Definition of participative management, Levels of participation, Trends in Participative management, Factors important for effective participative management, Forms of participation, Participation through quality circles, Empowered teams.<br>● Industrial Relations: Definition of industrial relations, Features of industrial relations, Importance of industrial relations, Approaches to industrial relations, Parties to industrial relations.<br>● Trade Unions: Definition of a trade union, Features of a trade union, Trade Union movement in India, Trends in TU. | |

## Reference Books:


1. Griffin, Ricky W: Organizational Behaviour, Houghton Mifflin Co., Boston.
2. Prasad L M, Organizational Behaviour, Sultan Chand.
3. Khanka S. S., Organizational Behaviour, S. Chand.
4. P.L. Rao-International Human Resource.
5. Ivancevich; John and Micheol T. Matheson: Organizational Behaviour and Management, Business Publication Inc., Texas.
6. Koontz, Harold, Cyril O'Donnell, and Heinz Weihrich: Essentials of management, Tata McGraw-Hill, New Delhi.
7. Luthans, Fred: Organizational Behaviour, McGraw-Hill, New York.
8. Human Resources and Personnel Management K Aswathappa Test and Cases.
9. Personnel Management Mamoria.
10. Personnel Management FlippoMcgraw.
11. Excellence through HRD M Nair and T V Rao.
12. Handbook of Human Resource Armstrong and Management Practice Michael Kogan.

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester II*

## 7. Physiology-I Practicals & VIVA

## Modules at a Glance

## Practicals

1. Histology of Tissues – Columnar, cubical, ciliated, squamous, stratified squamous. - d .
2. Histology of muscles – cardiac, striated, non – striated . - demonstration
3. Estimation of Haemoglobin, Bleeding time, Clotting time - demonstration
4. Measurement of Blood pressure – before and after exercise - demonstration
5. Demonstration of estimation of nitrogen
6. Demonstration of fibre estimation
7. Demonstration of acid and alkaline ash- its significance in meal planning

## Course Objectives

1. To understand the basic tenets of human physiology
2. To understand the basics of cells & tissue
3. To provide students insight into normal physiology of the Cardiovascular System

## Course Outcome

After successful completion of the course the learner will be able to:

1. Appreciation of the complex and diverse nature of life processes and a basic understanding of how various disciplines can come together, to improve the health and wellbeing
2. Gain an understanding of the basic concepts related to cells and tissues, blood and heart.

## References


1. Meyer B J, Meij H S and Meyer A C., Human Physiology, AITBS Publishers and Distributors.
2. Wilson, K.J.W and Waugh, A. (1996): Ross and Wilson, Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
3. Ranganathan, T.S. (2004): A Textbook of Human Anatomy, Chand & Co. N. Delhi.
4. Jain, A.K., Textbook of Physiology, Vol. I and II, Avichal Publishing Co., New Delhi.
5. Chatterjee C.C. (1987): Human Physiology, Vol. I & II, Medical Allied Agency, Calcutta.
6. Guyton, A.G. and Hall, J.B. (1996): Text Book of Medical Physiology, (9th Edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

# *Syllabus of Courses of*
# *B.Sc. (Honours) in Integrative Nutrition & Dietetics*
# *at Semester II*

## 8. Communication and Counselling Skills - I

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction and Concepts | 7 |
| Module 2 | Transactional Analysis | 7 |
| Module 3 | Personality Development | 8 |
| Module 4 | Communication Skills | 8 |
| | **Total** | **30** |

## Course Objectives

1. Understand the concept of personality and its development
2. Identify the basic principles of communication
3. Develop written communication skills for everyday and professional communication
4. Develop oral communication skills to participate independently in conversations and discussions conducted in English at medical forums.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Gain knowledge and apply a range of communication practices and resources relevant to Human Nutrition
2. Explain very briefly about all medical terminology & its kind & uses. Enumerated Idioms and Phrases,
3. Understand the importance & methodology of verbal & non-verbal communication in the medical & health sector.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Introduction and Concepts** | **7** |
| | ● Self- concepts, attitudes, goals and values. | |
| **2** | **Transactional Analysis** | **7** |
| | ● Introduction to transactional analysis -<br>○ ego states,<br>○ types of transactions,<br>○ social time structuring,<br>○ games, stamps,<br>○ rackets,<br>○ strokes and scripts. | |
| **3** | **Personality Development** | **8** |
| | ● Building self- esteem,<br>● Social skills,<br>● Assertiveness<br>● Training and leadership. | |
| **4** | **Communication Skills** | **8** |
| | ● Definition,<br>● Listening, non-listening, verbal and non-verbal communication (body language)<br>● Barriers to communication. | |

## Reference Books


1. Bob Wright, Skills for Caring, Communication Skills, 1992, Churchill Livingston.
2. Prasad L.M.,Principles and practice of Management, Sultan Chand and sons, New Delhi, 1999.
3. Jee Curroie, Bare Foot Councellor, Bangalore.
4. Morgan and King – Introduction to Psychology
5. Briany Thomas (ed) Manual of Dietetic Practice. 1986, Published by British Dietetic Association.

# *Syllabus of Courses of*
# *B.Sc. (Honours) in Integrative Nutrition & Dietetics*
# *at Semester II*

## 9.Yoga and Ethics

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction to Yoga | 6 |
| Module 2 | Yama and Niyama | 6 |
| Module 3 | Asanas | 6 |
| Module 4 | Breathing Exercising | 6 |
| Module 5 | Yoga and Meditation | 6 |
| | **Total** | **30** |

## Course Objectives

1. To understand the fundamentals of Yoga.

## Course Outcome

1. Learn more about different yoga postures and asanas.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction to Yoga** | 6 |
| | ● What is Yoga?<br>● History and Development of Yoga<br>● Fundamentals of Yoga<br>● Traditional Schools of Yoga<br>● Yogic practices of Health and Wellness<br>● General Guidelines for Yoga practice<br>● Food for thought | |
| 2 | **Yama and Niyama** | 6 |
| | ● Yama (Ahimsa, Satya, Asteya, Brahmacharya, Aparigraha)<br>● Niyama (Shauch, Santosh, Tapa, Swadhyaya, Ishwarpranidhan) | |
| 3 | **Asanas** | 6 |
| | ● Standing (Tadasana, Vrikshasana, Pada-Harkasana, Ardha-Chakrasana, Trikonasana)<br>● Sitting (Bhadrasana, Vajrasana, Ushtrasana, Shashankasana, Vakrasana)<br>● Prone (Makarasana, Bhujangasana, Sulabhasana)<br>● Supine (Setu Bandhasana, Uttanapadasana, Pavanamuktasana) | |
| 4 | **Breathing Exercises** | 6 |
| | ● Kapalabhati<br>● Pranayama—Anuloma-Viloma, Shitali, Bhramari | |
| 5 | **Yoga and Meditation** | 6 |
| | ● Prayer<br>● Dhyana<br>● Yoga Geet | |

## Reference Books:


1. Module I, III, IV, V – (As per common yoga protocol for International Day of Yoga) Ministry of AYUSH
2. Module II – (As per Patanjala Yogasutra)
   a. Yoga Sutra with Bhashya (Marathi) – Shri Rele, Prasad Prakashan, Pune
   b. Yoga Sutra with Bhasgya (Hindi) – Darshan Mahavidyalaya, Parsodi, Gujarat
   c. Yogasutra (Marathi) – Shri Kolhatkar, Prasad Prakashan, Pune

# Syllabus and Question Paper Pattern of Courses of

# B.Sc. (Honours) in Integrative Nutrition & Dietetics

## Programme
## Second Year
## *Semester III and IV*

**Under Choice Based Credit, Grading and Semester System**

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester III*

## 1. Introduction to Food Planning

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction to Food planning | 5 |
| Module 2 | Food exchange list | 10 |
| Module 3 | Recommended Dietary Allowance (RDA) | 15 |
| Module 4 | Meal planning | 15 |
| | **Total** | **45** |

## Course Objectives

1. To develop skills in preparation of various food items using five food groups for a day
2. To understand the basic concept of meal management, meal planning for all age groups

## Course Outcome

After successful completion of the course the learner will be able to:

1. Create meal plans for various age groups
2. Gain knowledge about food planning

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Introduction to Food planning** | **15** |
| | ● Introduction to Food planning<br>● Food pyramid and labels- reading of labels,<br>● Standardisation, portion size, mindful eating,<br>● Steps in meal planning | |
| **2** | **Food exchange list** | **15** |
| | ● Food exchange list across all food groups- cereals, pulses, fruits, veggies, dairy, fats, nuts and seeds, .<br>● Coming up with own handy food exchange list to be used while planning,<br>● Practical application of food exchange list in planning | |
| **3** | **Recommended Dietary Allowance (RDA)** | **15** |
| | ● RDA across age groups- for carbohydrates, proteins, fats, and micronutrients like Na, K, Iron, Vit C, B12.<br>● Looking at the requirements across different stages of life and including sources for the same ,<br>● how to derive RDA, its impact in planning | |
| **4** | **Meal Planning** | **15** |
| | ● Meal planning for adult male and female<br>● Planning using food exchange list, calorie and protein and carb counting | |

**Demonstration**

1. Derivation of exchange list
2. Standardisation of different food groups
3. Standardisation of cooked foods
4. Meal planning for average Indian male and female
5. Cooking practicals for average Indian male and female

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester III*

## 2. Food Chemistry

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Physico-chemical properties of foods | 5 |
| Module 2 | Chemistry of Starch and Sugars | 10 |
| Module 3 | Chemistry of Proteins | 15 |
| Module 4 | Chemistry of Fats and Oils, Pectic Substances, Plant Pigments, Spices and condiments | 15 |
| | **Total** | **45** |

## Course Objectives

1. To describe the basic principles and properties of starch proteins, fats and oils, pectic substances and spices and condiments.
2. To gain sufficient knowledge about chemistry of starch proteins, fats and oils, pectic substances
3. To develop products with minimum nutritional loss based on the knowledge of food chemistry

## Course Outcome

After successful completion of the course the learner will be able to:

1. Possess knowledge and understanding of the fundamental principles, concepts and terminology that underpin Human Nutrition through the study of molecular, cellular and physiological processes
2. Acquire knowledge on chemistry pertaining to foods.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Physico-chemical properties of foods** | 5 |
| | ● Moisture in Foods,<br>● Hydrogen Bonding,<br>● Bound Water, Water Activity in Foods,<br>● Determination of Moisture Content in Foods<br>● True Solutions,<br>● Dispersions, Sols, Gels, Foams, Colloids and Emulsions | |
| 2 | **Chemistry of Starch and Sugars** | 10 |
| | ● Components of Starch,<br>● Swelling of Starch Granules,<br>● Gel Formation,<br>● Retrogradation,<br>● Syneresis,<br>● Effect of Sugar,<br>● Acid, Alkali, Fat and Surface Active Agents on Starch,<br>● Stages of Sugar Cookery,<br>● Crystal Formation and factors affecting it.<br>● Types of Candies,<br>● Action of Acid, Alkali and Enzymes,<br>● Chemistry of Milk Sugar,<br>● Non Enzymatic Browning | |
| 3 | **Chemistry of Proteins** | 15 |
| | ● Components of Wheat Proteins, Structure,<br>● Gluten Formation,<br>● Effect of Soaking,<br>● Fermentation and Germination on Pulse Proteins,<br>● Properties of Egg Protein,<br>● Chemistry of Milk Protein,<br>● Changes in Milk, Egg and Meat Proteins during Heating<br>● Action of Heat, Acid, Alkalis on Vegetables Proteins and Animal Proteins | |
| 4 | **Chemistry of Fats and Oils, Pectic Substances, Plant Pigments, Spices and condiments** | 15 |
| | ● Physical and Chemical Properties of Fats and Oils,<br>● Rancidity, Hydrogenation, Winterization, Decomposition of Triglycerides,<br>● Shortening Power of Fats,<br>● Changes in Fats and Oils during Heating ,<br>● Factors Affecting Fat Absorption in Foods, Pectins, Phenolic Components, Enzymatic Browning in Fruits and Vegetables, Volatile Compounds from Cooked | |

| | | |
|---|---|---|
| | Vegetables, Different Types of Plant Pigments – Water and Fat Soluble Pigments. Properties and Active Principles of Spices and Condiments | |

## Reference Books


1. Shakuntala Manay, Shadaksharaswamy. M (2000) Foods, Facts and Principles, New Age International Pvt Ltd Publishers, 2nd Edition
2. Chandrasekhar, U. Food Science and applications in Indian Cookery (2002) Phoenix Publishing House, New Delhi
3. Swaminathan, M. Food Science, (2005) Chemistry and Experimental Foods, Bappco Publishers, Bangalore.
4. Meyer, L.H, Food Chemistry, (2004) CBS Publishers and Distributors, 4th edition
5. Paul, P.C. and Palmer, H.H. Food Theory and Applications( 2000) John Wiley and Sons, New York, (Revised Edition)
6. Chopra H.K, Panesar, P.S, Food Chemistry (2010) Narosa Publishing House, New Delhi

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester III*

## 3. Physiology - II

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Respiratory System | 15 |
| Module 2 | Reproductive System | 15 |
| Module 3 | Urinary System | 15 |
| Module 4 | Endocrine and Exocrine | 15 |
| | **Total** | **60** |

## Course Objectives

1. The various systems in the human body and their functioning
2. The mechanism and complications in various systems.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the functions of respiratory, reproductive, urinary and Endocrine & Exocrine Systems.
2. Understand the physiological processes and functions as applicable to human nutrition.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Respiratory System** | **15** |
| | ● Respiratory- anatomy, pulmonary ventilation, lung volume and capacity, exchange of gases, transport of gases,<br>● Control of respiration ,<br>● Development of the respiratory system,<br>● Aging and Respiratory system | |
| 2 | **Reproductive System** | **15** |
| | ● Male reproductive system - anatomy, spermatogenesis, hormonal control of testes , reproductive system ducts in males accessory sex gland ,<br>● Female reproductive system - Anatomy , structure and function, female reproductive cycle,<br>● Development of reproductive system,<br>● Aging and Reproductive system | |
| 3 | **Urinary System** | **15** |
| | ● Urinary System- anatomy and histology of kidneys ,<br>● Overview of renal physiology, tubular reabsorption and tubular secretion,<br>● Production of dilute and concentrated urine, urine transportation, storage and elimination,<br>● Aging and Urinary system . | |
| 4 | **Endocrine and Exocrine** | **15** |
| | ● Endocrine and Exocrine- Definition, difference , physiology, endocrine glands, role of hormone receptor, endocrine glands, hormonal activity, hypothalamus, pituitary, thyroid gland , parathyroid glands, adrenal glands, pancreatic islets | |

## Reference Books


1. Meyer B J, Meij H S and Meyer A C., Human Physiology, AITBS Publishers and Distributors.
2. Wilson, K.J.W and Waugh, A. (1996): Ross and Wilson, Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
3. Ranganathan, T.S. (2004): A Textbook of Human Anatomy, Chand & Co. N. Delhi.
4. Jain, A.K., Textbook of Physiology, Vol. I and II, Avichal Publishing Co., New Delhi.
5. Chatterjee C.C. (1987): Human Physiology, Vol. I & II, Medical Allied Agency, Calcutta.
6. Guyton, A.G. and Hall, J.B. (1996): Text Book of Medical Physiology, (9th Edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester III*

## 4. Food Processing & Preservation - I

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction to food processing and preservation | 5 |
| Module 2 | Food Spoilage | 10 |
| Module 3 | Processing of cereals and millets | 15 |
| Module 4 | Processing of milk and milk products | 15 |
| | **Total** | **45** |

## Course Objectives

1. To gain knowledge in food processing and food conservation
2. To understand the principles of food processing
3. To understand the food processing techniques of various food groups
4. To learn the suitable methods of preservation with special reference to our country.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of food processing & preservation, food spoilage.
2. Understand the properties of various food components.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction to food processing and preservation** | 15 |
| | ● Nature and properties of food, fluid and visco elastic behavior of foods,<br>● Principles of different food processing.<br>● Effect of food processing on nutritional properties of food.<br>● Importance of food processing | |
| 2 | **Food Spoilage** | 15 |
| | ● Types of Spoilage and organisms causing food spoilage-<br>● The environment conducive for their growth,<br>● How to identify spoilage and prevention techniques,<br>● Basic Principles of Food Preservation,<br>● Preservation at high and low temperatures,<br>● Preservation-<br>○ Using Different natural preservatives like sugar,salt and oils,<br>○ Using osmotic pressure,<br>○ By dehydration | |
| 3 | **Processing of cereals and millets** | 15 |
| | ● Milling products and by products of wheat, rice, corn, barley, oats, whole wheat atta, blended flour, fortified flour, flaked, puffed and popped cereals, malted cereals,<br>● Processed foods - bakery products, pasta products and value added products. | |
| 4 | **Processing of milk and milk products** | 15 |
| | ● Milk – manufacture of different types of milk, drying of whole and skim milk, cream separation, churning of butter, processing of different types of cheese,<br>● Probiotic milk products - yoghurt, curd and ice-cream,<br>● Indigenous milk products - khoa, burfi, paneer, ghee<br>● Physical and Chemical Properties of Fats and Oils,<br>● Rancidity, Hydrogenation, Winterization, Decomposition of Triglycerides,<br>● Shortening Power of Fats,<br>● Changes in Fats and Oils during Heating ,<br>● Factors Affecting Fat Absorption in Foods, Pectins, Phenolic Components, Enzymatic Browning in Fruits and Vegetables, Volatile Compounds from Cooked Vegetables, | |

| | | |
|---|---|---|
| | ● Different Types of Plant Pigments – Water and Fat Soluble Pigments. Properties and Active Principles of Spices and Condiments | |

## Demonstration –

1. Determination of adulterants in milk, chilli, coffee, ghee, wheat flour, coriander seed powder, turmeric, oil
2. Qualitative estimation of Carbohydrates
3. Qualitative estimation of Proteins
4. Qualitative estimation of Fats
5. Preservation using natural sources- salt, sugar, oil and techniques- heat, sundried, low temperature

## Reference Books


1. Shakuntala Manay, N. and Shadaksharaswamy, M., Foods – Facts and Principles, New Age International (P) Limited Publishers, New Delhi, 2003.
2. Sivasankar B, Food Processing and Preservation, Prentice – Hall of India Private Ltd., New Delhi, 2002.
3. Bawa AS, Raju PS, Chauhan OP, Food Science, New India Publishing Agency, New Delhi, 2013.
4. Srilakshmi, N., Food Science, New Age International Private Ltd., New Delhi, 2002.
5. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2004.
6. Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2002
7. Fellow, P., Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England, 2009.
8. Adams, M.R. and Moss, M.O., Food Microbiology, New Age International (P) Ltd., New Delhi, 2005.

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester III*

# *4.Marketing Fundamentals*

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction to Marketing | 12 |
| Module 2 | Marketing Environment | 12 |
| Module 3 | Segmentation, Target Marketing and Positioning | 12 |
| Module 4 | Consumer Behaviour | 12 |
| Module 5 | Marketing Mix | 12 |
| | **Total** | **60** |

## Course Objectives

1. To Understand the strategies and principles of Marketing and utilize it constructively.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Recall and Reproduce the various concepts, principles, frameworks and terms related to the function and role of marketing.
2. Demonstrate the relevance of marketing management concepts and frameworks to a new or existing business across a wide variety of sectors and Illustrate the role that marketing plays in the 'tool kit' of every organizational leader and manager.
3. Apply marketing principles and theories to the demands of marketing function and practice in contemporary real world scenarios
4. Examine and List marketing issues pertaining to segmentation, targeting and positioning, marketing environmental forces, consumer buying behavior, marketing mix and Product Life Cycle in the context of real world marketing offering (commodities, goods, services, e-products/ e-services).

5. Explain the interrelationships between segmentation, targeting and positioning, marketing environment, consumer buying behavior, marketing mix and Product Life Cycle with real world examples.
6. Discuss alternative approaches to segmentation, targeting and positioning, the marketing environment, consumer buying behavior, marketing mix and Product Life Cycle in the context of real world marketing offering (commodities, goods, services, e-products/ e-services).

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Introduction to Marketing** | **12** |
| | Definition & Functions of Marketing- Scope of Marketing, Evolution of Marketing, Core concepts of marketing – Need, Want, Demand, Customer Value, Exchange, Customer Satisfaction, Customer Delight, Customer loyalty, Concepts of Markets, Marketing V/S Market Competition, Key customer markets, market places, market spaces, Meta-markets, Digital Markets, Brick & Click Model. Impact of Globalization, Technology and Social Responsibility on Marketing. New Consumer Capabilities, New Company Capabilities. Functions of Marketing Manager. Linkage of Marketing functions with all functions in the organization. Company orientation towards market place: Product – Production - Sales – Marketing –Societal – Relational, Holistic Marketing Orientation. Selling versus marketing. Concept of Marketing Myopia. Marketing Process, Understanding Marketing as Creating, Communicating, and Delivering Value | |
| **2** | **Marketing Environment** | **12** |
| | Concept of Environment, Macro Environment & Micro Environment – Components and characteristics, Needs & Trends, Major forces impacting the Macro Environment & Micro Environment, Need for analyzing the Marketing Environment. Analyzing the Political, Economic, Socio-cultural, Technical and Legal Environment. Demographics | |
| **3** | **Segmentation, Target Marketing and Positioning** | **12** |

| | | |
|---|---|---|
| | Segmentation - Concept, Need & Benefits. Geographic, Demographic, Psychographic, Behavioural bases of segmentation for consumer goods and services. Bases for segmentation for business markets. Levels of segmentation, Criteria for effective segmentation. Market Potential & Market Share. Target Market - Concept of Target Markets and criteria for selection. Segment Marketing, Niche & Local Marketing, Mass marketing, Long Tail Marketing. Positioning - Concept of differentiation & positioning, Value Proposition & Unique Selling Proposition. | |
| **4** | **Consumer Behavior** | **12** |
| | Meaning & importance of consumer behavior, Comparison between Organizational Buying behavior and consumer buying behavior, Buying roles, Five steps consumer buyer decision process – Problem Recognition, Information Search, Evaluation of Alternatives, Purchase Decision, Post Purchase behavior. Moment of Truth, Zero Moment of Truth, ZMOT, Moderating effects on consumer behavior. | |
| **5** | **Marketing Mix** | **12** |
| | Origin & Concept of Marketing Mix, 7P's - Product, Price, Place, Promotion, People, Process, Physical evidence. Product Life Cycle: Concept & characteristics of Product Life Cycle (PLC), Relevance of PLC, Types of PLC and Strategies across stages of the PLC. | |

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester III*

## 5. Communication and Counselling Skills - II
## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Nutrition Counselling | 7 |
| Module 2 | Processes involved in dietary counselling | 7 |
| Module 3 | Counseling through the lifespan | 8 |
| Module 4 | Practical experience | 8 |
| | **Total** | **30** |

## Course Objectives

1. To understand the influence of counseling on disease management and identify components of counselling skills and to provide skills of counselling for specific disease conditions.
2. Able to provide nutrition counseling and education to individuals and groups using a variety of communication strategies.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Gain knowledge on the basics of communication strategies and best suited methods of communicating with individuals to select appropriate strategies presented with dietary
   problems
2. Understand the importance of BCC in managing nutrition related problems
3. Draw out a complete counseling plan for individuals based on their physiological conditions using the appropriate tools
4. Understand how best to maintain adherence to changed dietary practices for specific physiological conditions
5. Gain knowledge on traditional and alternative methods to manage disorders

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Nutrition Counselling** | 7 |
| | ● Concept and importance of counseling in the nutrition care process<br>● Understanding dietary patterns and food choices and their impact on counseling<br>● Behaviour Change Communication and Models for behaviour change<br>● Counseling strategies<br>● Factors to be considered for counseling<br>● Conventional and non-conventional tools in counseling | |
| 2 | **Processes involved in dietary counselling** | 7 |
| | ● Managing resources of the communicator/counselor<br>● Designing of counseling plans – goals & objectives, evaluation instruments.<br>● Implementation: facilitating self-management of disease condition<br>● Evaluation: evaluating adherence to dietary changes<br>● Counseling approaches after evaluation | |
| 3 | **Counseling through the lifespan** | 8 |
| | Considerations for counseling plans for:<br>● Prenatal and pregnant women<br>● Lactating women<br>● Childhood nutrition problems like - SAM, weight management, vitamin and mineral deficiencies<br>● School children, adolescents, young adults<br>● fitness, weight management, eating disorders<br>● Managing diet related chronic diseases in adults:<br>● Obesity & Diabetes<br>● Dyslipidemia & Hypertension<br>● Cancer risk prevention<br>● Renal disease & Liver disorders<br>● Geriatric counseling | |
| 4 | **Practical experience** | 8 |
| | Practical experience in personal counseling and diet counselling | |

## Reference Books


1. Mahan, L. K. and Escott Stump. S. (2016) Krause's Food & Nutrition Therapy 14th ed. Saunders-Elsevier
2. Snetselaar L. (2009). Nutrition Counseling Skills for the Nutrition Care Process. Fourth

Ed. Sudbury, Massachusetts: Jones Bartlett Publishers.
3. Holli B Betsy and Beto A Judith. (2014). Nutrition Counseling and Education Skills for Dietetics Professionals. Sixth edition. USA: Lippincot Williams and Wilkins; Wolters Kluwer.
4. Gable J. (2016). Counseling Skills for dietitians. Florida, USA: JohnWiley and Sons.
5. Midwinter R and Dickson J.(2015). Embedding Counseling and Communication Skills. A Relational Skills Model. Routledge 2015
6. Devito Joseph A. (2015) Human Communication: The Basic Course. New York:Pearson
7. King K and Klawitter B.(2007). Nutrition Therapy. Advanced Counseling Skills. Third Edition. Philadelphia, USA: Lippincot Williams and Wilkins; Wolters Kluwer. 2007
8. http://www.fao.org/docrep/X2550E/X2550e04.htm

# *Syllabus of Courses of*

# *B.Sc. (Honours) in Integrative Nutrition & Dietetics at Semester III*

## 6. Information & Communication Technology

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Office Automation using MS-Office – I | 7 |
| Module 2 | Office Automation using MS-Office – II | 8 |
| Module 3 | Email, Internet and its Applications -I | 7 |
| Module 4 | Email, Internet and its Applications -II | 8 |
| | **Total** | **30** |

## Course Objectives

1. Analyze the importance of use of technology as a professional
2. Understand the utility of Ms Office, Email, Internet and its applications

## Course Outcome

After successful completion of the course the learner will be able to:

1. Accomplish basic computer concepts knowledge.
2. Acquire knowledge of Communication Process and Communication Media.
3. Learn various functions available in Ms-Excel.
4. Understand the basic guidelines of email writing.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Office Automation using MS-Office - I** | **7** |
| | ● Learn Word:<br>○ Creating/Saving of Document,<br>○ Editing and Formatting Features,<br>○ Designing a title page,<br>○ Preparing Index,<br>○ Use of SmartArt, Bookmark and Hyperlink.<br>○ Mail Merge Feature. | |
| **2** | **Office Automation using MS-Office - II** | **8** |
| | ● Spreadsheet application (e.g. MS-Excel)<br>○ Creating/Saving and editing spreadsheets<br>○ Drawing charts.<br>○ Using Basic Functions: text, math & trig, statistical, date & time, database, financial, logical<br>● Using Advanced Functions : Use of VLookup/HLookup,<br>● Data analysis –<br>○ Sorting data, filtering data (AutoFilter , Advanced Filter),<br>○ Data validation,<br>○ What-if analysis (using data tables/scenarios), creating subtotals and grand totals, pivot table/chart, goal seek/solver | |
| **3** | **Email, Internet and its Applications -I** | **7** |
| | ● Introduction to Email Writing, professional emails Creating digitally signed documents.<br>● Use of Outlook : Configuring Outlook, Creating and Managing profile in outlook, Sending and Receiving Emails through outlook<br>● Introduction to Bulk Email software | |
| **4** | **Email, Internet and its Applications -II** | **8** |
| | ● Concepts of Internet, Intranet, Extranet<br>● Networking Basics, Different types of networks.<br>● Concepts (Hubs, Bridges, Routers, IP addresses) Study of LAN, MAN, WAN<br>● DNS Basics. Domain Name Registration, Hosting Basics. | |

## Reference Books

1. Information Technology for Management, 6TH ED (With CD ) By Efraim Turban,

Dorothy Leidner, Ephraim Mclean, James Wetherbe (Ch1, Ch2)
2. Microsoft Office Professional 2013 Step by Step By Beth Melton, Mark Dodge, Echo Swinford, Andrew Couch
3. Tata McGraw Hill Joseph, P.T. : E-commerce An Indian Perspective (Ch-13,Ch-14)
4. Computer Viruses and Related Threats: A Management Guide (Ch-2, Ch-3) By John P.Wack, Lisa J. Carnahan

Electronic Commerce - Technologies & Applications. Bharat, Bhaskar

# *Syllabus of Courses of*

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## 7. Sanskrit/Allied/other related course

- Vedic Sukta of concord Samjnanasukta
- Ten verses describing rainy season from Ramayana
- Selected verses from the second chapter of Bhagavadgeeta
- Twenty verses from Raghuvamsha by Kalidasa (Canto I.1-20)
- Ashtapadi by Jayadev
- Ten chitrashlok verses
- Ten verses related to health from Ayurveda 8) Fifteen verses from modern Sanskrit literature – Vainayakam

**OR**

## Selling Skills

Module 1-Basics of Selling
Module 2- Sales Conversation
Module 3-Negotiation
Module 4-Closure

# *Syllabus of Courses of*

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## 8. Industry Engagement/Internship

## Modules at a Glance

### Course Objective

1. To provide basic and hands on understanding of the industry.
2. To understand the professional setting and work culture of nutrition related organizations.
3. To get a first-hand experience of the career opportunities in the Food and Nutrition industry.
4. To get on the job training and skill enhancement in the Health and Nutrition sector.

Each student shall undergo an Internship of four weeks approx. during the vacations after Second semester in areas like Food industries, health centre's, hospitals, Gyms, FMCG Companies, Pharma Company's , Health Café,or any other business. The objective of this training is to make the students acquainted with the industrial / business working environment. After completion of the training they will have to submit a training report. The internship/project reports will carry 100 marks. It will be evaluated by the examiner. The training report is part of the third semester. It is to be submitted by the date fixed by the College.

The students will also have to submit a performance certificate from the company where he/she undertook the training. This report will also be considered while evaluating the training report by examiners. Alternatively, if it is not possible to do an industrial internship the students will prepare a project report on a topic assigned to him/ her by the college.

This allows students to undertake experiential learning by working with the Health and Nutrition organization to critically examine a major aspect of their operation.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester IV*

## 1. Fundamentals of Biochemistry

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Different Types of Carbohydrate | 5 |
| Module 2 | Building Blocks | 10 |
| Module 3 | Fats | 15 |
| Module 4 | Structure of Purine and pyrimidine nucleotides | 15 |
| | **Total** | **45** |

## Course Objectives

1. To understand the basic concepts of biochemistry
2. To gain knowledge on the metabolism of carbohydrate protein and lipids

## Course Outcome

After successful completion of the course the learner will be able to:

1. Possess knowledge and understanding of the fundamental principles, concepts and terminology that underpin Human Nutrition through the study of molecular, cellular and physiological processes.
2. Understand the fundamentals and principles of biochemistry.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Different Types of Carbohydrate** | **15** |
| | ● Monosaccharides: types, characteristics and properties;<br>● Disaccharides, oligosaccharides, polysaccharides – biological significance,<br>● Carbohydrate metabolism in Human body and different Metabolic Pathway<br>● Metabolic Pathway - Glycolysis, TCA cycle, HMP shunt, Glyoxylate cycle.<br>● Biosynthesis of carbs from fats and amino acids | |
| 2 | **Building Blocks** | **15** |
| | ● Composition of proteins, protein formation, Different peptide bond<br>● Amino acids: classification, structure, properties,<br>● Determination of N- and C- terminal amino acids,<br>● Protein functions.<br>● Metabolism – Synthesis of protein and metabolism of amino acids | |
| 3 | **Fats** | **15** |
| | ● Classification, structure, properties; biological significance.<br>● Electron transport and oxidative phosphorylation, redox potential, ATP and significance<br>● Lipid metabolism – metabolism of fatty acids, Biosynthesis of fatty acids . | |
| 4 | **Purine and pyrimidine nucleotides** | **15** |
| | ● Types of nucleotides- Its structure and functions and its biosynthesis. Types of Nucleic acid its structure and function<br>● classification and function of enzymes, factors affecting enzyme activity, | |

## Reference Books


1. Varley, H., Gowenlak, A.H. and Hill, M. Practical Clinical Biochemistry, William Itinmaon Medical Books, London, 2000.
2. Oser, B.L., Harke's Physiological Chemistry XIV Edition Tata McGraw Hill Publishing Company Ltd., Bombay, 2001
3. Sadasivam, S. and Manickam, A. Biochemical Method, Second Edition, New Age International P. Ltd., Publishers, New Delhi, 2003.
4. Raghuramulu, N., Madhavannair, K. and Kalyana Sundaram, National Institute of Nutrition, 2003, A Manual of Laboratory Techniques, Hyderabad, 500007.

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester IV*

## 2. Clinical Biochemistry

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Blood Sugar | 15 |
| Module 2 | Blood Lipids & Plasma Protein | 15 |
| Module 3 | Gastric Disorders | 15 |
| Module 4 | Urine | 15 |
| | **Total** | **60** |

## Course Objectives

1. To study different tests for diseases.
2. To know the biochemical composition of blood and different parts of the body.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the biological processes and systems applicable to human nutrition.
2. Understand the principles of biochemistry.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Blood Sugar** | **15** |
| | ● Level of blood glucose – glucose in normal conditions, Maintenance of blood glucose level,<br>● Inborn errors of Carbohydrate metabolism – Ketosis, Diabetic Coma, pentosuria, Galactosemia, Glycosuria and glucose 6 – phosphate,<br>● Glycogen storage diseases | |
| **2** | **Blood Lipids & Plasma Protein** | **15** |
| | ● Types and level of lipids in blood. Hyper and hypo lipidemia<br>● Inborn errors of fat metabolism,<br>● Determination of serum cholesterol,<br>● Plasma – Functions and determination of total plasma proteins,<br>● Inborn errors of amino acids metabolism – Phenyl ketonuria, Albiminism, Alkaptonuria and Maple syrup diseases. | |
| **3** | **Gastric Disorders** | **15** |
| | ● Bile Salt – Functions, formations of bile acids and bile salts,bile pigments from haemoglobin.<br>● Test for liver function. | |
| **4** | **Urine** | **15** |
| | ● Urine examination – their significance in health and disease,<br>● Test for kidney function, creatinine clearance test, urea clearance,insulin clearance, Dye test, dilution test, and dialysis. | |

**Practical**

1. Estimation of blood glucose - GOD. POd method
2. Estimation of serum SGOT, SGPT
3. Estimation of Bilirubin
4. Estimation of sugar in blood
5. Estimation of ketones in urine

## Reference Books


1. Lehninger,A.L,(2000) Biochemistry worth publishers INC New York.
2. Ambiga Shanmugam, (2002) Fundamentals of biochemistry for Medical students, Karthik printers.
3. Nutritional Biochemistry 2nd edition Tom Bridt, Academic press 2006.
4. Powar and Chatwal, Biochemistry, Himalaya publishing house,2000.
5. Rangantha Rao, K, Textbook of Biochemistry, prentice Hall of India New Delhi, (2000)

# *Syllabus of Courses of*

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## 3. Physiology-III

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Sensory Organs and Sensory System | 15 |
| Module 2 | Fluid Electrolyte Balance | 15 |
| Module 3 | Nervous System | 15 |
| Module 4 | Brain and Spine | 15 |
| | **Total** | **60** |

## Course Objectives

1. Understand the various organ systems and their roles in the human body
2. Understand the disorders and the cause in various body parts.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of sensory organs & nervous system.
2. Understand the role and functions of important systems in the human body.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Sensory Organs and Sensory System** | 15 |
| | ● Sensory organs and sensory system- olfaction -<br>● Sense of smell: Anatomy , physiology , olfactory pathway,<br>● Gustation - sense of taste- anatomy of taste buds, physiology of gustation,<br>● Vision : hearing equilibrium, anatomy of the ear, structure function, physiology and equilibrium pathways ,<br>● Ageing and special senses | |
| 2 | **Fluid Electrolyte Balance** | 15 |
| | ● Fluid electrolyte balance- Fluid components and fluid balance,<br>● Source of body water gain and loss, its regulation<br>● Electrolytes in body fluid, concentrations, sodium potassium calcium magnesium, bicarbonates, acid base<br>● Balance action of buffer system, | |
| 3 | **Nervous System** | 15 |
| | ● Nervous system- overview of nervous system ,<br>● Structure and functions ,<br>● Organisations of nervous system;<br>● Central and Peripheral Nervous system ,<br>● Electrical signals in neurons,<br>● Signal transmission,<br>● Disorders | |
| 4 | **Brain and Spine** | 15 |
| | ● Spinal cord<br>○ Anatomy,<br>○ Spinal nerves ,<br>○ Spinal cord physiology,<br>● Brain<br>○ Brain organisation protection and blood supply<br>○ Cerebrospinal fluid,<br>○ Brain stem,<br>○ Cerebellum,<br>○ Functional organisation of cerebral cortex,<br>● Disorders | |

## Reference Books

1. Meyer B J, Meij H S and Meyer A C., Human Physiology, AITBS Publishers and Distributors.

2. Wilson, K.J.W and Waugh, A. (1996): Ross and Wilson, Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
3. Ranganathan, T.S. (2004): A Textbook of Human Anatomy, Chand & Co. N. Delhi.
4. Jain, A.K., Textbook of Physiology, Vol. I and II, Avichal Publishing Co., New Delhi.
5. Chatterjee C.C. (1987): Human Physiology, Vol. I & II, Medical Allied Agency, Calcutta.

Guyton, A.G. and Hall, J.B. (1996): Text Book of Medical Physiology, (9th Edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

# *Syllabus of Courses of*

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## 4. Nutrition across Lifecycle

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Preconception and Pregnancy | 15 |
| Module 2 | Infancy, childhood | 15 |
| Module 3 | Adolescence | 15 |
| Module 4 | Nutrition in Old Age | 15 |
| | **Total** | **60** |

## Course Objectives

1. To understand growth and development and nutritional requirements during pregnancy and lactation to promote healthy living in the community
2. To know about growth and development and nutritional requirement of school going children and adolescents
3. To acquire the knowledge on growth and development and nutritional requirement during infancy and preschool age
4. To understand the basics of Geriatrics, Physical and physiological changes

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the nutritional requirements of adults.
2. Understand the nutritional needs during pregnancy and lactation.
3. Understand the effects of ageing and life expectancy.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Preconception and Pregnancy** | **15** |
| | ● Preconception and Pregnancy, lactation<br>● Challenges faced during preconception,<br>● Nutrients of importance during all 3 phases,<br>● Physiological changes occuring during pregnancy and lactation, | |
| 2 | **Infancy, childhood** | **15** |
| | Infancy, childhood<br>● RDA during these phases,<br>● Physiological changes,<br>● Nutrients of importance - calcium, iron,<br>● vitamins of interest- vit B, A, C, D during infancy and childhood | |
| 3 | **Adolescence** | **15** |
| | ● Physiological changes,<br>● Anemia (during period),<br>● Hormonal changes,<br>● Development of sec sexual characters- boys and girls,<br>● Nutrients of importance- proteins , calcium , iron fats<br>● Vitamins of interest , like ADC, Bcomplex etc during these conditions | |
| 4 | **Nutrition in Old Age** | **15** |
| | ● Geriatric nutrition - Physiological changes, RDA ,<br>● Nutrients of importance,<br>● Common diseases during this phase-<br>● Introduction to Parkinsons and Alzheimers,<br>● Postural changes | |

**Exercises**

1. Meal planning (2 hours weekly)
    - Preconception
    - Pregnancy- trimester I II and III
    - Lactation
    - Weaning and infants
    - Kids
    - Adolescent - both boys and girls
    - Meal planning for geriatrics
2. Cooking practicals - for all the meals planned

## Reference Books

1. Rajammal P. Devadas and Jaya N.Muthu, (1996): A text book of Child Development,

Macmillan, N.Delhi.
2. Hurlock E.B., (1972): Child development, McGraw Hill Book Company.
3. Suriakanthi A., (1997): Child Development - An Introduction, Kavitha Publishers.
4. Hurlock,E.B., (1995): Developmental Psychology-A life span approach, 5th Edition, McGraw Hill Book Co., New York.
5. Nanda V.K., (1998): Principles of Child Development, Anmol Publications Pvt. Ltd., New Delhi.

Berk L.E., (2004): Child Development, Pearson Longman New Delhi.

# *Syllabus of Courses of*
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## 5. Food Processing And Preservation -II (Practicals )

## Modules at a Glance

### Industrial Visits and report writing

1. Visit to Food processing unit
2. Visit to food industry

### Course Objectives

1. To examine the different preservation techniques used in the industry
2. To understand food adulteration and international standards
3. To understand different forms of food packaging

### Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of food processing & preservation.
2. Understand the basic principles of food processing and food preservation.

### Reference Books


1. Shakuntala Manay, N. and Shadaksharaswamy, M., Foods – Facts and Principles, New Age International (P) Limited Publishers, New Delhi, 2003.
2. Sivasankar B, Food Processing and Preservation, Prentice – Hall of India Private Ltd., New Delhi, 2002.
3. Bawa AS, Raju PS, Chauhan OP, Food Science, New India Publishing Agency, New Delhi, 2013.
4. Srilakshmi, N., Food Science, New Age International Private Ltd., New Delhi, 2002.
5. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2004.
6. Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2002
7. Fellow, P., Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England, 2009.

## 6.Nutrition across Lifecycle (Practicals)

### Practicals

1. Meal planning (2 hours weekly)
    - Preconception
    - Pregnancy- trimester I II and III
    - Lactation
    - Weaning and infants
    - Kids
    - Adolescent - both boys and girls
    - Meal planning for geriatrics
2. Cooking practicals - for all the meals planned

### Course Objectives

1. To understand growth and development and nutritional requirements during pregnancy and lactation to promote healthy living in the community
2. To know about growth and development and nutritional requirement of school going children and adolescents
3. To acquire the knowledge on growth and development and nutritional requirement during infancy and preschool age
4. To understand the basics of Geriatrics, Physical and physiological changes

### Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the dietary patterns across various stages of life.
2. Understand the principles of meal planning for different health conditions.

### Reference Books

1 Rajammal P. Devadas and Jaya N.Muthu, (1996): A text book of Child Development, Macmillan, N.Delhi.

2 Hurlock E.B., (1972): Child development, McGraw Hill Book Company.

3. Suriakanthi A., (1997): Child Development - An Introduction, Kavitha Publishers.
4. Hurlock,E.B., (1995): Developmental Psychology-A life span approach, 5th Edition, McGraw Hill Book Co., New York.
5. Nanda V.K., (1998): Principles of Child Development, Anmol Publications Pvt. Ltd., New Delhi.
6. Berk L.E., (2004): Child Development, Pearson Longman New Delhi.

# *Syllabus of Courses of*
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## 7. Food Processing And Preservation -II

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Preservation by the Use of Low and High Temperature | 15 |
| Module 2 | Preservation by Using Sugar Concentrates, preservatives and fermentation | 15 |
| Module 3 | Food adulteration and packaging | 15 |
| Module 4 | Food additives and fortification | 15 |
| | **Total** | **60** |

## Course Objectives

1. To examine the different preservation techniques used in the industry
2. To understand food adulteration and international standards
3. To understand different forms of food packaging

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of food processing & preservation.
2. Understand the basic underlying principles of food processing and food preservation.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Preservation by the Use of Low and High Temperature** | 15 |
| | ● Preservation by the Use of Low temperature-<br>○ Refrigeration,<br>○ freezing,<br>○ Refrigeration Advantages,<br>○ Methods of Freezing,<br>○ Freeze drying and freeze concentration,<br>● Preservation by the Use of High Temperature -<br>○ Drying,<br>○ Dehydration,<br>○ Sun Drying and Dehydration,<br>○ Mechanical Dehydration,<br>○ Spray drying,<br>○ Canning,<br>○ Pasteurization and Sterilization | |
| 2 | **Preservation by Using Sugar Concentrates, preservatives and fermentation** | 15 |
| | ● Sugar Concentrates – Principles of Gel Formation,<br>● Chemical Preservatives –<br>○ Definition,<br>○ Role of Preservation<br>○ Types of preservatives,<br>○ Ill effects on the nutritional status of the body,<br>○ Ill effects on nerve conduction ,<br>○ Its impact on hormone,<br>○ Permitted Preservatives,<br>● FPO Specification,<br>○ Types of Fermentation,<br>○ Common Fermented Foods,<br>○ Wine making | |
| 3 | **Food adulteration and packaging** | 15 |
| | ● Food adulteration-<br>○ Types of adulterants- saw dust, starch, chicory,<br>○ Intentional adulteration- arsenic, chicory,<br>○ incidental adulterants- by pesticides, rodents etc, | |

| | | |
|---|---|---|
| | ○ Food loss, Food standardisation and regulation,<br>○ International standards,<br>● Food packaging-<br>○ Function, definition,<br>○ Classification,<br>○ Types of packaging,<br>○ Packaging of specific foods,<br>○ Points to be considered before deciding packaging system,<br>○ Materials used for packaging ,<br>○ Pros and cons of the packaging materials,<br>○ Laws related to packaging | |
| **4** | **Food additives and fortification** | **15** |
| | ● Food Additives -<br>○ Food colors, stabilisers, emulsifiers, flavouring agents, artificial sweeteners-<br>○ Along with its side effects and government regulations,<br>● Fortification-<br>○ Definition,<br>○ Pros and cons of fortification,<br>○ Different products which are fortified,<br>○ Guidelines on food fortification,<br>○ It's on gut and brain/ neurons | |

**Industrial Visits and report writing**

1. Visit to Food processing unit
2. Visit to food industry

## Reference Books


1. Shakuntala Manay, N. and Shadaksharaswamy, M., Foods – Facts and Principles, New Age International (P) Limited Publishers, New Delhi, 2003.
2. Sivasankar B, Food Processing and Preservation, Prentice – Hall of India Private Ltd., New Delhi, 2002.
3. Bawa AS, Raju PS, Chauhan OP, Food Science, New India Publishing Agency, New Delhi, 2013.
4. Srilakshmi, N., Food Science, New Age International Private Ltd., New Delhi, 2002.
5. Swaminathan, M., Food Science, Chemistry and Experimental Foods, Bappco Publishers, Bangalore, 2004.
6. Chandrasekhar, U, Food Science and Applications in Indian Cookery, Phoenix Publishing House Private Ltd., New Delhi, 2002
7. Fellow, P., Food Processing Technology – Principles and Practices, 3rd Edition, CRC Press Woodland Publishers, England, 2009.
8. Adams, M.R. and Moss, M.O., Food Microbiology, New Age International (P) Ltd., New Delhi, 2005.

# 6. *Syllabus of Courses of B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester IV*

## 7. Introduction to Accounts & Finance

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction | 11 |
| Module 2 | Accounting Transactions | 11 |
| Module 3 | Introduction to Final Accounts | 11 |
| Module 4 | Ratio analysis and Interpretation | 12 |
| | **Total** | **45** |

## Course Objectives

1. To understand the mechanics of accounting.
2. To learn combine practice and theoretical knowledge of financial accounting.
3. To gain knowledge on the detailed understanding of the accounting information system, accounting concepts, accounting principles, accounting cycle and financial statement concepts.

## Course Outcome

After successful completion of the course the learner will be able to

1. Analyze financial statements.
2. Prepare a balance sheet, income statement etc
3. Develop decision making skills in the financial analysis context

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction** | 11 |
| | ● Meaning and Scope of Accounting: Need and development, definition: Book-Keeping and accounting, Persons interested in accounting, Branches of accounting, Objectives of accounting.<br>● Accounting principles: Introductions to Concepts and conventions.<br>● Accounting in Computerized Environment: Introduction, Features and application in various areas of Accounting,<br>● Sources of Finance - Short Term/Long Term, Domestic / Foreign, Equity/Borrowings/Mixed etc. | |
| 2 | **Accounting Transactions** | 11 |
| | ● Accounting transactions: Accounting cycle, Journal, Journal proper, Opening and closing entries, Relationship between journal & ledger: Rules regarding posting: Trial balance: Subsidiary books (Purchase, Purchase Returns, Sales, Sales Returns & cash book –Triple Column), Bank Reconciliation Statement.<br>● Expenditure: Classification of Expenditure- Capital, revenue and Deferred Revenue expenditure Unusual expenses: Effects of error: Criteria test.<br>● Receipts: Capital receipt, Revenue receipt, distinction between capital receipts and revenue receipts.<br>● Profit or Loss: Revenue profit or loss, capital profit or loss<br>● Invoices, Raising and invoice, Payment of Invoice | |
| 3 | **Introduction to Final Accounts** | 11 |
| | ● Introduction to Trading Account, Profit and Loss Account and Balance Sheet.<br>● Introduction to Vertical Form of Balance Sheet and Profit & Loss A/c-Trend Analysis, Comparative Statement & Common Size. | |
| 4 | **Ratio analysis and Interpretation** | 12 |
| | ● Ratio analysis and Interpretation (based on vertical form of financial statements) including conventional and functional classification restricted to: Balance sheet ratios- Revenue statement ratios - Combined ratios - Different modes of expressing ratios:-Rate, Ratio, Percentage, Number. Limitations of the use of Ratios | |

## Reference Books:


1. Advanced Accountancy - R.L.Gupta and Radhaswamy
2. Management Accounting - Brown and Howard
3. Management Accounting - Khan and Jain
4. Management Accounting - S.N. Maheswari
5. Management Accounting - Antony and Rececе 6. Management Accounting - J.Batty
6. Cost Accounting Fundamentals: Essential Concepts and Examples (3rd Edition) Steven M. Bragg (Author)
7. Cost Accounting and Management Essentials You… (Paperback) by Vibrant Publishers, KalpeshAshar
8. Time-Driven Activity-Based Costing: A Simpler by Robert S. Kaplan, Steven R. Anderson
9. Event Production - The Process
10. Successful Event Planning with companion, Shannon Kilkenny
11. Start Your Own Event Planning Business (Start…(Paperback), by Entrepreneur Press

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester IV*

## 8. Entrepreneurship & Management

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Foundations of Entrepreneurship Development | 7 |
| Module 2 | Types and Classification of Entrepreneurs | 7 |
| Module 3 | Entrepreneur Project Development & Business Plan | 8 |
| Module 4 | Venture Development | 8 |
| | **Total** | **30** |

## Course Objectives

1. To understand the concepts of entrepreneurship development.
2. To recognize the theories of entrepreneurship.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Choose resources needed for an enterprise
2. Compile the sales management tasks at the food based business
3. Analyse various departments and their functions.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Foundations of Entrepreneurship Development** | 7 |
| | ● Concept and Need of Entrepreneurship Development,<br>● Definition of Entrepreneur, Entrepreneurship,<br>● Importance and significance of growth of entrepreneurial activities<br>● Characteristics and qualities of an entrepreneur,<br>● Theories of Entrepreneurship :<br>○ Innovation Theory by Schumpeter & Imitating,<br>○ Theory of High Achievement by McClelland ,<br>○ X - Efficiency Theory by Leibenstein,<br>○ Theory of Profit by Knight,<br>○ Theory of Social change by Everett Hagen,<br>● External Influences on Entrepreneurship Development : Socio-Cultural, Political, Economical, Personal.<br>● Role of Entrepreneurial Culture in Entrepreneurship Development | |
| 2 | **Types and Classification of Entrepreneurs** | 7 |
| | ● Intrapreneur – Concept and Development of Intrapreneurship<br>● Women Entrepreneur –<br>○ Concept, development and problems faced by Women Entrepreneurs,<br>○ Development of Women Entrepreneurs with reference to Self Help Group,<br>● Social entrepreneurship – concept, development of Social entrepreneurship in India.<br>● Importance and Social responsibility of NGO's.<br>● Entrepreneurial development Program (EDP) – concept, factor influencing EDP.<br>● Option available to Entrepreneur. (Ancillarisation, BPO, Franchise, M&A) | |
| 3 | **Entrepreneur Project Development & Business Plan** | 8 |
| | ● Innovation, Invention, Creativity, Business Idea, Opportunities through change,<br>● Idea generation - Sources - Development of product /idea, Environmental scanning and SWOT analysis | |

| | | |
|---|---|---|
| | ● Creating Entrepreneurial Venture - Entrepreneurship Development Cycle,<br>● Business Planning Process -<br>○ The business plan as an Entrepreneurial tool,<br>○ scope and value of Business plan<br>○ Elements of Business Plan, Objectives,<br>○ Market and Feasibility Analysis,<br>○ Marketing, Finance, Organization & Management, Ownership,<br>○ Critical Risk Contingencies of the proposal, Scheduling and milestones | |
| **4** | **Venture Development** | **8** |
| | ● Steps involved in starting of Venture,<br>● Institutional support to an Entrepreneur,<br>● Venture funding, requirements of Capital (Fixed and working)<br>● Sources of finance,<br>● Problem of Venture set-up and prospects,<br>● Marketing : Methods, Channel of Marketing, Marketing Institutions and Assistance,<br>● New trends in entrepreneurship | |

## Reference Books


1. Entrepreneurial Development : S.S.Khanka
2. Entrepreneurial Development : C.B.Gupta & N.P. Srinivasan
3. Project Management : S.Choudhury
4. Project Management : Denis Lock
5. Stephen P. Robbins, Timothy A. Judge (Author) - Organizational behaviour (15th Edition), Prentice Hall Publication.
6. Niraj Kumar- Organisational Behaviour: A New Looks (Concept, Theory & Cases), Himalaya Publishing House
7. Strategic Leadership – Sahu & Bharati – Excel Books
8. Peter I. Dowling & Denice E. (2006). International HRM (1st ed.). New Delhi
9. French Wendell, Bell Cecil and Vohra Veena. (2004).
10. Organization Development, Behavioral Science Interventions for Organization Improvement. (6th ed.)

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester IV*

## 9.Environmental Studies

## Modules at a Glance

| Sr No | Module | No of Lectures |
|---|---|---|
| Module 1 | Components of Environment | 6 |
| Module 2 | Energy , Resource Conservation and Pollution | 6 |
| Module 3 | Climate Change and health management | 6 |
| Module 4 | Environmental Management | 6 |
| Module 5 | Practical Experiences | 6 |
| | **Total** | **30** |

## Course Objective

1. To create awareness among the students about the environment with respect to its processes, damages and effects of human intervention. It also aims at explaining the ways in which the environment can be managed so that it can be saved from the wrath of human beings.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Undertaking practical work like making an environmental diary, visits to sanctuaries and tree counting. This will enable the students to learn the environmental conditions in reality and the ways to manage them.
2. Realize the problems around them and their contribution towards increasing or decreasing them. The subject will therefore make the students environmentally conscious.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Components of Environment** | 6 |
| | ● Definition, nature and scope of environmental science<br>● Components of environment: atmosphere, biosphere, lithosphere, hydrosphere<br>● Man-environment relationship and concept of carrying capacity<br>Biogeochemical cycle: carbon, nitrogen, phosphorus, water, energy flow | |
| 2 | **Energy , Resource Conservation and Pollution** | 6 |
| | ● Energy: Definition, sources - Renewable and non-renewable, Sun as a source of energy<br>● Energy use patterns and future needs, Energy conservation policies<br>● Resources: Definition and types, conservation of resources with examples<br>Pollution- definition, types, effects and management, plastic pollution | |
| 3 | **Climate Change and health management** | 6 |
| | ● Climate Change: Meaning, impacts, examples<br>● Associated health risks and solutions, examples<br>● Climate Change and ecological imbalance, effects<br>Policies related to climate change, health management in India. | |
| 4 | **Environmental Management** | 6 |
| | ● Concept of sustainable development and it's application<br>● Meaning and process of Environmental impact assessment<br>● ISO: standards related to environmental management: ISO 14000 and ISO 14001<br>Waste management- Meaning, problems and case studies of Indian metro cities: Mumbai, Pune, Bangalore, Delhi, Chennai | |
| 5 | **Practical Exercises** | 6 |

| | | |
|---|---|---|
| | • Project work<br>• Environmental Diary: Based on observation<br>Field survey report: Visits to NGOs, Sanctuaries/National Parks, ecotourism | |

## Reference Books


1. Singh, Y.K. (2006): Environmental Science, New Age International, New Delhi.
2. Kumar, A. (2008): A Textbook of Environmental Science, APH Publishing Corporation, New Delhi.
3. Chauhan, B. S. (2008): University Science Press, New Delhi.
4. Folio, W. (2016): Climate change and health: Improving resilience and reducing risks, Springer, Portugal.
5. Levy, B. (2015): Climate change and public health, Oxford University Press, London.
6. Mareddy, A. (2017): Environmental impact assessment: Theory and practice, BS Publications, United States.

# Syllabus and Question Paper Pattern of Courses of

# B.Sc. (Honours) in Integrative Nutrition & Dietetics Programme

## Third Year

## *Semester V and VI*

**Under Choice Based Credit, Grading and Semester System**

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester V*

## 1. Clinical Nutrition-I

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Type 1 and Type 2 Diabetes Mellitus | 15 |
| Module 2 | Heart Disease | 15 |
| Module 3 | Respiratory Disease | 15 |
| Module 4 | Thyroid | 15 |
| | **Total** | **60** |

## Course Objectives

1. To understand the changes in nutritional requirements in various disease states.
2. To understand the evidence linking foods, nutrients and dietary patterns to the aetiology of major diet-related diseases..

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the changes in nutritional requirements in various disease states.
2. Understand the causes and symptoms of heart and respiratory diseases.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Type 1 and Type 2 Diabetes Mellitus** | **15** |
| | ● Etiology, clinical features, basic diagnosis and nutritional management - Type 1 and Type 2 Diabetes Mellitus,<br>● Causes, symptoms, complications , | |
| 2 | **Heart Disease** | **15** |
| | ● Etiology, clinical features, basic diagnosis and nutritional management of CVD -<br>● Causes, symptoms, diagnostic tests, nutritional management, complications for Hypertension, Hypotension Cholesterol and Coronary Heart Disease | |
| 3 | **Respiratory Disease** | **15** |
| | ● Etiology, clinical features, basic diagnosis and nutritional management of respiratory conditions Asthma, COPD, ARDS, Bronchitis, TB ,<br>● Causes symptoms complications | |
| 4 | **Thyroid** | **15** |
| | ● Etiology, clinical features, basic diagnosis and nutritional management of Thyroid gland -<br>● Causes, symptoms, diagnostic tests, nutritional management, complications- Hypothyroid, Hyperthyroid, | |

## Reference Books


1. Joshi SA. (2010). Nutrition and Dietetics. 3rd Ed. New Delhi: McGraw Hill Education (India) Put Ltd.
2. Raut SK., Mitra K and Chowdhury P., AdhunikPustibigyan, Academic Publishers.
3. Srilakshmi B.( 2018). Dietetics,. New Delhi: New Age International.
4. Sahoo S and Sahoo SK. (2016). Pustibigyan, Kolkata: ChayaPrakashani.
5. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
6. Mudambi SR and Rajagopal MV.(2012). Fundamentals of Foods, Nutrition and Diet Therapy. 6thed. New Delhi: New Age International.
7. Begum MR, A Textbook Of Foods- Nutrition And Dietetics. Sterling Publishers Pvt. Ltd.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester V*

## 2. Diet Therapy- I

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Principles of nutrition care | 15 |
| Module 2 | Etiology, clinical features and nutritional management of Infections and Fevers | 15 |
| Module 3 | Etiology, clinical features and nutritional management | 15 |
| Module 4 | Food Allergy and Food Intolerance | 15 |
| | **Total** | **60** |

## Course Objectives

1. To gain knowledge about causative factors and metabolic changes in various diseases/disorders and the associated principles of diet therapy.
2. To learn the principles of dietary counseling.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Gain knowledge and systematic understanding of key aspects in nutrition, health and wellbeing such as chemical composition and nutritional quality, social and environmental influences on nutritional intake and exercise habits, energy systems, energy balance, diet-disease relationships and behavior change.
2. Understand the principles of nutrition.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Principles of nutrition care** | **15** |
| | ● Nutrition Care Process,<br>● Therapeutic adaptations of the normal diet,<br>● Progressive diets – clear fluid, full fluid, soft and regular, meal planning for same ,<br>● Nutrients of interest while planning as per clients medical condition | |
| **2** | **Etiology, clinical features and nutritional management of Infections and Fevers** | **15** |
| | ● Typhoid<br>● Tuberculosis<br>● HIV<br>● GI Tract Disorders:<br>● Diarrhoea<br>● Constipation<br>● Acidity- medication- side effects.<br>● Liver: Infective Hepatitis | |
| **3** | **Etiology, clinical features and nutritional management** | **15** |
| | ● Weight Imbalances-Overweight and obesity; Underweight,<br>● Eating disorder- anorexia nervosa and bulimia, causes , symptoms,<br>● Body composition analysis ,<br>● Visceral fat,<br>● Subcutanoeous fat, WAT, BAT<br>● Complications of obesity<br>● BMI chart, waist:hip ratio | |
| **4** | **Food Allergy and Food Intolerance** | **15** |
| | ● Etiology of allergies and food intolerance,<br>● Clinical features, diagnostic tests and nutritional management of food allergies and intolerance<br>● Lactose intolerance, | |

| | | |
|---|---|---|
| | ● Gluten intolerance,<br>● igG, igE with respect to gut | |

## Reference Books


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.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester V*

## 3. **Nutrition, Exercise And Fitness**

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction to Basic Nutrition | 15 |
| Module 2 | Exercise physiology | 15 |
| Module 3 | Hydration and electrolytes | 15 |
| Module 4 | Fitness assessment | 15 |
| | **Total** | **60** |

## Course Objectives

1. Understand the knowledge related to physical fitness, health and nutrition
2. Develop the skill in practicing aerobics and anaerobic power to enhance the energy capacity

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of supplements & antioxidants in sports.
2. Understand the importance of diet planning in sports.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction to Basic Nutrition** | **15** |
| | ● Introduction to Basic Nutrition : Role & importance of nutrition ,<br>● Macronutrients - carbohydrates, proteins fats and water<br>● Micronutrients- zinc seleium chromium calcium magnesium iron iodine in detail with regards to exercise | |
| 2 | **Exercise physiology** | **15** |
| | ● Exercise physiology: Musculoskeletal anatomy- strength, power, endurance,<br>● Overview of aerobic and anaerobic pathway,<br>● Effect of training on heart & lung performance,<br>● Importance of heart rate monitoring and how do you calculate it | |
| 3 | **Hydration and electrolytes** | **15** |
| | ● Hydration and electrolytes- Role of water in energy metabolism,<br>● Impact of dehydartion on cells and hence activity ,<br>● Importance of sodium, potasium, iron calcium and magnesium in exercising individuals<br>● Dehydration, heat injury,<br>● Sports drinks | |
| 4 | **Fitness assessment** | **15** |
| | ● Fitness assessment-<br>○ Anthropometric measurements,<br>○ BMR,<br>○ factors,<br>○ measuring Resting Metabolic Rate,<br>○ Max Heart Rate,<br>○ Body Mass Index,<br>○ Body Fat composition,<br>○ Body composition Analysis,<br>● Endurance difference between subcutaneous and visceral fat , its significance | |

## Reference Books


1. Havley E. T. and Franks B . D. (1997) Health Fitness instructions handbook . Third edition . Human kinetics Champaign Illinois .
2. Carry Egger , Nigel champion and Allan Bolton compiled buy the fitness header's handbook A& C black London .

3. McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (1996) Exercise Nutrition: Energy Nutrition and Human Performance. William & Wilkin Publishing USA.
4. Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy W.B Saunders Company, USA.
5. Uppal . A.K. (2004) Physical Fitness and Wellness Friends publications India.
6. Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness, Morton Publishing Company, Colorado.
7. Mishra, S. C (2005) Physiology in Sports. Sports Publication, New Delhi
8. Greenberg, S. J and Pargman, D (1989) Physical Fitness – A Wellness Approach Prentice Hall International (UK) Limited, London
9. Swaminathan T, (2008) Essentials of Food and Nutrition Bangalore Printing Publishing Co.

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics at Semester V*

## 4.Clinical Nutrition-I

## Modules at a Glance

**Practicals-**

1. Meal planning for Diabetes type 1 and 2
2. Meal planning for Hypertension, dyslipidemia, CHD
3. Meal planning for Asthma, TB, COPD, Bronchitis
4. Meal planning for Hypothyroid and Hyperthyroid
5. Meal planning for Metabolic syndrome

**Cooking Practicals :**

1. Diabetes type 1 and 2
2. Hypertension, dyslipidemia, CHD
3. Asthma, TB, COPD, Bronchitis
4. Hypothyroid and Hyperthyroid
5. Metabolic syndrome

## Course Objectives

1. To understand the changes in nutritional requirements in various disease states.
2. To understand the evidence linking foods, nutrients and dietary patterns to the aetiology of major diet-related diseases..

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the changes in nutritional requirements in various disease states.
2. Understand the role of meal planning in different health conditions.

## Reference Books


1. Joshi SA. (2010). Nutrition and Dietetics. 3rd Ed. New Delhi: McGraw Hill Education (India) Put Ltd.
2. Raut SK., Mitra K and Chowdhury P., AdhunikPustibigyan, Academic Publishers.
3. Srilakshmi B.( 2018). Dietetics,. New Delhi: New Age International.
4. Sahoo S and Sahoo SK. (2016). Pustibigyan, Kolkata: ChayaPrakashani.
5. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
6. Mudambi SR and Rajagopal MV.(2012). Fundamentals of Foods, Nutrition and Diet Therapy. 6thed. New Delhi: New Age International.
7. Begum MR, A Textbook Of Foods- Nutrition And Dietetics. Sterling Publishers Pvt. Ltd.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester V*

## 5 Diet Therapy- I Practicals

1. Meal planning for clear fluid, full fluids, soft food, full diet
2. Meal planning for fever and typhoid
3. Meal planning for HIV
4. Meal planning for Acidity , Diarrhea and constipation
5. Meal planning for Hepatitis
6. Meal planning for weight loss and weight gain
7. Meal planning for lactose intolerance, gluten intolerance

## Cooking practicals :

1. clear fluid, full fluids, soft food, full diet
2. fever and typhoid
3. HIV
4. fever and typhoid
5. Acidity , Diarrhea and constipation
6. Hepatitis
7. weight loss and weight gain
8. lactose intolerance, gluten intolerance

## Course Objectives

1. To gain knowledge about causative factors and metabolic changes in various diseases/disorders and the associated principles of diet therapy.
2. To learn the principles of dietary counseling.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand key aspects in nutrition, health and wellbeing such as chemical composition and nutritional quality, social and environmental influences on nutritional intake and exercise habits, energy systems, energy balance, diet-disease relationships and behaviour change.
2. Understand the essentials of meal planning in different health conditions.

## Reference Books


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.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester V*

## 6. Physiology-IV

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Immunity and Lymphatic system | 15 |
| Module 2 | Upper GI | 15 |
| Module 3 | Lower GI | 15 |
| Module 4 | Musculoskeletal system | 15 |
| | **Total** | **60** |

## Course Objectives

1. To understand the advance muscle and the disorders associated with it.
2. To understand the basic functions of the lower and upper GI

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the basic functions of the lower and upper GI.
2. Understand the role and functions of different tissues and systems in the human body.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Immunity and Lymphatic system** | **15** |
| | ● Immunity and lymphatic system: Lymphatic system structure and function,<br>● Development of lymphatic tissues,<br>● Introduction to immunology,<br>● Types of immune system<br>● Self recognition and tolerance ,<br>● Stress and immunity | |
| 2 | **Upper GI** | **15** |
| | ● Upper GI: Overview of digestive system,<br>● Neural intervention of GI tract,<br>● Structure and function of - peritoneum, mouth, pharynx, esophagus, deglutition, stomach | |
| 3 | **Lower GI** | **15** |
| | ● Lower GI: structure and function of - pancreas, liver and gall bladder, small intestine, large intestine,<br>● Phases of digestion,<br>● Homeostasis of imbalance | |
| 4 | **Musculoskeletal system** | **15** |
| | ● Musculoskeletal system: Function of bone, skeletal system,<br>● Nerve supply of bone,<br>● Bone formation,<br>● Bones role in calcium homeostasis, exercise and bone tissues,<br>● Aging and bone tissues<br>● Disorders overview of muscular system,<br>● Muscle metabolism,<br>● Types of skeletal muscles,<br>● Development of muscles<br>● Cardiac muscle tissues<br>● Smooth muscle tissues | |

## Reference Books


1. Meyer B J, Meij H S and Meyer A C., Human Physiology, AITBS Publishers and Distributors.
2. Wilson, K.J.W and Waugh, A. (1996): Ross and Wilson, Anatomy and Physiology in Health and Illness, 8th Edition, Churchill Livingstone.
3. Ranganathan, T.S. (2004): A Textbook of Human Anatomy, Chand & Co. N. Delhi.
4. Jain, A.K., Textbook of Physiology, Vol. I and II, Avichal Publishing Co., New Delhi.
5. Chatterjee C.C. (1987): Human Physiology, Vol. I & II, Medical Allied Agency, Calcutta.
6. Guyton, A.G. and Hall, J.B. (1996): Text Book of Medical Physiology, (9th Edition, W.B. Sanders Company, Prism Books (Pvt.) Ltd., Bangalore.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester V*

## 6. Sports Nutrition

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Sports science | 12 |
| Module 2 | Exercise physiology | 12 |
| Module 3 | Sports Injuries | 12 |
| Module 4 | Human anatomy: | 12 |
| Module 5 | Energy Requirement | 12 |
| | **Total** | **60** |

## Course Objectives

1. To describe contemporary dietary guidelines and demonstrate an ability to use these guidelines to provide general nutrition advice for achieving or maintaining a healthy body weight
2. To describe how nutrition influences human development, exercise performance, recovery and physiological adaptations
3. To discuss macronutrient metabolism during and after exercise and outline the requirements of these nutrients for athletes

## Course Outcome

After successful completion of the course the learner will be able to

1. Understand the health aspects related to sports
2. Learn to interpret and apply nutrition concepts to evaluate and improve the nutritional health

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Sports science** | 12 |
| | • History of sports & games<br>• An introduction to Sports science | |
| 2 | **Exercise physiology** | 12 |
| | • Effect of training on heart & lung performance<br>• Importance of heart rate monitoring<br>• Index of training, over training & detraining | |
| 3 | **Sports Injuries** | 12 |
| | • Various sports injury<br>• Body's response to the injury<br>• Goal of treatment | |
| 4 | **Human anatomy:** | 12 |
| | • Body Composition, Respiratory system, cardiovascular system, Nervous system, excretory system, Endocrine system, Muscular skeletal system<br>• Types of contraction, Body temperature & its effects on sports performance, Aerobic capacity, anaerobic threshold, athletic heart. | |
| 5 | **Energy Requirement** | 12 |
| | • Aerobic capacity, anaerobic threshold, athletic heart, Water& electrolytes balance, Doping, Injury Supplementation, Training nutrition, pre-competition nutrition, competing nutrition and recovery nutrition | |

## Reference Books:


1. Steven Ray, Irvin Richer - Sports Medicine - , Prentice Hall,1983
2. Sports Injuries - Vinger and Roerner, - PSG Publishing Co. Inc,1981 William JGP,
3. Sports medicine - London Edwar - Arnold Publications Morehouse and Rash,
4. Sports medicine for Trainer by W.B.Saunders.
5. Armstrong and Tucker, Injuries and Sports, London Scamples Press

# *Syllabus of Courses of*

# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics Programme at Semester V*

## 7. Practical Training/Internship

**Goals:**

1. To enable students to make a carefully guided transition into the world of work.
2. To create an interface between learning and practice.
3. To provide students with an environment that facilitates knowledge building and enhancing skills/competencies.
4. To provide opportunities for experiential learning in varied areas of their disciplines and enhance their professional growth
5. To enable students to identify their own strengths and skills needing improvement and upgrade them in line with their career goals.
6. To enable students to strengthen their commitment towards becoming responsible, well trained, ethical professionals

**Objectives:**

Internship is introduced with a cohesive plan of action to realise the following learning outcomes: After going through the Internship the student will be able to :

- Facilitate cross- disciplinary learning and development of new skills.
- Integrate knowledge obtained through in-class teaching with a hands-on approach and become familiar with Professional Practices and the world of work
- Pursue responsible roles in an organization
- Develop a road map for future career

**Duration:**

Each student shall undergo an Internship of four weeks approx. in relevant industry or any other business. The objective of this training is to make the students acquainted with the industrial / business working environment.

**Report:**

After completion of the training they will have to submit a training report.

**Marks & Evaluation:**

The internship/project reports will carry 100 marks.It will be evaluated by the examiner. It is to be submitted on or before the date fixed by the Institute.

The students will also have to submit a performance certificate from the company where he/she undertook the training/internship. This report will also be considered while evaluating the training report by examiners.

Alternatively, if it is not possible to do an industrial internship the students will prepare a project report on a topic assigned to him/ her by the Institute.

This allows students to undertake experiential learning by working with organisations/ in the industry to critically examine a major aspect of their operation.

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## 8. Sanskrit/Allied/Other related course

- Selected portion from Taittiriyopanishad
- An extract from drama Pratima by Bhasa
- A story from Panchtantram
- An extract from Mricchakatikam by Shudraka
- A dialogue based on Meghadutam
- An extract from drama Malavikagnimitram
- Spy system in KautiliyaArthashastra ( 5 types of stationary spies)

OR

**Effective Presentation Skills**
Module 1-Fundamentals of Effective Presentations
Module 2- Preparing the Contents
Module 3- Speaking Skills
Module 4- Essentials for Dynamic Presentations and Speeches

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# *at Semester VI*

## 1. Lifestyle Pillars

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Sleep | 5 |
| Module 2 | Stress/Emotional health | 10 |
| Module 3 | Hydration and Basic lifestyle changes | 15 |
| Module 4 | Exercise | 15 |
| | **Total** | **60** |

## Course Objectives

1. To understand the basic lifestyle changes in a human body
2. To understand the benefits and need for exercise in a human body

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of Sleep, hydration, lifestyle changes & exercise.
2. Understand the basics of maintaining a healthy life.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Sleep** | **15** |
| | ● Sleep- cycle, brain waves,<br>● Conditions that impact sleep cycle,<br>● Sleep and bedtime routine,<br>● Importance of sleep and side effects of sleep deprivation - immunity, hormonal imbalance, gut etc<br>● Adrenal fatigue with respect to sleep | |
| **2** | **Stress/Emotional health** | **15** |
| | ● Stress/ emotional health- how does stress affect,<br>● Sympathetic Nervous system and Parasympathetic Nervous system,<br>● Stress and inflammation,<br>● Stress-immunity,<br>● Ways to manage stress,<br>● Adrenal fatigue with respect to stress | |
| **3** | **Hydration and Basic lifestyle changes** | **15** |
| | ● Hydration- Functions and importance-<br>● Adequate hydration<br>● Foods that dehydrate you,<br>● Side effects of dehydration,<br>● Concepts of Intermittent Fasting, -<br>Self study Dry Fasting, Circardian Intermittent Fasting,<br>● Impact of fasting on human body,<br>Fasting phase and building phase ,<br>● Impact of nutrition deprivation on cell metabolism | |
| **4** | **Exercise** | **15** |
| | ● Exercise- Benefits of exercise,<br>● Types- aerobic and anaerobic- and cover examples in detail,<br>● Side effects of over exercising,<br>● Impact of no/ over exercise on muscles- weight gain/loss and exercise/ muscle gain and loss with respect to exercise,<br>● Impact of exercise on BMR | |

**Reference Books**

1.Joshi SA. (2010). Nutrition and Dietetics. 3rd Ed. New Delhi: McGraw Hill Education (India) Put Ltd.
2. Raut SK., Mitra K and Chowdhury P., AdhunikPustibigyan, Academic Publishers.
3. Srilakshmi B.( 2018). Dietetics,. New Delhi: New Age International.
4. Sahoo S and Sahoo SK. (2016). Pustibigyan, Kolkata: ChayaPrakashani.
5. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
6. Mudambi SR and Rajagopal MV.(2012). Fundamentals of Foods, Nutrition and Diet Therapy. 6thed. New Delhi: New Age International.
7. Begum MR, A Textbook Of Foods- Nutrition And Dietetics. Sterling Publishers Pvt. Ltd.

# *Syllabus of Courses of*
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## 2. Diet Therapy - II

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction | 15 |
| Module 2 | Special Feeding methods | 15 |
| Module 3 | Diseases of the gastrointestinal tract | 15 |
| Module 4 | Diseases of the liver, gall bladder and exocrine pancreas | 15 |
| | **Total** | **60** |

## Course Objectives

1. To comprehend the feeding techniques
2. To know the corrective measures in malnutrition.
3. To develop skills and techniques in the planning and preparation of therapeutic diets for febrile conditions and gastrointestinal disorders, liver and pancreas

## Course Outcome

After successful completion of the course the learner will be able to:

1. Gain Knowledge and understanding of professional values, ethical standards and professional codes of conduct associated with Human Nutrition.
2. Understand the causes and symptoms of diseases of gastrointestinal tract, liver, gall bladder and exocrine pancreas.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction** | 15 |
| | ● Definition of Dietetics, dietitian,<br>● Goals of Diet Therapy,<br>● Types of dietitian,<br>● Role and responsibilities of dietitians,<br>● Qualification, qualities and professional ethics, code of conduct,<br>● Specially modified therapeutic diets,<br>● High calorie low calorie, high and low protein, bland, high and low residue diets. | |
| 2 | **Special Feeding methods** | 15 |
| | ● Special Feeding methods- Enteral nutrition- methods- nasogastric, gastrostomy and jejunostomy types of food, infusion techniques.<br>● TPN(total parentral nutrition)- Types of infusion, TPN formula for adults.,<br>● Dietary modification, diet planning, and preventive measures for- PEM( protein energy malnutrition),<br>● Iron deficiency anaemia and Vitamin A deficiency. | |
| 3 | **Diseases of the gastrointestinal tract** | 15 |
| | ● Diseases of the gastrointestinal tract: Causes, pathogenesis, dietary modification and diet planning for<br>○ GERD (Gastro Esophageal Reflux Disease) and Gastritis<br>○ Peptic ulcer and hemorrhoids<br>○ Irritable Bowel Syndrome and Inflammatory Bowel Disease | |
| 4 | **Diseases of the liver, gall bladder and exocrine pancreas** | 15 |
| | ● Diseases of the liver, gall bladder and exocrine pancreas – pathogenesis, causes, signs and symptoms,<br>● Dietary modification and diet planning for<br>○ Liver- fatty liver, hepatitis and cirrhosis, Non alcoholic fatty liver disease<br>○ Gall bladder – cholecystitis, cholelithiasis<br>○ Pancreas – pancreatitis | |

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## 3. Nutrition, Exercise And Fitness-II

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Supplements | 15 |
| Module 2 | Antioxidants | 15 |
| Module 3 | Diet planning in Sports | 15 |
| Module 4 | Ergonomics and Injury Management | 15 |
| | **Total** | **60** |

## Course Objectives

1. To gain knowledge on the classification of antioxidants and their role in combating diseases
2. To update knowledge on advanced techniques and concept of diet planning for athletes

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of supplements & antioxidants in sports.
2. Understand the importance and basics of diet planning in sports.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Supplements** | **15** |
| | ● Supplements - composition of supplements , How and when to use the supplements,<br>● Whey-whey protein concentrate, whey protein isolate casein - whey composition / proportion<br>● BCAA (Branch Chained Amino Acids),<br>● Glutamine, creatinine,Steroids, fat burners, NO boosters, - benefits, dosage, side effects | |
| 2 | **Antioxidants** | **15** |
| | ● Antioxidants, natural and supplement form both- Vit C, CoQ10, colostrum, Vit B, D, E,<br>● Preparing for an event- carbo loading, resting, hydration,<br>● Supplements to take and avoid before an event | |
| 3 | **Diet planning in Sports** | **15** |
| | ● Diet planning in Sports: Marathon Runs, Cricket etc.<br>● Strength Sports: Boxing, Weight Lifting etc.,<br>● Athletes Diet and eating disorders,<br>● Weight maintenance plans | |
| 4 | **Ergonomics and Injury Management** | **15** |
| | ● Ergonomics and Injury Management - lymphatic drainage, muscle development , impact of exercise on physiology, muscle injury ,different exercise | |

**Demonstration**

1. Meal planning for ectomorphs, mesomorphs, endomorphs
2. Meal planning for sportsman
3. Meal planning for gym goer- depending on the intensity of workout- light, moderate, intense
4. Practical training for exercise
5. Different warm up and stretches
6. Planning and preparation of sports drink

## 4. Diet Therapy- II Practicals

**Practicals-**

**I. Meal planning**

- Gastroesophageal reflux disease (GERD)
- Peptic ulcers
- Sibo and Hpylori,
- Irritable bowel syndrome (IBS)
- Inflammatory Bowel Disease (IBD)
- Pancreatitis, liver cirrhosis, cholelithiasis , Osteoarthritis,
- PCOD endometriosis, AKD, CKD,
- ADHD autism , epilepsy

**II. Cooking Demonstration for** :

- Gastroesophageal reflux disease (GERD)
- Peptic ulcers
- Sibo and Hpylori,
- Irritable bowel syndrome (IBS)
- Inflammatory Bowel Disease (IBD)
- Pancreatitis, liver cirrhosis, cholelithiasis , Osteoarthritis,
- PCOD endometriosis, AKD, CKD,
- ADHD autism, epilepsy
- Low sodium and low potassium recipes

## Course Objectives

1. To gain knowledge about causative factors and metabolic changes in various diseases/disorders and the associated principles of diet therapy.
2. To learn the principles of dietary counseling.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Acquire knowledge on the key aspects in nutrition, health and wellbeing such as chemical composition and nutritional quality, social and environmental influences on nutritional intake and exercise habits, energy systems, energy balance, diet-disease relationships and behaviour change.
2. Learn about causes and symptoms of different diseases.

## Reference Books

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.

# *Syllabus of Courses of*
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## 5. Clinical Nutrition- II

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Osteopenia, Osteoporosis, Osteoarthritis | 15 |
| Module 2 | PCOD, Pre menopause/ Menopause | 15 |
| Module 3 | Kidney | 15 |
| Module 4 | Phenylketonuria, Galactosemia & Nutritional care for the children with special needs | 15 |
| | **Total** | **60** |

## Course Objectives

1. To understand the importance of nutritional assessment in the care of patients.
2. To understand basic nutritional problems.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the changes in nutritional requirements in various disease states.
2. Understand the cause of basic diseases related to nutrition.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Osteopenia, Osteoporosis, Osteoarthritis** | 15 |
| | ● Etiology, clinical features, basic diagnosis and nutritional management of bone health Osteopenia, osteoporosis, osteoarthritis | |
| 2 | **PCOD, Pre menopause/ Menopause** | 15 |
| | ● Etiology, clinical features, basic diagnosis and nutritional management of Women's health, PCOD, pre menopause/ menopause | |
| 3 | **Kidney** | 15 |
| | ● Etiology, clinical features, basic diagnosis and nutritional management of Renal conditions - Nephrotic syndrome, Nephritic, syndrome, Acute Renal Failure, Chronic Kidney Disease,<br>● Dialysis- Introduction to Dialysis - types of dialysis- hemodialysis n peritoneal dialysis, | |
| 4 | **Phenylketonuria, Galactosemia & Nutritional care for the children with special needs** | 15 |
| | ● Etiology, clinical features, basic diagnosis and nutritional management of inborn errors of metabolism prognosis, symptoms, dietary management - phenylketonuria, galactosemia,<br>● Nutritional care for the children with special needs – overview of the disability, food and nutritional needs and their modification.<br>○ Attention deficit hyperactivity disorder<br>○ Autism<br>○ Cerebral palsy<br>○ Down's syndrome | |

## Reference Books


1. Joshi SA. (2010). Nutrition and Dietetics. 3rd Ed. New Delhi: McGraw Hill Education (India) Put Ltd.
2. Raut SK., Mitra K and Chowdhury P., AdhunikPustibigyan, Academic Publishers.
3. Srilakshmi B.( 2018). Dietetics,. New Delhi: New Age International.
4. Sahoo S and Sahoo SK. (2016). Pustibigyan, Kolkata: ChayaPrakashani.
5. Sohi D. A Comprehensive Textbook of Nutrition & Therapeutic Diets, New Delhi: Jaypee Brothers Medical Publishers.
6. Mudambi SR and Rajagopal MV.(2012). Fundamentals of Foods, Nutrition and Diet Therapy. 6thed. New Delhi: New Age International.
7. Begum MR, A Textbook Of Foods- Nutrition And Dietetics. Sterling Publishers Pvt. Ltd.

# *Syllabus of Courses of*
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## *5..*Alternative Health Strategies & Therapies

## *Modules at a Glance*

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Asanas and Pranayama | 15 |
| Module 2 | Mudra, Bandhas and Meditation | 15 |
| Module 3 | Eastern Alternative Health Strategies and Therapies | 15 |
| Module 4 | Western Alternative Health Strategies and Therapies | 15 |
| | **Total** | **60** |

## Course Objectives

1. To recognize the basic concepts of Yoga.
2. Develop skills required to meditate and practice Yoga.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Foster harmony in the body, mind, and environment.
2. Spiritually develop practices to train the body and mind to self-observe and become aware of their own nature

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| **1** | **Asanas and Pranayama** | **15** |
| | • Meaning, Definition, Aims, Objective of Hath Yoga and Ashtanga Yoga<br>• Different types of Asanas with Reference to Hath Pradipika, Gherand Aamhita, Patanjali Yoga Sutras- indications, contraindications<br>• Pranayama with Reference to Hath Pradipika, Gherand Aamhita, Patanjali Yoga Sutras- different types, indications, contraindications | |
| **2** | **Mudra, Bandhas and Meditation** | **15** |

| | | |
|---|---|---|
| | • Concept, Meaning, Application of Mudra and Bandhas.<br>• Concept, Meaning and Various Techniques of Meditation. | |
| **3** | **Eastern Alternative Health Strategies and Therapies** | **15** |
| | • Yoga<br>• Mindfulness and meditation<br>• Laughter therapy<br>• Acupuncture / acupressure<br>• Any other | |
| **4** | **Western Alternative Health Strategies and Therapies** | **15** |
| | • Music therapy<br>• Dance therapy<br>• Art-based therapy<br>• Flower Therapy<br>• Essential oils<br>• Any other | |

## Reference Books


1. Bases of Yoga- Shri Aurbindo
2. Patanjali Yoga Sutra – Gita Press Gorakhpur
3. Swami Niranjanananda Saraswati- Gherand Samhita, Bihar School of Yoga Munger.
4. Swami Digambar & Jha P – Hatha Pradipika kaivalydham Yoga Prakashan, Lonavala, Pune.
5. Saraswati Satyananda, Asana, Pranayama, Mudra Bandha- Bihar School of Yoga Munger.
6. Meditation Techniques of the Buddhist and Taoist Masters – Daniel Odier.

# *Syllabus of Courses of*
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## 6. Yoga and Exercise

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Basic Concepts of Yoga | 15 |
| Module 2 | Asanas | 15 |
| Module 3 | Pranayama | 15 |
| Module 4 | Mudra, Bandhas and Meditation | 15 |
| | **Total** | **60** |

## Course Objectives

1. To foster harmony in the body, mind, and environment.
2. To spiritually develop practices to train the body and mind to self observe and become aware of their own nature

## Course Outcome

After successful completion of the course the learner will be able to:

1. Understand the importance of Yoga for mind, body & soul.
2. Gain in depth knowledge about different asanas and pranayamas.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Basic Concepts of Yoga** | **15** |
| | ● Meaning of Yoga;<br>● Definitions of Yoga,<br>● History and Development of Yoga in Buddhism, Jainism and Indian Philosophy. | |
| 2 | **Asanas** | **15** |
| | ● Meaning, Definition, Aims,<br>● Objective of Hath Yoga and Ashtanga Yoga,<br>● Different types of Asanas with Reference to Hath Pradipika, Gherand Aamhita, Patanjali Yoga<br>● Sutras.- Indications, Contraindications | |
| 3 | **Pranayama** | **15** |
| | ● Pranayama with Reference to Hath Pradipika, Gherand Aamhita, Patanjali Yoga<br>● Sutras- different types, indications, contraindications | |
| 4 | **Mudra, Bandhas and Meditation** | **15** |
| | ● Concept, Meaning, Application of Mudra and Bandhas.<br>● Concept, Meaning and Various Techniques of Meditation. | |

## Demonstration

1. Mudras
2. Breathing exercises and Pranayama- anuloma viloma, bhastrika, kapal bhatti, deep breathing, left / right nostril breathing, etc
3. Asanas for different medical condition- hypothyroid, diabetes, weight loss, hypertension pcod , endometriosis etc
4. Meditation

## Reference Books


1. Bases of Yoga- Shri Aurbindo
2. Patanjali Yoga Sutra – Gita Press Gorakhpur
3. Swami Niranjanananda Saraswati- Gherand Samhita, Bihar School of Yoga Munger.
4. Swami Digambar & Jha P – Hatha Pradipika kaivalydham Yoga Prakashan, Lonavala,Pune.
5. Saraswati Satyananda, Asana, Pranayama, Mudra Bandha- Bihar School of Yoga Munger.
6. Meditation Techniques of the Buddhist and Taoist Masters – Daniel Odier.
7. Techniques of Prekhadhyan- Acharyan Maha Pragaya.

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## 6. Global Leadership & Culture

## Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Introduction | 9 |
| Module 2 | Global leaders and intercultural communication | 9 |
| Module 3 | Global leaders learning in response to change | 9 |
| Module 4 | Women leaders in global business | 9 |
| Module 5 | Leadership Skills to make globalization work | 9 |
| | **Total** | **45** |

## Course Objectives

1. To understand the complications involved in leadership across cultures.

## Course Outcome

After successful completion of the course the learner will be able to:

1. Appreciate the need to lead people differently in different cultures.

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Introduction** | 9 |
| | Culture, systems approach to culture, key cultural terminology, cultural understanding and sensitivity, global transformation. | |
| 2 | **Global leaders and intercultural communication** | 9 |
| | Introduction, intercultural communication process, models, non verbal communication, guidelines. | |
| 3 | **Global leaders learning in response to change** | 9 |
| | Introduction, aspects of organizational learning, management mindsets and learning, individual learning | |
| 4 | **Women leaders in global business** | 9 |
| | Current status of women global leaders, cultural stereotypes, balancing work and family, glass ceiling, company initiatives to break glass ceiling, women and overseas assignments | |
| 5 | **Leadership skills to make globalization work** | 9 |
| | Lessons from CEOs, description of competencies, framework. | |

## Reference Books:


1. Sethi & Rajiv, Tips for effective leadership, Beacon books
2. Marshal & Tom, Understanding leadership, Sovereign World Ltd
3. Abramson N R & Moran R T (2016) Managing cultural differences-Global leadership for 21st century: Routledge

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## 7. Project Work

## Market survey on different health products , protein supplements , fat burners, fad diet and its impact on human body

**OBJECTIVES:** At the end of the semester the students should be able to:
1. Identify the potential areas of research in his/her field.
2. Collect data from various sources including the internet or experiments, analysis the make new connections and link them to life
3. Read and write originally and usefully

**GUIDELINES:**
1. The project may be done individually or in groups not exceeding five per group
2. The minimum pages of the project should be 30 pages in A4 size.
3. Marks for the project report will be 100 divided as 80% for the presentation of project and 20% for viva-voce

Evaluation scheme:
The allocation of marks for project is as follows:

| **Project** | **Marks** |
|---|---|
| Objectives / Formulation including Hypothesis | 10 |
| Review of literature | 10 |
| Relevance of project to social needs | 10 |
| Methodology / Technique / Procedure adopted | 20 |
| Summary / Findings / Summation | 10 |
| Works cited / Annexure / Footnotes | 10 |
| Viva-Voce | 30 |
| **TOTAL** | **100** |

The research will be an original work with plagiarism check and ethical clearance.

# *Syllabus of Courses of*
# *B.Sc. (Hons.) in Integrative Nutrition & Dietetics*
# *at Semester VI*

## 8. Human Rights and Indian Constitution

### Modules at a Glance

| Sr. No. | Modules | No. of lectures |
|---|---|---|
| Module 1 | Indian Constitutional Philosophy and Union and State Executive, Legislature and Judiciary | 15 |
| Module 2 | Concept and Development of Human Rights and Human Rights in India | 15 |
| | **Total** | **30** |

## Course Objectives

1. To understand the concepts and fundamentals of Human Rights in India.

## Course Outcome

1. Know more about fundamental rights and duties.
2. Learn more about human rights

## Detailed Syllabus

| Module | Topics | No. of Lectures |
|---|---|---|
| 1 | **Indian Constitutional Philosophy and Union and State Executive, Legislature and Judiciary** | **15** |
| | ● Feature of the Constitution and Preamble<br>● Fundamental Rights and Fundamental Duties<br>● Directive Principles of State Policy<br>● Union Parliament and State Legislature: Power and Functions<br>● President, Prime Minister, and Council of Ministers<br>● State Governor, Chief Minister and Council of Ministers<br>● The Supreme Court and High Court: Power and Functions | |
| 2 | **Concept and Development of Human Rights and Human Rights in India** | **15** |
| | ● Meaning Scope and Development of Human Rights<br>● United Nations and Human Rights- UNHCR<br>● UDHR 1948, ICCPR 1996 and ICESCR 1966<br>● Protection of Human Rights Act, 1993 (NHRC and SHRC)<br>● First, Second and Third Generation of Human Rights<br>● Judicial Activism and Human Rights | |

## Reference Books:


1. Durga Das Basu, Introduction to the Constitution of India, Prentice—Hall of India Pvt. Ltd, New Delhi
2. Subash Kashyap, Indian Constitution, National Book Trust
3. J.A. Siwach, Dynamics of Indian Government and Politics
4. D.C. Gupta, Indian Government and Politics
5. H.M. Sreevai, Constitutional Law of India, 4th edition and 3 volumes (Universal Law Publication)
6. V.N. Shukla, Constitution of India (Eastern Books Co)
7. J.C. Johari, Indian Government and Politics
8. Hans. J. Raj, Indian Government and Politics
9. M.V. Pylee, Indian Constitution
10. Durga Das Basu, Human Rights in Constitutional Law, Prentice—Hall of India Pvt. Ltd, New DelhiNoorani, A.G. (South Asia Human Rights Documentation Centre), Challenges to Civil Right, Challenges to Civil Right Guarantees in India, Oxford University Press 2012

11. Noorani, A.G. (South Asia Human Rights Documentation Centre), Challenges to Civil Right, Challenges to Civil Right Guarantees in India, Oxford University Press 2012
12. S.K. Kapoor, Human Rights