

ORDINANCE

FOR

**BACHELOR OF SCIENCE IN
NUTRITION & DIETETICS**



THIS ORDINANCE HAS BEEN APPROVED IN THE MEETING OF
BOARD OF MANAGEMENT HELD ON DATED: 7th July 2022)

APPLICABLE W.E.F. ACADEMIC SESSION 2022-2023



SRI HARGOBINDGARH, PHAGWARA – HOSHIARPUR ROAD,
PHAGWARA 144401, PUNJAB

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BACHELOR OF SCIENCE IN NUTRITION & DIETETICS

SHORT TITLE AND COMMENCEMENT

I. This ordinance shall be called the ordinance for the Bachelor of Science in Nutrition and Dietetics of GNA University, Phagwara.

II. This ordinance shall come into force with effect from academic session 2022 - 23.

1. Name of Program: Bachelor of Science in Nutrition and Dietetics (BND)

2. Name of Faculty: Faculty of Allied & Healthcare Sciences

3. Vision of the Department: Department of Nutrition and Dietetics is the best platform to produce highly qualified Dietitians in the field of Allied & Healthcare sciences to learn the intricacies of the health profession with regard to diagnosis, treatment and prevention of disease.

3.1 Mission of the Department:

M1: Developing curriculum as per Clinical and Diagnostic requirements.

M2: Prepare students for leadership roles in the hospitals and professional organizations and clinics.

M3: Providing practical knowledge with hands on experience in hospitals and diet clinics.

M4: Each faculty member motivates the students to serve the community and innovatively advance research.

4. Program Educational Outcomes (PEOs):

PEO1: Recognize the role of Dietitians and Nutritionists in the context of health care.

PEO2: Perform basic anthropometric measurements using appropriate techniques.

PEO3: Observe the Medical Reports of the Patients and identify the deficiencies of the Patients.

PEO4: Calculate and Plan Diet Charts.

PEO5: Use effective written and verbal communication that represents competence and professionalism in the Hospitals and Diet Clinics.

4.1 Program Outcomes:

- Po1:** Apply knowledge and technical skills associated with Nutrition and Dietetics.
- Po2:** Perform routine clinical procedures which is acceptable in the areas of Therapeutic Nutrition, Public Health Nutrition and Community Nutrition.
- Po3:** Demonstrate technical skills, social behavior and professional awareness for functioning effectively as a Dietitian.
- Po4:** Apply problem solving techniques in identification and correction of pre analytical, post analytical & analytical variables.
- Po5:** Plan a Diet Chart for the Patient after considering their age, sex, physiological needs and food habits.
- Po6:** Recognize the impact of planned Diet Charts on their body and the disease.
- Po7:** Communicate effectively by oral, written and graphical means.
- Po8:** Function as a leader/team member in diverse professional clinics and hospital research areas.
- Po9:** Analyzing changes in health patterns after recommending changes in diets
- Po10:** Function in an ethical and professional manner without bias against any ethnicity, race, religion, caste or gender.
- Po11:** Practice professional and ethical responsibilities with high degree of credibility, integrity and social concern.

5. Program specific Outcomes:

- PSO1:** Utilize knowledge from the physical and biological sciences as a basis for understanding the role of food and nutrients in health and disease processes.
- PSO2:** Provide nutrition counseling and education to individuals, groups, and communities throughout the lifespan using a variety of communication strategies.
- PSO3:** Apply technical skills, knowledge of health behavior, clinical judgment, and decision-making skills when assessing and evaluating the nutritional status of individuals and communities and their response to nutrition intervention.
- PSO4:** Implement strategies for food access, procurement, preparation, and safety for individuals, families and communities.
- PSO5:** Practice state-of-the-art nutrition care in collaboration with other healthcare providers in interdisciplinary settings within the bounds of ethical, legal, and professional practice standards.

- PSO6:** Effective communication skill to ensure accurate and appropriate information transfer.

6. General Regulations for Faculty of Allied & Healthcare Sciences:

- a)** The University may introduce programs under Faculty of Allied & Healthcare Sciences which are specified under the UGC Act 1956. The Governing Body may approve the introduction, suspending or phasing out a program on the recommendation of the Academic Council either on its own or on the initiative of faculty.
- b)** The admissions to a Faculty of Allied & Healthcare Sciences programs shall be generally governed by the rules of the UGC or any other competent authority of the MHRD or as approved by Governing Body of University and shall be as notified in the admission notification of the respective academic year.
- c)** The minimum entry qualification for admission to the students of Faculty of Allied & Healthcare Sciences shall be such as may be laid down in the regulations or specified by the Governing Body like ME. Minimum qualification for admission to the first year program of Faculty of Allied & Healthcare Sciences shall be the Senior Secondary School Certificate (10+2) in any stream recognized from any board/ institution/ university. While deciding the admission procedure, the University may lay down compulsory subjects in qualifying examination for admission for various programs in the admission policy.
- d)** A student shall be required to earn a minimum number of credits through various academic components of a curriculum, as provided for in the regulations.
- e)** A student shall be required to complete all the requirements for the award of the degree with in such period as may be specified in the regulations.
- f)** A student may be granted such scholarship as may be specified in accordance with the directions of the Governing Body from time to time or regulations laid down for the same.
- g)** A student admitted to the programs shall be governed by the rules, regulations and procedures framed and implemented by the University from time to time.
- h)** The students shall abide by the regulations mentioned in student handbook issued by the University. These standing regulations shall deal with the discipline of the students in the Hostels, Faculty, and University premises or outside. The standing orders may also deal with such other matters as are considered necessary for the general conduct of the students' co-

curricular and extra-curricular activities.

i) In exceptional circumstances the chairman of Academic Council may, on behalf of the Council, approve amendments, modifications, Insertions or deletions of an Ordinance(s) which in his/her opinion is necessary or expedient for the smooth running of the program provided all such changes are reported to the Council in its next meeting.

6.1. General Regulations for the Nutrition and Dietetics:

a) **Short Title and Commencement:** These regulations shall be called regulations for the Bachelor program in Faculty of Allied & Healthcare Sciences of the University and shall come into force on such date as the Academic Council may approve.

b) **Duration:** The duration of the Bachelor program leading to Bachelor of Nutrition and Dietetics shall be minimum of three years and maximum of four years for honors course and each year will comprise of two semesters. However, the duration may be extended up-to five years from the registered batch for Bachelors course and the duration may be extended up-to six years from the registered batch for the honors course. The maximum duration of the programs excludes the period of withdrawal, due to medical reasons. However, it shall include the period of rustication or any other reason of discipline /academics e.g., detention, willful absence by the student, not getting promotion to the next class due to poor academic performance etc. Under detention, the student shall attend the University for an additional semester or more time, as equated to period of absence/suspension.

c) **Starting or phasing out of Program:** The University may order such Undergraduate programs in Faculty of Allied & Healthcare Science leading to award a bachelor of degrees of Nutrition and Dietetics (BND) as per nomenclature laid by the UGC regulations on the subject. A program may be phased out on recommendations of the Academic Council and approval of the Governing Body, on account of continuous low registration in the program or any other justifiable reason like becoming obsolete etc. Similarly, the Academic Council may approve starting of a new program or modifying the existing one on the recommendations of the Academic Council.

d) **Admissions:** Admission to Nutrition and Dietetics program shall be made as per procedure approved by the Governing Body and may be reviewed periodically as required. Fee structure,

refund policy, total number of seats, reservation policy, and special category seats, e.g. sponsored seats, or direct into II year through lateral entry scheme for those who have completed Diploma in Nutrition and Dietetics.

e) **Eligibility for Admission:** 10+2 in any stream with 50% (45 % for SC/ST/OBC) marks in aggregate from any recognized board. Lateral entry: 10th with three-year diploma in Nutrition and Dietetics will be eligible for admission in second year/ 3rd semester. It is compulsory for the students of 10+2 in any stream to pass Deficiency Course i.e. Basic Biology (BIO000)* and Chemistry (CHE000)* subjects in IIInd SEM) or student has to clear /produce 10+2 Biology or Chemistry from their respective recognized board.

*A separate certificate will be issued for the same.

f) **Semester System:** The Bachelor of Science in Nutrition and Dietetics program in the University shall be based on Semester System; namely, Even (Jan to June) and Odd (July to Dec) Semesters, in an academic year. The courses whether ordered in regular semester shall be evaluated as per the policy and procedure laid down.

g) **Semester Duration:** A semester will be of approximately 18-20 weeks' duration. Of these, 90 days will be available for actual instructions including Mid Semester Exam.

7. Curriculum:

The 3-year curriculum has been divided into six semesters and shall include lectures/ tutorials/ laboratory work/ field work/ outreach activity/ project work/ viva/ seminars/ presentations/ assignments etc. or a combination of some of these. The curriculum will also include other curricular, co-curricular and extra-curricular activities as may be prescribed by the university from time to time.

***B.Sc. (Honors) Nutrition and Dietetics: A student can opt honors course by studying 4th year which comprises of core courses, Discipline Specific courses, research project & internship of 6 months.**

8. Choice Based Credit System:

The University has adopted Choice Based Credit System (CBCS), which provides an opportunity to the students to choose courses from the offered courses comprising of Core Course, Ability Enhancement, and Audit Courses. The choice-based credit system provides a

“flexible” approach in which the students can take courses of their choice, learn at their own pace, undergo additional courses, and acquire more than the required credits, and adopt an interdisciplinary approach to learning. Following are the types of courses and structure for the program:

Courses:

I. Core Course: A course, which should compulsorily be studied by a candidate as a core requirement to complete the requirement of program in as a discipline of study.

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

i. Discipline Specific Elective (DSE) Course: Elective courses may be ordered by the main discipline/subject of study, is referred to as Discipline Specific Elective. The University/Institute may also order discipline related Elective courses from unrelated discipline (to be ordered by main discipline/subject of study).

ii. Generic Elective (GE) Course: An elective course chosen generally from an unrelated discipline/subject, with an intention to add generic proficiency to the students.

Note: A core course ordered in a discipline/subject may be treated as an elective by other discipline/subject and vice versa and such electives may also be referred to as Generic Elective. Elective Course(s) may also be called an “Open Elective”

a) Ability Enhancement Courses (AEC): The Ability Enhancement Courses (AEC) may be of two kinds: Ability Enhancement Compulsory Courses (AECC) and Skill Enhancement Courses (SEC).

i. Ability Enhancement Compulsory Courses (AECC): “AECC” courses are the courses based upon the content that leads to Knowledge enhancement. These are mandatory for all disciplines i.e., (i) Environmental Studies, and (ii) English Communication/MIL Communication.

ii. Skill Enhancement Courses (SEC): These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge and are aimed at providing hands-on-training, competencies, skills, etc.

iii. Deficiency Course (DC): These courses i.e. Basic Biology (BIO000) and Chemistry (CHE000)

are compulsorily be studied by the candidates of 10+2 any stream.

9. Medium of Instructions:

- The medium of instructions and examination will be English.
- Practical work/Project Work / Project Report / Dissertation / Field Work Report / Training Report etc., if any, should be presented in English.

10. Mode: The program is offered in 'Full Time' mode of study only.

11. Attendance Requirement to be Eligible to Appear in End Semester Examination:

- Every student is required to attend at least 75% of the lectures delivered squaring tutorials, practical and other prescribed curricular and co-curricular activities.
- Dean of Faculty may give a further relaxation of attendance up to 10% to a student provided that he/she has been absent with prior permission of the Dean of the Faculty for the reasons acceptable to him/her.
- Further, relaxation up to 5% may be given by the Vice Chancellor to make a student eligible under special circumstances only.
- No student will be allowed to appear in the end semester examination if he/she does not satisfy the attendance requirements. Further, the attendance shall be counted from the date of admission in the University or commencement of academic session whichever is later.
- Attendance of N.C.C/N.S.S. Camps or Inter-Collegiate or Inter-University or Inter-State or International matches or debates or Educational Excursion or such other Inter-University activities as approved by the authorities' involving journeys outside the city in which the college is situated will not be counted as an absence. However, such absence shall not exceed four weeks per semester of the total period of instructions. Such type of facility should not be availed twice during the study.

12. Credit:

Each course, except a few special audit courses, has a certain number of credits assigned to it depending upon its lecture, tutorial and/or laboratory contact hours in a week. A letter grade, corresponding to specified number of grade points, is awarded in each course for which a student is registered. On obtaining a pass grade, the student accumulates the course credits as earned credits. A student's performance is measured by the number of credits that he/she has earned and by the weighted grade point average. A minimum number of credits should be

acquired to qualify for the programs.

Earned Credits (EC): The credits assigned to a course in which a student has obtained 'D' (minimum passing grade) or a higher grade will be counted as credits earned by him/her. Any course in which a student has obtained F, or W or "I" grade will not be counted towards his/her earned credits. A unit by which the course is measured. It determines the number of hours of instruction required per week.

Definition of Credit	
1 Hr. Lecture (L) per week	1 credit
1 Hr. Tutorial (T) per week	1 credit
2 Hours Practical (Lab) per week	1 credit

13. Program Structure:

As per GNA University

SEM	Course	Theory & Tutorial (No. × Credits)	Practicals (No. × Credits)	Total Credits / Semester
I & II	Core Courses	6 × 4 = 24	6 × 2 = 12	47
		2 × 3 = 06		
	Ability Enhance Compulsory Courses (AECC)	2 × 2 = 04	1 × 1 = 01	
Exit Program as certificate course		34	13	47
III & IV	Core Courses	6 × 4 = 24	4 × 2 = 08	48
	Skill Enhance Courses	2 × 4 = 08		
	Discipline Specific Courses	2 × 3 = 06	2 × 1 = 02	
Exit Program as Diploma Course		72	23	95
V & VI	Core Courses	6 × 4 = 24	4 × 2 = 08	48
	Skill Enhance Courses	2 × 4 = 08		
	Discipline Specific Courses	2 × 3 = 06	2 × 1 = 02	
Exit Program as Degree Course		110	33	143
VII & VIII	Core Courses	1 × 4 = 04	1 × 2 = 02	52
		1 × 6 = 06		
	Discipline Specific Electives	2 × 3 = 06	2 × 1 = 02	
	Research Project	1 × 4 = 04		
	Internship	1 × 8 = 08		
Exit Program as Degree in Honors		158	37	195
Total Course Credit				195
	Deficiency Course (DC)- Basic Biology (BIO000)	1 × 3 = 03	-	03
	Deficiency Course (DC)- Chemistry (BIO000)	1 × 3 = 03	-	03

Semester	Core Course (CC)	Ability Enhancement Compulsory Course (AECC) (2)	Skill Enhancement Course (SEC) (4) Skill Based	Discipline Specific Elective (DSE) (6)
I	CC 1	AECC 1		
	CC 2			
	CC 3			
	CC 4			
II	CC 5	AECC 2		
	CC 6			
	CC 7			
	CC 8			
III	CC 9		SEC – 1	DSE – 1
	CC 10 CC 11			
IV	CC 12		SEC – 2	DSE – 2
	CC 13			
	CC 14			
V	CC 15		SEC – 3	DSE – 3
	CC 16			
	CC 17			
VI	CC 18		SEC – 4	DSE – 4
	CC 19			
	CC 20			
VII	CC 21			DSE – 5
	CC 22			DSE – 6
				DSE – 7
VIII	Research Project			
	Major Internship (6 months)			
IX	DC (BIO000)			
X	DC (CHE000)			

Bachelor of Science in Nutrition & Dietetics Semester I (First year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Core Course	BND101	Principle of Human Nutrition	3	1	0	4	4	40	60	100
2	Core Course	BND102	Fundamental of Food Science – I	3	1	0	4	4	40	60	100
3	Core Course	BND103	Elementary Human Physiology	3	0	0	3	3	40	60	100
4	Core Course	BND104	Food Chemistry	3	1	0	4	4	40	60	100
5	Core Course	BND121	Principle of Human Nutrition LAB	0	0	4	2	4	30	20	50
6	Core Course	BND122	Fundamental of Food Science – I LAB	0	0	4	2	4	30	20	50
7	Core Course	BND123	Elementary Human Physiology LAB	0	0	4	2	4	30	20	50
8	Ability Enhanced compulsory Course		AECC – 1	2	0	0	2	2	40	60	100
9	Ability Enhanced compulsory Course		AECC – 1 LAB	0	0	2	1	2	30	20	50
Total Credits				14	3	14	24	31	320	380	700

Bachelor of Science in Nutrition & Dietetics Semester II (First year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Core Course	BND201	Public Health Nutrition	3	0	0	3	3	40	60	100
2	Core Course	BND202	Food Processing and Preservation	3	1	0	4	4	40	60	100
3	Core Course	BND203	Food Microbiology	3	1	0	4	4	40	60	100
4	Core Course	BND204	Fundamental of Food Science – II	3	1	0	4	4	40	60	100
5	Core Course	BND221	Public Health Nutrition LAB	0	0	4	2	4	30	20	50
6	Core Course	BND222	Food Processing and Preservation LAB	0	0	4	2	4	30	20	50
7	Core Course	BND223	Food Microbiology LAB	0	0	4	2	4	30	20	50
8	Ability Enhanced compulsory Course		AECC – 2	2	0	0	2	2	40	60	100
Total Credits				14	3	12	23	29	290	360	650

9	Deficiency Course (DC)	BIO000	Basic Biology	3	0	0	3	3	40	60	100
10	Deficiency Course (DC)	CHE000	Chemistry	3	0	0	3	3	40	60	100

Bachelor of Science in Nutrition & Dietetics Semester III (Second year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Core Course	BND301	Nutrition Through Life cycles	3	1	0	4	4	40	60	100
2	Core Course	BND302	Introduction to Clinical Nutrition	3	1	0	4	4	40	60	100
3	Core Course	BND303	Nutraceuticals and Health Foods	3	1	0	4	4	40	60	100
4	Core Course	BND321	Nutrition Through Life cycles LAB	0	0	4	2	4	30	20	50
5	Core Course	BND322	Introduction to Clinical Nutrition LAB	0	0	4	2	4	30	20	50
6	Discipline Specific Elective		DSE-1	3	0	0	3	3	40	60	100
7	Discipline Specific Elective		DSE-1 LAB	0	0	2	1	2	30	20	50
8	Skill Enhanced Course		SEC-1	3	1	0	4	4	40	60	100
Total Credits				15	4	10	24	29	290	360	650

Bachelor of Science in Nutrition & Dietetics Semester IV (Second year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Core Course	BND401	Nutrition and Meal Planning	3	1	0	4	4	40	60	100
2	Core Course	BND402	Community Nutrition	3	1	0	4	4	40	60	100
3	Core Course	BND403	Food Standard & Quality Control	3	1	0	4	4	40	60	100
4	Core Course	BND421	Nutrition and Meal Planning LAB	0	0	4	2	4	30	20	50
5	Core Course	BND422	Community Nutrition LAB	0	0	4	2	4	30	20	50
6	Discipline Specific Elective		DSE-2	3	0	0	3	3	40	60	100
7	Discipline Specific Elective		DSE-2 LAB	0	0	2	1	2	30	20	50
8	Skill Enhanced Course		SEC-2	3	0	0	3	3	40	60	100
8	Skill Enhanced Course		SEC-2 LAB	0	0	2	1	2	30	20	50
Total Credits				15	3	12	24	30	320	380	700

Bachelor of Science in Nutrition & Dietetics Semester V (Third year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Core Course	BND501	Therapeutic Nutrition – I	3	1	0	4	4	40	60	100
2	Core Course	BND502	Nutritional Biochemistry – I	3	1	0	4	4	40	60	100
3	Core Course	BND503	Nutrition & Immunity	3	1	0	4	4	40	60	100
4	Core Course	BND521	Therapeutic Nutrition – I LAB	0	0	4	2	4	30	20	50
5	Core Course	BND522	Nutritional Biochemistry – I LAB	0	0	4	2	4	30	20	50
6	Discipline Specific Elective		DSE-3	3	0	0	3	3	40	60	100
7	Discipline Specific Elective		DSE-3 LAB	0	0	2	1	2	30	20	50
8	Skill Enhanced Course		SEC-3	3	0	0	3	3	40	60	100
9	Skill Enhanced Course		SEC-3 LAB	0	0	2	1	2	30	20	50
Total Credits				15	3	12	24	30	320	380	700

Bachelor of Science in Nutrition & Dietetics Semester VI (Third year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Core Course	BND601	Therapeutic Nutrition – II	3	1	0	4	4	40	60	100
2	Core Course	BND602	Food Product Development and Formulation	3	1	0	4	4	40	60	100
3	Core Course	BND603	Nutritional Biochemistry – II	3	1	0	4	4	40	60	100
4	Core Course	BND621	Therapeutic Nutrition – II LAB	0	0	4	2	4	30	20	50
5	Core Course	BND622	Food Product Development and Formulation LAB	0	0	4	2	4	30	20	50
6	Discipline Specific Elective		DSE – 4	3	0	0	3	3	40	60	100
7	Discipline Specific Elective		DSE – 4 LAB	0	0	2	1	2	30	20	50
8	Skill Enhanced Course		SEC – 4	3	0	0	3	3	40	60	100
8	Skill Enhanced Course		SEC – 4 LAB	0	0	2	1	2	30	20	50
Total Credits				15	3	12	24	30	320	380	700

** Note: A student must undergo a compulsory Minor Internship of 45 days after the completion of 6th semester and submit his/her completion certificate.

Bachelor of Science in Nutrition & Dietetics Semester VII (Fourth year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Core Course	BND701	Institutional Food Service Management	3	1	0	4	4	40	60	100
2	Core Course	BND702	Research Methodology	5	1	0	6	6	40	60	100
3	Core Course	BND721	Institutional Food Service Management LAB	0	0	4	2	4	30	20	50
4	Discipline Specific Elective		DSE – 5	3	0	0	3	3	40	60	100
5	Discipline Specific Elective		DSE – 5 LAB	0	0	2	1	2	30	20	50
6	Discipline Specific Elective		DSE – 6	3	0	0	3	3	40	60	100
7	Discipline Specific Elective		DSE – 7	3	1	0	4	4	40	60	100
Total Credits				17	3	6	23	26	260	340	600

Bachelor of Science in Nutrition & Dietetics Semester VIII (Fourth year)

Sr. No	Category	Course Code	Course Title	Teaching Scheme			credits	Hours	Examination Scheme		Total
				L	T	P			Internal	External	
1	Research Project	BND821	Research Project				8		80	120	200
2	Major Internship	BND822	Major Internship				20		160	240	400
Total Credits							28		240	360	600

Bachelor of Science in Nutrition & Dietetics**Core Course**

Sr. No	Category	Course Code	Course Name
1	Core Course	BND101	Principle of Human Nutrition
2	Core Course	BND102	Fundamental of Food Science – I
3	Core Course	BND103	Elementary Human Physiology
4	Core Course	BND104	Food Chemistry
5	Core Course	BND201	Public Health Nutrition
6	Core Course	BND202	Food Processing and Preservation
7	Core Course	BND203	Food Microbiology
8	Core Course	BND204	Fundamental of Food Science – II
9	Core Course	BND301	Nutrition Through Life cycles
10	Core Course	BND302	Introduction to Clinical Nutrition
11	Core Course	BND303	Nutraceuticals and Health Foods
12	Core Course	BND401	Nutrition and Meal Planning
13	Core Course	BND402	Community Nutrition
14	Core Course	BND403	Food Standard and Quality Control
15	Core Course	BND501	Therapeutic Nutrition – I
16	Core Course	BND502	Nutritional Biochemistry – I
17	Core Course	BND503	Nutrition and Immunity
18	Core Course	BND601	Therapeutic Nutrition – II
19	Core Course	BND602	Food Product Development and Formulation
20	Core Course	BND603	Nutritional Biochemistry – II
21	Core Course	BND701	Institutional Food Service Management
22	Core Course	BND702	Research Methodology

Bachelor of Science in Nutrition & Dietetics**Core Course**

Sr. No	Category	Course Code	Course Name
1	Core Course	BND121	Principle of Human Nutrition LAB
2	Core Course	BND122	Fundamental of Food Science – I LAB
3	Core Course	BND123	Elementary Human Physiology LAB
4	Core Course	BND221	Public Health Nutrition LAB
5	Core Course	BND222	Food Processing and Preservation LAB
6	Core Course	BND223	Food Microbiology LAB
7	Core Course	BND321	Nutrition Through Life cycles LAB
8	Core Course	BND322	Introduction to Clinical Nutrition LAB
9	Core Course	BND421	Nutrition and Meal Planning LAB
10	Core Course	BND422	Community Nutrition LAB
11	Core Course	BND521	Therapeutic Nutrition – I LAB
12	Core Course	BND522	Nutritional Biochemistry – I LAB
13	Core Course	BND621	Therapeutic Nutrition – II LAB
14	Core Course	BND622	Food Product Development and Formulation LAB
15	Core Course	BND721	Institutional Food Service Management LAB
16	Core Course	BND821	Research Project
17	Core Course	BND822	Major Internship

Deficiency Courses

Sr. No	Category	Course Code	Course Name
1	Deficiency Course	BIO000	Basic Biology
2	Deficiency Course	CHE000	Chemistry

a) Discipline Specific Elective (DSE)

Sr. No	Category	Course Code	Course Name	L	T	P	Credits
1	DSE1	BND001	Health Hygiene and Sanitation	3	0	0	3
2		BND021	Health Hygiene and Sanitation LAB	0	0	2	1
3	DSE2	BND002	Sports Nutrition and Physical Fitness	3	0	0	3
4		BND022	Sports nutrition and Physical Fitness LAB	0	0	2	1
5	DSE3	BND003	Introduction to Cookery	3	0	0	3
6		BND023	Introduction to Cookery LAB	0	0	2	1
7	DSE4	BND004	Elementary Statistics	3	0	0	3
8		BND024	Elementary Statistics LAB	0	0	2	1
9	DSE5	BND005	Food Analysis	3	0	0	3
10		BND025	Food Analysis LAB	0	0	2	1
11	DSE6	BND006	Food Toxicology	3	0	0	3
12	DSE7	BND007	Nutrigenomics	3	1	0	4

b) Ability Enhanced Compulsory Courses (AECC)

Sr. No	Category	Course Code	Course Name	L	T	P	Credits
1	AECC – 1	COM101	English Communication	2	0	0	2
2		COM121	English Communication LAB	0	0	2	1
3	AECC – 2	ENS001	Environmental studies	2	0	0	2
4	AECC – 3	GWE101	Gender Equality and Women Empowerment	2	0	0	2
5	AECC – 4	HVPE101	Human Values and Professional Ethics	2	0	0	2

c) Skill Enhanced Course (SEC) Laboratory

Sr. No	Category	Course Code	Course Name	L	T	P	Credits
1	SEC – 1	EBM101	Entrepreneurship Development & Business Management	3	1	0	4
2	SEC – 2	BCA101	Computer Fundamentals	3	0	0	3
3		BCA121	Computer Fundamentals LAB	0	0	2	1
4	SEC – 3	BPS010	Yoga Education	3	0	0	3
5		BPS307	Yoga Education LAB	0	0	2	1
6	SEC – 4	BND008	Bakery and Confectionery	3	0	0	3
7		BND028	Bakery and Confectionery LAB	0	0	2	1
8	SEC – 5	BCH409	Pesticide Chemistry	2	0	0	2

d) Deficiency Course

Sr. No	Category	Course Code	Course Name
1	DC	BIO000	Basic Biology
2	DC	CHE000	Chemistry

14. Internship:**14.1 Minor Internship:**

a) Minor Internship is a non- credit compulsory course, to be done typically after VI semester. A student should undergo training for 45 days after VI semester and will submit minor internship completion certificate from the concerned hospitals.

b) It is the responsibility of the Corporate Relations Department (CRD) to arrange for training for all the students. In the beginning of each academic session, Corporate Relations Department will prepare a list of all potential medical Laboratories and Hospitals for training. These training organizations will be approached by the Corporate Relations Department with a request to provide training seats. Consolidated lists of training offers will be made available to all the students in the beginning of semesters of the session. If a student is interested in making his/her own arrangement for the training seat, he/she will need to have the training organization approved by routing the application to the Dean of Faculty of Allied & Healthcare Sciences for approval.

c) The students will be required to get their training activity and results reviewed by organization in which they have attended the training. Each Faculty shall nominate training coordinator from amongst the faculty members. The faculty will scrutinize the training report and the certificate issued by the corporate and will award a marks grade, which must be sent to the controller of examination. The clinics and Hospitals training, submission of project report and obtaining pass grade is mandatory requirement for award of Bachelor of Nutrition & Dietetics degree.

14.1 Major Internship:

d) Major Internship is a credit compulsory course of 20 credits, to be done typically in VIII semester. A student should undergo training for six months in VIII semester and will submit internship completion certificate from the concerned hospitals.

e) It is the responsibility of the Corporate Relations Department (CRD) to arrange for training for all the students. In the beginning of each academic session, Corporate Relations Department will prepare a list of all potential medical Laboratories and Hospitals for training. These training organizations will be approached by the Corporate Relations Department with a request to provide training seats. Consolidated lists of training offers will be made available to all the students in the beginning of semesters of the session. If a student is interested in making

his/her own arrangement for the training seat, he/she will need to have the training organization approved by routing the application to the Dean of Faculty of Allied & Healthcare Sciences for approval.

f) The students will be required to get their training activity and results reviewed by organization in which they have attended the training. Each Faculty shall nominate training coordinator from amongst the faculty members. The faculty will scrutinize the training report and the certificate issued by the corporate and will award a marks grade, which must be sent to the controller of examination. The clinics and Hospitals training, submission of project report and obtaining pass grade is mandatory requirement for award of Bachelor of Nutrition & Dietetics degree.

15 Examination/Evaluation System:

The evaluation system of the University shall be oriented to encourage the academic qualities.

We follow the Absolute Grading System. The University follows two components to evaluate student's performance:

a) **Internal Assessment:** which is to be marked by respective teacher includes attendance, mid semester examination and other components (Assignment, Project, Practical Lab Continuous Assessment, case study, viva voce, MCQ Quiz) carrying a weightage of 40%. This is applicable for all the courses.

b) **Practical Courses:** The examination/evaluation criteria of the practical courses shall be decided by the respective faculty member and wherever required on the availability of the external experts/visiting faculty. Faculty may set/design the practical exercises out of any marks, but the overall weightage shall be in pre- defined percentage, which the concerned faculty/course coordinator shall announce in the first class of the semester and upload on the GU-MS. Methodology for evaluation of Lab component may include day to day work, lab records, quantity/quality of work and Viva/Seminar/Practical as may be decided.

c) **External Assessment:** i.e., End Semester Examination, carrying a weightage of 60%.

i. **End Semester Examination:** These examinations shall be conducted under Controller of Examination. The examination dates and schedule shall be released by the University's Controller of Examination.

ii. Similar division of marks may be created for special courses like Major Projects, seminars, term papers, internship etc. by respective faculty but same shall also be predefined.

iii. Every student has to score at least 25% marks each in Continuous Assessment and End Semester examination. The minimum pass percentage is 40% in aggregate. In case a student scores more than 25% each in Continuous Assessment and End Semester Examination, but overall percentage in the concerned subject remains less than 40%, then student has to repeat End Semester Examination in that subject.

d) Failing to meet Attendance Requirement:

a) A student is required to attend all the classes.

b) If the attendance profile of a student is unsatisfactory, he/she will be debarred. Any student, who has been debarred due to attendance shortage, shall not be allowed to take the supplementary Examination. The student shall have to register for the course in the regular semester when offered.

e) **Make-up Examinations for Mid Semester Examination:** A student may apply for a make-up examination where he/she is not able to attend the examination schedule due to reasons of personal medical condition or compassionate reason like death of a very close relative. No other contingencies are acceptable. Except in case of medical emergency, a student needs to seek advance approval from appropriate authority before missing the Examination.

Theory Courses:

- A student missing Mid Term Examination only shall be required to take a make-up Examination.
- The students must put-up the request for make-up Examination along with the medical documents to prove the genuineness of the case (for having missed the Examination) within 5 days of last date of Examination.
- The genuineness shall be reviewed and approved by the Vice Chancellor, whose decision shall be final.
- In case a student misses the make-up Examination also, then no further chance will be provided.
- The duration of Examination shall be as decided by the faculty member.
- Genuine approved cases shall be notified by the Controller of Examination based on the requests received and only such students shall be allowed to take make-up Examination in the subjects where approval has been granted.

- The date sheet need not be taken out as the makeup examination shall be conducted under arrangement concerned faculty, who after evaluation and sharing the evaluated answer sheet with student shall submit marks to the Controller of Examination.
- In the case of deficiency course, student has to submit a separate fee (5000 per course) for the same.

f) Makeup of End Semester Examination: It is mandatory to appear the end semester major examination to obtain any grade for a course. A student who misses the end semester major examination shall follow a similar procedure as outlined above, to obtain approval of the Vice Chancellor to prove genuineness of the case. The student whose case is approved as genuine shall be awarded "I" Grade in the semester results in the given subject. The student shall be allowed to appear in the supplementary examination of the said subject. However, the grades shall be worked out by computing the marks obtained by students in Mid Term Exams, TA, Lab and supplementary examination (equated to the weightage of end semester examination). The total marks shall be compared with the marks of the class as in the regular semester for award of grade.

g) Makeup of End Semester Viva of Projects: It is mandatory to appear in the final Viva examination to obtain any grade for a project course. In case of student missing the same for genuine reasons; similar method as given for written examination of theory courses shall be followed.

h) Procedure to be adopted by students in case of missing any of the specified Examination(s): Following procedure shall be adopted for establishing genuineness of the case.

a. Action by the student (Medical Cases)

I. They should report absence from the Examination(s) by fastest possible means to the Controller of Examination. It could be email or written communication by speed post or sent by hand through any means. In case of Hosteller's, if a student falls sick while residing in the hostel, he/she should seek advice of the available qualified doctor.

II. The said report should preferably be sent prior to the Examination, but not later than 5 days after the last date of the said Examination.

III. The student should on rejoining:

a. Report to the Controller of Examination with complete medical documents to include referral/Prescription slip of the doctor specifically indicating the disease and medicine prescribed, investigation/Lab reports and discharge slip in case of admission should be provided.

b. Submit the Documents to the Controller of Examination, not later than 5 days after the last date of Examination.

IV. In case delay beyond 5 days is anticipated the student should arrange for the medical documents to be sent to the University Medical Officer by hand through a friend / relative etc. and get the said genuineness deposit with the Controller of Examination.

V. No request later than 5 days after the last date of Examination shall be accepted for reasons of ignorance or any other reasons.

b . Action by students (any other reason)

In case the student must miss Examination due to genuine reason other than medical, prior written sanction of Vice Chancellor and in his absence Dean is mandatory. No post facto requests shall be accepted in any case. The approval should be deposited with the Controller of Examination before the examination.

i) Supplementary Examination:

a. The supplementary examinations shall be held for each commiserating semester in December for Odd semester and May/June for Even semester respectively. For the final semester students, there is privilege to appear in the supplementary exams of all pervious semester.

b. Eligibility: Student with 'F' grade is eligible to appear in the Supplementary Examination.

c. Supplementary for Projects: There shall be no supplementary examinations for the projects, except make up examination for missing the final viva as per rules outlined above.

16. Grading System: University follows eight letter grading system (A+, A, B+, B, C+, C, D, and F) that have grade points with values distributed on a 10-point scale for evaluating the performance of student. The letter grades and the corresponding grade points on the 10-point scale are as given in the table below.

Academic Performance	Range of Marks	Grades	Grade Point
Outstanding	≥90	A+	10
Excellent	≥80 &< 90	A	9
Very Good	≥70 &< 80	B+	8
Good	≥60 &< 70	B	7
Fair	≥50 &< 60	C+	6
Average	>40 &< 50	C	5
Minimally Acceptable	40	D	4
Fail	< 40	F	0
Incomplete		I	-
Withdrawal		W	-
Grade Awaited		GA	-
S-Satisfactory, US-Unsatisfactory Minor Project		S/US	-

Description of Grades:

A. D Grade: The D grades stands for marginal performance, i.e. it is the minimum passing grade in any course. D grade shall not be awarded below 30% marks, though each teacher may set higher marks for same

B. F Grade: The 'F' grade denotes a very poor performance, i.e. failing a course. A student has to repeat all courses in which she/he obtains 'F' grade, until a passing grade is obtained. In the case of 'F', no Grade points are awarded. However, the credits of such courses shall be used as denominator for calculation of GPA or CGPA.

B. W Grade: The 'W' grade is awarded to a student if he/she is allowed to withdraw for an entire Semester from the University on medical grounds for a period exceeding five weeks.

C. I' Grade: The 'I' grade is awarded when the student is allowed additional opportunity like make up Examination etc. based on which the grade is to be decided along with other components of the evaluation during the semester 24 An incomplete grade of 'I' may be given when an unforeseen emergency prevents a student from completing the work in a course. The 'I' must be converted to a performance grade (A to F) within 90 days after the first day of classes in the subsequent regular semester.

D. X Grade: It is equivalent to Fail grade but awarded due to student falling below the laid down attendance requirement. Students having X grade shall be required to re-register for the course, when offered next.

Cumulative Grade Point Average (CGPA), it is a measure of overall cumulative performance of a student over all semesters.

The CGPA is the ratio of total credit points secured by a student in various courses in all Semesters and the sum of the total credits of all courses in all the semesters. It is expressed up to two decimal places.

NB: The CGPA can be converted to percentage by using the given formula: $CGPA \times 10 = \%$

$$\text{e.g. } 7.8 \times 10 = 78\%$$

Based on the grades earned, a grade certificate shall be issued to all the registered students after every semester. The grade certificate will display the course details (Course title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

16.1 Acceptance of MOOC courses

Faculty of Allied & Healthcare Sciences (Nutrition and Dietetics) accepts the MOOC course

available on SWAYAM platform for credit transfer.

40% of the courses can be taken from the available list of MOOCs on SWAYAM.

Instructions for MOOC courses

I. MOOC courses taken for credit transfer must be approved and recommended by Dean Academics and Dean of the Faculty before the start of the semester.

II. The copy of the list of courses taken by the students for any course has to be submitted to the Controller of the Examination.

III. MOOC course should be done from SWAYAM plat form as per the guidelines of UGC.

IV. To obtain the credit the student needs to complete the assessment of the course and provide the certificate of the course issued by the SWAYAM/NPTEL. After completing the certificate, the student must submit the certificate within a week to the department.

V. The fees (if any) for the registration and / or assessment of the MOOC course must be borne by the student only.

VI. The student can opt for a particular online MOOC course if and only if the credit of that course is equivalently mapped with the program structure.

VII. If the student obtains the same course credit which mapped with the course, then credit shall be considered for this course and the grade/marks provided by the accessing authority shall be transfer to the student. The result of the MOOC shall be take non record by the university examination cell and a result declared for these papers.

VIII. For any particular semester, all results for the MOOC course must be submitted along with the marks of other papers of the same semester by the course coordinator.

IX. MOOC course coordinators shall be appointed for each of the course taken by the student.

17. General Rules: Examinations:

a) Showing the Answer Scripts: The answer scripts of all written Examinations i.e. Mid Term or end semester examination or any other written work conducted by a teacher shall be shown to the students.

b) Marks/Answer Sheets of all other tests shall also be shared with the students and thus, there shall be no scrutiny of grades. However, before the grades are forwarded to Registrar/Controller of Examination, they should be displayed on GU-MS and time given to students, to discuss the same with respective faculty.

c) No appeal shall be accepted for scrutiny of grades.

d) Examination Fee for Supplementary. A fee of Rs.1000/- per course or as decided by the

Management from time to time will be charged from the students.

18. Improvement of overall Score: A candidate having CGPA < 5.5 and wishes to improve his/her overall score may do so within two academic years immediately after passing the degree program by reappearing into maximum four course(s)/subject(s). The improvement would be considered if and only if the CGPA becomes > 5.5.

19. Program qualifying criteria: For qualifying the Program every student is required to earn prescribed credits (i.e., for certificate course required credits are 47, for diploma course required credits are 95, for degree course, required credits are 143, for honors degree, required credits are 195). If any student fails to earn prescribed credits for the program, then he/she will get a chance to complete his/her Program in two more years than the actual duration of degree.

20. Revision of Regulations, Curriculum and Syllabi: The University may revise, amend, change or update the Regulations, Curriculum, Syllabus and Scheme of examinations through the Board of Studies and the Academic Council as and when required.

21. Conditions for Award of a Degree:

a) Should complete the requirements of the Degree in maximum duration specified for the program. Semester withdrawals due to medical reasons are not counted in six years. However, forced withdrawal of students e.g. rustication or expulsion or nonattendance by student due to any other reasons, shall count in the maximum period of six years and minimum period of four years.

b) Successfully completing the Internship studies.

c) Should have cleared all the foundational and core courses of the programs. In case of lateral entry students (direct entry into second year) the student should have completed the foundational/core courses/equivalent courses, as approved at the time of admission in the programs.



BACHELOR OF SCIENCE IN NUTRITION & DIETETICS

FACULTY OF ALLIED & HEALTH CARE SCIENCES

SEMESTER I

Core Course BND101: PRINCIPLE OF HUMAN NUTRITION

Credits: 04

LTP 310

THEORY

Course Description: Provides an integrated overview of the physiological requirements and functions of protein, energy, and the major vitamins and minerals that are determinants of health and diseases in human populations.

Course Learning Outcomes (CLO): Through this course student should be able to:

- Describe the major energy sources, their requirement, utilization and factors influencing energy requirements
- Study about major macro and micro nutrients; their functions, requirements, sources and their utilization in human body
- Master the understanding of nutritional status and basic metabolic process of human body
- Differentiate between deficiency and toxicity diseases related to micro nutrients

Course Content

Unit I

Food groups, food guide pyramid and its importance, foods as a source of nutrients
Relationship of nutrition to health, growth and human welfare; Definitions of terms used in nutrition -Recommended dietary allowances; balanced diet; health; functional food; phytochemicals; nutraceuticals; dietary supplements
Digestion and absorption of carbohydrates, fats and proteins
Water, Functions, sources, distribution in body, water and electrolyte balance

Unit II

Energy -Units, sources and requirements, fuel value of foods, Methods of measuring energy value of food, Energy requirement of body, physical activity and thermogenic effect of food,

BMR -methods of measurement, factors affecting BMR

Carbohydrates -Types, functions, sources, requirement, health conditions affected by carbohydrates, Significance of dietary fibre

Unit III

Proteins -types, functions, sources, requirement, quality evaluation, improvement, deficiency disorders and protein energy malnutrition

Lipids -Types, functions, sources, requirement, health problems associated with lipids

Unit IV

Vitamins -Classification, functions, sources, requirement, deficiency and toxicity of the following - (i) Fat soluble vitamins-A, D, E, K; (ii) Water soluble vitamins –C, (iii) B Complex: thiamine, riboflavin, niacin, B2, B3 and folic acid

Minerals -Classification, functions, sources, requirements, deficiency and toxicity of calcium, phosphorus, iodine, fluorine, iron, bioavailability and factors affecting calcium and iron absorption Sodium, potassium, chloride, copper and zinc

Suggested Readings:

1. Shubhangini A. Joshi,(2021)' "Nutrition and Dietetics "Tata Mc Grow- Hill publishing Company Ltd, New Delhi.
2. Srilakshmi. B (2021) – "Nutrition Science", V Edn, New Age International (P) Ltd, Publishers, Chennai
3. Passmore R. and Eastwood M.A,(1986), "Human Nutrition and Dietetics", English language book Society/Churchill Livingstone, Eighth edition, Hong Kong.
4. Groff JL and Gropper S (2012) Advanced Nutrition and Human Metabolism. 7th Edition, Yolanda Cossio, New York.
5. Guardia M and Garrigues S (2015) Hand Book of Mineral Elements in Foods. John Wiley & Sons Inc. Hoboken, New Jersey.
6. Schwalfenberg GK (2017) Vitamins K1 and K2: the emerging group of vitamins required for human health. Journal of Nutrition and Metabolism. <https://doi.org/10.1155/2017/6254836>.
7. <https://www.who.int>
8. <https://nutrition.org>
9. FAO/WHO (2004) Vitamins and Minerals in Human Nutrition. A report of joint FAO/WHO Expert Consultation. 2nd Edition, World Health Organization and Food and Agriculture Organization of the United Nations.
10. FAO WHO/UNU (2004) Human Energy Requirements: Report of a Joint FAO/WHO/UNU Expert Consultation. Geneva: World Health Organization. FAO Food and Nutrition Technical Report Series 1.

SEMESTER I

Core Course BND121: PRINCIPLE OF HUMAN NUTRITION LAB

Credits: 02

LTP 004 PRACTICAL

PRACTICAL LIST

1. Introduction to Recommended Dietary Allowances/Nutritive value of foods.
2. Standardization of recipes.
3. Planning and preparation of nutrient rich dishes;
 - a. Protein, calcium, iron, vitamin A, thiamine, riboflavin, niacin and ascorbic acid,
 - b. Calculate cost of dishes prepared for above nutrients.
4. Planning and preparation of dishes based on simple processing techniques to improve bioavailability of nutrients.
 - Germination
 - Fermentation
 - Mutual supplementation

SEMESTER I**Core Course BND102: FUNDAMENTALS OF FOOD SCIENCE – I****Credits: 04****LTP 310 THEORY**

ISBN-13 9780367484170

6. De S, Outlines of Dairy Technology, Oxford Publishers, 2001

7. Frazier WC and Westhoff DC, Food Microbiology, 5th ed. TMH Publication, New Delhi, 2014

8. Ward JD and Ward LT (2012) Principles of Food Science. Goodheart-Willcox Publisher, Illinois

Course Description: Provides information about the food resources and minimize waste. Also gives an insight about the processing, distribution, storage and preparation of food.

Course Learning Outcomes (CLO): Through this course student should be able to:

- Discuss various method of food preparation
- Enumerate and classify status of nutritive value and structural composition of food
- Evaluate chemical composition and nutritive value of the fruits, vegetables, cereals and meat based food products
- Analyze the effect of processing parameters on nutritional value

Course Content**Unit I**

Introduction to Food Science: Definition, functions, food groups, classification of foods. Study of different cooking methods, merits and demerits, Solar cooking, Microwave cooking. Nutrients and functions of food viz. Carbohydrates, Protein, Lipids, Vitamins, Minerals. Changes in nutrients during processing and storage of food.

Unit II

Water: Physical properties of water and Ice, chemical, nature, structure of the water molecule. Absorption phenomena, types of water solutions and colligative properties; Free and bound water; Water activity and Food spoilage; Freezing and Ice structure.

Unit III

Food Dispersions- Introduction, structure and stability of different types of food dispersions
Cereals: General outline, Composition & Nutritive value, Structure of wheat and Rice, use in variety of preparation, selection, variety, storage, nutritional aspects and cost. Changes during cooking and germination.

Unit IV

Pulses & Legumes: Composition, Nutritive value, Antinutritional factors Changes during cooking, Factors affecting cooking time, Germination, Changes during germination

Suggested Readings:

1. Deman JM, Principles of Food Chemistry, 4th ed. Van Nostrand Reinhold, 2018 NY ISBN: 978-3-319-63607-8
2. Meyer LH, Food Chemistry, CBS Publication, (2004) New Delhi, 1987 ISBN:9788123911496, 9788123911496
3. Manay NS and Shadaksharaswamy M, Food-Facts and Principles, 4th ed. New Age International (P) Ltd. Publishers, New Delhi, 2020
4. Potter NH, Food Science, CBS Publication, New Delhi, 2007 ISBN: 9788123904726, 9788123904726
5. Ramaswamy H and Marcott M, Food Processing Principles and Applications CRC Press, 2015

SEMESTER I

Core Course BND122: FUNDAMENTALS OF FOOD SCIENCE – I LAB

Credits: 02

LTP 004 PRACTICAL

PRACTICAL LIST

1. Orientation to foods.
2. Equipment, tools, weights and measures used in the kitchen.
3. Methods of measuring and weighing dry ingredients and liquids.
4. Market survey of essential raw and processed food products.
5. Preparation of dishes and beverages using:
 - cereals,
 - pulses,
 - fruits,
 - vegetables,
 - milk and milk products
6. Sugar cookery: Stages, Process of caramalization, demonstration of 1-thread and 2-thread consistency.

Core Course

BND103: ELEMENTARY HUMAN PHYSIOLOGY

Credits : 03

LTP 300

THEORY

Course Description: Enlightens about the structure and functions of various organs of the body and makes aware about the basic mechanism of the body system by maintaining general homeostasis.

Course Learning Outcomes (CLO): Through this course student should be able to:

CO1: Know about different anatomical structures of Human Body

CO2: Knowledge about Cellular & Tissue level of organization.

CO3: Understanding about Skeletal system & Bones.

CO4: Knowledge about Neurons & Nervous System.

CO5: To study about Endocrine System & Hormones.

Course Content

Unit I

Introduction to human body: Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology

Cellular level of organization: Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine

Tissue level of organization: Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

Unit II

Alimentary system: mechanism and physiology of digestion and absorption structure & function (Mouth, Tongue, Teeth, Esophagus, Pharynx, Stomach, Intestine, Rectum, Anus; Digestive glands; physiology of digestion of carbohydrates, lipids & proteins, structure and function of liver.

Urinary system: Main parts, Structure & function of kidney, structure of nephron, physiology of excretion & urine formation, urine, additional excretory organs.

Unit III

Circulatory system: Composition and functions of blood, anatomy and physiology of Heart, circulation of blood, cardiac cycle and conducting system of Heart, the blood pressure, arteries and veins.

Respiratory system: Organs of respiration and their histology, Respiration (definition and mechanism), Gas exchange in the lungs, Regulation of respiration, Basal metabolic rate.

Unit IV

Reproductive system: Male and Female reproductive system, Histology of gonads, the ovarian cycle and ovulation, Fertilization, spermatogenesis

Suggested Readings:

1. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson.
2. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam.
3. Principles of Anatomy and Physiology by TortoraGrabowsk

Core Course

BND123: Elementary Human Physiology LAB

Credits : 02

LTP 004

PRACTICAL LIST

I. Identification of Various Organs in the human Body:

- i. Liver
- ii. Heart
- iii. Kidney
- iv. Nephron
- v. Lungs
- vi. Neuron
- vii. Ovary

II. Demonstration of various parts of body

III. Estimation of blood pressure, cardiac cycle and respiration.

IV. Identification of blood cells and different counts.

Core Course**BND104: FOOD CHEMISTRY****Credits : 04****LTP 310****THEORY**

Course Description: Food chemistry mainly deals with chemical structure and properties of food constituents, and with chemical changes food undergoes. The course covers a broad range of subjects related to foods including basic scientific principles to food systems and practical applications.

Course Learning Outcomes (CLO): To enable the students to:

- Understand the relationship between nutrition and human wellbeing.
- Know and understand the functions, importance of all nutrients for different age groups and special groups
- To know the major and minor components of foods.
- To know composition and properties of food

Course Content**Unit I**

1. Properties of foods. Solubility Vapor pressure, boiling point, Freezing point, Osmotic pressure, Viscosity, Surface tension, Specific gravity
2. Oxidation and reduction, Acids Bases and Buffers, Chemical bonding, Ionic bond, Covalent bond, Hydrogen bond Polar and Non- polar molecules
3. Colloids Sols Gels Emulsions and Foams
4. Composition of foods- classification Structure and properties of carbohydrates

Unit II

5. Proteins
6. Lipids
7. Properties of minerals and vitamins

Unit III

8. Pigments - Structure and properties of chlorophyll, Anthocyanins, Flavanoids, Tannins, Betalains, Quinones and Carotenoids

9. Myoglobin and hemoglobin, Flavor compounds- Terpenoids, Flavonoids, Sulphur compounds and volatile flavor compounds
10. Enzymatic browning Enzymes in food processing Classification, composition and effect of processing of fruits and vegetables. Structure, composition, processing and effects on composition of cereals, pulses and oilseeds. Composition, processing and changes in processing of milk, eggs, meat and poultry

Unit IV

11. Sugars and sweeteners Reaction of sugars, Non-nutritive sweeteners
12. Food additives: Antioxidants, Chelating Agents, Coloring Agents, Emulsions, flavor enhancers, Humectants and anti-caking agents
13. Nutrient supplements

Suggested readings:

1. Fennema, Owen R, Food Chemistry, 5th ed., Marcell Dekker, New York, 2017
2. Whitehurst and Law, Enzymes in Food Technology, 2nd ed. CRC Press, Canada, 2009 ISBN: 978-1-405-18366-6
3. Wong, Dominic WS, Food Enzymes, Chapman and Hall, New York, 1995
4. Potter NH, Food Science, CBS Publication, New Delhi, 2007 ISBN: 9788123904726, 9788123904726
5. Deman JM, Principles of Food Chemistry, 4th ed. Van Nostrand Reinhold, 2018 NY ISBN: 978-3-319-63607-8
6. Manay NS and Shadaksharaswamy M, Food-Facts and Principles, 4th ed. New Age International (P) Ltd. Publishers, New Delhi, 2020
7. Aurand, L.W .and Woods A.E(.1973 .)Food chemistry .The AVI Publishing Company, Inc., Westport Connecticut.
8. Mondy, N.I(.1980.)Experimental food chemistry.AVI Publishing Company, Inc .Westport Connecticut

Core Course

BND201: PUBLIC HEALTH NUTRITION

Credits : 03

LTP 300

SYLLABUS FOR SECOND SEMESTER NUTRITION & DIETETICS

THEORY

Course Description: This integrated program covers dietary, epidemiological, public health, social and biological aspects of nutritional science. Special topics include bio statistics, maternal and child nutrition, food policy, nutrition program planning, monitoring and evaluation and nutritional epidemiology.

Course Learning Outcomes (CLO): The students will have a clear understanding about the:

- Concept of health care delivery at different levels in a community.
- The students will be able to understand the concept of Nutrition Security and get familiarized with the various approaches and strategies for combating malnutrition
- The student will be able to assess, monitor and evaluate the impact of public health programs
- The students will be able to integrate biological and social factors affecting health to develop intervention (prevention) programs that will have an impact on the nutritional status of a community.

Course Content**Unit I**

1. Scope of public health, Goals and history of public health nutrition
2. The basic concept of health, health as a human right, national health and nutritional policy
3. Public health problems of India, nutrient deficiency and other diseases, their etiology, prevalence and prevention
4. Mortality and Morbidity

Unit II

5. Nutritional needs of normal infants, prelacteal feeding, exclusive breast feeding, feeding of full term and premature infants. supplementary foods in combating malnutrition in infants and young children. Existing picture of child health, objective and imaginative approach to child care

6. Identification of nutritional problems and target groups, Nutritional surveys, National Nutrition Monitoring Bureau

Unit III

7. National programs relevant for public health:

- Vitamin A deficiency disorder control program,
- National diarrheal disease program,

8. National programs relevant for public health:

- National iodine deficiency Disorder control program,
- Iron deficiency anemia prophylaxis program

Unit IV

9. Gaps between the government policies and their benefits to the population. Factors affecting implementation of programs in rural areas. Importance of Surveillance systems and NFHS

10. Modulating factors in nutrition for public health

11. Genetically modified foods and their relevance in human health

Recommended Books / Suggested Readings:

1. Mukhopadhyay, A(.1992 .)State of India's health .Voluntary Health Association of India.
2. Srilakshmi, B(.2021 .)Nutrition science .New Age International (P)Limited.
3. McLaren, D.S(.1976 .) Nutrition in the community. John Wiley and Sons, London.
4. DeMaeyer, E.M (.1989 .)Preventing and controlling iron deficiency anaemia through primary health care .A guide for health administrators and programme managers .WHO, Geneva.
5. WHO 2001 .Assessment of iodine deficiency disorders and monitoring their elimination .A guide for programme managers 2nd ed.
6. Meashan, A.R .and Chatterjee, M(.1999 .)Wasting Away :The crisis of malnutrition in India .The World Bank, Washington, D.C.
7. Krishnaswamy, K(.2000 .)Twenty five years of National Nutrition Monitoring Bureau .NIN, Indian Council of Medical Research, Hyderabad.
8. <https://www.who.int>
9. <http://www.fao.org/home/en>

Core Course

BND221: PUBLIC HEALTH NUTRITION LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Epidemiological approach to study individual disease in a community
2. Analysis of data and report writing
3. Discussion for preventive and therapeutic strategies
4. Public health campaign in a village

CORE COURSE

BND202: FOOD PROCESSING AND PRESERVATION

Credits : 04

LTP 310

THEORY

Course Description: Clinical methods of assessing nutritional status involve checking signs of deficiency at specific places on the body or asking the patient whether they have any symptoms that might suggest nutrient deficiency from the patient.

Course Learning Outcome (CLO):

- Describe the technologies used to effect preservation
- Describe the manufacture of a variety of foods and food products, including formulated and specialty foods as well as those within the main commodity groups
- Understand the role of fractionation and manipulation of food components to produce new products or ingredients
- Understand and evaluate the implications of processing and preservation methodologies on the physical, chemical, microbiological and nutritional quality of foods

Course Content:**Unit I**

Scope and importance of food preservation, Historical developments in food processing. Types of foods and causes of food spoilage. Definition of shelf life, perishable foods, semi perishable foods, shelf stable foods. Principles of Food Preservation.

Food Microbiology: microorganisms associated with foods- bacteria, yeast and mold, Importance of bacteria, yeast and molds in foods. Classification of microorganisms based on temperature, pH, water activity, nutrient and oxygen requirements, typical growth curve of micro-organisms. Food infection, food intoxication.

Unit II**Food Preservation by Low temperature**

Freezing and Refrigeration: Introduction to refrigeration, cool storage and freezing, definition, principle of freezing, freezing curve, changes occurring during freezing, types of freezing i.e. slow freezing, quick freezing, introduction to thawing, changes during thawing and its effect

on food

Food Preservation by high temperature

Thermal Processing: Commercial heat preservation methods: Sterilization, commercial sterilization, Pasteurization, and blanching

Unit III**Food Preservation by Moisture control**

Drying and Dehydration - Definition, drying as a means of preservation, differences between sun drying and dehydration (i.e. mechanical drying), heat and mass transfer, factors affecting rate of drying, normal drying curve, names of types of driers used in the food industry

Evaporation – Definition, factors affecting evaporation, names of evaporators used in food industry

Unit IV**Food Preservation by Irradiation**

Introduction, units of radiation, kinds of ionizing radiations used in food irradiation, mechanism of action, uses of radiation processing in food industry

Food Preservation by Preservatives: Uses and effects of class I and class II preservatives in foods

Suggested Readings:

1. Sivasankar, B. (2014). Food processing and preservation: Hall of India Pvt., New Delhi.
2. Fellows, P. J. (2009). Food processing Technology: Principles and Practice: Wood head Publishing.
3. Brennan, J. G. (2006). Food Processing Handbook: Weinheim: Wiley-VCH.
4. Zeuthen, P. & Bogh- Sprensen, L. (2003). Food Preservation Techniques: CRC Press, Boca raton.
5. Vonlosecka, H. W. (1998). Drying and Dehydration of Foods: Allied, Bikaner.
6. B. Srilakshmi, Food science, New Age Publishers, 2018
7. Meyer, Food Chemistry, New Age, 2004
8. Bawa. A.S, O.P Chauhan etal. Food Science. New India Publishing agency, 2013
9. Frazier WC and Westhoff DC, Food Microbiology, TMH Publication, New Delhi, 2004

Core Course

BND222: FOOD PROCESSING AND PRESERVATION LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Market survey of raw and preserved foods
2. Preparation of preserved products:
 - Squash,
 - Crush
3. Jams, jellies, Candy, murabbas, syrup
4. Pickles with and without oil, chutneys
5. Candies & toffees
6. Sauces
7. Visit to food processing and preservation units, canning and bottling units, grain storage institute dairy plant.

Core Course

BND203: Food Microbiology

Credits : 04

LTP 310

THEORY

Course Description: Provides knowledge of microbial diversity affects food and also helps to understand the different techniques employed for food safety and preservation.

Course Learning Outcomes (CLO):

- Outline the fundamental knowledge on the microorganisms and classify them
- Explain the sources of contamination and spoilage of foods
- Categorize the microorganisms in soil, water, air and sewage and assess the quality of water
- Explain the causes and prevention of food poisoning and food borne infections.

Course Content**Unit I**

Basic aspects and scope of food microbiology: Intrinsic and extrinsic factors that affect microbial growth in foods

Food preservation -Physical methods

Microbial spoilage of Milk, fruits, fruit juices, vegetables, cereals, meat, poultry, sea foods, carbonated soft drinks, canned foods; chemical changes caused by microorganisms; control of spoilage

Unit II

Microbiology of milk and milk products; Sources of contamination, spoilage and prevention

Microbiology of fruits and vegetables

Food Fermentations, traditional fermented foods of India and other Asian Countries

Probiotics, prebiotics and synbiotics

Unit III

Cereal and cereal products

Meat and meat products

Sugar and sugar products; salts and spices

Chemical preservatives and natural antimicrobial compounds, biology based preservation system

Unit IV

Fish and other sea foods

Poultry and eggs

Control of microorganisms by use of low and high temperature, asepsis, water activity, drying, preservatives, radiation and pressure for control of microorganisms

Food poisoning caused by bacteria: Salmonella Staphylococcal poisoning Botulinum Clostridium perfringens and B.cerus .Sources incubation period mechanism of action

Suggested Readings:

1. Kapoor, T. and Yadav. 1991 .An Introduction to Microbiology.
2. Stanier RY, Ingraham JL, Wheelis ML, and Painter PR. (2005). General Microbiology. 5th edition. McMillan.
3. Willey JM, Sherwood LM, and Woolverton CJ. (2008). Prescott, Harley and Klein's Microbiology. 7th edition. McGraw Hill Higher Education.
4. Tortora GJ, Funke BR, and Case CL. (2008). Microbiology: An Introduction. 9th edition. Pearson Education
5. Pelczar MJ, Chan ECS and Krieg NR. (1993). Microbiology. 5th edition. McGraw Hill Book Company
6. Nestle M (2003) Safe Food: Bacteria, Biotechnology and Bioterrorism. University of California Press Ltd., London.

Core Course

BND223: FOOD MICROBIOLOGY LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. General laboratory practices in microbiology laboratory
2. Equipment used in food microbiology laboratory
3. Aseptic methods
4. Sterilization methods
5. Morphological studies
6. Preparation of media
7. Isolation and enrichment of microorganisms
8. Microbial analysis of food products and water
9. Isolation of molds from foods.
10. Microbial examination of:
 - Cereal and cereal products
 - Vegetable and fruits
 - Milk and milk products; sugar, salts and spices.

Core Course**BND204: FUNDAMENTALS OF FOOD SCIENCE – II****Credits : 04****LTP 310****THEORY**

Course Description: Provides information about the food resources and minimize waste. Also gives an insight about the processing, distribution, storage and preparation of food.

Course Learning Outcomes(CLO): Through this course student should be able to

- Discuss various method of food preparation
- Enumerate and classify status of nutritive value and structural composition of food
- Evaluate chemical composition and nutritive value of the fruits, vegetables, cereals and meat based food products
- Analyze the effect of processing parameters on nutritional value

Course Content**Unit I****Composition and nutritive value of plant foods**

Nuts & Oilseeds: Composition, sources of proteins and oil, Processing of oil seeds - Soya bean, coconut, Protein isolates, Texturized vegetable protein

Spices & herbs: Definition, Classification, Chemical composition, use of spices & herbs

Unit II

Fruits & Vegetables: Composition, Classification, Nutritive value, Vegetable Cookery, Changes during cooking, Ripening, Climacteric, Non climacteric fruits, Changes during ripening

Unit III**Composition and Nutritive Value of Flesh Foods**

Eggs: Structure, Composition, Nutritive value of egg, Grading Changes during cooking & storage

Fish: Composition, Nutritive value of fish, effect of different processing

Meat: Structure, composition, types and nutritive value of meat, effect of different processing

Unit IV**Composition and Nutritive Value of dairy products**

Milk: Definition, composition, nutritive value of milk and milk products; changes during processing

and storage of milk and milk products

Health foods: Functional foods, Prebiotics, Probiotics, Nutraceuticals, organic foods, GM foods

Suggested Readings:

1. Deman JM, Principles of Food Chemistry, 2nd ed. Van Nostrand Reinhold, 2018 NY ISBN: 978-3-319-63607-8
2. Meyer LH, Food Chemistry, CBS Publication, New Delhi, 2004
3. Manay NS and Shadaksharaswamy M, Food-Facts and Principles, 4th ed. New Age International (P) Ltd. Publishers, New Delhi, 2020
4. Potter NH, Food Science, CBS Publication, New Delhi, 2004
5. Ramaswamy H and Marcott M, Food Processing Principles and Applications CRC Press, 2015 ISBN-13 9780367484170
6. De S, Outlines of Dairy Technology, Oxford Publishers, 2001
7. Frazier WC and Westhoff DC, Food Microbiology, 5th ed. TMH Publication, New Delhi, 2014
8. Ward JD and Ward LT (2012) Principles of Food Science. Goodheart - Willcox Publisher, Illinois.

Deficiency Course**BIO000: BASIC BIOLOGY****Credits : 03****LTP 300**

Course Description: Students will be able to learn the terminology of the subject and basic knowledge of cells, tissues, and various organ systems to understand basic biology. This subject will develop basic understanding of biology.

Course Learning Outcomes(CLO): Upon successful completion of the course, the students should be able to learn about:

CO1: Different branches of biology, scientific methods, scope and structure/function of different tissues.

CO2: Cells-its structure and functions of different organelles.

CO3: Different molecules of cells, cell cycle, DNA and RNA role in protein synthesis.

CO4: Different organ system and body fluids and their significance.

Course Content**Unit I**

Biology & Its Branches; Scientific methods in Biology; Scope of biology and career options in medical streams. Structure and function of tissues - epithelial, connective, muscular and nervous

Unit II

Cell as a basic unit of life - discovery of cell, cell theory, cell as a self-contained unit; prokaryotic and eukaryotic cell; unicellular and multicellular organisms; Ultrastructure of prokaryotic and eukaryotic, cell - cell wall, cell membrane - unit membrane concept (Fluid-Mosaic model); membrane transport; cellular movement (exocytosis, endocytosis); cell organelles and their functions- nucleus, mitochondria, plastids, endoplasmic reticulum, Golgi complex, lysosomes, microtubules, centriole, vacuole, cytoskeleton, cilia and flagella, ribosomes.

Unit III

Molecules of cell; inorganic and organic materials - water, salt, mineral ions, carbohydrates, lipids, amino acids, proteins, nucleotides, nucleic acids (DNA and RNA), Cell division: Binary fission, Cell cycle: Mitosis, Meiosis, Continuity of life - heredity, variation; Mendel's laws of

inheritance, chromosomal basis of inheritance; other patterns of inheritance- incomplete dominance, multiple allelism, quantitative inheritance. Chromosomes - bacterial cell and eukaryotic cell; parallelism between genes and chromosomes; genome, linkage and crossing over; gene mapping; recombination; DNA as a genetic material-its structure and replication; structure of RNA and its role in protein synthesis

Unit IV

Organ systems: Various parts of Respiratory system, Cardiovascular system, Lymphatic system, Digestive system, Excretory system and their functions. Body fluids and their significance: Important terms, types of body fluid, total body water, avenues by which water leaves and enters body, general principles for fluid balance, how body fluids maintain Homeostasis, Electrolytes & ions Function of electrolytes.

Recommended Books:

1. A text book of biology by Pradeep's publications.
2. A text book of biology by Trueman.
3. NCERT 12th Biology book.
4. Fried, G.H. & Hademenos, G.J. (2002). Schaum's Biology. Tata McGraw Hill Publications, New Delhi.

Deficiency Course**CHE000: CHEMISTRY****Credits : 03****LTP 300**

Course Description: To make students capable of understanding basic chemistry in context.

To enhance effective learning skills.

Course Outcomes(CLO):

Upon successful completion of the course, the students should be able to:

CO1: Learn about basic principles of chemistry, material chemistry and mechanism of enzyme catalysis.

CO2: Learn about chemical bonding, types of bond formation and the factors affecting the bond formation.

CO3: Learn about elements of periodic table and occurrence of elements and its refining.

CO4: Learn about hydrocarbons, their chemical as well as physical properties.

Course Content**Unit I**

Basic Concepts of Chemistry: Matter and its nature, Atom and its constituent particle, molecule, element, and compound, Classification of matter into solid, liquid and gaseous states, Homogeneous and heterogeneous, Activity and selectivity of solid catalysts, Enzyme catalysis and its mechanism, Symbol, formula, Empirical and molecular formula, Valency and chemical equation, Chemical formula of a simple compounds, Balancing of chemical equations.

Unit II

Chemical Bonding: The concept of ionic and covalent bonds, Formation of ionic bonds, factors affecting the formation of ionic bonds, Covalent Bonding, Hydrogen bonding, and its applications, atomization, sublimation, phase transition, hydration, ionization, and solution, concepts of oxidation and reduction, redox reactions, factors affecting the rate of reactions: concentration, temperature, pressure, and catalyst.

Unit III

Inorganic chemistry: Periodic table, salient features of modern periodic law (periods and groups), S block elements, P block elements, F block elements, D block elements (Physical and chemical properties). Modes of occurrence of elements in nature, minerals, ores; Steps involved in the extraction of metals - concentration, reduction (chemical and electrolytic methods) and refining with special reference to the extraction of Al, Cu, Zn and Fe. The biological significance of Na, K, Mg and Ca.

Unit IV

Organic chemistry: Alkanes, alkenes, alkynes, Alcohols, Phenols, Ester, Ether, Carboxylic acid, Aromatic, Aldehyde and Ketones, Amines, Various concepts of acids and bases (Arrhenius, Bronsted-Lowry and Lewis) and their ionization, ionization of water, pH scale, common ion effect, hydrolysis of salts and pH of their solutions, solubility of sparingly soluble salts and solubility products, buffer solutions.

Recommended Books:

1. Anslyn EV, Dougherty DA. Modern physical organic chemistry. University science books; 2006.
2. Solomons TG, Fryhle CB. Organic chemistry. John Wiley & Sons; 2008.
3. House JE. Inorganic chemistry. Academic Press; 2012 Dec 31.

Core Course

BND301: NUTRITION THROUGH LIFE CYCLES

Credits : 04

LTP 310

THEORY

Course Description: Nutrition in the Life Cycle will cover nutritional needs of individuals during critical stages of development. Students will learn about the biological basis for nutritional requirements in normal development and maintaining health in adulthood.

Course Learning Outcomes(CLO): The student will learn and apply the latest in research-based nutrient needs of pregnant and lactating females.

- The student gains knowledge about the changing nutritional needs of an infant and about complementary feeding.
- The students will be able to relate nutrient needs to developmental stages and plan diets which will adequately meet nutritional needs during childhood and adolescents.
- The student will be able to connect the role of changing metabolism, risk of chronic diseases and impact of functional foods in effectively planning diets for adults.
- The student gains competence on meeting nutrition needs and establishing dietary patterns to promote optimum health and reducing the impact of chronic diseases in the elderly.

Course Content

Unit I

Infancy- nutrient requirement during infancy, feeding of infants, value of breast feeding on infants, breast feeding versus artificial feeding, types of milk and their use in infant feeding
Role of nutrition on physical and mental development, rate of growth-weight as an indicator, assessment of growth

Feeding of premature and low-birth-weight infants

Nutritional disorders and common ailments in infancy, feeding the sick child, immunization schedule and growth charts

Unit II

Preschool age: Physical growth and mental development prevalence of malnutrition in preschool years and food habits, nutritional requirements during preschool age and supplementary foods

SYLLABUS FOR THIRD SEMESTER NUTRITION & DIETETICS

School age: Physical growth and mental development, nutritional requirements during school age, specific problems, specific problems in feeding school children

Adolescence: Physical and physiological changes, nutritional requirements, food preferences and nutritional problems, growth spurt and nutrition, adolescent fads influencing nutrition

Unit III

Adulthood, Sex, occupation and income, nutritional requirements and vegetarianism

Pregnancy: Physiological changes in pregnancy, weight gain during pregnancy, food and nutrient requirements. Complications of pregnancy and their nutritional management

Impact of nutrition on the outcome of pregnancy. Nutritional need of fetus during different stages of fetal cell growth and maternal nutritional needs

Unit IV

Psycho-physiology of lactation; milk synthesis and secretion, maternal needs during lactation, composition of colostrum and mature human milk, milk of mothers of pre-term babies. Non-nutritional factors of human milk; immunological factors, enzymes, hormones

Elderly: Physical and physiological changes, nutritional requirements, problems of old age, nutrients influencing aging process

Recommended Books:

1. Moris, E.S. (2006). Modern nutrition in health and disease 10th ed. Leaned Febinger, USA
2. Srilakshmi, B. (2019). Dietetics. New age international publishers, New Delhi.
3. Corinne H.R, Marilyn R .L, Wanda L .C and E. Garwick (1990). Normal and therapeutic nutrition(.pp -1-16.)New York, Macmillan Publishing Company.
4. Williams, S.R.; Worthington, R.S.; Sneholinka, E.D.; Pipes, P.; Ress, J.M .and Mahal, K.L. (1988). Introduction to nutrition throughout the life cycle .Times Mirroe/Mosby College Publishers.
5. Morgan JB and Dickeson JWT (2003) Nutrition in Early Life. John Wiley and Sons Ltd. Chichester
6. Brown JE (2016) Nutrition through the Life Cycle. 6 th Edition. Cengage Learning, Boston.
7. Gluckman P, Hanson M, Seng CY and Bardsley A (2015) Nutrition and Lifestyle for Pregnancy and Breastfeeding. Oxford University Press, UK.
8. <https://www.unicef.org>
9. <https://www.nutrition.org.uk>

Core Course

BND321: NUTRITION THROUGH LIFE CYCLES LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Grouping of foods based on richness of nutrients and quantifying foods to give uniform content of each nutrient.
2. Planning and formulation of food exchange lists.
3. Planning, preparation and evaluation of diet for adult men and women involved in different activities.
4. Planning, preparation and evaluation of diets for pregnant women, lactating mothers, weaning and supplementary foods for infants, preschool children, school going children, packed lunches for preschoolers and school children, adolescent boys and girls, elderly.
5. Vitamin A Deficiency Planning diets for, adolescents and pregnant women.

Deficiency Course

BND302: INTRODUCTION TO CLINICAL NUTRITION

Credits : 04

LTP 310

THEORY

Course Description: Clinical nutrition centers on the prevention, diagnosis, and management of nutritional changes in patients linked to chronic diseases and conditions primarily in health care.

Course Outcomes(CLO): Understand the etiology, physiologic and metabolic anomalies of acute and chronic diseases and patient needs.

- To get familiar with fundamentals of clinical nutrition and what are the roles of dietitian
- To know about pathogenesis of diseases related to gastrointestinal disorders and liver disorders
- To know about pathogenesis of diseases related to cardiovascular diseases.
- To know about pathogenesis of diseases related to kidney diseases.

Course Content**Unit I**

Clinical Nutrition: Introduction, Nutritional status and disease, Nutrition Screening in clinical setting

Definition of Dietetics, dietitian, Goals of Diet Therapy. Basic concepts of Diet Therapy: Therapeutic adaptations of the normal diet. Routine hospital diets –Regular, soft, full fluid, clear fluid diet. Specially modified therapeutic diets

Unit II

Pathogenesis of diseases. Etiology, prevalence, clinical signs, symptoms, metabolic changes, clinical manifestations, complications, and dietary management of gastrointestinal disorders - diarrhea, constipation, peptic ulcer, ulcerative colitis

Pathogenesis of diseases. Etiology, prevalence, clinical signs, symptoms, metabolic changes, clinical manifestations, complications, and dietary management of liver disorders - hepatitis, cirrhosis

Unit III

Pathogenesis of diseases. Etiology, prevalence, clinical signs, symptoms, metabolic changes,

clinical manifestations, complications, and dietary management of diabetes mellitus, cardiovascular diseases, hypertension, atherosclerosis.

Unit IV

Pathogenesis of diseases. Etiology, prevalence, clinical signs, symptoms, metabolic changes, clinical manifestations, complications, and dietary management of renal disorders - acute and chronic glomerulonephritis, nephrotic syndrome, urinary calculi, renal failure.

Recommended Books:

1. Robinson. Basic Nutrition and Diet Therapy (8th Edition)
2. Williams Basic Nutrition And Diet Therapy 16th Edition 2022 By Nix S, 9780323749800
3. Robinson, Lawler: Normal & Therapeutic Nutrition (17th Ed.) Macmillan Publishing Co. 1986. 14.
4. Davis J. and Sherer, K. (1994): Applied Nutrition and Diet Therapy for Nurses, 2nd edition, W.B. Saunders Co.
5. Davidson's Human Nutrition – Geissler. (2017)
6. Nutrition and Biochemistry for Nurses(3rd ed) by Jacob Anthikad (2020)
7. Willims S. R.: Essentials of Nutrition and Diet Therapy, 4th ed., Mosby College Pub. S. Louis, (2018).
8. Thomas, B.: Manual of Dietetic Practice (4th ed), (2013).
9. L. MatareseGottschlich Contemporary Nutrition Support Practice, Saunders (2003)
10. ASPEN; Nutrition Support, Dietetics 21. Clinical dietetics and nutrition by F.P Antia and Philip Antia 4th ed (2002).

Core Course**BND322: INTRODUCTION TO CLINICAL NUTRITION LAB****Credits: 2****LTP 004****PRACTICAL LIST**

1. Nutritional care and documentation of hospitalized patients.
2. Nutrition screening for normal and diseased person
3. Estimation of glucose in blood and urine in normal and diabetic persons
4. Planning and preparation of Therapeutic Diets for the following diseases:
 - i. Diabetes mellitus
 - ii. Hepatitis
 - iii. Hypertension and
 - iv. Other common diseases

Deficiency Course**BND303: NUTRACEUTICALS AND HEALTH FOODS****Credits :04****LTP 310****THEORY**

Course Description: This online course deals with health promoting nutritional factors and bioactive constituents, their potential health implications and mechanisms of action.

Course Outcomes(CLO): By the end of this course, student will be able to:

- To recognize the relationship between nutraceuticals and food
- Recognize nutraceuticals and their effects on health.
- Categorize nutraceuticals.
- Identify effects of nutraceuticals on health.

Course Content**Unit I**

Introduction, relationship between nutraceuticals, foods and medicines.

Definition of nutraceuticals and functional foods, synonymous terms i.e. bioactive compound, phytochemicals, classification of nutraceutical substances based on food sources and based on mechanism of action, labeling and health claims.

Regulatory issues for nutraceuticals including national and international standards

Unit II

Nutraceuticals: Need, Potential health benefits of major nutraceuticals, omega3, lycopene, Isoflavonoids, prebiotics and probiotics, glucosamine, phytosterols etc., metabolism and bioavailability of nutraceuticals.

Concept of angiogenesis, nutraceuticals for joint health, cardiovascular diseases, cancer, diabetes, obesity, eye health, cholesterol management. mental health

Therapeutic use of nutraceuticals and functional foods

Unit III

Safety aspects of functional foods, Analytical techniques, Quality of nutraceuticals

Computer-aided sensory evaluation of food and beverage, statistical analysis of sensory and objective analysis data.

Consumer studies and different types of consumer studies, implementation in food industry

Unit IV

Nutraceutical Stability, Concerns and shelf life testing

Regulatory aspects of functional foods, Legal aspects of functional foods

Current research in functional foods

Suggested Readings:

1. Brigelius-F, J .and JoostHG(.2006 .)Nutritional Genomics :Impact on Health and Disease .Wiley VCH.
2. Cupp, J .and Tracy, T.S(.2003 .)Dietary Supplements :Toxicology and Clinical Pharmacology .Humana Press.
3. Gibson, G.R .and William CM(.2000 .)Functional Foods -Concept to Product.
4. Goldberg I(.1994 .)Functional Foods :Designer Foods, Pharma Foods .1sted .Springer US
5. Losso, J.N(.2007 .)Angi-angiogenic Functional and Medicinal Foods .CRC Press.
6. Manson, P(.2001 .)Dietary Supplements .2nded .Pharmaceutical Press.
7. Campbell J.E .and Summers JL(.2004 .)Dietary Supplement Labelling Compliance.
8. Neeser, J.R .and German BJ (.2004 .)Bioprocesses and Biotechnology for Nutraceuticals . Chapman and Hall.
9. Robert, E.C(.2006 .)Handbook of Nutraceuticals and Functional Foods .2ndedn .Wildman.
10. Shi J(.2006 .)Functional Food Ingredients and Nutraceuticals :Processing Technologies .CRC Press.
11. Robert .E.C(.2020 .)Hand book of Neutraceuticals and Functional Foods (3rd ed.), CRC, Press.
12. Goldber, I (.2010 .)Functional foods :Designer foods, Pharma foods and Nutraceuticals, An Aspen Publications.
- 13.Ghosh, D., BaghchiDebasis and Konishi Tetsuya .2014 .Clinical Aspects of Functional Foods, CRC Press.

SYLLABUS FOR FOURTH SEMESTER NUTRITION & DIETETICS

Core Course**BND401: NUTRITION AND MEAL PLANNING****Credits : 04****LTP 310****THEORY**

Course Description: Meal planning includes types and amounts of food, incorporating dietary fiber, understanding proper serving sizes, management of eating out and special occasions, as well as incorporating favorite recipes

Course Outcomes(CLO): Through this course student should be able to

- Understand the concept of menu planning and their principles
- Memorize the recommended dietary allowance of all the age groups and factor affecting them
- Assess the nutritional requirements for all the age groups
- Consider the additional requirements and needs in various stages of human life

Course Content**Unit I**

Basic principles of menu planning, planning menus for individual and family
Food groups and their use in meal planning, Factors influencing food intake and food habits,
Classification of vegetarianism

Unit II

Recommended dietary allowances of macro and micro nutrients for different age groups.
Factors affecting food requirements of individuals, families and different groups of people
Importance of balanced diets: Steps involved in meal planning physiological and psychological factors affecting the diet plan

Unit III

Food exchange list: Use of food exchange list in diet planning, planning breakfast, lunch, tea, dinner, packed lunch and snacks; considering RDA for individuals
Food and nutrient requirement of adults (male and female of all activities level), pregnant women, lactating women

Unit IV

Infants and normal infants. Breast feeding, advantages of breast feeding, breast feeding during illness, feeding of pre term baby, feeding problems. Weaning and complementary feeding.
Food and nutrient requirement of pre-school children, school age children, adolescents, old age people

Recommended Books:

1. Robinson and Weicley, 1996. Basic Nutrition and diet Therapy .Macmillian Publishing Co .Inc .New York and London. ISBN-13 978-0135770160
2. Gopalan, C., Ramsastri, B.V .and Balasubramanian, S.C. 2021. Nutritive Value of Indian Foods.
3. ICMR, 2020. Recommended Dietary allowance for Indians, ICMR, Delhi.
4. Srilakshmi, B. 2021 Nutrition science, New age Int .Ltd .Pub., New Delhi 7th ed.
5. Joshi, S. 2000. Nutrition and dietetics .Tata McGraw-Hill Publishing Co .Ltd., New Delhi.
6. Sharma S. 2006. Human nutrition and meal planning .Delhi, Jnanada Prakasham (PandD .)
7. Mudambi, S .R .and Rajagopal M.V. 2020. Fundamentals of foods and nutrition .New Delhi, New Age International (P)Ltd .New Delhi.

Core Course

BND421: NUTRITION AND MEAL PLANNING LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Standardization of serving sizes,
 - Portion,
 - Cost of locally available common foods
2. Planning preparation and nutrient calculation of diets of preschool children,
 - School going children,
 - Adolescents and
 - Adults
3. Packed lunches for school children
4. Meal planning and preparation for special occasions

Core Course

BND402: COMMUNITY NUTRITION

Credits : 04

LTP 310

THEORY

Course Description: Development of skills in organizing and evaluating nutrition projects in the community.

Course Outcomes(CLO): Through this course student should be able to

- Analyze, critically, the various nutritional problems and impart nutrition education to the vulnerable group of community.
- Identify the various nutritional related deficiencies and its corrective measures.
- Acquire broad perspectives to analyze the objectives and working of national and international policies and programme.
- Acquire the knowledge about various nutritional programme running worldwide.

Course Content**Unit I**

Basic concept of community, nutrition role of nutritionist in improving nutrition in community

Major nutritional problems prevalent in India and the state,

- Iron deficiency anemia,
- Vitamin A deficiency,
- Iodine deficiency disorders,
- Calcium and vitamin D deficiency
- Fluorine deficiency and toxicity

Unit II

Malnutrition-Definition and causes, PEM, Marasmus, Kwashiorkor, vicious cycle of malnutrition.

Unit III

Assessment of nutritional status: Clinical signs and symptoms, Nutritional anthropometry, Growth monitoring Biochemical tests, biophysical tests, Diet survey methods

Unit III

National programs and policies: role of national and international agencies in improving

nutritional status of the community, Integrated Child Development Service (ICDS), supplementary Nutrition Program (SNP), Applied Nutrition Program (ANP), Mid-Day Meal Program (MDMP), Vitamin A Prophylaxis Program, Anemia Prophylaxis Program, Food and Agricultural Organization (FAO), World Health Organization (WHO), United Nations Children's Fund (UNICEF), UNDP, CARE and other Voluntary and Government Agencies

Unit IV

Nutrition education -Objectives, principles and importance of nutrition education in a community.

Suggested Readings:

1. Annalynn Skipper. (2009). Advanced Medical Nutrition Therapy Practise. Jones & Bartlett Publishers.
2. Assessment of IDD & monitoring their elimination. (2001) – a guide for programme managers ICCIDD/UNICEF/WHO.
3. Bamji M. S, Prahlad Rao N. & Vinodireddy (2019). Text book of Human Nutrition (p-p 197-201), New Delhi. Oxford & IBH Publishing Co. PVT. LTD
4. Derrick. B. Jelliffe (1966), The assessment of the nutritional status of the community (With special reference to field surveys in developing regions of the World). World Health Organization, Geneva
5. FAO/ WHO Expert Committee on Medical Assessment of Nutritional Status. WHO Tech. Rep.ser . 8.
6. Jim Mann and Stewart Truswell A. (2007). Essentials of human nutrition. Third edition; New York, Oxford University press.
7. Mahan, K. L., Stump E. S. (2012). Food and the Nutrition Care Process. (13thed) USA :Saundus Elsevier.
8. Mary, M. Mary K.R. & Scott. A. S. (2008). Clinical Nutrition for surgical patients. Jones & Bartlett Publishers.
9. Michael C Latham, Human Nutrition in the Developing World. Ithaca, New York, USA
10. Srilakshmi.B (2021). Nutrition Science (pp 3-14), New Delhi. New Age International (P) Limited.
11. Swaminathan, M. 2018, Essentials of Food and Nutrition, vol I Second edition, BAPPCO,

Bangalore p-p 107-111.

12. Tara Gopaldas and Subadra Seshadri (1987), Nutrition: Monitoring and Assessment. Oxford University Press.
13. Thomas, B. (Eds). (1994). Manual of Dietetics Practice .Oxford : Blackwell Scientific Publication.
14. Wardlaw, M. G. (1999) Perspectives In Nutrition. (4thed) .USA : WCB/ McGraw–Hill.
15. Zeman J. F. & Ney M. D. (1988). Application of Clinical Nutrition. London : Prentice – Hall International
16. Gibney MJ (2004) Public Health Nutrition. Blackwell Science, Oxford.
17. Spark A (2007) Nutrition in Public Health: Principles, Policies and Practice. CRC Press, New York.
18. Garland CF, Garland FC, Gorham ED, Lipkin M, Newmark H, Mohr SB and Holick MF (2006) The Role of Vitamin D in Cancer Prevention. American Journal of Public Health. 96(2), 252–261.

Core Course

BND422: COMMUNITY NUTRITION LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Assessment of nutritional status of an individual/community using anthropometry and dietary survey
 - a. Preparation of schedule
 - b. Survey work
 - c. Analysis of data
 - d. Writing of report
2. Visit to local health Centre to identify clinical signs and symptoms of nutritional problems. Inferences to identify nutritional problems
3. Visit to an ICDS Block, Anganwadi centers and evaluation of feeding provided at these centres.
4. Preparation and use of instructional material -radio script; Charts, posters, calendars, flipcharts, popular article; pamphlets.
5. Practicing use of nutrition education material on vulnerable groups in the community, rural and urban
6. Planning, implementation and evaluation of nutrition education for a target group

Core Course

BND403: FOOD STANDARDS & QUALITY CONTROL

Credits : 04

LTP 310

THEORY

Course Description: It seeks to develop India's capability to meet the global food safety and quality requirements and enhance the competitiveness of food products. In long term perspective, it would contribute to ensure consumer safety within and outside the country.

Course Outcomes(CLO): To enable the students to understand:

- Explain the application of food quality and food safety system
- Identify the hazard of the food chain to ensure food safety
- Examine the chemical and microbiological quality of food samples
- Detect the adulteration in food samples

Course Content**Unit I**

Definitions, Food Quality and Food Sampling, factors affecting Food Quality

Determination of quality of foods, Chemical methods, Subjective methods

Selection of sensory panel and sensory evaluation of food products. Grading and marketing standards, specifications of finished products

Unit II

Food Toxicants: Introduction, Types of toxicants, Phytates, Oxalates, Saponins, Protease inhibitors, Processing contaminants

Food Hazards: Types of hazards, Physical Hazards, Chemical Hazards, Bacterial Hazards, Viral Hazards and Parasitic Hazards. Introduction about of GHP, GMP. Hazards Analysis Critical Control Point (HACCP): Definition, HACCP Concept, Principles of HACCP, HACCP Plan, Implementing HACCP System, Managing HACCP System.

Unit III

Food Laws and Regulations: Introduction and objectives of International Agencies i.e. WHO, FAO, USFDA, Codex Standards. Introduction and objectives of Food Quality Management System and Food Safety Management System. Introduction and objectives of FSSAI and WTO.

Unit IV

Food Additives: Definition, Classification of Food Additives, Coding of food additives, Safety of Food Additives, GRAS

Food Adulteration: Simple tests for food adulteration, Classification of Food Adulteration, Standards for product quality and Safety, Public, Private, Consumer and Industry Standards, AGMARK, Bureau of Indian Standard,

Suggested Readings:

1. Quality standards and Regulatory acts for food safety in India, WTO cell, July 2007 ANGRAU, Hyderabad
2. A.V. Savov and G.B. Kouzmanov, Food quality and safety standards at a glance. Biotechnology & Biotechnological Equipment. (23) 2009 No 4, pp.1462-1468
3. Julie K. Northcutt and Scott M. Russell. General Guidelines for Implementation of HACCP in a Poultry Processing Plant. A publication of University of Georgia , Cooperative Extension, College of agriculture and Environmental Sciences & Consumer Sciences. An Introduction to Food Science Tech.& Quality Management.
4. RadomirLasztity, Marta Petro-Turza, Tamas Foldesi, (2004), HISTORY OF FOOD QUALITY STANDARDS, in Food Quality and Standards, [Ed. RadomirLasztity], in Encyclopedia of Life Support Systems (EOLSS), Developed under the Auspices of the UNESCO, Eolss Publishers, Oxford ,UK, [<http://www.eolss.net>]
- 5.Importance of food safety for developing countries http://www.fao.org/trade/docs/LDCfoodqual_en.htm
6. Meredith S.S. Curren and Jerry W. King Comprehensive Analytical Chemistry Volume 37, 2002, Pages 869-894 Sampling and Sample Preparation for Field and Laboratory
7. Production practices and quality assessment of food crops, Vol.3 Quality handling and Evaluation. Ed..RamadaneDris and Mohan Jain. Kuwer Academic Publishers
8. The European Food Information Council. www.eufic.org/index/en
9. Hartel RW and Heldman D (2012) Principles of Food Processing. Aspen Publishers Inc. New York.
10. <https://foodprocessingindia.co.in>
11. <http://agronfoodprocessing.com>

SYLLABUS FOR FIFTH SEMESTER NUTRITION & DIETETICS

Core Course

BND501: THERAPEUTIC NUTRITION – I

Credits : 04

LTP 310

THEORY

Course Description: Emphasis on importance of different therapeutic diets and develops attitude of taking dietetics as profession.

Course Outcomes(CLO): To enable students to:

- Understand the basic principles of diet and diet therapy.
- Acquire the knowledge of modifications of normal diet for therapeutic purposes which is during infections
- Acquire the knowledge of modifications of normal diet for therapeutic purposes which is during Gastrointestinal disorders
- Acquire the knowledge of modifications of normal diet for therapeutic purposes which is during Cancer

Course Content

Unit I

Importance of therapeutic meal planning and factors to be considered in meal planning. Use of food groups and exchange list in therapeutic meal planning. Importance and modification of normal diet to therapeutic diets – Nutrients Consistency temperature

Methods of feeding (normal and artificial)– Oral Enteral Parenteral feeding.

Causes symptoms and dietary management in various nutritional deficiencies – Energy Protein

Unit II

Infections and fevers: Types, causes, Symptoms and dietary management in acute and chronic fevers

Malabsorption syndrome, Liver and gall bladder diseases – Causes Symptoms and dietary management of Jaundice

- Hepatitis
- Cirrhosis
- Ascites
- Hepatic coma
- Cholelithiasis

Eating disorders:

- Anorexia nervosa Bulimia
- Underweight

Unit III

Gastrointestinal disorders:

- Diarrhea, constipation
- Peptic ulcers
- GERD
- Ulcerative colitis
- Diverticulitis
- Irritable bowel disease

Overweight and obesity and problems of weight control Inborn errors of metabolism and their dietary management and Physical changes during this disorder

Unit IV

Antioxidant Free radical scavenging activity, How Antioxidant and Phytochemical Functional food helpful for the degenerative disease or Non-Communicable disease

Inborn errors of metabolism and their dietary management and Physical changes change's during this disorder Antioxidant, free radical scavenging activity, How antioxidants and phytochemical, functional food helpful for the degenerative disease or Non- Communicable disease.

Suggested Readings:

1. Antia,P(.2002.)Clinical dietetics and nutrition .Oxford Univ .Bombay.
2. Moris,E.S(.2006 .)Modern nutrition in health and disease .Leaned febiger, USA.
3. Srilakshmi, B(.2019 .)Dietetics .New age international publishers, New Delhi.
4. Corinne H .Robinson, Marilyn R .Lawler, Wanda L .Chenoweth, Ann E .Garwick(.1991.)Normal and Therapeutic Nutrition(.pp -1-16 .)New York, Macmillan Publishing Company.
5. Elia, M., Ljungqvist, O., Stratton, R. and Susan, L. (Eds (.).2012 .)Clinical Nutrition, 2nd Edition.Wiley-Blackwell
6. Gopalan, C., Ramsastri, B.V .and Balasubramanian, S.C(.2021 .)Nutritive value of Indian foods.
7. ICMR(.2020 .)Recommended Dietary Allowances for Indians, ICMR, Delhi.
8. Joshi, S(.2000 .)Nutrition and dietetics .Tata McGraw-Hill Publishing Co .Ltd., New Delhi.
9. Textbook of Nutrition and Dietetics by Ranjana Mahna &; Seema Puri Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth (2016).

Core Course

BND521: THERAPEUTIC NUTRITION – I LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Market survey for determining cost of locally available common foods; Standardization of serving sizes for different food items portioning. Planning and preparation of soft and liquid diets
2. ORS and bland diet and therapeutic diets for typhoid
 - Tuberculosis
 - Influenza
3. Planning and preparation of diets for gastrointestinal disorders i.e.
 - Diarrhea
 - constipation
 - Peptic ulcers
 - GERD
 - Ulcerative colitis
 - Diverticulitis
 - Irritable bowel disease
4. Malabsorption syndrome. Planning and preparation of diets for liver and gall bladder diseases i.e.
 - Jaundice
 - Hepatitis
 - Cirrhosis
 - Hepatic coma and cholelithiasis
5. Eating disorders i.e. Anorexia nervosa bulimia Underweight, Overweight and obesity and problems of weight control.

Core Course

BND502: NUTRITIONAL BIOCHEMISTRY – I

Credits : 04

LTP 310

THEORY

Course Description: Emphasis on importance of different therapeutic diets and develops attitude of taking dietetics as profession.

Course Outcomes(CLO): describe the scope and importance of biochemistry in foods and nutrition

- To learn the basics of biochemistry and its inter relationship with biological sciences
- Analyze the major pathways involved in the metabolism of nutrients
- Outline the concept of lipids
- Outline the concept of proteins

Course Content

Unit I

Introduction to biochemistry -Definition, objectives, scope and Inter relationship between biochemistry and other biological sciences

Molecular aspects of transport, passive diffusion, facilitated diffusion, active transport.

Intermediary metabolism -Carbohydrate definition, classification, functions, structure

Unit II

Metabolism, glycolysis, TCA cycle and energy generation, HMP shunt

Gluconeogenesis, glycogenesis, glycogenolysis, blood sugar regulation

Unit III

Lipids -Definition, classification, structure, function Oxidation and biosynthesis of fatty acids (saturated and mono-unsaturated)

Synthesis and utilization of ketone bodies, ketosis, fatty liver.

Unit IV

Proteins -General reaction of amino acid metabolism, deamination, transamination, decarboxylation, urea cycle.

Lipoproteins -Types, composition, role and significance in disease.

Suggested Readings:

1. West, E .S., Todd, W .R.; Mason .H.S .and Van Bruggen J.T .:4th Ed .Text book of Biochemistry. Amerind Publishing Co .Pvt .Ltd .

2. Murray, R .K .Grannen, D .K.; Mayes, P .A .and Rodwell .V .W .:Harper's biochemistry .Lange Medical Book.
3. Handler, P. Smith E.I.; Stelten, D.W. : Principles of biochemistry, Mc. Grew Hill Book Co.
4. Devlin, T.M. : Text Book of Biochemistry with Clinical Corelations. John Wiley and Sons.
5. Stryer .L .biochemistry .Freeman W.H .and Co.Assaini .J.An Introduction of Practical Biochemistry :D .Plummer Practical biochemistry :K Wilson and Walker Biochemical methods :S.Sadasivan and K Manikam Hawk's physiological Chemistry :B.L .Oser(ed)
6. Practical Biochemistry :R .L .Nath .A treatise on Analysis of Food, Fats and Oils :A .R .Sen, N.K .Pramanik and S.K .Roy.
7. Berg JM (2007) Biochemistry. 6 th Edition. W. H. Freeman and Company, New York.
8. Nelson D L and Cox MM (2017) Lehninger Principles of Biochemistry. 7th Edition .WH Freeman, New York.

Core Course**BND522: NUTRITIONAL BIOCHEMISTRY – I LAB****Credits: 2****LTP 004****PRACTICAL LIST**

1. Handling of equipment and instruments; Qualitative and quantitative tests of carbohydrates
2. Qualitative analysis of amino acids
3. Qualitative analysis of proteins
4. Determination of acid values
5. Saponification and iodine numbers
6. Paper chromatography of amino acids or carbohydrates ascending and descending
7. Estimation of nitrogen by Kjeldhal method
8. Estimation of fat by soxhlet method

Core Course

BND503: NUTRITION & IMMUNITY

Credits : 04

LTP 310

THEORY

Course Description: The purpose of this course is to introduce the students how to operate a successful food service operation at hospitals and supplements delivery in primary health care. This course covers the organization the nutrition department including environmental issues and waste management, food safety and sanitation in the kitchens. In addition, other aspects of delivery of nutritional care such as product selection and purchasing, receiving, storage food preparation, distribution and service as well as facility design and equipment selection.

Course Outcomes(CLO): To enable students to:

- Recognize the different aspects of Nutritional Services in Hospitals.
- Use the appropriate methods for food safety and sanitation in kitchens of hospitals.
- Develop skills in various components of course module and working with a different food service department in hospitals.
- Operate and manage a successful food service operation.

Course Content**Unit I**

Immune system: The defense mechanisms of the body, Role of nutrients in immune functions, Under nutrition-causes and consequences

Infection: Risk of infection, influence of infections on nutrition and susceptibility to infection

Unit II

Role of nutrients in prevention of risk of infections, Childhood mortality associated with infectious diseases of gastro-intestinal tract and lungs.

Age related immune depression

Unit III

Role of nutraceuticals and functional foods

Nutrition, HIV/AIDS and tuberculosis

Unit IV

Probiotics, Prebiotics and Immunity

Food allergy

Suggested Readings:

1. Barasi Mary, E. (1997). Human Nutrition-A health perspective. Arnold International Student's edition, U.K.
2. Gershwin, M.E., Nestel, P. and Keen, C.L. (2004). Handbook of Nutrition and Immunity. Humana Publishers, USA.
3. Owen, J., Punt, J. and Stanford, S. (2013). Kuby Immunology: International Edition. Macmillan Publishers, USA.
4. Prason, S.K. and Poddar, T. (2012). Perfect Health-Body Diet and Nutrition. V& S publishers, New Delhi.

Core Course

BND601: THERAPEUTIC NUTRITION – II

Credits : 04

LTP 310

THEORY

Course Outcomes(CLO): To enable students to:

- Acquire the skills and techniques involved in the planning and preparation of therapeutic diets for Hypertension and CVD.
- Acquire the skills and techniques involved in the planning and preparation of therapeutic diets Diabetes and gout.
- Acquire the skills and techniques involved in the planning and preparation of therapeutic diets Respiratory disorders
- Develop the capacity and attitude for taking dietetics as a profession.

Course Content**Unit I****Principles and objectives:** Therapeutic diets**Cardiovascular diseases:** Causes symptoms and dietary management in atherosclerosis and hypertension, myocardial infarction cerebrovascular and stroke, congestive heart failure.**Unit II****Diabetes mellitus and gout:** Types causes Symptoms and dietary management.**Renal disorders:** Physiology of kidney; causes symptoms and dietary management in nephrosis nephritis acute and chronic renal failure renal calculi; dialysis.**Unit III****Respiratory disorders:** Acute and chronic COPD acute respiratory disorders.**Cancer:** Causes symptoms and dietary management.**Unit IV****Dietitian:** Definition role and responsibilities of a dietitian code of ethic, Competencies of dietitian. Management of dietetics department, Guidelines and requirements for establishing a diet counseling Centre, Techniques for diet counseling stages of change in behavior.

SYLLABUS FOR SIXTH SEMESTER NUTRITION & DIETETICS

Suggested Readings:

1. Antia,P(.2002 .)Clinical dietetics and nutrition .Oxford univ .Bombay.
2. Moris,E.S(.2006 .)Modern nutrition in health and disease .Leaned febiger, USA.
3. Srilakshmi, B(.2019 .)Dietetics .New age international publishers, New Delhi.
4. Corinne H .Robinson, Marilyn R .Lawler, Wanda L .Chenoweth, Ann E .Garwick(.1982 .)Normal and Therapeutic Nutrition(.pp -1-16 .)New York, Macmillan Publishing Company.
5. Textbook of Nutrition and Dietetics by Ranjana Mahna &; Seema Puri Kumud Khanna, Sharda Gupta, Santosh Jain Passi, Rama Seth (2016).

Core Course**BND621: THERAPEUTIC NUTRITION – II LAB****Credits: 2****LTP 004****PRACTICAL LIST**

1. Planning and preparation of diets for patients suffering from atherosclerosis
2. Hypertension
3. Different types of diabetes mellitus
4. Gout
5. Planning and preparation of diets for renal disorders i.e. Nephrosis, Nephritis
6. Acute and chronic renal failure Renal calculi
7. Respiratory disorders – Acute and chronic COPD
8. Acute respiratory disorders
9. Role play exercises for counseling

Core Course**BND602: FOOD PRODUCT DEVELOPMENT AND FORMULATION****Credits : 04****LTP 310****THEORY**

Course Description: This course involves going through the process of developing a new food product from concept, through to market analysis, design, development and evaluation, and finally to market release. On successful completion of this course, students will gain a wide range of knowledge and skills that can be applied for the improvement or development of food products to satisfy consumers' changing demands and to improve business related outcomes.

Course Outcomes(CLO): Upon successful completion of the subject, students will be able to:

- Demonstrate an understanding of product development in the food and beverage processing industry.
- Analyze data collected during the development phase of a new food product.
- Apply the principles of quality assurance, food safety and GMP to a food product design.
- Produce elements of a HACCP-based food safety program that is applicable to the production of a new food product

Course Content**Unit I****Basic principles of food product development**

Objective methods of product evaluation Advances in techniques of product development

Sensory properties of food and their role in product development

Unit II

Bulk food preparation for food institutions and enterprises: Servings, nutritive value and costing

Evaluation of food: Objective and subjective methods, selection and training of judges,

Development of score cards and analysis of data

Unit III

Consumer evaluation: development of schedule and data analysis

Sensory evaluation of product Food security in food product development

Packaging materials and labeling

Unit IV

Food safety and quality control issues in product development

Food quality regulations and standards, quality control and HACCP Product formulation and development for general and therapeutic use

Suggested Readings:

1. Altschul A., M(.1993 .)Low calorie foods .Marcel Dekker .
2. Goldberg, I(.1994 .)Functional foods :Designer foods, Pharma Foods, Nutraceuticals .Springer.
3. Matz, S.A(.2004 .)Formulating and processing of dietetic foods .CHIPS Publ .
4. Kalia, M. and Sood, S. (2010). Food preservation and processing. Revised edition, Kalyani Publishers, New Delhi.
5. Srilakshmi, B (.2018 .)Food science (Fifth ed).New Age International Pvt .Limited, Pub., New Delhi.
6. Ward JD and Ward LT (2012) Principles of Food Science. Goodheart-Willcox Publisher, Illinois.
7. Ss'hetty K, Paliyath G, Pometto A and Levin RE (2011) Food Biotechnology. 2 nd Edition, CRC Press, New York.
8. Ravishankar Rai V (2015) Advances in Food Biotechnology. Wiley-Blackwell Publishing Company, Boston.

Core Course

BND622: FOOD PRODUCT DEVELOPMENT AND FORMULATION LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Sensory evaluation: Methods, training of judges, score card preparation
2. Selection and modification of food products to be developed,
3. Formulation and standardization of products, objective and subjective evaluation of the products
 - Snacks
 - Fermented foods
 - Curries and gravies
 - Continental dishes
 - Baked foods
4. Evaluation of consumer acceptability
5. Cost calculation, packaging and sale of products
6. Presentation of developed food products
7. A.V. aids/ Video shooting of product preparation

Core Course

BND603: NUTRITIONAL BIOCHEMISTRY – II

Credits : 04

LTP 310

THEORY

Course Description: The aim of this course is to understand the water and fat soluble vitamins, vitamin-like substances, minerals, electrolytes and water. Also, metabolic pathways occurring in cells, such as respiration and the biosynthetic pathways for the key macromolecules.

Course Outcomes(CLO): To enable the students to understand

- To outline the concept of enzymes and their activity
- To learn about nucleic acids and biosynthesis of proteins
- To know the biochemical functions of fat soluble vitamins and water soluble vitamins
- To know the biochemical functions of minerals

Course Content**Unit I**

Water: electrolyte balance, Acid base balance. pH and buffers

Enzymes: Definition types and classification of enzymes definition and types of coenzymes Cofactors specificity of enzymes Isozymes enzyme kinetics including factors affecting enzyme action velocity of enzyme catalyzed reactions enzyme inhibition

Unit II

Introduction to nucleic acids-nitrogenous bases Nucleosides Nucleotides Biosynthesis of DNA RNA –Structure Replication transcription and translation Genetic code regulation of gene expression

Elementary knowledge of biosynthesis of proteins**Unit III**

Vitamins: Chemistry and biochemical role of fat soluble vitamins - A DE and K

Water soluble vitamins: B1 B2 B6 niacin pantothenic acid B12 folic acid and vitamin C

Unit IV

Minerals: Calcium, iron, Magnesium, phosphorus, Sodium, potassium, iodine, fluorine

Trace minerals: zinc, copper, chromium, Selenium. Biochemical role of inorganic elements, Lead, Mercury, Arsenic, phosphorus, tin (in brief)

Suggested readings:

1. West, E .S., Todd, W .R.; Mason .H.S .and Van Bruggen J.T :.4th Ed .Text book of biochemistry Amerind Publishing Co .Pvt .Ltd .
2. Murray, R .K .Grannen, D .K.; Mayes, P .A .and Rodwell .V .W :.Harper's biochemistry .Lange Medical Book
3. Berg JM (2007) Biochemistry. 6 th Edition. W. H. Freeman and Company, New York.
4. Nelson D L and Cox MM (2017) Lehninger Principles of Biochemistry. 7th Edition .WH Freeman, New York.
5. Stipanuk MH and Caudill MA (2013) Biochemical, Physiological and Molecular Aspects of Human Nutrition. 3 rd Edition. Elsevier Pub.

**SYLLABUS FOR SEVENTH SEMESTER
NUTRITION & DIETETICS**

Core Course

BND701: INSTITUTIONAL FOOD SERVICE MANAGEMENT

Credits : 04

LTP 310

THEORY

Course Description: Institutional food service management program provides you with theoretical and practical knowledge, and you usually spend extensive time applying your coursework in real-world restaurant environments. The courses you take include food service sanitation, nutrition, culinary arts, dining room management and business practices.

Course Outcomes(CLO): Through this course student should be able to:

- Enumerate basic factors involved meal planning and food preparation
- Define different types of organizations and understand the basic principles of management
- Identify the tools of management used in management of personnel in food service organization
- Determine importance of food standards and cost control

Course Content**Unit I**

Types of institutional food service operations: Commercial, Noncommercial and styles of food services

Meal planning in institutions: Basic factors in institutional meal planning, writing, types and preparation of menu and menu cards and portion control and maintenance of standard serving

Unit II

Organization: Theories of organization and Different types of organization

Management: Definition, functions and Tools of management – Organization chart, job analysis, job specification, job evaluation

Cost concept, food cost control, pricing, budget and accounting, systems of book keeping

Unit III

Physical plant: Location, Floor plans, Space, Kitchen units, Storage units, Serving units and Dish washing units. Importance of - Personal hygiene, sanitation and hygiene in food service organizations and while food handling

Equipment: Types of equipment as per the size and type of establishment.

Factors affecting choice of equipment's - utility of design ease of installation, functionality and maintenance.

Unit IV

Food purchasing- Selection; buying and purchasing. Methods of purchasing and pricing. Requisition and inventory.

Food storage: Selection, Receiving and storage of food in institutions, Location of storage spaces and Types of storage for different food stuffs

Overview of budgeting, accounting and record keeping

Suggested Readings:

1. A Textbook of Hotel Management by K S Negi, Wisdom Press New Delhi, 2011.
2. Food Service Manual for Healthcare Institution by Ruby Parker Puckett, 4th edition, 2012.
3. Food Service Organizations: A Managerial and System Approach by Marian C. Spears, 3rd edition, Merrill an imprint of Prentice Hall Publishers, New Jersey, 1995.
4. Food Safety: Theory and Practice by Paul L. Knechtges, Ascend Learning Company, 2012.
5. Food Hygiene and Sanitation with Case Studies by Sunetra Roday, 2nd edition, Tata McGraw Hill Education Pvt. Ltd, New Delhi, 2012.
6. Food Service and Catering Management, RK Malhotra, Anmol Publications Pvt. Ltd., New Delhi, 1998.
7. Introduction to Catering: Ingredients for Success by Stephen B. Shiring, Baba Barakha Nath Printers, 2001.
8. Institutional Food Management, Mohini Sethi, New Age International Ltd., New Delhi, 2008 (reprint).
9. Kitchen Guide to Hotel Management by Pradeep Paul, Random Publications, 2014.
10. Managing Food and Nutrition Service for the Culinary, Hospitality and Nutrition Professions by Sari Edelstein, Jones and Bartlett Publishers, 2008.
11. Quantity Food Production: Operation and Indian Cuisine by Parvinder S Bali, Oxford University Press, 2011.

Core Course

BND721: INSTITUTIONAL FOOD SERVICE MANAGEMENT LAB

Credits: 2

LTP 004

PRACTICAL LIST

1. Standardization of recipes of snacks and a meal for portion and cost (cakes, ladoo, mathri, roasted namkeen and nutritious ladoo)
2. Development of recipe book.
3. Preparation of various types of menu cards.
4. Table setting, tray service of tea and snacks for 25 persons.
5. Running a canteen for one day.
6. Serving high tea to 20 persons and a meal to 10 persons.
7. Preparation and service of packed lunch.
8. Maintenance of accounts and record keeping.
9. Visit to different food service institutions.

Core Course

BND702: RESEARCH METHODOLOGY

Credits : 06

LTP 510

THEORY

Course Description: This course will provide an opportunity for participants to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. The course introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches.

Course Outcomes(CLO): At the end of the study of this subject the student should be able to:

- Describe the importance & use of research methodology for research work.
- Knowledge of processing and analyzing data can be gained
- Describe the importance & use of biostatistics
- Implementation of hypothesis testing and important concepts relating to research design and measurements and scaling techniques

Course Content**Unit I****Introduction to Research Methodology**

1. **Meaning of research**, objectives of research, Motivation in research, Types of research & research studies, Research methods vs methodology, Criteria for good research.
2. **Research problem:** Statement of research problem, Statement of purpose and objectives of research problem, Necessity of defining the problem.
3. **Research design:** Meaning of research design, need for research design, Features for good design, Different research designs, Basic principles of research design.

Unit II**Measurement & scaling techniques / Methods of data collection:**

1. **Measurement in research-** Measurement scales, sources of error in measurement, Technique of developing measurement tools
2. **Meaning of scaling-** Its classification, important scaling techniques.
3. **Collection of data-** primary data, collection data through questionnaires & schedules. Difference between questionnaires & schedules.

Unit III

Statistics

1. Introduction: Meaning, definition, characteristics of statistics. Importance of the study of statistics, Branches of statistics, Parameters and Estimates, Variables and their types, Measurement scales.

2. Tabulation of Data: Basic principles of graphical representation, Types of diagrams – histograms, frequency polygons, smooth frequency polygon, cumulative frequency curve, Normal probability curve.

3. Data Distribution: Measures of Central Tendency, need for measures of central Tendency, Definition and calculation of Mean – ungrouped and grouped, interpretation and calculation of Median-ungrouped and grouped, Meaning and calculation of Mode, Geometric mean & Harmonic mean, Guidelines for the use of various measures of central tendency.

4. Measures of Dispersion: Range, mean deviation, standard deviation & variance. Probability and Standard Distributions: Meaning of probability of standard distribution, the binomial distribution, the normal distribution, Divergence from normality – skewness, kurtosis.

Unit IV

Statistical Process and Calculations

1. Sampling: Definition, Types- simple, random, stratified, cluster and double sampling. Need for sampling - Criteria for good samples, Application of sampling in community, Procedures of sampling and sampling designs errors.

2. Testing of Hypotheses, Level of significance, Degrees of freedom.

3. Theory and practice using statistical software of the following: Correlation & regression: Significance, correlation coefficient, linear regression & regression equation, Chi-square test, test of Goodness of fit & student t-test.

4. Theory and practice using statistical software of the following:

- i. Analysis of variance (ANOVA)
- ii. Analysis of Co variance (ANACOVA)
- iii. Multivariate analysis

Suggested Readings:

Text Books:

1. Physical Therapy Research: Principles and Applications – Domholdt – Elsevier
2. Rehabilitation Research (5th Ed.) – Carter and Lubinsky - Elsevier
3. Methods in Biostatistics – Mahajan – J.P.

Reference Books:

1. Statistics in Medicine – Colton – Little Brown, Boston.
2. Biostatistics: The manual for statistics methods for use in health and nutrition – K.V. Rao.

Discipline Specific Elective**BND001: HEALTH HYGIENE AND SANITATION****Credits : 03****LTP 300****THEORY**

Course Description: The course is designed to provide a complete guidance on health and hygiene systems, guidelines for implementing and role of government and public in maintaining a healthy life.

Course Learning Outcomes(CLO):

- Discuss how contamination of food can occur in a food service establishment.
- Describe the effect and consequences of food borne illness.
- Display sound practices to prevent the possibility of food poisoning.
- Identify measures/procedures that will reduce or eliminate accidents in food preparation and service areas.

Course Content**Unit I**

Concept, Dimensions, significance and interrelationship of health, hygiene and sanitation. Characteristics of good health and factors affecting it. determinants of Health, Indicators of Health, Concept of Disease and Disease Causation, Responsibility of Health, Concept of Control and Prevention of Diseases.

Unit II

Immunization to Prevent Communicable Disease, Host Defenses
Hygiene, Personal Hygiene, Housing Standards: Criteria for Healthful Housing, Ventilation, Lighting and Noise- Need, Standards, Types, Effects on Health
Vector Management, Rodent Control,
Food Hygiene, inculcating hygienic habits to promote health. Kitchen hygiene and sanitation

Unit III

Sources of water contamination and its purification at domestic level.
Causes of air pollution and its ill effects on health.
Soil impurities, their effect on health and its prevention and control.
Accidental and bacterial food poisoning. Symptoms and prevention of food poisoning.
Causes, symptoms and control of food borne diseases - diarrhea, dysentery, cholera, typhoid, jaundice.

Unit IV

Municipal health services and mobile units
Prevention and control of infectious diseases. Notification, quarantine, segregation, and disinfection.

Health services at fairs and festivals

Removal and disposal of refuse and excreta. Sanitary drainage fittings

Suggested Readings:

1. Biorlund A., Svensson T, and Read S. 2006, Holistic and biomedical concepts of health: a study of health notions among Swedish occupational therapists and a suggestion for developing an instrument for comparative studies. Scand. J. OccupTher 2006 Sep;13(3):141-50.
2. RodayS.(1998). Food Hygiene and Sanitation 10th Reprint. New Delhi:TataMcGraw-Hill Education.3. ChattopadayGhosh S and BasuN.(2015). UcchaMadhaymikKhadda O Pusti, Calcutta Book House
3. Okuno. T (1978). World Health Statistics, Quarterly Report, 31 (2) 120.
4. Park K. 2007, Park's text book of Preventive and Social Medicine, BanarsidasBhanot publishers, India.
5. SrilakshmiB.(2018). Food Science. New Delhi: New Age International

Discipline Specific Elective

BND021: HEALTH HYGIENE AND SANITATION LAB

Credits: 1

LTP 002

PRACTICAL LIST

1. Personal and environmental hygiene
2. Preparation of oral rehydration solution (ORS)
3. Chlorination of water
4. Control of infestation - rodent control, proofing and destruction of rats, mice etc.
5. Swab testing for food preparation surfaces and utensils
6. Personnel Hygiene Monitoring / Swab Testing
7. Quality analysis of drinking water
8. Microbiological analysis of the air
9. Organization of health and hygiene camp
10. Visit to primary health Centre and civil hospital

Discipline Specific Elective

BND002: SPORTS NUTRITION AND PHYSICAL FITNESS

Credits : 03

LTP 300

THEORY

Course Description: This course presents the scientific basis for sports nutrition emphasizing the energy needs of activity and effect of dietary intake on performance. Special dietary requirements of specific sports and athletic activities will be taught.

Course Outcomes(CLO):

- Categorize the role that each of the macronutrients and micronutrients has on physical activity and athletic performance
- Examine the impact on physical activity and athletic performance when deficiencies of macronutrients or micronutrients are present
- Identify accepted techniques for the assessment of body composition and energy balance
- Examine the prevalence of disordered eating and eating disorders in male and female athletes

Course Content**Unit I**

Overview of nutritional management vis-a-vis physical fitness, techniques and methods of measuring physical fitness

Body composition: methods of measuring body composition - direct and indirect, Body composition in different physiological conditions and factors affecting it

Energy metabolism and physical fitness- aerobic and anaerobic, concept, importance, influencing factors

Unit II

Techniques to measure energy expenditure and energy intake, Aging physiology, mechanism and role of nutrients in arresting aging process, aging theories, nutritional requirements of sports personnel involved in various sports, Basic exercise physiology and biochemistry - Physiological and metabolic changes during and after sports activity

Macronutrients metabolism in exercise: carbohydrates problems and fat (Fueling before, during and after exercise)

Unit III

Macronutrients metabolism in exercise: carbohydrates problems and fat (Fueling before, during and after exercise)

Effects of dehydration and rehydration in exercise and role of water and electrolytes in performance

Vitamins metabolism in sports Free radicals in exercise role of antioxidants in exercise

Unit IV

Minerals and trace minerals metabolism in exercise and essential minerals and trace minerals in sports

Sports nutrition products, sports nutrition, theory to practice –, Special consideration in sports nutrition- Women, young, diabetic, vegetarian athletes, Sport specific nutrition –Gymnastics, weight lifters, skiers, cyclists, swimming, skating, Winning recipes for peak performance

Suggested Readings:

1. Falkner, F. and Tanner JM. (1978). Human growth -Principles and prenatal growth .Vol .I .
2. Falkner, F. and Tarnner JM. (1980). Human growth methodology .Ecological, genetic and nutritional effects on growth .Vol .III .Plenum Press.
3. Passmore, R .and Eastwood MA. (1986). Human nutrition and dietetics.ELBS Churchill Livngstone.
4. Pike, R.L .and Brown ML. (1988). Nutrition -An Integrated Approach .John Wiley and Sons.
5. Driskell JA and Wolinsky I (2007) Sports Nutrition: Energy Metabolism and Exercise. 2 nd Edition. CRC Press, New York.
6. Scott B (2008) A Primer for the Exercise and Nutrition Sciences: Thermodynamics,Bioenergetics, Metabolism. Humana Press Inc. New York.

Discipline Specific Elective

BND022: SPORTS NUTRITION AND PHYSICAL FITNESS LAB

Credits: 1

LTP 002

PRACTICAL LIST

1. Development of project proposal on nutrition in physical fitness
2. Development of methodology for collection of data, assessment of nutritional status and physical fitness, practice of using anthropometry, clinical and dietary assessment techniques, assessment of body composition of the selected group
3. Development and standardization of tool for physical fitness
4. Assessment of physical fitness of the selected group using standard tool
5. Compilation of data of anthropometry and clinical observation
6. Analysis of dietary intake to assess the nutrient intake, interpretation of nutrient intake in comparison with RDA, compilation of data on energy expenditure, analysis of data and Final report writing of the project and presentation

Discipline Specific Elective
BND003: INTRODUCTION TO COOKERY

Credits : 03

LTP 300

THEORY

Course Learning Description: This course is structured to teach the fundamental and basic concepts of culinary techniques and cookery to include the cooking techniques, heat transfer, sanitation, safety, equipment usage and maintenance, menu knowledge and professionalism.

Course Learning Outcomes(CLO):

- Determine the different positions and function of kitchen production.
- Identify and properly operate equipment & common culinary hand tools.
- Productively apply appropriate cooking skills
- Comply with and practice safe work habits, identify safety hazards, employ preventative safety measures.
- To know the basics of culinary practices

Course Content

Unit I

Kitchen attire and equipment's: Terminology used in cooking

Cooking of food: heat and heat transfer methods. Effects of cooking on food and its nutritive value

Unit II

Principles and practices of boiling, simmering, steaming, frying, stewing, pressure cooking, roasting, baking for different food groups

Unit III

Principles and practices of braising, grilling, infrared, microwave cooking and combined methods of cookery for different food groups

Unit IV

Basics of culinary practices: Thickening and binding agents. Flavoring stocks, essence, glazes, sauces, soups and garnishes

Suggested Readings:

1. Fuller J. (1966). Chefs manual and kitchen management, B.T .Badtsford Ltd.
2. Treat N. and Richard S. (1977). Quantity cookery .Little brown and Co.

3. Klest, B.B., Wood, L., Horger, V.F .and Shugart G.S. (1977). Food Service in Institutions,
4. John Kliley and Sons.
5. Srilakshmi, B. (2010). Food Science .5
6. thedn .New Age International .Pvt .Limited.
7. Swaminathan, M.S. (1993). Food science and experimentalfoods .Ganesh.

Discipline Specific Elective
BND023: INTRODUCTION TO COOKERY LAB

Credits: 1

LTP 002

PRACTICAL LIST

1. Preparation of recipes from different food groups such as:

- a. Cereals
- b. Pulses
- c. Eggs
- d. Vegetables
- e. Fruits and
- f. Milk

2. Preparation of food products using various cooking methods:

- a. Boiling
- b. Steaming
- c. Frying
- d. Stewing
- e. Roasting
- f. Braising
- g. Grilling
- h. Microwave cooking and
- i. Methods in combination.

Discipline Specific Elective
BND004: ELEMENTARY STATISTICS

Credits : 03

LTP 300

THEORY

Course Description: A study of the acquisition, presentation, analysis, and interpretation of data.

Course Outcomes(CLO):

- Organize, manage and present data
- Analyze statistical data graphically using frequency distributions and cumulative frequency distributions.
- Analyze statistical data using measures of central tendency, dispersion and location
- Use the basic probability rules, including additive and multiplicative laws, using the terms, independent and mutually exclusive events

Course Content

Unit I

- 1. Introduction to statistics:** definitions, functions, uses and limitations.
- 2. Classification and tabulation of data:** qualitative and quantitative classification, discrete and continuous variables, frequency tables, grouped and ungrouped data.
- 3. Graphical representation of data:** Histogram, frequency polygon, frequency curve, ogives
- 4. Measures of central tendency:** Introduction to basic concepts of logarithms, AM, GM, HM, median, mode with merits, demerits and uses, relationship between AM, GM and HM

Unit II

- 1. Measures of dispersion:** range coefficients, inter quartile range, quartile deviation, deciles, coefficient of quartile deviation, mean deviation from AM, median and mode, variance, standard deviation, coefficient variation.
- 2. Moments:** Raw moments, Central moments for grouped and ungrouped data, relationship between raw moments and central moments

Unit III

- 1. Measures of skewness and kurtosis:** definitions of symmetrical distribution, skewness and kurtosis, relationship between mean, median and mode and between quartiles for symmetrical and skewed distributions.

Correlation and linear regression analysis: definition of correlation its types, scatter diagrams, Karl Pearson's formula of correlation coefficients, properties of correlation coefficient, definition of regression, regression equations of Y on X and of X on Y, relationship between correlation coefficient and regression coefficients. Problems based on correlation and regression

Unit IV

1. Tests of significance: basic definitions, hypothesis, null and alternative hypothesis, tests statistic, testing of hypothesis, one sample t-test and two sample fisher's t-test. Chi-square test of goodness of fit and Chi-square test of independence of attributes

2. Introduction to sampling methods: definition of population, random sample, sampling versus complete enumeration

Suggested readings:

1. Elhance, D. N. Fundamentals of Statistics
2. Agarwal, B. L. Basic Statistics
3. Kapoor and Saxena Mathematical Statistics
4. Singh and Verma Agricultural Statistics
5. Hall and KniGHT Higher Algebr

Discipline Specific Elective

BND024: ELEMENTARY STATISTICS LAB

Credits: 1

LTP 002

PRACTICAL LIST

1. Graphical representation of data (Histogram, frequency polygon, frequency curve, ogives)
2. Measures of central tendency (AM, GM, HM, median, mode for Grouped and Ungrouped data)
3. Measures of dispersion (Range, mean deviation, standard deviation, quartile deviation coefficient of variation for Grouped and Ungrouped data) with calculation of quartiles, deciles and percentiles.
4. Measures of skewness and kurtosis (Grouped and Ungrouped data), moments
5. Correlation and regression analysis
6. Application of one sample t-test, Application of two sample t-test
7. Chi-square test of goodness of fit, Chi-square test of independence of attributes
8. Selection of random sample using simple random sampling

Discipline Specific Elective**BND005: FOOD ANALYSIS****Credits : 03****LTP 300****THEORY**

Course Learning Description: Foods are analyzed for purposes of trade, compliance, quality assurance, authentication, complaint investigation, nutritional attributes and scientific research. In this course students will undertake and compare various food analysis techniques, followed by analysis, interpretation and presentation of the results. Upon completion of this course, students will have the knowledge and skills to apply and assess the principles and practices required for the analysis of foods.

Course Learning Outcomes(CLO):

- The principles, methodology and applications of instrumentation and technology in food analysis
- Comparison of advanced analytical techniques with conventional techniques in food analysis
- Application of common techniques for analyzing food components from specific food products to determine proximate composition
- Assessment of data using statistical analysis and reporting of results in a scientific manner

Course Content**Unit I**

1. Introduction to food analysis- definition reasons for food analysis Official methods
2. Rules and regulation for food analysis and importance of food analysis in quality control
3. Sample and sampling techniques
4. Familiarization to terms and calculations used in preparation of various standard solutions
5. Principles techniques and applications of colorimetric and spectrophotometer
6. Analysis of carbohydrates- introduction Methods of analysis Sample preparation

Unit II

1. Extraction of monosaccharide's oligosaccharides Chemical methods for carbohydrates analysis gravimetric methods Titrimetric methods and colorimetric methods enzymatic methods

2. Analysis of polysaccharides- starch Crude fiber and dietary fiber
3. Analysis of moisture importance of moisture analysis– methods of analysis direct methods Evaporation Methods10.
4. Analysis of moisture - indirect methods Chemical and distillation methods Analysis of moisture– instrumental methods.
5. Analysis of proteins– importance of protein analysis Protein analysis by Kjeldhal Dumas Biuret Lowry Dyebinding Turbid and UV visible spectroscopy methods.
6. Analysis of amino acids- Characterization
7. Basic principles of chromatography.

Unit III

1. Types of chromatography and its applications
2. Paper and GLC chromatography Analysis of fats- by solvent Non-solvent and instrumental methods
3. Analysis of composition fats and its physical parameters
4. Analysis of anti-nutritional factors- characterization Basic principles –tannins Phytates Oxalates etc.
5. Principles Techniques and applications of HPLCTLC
6. Analysis of ash- introduction and importance Dry ashing Wet ashing and low plasma temperature ashing

Unit IV

1. Analysis of different minerals by gravimetric and titration methods
2. Principles Techniques and applications of AAS and AES
3. PH meter
4. Electrophoresis
5. Introduction to animal assay
6. Principles Techniques and applications of color estimating instruments.

Suggested Readings:

1. AOAC (1995 .) Association of official analytical chemists. Washington, DC.
2. Gruenwedels DW and whitakor JR (1984 .) Food analysis :Principles and techniques .Vols .I-VIII. Marcel Dekker.
3. Joslyn MA(.1970 .)Methods in food analysis :Physical, chemical and instrumental Methods of analysis .academic Press.
4. Pomeranz Y and Molean CE(.1977 .)Food analysis theory and practice .AVIPubl.
5. Sawhney SK and Singh R(.2000 .)Introductory practical biochemistry .Narosa

Core Course**BND025: FOOD ANALYSIS LAB****Credits: 2****LTP 004****PRACTICAL LIST**

1. Introduction to glassware's used in laboratory
2. Preparation of samples and preparation of solutions buffers
3. Estimation of moisture in food stuffs
4. Estimation of bulk density of foods
5. Estimation of color using spectrophotometer
6. Physical analysis-specific gravity
7. Quantitative estimation of proximate principles- Ash Minerals Free fatty acids Protein
8. Estimation of sugars-reducing and non-reducing
9. Estimation of starch digestibility
10. Estimation of vitamins by use of colorimetry
11. Estimation of minerals by use of UV spectrophotometer
12. Estimation of amino acids by use of paper chromatography
13. Estimation of vitamins by use of HPLC
14. Estimation of fatty acids and pesticide residues by use of GC
15. Estimation of minerals by use of atomic absorption spectrophotometer
16. Quantitative estimation of minerals and vitamins by use of photofluorometry
17. Analysis of antinutrients- Phytic acid Saponins Trypsin inhibitors etc.

Discipline Specific Elective**BND006: FOOD TOXICOLOGY****Credits : 04****LTP 310****THEORY**

Course Description: It is a more detailed study of natural constituents of foodstuffs that occur as toxicants, natural contaminants associated with our foodstuffs that act as toxicants and toxicants intentionally/unintentionally introduced into foods during processing. This course also focuses on the effects/significance of toxicants on consumers' health.

Course Outcomes(CLO):

- To understand the concept of food toxicology
- Differentiate between natural constituents that are toxicants and natural contaminants that act as toxicants,
- Differentiate between the various types of toxicants, chemistry, their mode of action, significance, food sources, and possible detoxification methods
- To understand the concept of packaging

Course Content**Unit I****Introduction and significance of food toxicology**

Food poisoning –Types, causative factors, signs and symptoms, preventive measures

Unit II

Natural food toxins – Anti-nutritional factors, other food toxins, their harmful effects and methods of removal

Unit III

Microbial toxins and food intoxication – Source of contamination, effect on health, preventive measures, methods of inactivation / destruction

Chemical toxins – Pesticides, insecticides, metallic and others, residual effects, preventive measures, methods of removal

Unit IV

Food packaging material – Potential contaminants from food packaging material

Suggested Readings:

1. Kramer and Kramer 1984 Nutritional toxicology Vol I and II.
2. Fennamma, O.R. 1996 Food chemistry

Discipline Specific Elective**BND007: NUTRIGENOMICS****Credits : 04****LTP 310****THEORY**

Course Description: This course aims to understand, in depth, the influence of genetics on micronutrient metabolism, and implications for human diseases including inherited inborn disease, metabolic disease, cancer, neurodevelopment, and neurodegenerative diseases, etc.

Course Learning Outcomes(CLO): This course will enable the students to:

- To get familiar with concept of genomics
- Influence of genetic variation on nutritional requirement
- Role of genetics in human nutrient metabolism
- Regulation of genetics on cellular and molecular metabolism

Course Content**Unit I**

Genomics – scope and importance Definition

Global impact of genomics; genomics in agriculture and environment

Unit II

Application of genomics in development of nutritious foods

Single cell protein

Unit III

Nutritional significance of food products developed by biotechnological techniques;

Scientific Technological and resource constraints on genomics;

Important factors affecting development in nutrigenomics.

Overview of genomics in agriculture & environment

Nutritional genomics: definition Concept

Scope Applications Regulatory issues

Unit IV

Nutrigenetics and Personalized Nutrition

Genetically modified foods -Development

Advances, Health concerns

Regulatory issues

Ethical concerns of genetic engineering

Suggested Readings:

1. Nestle M .2003. Safe Food :Bacteria, Biotechnology and Bioterrorism .University of California Press.
2. Rogers PL and Fleet GH .1989 .Biotechnology and Food Industry .Univ .of Minnesota.

Ability Enhanced Compulsory Course 1**ENS001: ENVIRONMENTAL STUDIES****Credits : 02****LTP 200****THEORY**

Course Description: The course aims to equip the students with causes and consequences of different kinds of global environmental problems and develop the thinking about the remedial measures of these problems.

The course includes the scope of environmental studies, ecosystem, natural resources, biodiversity and its conservation, various types of environmental pollutions, policies & practices.

Course Learning Outcomes(CLO): Upon successful completion of the course, the students should be able to:

CO1: To understand the multidisciplinary nature of environment and ecosystem.

CO2: To provide an introduction to renewable and non-renewable resources of energy.

CO3: To become familiar with biodiversity and its conservation.

CO4: To analyze the various environmental practices, policies and pollutions.

Course Content**Unit I****Introduction to environmental studies**

- Multidisciplinary nature of environmental studies; components of environment –atmosphere, hydrosphere, lithosphere and biosphere.
- Scope and importance; Concept of sustainability and sustainable development.

Ecosystems

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

Unit II**Natural Resources: Renewable and Non-renewable Resources**

- Land Resources and land use change; Land degradation, soil erosion and desertification.

- Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations.
- Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state).
- Heating of earth and circulation of air; air mass formation and precipitation.
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.

Biodiversity and Conservation

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

Unit III**Environmental Pollution**

- Environmental pollution: types, causes, effects and controls; Air, water, soil, chemical and noise pollution
- Nuclear hazards and human health risks
- Solid waste management: Control measures of urban and industrial waste.
- Pollution case studies.
- Environmental Policies & Practices
- Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture.
- Environment Laws: Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC).
- Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context

Unit IV

Human Communities and the Environment

- Human population and growth: Impacts on environment, human health and welfares.
- Carbon foot-print.
- Resettlement and rehabilitation of project affected persons; case studies.
- Disaster management: floods, earthquakes, cyclones and landslides.
- Environmental movements: Chipko, Silent valley, Bishnios of Rajasthan.
- Environmental ethics: Role of Indian and other religions and cultures in environmental conservation.
- Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).

Field work

- Visit to an area to document environmental assets; river/forest/flora/fauna, etc.
- Visit to a local polluted site – Urban/Rural/Industrial/Agricultural.
- Study of common plants, insects, birds and basic principles of identification.
- Study of simple ecosystems-pond, river, Delhi Ridge, etc.
-

Suggested Readings:

1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.
2. Gadgil, M., & Guha, R. 1993. This Fissured Land: An Ecological History of India. Univ. of California Press.
3. Gleeson, B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.
4. Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute, Oxford Univ. Press.
5. Groom, Martha J. Gary K. Meffe, and Carl Ronald Carroll. Principles of Conservation Biology. Sunderland: Sinauer Associates, 2006.
6. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India's Himalaya dams. Science, 339: 36-37.
7. McCully, P. 1996. Rivers no more: the environmental effects of dams (pp. 29-64). Zed Books.
8. McNeil, John R. 2000. Something New Under the Sun: An Environmental History of the Twentieth Century.
9. Odum, E.P., Odum, h.T. & Andrews, J. 1971. Fundamentals of Ecology. Philadelphia:

Saunders.

10. Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2011. Environmental and Pollution Science. Academic Press.
11. Rao, M.N. & Datta, A.K. 1987. Waste Water Treatment. Oxford and IBH Publishing Co. Pvt. Ltd.
12. Raven, P.H., Hassenzahl, D.M. & Berg, L.R. 2012. Environment. 8th edition. John Wiley & Sons.
13. Rosencranz, A., Divan, S., & Noble, M.L. 2001. Environmental law and policy in India. Tripathi 1992.
14. Sengupta, R. 2003. Ecology and economics: An approach to sustainable development. OUP.
15. Singh, J.S., Singh, S.P. and Gupta, S.R. 2014. Ecology, Environmental Science and Conservation. S. Chand Publishing, New Delhi.
16. Sodhi, N.S., Gibson, L. & Raven, P.H. (eds). 2013. Conservation Biology: Voices from the Tropics. John Wiley & Sons.
17. Thapar, V. 1998. Land of the Tiger: A Natural History of the Indian Subcontinent.
18. Warren, C.E. 1971. Biology and Water Pollution Control. WB Saunders.
19. Wilson, E.O. 2006. The Creation: An appeal to save life on earth. New York: Norton.
20. World Commission on environment and Development. 1987. Our Common Future. Oxford University Press.
21. www.nacwc.nic.in
22. www.opcw.org

Ability Enhanced Compulsory Course

COM101: ENGLISH COMMUNICATION

Credits: 02

LTP 200

Course Description: To make students capable of using English language in context. To enhance effective reading and writing skills.

Course Learning Outcomes(CLO): Upon successful completion of the course, the students should be able to:

CLO1: The students will develop a minute practical knowledge about English grammar and its usage

CLO2: The students will develop an understanding of the importance of free expression

Course Content**Unit I**

Reading Skills: Comprehension of Unseen Passage [Reading articles] (Intermediate) Summary Paraphrasing, Translation and Precis Writing

Unit II

English Grammar and Usage: Parts of speech, common errors in writing (based on Parts of Speech) Tenses, Change of Voice, and Transformation of Sentences

Unit III

Basic Writing Skills and Writing Practices: Paragraph/essay writing, short life story writing, Notice (General like trip, change of name, function) making notes and Letter writing

Unit IV

Vocabulary Enhancement: Synonym, Antonym, Idioms and Phrasal verbs

Suggested Readings:

1. Practical English Usage. Michael Swan OUP. 1995
2. On Writing Well. William Zinsser. Harper Resource Book. 2001
3. Communication Skills. Sanjay Kumar and PushpLata. Oxford University Press. 2006
4. Exercises in Spoken English. CIEFL, Hyderabad. Oxford University Press

Ability Enhanced Compulsory Course

COM121: ENGLISH COMMUNICATION LAB

Credits: 01

LTP 200

Course Description: The course aims to equip the students with focus on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

The course includes description of sights seen in everyday life, pronunciation of different words and its correct usage.

Course Learning Outcomes(CLO): Upon successful completion of the course, the students should be able to:

CO1: Better understanding of nuances of English language through audio- visual experience and group activities

CO2: Speaking skills with clarity and confidence enhancing their employability skills

CO3: Better comprehension of speech of people of different backgrounds and regions.

CO4: Ability to use English grammar accurately.

Course Content**Unit I**

Daily Discourse: Common Everyday Situations: Conversations and Dialogues, Monologue, and Communication at workplace.

Unit II

Listening Skills: Listening skills on Social Interactions.

Unit III

Phonetic Skills: Pronunciation, Intonation, Stress and Rhythm

Unit IV

Speaking Skills: Group Discussion / Debate, Role Plays

Suggested Readings:

1. Cambridge English Empower Elementary Student's Book by Cambridge University Press
2. Exercises in Spoken English. Parts. I-III. CIEFL, Hyderabad. Oxford University Press
3. Study Writing. Liz Hamp-Lyons and Ben Heasley, Cambridge University Press. 2006.
4. On Writing Well. William Zinsser. Harper Resource Book. 2001
5. Practical English Usage. Michael Swan. OUP. 1995.

Ability Enhanced Compulsory Course**GWE101: GENDER EQUALITY AND WOMEN EMPOWERMENT****Credits: 02****LTP 200****Course Objectives:**

1. To sensitize the participants regarding the issues of gender and the gender inequalities prevalent in society.
2. To raise and develop social consciousness among the students.
3. To introduce gender sensitization and related issues.

Course Learning Outcomes(CLO): Upon successful completion of the course, the students should be able to:

1. Recognize the intersections between gender and other social and cultural identities
2. Engage in promoting social justice and human rights
3. Explain how theories of gender and sexuality have been influenced by and influence their social contexts
4. Describe the social construction of gender and sexuality and explain who these constructions are shaped by the time, location, and culture that they are situated in

Contents:**I) Introduction to Women's Studies**

Sex and Gender, socialization, Definition, Nature, Scope and various dimensions

II) Approaches of Feminism

Feminism and Patriarchy, Feminist ideology, Feminist Movements in brief

(III) Basic concepts of Gender and Society

Sexual division of Labour, Masculinity & femininity, Man and Woman relationship, Self-awareness, consciousness raising

(IV) Women and Law

Constitutional Laws and Fundamental rights, Human Rights, Women related Law, Women in Politics

(V) Skill development and presentation

Film/Documentary Screening , Field Visits, Group discussion and debate, Awareness Songs, Street plays, theatre and presentation skills for personality development

(VI) Prevention of Sexual Harassment Preconditions for Effective Working of Sexual Harassment, Complaints Committees, Role of men in prevention of sexual harassment at workplace, Gender sensitive language, work culture and workplace

Suggested Readings:

1. Gill, Rajesh, Contemporary Indian Urban Society- Ethnicity, Gender and Governance, Bookwell Publishers, New Delhi, 2009
2. Jain, Devaki and Rajput, Pam, (eds), Narratives from the Women's Studies Family, Sage, New Delhi, 2003

Suggested Books:

1. Mies, Maria, Indian Women and Patriarchy, Concept Publishing Company, New Delhi

Ability Enhanced Compulsory Course
HVPE101: HUMAN VALUES AND PROFESSIONAL ETHICS

Credits: 02

LTP 200

Course Objectives:

1. To help students distinguish between values and skills, and understand the need, basic guidelines, content and process of value education
2. To help students understand the meaning of happiness and prosperity for a human being
3. To facilitate the students to understand harmony at all the levels of human living, and live accordingly
4. To facilitate the students in applying the understanding of harmony in existence in their profession and lead an ethical life

Course Learning Outcomes(CLO): Upon the successful completion of the course, student will be able to:

- Understand the significance of value inputs in a classroom, distinguish between values and skills
- Distinguish between the Self and the Body, understand the meaning of Harmony in the Self the Co-existence of Self and Body
- Distinguish between ethical and unethical practices, and start working out the strategy to actualize a harmonious environment wherever they work.
- Understand the value of harmonious relationship based on trust, respect and other naturally acceptable feelings in human-human relationships and explore their role in ensuring a harmonious society

Content

Unit I

I) Introduction to Value Education

Understanding Value Education, Self-exploration as the Process for Value Education, Happiness and Prosperity – Current Scenario

II) Harmony in the Human Being

Understanding Human being as the Co-existence of self ('I') and the Body, Discriminating between the Needs of the Self ('I') and the Body, Understanding Harmony in the self ('I'), Harmony of the self ('I') with the Body

Unit II

(III) Harmony in the Family and Society

Harmony in the Family – the Basic Unit of Human Interaction, 'Trust' - the Foundational Value in Relationships, Understanding, Harmony in the Society,

Unit III

(IV) Harmony in the Nature (Existence)

Understanding Harmony in the Nature, Interconnectedness, Self-regulation and Mutual Fulfillment among the Four Orders of Nature, The Holistic Perception of Harmony in Existence

Unit IV

(V) Implications of the Holistic Understanding – a Look at Professional Ethics

A Basis for Humanistic Education, Humanistic Constitution and Universal Human Order, Competence in Professional Ethics, Strategies for Transition towards Value-based Life and Profession

Suggested Readings:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics
2. A.N. Tripathy, 2003, Human Values, New Age International Publishers.

Suggested Books:

1. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
2. B P Banerjee, 2005, Foundations of Ethics and Management, Excel Books

Skill Enhanced Course**EBM101: ENTREPRENEURSHIP DEVELOPMENT AND BUSINESS MANAGEMENT****Credits: 04****LTP 310****THEORY**

Course Description: The purpose is to Develop entrepreneurial abilities by providing background information about support systems, skill sets, financial and risk covering institutions and other for building an enterprise so that future budding entrepreneurs can make right decisions for starting and running a venture. With a solid introduction to the entrepreneurial process of creating new businesses, role of Creativity and innovation in Entrepreneurial start-ups, manage family-owned companies, context of social innovation and social entrepreneurship and issues and practices of financing entrepreneurial businesses.

Course Learning Outcomes(CLO):Through this course student should be able to:

- Learners will pick up about foundation of Entrepreneurship Development and its theories.
- Learners will explore entrepreneurial skills and management function of a company.
- Learners will identify the type of entrepreneur and the steps involved in an entrepreneurial venture.
- Learners will understand various steps involved in starting a venture and to explore marketing methods & new trends in entrepreneurship.

Course Content: Through this course student should be able to:

Unit I

Entrepreneurial Development: Need and importance, Entrepreneurship and enterprise.

Entrepreneurship and role in economic development: Intrapreneurship and its importance.

Unit II

Entrepreneurial Behavior: Types of an entrepreneur, Entrepreneurial traits.

Entrepreneurial Motivation: Types and importance of motivation, various motivating factors.

Entrepreneurs: Growth and Characteristics, role and challenges faced during creation and enterprise management.

Unit III

Intellectual Property Rights (Creation-Protection-Encashing).

Unit IV

Financial marketing, sources of funds, budgeting, financial functions, problems of small entrepreneurs, success factor for small business.

Suggested Readings:

1. Gupta C.B and Srinivisan N.P, “ Entrepreneurial Development” Sultan Chand and Sons, New Delhi
2. Khanna S.S, “Entrepreneurship Development” Sultan Chand and Sons, New Delhi
3. Patel, V. G., “The Seven Business Crises and How to Beat Them” Tata-McGraw, New Delhi, 1995.
4. SIDBI Report on Small Scale Industries Sector (Latest Editions)
5. Taneja, Satish and Gupta, S.L, “ Entrepreneurship Development-New VentureCreating”

Skill Enhanced Course**BCA101: COMPUTER FUNDAMENTALS & IT****Credits: 03****LTP 300**

Course Description: The course aims to equip the students with various Office Automation Tools like Word processor, Spreadsheet program & Presentation program. The course includes Crafting professional word documents; excel spread sheets, power point presentations using the Microsoft suite of office tools.

Course Learning Outcomes(CLO): Upon successful completion of the course, the students should be able to:

- Use various Office Automation Tools like Word processor, Spreadsheet software & Presentation software.
- Learn the fundamental of processing unit and operating system.
- Understand various peripheral devices like Input and Output devices of Computer systems, online storage devices.
- Perform documentation, accounting operations, presentation skills.
- Study to use the Internet safely, legally, and responsibly
- **Course Content:**

Unit I

Introduction to Computers: Introduction, Characteristics of Computers, Block diagram of computer. Types of computers and features, Mini Computers, Micro Computers, Mainframe Computers, Super Computers. Types of Programming Languages (Machine Languages, Assembly Languages, High Level Languages). Data Organization, Drives, Files, Directories. Secondary Storage Devices (FD, CD, HD, Pen drive) I/O Devices (Scanners, Plotters, LCD, Plasma Display), Data Representation: Bit, Byte, Binary, Decimal, Hexadecimal, and Octal Systems, Conversions and Binary Arithmetic (Addition/ Subtraction/ Multiplication): Introduction to Binary, Octal, Hexadecimal system Conversion, Simple Addition, Subtraction, Multiplication.

Functional Units of Computer System: CPU, registers, system bus, main memory unit Types of Memory (Primary and Secondary) RAM, ROM, PROM, EPROM, cache memory, Inside a computer, SMPS, Motherboard, Ports and Interfaces, expansion cards, ribbon cables, memory chips, processors.

Unit II

Devices: Input and output devices (with connections and practical demo), keyboard, mouse, joystick, scanner, OCR, OMR, bar code reader, web camera, monitor, printer, plotter. Memory: Primary, secondary, auxiliary memory, RAM, ROM, cache memory, hard disks, optical disks.

Algorithm: Definition, Characteristics, Advantages and disadvantages, Examples. Flowchart: Definition, Define symbols of flowchart, Advantages and disadvantages, Examples. Operating System and Services in O.S., Types of O.S. DOS: History, Files and Directories, Internal and External Commands, Batch Files.

Unit III

Word Processing: Typing, Editing, Proofing & Reviewing, Formatting Text & Paragraphs, Automatic Formatting and Styles, working with Tables, Graphics and Frames, Mail Merge, Automating Your Work & printing Documents.

Excel Spreadsheet: Working & Editing in Workbooks, Creating Formats & Links, formatting a Worksheet & creating graphic objects, Creating Charts (Graphs), formatting and analyzing data, Organizing Data in a List (Data Management), Sharing & Importing Data, Printing.

Unit IV

PowerPoint Presentations: Getting started in PowerPoint, creating a presentation, Creating & editing slides, previewing a slide show, adding picture & graph, adding sound & video, adding auto shape, Animating objects.

Electronic Payment System: Secure Electronic Transaction, Types of Payment System: Digital Cash, Electronic Cheque, Smart Card, Credit/Debit Card E-Money, Bit Coins and Crypto currency, Electronic Fund Transfer (EFT), Unified Payment Interface (UPI), Immediate Payment System (IMPS), Digital Signature and Certification Authority.

Recommended Books / Suggested Readings:

1. "Computers Today", D. H. Sanders, Fourth Edition, McGraw Hill, 1988.
2. Fundamental of Computers – By V. Rajaraman B.P.B. Publications.
3. "Fundamental of Computers – By P.K. Sinha.
4. MS-Office 2000(For Windows) – By Steve Sagman.
5. "Information Technology Inside and Outside", David Cyganski, John A. Orr, Paperback Edition, Pearson Education 2002.
6. IT Tools, R.K. Jain, Khanna Publishing House

Skill Enhanced Course**BCA121: COMPUTER FUNDAMENTALS AND IT LAB****Credits: 01****LTP 002**

Course Description: The course aims to equip the students with the knowledge of computer fundamentals. The course includes Data Processing Cycle, History and Generations of Computers, Memory structure and Types of Memory.

Course Learning Outcomes(CLO): Upon successful completion of the course, the students should be able to:

CO1: Understand basic computer architecture.

CO2: Understand the fundamental Computer components that make up a computer's hardware and the role of each of these components.

CO3: Recognize when to use each of the Microsoft Office programs to create professional business documents.

CO4: Gain hands-on experience of working in Microsoft products such as: MS Word, MS Excel and MS PowerPoint. Lab Exercises

Practicals:

1. Identify computer hardware and software (in the lab).
2. Draw and explain the block diagram of computer system.
3. Demonstrate various peripherals and their applications.
4. Demonstrate the usage of various storage devices
5. Illustrate the booting procedure (using windows).
6. Demonstrate installation of application software (in windows).
7. Introduction to DOS Commands.
8. Introduction to Windows.
9. Introduction to Microsoft Office.
10. Introduction to MS-Word.
11. Define page size and margins for a document.
12. Insert graphics (a picture for example) in a document.
13. Prepare a document with at least three fonts and four different font sizes. Include superscript and subscript.
14. Prepare your biodata in one A-4 size page.

15. Prepare a document with at least three fonts and four different font sizes. Include superscript and subscript.

16. Explain the use of spell check.

17. Introduction to MS-Excel.

18. Open a work sheet, name it and save it.

19. Change the width of a column/ range of columns

Recommended Books/Suggested Readings:

1. "Computers Today", D. H. Sanders, Fourth Edition, McGraw Hill, 1988.
2. Fundamental of Computers – By V. Rajaraman B.P.B. Publications.
3. "Fundamental of Computers – By P.K. Sinha.
4. MS-Office 2000(For Windows) – By Steve Sagman.
5. "Information Technology Inside and Outside", David Cyganski, John A. Orr, Paperback Edition, Pearson Education 2002.
6. IT Tools, R.K. Jain, Khanna Publishing House

Skill Enhanced Course
BPS307: YOGA EDUCATION

Credits: 03

LTP 300

Course Outcome:

- CO1. To acquaint students with historical perspective of the Physical Education and sports
CO2. To know how physical education developed in different societies of the world
CO3. To provide basic knowledge about the different dimensions of Physical Education as discipline.

Unit I

Yoga : Meaning , definition , aims, objectives, importance and scope of yoga. Historical development of yoga. Types of Yoga: karam yoga , hatha yoga , laya yoga, bhakti yoga.

Unit II

Asthanga Yoga: Concept and philosophy of asthanga yoga. Constituents of asthanga yoga: yama, niyama, asanas, pranayama , pratyahar, dharma, dhyana, smadh. Difference between yoga and general exercises

Unit III

Asanas: Meaning importance, classification of asanas: meditative, relaxative , cultural. General techniques and benefits of the following: padmasana, vajrasana, halasana, bhujangasana, sarvangasana, chakrasana, dhanurasana, salabhasana, paschimotanasana, mayurasana, shirshasana. Technique and benefits of Surya namaskar.

Unit IV

Shudhi Kriyas: Concept of shat Karma (Shudhi Kriyas) and brief description of the following: neti, dhoti, basti, nauli , tratak, kapalbhati.

Pranayama : meaning and definition of pranayama, general techniques and physiological benefits of the following : ujjai , sitkari , shitali , bhastrika, bhramari.

Suggested Readings:

1. Textbook of Basic Core Fitness through Yoga and Naturopathy by Debnath Manika New Delhi, Sports Publication (2007).
2. Health & Physical Education by Uppal

Skill Enhanced Course
BPS010: YOGA EDUCATION LAB

Credits: 03

LTP 300

Pre-Requisites: NA

Course Outcome:

- CO1. To acquaint students with historical perspective of the Physical Education and sports
CO2. To know how physical education developed in different societies of the world
CO3. To provide basic knowledge about the different dimensions of Physical Education as discipline.

Unit I

Practice of following asana :

Padamasana , sidhasana , vajrasana , shavasan , makarasan , bhujangasana , sarvangasana , halasan , paschimotanasana, chakkarsana , naukasana , mastyasana, shalabhasana, dhanurasana

Unit II

Practice of surya amaskar.

Practice of Bandhas : Jalandhar bandh , uddiyan bandh , mool bandh.

Unit III

Practice of Pranayam

suryabhedana , sitali pranayam , shitkari pranayam , bhastrika pranayam , bhramari pranayam .

Unit IV

Practice of shudhi kriya

Neti, Tratak, Kunjal Kriya

Massage

Suggested Readings:

1. Textbook of Basic Core Fitness through Yoga and Naturopathy by Debnath Manika New Delhi, Sports Publication (2007).
- 2- Health & Physical Education by Uppal AK & Gautam GP , Friends Publication, New Delhi (2008).

Skill Enhanced Course
BCH409: PESTICIDE CHEMISTRY

Credit: 4

LTP: 400

Course Objectives:

This course deals with general introduction to pesticides, Structure Activity Relationship, Organophosphates, Quinones.

Course Learning Outcomes: After reading this course student will be able to have knowledge of

- pesticides,
- Structure Activity Relationship of Organochlorines
- Organophosphates,
- Quinones.

Unit I

1. General introduction to pesticides

(natural and synthetic), benefits and adverse effects, changing concepts of pesticides,

Unit II

2. Structure Activity Relationship

Synthesis and technical manufacture and use of representative pesticides in the following classes:

Organochlorines (DDT, Gammexene);

Unit III

3. Organophosphates

(Malathion, Parathion); Carbamates (Carbofuran and carbaryl);

Unit IV

4. Quinones

(Chloranil), Anilides (Alachlor and Butachlor).

Reference Books:

1. Cremlyn, R. Pesticides. Preparation and Modes of Action, John Wiley & Sons, New York,

19

Skill Enhanced Course
BND008: BAKERY AND CONFECTIONERY

Credits: 03

LTP 300

THEORY

Course Description: To provide comprehensive knowledge on the production process of bakery products and quality control.

Course Learning Outcomes (CLO): Upon completion of the course students will be able to:

- Gained insights in baking science to produce various products with variable nutritional values.
- Ability to analyze the ingredients, their proportion, quality control and their function in the process of producing bakery products and confectionaries.
- Gained knowledge on various categories of bakery products, their classification and their shelf-life.
- Gained knowledge on various bakery products and confectionery.

Course Content

Unit I

1. Introduction to baking science. Basic materials used in bakery and confectionery Selection, properties and functions.
2. Flours -constituents' functions and characteristics of good flour and tests. Different types of flour mixtures used bakery and confectionery
3. Egg structure composition and its functions in bakery and confectionery. Different types of fats and oils used in bakery and confectionery and their functions.
4. Sugars and functions and types of sugars used in bakery and confectionery cooking of sugar and its stages

Unit II

1. Leavening agents used in bakery and confectionery and their functions liquid sand moisturizing agents used in bakery and confectionery and their functions. Salt and its functions in bakery and confectionery and their functions
2. Yeast and types of yeast used in bakery and confectionery and their functions. Biscuits and cookies -basic ingredients required and their functions

3. Improvers and emulsifiers used in bakery and confectionery and their functions.
4. Techniques in preparation of biscuits and cookies and different types of biscuits and cookies faults and remedies in biscuit and cookies preparation

Unit III

1. Color flavoring and related products used in bakery and confectionery. Cakes -Types of cakes ingredients required and their role in cake preparation.
2. Balancing a cake formula, characteristics of good cake -external and internal characteristics faults and remedies in cakes preparation
3. Gelling, whipping agents and related products used bakery and confectionery
4. Bread –Ingredients required in bread preparation and their functions steps involved in preparation of bread

Unit IV

1. Different methods of bread preparation. Characteristics of good bread –External and internal characteristics bread diseases and preventive measures -Rope and mold-causes and prevention Faults and remedies in bread preparation
2. Icing –Types of icing and ingredients used in icing and their role gums Pastry making, principles and various derivatives jellies-introduction processing treatments
3. Tools and techniques used in bakery equipment used in bakery caramel
4. Toffee and fondant-introduction ingredients structure of toffee formulations texture of toffee and fudge quality control of bakery products.

Suggested Readings:

- a. Edmund, B.B .and James, steward .Cake Making, G.S.T .Bamford, Leonard Hill Book, London.
- b. Peter R .W .Biscuit manufacture -Fundamentals of Online Production .Elsevier Publishers.
- c. Fance, W.J and Wragg, BH .Up-to -date bread making, Maclaren and Sons, London.

Skill Enhanced Course

BND028: BAKERY AND CONFECTIONERY LAB

Credit: 1

LTP: 002

PRACTICAL LIST

1. Use of different bakery equipment balancing the formula for bakery products
2. Demonstration on standard method of making different types of biscuits salt
3. Coconut and fruit biscuits
4. Demonstration on standard method of making different types of cookies 3
5. Preparation of different types of cookies
6. Plain sponge cake
7. Chocolate cake
8. Pineapple upside down cake
9. Eggless cakes and muffins walnut cake
10. Madeira cake
11. Fruit/plum cake
12. Carrot cake
13. Demonstration on standard method of making of pastries
14. Pastries
15. Icings and cake decoration.