SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION AND RESEARCH
(A Deemed to be University Declared under Section 3 of UGC Act, 1956)
Comprising Sri DevarajUrs Medical College
[Constituent Unit of Sri DevarajUrs Educational Trust for Backward Classes (Regd.)]
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CHOICE BASED CREDIT SYSTEM
(CBCS)

(With effect from 2017-2018 batches)

Curriculum for Integrated B.Sc. - M.Sc. Clinical Nutrition and Dietetics Programme

Dean
Faculty of Allied Health Sciences
Sri Devaraj Urs Academy of
Higher Education & Research
Tamaka, Kolar-563 101

Approved as per BOM-44-2017, (Resolution No-**XLIV**-12) Dated-23/06/2017

REGULATIONS GOVERNING

THE INTEGRATED B.Sc. - M.Sc. CLINICAL NUTRITION AND DIETETICS PROGRAMME

UNDER CHOICE BASED CREDIT SYSTEM

(2017)

DEPARTMENT OF CLINICAL NUTRITION AND DIETETICS

SRI DEVARAJ URS ACADEMY OF HIGHER EDUCATION & RESEARCH

Comprising Sri Devaraj Urs Medical College

A DEEMED TO BE UNIVERSITY

Declared under Section 3 of UGC Act, 1956, MHRD GOI No.F.9-36/2006-U.3(A) Dt. 25th May 2007

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REGULATIONS GOVERNING THE INTEGRATED OF B.Sc - M.Sc CLINICAL NUTRITION AND DIETETICS PROGRAMME UNDER CHOICE BASED CREDIT SYSTEM

SECTION I

a. INTRODUCTION

The University Grants Commission has brought in numerous measures to enhance equity, efficiency and excellence in the higher education system in the country. Consequently, has set considerable effectiveness with noticeable improvements in higher education system. Even though, there existed diversity in the evaluation system in the evaluation system in Universities in India and to mitigate tremendous diversity adapted in Universities, UGC issued circular D.O.No. F.1-2/2008 (XI Plan) dated March 2009 and further in its circular D.O. No. F-1-1/2014 dated 12th November 2014 has directed all the Universities in the country to implement The Choice Based Credit System (CBCS) scheme to all the undergraduate and post graduate level degrees programme mandatorily

In compliance to the above, Sri Devaraj Urs Academy of Higher Education and Research (SDUAHER) has notified with the vide No. SDUAHER/KLR/ADMN/2063/16-17 dated 20.10.16 and introduced CBCS for undergraduate programme in order to achieve academic excellence, quality improvement and as administrative reforms. Based on this background, SDUAHER has framed REGULATION governing Integrated B.Sc-M.Sc Clinical Nutrition and Dietetics under Faculty of Allied Health Sciences.

This facilitates flexible learning; multifaceted development of students with wide variety of courses viz core, electives in discipline specific, Ability enhancement and open to enhance their knowledge and skills. This qualitative change in the programmes is to the global requirements and aspiration of students and stake holders for mobility both within and across the geographical jurisdiction.

CBCS implementation brings desired uniformity in grading system and method for computing Semester Grade Point Average (SGPA) for semester performance and Cumulative Grade Point Average (CGPA) for overall programme performance of students in the examinations.

b. ABOUT THE PROGRAMME

Integrated B.Sc – M.Sc Clinical Nutrition and Dietetics is a combination of 2 programmes (Undergraduate and Post graduate program). An Integrated degree would give a candidate a PG degree in 5 years saving one year. It is a comprehensive entity. Integrated B.Sc – M.Sc Clinical Nutrition and Dietetics is designed to cover multidisciplinary perspectives, encouraging depth and breadth in understanding complex issues at each level, without any repetition of the course contents. It enhances student's engagement through experiential and active learning, which supports an integrated course capacity to address the challenges posed by increasingly complex world of today. This is achieved through a blend of academics, research training and extension as well as therapeutic applications The PG program in this discipline has been designed to provide the students intensive and extensive theoretical and experiential training. The program allows flexibility in the choice of thrust areas, which students can select, based on their career goals.

This course provides various Specialized Areas in Clinical Nutrition such as Clinical Nutritionists, Management Nutritionists, Consultant Nutritionists, Specialized Nutritionists in the fields such as Renal

Nutritionists, Cardio-Nutritionists, Endocrine Nutritionists, Critical Care Nutritionists, etc. Clinical Dietitians are specialists in food nutrition services in hospitals, outpatient clinics, and private practices. They assess patient nutrition, develop dietary plans, provide patient counselling, and monitor patient's progress. Management Dietitians specialize in food service systems or clinical management. They work in hospitals, nursing homes, school food service, cafeterias, and restaurants. They manage personnel, plan and conduct employee training programme, design food systems, and plan budgets. Consultant Dietitians are independent business people who work as nursing home consultants, book authors, and patient counselors in medical centers and fitness programme. They also develop and evaluate food service systems and serve as independent advisors to industry.

c. NEED FOR THE COURSE

The current scenario at the regional and national level requires trained professionals in areas such as Clinical Nutrition and Dietetics, Public Nutrition, Institutional Food administration, Quality Control Analyst, Research. Thus an Integrated course covering these aspects is essential.

d. SCOPE

The programme integrating several elective courses and skill enhancement courses, besides the core has been formulated to provide professionally competent manpower which as a wide scope for….

- ✓ Academic and research Institutions
- ✓ Hospitals, Food service Institutions and Industry
- ✓ Managerial Nutrition expertise roles in agencies and Institutions- both Governmental and NGO sectors, international and national agenices such as FSSSAI, CAC, UNICEF, WHO, CARE, ICDS, NNMB, NIN, etc
- ✓ Planning, Monitoring and evaluation of Nutrition Health programs
- ✓ Training and IEC activities of regional and national programs
- ✓ Ensuring Food safety and quality for consumers via various bodies (e.g FSSAI, CAC, etc)
- ✓ Entrepreneurial ventures
- ✓ Advocacy and Consultancy

e. DEFINITIONS BY KEYWORDS

Applicable to Integrated B.Sc-M.Sc Degree

1. **University**: Sri Devaraj Urs Academy of Higher Education and Research (SDUAHER), Tamaka Kolar

2. **Academic Year : It consists of t**wo consecutive semesters a) one even semester (scheduled from January to June) one odd semester (scheduled between July to December).

3. **Semester**: Each semester will consist of 15-18 weeks of academic work equivalent to 90actual teaching days

4. **Choice Based Credit System (CBCS):** The CBCS provides choice for students to select from the prescribed courses (core, elective or minor or soft skill courses) offered in a programme

5. **Credit Based Semester System (CBSS)**: Under the CBSS, the requirement forawarding a degree or diploma or certificate is prescribed in terms of number of credits to be completed by the students

6. **Programme**: An educational programme leading to award of a Degree, diploma orCertificate

7. **Course**: Usually referred to, as 'papers' is a component of a programme. All course may not carry the same weight. The courses should define learning objectives and learning outcomes. A course may be designed to comprise lectures/ tutorials/laboratorywork/ field work/ outreach activities/ project work/ vocational training/viva/ seminars/term papers/ assignments/ presentations/ self-study etc. or a combination of some ofthese.

8. **Branch:** Specialization or discipline of Clinical Nutrition and Dietetics such as Integrated B.Sc – M.Sc Clinical nutrition and Dietetics, etc.

9. **Credit**: each course shall carry certain no. of credits. Credits normally represent the weightage of a course and are a function of teaching, learning and evaluation strategies such as no. of contact hours, the course contents, teachingmethodology, learning expectations, etc. In the proposed programmes credit is a unit by which the course work is measured. It determines the number of hours of instructions required per week. One credit is equivalent to one hour of teaching (lecture or tutorial) or two hours of practical work/field work per week.

10. **Credit Point**: It is the product of grade point and number of credits for a course.

11. **Semester Grade Point Average (SGPA)**: It is a measure of performance of workdone in a semester. It is ratio of total credit points secured by a student in variouscourses registered in a semester and the total course credits taken during that semester.It shall be expressed up to two decimal places

12. **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.

13. **Grade Point**: It is a numerical weight allotted to each letter grade on a 10-point scale.

14. **Letter Grade:** It is an index of the performance of students in a said course. Grades aredenoted by letters O, A+, A, B+, B, C, P, F and Ab.

15. **Firs Attempt**: A student who has completed all formalities of the semester becomes eligible to attend the examinations and has passed in first sitting: such attempt shall be treated as first attempt.

16. **Transcript or Grade Card or Certificate:** 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 (code, title, number of credits, grade secured) along with SGPA of that semester and CGPA earned till that semester.

f. TYPES OF COURSES

Courses in a programme may be of three kinds: **Core, Elective** and **Ability Enhancement Courses (Foundation Course).**

1. Core Course:

There may be a Core Course in every semester. This is the course which is to be compulsorily studied by a student as a core requirement to complete the requirement of a programme in a said discipline of study.

2. Elective Course: Elective course is a course which can be chosen from a pool of papers. It may be:

- ✓ Supportive to the discipline of study
- ✓ Providing an expanded scope
- ✓ Enabling an exposure to some other discipline/domain
- ✓ Nurturing student's proficiency/skill.

An elective may be "Generic Elective" focusing on those courses which add generic proficiency to the students. An elective may be "Discipline centric" or may be chosen from an unrelated discipline. It may be called an "Open Elective."

3. Ability Enhancement Courses (AEC):

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

a. "AECC" courses are the courses based upon the content that leads to Knowledge enhancement; i. Environmental Science and ii. English/MIL Communication. These are mandatory for all disciplines.
b. SEC courses are value-based and/or skill-based and are aimed at providing hands-on-training, competencies, skills, etc.These courses may be chosen from a pool of courses designed to provide value-based and/or skill-based knowledge.

Project work/Dissertation is considered as a special course involving application of knowledge in solving / analyzing /exploring a real life situation / difficult problem. A Project/Dissertation work would be of 6 credits. A Project/Dissertation work may be given in lieu of a discipline specific elective paper.

Research Course: This is a compulsory type of core course which is to be compulsorily studied by a student. These course will provide an opportunity for participants to establish or advance their understanding of research through critical exploration of research language, ethics, and approaches. It introduces the language of research, ethical principles and challenges, and the elements of the research process within quantitative, qualitative, and mixed methods approaches. Participants will use these theoretical underpinnings to begin to critically review literature relevant to their field or interests and determine how research findings are useful in forming their understanding of their work, social, local and global environment.

g. **PROGRAMME STRUCTURE (5 years Programme)**

In CBCS, UG and PG degree programmes offered in University are structured to have 10 semesters (UG-6, PG-4). The programme structure is as per the curriculum formulated by the University.

SECTION – II

REGULATIONS GOVERNING THE DEGREE OF INTEGRATED B.SC-M.SC CLINICAL NUTRITION AND DIETETICS AS PER CBCS

1. TITLE

The Integrated B.Sc –M.Sc programme known as Bachelor and Masters of Clinical nutrition and Dietetics abbreviated as "Integrated B.Sc-M.Sc Clinical Nutrition and Dietetics"

2. DURATION

The course of study including submission of dissertation on the research topic assigned shall be of 5 years (consisting 10 semesters) duration from the commencement of the academic term.

3. CALENDAR OF EVENTS

The calendar of events in respect of the programme for each respective academic year shall be determined and notified by the university from time to time. The examinations shall be conducted at the end of each semester**.**

4. ELIGIBILITY FOR ADMISSION

Candidates for admission to the Integrated B.Sc – M.Sc Clinical Nutrition and Dietetics should have passed 10+2/ Pre-University examination in Science with Biology, Physics, Chemistry as main subjectsor equivalent/ SSLC with 3 years Diploma in concerned subject from a recognized institute/ university with minimum 50 % marks.

5. LATERAL ENTRY

Candidates passing diploma in concerned discipline and 10+2or PUC shall be eligible for lateral entry i.e admission to II year/ semester – III of the B.Sc Programme. However, this will be entertained only if vacancies are available. Applicants should possess minimum of 50% aggregate marks in PUC (PCMB) or 10+2 (BPC)

6. CRITERIA FOR INTAKE OF STUDENTS

The sanctioned intake for Integrated B.Sc – M.Sc Clinical Nutrition and Dietetics shall be ten candidates as per the categories given below:

SC - 15%

ST - 7.5 %

OBC - 27.4 %

GM - 50%

Reservation will be following according to state government.

[**Note**: If there are no candidates available from deputation, OBC or SC/ST category, the seats may be given to GM candidates]

7. SELECTION PROCEDURE

The selection of the eligible candidates shall be made in the order of merit in qualifying examination.

8. FEE STRUCTURE

Fees for the Integrated B.Sc-M.Sc CND is Rs. 40,000/- per annum (2017). The fees may subject to change as per University norms. However, the candidates have to pay examination fee as applicable in other UG and PG courses at SDUAHER for every semester.

9. ATTENDANCE

Each course comprising theory, practical, tutorials shall be treated as single unit for the purpose of calculation of attendance. No candidate shall be permitted to appear in Examinations unless he/she has attendance of a minimum of 75% in each subject before admission to the examination.

The students shall be informed about their attendance status periodically by the department, so that the students shall be cautioned to make up the shortage. The department shall submit the list of students who have been eligible to appear examinations and list of detained students due to shortage of attendance by the end of the semester to the Registrar (Evaluation).

Students lacking in the prescribed attendance and progress in any subject (s) in theory and practical should not be permitted to appear for the examination. Such students should repeat the course, in which he/she is deficient with attendance.

10. MAXIMUM PERIOD FOR COMPLETION OF THE PROGRAMME

The candidate shall complete the programme generally within the twice the no. of years of the programme from the date of commencement of the programme i.e within the 10 years from the date of admission. If the candidate fails to complete the program within the period permitted he/she will be discharged from the university. However, fee to be paid for repeating the semesters.

11. EXIT OPTION

The candidates are allowed to exit the Integrated programme after successful completion of 3years of B.Sc degree programme.

12. MEDIUM OF INSTRUCTION: The medium of instruction shall be English

13. TEMPORARY DISCONTINUATION OF THE PROGRAMME

A student, who wishes temporarily to discontinue the program and continue the same subsequently has to obtain prior permission from the university by applying through the Head of the Department . Such

students have to take re-admission to the same semester/year in the subsequent session. However the students shall complete the course as per the maximum period fixed by the university.

14. HOURS OF INSTRUCTION PER WEEK

The number of hours of instruction per each course is defined which includes lectures, tutorials, practical and assignments, tests, seminars, presentations, class performance, field work, as specified to individual courses. The weightage assigned to each of such units in respect of each course shall be determined by the appropriate academic body of the university, and shall be made known to the students at the beginning of the academic session of the year, the semester or the trimester, as the case may be.

15. COURSE PATTERN

The Integrated B.Sc-M.Sc CND shall be of semester system and Choice based credit system extending for 5 years from the commencement of the academic term. The number of credits per semester may vary from 20-26for B.Sc, and a total of around 190 credits for Integrated B.Sc - M.Sc program.A candidate has to complete a minimum of 120 credits to obtain a Bachelor's Degree Certificate and a minimum of 60 credits to obtain a Master's Degree Certificate after completion of Bachelor's degree program. Generally 1 credit per hour of instruction in theory and 1 credit for 2 hours of practical work. A Project/Dissertation work would be of 6 credits. Internship should be an integral part of the course, but does not carry separate credit. This can be arranged during the course of the study or after the completion of the programme. It can be arranged in one single assignment or two.

16. COURSE CURRICULUM

The Curriculum and the syllabus for the course shall be as prescribed. The curriculum is subject to modifications by the Academic Board from time to time.

17. SCHEME OF EXAMINATION

There shall be examinations at the end of each semester at the end of each semester as per the calendar of events notified by the university.

18. INTERNAL ASSESSMENT

Regular internal assessment examinations should be conducted on each course in a semester. Internal Assessment will be based on 2 internal examinations, seminar, assignments and class performance. Internal Assessment total marks will be the sum of the marks given to internal examinations, seminar, assignments and class performance. There should be a minimum of at least 2 internal assessments examinations in each semester, the number of examination on each course is left to the department. An average of the two internal assessment examinations should be taken into consideration during calculation of marks of internal assessment. The nature of final examination, whether written or oral or

both, in respect of each course shall also be made known to the students at the beginning of the academic session. The weightage given to the internal assessment is 20 % out of the total marks assigned to the course. The student must secure at least 35% in each subject of the internal assessment of the course.

19. REGISTERING FOR THE EXAMINATIONS

Candidate to be eligible to appear for University examination, shall have undergone satisfactorily the semester of the study, shall have to obtain 75% attendance in theory and practical/ tutorial jointly to become eligible to appear for examination in the subject or course. Shall secure at least 35% of internal assessment for total marks fixed for IA in a particular subject in order to become eligible for examination, shall fulfill any other requirement that may be prescribed by the university from time to time and shall pass in all the courses of that semester. Such eligible students will be allotted Registration Number.

20. VALUATION OF ANSWER SCRIPTS

Each written paper shall be valued by one internal examiner and one external examiner. Each practical examination shall be jointly conducted and evaluated by one internal examiner and one external examiner or two external examiners if there are no internal examiners. But the valuation should not be done by two internal examiners.

If the difference in marks between two valuations is more than 15% of the maximum marks, the controller of examination or his nominee shall check the entrees and the total marks assigned by the two valuers. If there is any mistake in totaling, it shall be rectified. While checking the total, if it is observed that any one or more of the answers is not valued by one of the valuers, the Chairman, BOE shall advise internal members of the Board of examiners to value that answer. After receiving the marks, the Chairman, BOE shall make the necessary corrections. Despite all these corrections, if the difference between the two valuations is still more than 15%, the Chairman, BOE shall arrange for third evaluation by examiners from the approved panel of examiners.

In case of two valuations, the average of the two valuations and if there are 3 valuations, the average of the nearest two valuations shall be taken for the declaring results.

21. RESULTS CLASSFICATION OF SUCCESSFUL CANDIDATES

The results of successful candidates at the end of each semester shall be declared on the basis of percentage of aggregate marks, converted to grade point and alpha-sign grade for each course on the basis of 10 point scale recommended by UGC

The following table 1 and 2 shows the final results with grade description and grades

Table 1 – Final results/ Grade Description

Semester/ Program % of marks	SGPA/ Program CGPA	Alpha-Sign/ Letter Grade	Result/ Class Description
90.0-100	9.00-10.00	O (Outstanding)	Outstanding
80.0-<90.0	8.00-<9.00	A+(Excellent)	First Class Exemplary
70.0-<80.0	7.00-<8.00	A(Very Good)	First Class Distinction
60.0-<70.0	6.00-<7.00	B+(Good)	First Class
55.0-<60.0	5.50-<6.00	B(Above Average)	High Second Class
50.0-<55.0	5.00-<5.50	C(Average)	Second Class
40.0-<50.0	4.00-<5.00	P (Pass)	Pass Class
<40.0	<4.00	F(Fail)	Fail/ Reappear
Absent	0	Ab (Absent)	-

Table 2 point Grading System with letter grade

Letter Grade	Grade Point
O (Outstanding)	10
A+(Excellent)	9
A(Very Good)	8
B+(Good)	7
B(Above Average)	6
C(Average)	5
P (Pass)	4
F(Fail)	0
Ab (Absent)	0

22. COMPUATION OF SGPA AND CGPA

a. Grade Point

Grade Point of course (Gi) It is the value obtained by dividing the percentage of marks secured in a course by 10

b. Calculation of SGPA

The SGPA is the ratio of sum of the product of the number of credits with the grade points scored by a student in all the courses taken by a student and the sum of the number of credits of all the courses undergone by a student, i.e

$$\textbf{SGPA}\ (Si) = \Sigma(Ci \times Gi) / \Sigma Ci$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the i^{th} course.

Illustration of SGPA

Course	Credit	Grade letter	Grade point	Credit Point (Credit x Grade
Course 1	3	A	8	3 X 8 = 24
Course 2	4	B+	7	4 X 7 = 28
Course 3	3	B	6	3 X 6 = 18
Course 4	3	O	10	3 X 10 = 30
Course 5	3	C	5	3 X 5 = 15
Course 6	4	B	6	4 X 6 = 24
	20			139

The SGPA shall then be computed by dividing the sum of total credit points of the courses by the total credits of the semester.

SGPA = Total Credit points/ Total Credits = 139/20 = 6.95

Semester Alpha-Sign Grade : **B**

c. Calculation of CGPA

The CGPA is also calculated in the same manner taking into account all the courses undergone by a student over all the semesters of a programme, i.e.

$$\textbf{CGPA} = \Sigma(Ci \times Si) / \Sigma Ci$$

where Si is the SGPA of the ith semester and Ci is the total number of credits in that semester.

Illustration for CGPA

Semester 1	Semester 2	Semester 3	Semester 4
Credit: 22; SGPA:6.8	Credit: 22; SGPA:6.73	Credit: 28; SGPA: 9.07	Credit: 28; SGPA:7.5

Semester 5	Semester 6
Credit: 24; SGPA:7.75	Credit: 24; SGPA: 8.0

Thus, **CGPA** = (22 x 6.8 + 22 x 6.73 + 28 x 9.07 + 28 x 7.5 + 24 x 7.75 + 24 x 8.0)/ 148 = **7.7**

CGPA= 7.7 A (very good) first Class with distinction

23. TRANSCRIPT (SCORE CARD/ MARKS SHEET) FORMAT

University will issue a transcript of marks indicating the list of all papers studied, Credit hours, Grade points, credit points, SGPA and CGPA. Where the SGPA and SGPA shall be rounded off to 2 decimal places and reported in Transcript of marks.

24. MINIMUM FOR A PASS

A candidate shall be declared to have passed the UG and PG if he/she secures at least a CGPA of 4.0 (Course Alpha-Sign Grade C) in the aggregate of both internal assessment and semester end

examination marks put together in each unit such as theory papers/ practicals/ project work/ dissertation/ viva-voice.

However, candidate has to secure minimum of 35% Marks in written theory and Practical examination separately and 40% as subject aggregate to be declared as pass.

GRACE MARKS

Any student who completes all the courses in a semester, but failed in any one of the course with a shortage of 5 or less than 5 marks, such candidates will be awarded to maximum of 5 marks

25. CARRY OVER PROVISION

In the first year, candidates who fail in a first semester examinations may go to the second semester and take the examinations. But he/she has to complete the first year courses before enters to 2^{nd} year 3^{rd} semester. However candidate is allowed to carry subjects of third and fourth semester to 5^{th} semester but before entering for the sixth semester he/she has to complete all the carried subjects along with fifth semester courses. However a carry over provision restricted to the maximum period offered to a candidate for completion of the program as per the clause 10.

26. REVALUATION

There is no revaluation permissible in the regulation.

27. POWER TO REMOVE DIFFICULTIES

i. If any difficulty arises in giving effect to the provisions of these regulations, the Vice Chancellor may by order make such provisions not inconsistent with the Act, Students, Ordinance or other regulations as appears to be necessary or expedient to remove the difficulty.

ii. Every order made under this rule shall be subjected to ratification by the appropriate university authorities.

Format for Transcript of Marks

BAR CODE		S.NO. :

SDU AHER

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POST BOX NO.62, TAMAKA, KOLAR-563 101, KARNATAKA, INDIA

FACULTY OF ALLIED HEALTH SCIENCES

Integrated B.Sc-M.Sc Clinical Nutrition and Dietetics

CONSOLIDATED TRANSCRIPT OF MARKS

Student's Name :

Register No. :

Mother's Name :

Father's Name :

Date of Birth :

Year of Admission :

ELECTRONIC PHOTO COPY

Permanent Address :

Duration of Degree :

Department :

Medium of Instruction :

Course Code	Title of the Course	Credit Hours (Th +Pr)	Grade point	No. of Attempts
	FIRST YEAR			
	FIRST SEMESTER			
	Course 1:			
	Course 2:			
	SGPA:			
	SECOND SEMESTER			
	THIRD SEMESTER			

The candidate has completed the degree program in ___Semesters against prescribed 10 semesters. Minimum Grade point for a pass in each course : 4.00/10.00

CGPA:____In Words: _____ Equivalent to_____% of marks. Provisionally declared to have completed Graduation and Post Graduation requirements for the award of Integrated B.Sc-M.Sc Clinical Nutrition and Dietetics in the month of _____

COURSE CURRICULUM

COURSE CURRICULUM OUTLINE

I YEAR I SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
A070	Human Physiology	5 (4+1)	4	2	96
A030	Nutritional Biochemistry	6 (4+2)	4	4	128
A040	Functional Human Anatomy	5 (3+2)	3	4	112
A050	Food Facts and Principles-I	4 (3+1)	3	2	80
A060	English for communication	2 (2+0)	2	0	32
Total		22	16	12	448

I YEAR II SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
B110	Environmental Science	2 (2+0)	2	0	32
B070	Assessment of Nutritional Status	4 (2+2)	2	4	96
B080	Hospital Dietetics-I	4 (3+1)	3	2	80
B090	Applied Nutrition-I	4 (3+1)	3	2	80
B100	Food facts and Principles-II	4 (3+1)	3	2	80
B120/B130/ B140	Elective Paper : Yoga Therapy/ Food biotechnology/ Home based catering	2 (1+1)	1	2	48
Total		20	14	12	416

II YEAR I SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
C060	Computer Science	2(1+1)	1	2	48
C010	Medical Nutrition Management-I	4 (3+1)	3	2	80
C020	Nutrition through life span –I	4 (3+1)	3	2	80
C030	Applied Nutrition-II	4 (3+1)	3	2	80
C040	Food Sanitation and Hygiene	4 (4+0)	4	0	64
C050	Food Standards and Quality Control	4 (4+0)	4	0	64
Total		22	18	8	432

II YEAR II SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
D101	Entrepreneurship Development	2 (2+0)	2	0	32
D102	Nutrition Through Life Span-II	4 (3+1)	3	2	80
D103	Medical Nutrition Management-II	4 (3+1)	3	2	80
D104	Food Processing and Technology	5 (3+2)	3	4	112
D105	Hospital Dietetics-II	4 (0+4)	0	8	128
D106/107/ 108	Elective Paper: Psychology/ Integrated Nutrition therapy for Diabetes/ Personality Development	2 (2+0)	2	0	32
Total		21	13	16	464

III YEAR I SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
E010	Medical Nutrition Management-III	4 (3+1)	3	2	80
E020	Nutrition and Fitness	4 (2+2)	2	4	96
E030	Nutrition through life span-III	4 (3+1)	3	2	80
E040	Dietary Counseling	3 (1+2)	1	4	80
E050	Nutrition and Immunity	4 (4+0)	4	0	64
E060	Elective Paper : Bakery Science/ Communication and Extension/ Socio-Economic Analysis of communities	2 (1+1)	1	2	48
Total		21	14	14	448

III YEAR II SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
F101	Improving Health and Nutrition: IEC Approaches	4 (2+2)	2	4	96
F102	Food Preservation	3 (2+1)	2	2	64
F103	Public Health Nutrition	3 (2+1)	2	2	64
F104	Institutional Food Administration	4 (3+1)	3	2	80
F105	Project cum Internship*	4 (1+3)	1	6	112
F106	Elementary Statistics	2 (1+1)	1	2	48
Total		20	11	18	464

*Internship for 2 months is mandatory

IV YEAR I SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
	Food Toxicology	4 (4+0)	4	0	64
	Research Methodology	4 (4+0)	4	0	64
	Functional Foods and Neutraceuticals	3 (3+0)	3	0	48
	Nutritional Genomics	4 (3+1)	3	2	80
	Food microbiology	4 (3+1)	3	2	80
	Minor Project	4 (0+4)	0	8	128
Total		23	17	12	464

IV YEAR II SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
	Methods of Investigation	3 (1+2)	1	4	80
	Statistics and Computer Applications	3 (2+1)	2	2	64
	Instrumentation for Food Analysis	2 (0+2)	0	4	64
	Research Methods in Food and Nutrition	2 (2+0)	2	0	32
	Sensory Evaluation	2 (1+1)	2	2	64
	Elective Paper : Food packaging/ Resource Management/ Project Planning	2 (2+0)	2	0	32
Total		14	9	12	336

V YEAR I SEMESTER					
Course No	**Title of the Course**	**Credits**	**Hrs/Wk**		**Total Hrs/ Semester**
			(T)	(P)	
	Dissertation (to be completed by II sem)	4 (0+4)	0	8	128
	Food Product Development	4 (1+3)	1	6	112
	Current trends and Issues in Clinical Nutrition	2 (0+2)	0	4	64
	Nutrition in Critical Care	4 (3+1)	3	2	80
	Elective Paper Food Analysis/ Web designing/ Project Management	2 (1+1)	1	2	48
Total		16	5	22	432

V YEAR II SEMESTER					
Course No	Title of the Course	Credits	Hrs/Wk		Total Hrs/ Semester
			(T)	(P)	
	Dissertation	4 (0+4)	0	8	128
	Scientific Writing	3 (1+2)	1	4	80
	Nutrition in Emergencies and Disasters	4 (4+0)	4	0	64
Total		11	5	12	272

Note: Internship/Field Placement for 2 months is mandatory for the completion of M.Sc course

CORE COURSES		
1	A070	Human Physiology-I
2	A030	Nutritional Biochemistry
3	A040	Functional Human Anatomy
4	A050	Food Facts and Principles-I
5	B070	Assessment of Nutritional Status
6	B080	Hospital Dietetics-I
7	B090	Applied Nutrition-I
8	B100	Food facts and Principles-II
9	C010	Medical Nutrition Management-I
10	C020	Nutrition through life span –I
11	C030	Applied Nutrition-II
12	C040	Food Sanitation and Hygiene
13	C050	Food Standards and Quality Control
14	D102	Nutrition Through Life Span-II
15	D103	Medical Nutrition Management-II
16	D104	Food Processing and Technology
17	D105	Hospital Dietetics-II
18	E010	Medical Nutrition Management-III
19	E020	Nutrition and Fitness
20	E030	Nutrition through life span-III
21	E040	Dietary Counseling
22	E050	Nutrition and Immunity
23	F101	Improving Health and Nutrition: IEC Approaches
24	F102	Food Preservation
25	F103	Public Health Nutrition
26		Food Toxicology
27		Functional Foods and Neutraceuticals
28		Nutritional Genomics
29		Food microbiology
30		Methods of Investigation
31		Instrumentation for Food Analysis
32		Sensory Evaluation
33		Current trends and Issues in Clinical Nutrition
34		Nutrition in Critical Care
35		Nutrition in Major Emergencies

ABILITY ENHANCEMENT COMPULSORY COURSE (AECC)		
1	A060	English for Communication
2	B110	Environmental Science

SKILL ENHANCEMENT COURSES		
1	C060	Computer Science
2	D101	Entrepreneurship Development
3	F104	Institutional Food Administration
4	F105	Project cum Internship
5		Food Product Development

RESEARCH COURSES		
1	F106	Elementary Statistics
2		Research Methodology
3		Minor Project
4		Statistics and Computer Applications
5		Research Methods in Food and Nutrition
6		Dissertation (to be completed by II sem)
7		Dissertation
8		Scientific Writing

DISCIPLINE SPECIFIC ELECTIVE COURSES		
1	B120	Yoga Therapy
	B130	Food biotechnology
	B140	Home based catering
2	D106	Psychology
	D107	Integrated Nutrition therapy for Diabetes
	D108	Personality Development
3	E060	Bakery Science
		Communication and Extension
		Socio-Economic Analysis of communities
4		Food packaging
		Resource Management
		Project Planning
5		Food Analysis
		Web designing
		Project Management

DISTRIBUTION OF CREDITS

YEAR	SEMESTER No	Total No. Of Credits
I YEAR	**I**	22
	II	20
II YEAR	**I**	22
	II	21
III YEAR	**I**	21
	II	20
Total UG		**126**
IV YEAR	**I**	23
	II	14
V YEAR	**I**	16
	II	11
Total PG		**64**
Integrated Total		**190**

COURSES	TOTAL
Total Core Courses	35
AECC	2
Total Skill Enhancement Courses	5
Discipline Specific Elective Courses	5 (out of 15)
Research courses	8
Total Courses	55

Integrated B.Sc.-M.Sc. Clinical Nutrition and Dietetics (CBSC)

Each paper distribution of marks for Theory and Practical for I year I Semester

Type & Course Code	Title of the Course	Theory					Practical				Total Credits	Total Marks
		Theory	IA	Viva voice	Credits	Total	Practical	IA	Credits	Total		
A070	Human Physiology	50	10	10	4	70	25	5	1	30	5	100
A030	Nutritional Biochemistry	50	10	10	4	70	25	5	2	30	6	100
A040	Functional human Anatomy	50	10	10	3	70	25	5	2	30	5	100
A050	Food facts and principles-I	50	10	10	3	70	25	5	1	30	4	100
AECC A060	English for communication	50	-	-	2	50	_	_	_	_	2	50
	Total				16	380			6	120	22	450

*AECC : Ability enhancement compulsory course

Each paper distribution of marks for Theory and Practical for I year II Semester

Type & Course Code	Title of the Course	Theory					Practical				Total Credits	Total Marks
		Theory	IA	Viva voice	Credits	Total	Practical	IA	Credits	Total		
AECC B110	Environmental Science	60	20	20	2	100	-	-	-	-	2	100
B070	Assessment of Nutrition Status	50	10	10	2	70	25	5	2	30	4	100
B080	Hospital Dietetics-I	50	10	10	3	70	25	5	1	30	4	100
B090	Applied Nutrition -I	50	10	10	3	70	25	5	1	30	4	100
B100	Food Facts and Principles-II	50	10	10	3	70	25	5	1	30	4	100
B120/ B130/ B140	Elective Paper : Yoga Therapy/ Food biotechnology/ Home based catering	50	10	10	1	70	25	5	1	30	2	100
	Total				14	450			6	150	20	600

*AECC : Ability Enhancement Compulsory Course

** DSEC : Discipline Specific Elective Course

Each paper distribution of marks for Theory and Practical for II year I Semester

Type & Course Code	Title of the Course	Theory					Practical				Total Credits	Total Marks
		Theory	IA	Viva voice	Credits	Total	Practical	IA	Credits	Total		
AECC C060	Computer Science	50	10	10	1	70	25	5	1	30	2	100
C010	Medical Nutrition management-I	50	10	10	3	70	25	5	1	30	4	100
C020	Nutrition through life span-I	50	10	10	3	70	25	5	1	30	4	100
C030	Applied nutrition-II	50	10	10	3	70	25	5	1	30	4	100
C040	Food sanitation and Hygiene	60	20	20	4	100	_	_	_	_	4	100
C050	Food standards and quality control	60	20	20	4	100	_	_	_	_	4	100
	Total				18	480			4	120	22	600

*AECC : Ability enhancement compulsory course

Each paper distribution of marks for Theory and Practical for II year II Semester

Type & Course Code	Title of the Course	Theory					Practical				Total Credits	Total Marks
		Theory	IA	Viva voice	Credits	Total	Practical	IA	Credits	Total		
SEC D101	Entrepreneurship Development	60	20	20	2	100	-	-	-	-	2	100
D102	Nutrition through life Span-II	50	10	10	3	70	25	5	1	30	4	100
D103	Medical Nutrition Management-II	50	10	10	3	70	25	5	1	30	4	100
D104	Food Processing and technology	50	10	10	3	70	25	5	2	30	5	100
D105	Hospital Dietetics-II	-	-	-	-	-	80	20	4	100	4	100
D106/107/ 108	*DSEC : Psychology	60	20	20	2	100	-	-	-	-	2	100
	Total				13	410			8	190	21	600

***DSEC : Discipline Specific Elective Course**

*** SEC: Skill Enhancement Course**

Each paper distribution of marks for Theory and Practical for III year I Semester

Type & Course Code	Title of the Course	Theory					Practical				Total Credits	Total Marks
		Theory	IA	Viva voice	Credits	Total	Practical	IA	Credits	Total		
E010	Medical Nutrition management-III	50	10	10	3	70	25	5	1	30	4	100
E020	Nutrition and Fitness	50	10	10	2	70	25	5	2	30	4	100
E030	Nutrition through life span-III	50	10	10	3	70	25	5	1	30	4	100
E040	Dietary Counselling	50	10	10	1	70	25	5	2	30	3	100
E050	Nutrition and Immunity	60	20	20	4	100	_	_	_	_	4	100
E060	Elective Paper : Bakery Science/ Communication and Extension/ Socio-Economic Analysis of communities	50	10	10	1	70	25	5	1	30	2	100
	Total				14	450			7	150	21	600

*DSEC: Discipline specific elective course

Each paper distribution of marks for Theory and Practical for III-year II Semester

Type & Course Code	Title of the Course	Theory					Practical				Total Credits	Total Marks
		Theory	IA	Viva voice	Credits	Total	Practical	IA	Credits	Total		
F101	Improving Health and Nutrition: IEC Approaches	50	10	10	2	70	25	5	2	30	4	100
F102	Food Preservation	50	10	10	2	70	25	5	1	30	3	100
F103	Public Health Nutrition	50	10	10	2	70	25	5	1	30	3	100
SEC F104	Institutional Food Administration	50	10	10	3	70	25	5	1	30	4	100
SEC F105	Project cum Internship*	50	10	10	1	70	25	5	3	30	4	100
RC F106	Elementary Statistics	50	10	10	1	70	25	5	1	30	2	100
	Total				11	420			9	180	20	600

- *SEC – Skill Enhancement Course
- *RC – Research Course

QUESTION PAPER FORMAT FOR THEORY EXAM – 50 MARKS

Maximum Marks= 50marks					
Section	**Type of Questions**	**No. of Questions**	**Questions to be answered**	**Marks per question**	**Total Marks**
A	Long Essay	2	2	6	12
B	Short Essay	6	6	4	24
C	Short Answer	7	7	2	14
Total		15	15	-	50
Total Marks					50

QUESTION PAPER FORMAT FOR THEORY EXAM – 60 MARKS

Maximum Marks= 60marks					
Section	**Type of Questions**	**No. of Questions**	**Questions to be answered**	**Marks per question**	**Total Marks**
A	Long Essay	2	2	10	20
B	Short Essay	5	5	5	25
C	Short Answer	5	5	3	15
Total		12	12	-	60
Total Marks					60

CLINICAL NUTRITION AND DIETETICS

I YEAR I SEMESTER
HUMAN PHYSIOLOGY - Theory
(CORE COURSE)

Course code: CND 111
Credits: 5(4T+1P)

Unit	Contents	hours	%weightage
I	**Cell and Blood** Introduction Cell: The Basic Unit of Life, functions Structure of Cell- Eukaryotic Cell and Prokaryotic Cell Tissue and Their Functions : Epithelial Tissue, Connective Tissue, Muscle Tissue, Nervous Tissue. Blood: Blood Composition, The Plasma, Blood Cells-Types, Erythropoiesis-Regulation of Erythropoiesis , Blood Groups, Abo Blood Grouping System, Rh Blood Grouping System, Anaemia, Haemostasis	**6**	**9.37**
II	**The Immune System** Introduction Specific Defence Mechanism - Major Histocompatability Complex (MHC) and Antibodies Innate Immunity- Phagocytosis, The Complement System, Humoral Mechanisms. Specific Acquired Immunity- Antibody Mediated Immune System and Cell Mediated Immune System. In-Vitro Detection of Antigen-Antibody Interaction	**8**	**12.50**
III	**Cardiovascular System** Structure and Functions of Heart Blood Vessels, Pacemaker and Conduction Tissues, The Cardiac Muscle, Cardiac Output, The Cardiac Cycle. Blood Pressure - Factors affecting Blood Pressure and Factors regulating Blood Pressure. Pathophysiology of Hypertension. Myocardial Ischemia and Infarction. ECG-What it is and why do we need it?	**8**	**12.50**
IV	**Respiratory System** Introduction Organs of the Respiratory System- The Nose and the Nasal Cavity, The Pharynx, The Larynx, The Trachea, The Bronchi, The Bronchioles and Smaller Air Passages, The Lungs and the Pleura . The Mechanics of Respiration, Interchange of Gas within the Lungs-Transport of Oxygen and Transport of Carbon Dioxide. Internal Respiration, Artificial Respiration	**6**	**9.37**
V	**Gastrointestinal System** Introduction . Description of the Gastrointestinal Tract . Mouth, Tongue , Teeth , Salivary Glands , The Pharynx , The Esophagus , The Stomach, Structure of the Stomach , Functions of the Stomach, Composition and Functions of Gastric Juice, Mechanism of Secretion of Gastric Juice ,	**10**	**15.62**

	The Pancreas - Structure of the Pancreas, Functions of the Pancreas The Liver and Billiary System- Liver-Structure and Functions, The Gall Bladder and the Bile Ducts The Small Intestine and The Large Intestine Movements of the Gastrointestinal Tract Gastrointestinal Hormones Absorption and Utilization of Carbohydrates, Proteins and Fats Some Common Disorders of the Digestive System		
VI	**Renal System** Kidney: Structure and Functions. Structure and Functions of Nephron, Types of Nephron Functions of the Kidney .. How the Kidney Works Formation of Urine Micturition Reflex Role of Kidney in Fluid and Electrolyte Balance. Renal Function Tests	**6**	**9.37**
VII	**Maintenance of Body Homeostasis .** Homeostasis –An Introduction . Body Fluids - Intracellular Fluid Compartment and Extra cellular Fluid Compartment Transports across Cell Membranes - Passive Transport and Active Transport . Solute-Solvent Interaction	**4**	**6.25**
VIII	**Nervous System** Structure of Neuron Communication between Neurons - The Process of Synaptic Transmission , Neurotransmitter and Neuromodulators. Structural Organization of Nervous System The Central Nervous System – Structure nad Functions of Brain and Spinal Cord The Peripheral Nervous System (PNS)- Somatosensory System , Autonomic Nervous System (ANS).	**5**	**7.81**
IX	**Endocrinology** - Definition - Classification of endocrine hormones - Functions of Pituitary hormone - Functions of Thyroid hormone - Functions of Parathyroid hormone - Functions of Adrenal hormone - Functions of Pancreatic hormones - List the disease associated with hyper secretion and hyposecretion	**5**	**7.81**
X	**The Reproductive System** **Male Reproductive System** - Function of testis - Spermatogenesis and factors influencing it **Female Reproductive System** - Function of Ovary - Ovulation tests - Define Menstrual Cycle, give the average duration - Name the hormones influencing menstrual cycle, - Physiological changes during pregnancy - Pregnancy diagnostic tests - Define Contraception - Describe contraceptive methods in males and females	**6**	**9.37**

Practicals

HEMATOLOGY EXPERIMENTS

1. Estimation of Haemoglobin concentration
2. Determination of bleeding time
3. Determination of clotting time
4. Determination of packed cell volume
5. Determination of Erythrocyte sedimentation rate
6. Preparation of peripheral smear

Clinical Physiology

1. Pulse
2. Blood pressure
3. Spirometry
4. Pulmonary function tests
5. Electrocardiogram (ECG)
6. General Physical Examination

CLINICAL NUTRITION AND DIETETICS
I YEAR I SEMESTER
NUTRITIONAL BIOCHEMISTRY- THEORY
(CORE COURSE)

Course Code: CND 112 Credits: 6 (4T+2P)

Unit No.	Contents	No. of Hrs	% Weightage
I	Introduction to Biochemistry- Definition, objectives, scope and inter relationship between biochemistry and other biological sciences	2	3
II	**Carbohydrates- Definition, Classification, Structure and properties of** - Monosaccharides-glucose, fructose , galactose - Disaccharides-maltose, lactose, sucrose - Polysaccharides-Classification, Structure and properties of Dextrin, starch, glycogen	6	10
III	**Lipids- Definition and classification of lipids, types and properties of,** - Fatty acids, composition and properties of fats, significance of Acid value, Iodine Value, and Saponification Value - Classification and structure of phospholipids, structure of glycolipids, types and structure of sterols.	6	10
IV	**Proteins - Definition, classification, structure and properties of** - Amino acids, essential and non-essential amino acids - Definition, classification, structure, properties and functions of proteins	6	10
V	**Enzymes** - Definition, types and classification enzymes, - Definition and types of coenzymes, - Specificity of enzymes, - Isozymes, - Enzyme kinetics including factors affecting velocity of enzyme catalyzed reactions, - Enzyme inhibition	4	6
VI	**Molecular aspects of transport-** Passive diffusion, Facilitated diffusion, Active transport	2	3
VII	**Intermediary metabolism-General consideration** - **Carbohydrates-**glycolysis, gluconeogenesis, glycogenesis, glycogenolysis, Pentose phosphate pathway, blood sugar regulation - **Lipids-**oxidation and biosynthesis of fatty acids. Synthesis and utilization of ketone bodies, ketosis, fatty liver - **Proteins-**General reactions of amino acid metabolism,	10	16

	urea cycle		
VIII	**Biological Oxidation - Citric acid cycle, Electron transport chain** Oxidative phosphorylation, energy conservation, high energy phosphate bond	6	9
IX	**Lipoproteins-types, composition, role and significance in diseases**	2	3
X	**Introduction to genetic control of metabolism -** Nucleic acids, types, composition, structure, replication, transcription, genetic code Elementary knowledge of biosynthesis of proteins	6	9
XI	**Fluid, electrolyte and Acid-Base Balance**	4	6
XII	**Vitamins-** Chemistry and biochemical role of fat soluble vitamins-A,D,E & K and Water soluble vitamins-B1, B2, B6 niacin and Vitamin C	4	6
XIII	**Minerals -** Biochemical role of inorganic elements	4	6
XIV	**Hormones-**Biological role of hormones of Pituitary, Adrenal Cortex and Medulla, Thyroid, Parathyroid, Pancreas	2	3

Practicals

Unit No.	Contents	No. of Hrs	% Weightage
I	**QUALITATIVE ANALYSIS** 1. Qualitative Analysis of Carbohydrates 2. Qualitative Analysis of Proteins 3. Spectroscopic examination of hemoglobin and its derivatives	6	18
II	**QUANTITATIVE ANALYSIS** 1. Principles of calorimetry 2. Estimation of blood sugar 3. Estimation of blood urea 4. Estimation of urea creatinine 5. Estimation of serum inorganic phosphate 6. Estimation of serum total proteins	12	38
III	**DEMONSTRATION EXPERIMENTS** 1. Chromatography 2. Electrophoresis 3. Glucose tolerance test 4. Estimation of serum AST and ALT 5. Estimation of serum cholesterol 6. Flame photometer 7. Estimation of albumin in urine	14	44

CLINICAL NUTRITION AND DIETETICS
I YEAR I SEMESTER
FUNCTIONAL HUMAN ANATOMY - THEORY
(CORE COURSE)

Course Code: CND 113
Credits: 5(3T+2P)

UNIT	CONTENTS	NO.OF HOURS	% WEIGHTAGE
1	1. General anatomy 2. Introduction to anatomy,nomenclature,anatomicalposition,planes,tissues and movements 3. Bone:cells, bone matrix, structural features of compact and cancellous bone their distribution and functions, ossification, blood supply of long bone. 4. Muscle: general features, detailed structure of: skeletal muscle, structural muscle and functional characteristics of cardiac and smooth muscle; innervation of cardiac and smooth muscle. 5. Nervous tissue: structural characteristics of neuron, axon and dentritis. Different types of neurons and their specific structural and functional features and distribution. Axonal transport, synapses, morphological and functional characteristics of different types of synapses. 6. Neuroglia:types, structure and functions, blood brain barrier. Sensory and autonomic ganglia 7. Exocrine glands: characteristics, simple and compound glands; types of secretions, modes of secretion, detailed structural features of serous secreting cell and mucous secreting cell, serous and mucous acini, duct system, features of salivary glands, mammary gland, bulbourethral gland etc.	8	18
2	CARDIO VASCULAR SYSTEM 1.normal position, external features and parts of the heart; internal features of the chambers of heart, names of the blood vessels and venous drainage of the organs, structures and body as a whole, conducting system of heart, fibro skeleton of heart. 2.varations, development anomalies of heart and blood vessels, vascular defects and their effects in pathogenesis of the anomalies.	6	12
3	RESPIRATORY SYSTEM: structure of lungs	4	8
4	DIGESTIVE SYSTEM 1.position, extent, parts, relations, blood supply, never supply, lymphatic drainage and sphincters of the gastrointestinal system.	2	4

	2.sphincteric action including functional implications		
5	Excretory system: kidney, ureter, urinary bladder	4	8
6	Endocrine system and individual endocrine glands: thyroid, pituitary, salivary glands and pancreas.	6	12
7	Nervous system and its components 1. Parts of nervous system, neuron meninges, degeneration and regeneration, ventricles, CFS, spinal cord and its blood supply. 2. Motor and sensory pathways, cranial nerves, thalamus, cerebellum, limbic and autonomic pathways. Functional cortical areas, motor and sensory cortex and their blood supply.	4	8
8	Special sensory organs Gross Anatomy of: (1) Eye ball, extra ocular muscles their nerve supply and actions (2) Ear (3) Nose (4) Tounge, its musculature blood supply, never supply and lymphatic drainage.	4	8
9	Embryology: general embryology – till placenta and umbilical cord, systemic – GIT anomalies and Reproductive Anomalies	2	4

CLINICAL NUTRITION AND DIETETICS

I YEAR I SEMESTER
FUNCTIONAL HUMAN ANATOMY - PRACTICALS

Histology of

(1) Bones
(2) Muscles
(3) Skeletal
(4) Smooth
(5) Cardiac
(6) Neuron
(7) Endocrine glands
(8) Pancreas
(9) Artery and vein
(10) Respiratory system
(11) Structure of eye
(12) Taste buds
(13) Intestine

CLINICAL NUTRITION AND DIETETICS

I YEAR I SEMESTER
FOOD FACTS AND PRINCIPLES I - THEORY
(CORE COURSE)

Course Code: CND 114
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Concepts in food facts and principles** - Functions of Food - Classification of Foods - Food groups - **Properties of food:** Solutions, Vapour Pressure, Boiling Point, Freezing point, Osmotic pressure, Viscosity, Surface and Interfacial tension, specific gravity, - **Acids, Bases and Buffers:**Ph, Acids and Bases in foods, Concept of acid, bases and buffers - **The Chemical Bond:** Octet Rule, Ionic Bond, Covalent Bond, Polar and Nonpolar Molecules, The Hydrogen Bond - **Colloids:** - Properties of Colloids - Biological Importance of Colloids - Sols, Gels, Emulsions---Types and factors affecting stability, Foam—factors affecting foam volume and stability - **Water:** - Properties of Water - Structure of water molecule - Bound water and free water - Biological importance of water	10	21
II	**Study of cereals and millets** **Introduction** **Cereals: Wheat, Rice, Maize, Oats, Rye, etc** **Millets: Sorghum, Barley, Ragi, Bajra, Foxtail millet, etc** - Structure of Wheat and Rice - Nutritive Value of Cereals and Millets - Storage of Cereals - Cereal cookery	10	21
III	**Pulses and legumes** - Introduction - Pulse protein concentrates - Utilization of pulses: Mature seeds, Fresh seeds, Immature pods - Nutritive Value of Pulses - Nutritive Value of Soybean - Toxic constituents of pulses - Elimination of toxic constituents in pulses - Pulse cookery	10	21

IV	**Fats and oils** **A. Introduction** - Nutritive Value of Fats and Oils - Nutritional importance of oils and fats - Functions of fats and oil in foods - Physical and chemical properties - Rancidity and prevention - Fats and oils cookery **B. Nuts and oilseeds** - Nutritive value - Nutritional food mixes from oil seeds - Nuts and oils cookery	10	21
V	**Fruits** - Classification and Nutritive Value of fruits - Storage of fruits - Composition of fruits, & pigments present in fruits - Post harvest changes in fruits - Ripening of fruits	4	8
VI	**Vegetables** - Classification and nutritive value of vegetables - Pigments& flavor components in vegetables - Post harvest changes - Vegetable cookery and storage - Browning reaction in fruits and vegetables and prevention	4	8

Practicals

Unit No.	Contents	No. of Hrs	% Weightage
I	a. Classification of food groups. b. List the different foods under each food group c. Weights and Measures d. Preparation of Sol, Gel, Foam and Emulsion (Temporary and Permanent)	4	12
II	Cereals a. 1000 Kernel weight, volume and density b. Microscopic observation of different types of starch c. Preparation of different types of rice to study the effect on cooking time and volume of water absorbed d. Gelatinization of starch –factors affecting gelatinization of starch e. Retrogradation and syneresis f. Factors affecting Gluten formation-Gluten test, effect of kneading and added substances on chapattis	10	32
III	Pulses Effect of various methods of cooking and processing methods on characteristics of pulses	10	32
IV	Fats and oils a. Functions of fats and oils in food b. Smoking point of different oils c. Factors affecting fat absorption	4	12
V	Fruits and Vegetables a. Prevention of Enzymatic browning in fruits b. Study of factors affecting texture and pigments of vegetables	4	12

CLINICAL NUTRITION AND DIETETICS
I YEAR I SEMESTER
ENGLISH FOR COMMUNICATION- Theory
(Fundamental Course- AECC)

Course Code: CND 115
Credits: 2 (2T+0P)

CLINICAL NUTRITION AND DIETETICS
I YEAR II SEMESTER
ENVIRONMENTAL SCIENCE- Theory
(AECC)

Course Code: CND 121
Credits: 2(2T+0P)

Should type

CLINICAL NUTRITION AND DIETETICS
I YEAR II SEMESTER
ASSESSMENT OF NUTRITIONAL STATUS - Theory
(CORE COURSE)

Course Code: CND 122
Credits: 4 (2T+2P)

Unit No.	Content	No. of hrs.	% Weightage
I	Nutritional assessment as a tool for improving the quality of life of various segments of the population including hospitalized patients	6	19
II	Current methodologies of assessment of nutritional status, their interpretation and comparative applications of the following: a)Indirect Assessment b)Direct assessment - Anthropometry - Biochemical - Clinical - Dietary - Rapid Assessment and PRA - Functional indicators such as grip strength, respiratory fitness, Harvard Step Test, Squatting test	10	31
III	Nutritional surveillance - Basic Concepts - Uses and setting up of surveillance systems	8	25
IV	Monitoring evaluation	8	25

Practicals

Practical Activities

1. Training in all assessment techniques applicable for individuals and community, including ones used for hospital-based patients
- Validity and reliability of these techniques
2. Community based project for assessment of nutritional status of anyvulnerable group
3. A small evaluation study of a nutrition project

CLINICAL NUTRITION AND DIETETICS
I YEAR II SEMESTER
HOSPITAL DIETETICS I - Theory
(CORE COURSE)

Course Code: CND 123

Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs.	% Weightage
I	**Introduction to clinical nutrition and dietetics:** - Definition and history of dietetics, - Importance of hospital dietetics, - Principles of dietetics	2	4
II	**Dietitian and Team Approach** - Introduction - Dietitian and Team approach in patient care - Role of Dietitian - Duties and responsibilities of dietitian	6	12
III	**The Nutritional Screening and Nutritional Care Process** - Nutritional Assessment - Nutritional diagnosis - Nutritional Intervention - Monitoring & Evaluation - Documentation	8	17
IV	**Principles of nutrition care** - Menu Planning - Principles of menu planning - Concept of balanced diet - Food exchange list - Concept of Dietary Reference Intakes and RDA - Dietary guidelines for Indians and food pyramid	8	17
V	**Basic Principles of Planning a Normal Diet** - Characteristics of normal diet, meeting nutrient requirement of individuals family and institutions, - Interrelationship between food, nutrition and health. Role of nutrition in , ▪ Nutrition and Immunity ▪ Nutrition and Atherosclerosis ▪ Nutrition and Immunity ▪ Nutrition and Ageing ▪ Nutrition and Cancer ▪ Nutrition and Obesity - Factors affecting food choices and regulation of food intake- huger, appetite, satiety and role of hormones neurotransmitters.	12	25
VI	**THERAPEUTIC ADAPTATIONS OF THE NORMAL DIET** - Progressive diets – clear fluid, full fluid, soft and regular - Special feeding methods: Enteral and parenteralfeeding methods **Types of Therapeutic diets : Indications, Foods to be included and avoided**	12	25

	- High fibre diet - Moderately high fibre diet - Very low residue diet - Bland diet - High Calorie diet - High caloric fluid and soft diet - Low calorie diet - High carbohydrate diet - High protein diet - Moderately low protein diet - Moderate to low fat diet - Low cholesterol diet - Sodium restricted diet - Acid-ash diet - Alkaline-ash diet - Low purine diet **Naturopathy Diet**		

Practicals

Unit No.	Content	No. of hrs.	% Weightage
I	Standardizations of common food preparations for portion size	8	25
II	Planning and Preparation of Normal diet	4	12
III	Planning and Preparation of fluid food preparations Clear fluid preparations Full fluid preparations Planning and preparation of fluid diet – Clear & Full Fluid	8	25
IV	Planning and Preparation of Recipes for soft/ semi-solid diet Mechanical, pureed. Planning and Preparation of soft diet	6	19
V	Planning and Preparation of Bland diet recipes	6	19

CLINICAL NUTRITION AND DIETETICS
I YEAR II SEMESTER
APPLIED NUTRITION I - Theory
(CORE COURSE)

Course Code: CND 124
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs.	% Weightage
I	**Introduction to Human Nutrition** - Introduction-Definitions - History, Concepts - Role of Nutrition in maintaining health - Elements of nutrition - Functional Classification of Nutrients - Factors affecting Nutrition status: Socio-economic status, cultural, tradition, Food production and distribution system, Lifestyle and food habits, Climate, illiteracy, ignorance, BMR, BMI, etc	4	8
II	**Energy** - Introduction - Units of Energy-kcal or KJ - Energy intake verses Energy Expenditure, Energy Balance. - Components of energy expenditure: RMR, BMR, Activity Thermogenesis, Thermic effect of food - Factors effecting BMR - Measurement of BMR and TEE - Estimation of Energy requirement for different age groups - Recommended Energy requirements of different age groups - Regulation of energy metabolism and body weight: Control of food intake – role of leptin, Ghrelin, Neuropeptide Y, estrogen, resistin, cytokine TNF-α, etc	8	17
III	**Carbohydrates** - Introduction - Functions - Classification of carbohydrates - Calorie Value - Recommended Dietary Allowances - Dietary Sources - Digestion, Absorption, Metabolism and Storage - Regulation of Carbohydrate metabolism- Blood Glucose Homeostasis, Hormonal regulation. **Dietary fibre :** - Types, - Sources, - Role of dietary fibre in human nutrition, - Potential health benefits of dietary fiber - RDA of dietary fibre	12	25

	- Resistant starch-chemical composition and physiological effects - Glycemic Index and Glycemic load - Factors affecting glycemic index of foods. **Malnutrition** - Insufficient intake of Carbohydrates - Overconsumption		
IV	**Protein** - Introduction - Functions - Introduction-Proteins & Amino Acids - Nutritional classification of Amino Acids - Nutritional classification of Proteins - Classification of proteins based on structure and function in the body -Fibrous & Globular proteins - Calorie Value - Recommended Dietary Allowances - Dietary Sources - Digestion, Absorption, Metabolism and Storage - Protein quality, Methods of evaluating protein quality - Therapeutic applications of specific amino acids: Branched Chain Amino Acids, Glutamine, Arginine, Homocysteine, Cysteine, Taurine **Malnutrition** - Deficiency of Protein - Deficiency of Essential Amino Acids - Overconsumption of Protein	12	25
V	**Lipids** - Introduction - Classification of lipids: Simple, Compound, Derived and Neutral Lipids - Classification of Fatty Acids: SFA, UFA, MUFA, PUFA. - Role of Fat in the body, Functions of Essentials fatty acids - Role of Fat in the diet - Role of lipoprotein and Cholesterol, SFA, Trans fatty Acids in Cardiovascular Disease Risk - Prostaglandins - Calorie Value - Dietary Sources - Deficiency of Essential Fatty acids - RDA, Desirable percentage of calories from fats - Normal lipid Profile-Total Cholesterol, Triglycerides, LDL-c, VLDL-c, HDL-c, HDL/LDL Ratio - Recommended Combinations of oils for Optimal Health benefit **Malnutrition** - Deficiencies of Fat - Overconsumption of fats	12	25

Practicals

Unit No.	Contents	No. of Hrs.	% Weightage
I	a. List the Carbohydrate rich foods. b. List the Protein rich foods. c. List the foods high in Omega-3 and Omega-6 fatty acids d. Write in detail the composition of each food	6	9
II	Calculate the macro-nutrient (Energy, Carbohydrate, Protein, fat) content of the given foods.	10	15
III	Calculate the BMR, TEE of the given profile Calculate the macro-nutrient (Carbohydrate, Protein, fat) requirement of the given profiles	14	22
IV	Planning of protein rich recipes and comparison with reference protein (Egg white) Estimation of Protein quality – NDP-Cal %, PER	14	22
V	Planning of recipes rich in Soluble fibre	10	16
VI	Planning of recipes rich in Omega-3 fatty acids Formulate combination of oils to get adequate ratio of fatty acids	10	16

CLINICAL NUTRITION AND DIETETICS
I YEAR II SEMESTER
FOOD FACTS ANDPRINCIPLES II - Theory
(CORE COURSE)

Course Code: CND 125
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs.	% Weightage
I	**Milk and milk products** **Introduction** - Composition - Properties of Milk - Effect of Heat and Milk - Nutritional importance of milk - Milk Microorganisms - Milk processing: Clarification, Pasteurization, Homogenization. - Types of processed milk : Vitamin D Milk, Skim milk, Concentrated Milk, Cream Butter - Milk products: Fermented [cheese and yogurt] and unfermented [khoa and ice cream] - Factors affecting coagulation of casein [study of paneer] - Indigenous milk products	15	23
II	**FLESH FOODS** **a.Meat and poultry** - Structure - Muscle proteins: Contractile proteins, connective tissues - Composition of meat - Postmortem changes in Meat: Aging of meat - Tenderizing Meat - Curing of meat - Cutt and Grades of Meat - Cooking of meats - Changes produced during Meat Cooking - Meat substitutes - Gelatin: Gel formation **b. Eggs** - Nutritive value - Structure - Composition: egg white proteins, egg yolk proteins - Egg Quality: - Evaluation of Egg Quality, - Egg Grading - Determination of egg quality -Egg storage - Effect of heat on egg proteins	30	47

	- Egg Foams: Egg beating, Factors influencing foaming. **c. Fish** - Composition and Nutritive value - Types of fish - Methods of cooking and changes during cooking - Storage - Quality buying: Fish spoilage, Microbiological, Physiological and chemical. - Fish products: Fish Flour, Fish meal, Fish oils.		
III	**Sugar and Sugar products** **a. Sugar and Sugar products** - Nutritive value - Types of sugars: Cane sugar, Beet sugar, raw sugar, refined sugar, white sugar, Brown sugar, Damarara sugar. - Forms of sugar - Reactions of sugar: Caramelization, Hydrolysis, Crystallization - Crystallization and factors affecting it - Non-enzymatic browning - Liquid sweeteners	10	16
IV	**Beverages** - Classification of beverages - Processing of coffee - Chemical composition of coffee - Soluble coffee - Soft drinks - Fruit beverages - Alcoholic beverages	4	6
V	**Spices and condiments** - Flavouring extracts - Major and minor spices of India - Types - Health benefits	3	5
VI	**Leavening agents** - Classification : Air, steam, chemical leavening agents, yeast - Methods of leavening	2	3

Practicals

Unit No.	Contents	No. of hrs	% Weightage
I	**Milk and Milk products:** - Preparation of chana - Preparation of khoa - Preparation of cream of tomato soup	2	6
II	**Eggs** - Quality testing of eggs - Factors affecting ferrous sulphide formation in boiled eggs - Formation of Emulsion [Temporary and permanent emulsion] - Studying foaming properties and various factors affecting foaming	6	19
III	**Sugar and jaggery** - Demonstrate stages of sugar and jaggery cookery - Preparation of sugar and jaggery based Indian sweets	6	19
IV	**Leavened products** - Use of different leavening agents in food preparation - Air - preparation of foam - Steam and Biological leavening agents— preparation of idlis - Chemical leavening agents-preparation of cakes using : egg white and whole egg - slow and fast acting baking powder	4	12
V	**Spices and Condiments** - Market survey of spices and condiments - Identification of different spices **Beverages** - Market survey of Beverages	4	13

CLINICAL NUTRITION AND DIETETICS

I YEAR II SEMESTER
YOGA THERAPY - Theory
(DSEC)

Course Code: CND 126
Credits: 2 (1T+1P)

1. Explain the fundamental principles of Yoga
2. Explain the benefits, indications and contraindications of different asanans, pranayama, Meditation, Shatkriyas (Cleansing techniques)
3. Demonstrate basic Yoga practices (SukhmaVyayama, Asanans, pranayama, Meditation /Yoga Nidra)
4. Role of Yoga in Self-management of Stress and better academic performance
5. Explain therapeutic applications of Yoga in Clinical Nutrition

CLINICAL NUTRITION AND DIETETICS

I YEAR II SEMESTER
FOOD BIOTECHNOLOGY- Theory
(DSEC)

Course Code: CND 126
Credits: 2 (1T+1P)

Unit No.	Contents	No. of hrs	% Weightage
I	Prospectus of biotechnology- definition, scope and applications, Application of Biotechnology in food (Food industries), pharmaceuticals and agriculture, Application of biotechnology for food plant waste utilization, biogas plants.	3	19
II	Biological role of DNA in cell metabolism, Molecular genetics i.e. fundamentals of molecular biology with special reference to chemistry and biology and DNA, (Primary secondary and tertiary) structures.	4	25
III	GMO, genetic recombination mechanisms and technique used for improvement in microbial strains, Recombinant-DNA technology (plasmids and cloning), Expression of foreign genes, Promoters (Enzyme), Biomass production by using various microorganisms.	4	25
IV	Applications of genetical control mechanism in industrial fermentation process, (Induction, manipulation and recombination).	3	19
V	Cell and tissue culture, Continuous cultures, Secondary metabolites synthesis.	2	12

Practicals

Unit No.	Contents	No. of hrs	% weightage
I	Study of auxotroph, Micropropogation through tissue culture, Strain improvement through U.V. mutation for lactose utilization,	6	19
II	Chemical mutagenesis using chemical mutagens (Ethidium bromide), Determination of survival curves using physical and chemical mutagens,	6	19
III	Isolation and analysis of chromosomal / genomic DNA from *E.coli* and *Bacillus cereus,*	4	12.5
IV	Separation of protoplast using cellulytic enzymes,	3	9
V	Production of biogas from organic waste	3	9
VI	Introduction of ELISA / Southern blot / DNA finger printing etc., Agarose gel electrophoresis of plasmid DNA	6	19
VII	Pesticide degradation by *pseudomonas spp.*	4	12.5

CLINICAL NUTRITION AND DIETETICS
I YEAR II SEMESTER
HOME BASED CATERING- Theory
(DSEC)

Course Code: CND 126
Credits: 2 (1T+1P)

Unit No.	Contents	No. of hrs	% Weightage
I	**Introduction to Food Service** - Factors contributing to the growth of food service industry - Kinds of food service establishments	4	25
II	**Food Production** - Menu planning: Importance of menu, factors affecting menu planning, menu planning for different kinds of food service units - Food Purchase and Storage - Quantity Food production: Standardization of recipes, quantity food preparation techniques, recipe adjustments and portion control - Hygiene and Sanitation	4	25
III	**Resources** - Money - Manpower - Time - Facilities and equipment - Utilities	4	25
IV	**Planning of A Food Service** - Preliminary Planning - Survey of types of units, identifying clientele, menu, operations and delivery - Planning the set up: a) Identifying resources b) Developing Project plan c) Determining investments d) Project Proposal	4	25

Practicals

Unit No.	Contents	No. of hrs	% Weightage
I	Market survey of different kinds of food service establishments	4	12
II	Menu planning for different kinds of occasions at home A. Quantity Food production for the given occasions: Standardization of recipes, Quantity food production B. Management of Resources Money Manpower Time Facilities and equipment Utilities	20	63
III	Planning of A Food Service Preliminary Planning: Identifying clientele, Planning a menu Planning the set up: a) Identifying resources b) Developing Project plan c) Determining investments d) Project Proposal	8	25

CLINICAL NUTRITION AND DIETETICS
II YEAR I SEMESTER
MEDICAL NUTRITION MANAGEMENT I- Theory
(CORE COURSE)

Course Code: CND 212
Credits: 4 (3T+1P)

Unit No.	Contents	No. of hrs
I	**FOOD AND DRUG INTERACTIONS** - Effects of Food on Drug Therapy - Effects of Drugs on Food and Nutrition -Modification of Drug Action by Foodand Nutrients - Effects of Drugs on Nutritional status - Medical Nutrition Therapy	8
II	**DIET IN FEBRILE CONDITION** - Fever and Infections - Short duration - Typhoid, Influenza, Malaria, - Long duration -Tuberculosis. - Medical Nutrition Therapy	6
III	**MEDICAL NUTRITION MANAGEMENT IN GI TRACT DISEASES** Etiology, Pathophysiology, Symptoms and Medical Nutrition Therapy **Upper GI Tract: Disorders of Esophagus andStomach** - Esophagitis - Dyspepsia - GERD - Peptic Ulcer - Gastritis - Gastrectomy - Dumping Syndrome **Lower GI Tract: Intestinal Disorders** - Flatulence - Diarrhoea Dysentery, and Traveler's Diarrhea - Constipation, Hemorrhoids, - Diverticular disease - Duodenal Ulcer - Inflammatory Bowel Disease,- Crohn's disease Ulcerative Colitis - Irritable bowel syndrome **Malabsorption Syndrome** - Celiac disease - Steatorrhea - Intestinal Brush border deficiencies (Acquired Disaccharide Intolerance) - Lactose intolerance	10
IV	**MEDICAL NUTRITION MANAGEMENT IN DISEASES OF THE LIVER, PANCREAS AND BILIARY SYSTEM**	8

	Etiology, Pathophysiology, Symptoms, Medical Nutrition Therapy - Viral Hepatitis, Cirrhosis of Liver, Alcoholic Liver Diseases, NASH, Hepatic Encephalopathy, Wilson's disease - Liver Transplant **Diseases of Gall Bladder and Pancreas** - Biliary Dyskinesia - Cholelithiasis, - Cholecystitis, - Cholecystectomy - Pancreatitis - Zollinger- Ellison Syndrome	
V	**MEDICAL NUTRITION MANAGEMENT OF METABOLIC DISEASE-I : DIABETES & HYPOGLYCEMIA** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction - Diagnostic and Screening Criteria - Management of Pre-Diabetes - Management of Diabetes - Acute Complications - Long-Term Complications - Management of Diabetes Mellitus - Nutritional Therapy: Diet Plan-Food exchange list, Glycemic Index, Glycemic Load, CHO counting - Meal planning with and without Insulin, during sickness - Sweeteners and Sugar Substitutes - Exercise - Hypoglycemia of Nondiabetic origin	8
VI	**MEDICAL NUTRITION MANAGEMENT OF METABOLIC DISEASE- II: GOUT AND INBORN ERRORS OF METABOLISM** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction Gout Inborn errors of metabolism - PKU - MSUD - Tyrosinemia - Homocystinuria - Glycogen storage Disorder - Galactosemia	8

MEDICAL NUTRITION MANAGEMENT I – Practicals

Unit No.	Contents	No. of hrs
I	Planning, formulating and preparation of therapeutic diet for - Fever - Tuberculosis	4
II	Planning,formulating and preparation of therapeutic diet for - Peptic Ulcer - IBS: Diarrhoea, Constipation - Diverticular diseases: Diverticulosis, Diverticulitis - IBD - Crohn's Disease, Ulcerative Colitis - Celiac Disease - Short Bowel Syndrome	8
III	Planning,formulating and preparation of therapeutic diet for - Cirrhosis - ALD/NASH - Wilson's Disease - Hepatic Encephalopathy - Cholelithiasis/ Cholecystitis - Pancreatitis	6
IV	Planning,formulating and preparation of therapeutic diet for - Type 1 Diabetes - Type 2 Diabetes - Gestational Diabetes Mellitus	8
V	Planning, formulating and preparation of therapeutic diet for Gout Inborn errors of metabolism - PKU - MSUD - Tyrosinemia - Homocystinuria	6

CLINICAL NUTRITION AND DIETETICS
II YEAR I SEMESTER
NUTRITION THROUGH LIFE SPAN I - Theory
(CORE COURSE)

Course Code: CND 213
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs
I	**The Life-Course Approach to Nutrition and Health** - Dietary Considerations Based on Ethnicity - Dietary Considerations Based on Religion	2
II	**Preconception Nutrition** - Introduction - Preconception Overview **Nutrition-Related Disruptions in Fertility** - Undernutrition and Fertility - Body Fat and Fertility - Oxidative Stress, Antioxidant Nutrient Status, and Fertility - FolateIntake,and Fertility - Caffeine and Fertility - Preconception Care: Preparing for Pregnancy	8
III	**Preconception Nutrition : Conditions and Interventions** Introduction **Premenstrual Syndrome** - Caffeine Intake and PMS - Exercise and Stress Reduction **Obesity and Fertility** - Central Body Fat and Fertility - Weight Loss and Fertility **Hypothalamic Amenorrhea** - Nutritional Management of HypothalamicAmenorrhea **The Female Athlete Triad and Fertility** - Nutritional Management of the FemaleAthlete Triad **Eating Disorders and Fertility** - Nutritional Management of Women with Anorexia Nervosa or Bulimia Nervosa **Polycystic Ovary Syndrome:** Nutritional Management of Women with PCOS	8
IV	**Nutrition During Pregnancy** **Introduction** **Nutritional status of Pregnancy outcome** - Low Birth Weight, Preterm Delivery, and InfantMortality **Physiology of Pregnancy** - Normal Physiological Changes During Pregnancy - The Placenta - Critical Periods of Growth and Development - Nutrition, Miscarriages, and Preterm Delivery	7

	Pregnancy Weight Gain - Pregnancy Weight Gain Recommendations - Composition of Weight Gain in Pregnancy - Postpartum Weight Retention **Nutrient Needs During Pregnancy** - The Need for Energy - The Need for Carbohydrates - Alcohol and Pregnancy Outcome - The Need for Protein - Vegetarian Diets in Pregnancy - The Need for Fat : Omega- Fatty Acids EPA and DHA During Pregnancy **The Need for Vitamins and Minerals During Pregnancy** - Folate : Folate and Congenital Abnormalities - Choline - Vitamin A - Vitamin D **The Need for Minerals During Pregnancy** - Calcium - Fluoride - Iron - Iodine - Sodium **Exercise and Pregnancy Outcome:** Exercise Recommendations for Pregnant Women **Common Health Problems During Pregnancy** - Nausea and Vomiting - Heartburn - Constipation - Pica	
V	**Nutrition During Pregnancy: Conditions and Interventions Introduction** **Obesity and Pregnancy** - Obesity and Infant Outcomes - Nutritional Recommendations and Interventions for Obesity during Pregnancy **Hypertensive Disorders of Pregnancy** - Hypertensive Disorders of Pregnancy, Oxidative Stress, and Nutrition - Preeclampsia–Eclampsia - Nutritional Recommendations and Interventions forPreeclampsia **Diabetes in Pregnancy** - Gestational Diabetes - Potential Consequences of Gestational Diabetes - Risk Factors for Gestational Diabetes - Nutritional Management of Women with GestationalDiabetes - Low-Glycemic Index (GI) Foods - Postpartum Follow-Up - Type 1 Diabetes During Pregnancy **Multifetal Pregnancies** - Background Information about Multiple Fetuses - Risks Associated with Multifetal Pregnancy	8

	- Nutrition and the Outcome of Multifetal Pregnancy - Nutritional Recommendations for Women with MultifetalPregnancy **HIV/AIDS During Pregnancy** - Treatment of HIV/AIDS - Consequences of HIV/AIDS During Pregnancy - Effect of HIV/AIDS on nutritional status of pregnant woman - Nutritional Management of Women with HIV/AIDS duringPregnancy **Eating Disorders in Pregnancy** - Nutritional Interventions for Women with Eating Disorders **Fetal Alcohol Syndrome** - Effects of Alcohol on Pregnancy Outcome - The Fetal Alcohol Syndrome **Nutrition and Adolescent Pregnancy** - Nutritional needs During Adolescent Pregnancy - Dietary and Other Recommendations for PregnantAdolescents	
VI	**Nutrition During Lactation** **Introduction** **Lactation Physiology** - Functional Units of the Mammary Gland - Mammary Gland Development - Lactogenesis - Hormonal Control of Lactation - Secretion of Milk - The Letdown Reflex **Human Milk Composition** - Colostrum - Water - Energy - Lipids - Protein - Milk Carbohydrates - Fat-Soluble Vitamins - Water-Soluble Vitamins - Minerals in Human Milk **Benefits of Breastfeeding** - Breastfeeding Benefits for Mothers - Breastfeeding Benefits for Infants **The Breastfeeding Infant** - Optimal Duration of Breastfeeding and Feeding Frequency - Breastfeeding Positioning - Identifying Breastfeeding Malnutrition **Maternal Diet** - Energy and Nutrient Needs Breastfeeding versesartificial feeding	7
VII	**Nutrition During Lactation: Conditions and Interventions** **Introduction** **Common Breastfeeding Conditions** - Sore Nipples - Flat or Inverted Nipples - Letdown Failure - Hyperactive Letdown	8

	- Hyperlactation - Engorgement - Plugged Duct - Mastitis - Low Milk Supply **Neonatal Jaundice and Kernicterus** - Bilirubin Metabolism - Physiologic Versus Pathologic Newborn Jaundice - Hyperbilirubinemia and Breastfeeding - Prevention and Treatment for Severe Jaundice	

CLINICAL NUTRITION AND DIETETICS

II YEAR I SEMESTER
NUTRITION THROUGH LIFESPAN I – Practicals

Course Code: CND 213 (P)
Credits: 1P

Unit No.	Contents	No. of Hrs
I	Planning, formulating and preparation of therapeutic menu for women during preconception	6
II	Planning, formulating and preparation of therapeutic menu for Pregnant woman: - Low Income - High Income	10
III	Planning, formulating and preparation of therapeutic menu for Lactating woman - Low Income - High Income	10
IV	Planning Micro-nutrient dense recipes for Pregnant and lactating woman	6

CLINICAL NUTRITION AND DIETETICS
II YEAR I SEMESTER
APPLIED NUTRITION II - Theory
(CORE COURSE)

Course Code: CND 214
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs
I	**Body Composition** Introduction - Components of Body Composition and factors affecting it. - Significance of body composition and changes through the life cycle - Methods for assessing body composition (both classical and recent) and their applications. - Influence of Energy Excess and Energy deficit in body composition	5
II. a	**Vitamins** **Introduction** **History** **Classification** **a. Fat soluble vitamins** - Vitamin A, Vitamin D, Vitamin E, Vitamin K For each nutrient following should be discussed: - Functions - Dietary sources - Recommended dietary allowances - Deficiency and toxicity - Bioavailability and factors affecting bioavailibility (wherever applicable) - Interaction with other nutrients (wherever applicable)	18
II.b	**b. Water soluble vitamins** **Classification: B-Complex and Non B-Complex vitamins,** **Classification of B-Complex vitamins: Energy Yielding and Haemopoitic Vitamins** - Thiamine, Riboflavin, Nicotinic acid, Pantothenic acid, Pyridoxine, Biotin, folic acid, Cyanocobalamin, choline, vitamin C For each nutrient following should be discussed: - Functions - Dietary sources - Recommended dietary allowances - Deficiency and toxicity - Bioavailability and factors affecting bioavailibility (wherever applicable) - Interaction with other nutrients (wherever applicable)	18
III	**Minerals** **Introduction** **History** **Mineral Composition of the body**	18

	Classification **a. Macrominerals** - Calcium, Phosphorous, Magnesium, Sodium, Potassium, Chloride, Sulphur **b.Microminerals** - Iron, Copper, Zinc, Fluorine, Iodine, Chromium, Cobalt **c. Ultratrace minerals** such as selenium, manganese, silicon, vanadium, nickel, tin, molybdenum. **For macro and micro minerals** the following should be discussed: - Functions - Dietary sources - Recommended dietary allowances - Deficiency and toxicity - Bioavailability and factors affecting bioavailibility (wherever applicable) - Interaction with other nutrients (wherever applicable)	
IV	**Water and Electrolytes** - Introduction - Daily requirements - Functions of water - Requirements for water - Regulation of Fluid and Electrolyte balance - Water imbalances: Overhydration, Dehydration, water intoxication - Electrolyte imbalances	5

APPLIED NUTRITION II – Practicals

Course Code: CND 214 (P)
Credits: 1P

Unit No.	Contents	No. of Hrs	% Weightage
I	**Body Composition Analysis and Interpretation of data** Planning and formulating therapeutic diet for any one case profile according to the nutrition needs.	12	37
II	Planning and preparation of recipes rich in Vitamin A and calculating Carotene profile**.**	8	25
III	Planning and preparation of recipes rich in Iron and calculate nutrient density	6	19
IV	Planning and preparation of recipes rich in Calcium and calculate nutrient density	6	19

CLINICAL NUTRITION AND DIETETICS
II YEAR I SEMESTER
FOOD SANITATON AND HYGIENE - Theory
(CORE COURSE)

Course Code: CND 215
Credits: 4 (4T+0P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Food sanitation** Introduction, definition, importance	2	3
II	**Food Contamination and Spoilage** - Food contamination - Health hazards due to contaminated foods - Criteria for judging food fit for consumption - Criteria for judging water quality - Water quality standards - Classification of food according to ease of spoilage - Food borne diseases: bacteria, virus, fungi, insects and rodents. Routes of contamination. Control and prevention. - Food poisoning and infections -Causative agents, symptoms, sources and mode of transmission, foods involved, Method of prevention. - Control and eradication of flies and cockroaches, rodents and other pests	10	16
III	**Personal hygiene** - Necessity for personal hygiene - Care of skin, hair, hands, feet, teeth, use of cosmetics and jewellery - Health of staff: medical checkup - Sanitary practices - Habits - Protective clothing	8	12
IV	**Hygienic food handling** - Purchasing and receiving safe food - Sanitary Procedures while preparing, cooking and holding food - Importance of following sanitary procedures,	10	16
V	**Cleaning and Sanitation** - Cleaning and Sanitizing - Disinfectants, sanitizers, antiseptic and germicide. - Common disinfectants - Sterilization of kitchen and service equipment - Cleaning of premises and surroundings	10	16
VI	**Storage of Food** - Storage temperatures of different commodities to prevent bacterial contamination and spoilage	6	9

	or growth. - Pasteurization of milk, butter, cream, cheese, fruit juices etc. LST, HTST methods - Sterilization of milk, water, etc		
VII	**Disposal of waste** Waste disposal methods, collection, storage and proper disposal from the premises.	8	12
VIII	**Sanitation regulation and standards** - Regulatory Agencies - Control of food quality - Laws relating to food hygiene - FSSAI - Concept of Codex Alimentarius - The concept and process of implementation of HACCP in an industry - Good Manufacturing Practices	10	16

FOOD STANDARDS AND QUALITY CONTROL - Theory
(CORE COURSE)

Course Code: CND 216
Credits: 4 (4T+0P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Food Quality Management** - Characteristics of quality - Quality Control - Quality Assurance - Total Quality Management - Food Quality – its need and its role in Food Industry - Food Quality and Quality Attributes- Classification of Quality Attributes and their role in food Quality - Objectives, Importance and Functions of Quality Control	8	12
II	**Food Adulteration and Safety** - Food adulteration - definition, types - Common adulterants in different foods, method of detecting adulterated foods.	10	16
III	**Food additives - Definitions, Types** **Additives and Preservatives** - Definition of food additives, - Classification of chelating agents, antimicrobial agents, sweeteners, stabilizers and thickeners, fat replacers, firming texturizers, and clarifying agents. - Flavour enhancers, aroma substances, antioxidants. Anticaking agents, bleaching agents.	15	23
IV	**Sensory Methods of Food Quality Testing** Sensation of taste, smell, appearance and flavor, sensory evaluation techniques – subjective methods	6	10
V	**Objective Methods of Food Quality Testing** - Physical test methods (moisture, acidity, water activity, texture, viscosity, colour) - Simple methods of chemical analysis (protein, fat, water, ash)	10	16
VI	**Food Laws and Regulations** Food grade and standards - International food regulations and certifications - Indian food regulations and Certifications	15	23

CLINICAL NUTRITION AND DIETETICS
II YEAR I SEMESTER
COMPUTER SCIENCE- Theory
(SEC)

Course Code: CND 211
Credits: 2 (1T+1P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Introduction to Computers** Definition, Advantages & Limitations Anatomy of Computers Components of Computers and its functions Overview of Input devices of Computer Overview of Output devices of Computer, Memory, Processors, Hardware, Software & Speed	3	19
II	**Types of Software** Operating System, Translators & Programming languages Types of Software – Application Programmes, Utility Programmes& General Purpose Programmes, Classification of Computers	3	19
III	**Operating System** Functions of OS – Types of OS-DOS and WINDOWS, Booting process Some fundamental DOS commands – FORMAT, DIR, COPY, PATH, LABEL, VOL, MD, CD, DEL and TREE WINDOWS:GUI, Desktop and its elements, Anatomy of a window – Title Bar, Minimize, Maximize, Restore and Close Buttons, Scroll Bars, Menus and Tool - Starting and shutting down of windows WINDOWS Explorer , working with organization of files and folders, Copy, Move and Print files – setting time and date	3	19
IV	**MSWORD**: Word processing and units of document, features of word processing packages MSWORD: Creating, Editing, Formatting and Saving a document in MSWORD – Features of File, Edit and Format menus	2	12
V	**MSEXCEL**: Electronic Spreadsheets – concept, packages, creating, editing and saving a spreadsheet with MSEXCEL MSEXCEL: Use of in-built Statistical and other functions and writing expressions, Creating Data Analysis option in Tools Menu, Use of Data Analysis Tools – Correlation and Regression, t-test for two samples, Creating Graphs	2	13
VI	**MSACCESS**: Concept of Database, Units of database, creating database	2	12
VII	**INTERNET** Internet and e-mail-Introduction, browsers, www, internet	1	6

	explorer, search engine, web server-online and off line browsing-, Individual account creation, Browsing important internet sites, creating mail ID, sending and receiving mails, sending attachments, HTTP Use of statistical packages		

COMPUTER SCIENCE- Practicals

Unit No.	Contents	No. of hrs	% Weightage
I	**COMPUTER FUNDAMENTALS** - Overview of computers - Components of a computer - Input/ output devices - Secondary storage devices - Number systems: Decimal, Binary, Octal, Hexadecimal - Representation of information: BCD, EBCDIC, ASCII - Representation of data: files, records - File organization and access - Security and safety of data - Introduction to operating systems	5	16
II	**MS WINDOWS** - Introduction - Exploring the desktop - Running multiple programs - Accessories - Control panel - Managing documents and folders	4	12
III	**MS WORD** - Starting MS WORD - Creating and formulating a document - Changing fonts and point size - Table creation and operations - Auto-correct, auto-text, spell check thesaurus - Word art, interesting objects - Mail merge, letter, label , envelope - Page setup, page preview - Printing a document	6	20
IV	**MS EXCEL** - Starting Excel - Worksheet, cell, inserting data into row/columns - Alignment, text wrapping - Sorting data, auto sum - Use of functions, Referencing formula cells in other formulae - Naming cells and ranges, goal seek - Generating graphs - Integrating worksheet data and charts with word - Creating hyperlink to a WORD document - Page setup, print preview, printing worksheets -	6	20

V	**MS POWERPOINT** - Starting MS POWERPOINT - Autowizard, creating a presentation using auto content wizard - Blank presentation, creating, saving and printing a presentation - Adding a slide to a presentation - Navigating through a presentation, slides sorter, slideshow, editing slides - Using clipart, wordart gallery - Adding transitions and animation effects, setting timings for slideshow, preparing note pages, preparing audience handouts, printing presentation document.	6	20
VI	**INTERNET** - Genesis and use of internet - Software and hardware requirements for internet - Assessing internet, web page, using a search engine, accessing engine internet from MS office applications	5	16

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
ENTREPRENEURSHIP DEVELOPMENT - Theory
(SEC)

Course Code: CND 221

Credits: 2 (2T+0P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Starting and managing an enterprise** a. Need for and Enterprise, Developing an Enterprise – Idea generation and thought process, Steps in preparing a business plan, Feasibility planning, Preparing a feasibility plan, Customer analysis. b. Components of management, Managerial skills, Developing managerial skills, Managing a food industry.	10	31
II	**Entrepreneurship**: Entrepreneur and entrepreneurship, Decision making for the enterprise, Qualities of an entrepreneurial individual.	6	19
III	**Marketing and advertising**: Marketing basics, Product basics, Competitor analysis, Market analysis, Advertising	10	31
IV	**Changing food trends and marketing**- influencing factors: Life style changes: economic, socio-cultural, psychological influences and marketing influence	6	19

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
NUTRITION THROUGH LIFE SPAN II - Theory
(CORE COURSE)

Course Code: CND 222
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs	% Weightage
I.	**Infant Nutrition** **Introduction** **Assessing Newborn Health** - Birth Weight as an Outcome - Infant Mortality - Combating Infant Mortality - Standard Newborn Growth Assessment - Energy and Nutrient Needs - Caloric Needs - Protein Needs - Fats - Metabolic Rate, Calories, Fats, and Protein—How Do - They All Tie Together? - Other Nutrients and Non-nutrients **Physical Growth Assessment:** Interpretation of Growth Data **Feeding in Early Infancy** - Breast Milk and Formula - Cow's Milk During Infancy - Soy Protein-Based Formulas During Infancy **Development of Infant Feeding Skills** - Introduction of Solid Foods - The Importance of Infant Feeding Position - Preparing for Drinking from a Cup - Food Texture and Development - First Foods - Inappropriate and Unsafe Food Choices - Water - How Much Food Is Enough for Infants? - How Infants Learn Food Preferences **Nutrition Guidance** - Infants and Exercise - Supplements for Infants **Common Nutritional Problems and Concerns** - Failure to Thrive - Nutrition Intervention for Failure to Thrive - Colic - Iron-Deficiency Anemia	10	21

	- Diarrhea and Constipation - Prevention of Baby-Bottle Caries and Ear Infections - Food Allergies and Intolerances - Lactose Intolerance **Cross-Cultural Considerations** **Vegetarian Diets** **Nutrition Intervention for Risk Reduction** Model Program: Newborn Screening		
II.	**Infant Nutrition : Conditions and Interventions** **Introduction** **Infants at Risk** **Energy and Nutrient Needs** - Energy Needs - Protein Requirements - Fats - Vitamins and Minerals **Growth** - Growth in Preterm Infants - Does Intrauterine Growth Predict Growth - Outside? - Interpretation of Growth **Nutrition for Infants with Special Health Care Needs** Nutrition Risks to Development **Severe Preterm Birth and Nutrition** - How Sick Babies Are Fed - What to Feed Preterm Infants - Preterm Infants and Feeding **Infants with Congenital Anomalies and Chronic Illness** Infants with Genetic Disorders **Feeding Problems** **Nutrition Interventions** **Nutrition Services**	6	12
III.	**Toddler and Preschooler Nutrition** **Introduction** Definitions of the Life-Cycle Stage Importance of Nutrition **Tracking Toddler and Preschooler Health** Healthy People **Normal Growth and Development** - Measuring Growth - The CDC Growth Charts - WHO Growth Standards - Common Problems with Measuring and Plotting GrowthData **Physiological and Cognitive Development** - Toddlers - Preschool-Age Children - Temperament Differences - Food Preference Development, Appetite, and Satiety **Energy and Nutrient Needs**	8	17

	- Energy Needs - Protein - Vitamins and Minerals **Common Nutrition Problems** - Iron-Deficiency Anemia - Dental Caries - Constipation - Elevated Blood Lead Levels - Food Security - Food Safety **Prevention of Nutrition-Related Disorders** - Overweight and Obesity in Toddlers and Preschoolers - Assessment of Overweight and Obesity - Prevention of Overweight and Obesity - Treatment of Overweight and Obesity Expert Committee - Recommendations - Dietary Guidelines for Americans - Nutrition and Prevention of Cardiovascular Disease in - Toddlers and Preschoolers - Vitamin and Mineral Supplements **Dietary and Physical Activity Recommendations** - Dietary Guidelines - Food Guide Pyramid - Recommendations for Intake of Iron, Fiber, Fat, andCalcium - Fluids - Recommended vs. Actual Food Intake - Cross-Cultural Considerations - Vegetarian Diets - Child Care Nutrition Standards - Physical Activity Recommendations **Nutrition Intervention for Risk Reduction** - Nutrition Assessment - Model Program **Public Food and Nutrition Programs** - WIC - WIC's Farmers' Market Nutrition Program - Head Start and Early Head Start - Supplemental Nutrition Assistance Program (formerly the - Food Stamp Program)		
IV.	**Toddler and Preschooler Nutrition: Conditions and Interventions** **Introduction** **Who Are Children with Special Health Care Needs?** **Nutrition Needs of Toddlers and Preschoolers with Chronic Conditions** **Growth Assessment** **Feeding Problems**	8	17

	- Behavioral Feeding Problems - Excessive Fluid Intake - Feeding Problems and Food Safety - Feeding Problems from Disabilities Involving NeuromuscularControl **Nutrition-Related Conditions** - Failure to Thrive - Toddler Diarrhea and Celiac Disease - Autism - Muscle Coordination Problems and Cerebral Palsy - Pulmonary Problems - Developmental Delay and Evaluations **Food Allergies and Intolerance** **Dietary Supplements and Herbal Remedies** **Sources of Nutrition Services**		
V.	**Child and Preadolescent Nutrition** **Introduction** - Definitions of the Life Cycle Stage - Importance of Nutrition **Tracking Child and Preadolescent Health :** Healthy People **Normal Growth and Development** - The CDC Growth Charts - WHO Growth References **Physiological and Cognitive Development of School-Age Children** - Physiological Development - Cognitive Development - Development of Feeding Skills and Eating - Behaviors **Energy and Nutrient Needs of School-Age Children** - Energy Needs - Protein - Vitamins and Minerals **Common Nutrition Problems** - Iron Deficiency - Dental Caries **Prevention of Nutrition-Related Disorders in School-Age Children** - Overweight and Obesity in School-Age Children - Addressing the Problem of Pediatric Overweight andObesity - Nutrition and Prevention of Cardiovascular Disease inSchool-Age Children - Dietary Supplements **Dietary Recommendations** - Recommendations for Intake of Iron, Fiber, Fat, Calcium, - Vitamin D and Fluids - Recommended vs. Actual Food Intake - Cross-Cultural Considerations - Vegetarian Diets	10	21

	Physical Activity Recommendations - Recommendations vs. Actual Activity - Determinants of Physical Activity - Organized Sports **Nutrition Intervention for Risk Reduction** - Nutrition Education - Nutrition Integrity in Schools - Nutrition Assessment - Model Programs **Public Food and Nutrition Programs** - The National School Lunch Program - School Breakfast Program - Summer Food Service Program - Team Nutrition		
VI.	**Child and Preadolescent Nutrition: Conditions and Interventions** **Introduction** **"Children Are Children First"—What Does that Mean?** **Nutritional Requirements of Children with Special Health Care Needs** - Energy Needs - Protein Needs - Other Nutrients **Growth Assessment** - Growth Assessment and Interpretation in Children withChronic Conditions - Body Composition and Growth **Nutrition Recommendations:** Methods of Meeting Nutritional Requirements, Fluids **Eating and Feeding Problems in Children with Special** **Health Care Needs :** Specific Disorders **Dietary Supplements and Herbal Remedies** **Sources of Nutrition Services** - USDA Child Nutrition Program - Maternal and Child Health Block Program of the U.S. - Department of Health and Human Services (HHS) - Public School Regulations: Accommodation and IDEA - Nutrition Intervention Model Program	6	12

Practicals

Unit No.	Contents	No. of Hrs	% Weightage
I	Planning and preparation of nutritious weaning mix - Stage 1 (6-9months) – Amylase rich foods - Stage 2 (9-12months)	8	24
II	Planning and preparation of nutritious weaning mix – Gluten free	6	19
III	Planning and preparation of malted weaning mix	6	19
IV	Planning and preparation of nutritious recipes for toddlers	6	19
V	Planning and preparation of nutritious packed lunch recipes for school children	6	19

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
MEDICAL NUTRITION MANAGEMENT II- Theory
(CORE COURSE)

Course Code: CND 223
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**MEDICAL NUTRITION MANAGEMENT IN CORONARY HEART DISEASE (CHD)** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction Coronary Heart Disease (CHD) - Dyslipidemias - Atherosclerosis - Hypertension- DASH diet - Ischemic heart disease –Angina, Myocardial Infarction - Congestive Heart failure - Rheumatic Heart Disease - Cardiac transplantation	12	25
II	**MEDICAL NUTRITION MANAGEMENT IN PULMONARY DISORDERS** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction - Chronic Lung Disease of Prematurity and - Bronchopulmonary Dysplasia - Chronic Obstructive Pulmonary Disease - Cystic Fibrosis - LungCancer - Pneumonia - Respiratory Failure - Turberculosis	12	25
III	**MEDICAL NUTRITION MANAGEMENT IN RENAL DISORDERS** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction - Glomerular and Autoimmune Kidney Diseases - Diseases of the Tubules and Interstitium - Nephrotic Syndrome - Progressive Nature of Renal Disease - End-Stage Renal Disease - Renal Failure - Dialysis - Nephrolithiasis - Renal Metabolic Disorders: Hypophosphatemia - Rickets and Hartnup Disorder - Polycystic Kidney Disease - Renal Transplantation	14	29

	- Urinary Tract Infections		
IV	**MEDICAL NUTRITION MANAGEMENT IN RHEUMATIC DISORDERS** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction - Osteoarthritis - Rheumatoid Arthritis - Osteopenia and Osteoporosis Other disorders: - Sjogren's Syndrome - Temporomandibular Disorders - Systemic Lupus Erythematosus - Chronic Fatigue Syndrome and Fibromyalgia - Ankylosing Spondylitis (Spinal Arthritis) - Muscular Dystrophy - Myofascial Pain Syndromes: Fibromyalgia and Polymyalgia Rheumatica - Osteomyelitis - Osteomalacia - Paget's Disease (OsteitisDeformans) - PolyarteritisNodosa - Rhabdomyolysis - Ruptured Disc - Scleroderma (Systemic Sclerosis)	10	21

Practicals

Unit No.	Contents	No. of hrs	% Weightage
I	Planning,formulating and preparation of therapeutic diet in the following conditions - Hypertension- DASH diet - Congestive Heart failure - Rheumatic Heart Disease - CAD	8	25
II	Planning, formulating and preparation of therapeutic diet in the following conditions - Chronic Lung Disease of Prematurity and Bronchopulmonary Dysplasia - Chronic Obstructive Pulmonary Disease - Cystic Fibrosis - Pneumonia - Turberculosis	10	31
III	Planning, formulating and preparation of therapeutic diet in the following conditions - Nephrotic Syndrome - End-Stage Renal Disease - Dialysis - Nephrolithiasis - Polycystic Kidney Disease - Renal Transplantation	10	31
IV	Planning, formulating and preparation of therapeutic diet in the following conditions - Osteoarthritis/ Rheumatoid Arthritis - Osteopenia and Osteoporosis	4	13

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
FOOD PROCESSING AND TECHNOLOGY- Theory
(CORE COURSE)

Course Code: CND 224
Credits: 5 (3T+2P)

Unit No.	Contents	No. of hrs	% Weightage
I.	**Introduction** Main crops grown in the country – importance and storage **Physical principles in food processing operations** - Thermal processing – Degree of processing or preservation, selecting heat treatments, heat resistance of micro-organisms, nature of heat transfer, protective effects of food constituents, types of thermal treatments. - Refrigeration – Refrigeration, cool storage and shelf life extension; cool storages with air circulation, humidity control and gas modification (i.e CA, MA & SA) - Freezing – Changes during freezing rate of freezing, choice for final temperature for frozen foods, freezing methods, freezing effects - Dehydration – Dehydration, water activity and food safety/Quality, methods of dehydration - Ionizing radiations – Forms of radiant energy, ionizing radiations, sources and properties, radiation units, radiation effects, limiting indirect effects, dose fixing factors, objectives in food irradiation, safety and quality of irradiated food, irradiation of various foods and comparison with other methods of preservation	10	21
II.	**Chemical principles in food processing** - Preservation/ processing by sugar, salt, curing, smoke, acid and chemicals. - Chemical changes in foods that effect texture, flavor, colour, nutritive value and safety during handling, storage and processing. - Chemical and biological reactions affecting food quality and safety	6	12
III.	**Cereals and Pulses** - Wheat Grain characteristics and products, wheat milling process, milling of durum or semolina, macaroni or pasta products, noodles, wheat starch, gluten fractionation,	6	12

	balking technology, production of read, biscuits and cakes. - Corn wet milling, zein separation, corn starch products - Barley malting, dry milling and air classification, wet fractionation of barley, pearling - Storage and quality of cereal grains - Rice processing, fractionation, quick-cooking rice, parboiled rice, rice based instant foods - Pulses-processing, elimination of toxic factors, quick-cooking dals, fermentation and germination.		
IV.	**Oilseeds** Oilseed pressing, solvent extraction, purification (degumming, refining, bleaching, deodorization), hydrogenation, plasticizing and tempering, products-butter, margarine, shortening, mayonnaise, salad dressing, inter-esterification and production of MCT.	4	9
V.	**Fruits and Vegetables** - Structure, composition, physiological and biochemical changes during ripening, handling and storage - Varietal, harvesting and pre-processing considerations for vegetables, post harvesting processing practices. Processing of vegetables, canning, freezing, dehydration, pickles and chutneys - Potato processing – Raw material handling and storage, raw material quality and suitability for chips, French fries, dehydrated granules and boiled/canned potatoes, processing for chips, French fries and dehydrated granules. - Fruit processing-Citrus juices, apple juices, slices and dehydrated products, grape juice and raisins. Canning, fruit-based beverages and concentrates, squashes, jams, jellies, ketchup's sauces, high sugar, high acid products.	6	12
VI.	**Milk and Milk Products** - Milk processing - Classification, separation and standardization, pasteurization, off-flavour removal, homogenization, packaging, UH sterile milk. - Milk products – Fortified milk, skim milk, concentrate milks, cream, butter, cheese, cultured milk products, dehydrated milk products, ice creams. Indigenous milk products: khoa, channa, paneer, curd, yoghurt, ghee, kulfi.	6	12

VII.	**Meat, Fish and Eggs** - Chemistry of processed meats, Ageing and tenderizing, curing, smoking and freezing of meat, fresh storage of meat - Fish preservation and processing - Meat and fish products: preservation by curing, smoking, salting and pickling and dehydration, comed beef, sausages, salami, bacon, luncheon meat. - Dehydrated egg powder and frozen egg, egg, storage - Sources of bone meal, gelatin, casing, plasma and blood, curing.	6	12
VIII.	**Spices**: Processing and extraction of essential oils and colours, stability, storage and preservation.	2	5
IX.	**Fermentation technology** - Fermentation technology, yeast, milk products, fermented vegetables, beer, vinegar, fermented soy products. - Enrichment and fortification technology, high protein food technology.	2	5

Practicals

Unit No.	Contents	No. of hrs	% Weightage
I	Preparation of Soups	6	9
II	Cereal and Millet Preparations	10	17
III	Pulse Preparations	6	9
IV	Vegetable preparations	4	6
V	Egg Cookery	6	9
VI	Meat preparations	6	9
VII	Preparation of Milk products	8	14
VIII	Preparation of Desserts	4	6
IX	Preparation of Beverages	4	6
X	Preparation of Chutneys	4	6
XI	Preparation of Fermented Products	6	9

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
HOSPITAL DIETETICS II- Theory
(CORE COURSE)

Course Code: CND 225
Credits: 4 (0T+4P)
PRACTICALS
Clinical Postings

Name of the Departments	**No. of Hrs**
General Medicine (Endocrinology, , Geriatric, Other Infectious cases)	32
Nephrology	16
Pediatric	16
Surgical	16
Oncology	16
Gastro-enterology	16
Pre-Natal and Post Natal	16

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
INTEGRATED NUTRITION THERAPY FOR DIABETES- Theory (DSEC)

Course Code: CND 226
Credits: 2 (2T+0P)

Unit No.	Contents	No. of Hrs	% Weightage
I.	A Nutritionist's perspective on Medical Nutrition Therapy for Diabetes	1	3
II.	Nutrition Therapy for Type 1 Diabetes	4	13.5
III.	Nutrition Therapy for Type 2 Diabetes	4	13.5
IV.	Weight loss treatments for Overweight individuals with diabetes	2	6
V.	Carbohydrates and Diabetes	2	6
VI.	Protein and Diabetes	1	3
VII.	Food fats and Dyslipidemia	1	3
VIII.	Sugar alternatives and fat replacers	1	3
IX.	Micronutrients and Diabetes	1	3
X.	Alcohol and Diabetes	1	3
XI.	Nutrition therapy for Children and Adolescents with diabetes	2	6
XII.	Nutrition therapy for Pregnancy and lactation	2	6
XIII.	Nutrition therapy for older adults with Diabetes	2	6
XIV.	Nutrition therapy for ethnic populations	1	3
XV.	Hypertension with Diabetes and MNT	1	3
XVI.	Nephropathy and MNT	1	3
XVII.	Diabetes Gastropathy and MNT	1	3
XVIII.	Nutrition sports and Diabetes	2	6
XIX.	Lifestyle and Prevention of Diabetes	1	3
XX.	Counselling and education strategies for improved adherence to Nutrition therapy	1	3

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
PSYCHOLOGY- Theory
(DSEC)

Course Code: CND 226
Credits: 2 (2T+0P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Introduction** Concept and definition of psychology: Perspectives on behavior. Major subfields of psychology; Psychology in modern India;Biological basis of human behavior	4	13
II	**Perception** Perceptual processing, Role of attention in perception, Perceptual organization.Perception of depth, distance and movement; Illusions.	10	31
III	**Learning** Classical conditioning, operant conditioning, observational learning; Learning strategies;Learning in a digital world	8	25
IV	**Memory** Models of memory: Levels of processing, Parallel Distributed Processing model. Information processing, Reconstructive nature of memory; Forgetting, ImprovingMemory	10	31

CLINICAL NUTRITION AND DIETETICS
II YEAR II SEMESTER
PERSONALITY DEVELOPMENT- Theory
(DSEC)

Course Code: CND 226

Credits: 2 (2T+0P)

Unit No.	Contents	No. of Hrs	% weightage
I.	**Introduction to Personality Development** Scope of the study of personality **Definitions of personality** **Theoretical perspectives on personality** **Psychodynamic perspective** - Id - Ego - Super Ego	2	6
II.	**Development of Personality: Psychodynamic perspective** Psycho sexual Stages - The oral stage-Birth to 18 months - The Anal stage (18 months to 3 years) - The phallic stage(3 – 5 years) - Latency period (5-12 years) - Genital stage (12 to 14 years) - Fixation The ego-defense mechanisms	2	6
III.	**Development of Personality- Trait Perspective** Trait - Meaning Type theories - Carl Jung's - William Sheldon's type theory - Endomorphy - Mesomorphy - Ectomorphy	2	6
IV.	**Development of Personality- Trait Perspectives** - Suinn's (1976) Typology - Prevalence - Trait theories - Allport's trait theory - Common traits - Unique traits	2	6
V.	**Development of Personality- Trait Perspective** - Eysenck's theory - Cattell's basic personality traits - Cattell's 16 personality traits - The big five factor theory - Agreeableness & Conscientiousness - Extroversion & Neuroticism	2	6

	- Openness to experience		
VI.	**Development of Personality- Behavioural Perspective** - Behavioural Perspectives on Personality - Radical behaviorism - Social learning theory- Albert Bandura (1977) - Self Efficacy theory - Cognitive social learning theory - Locus of control theory	2	6
VII.	**Development of Personality- Humanistic Perspective** - The Humanistic Perspective - Abraham Maslow's hierarchical theory of motivation - Some salient characteristics of self actualized individuals - Carl Roger's Self Concept theory	2	6
VIII.	**Development of Personality- Humanistic Perspective** - Humanistic perspective- Self perception Theories - The paradoxes of human beings(Concept) - Meaning of self - Definition of self - Difference in self presentation	2	6
IX.	**Development of Personality- Self Perspective** - Self-concept - Facets of self concept - Self esteem - Self attribution theory	1	3
X.	**Personality Structures - Berne** Personality Structures - The Child ego state - The Adult ego state - Parent ego state	1	3
XI.	**Gender Role Orientation and Personality** - Concept of Gender roles & stereotypes - Gender Role Orientation theory- Sandra Bem - Motivation - Intrinsic motivation and the 16 basic desires theory - Role of motivation in education	2	6
XII.	**Intelligence and Personality** **Intelligence** - Traditional views on Intelligence - Charles Spearman - L.L.Thurston (1938) - Guilford's model - Operations - Products - Categories	3	10

	- Cattel's description - Multiple intelligences		
XIII.	**Piaget's Theory of Intelligence and Personality** - Basic Concepts - Piaget stages Stages of intelligence/cognitive development - Vygotsky Theory of Intelligence	2	7
XIV.	**Emotional Intelligence and Personality** - Emotional Intelligence - Concept - Emotional Intelligence- Definition - Emotional brain - Domains of emotional Intelligence - Knowing ones emotions - Managing emotions - Motivating oneself - Recognizing emotions in others - Handling relationships - Emotional competence - Significance of Emotional Intelligence	3	10
XV.	**Factors Affecting Personality** Determinants for Personality - Heredity - Family factors - Intelligence - Health and physical states - Neighborhood - Culture	2	6
XVI.	**Measurements of Personality** - Personality Tests - Personality inventories - Projective Tests - Rorschach ink blot Test - Thematic Apperception Test (TAT) - Self-Reports - Observation method - Personality disorders	2	7

CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
MEDICAL NUTRITION MANAGEMENT III- Theory
(CORE COURSE)

Course Code: CND 311
Credits: 4 (3T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I.	**MEDICAL NUTRITION MANAGEMENT IN NEUROLOGICAL AND PSYCHIATRC DISORDERS** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction **Neurological Disorders** - Alzheimer's Disease and Dementias - Amyotrophic Lateral Sclerosis - Brain Trauma - Cerebral Aneurysm - Coma or Persistent Vegetative State - Epilepsy and Seizure Disorders - Guillain-Barré Syndrome - Huntington's Disease - Migraine Headache - Multiple Sclerosis - Myasthenia Gravis and Neuromuscular Junction - Disorders - Parkinson's Disease - Spinal Cord Injury - Stroke (Cerebrovascular Accident) - Tardive Dyskinesia - Trigeminal Neuralgia **Psychiatric Disorders-Eating Disorders** - Anorexia Nervosa - Binge Eating Disorder - Bulimia Nervosa **Neuro-psychiatric Disorders-Other** - Bipolar Disorder - Depression - Schizophrenia - Sleep and Circadian Rhythm Disorders - Substance Use Disorders and Addiction	10	21
II.	**MEDICAL NUTRITION MANAGEMENT IN CANCER AND HIV/AIDS** **CANCER** Etiology, Pathophysiology, Symptoms, MNT, Food and Drug Interaction - Cancer - carcinogenesis - Role of nutrients, foodstuffs and food additives incancer.	10	21

	- Types - Symptoms - Cancer therapies and treatment - side effects and nutritional implications - Dietary management **HIV/AIDS** - Pathophysiology, Etiology - Stages of HIV Infection - Medical Management - Opportunistic Infections, Complications, and Malnutrition - Relationship Between Malnutrition and Aids - Medical Nutrition Therapy		
III.	**MEDICAL NUTRITION MANAGEMENT IN GENETICALLY METABOLIC DISORDERS** - Newborn Screening - General Goals of Medical Nutrition Therapy - Disorders of Amino Acid Metabolism - Disorders of Organic Acid Metabolism - Disorders of Urea Cycle Metabolism I - Disorders of Carbohydrate Metabolism - Disorders of Fatty Acid Oxidation - Other Disorders - Role of Nutritionist in Medical Nutrition Therapy forGenetic Metabolic Disorders	10	21
IV.	**MEDICAL NUTRITION MANAGEMENT IN DEVELOPMENTAL DISABLILITIES** - Defining Developmental Disabilities - Etiology and Incidence - Principles of Nutrition Care - Chromosomal Aberrations - Neurologic Disorders - Nutrition Therapy	9	18
V.	**MEDICAL NUTRITION MANAGEMENT FOR FOOD ALLERGY AND FOOD INTOLERANCES** - Immunologic Basis - Symptoms - - Risk Factors for the Development of Food Allergy - Food Intolerances - Diagnosis - Treatment - Natural History of Food Allergy - Food Allergy in infancy - Diet and Prevention of Allergic Disease	9	19

Practicals

Unit No.	Contents	No of hrs	% weightage
I.	Planning, formulating and preparation of therapeutic diet for - Parkinson's Disease Counsel patients with Psychiatric Disorders-Eating Disorders - Anorexia Nervosa - Binge Eating Disorder - Bulimia Nervosa	8	24
II.	Planning, formulating and preparation of therapeutic diet for Cancer Patients Dietary management for the side effects of Cancer therapies and treatment Planning, formulating and preparation of therapeutic diet for individuals with HIV/AIDS	12	38
III.	Planning, formulating and preparation of therapeutic diet forFood Allergy - Gluten - Lactose - Soy - Rice - Others	12	38

CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
NUTRITION AND FITNESS- Theory
(CORE COURSE)

Course Code: CND 312 Credits: 4 (2T+2P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Definitions, components of physical fitness and health status.** - Holistic approach to the management of fitness and health: Energy input and output. Diet and Exercise. Effect of specific nutrients on work performance and physical fitness. - Nutrition, exercise, physical fitness and health inter-relationship	3	9
II	**Review of different energy systems for endurance and power activity** - Fuels and Nutrients to support physical activity - Shifts in Carbohydrate and Fat metabolism - Mobilization of fat stores during exercise	6	20
III	**Nutrition in Sports** - Sports specific requirement, Diet Manipulation - Pre-game and post game meals - Assessment of different ergogenic aids and commercial supplements - Diets for persons with high energy requirements, stress, fractures and injury	4	12
IV	**Water and electrolyte balance:** - Losses and their replenishment during exercise and sports event. - Effect of Dehydration, - Stages of Dehydration - Sports drinks	4	12
V	**Significance of physical fitness and nutrition in the prevention and management of weight control, obesity, DM, CV Disorders, bone health and cancer Defining nutrition goals/ guidelines appropriate to health, fitness and prevention and management of the above chronic degenerative disorders**	6	20
VI	**Nutritional and exercise regimes for management of obesity** - Critical review of various dietary regimes for weight and fat reduction - Prevention of weight cycling	3	9
VII	**Nutrition and exercise regimes for pre and post natal fitness**	3	9
VIII	**Alternative systems for health and fitness like Ayurveda, yoga, meditation, vegetarianism and traditional diets**	3	9

Practicals

Unit No.	Contents	No of Hrs	% Weightage
I	Assessment of Nutritional status including body composition	20	31
II	Physiological parameters likeheart rate and blood pressure	8	12
III	Assessment of Coronary risk profile – RISKO factor	12	19
IV	Assessment of bone health	6	9
V	Planning diets and formulating dietary guidelines for: - Fitness and health - Prevention of chronic degenerative disorders - Obesity Management - Management of DM and CVD	15	24
VI	Review of existing alternative diet related systems for physical fitness and health	3	5

CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
NUTRITION THROUGH LIFE SPAN III - Theory
(CORE COURSE)

Course Code: CND 313
Credits: 4 (3T+1P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Adolescent Nutrition** **Introduction** **Nutritional Needs in a Time of Change** **Normal Physical Growth and Development:** Changes in Weight, Body Composition, and Skeletal Mass **Normal Psychosocial Development** **Health and Eating-Related Behaviors During Adolescence** - Vegetarian Diets - Dietary Intake and Adequacy Among Adolescents **Energy and Nutrient Requirements of Adolescents** - Energy - Protein - Carbohydrates - Dietary Fiber - Fat - Calcium - Iron - Vitamin D - Folate - Vitamin C **Nutrition Screening, Assessment, and Intervention** Nutrition Education and Counseling **Physical Activity and Sports** Factors Affecting Physical Activity **Promoting Healthy Eating and Physical Activity Behaviors** - Effective Nutrition Messages for Youth - Parent Involvement - School Programs - Community Involvement in Nutritionally SupportiveEnvironments	8	17
II	**Adolescent Nutrition : Conditions and Interventions** **Introduction** **Overweight and Obesity** - Health Implications of Adolescent Overweight and Obesity - Assessment and Treatment of Adolescent Overweightand Obesity **Supplement Use** - Vitamin–Mineral Supplements - Ergogenic Supplements Used by Teens **Nutrition for Adolescent Athletes**	8	17

	- Fluids and Hydration - Special Dietary Practices **Substance Use** **Iron-Deficiency Anemia** **Cardiovascular Disease** - Hypertension - Hyperlipidemia **Dieting, Disordered Eating, and Eating Disorders** - The Continuum of Eating Concerns and Disorders - Dieting Behaviors - Body Dissatisfaction - Disordered Eating Behaviors - Eating Disorders - Anorexia Nervosa - Bulimia Nervosa - Binge-Eating Disorder - Etiology of Eating Disorders - Treating Eating Disorders - Preventing Eating Disorders - Children and Adolescents with Chronic Health - Conditions		
III	**Adult Nutrition** **Introduction** Importance of Nutrition **Health Objectives for the Nation** **Physiological Changes During Adulthood** - Body Composition Changes in Adults - Estimating Energy Needs in Adults - Energy Adjustments for Weight Change - Age-Related Changes in Energy Expenditure - Fad Diets - Continuum of Nutritional Health - States of Nutritional Health - Health Disparities Among Groups of Adults **Dietary Recommendations for Adults** - Dietary Guidelines for Americans - Vegetarian Diets - Beverage Intake Recommendations - Alcoholic Beverages - Water Intake Recommendations - Effects of Caffeine Intake on Water Need - Dietary Supplements and Functional Foods **Nutrient Recommendations** Risk Nutrients **Physical Activity Recommendations** - Physical Activity, Body Composition, and Metabolic - Function - Physical Activity Types and Settings - Physical Activity and Lifestyle - Diet and Physical Activity **Nutrition Intervention for Risk Reduction** - The Eating Competence Model	8	16

	- A Model Health-Promotion Program - Public Food and Nutrition Programs		
IV	**Adult Nutrition : Conditions and Interventions** **Introduction** **Overweight and Obesity** - Effects of Obesity - Etiology of Obesity - Screening and Assessment - Recommendation for Weight-Management Therapy - Nutrition Assessment - Nutrition Interventions for Weight Management - Weight Loss **Medical Nutrition Therapy for Weight Management** - Cognitive Behavioral Therapy for WeightManagement - Physical Activity for Weight Management - The Challenge of Weight Maintenance - Pharmacotherapy for Weight Loss - Surgery **Cardiovascular Disease** - Prevalence of CVD - Etiology of Atherosclerosis - Physiological Effects of Atherosclerosis - Risk Factors for CVD - Screening and Assessment of CVD - Nutrition Interventions for CVD - Primary Prevention - Medical Nutrition Therapy for CVD - Pharmacotherapy of CVD **Metabolic Syndrome** - Introduction - Prevalence of Metabolic Syndrome - Etiology of Metabolic Syndrome - Effects of Metabolic Syndrome - Nutrition Interventions for Metabolic Syndrome **Diabetes Mellitus** - Prevalence of Diabetes - Disparities in the Prevalence of Diabetes - Etiology of Diabetes - Physiological Effects of Diabetes - Prevention of Diabetes Complications - Screening and Assessment - Nutrition Assessment - Interventions for Diabetes - Medical Nutrition Therapy for Diabetes - ADA Exchange Lists - Carbohydrate Counting - Self-Monitored Blood Glucose - Physical Activity in Diabetes Management - Pharmacological Therapy of Type Diabetes **Cancer** - Prevalence of Cancer - Physiological Effects of Cancer	8	17

	- Etiology of Cancer - Risk Factors for Cancer - Screening and Assessment - Nutrition Interventions for Cancer - Alternative Medicine and Cancer Treatment **HIV Disease** - Prevalence of HIV - Physiological Effects of HIV - Etiology of HIV - Assessment - Nutrition Interventions for HIV		
V	**Nutrition and OlderAdults** **Introduction** What Counts as Old Depends On Who Is Counting Food Matters: Nutrition Contributes to a Long and Healthy Life **A Picture of the Aging Population: Vital Statistics** - Global Population Trends: Life Expectancy and Life Span - Nutrition: A Component of Health Objectives for the Older Adult Population **Theories of Aging** - Programmed Aging - Wear-and-Tear Theories of Aging - Calorie Restriction to Increase Longevity **Physiological Changes** - Body-Composition Changes - Changing Sensual Awareness: Taste and Smell, Chewing andSwallowing, Appetite and Thirst **Nutritional Risk Factors** **Dietary Recommendations: Pyramids for Older Adults** **Nutrient Recommendations** - Estimating Energy Needs - Nutrient Recommendations for Older Adults: Energy - Sources - Recommendations for Fluid - Age-Associated Changes: Nutrients of Concern - Nutrient Supplements: When, Why, Who, What, and HowMuch? - Dietary Supplements, Functional Foods, Nutraceuticals, andOlder Adults - Nutrient Recommendations: Using the Food Label - Cross-Cultural Considerations in Making Dietary - Recommendations **Food Safety Recommendations** **Physical Activity Recommendations** Exercise Guidelines **Nutrition Policy and Intervention for Risk Reduction** Nutrition Education **Community Food and Nutrition Programs** - Nutrition Programs Serving Older Adults	8	16

	- Store-to-Door: A Nongovernmental Service that Supports - Aging in Place - Senior Nutrition Program: Promoting Socialization andImproved Nutrition - The Promise of Prevention: Health Promotion		
VI	**Nutrition and Older Adults: Conditions and Interventions** **Introduction: The Importance of Nutrition** **Nutrition and Health** **Heart Disease:** Coronary Heart Disease, Cerebrovascular Disease, Peripheral Artery Disease - Prevalence - Risk Factors - Nutritional Remedies for Cardiovascular - Diseases **Stroke** - Definition - Prevalence - Etiology - Effects of Stroke - Risk Factors - Nutritional Remedies **Hypertension** - Definition - Prevalence - Etiology - Effects of Hypertension - Risk Factors - Nutritional Remedies **Diabetes** - Special Concerns for Older Adults - Effects of Diabetes - Nutritional Interventions **Obesity** - Definition - Prevalence - Etiology, Effects, and Risk Factors ofObesity - Nutritional Remedies **Osteoporosis** - Definition - Prevalence - Etiology - Effects of Osteoporosis - Risk Factors - Nutritional Remedies - Other Issues Impacting Nutritional Remedies **Oral Health** **Gastrointestinal Diseases** - Gastroesophageal Reflux Disease (GERD) - Stomach Conditions Affect Nutrient Availability: Vitamin BMalabsorption - Constipation	8	17

	Inflammatory Diseases: Osteoarthritis - Definition - Etiology - Effects of Osteoarthritis - Risk Factors - Nutritional Remedies **Cognitive Disorders: Alzheimer's Disease** - Definition - Prevalence of Dementia - Etiology of Cognitive Disorders - Effects of Cognitive Disorders - Nutrition Interventions for Cognitive Disorders **Medications and Polypharmacy** **Low Body Weight/Underweight** - Definition - Etiology - Nutrition Interventions **Dehydration** - Definition - Etiology - Effects of Dehydration - Nutritional Interventions - Rehydrate Slowly - Dehydration at End of Life **Bereavement**		

Practicals
CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
DIETARY COUNSELLING - Theory
(SEC)

Course Code: CND 314
Credits: 3 (1T+2P)

Unit No.	Contents	No of hrs	% Weightage
I	Dietitians as part of the medical team and outreach services	4	25
II	Medical history assessment- techniques of obtaining relevant information for patient profiles	2	12.5
III	Dietary diagnosis and tests for nutritional status – Correlating clinical and dietary information	2	12.5
IV	Patient education and counselling- Assessment of patient needs, establishing rapport, counselling relationship, resources and aids to counselling	4	25
V	Aesthetic attributes of diets	2	12.5
VI	Follow up visits and patients education	2	12.5

Practicals

Unit No.	Contents	No of hrs	% Weightage
I	**Appraisal of routine hospital diets and dietary units (Survey and discussion)** Organizational structure and staffing pattern, number of patients, departments and types of diets, cost and nutritional adequacy, time schedule, service protocol, equipment.	8	25
II	**Case studies and counselling for special diets and feeding methods**: Dialysis patients, Renal Transplant patients, tube feeds, jejunostomy, burns, TPN, Post surgical, Cardiac bypass surgery, Hypertension, CHD, Post heart attack, liver cirrhosis	8	25
III	**Children's diet-management of sick child-case studies, juvenile –** Diabetes, children with special needs, Cleft palate. Integrating special and specific needs of a sick child with management of routine hospital diets	8	25
IV	**Metabolic disorders including inborn errors of metabolism, Type 1 and Type 2 Diabetes mellitus**	8	25

CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
NUTRITION AND IMMUNITY - Theory
(CORE COURSE)

Course Code: CND 315
Credits: 4 (4T+0P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Immunity** - The functioning of the immune system - Major cells of the immune system - The immune system of the gut - The development of the immune system	6	9
II	**Evaluation of the Immune Function in the Nutritionally At-Risk Patient** - Introduction - Nutrients and Immunity in Specific Conditions - Clinical Evaluation of the Patient with Suspected Immunodeficiency - The Tier System	6	9
III	**Under Nutrition and Immunity** - Introduction - Nature of Severe Undernutrition - Reductive Adaptation - Effect of Undernutrition on the Immune Response - Effect of Acute Phase Response on Nutrition - Nature of the Problem to be Managed in Treating a Child With Severe - Undernutrition and Infection	10	16
IV	**Role of nutrients in immunity** - Carbohydrates and immune system. - Fat and immune system- factors affecting acquired immunity. - Protein and immune functions- effect of arginine, glutamine and Sulphur amino acids. Glutathione and immune system. - Effect of malnutrition on immunity.	10	16
V	**Role of vitamins in immune functions-effect of deficiency.** **Role of minerals-effect of deficiency and excess on immune cell functions**	4	7
VI	**Prebiotics, Probiotics, Dietary fiber and Immunity, Antioxidants – their effect on immune function. Immunity against infection – role of immunization**	6	9
VII	**Allergies and Immunity** - Introduction - Foods That Cause Allergies - The Diagnosis and Treatment of Food Allergies - The Effects of Foods on Allergies and Asthma	4	7
VIII	**Acute Respiratory Infections**	6	9

	- Introduction - Anatomical Classification and Pathology - WHO Clinical Classification - Etiologic Agents of Respiratory Disease - Respiratory Defenses Against Bacterial Invasion of the Lungs - Risk factors - Nutrition - Indoor Air Pollution		
IX	**Diarrhea and Immunity** - Introduction - Diarrhea and Gastrointestinal Infections - Immune Response to Persistent Diarrhea - Expanding the Undernutrition-Diarrhea Interaction Paradigm - Nutrition Interventions As an Adjuvant to Diarrhea Prevention and Treatment - The Nine Pillars of Good Treatment of Acute Gastroenteritis	6	9
X	**HIV and Immunity** - Introduction - Causes of Undernutrition in HIV-Infected Individuals - Macronutrients - Micronutrients - Nutrition and HIV Disease Progression Among Children - Nutrition and HIV Transmission	6	9

CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
BAKERY SCIENCE - Theory
(DSEC)

Course Code: CND 316
Credits: 2 (1T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I	Introduction to bakery and confectionary – Aims and objectives, historical perspective.	2	6
II	Wheat Flour and its role in bakery and confectionery products: Wheat – type, grading, varieties, structure, composition, principles of flour milling and classification Flour- Types of flour (bakers, biscuits, cake, pastry, self mixing flours, whole wheat flour) Role of constituents in baking	6	19
III	Other ingredients and their function in baking Yeast – Types. Function, uses, effects of over and under fermentation	4	12
IV	Eggs-composition, function in bakery and confectionery	4	12
V	Sugar- Types, different forms, uses	3	8
VI	Fats- Composition, classification, function, effect of cooking	3	8
VII	Milk products, emulsifiers, dried fruits, enzymes, cream, other leavening agents	3	8
VIII	Variety of baked products: bread, biscuit, cake, cookies, pastries	3	8
IX	Baking process- Basic concepts, batch/continuous, dough mixing, dividing, moulding, panning, proofing, baking	6	19

Practicals

Unit No.	Contents	No of hrs	% Weightage
I	Preparation of cakes – plain cake, sponge cake, cup cake – quality characteristics	15	47
II	Preparation of biscuits – Salt biscuits, sweet biscuits, coconut biscuits.	15	47
III	Shelf life of bakery products	2	6

CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
COMMUNICATION AND EXTENSION - Theory
(DSEC)

Course Code: CND 316

Credits: 2 (1T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Communication: Concepts** - Historical background, concept and nature - Functions of Communication - Types of Communication - communication transactions; Formal and informal communication; Verbal and Non-verbal Communication - Scope of Communication- Education, training and learning industry, Motivation and Management, Corporate Communication, Management of Organizations, Advertising and Public relations - Communication and mainstream media- newspaper, radio, television and Cinema, ICTs and web based communication - Communication for social change	10	31
II	**Understanding Human Communication** - Culture and communication- Signs, symbols and codes in communication - Postulates/Principles of Communication - Elements of Communication and their characteristics - Models of Communication - Barriers to Communication	8	25
III	**Communicating Effectively** Concept, nature and relevance to communication process: - Empathy - Persuasion - Perception - Listening	6	19
IV	**Communication for Extension** - Concept, nature and philosophy of Extension - Principles of Extension - Methods and Media of community outreach; Audio-Visual aids- concept, classification, characteristics and scope. - Relationship between, Communication, Extension and Development	8	25

PRACTICALS

Practicals

1. Developing skills in planning and conducting small group communication.
2. Review of media on selected issues
3. Design and use of graphic media – Audio Visual Aids

CLINICAL NUTRITION AND DIETETICS
III YEAR I SEMESTER
SOCIO-ECONOMIC ANALYSIS OF COMMUNITIES - Theory (DSEC)

Course Code: CND 316
Credits: 2 (1T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Introduction to social structures and systems – framework for analysis** - Meaning and systems of organisation - Relationship between Social systems - Types of society – Harmonic and Disharmonic	5	17
II	**Analysis of Family as a Social unit** - Type(s), average size (Micro/macro), marriage patterns, distinct social roles and nature of relationships between members of the family; - Internal distinction in authority based on age and sex roles, - Gender differences with reference to activities and access to resources. - Emerging patterns of familial organization influenced by broader economic and political forces – female headed households.	6	18
III	**Economy Analysis** - Resources available (land, water, assets etc) - Income distribution pattern, income disparities (growing or reducing) among class groups and within each class. - The type of economy – subsistence or market surplus according to classes.	6	18
IV	**Poverty Analysis** - The number and proportion of poor, prevalence of hunger and malnutrition, - Availability and Accessibility to drinking water and sanitation facilities, health facilities, clothing and housing facilities, education facilities. - Unemployment pattern and indebtedness; - Cause of poverty and inequalities; - Programs for poverty alleviation - Poverty line	6	18
V	**Gender Analysis** - The concept of Gender as distinct from sex - The division of labour - Access and control of resource - Changes in the means of gaining access to resources	4	12
VI	**Approaches and Methods of Socio-Economic Analysis**	5	17

	- Rapid Rural Appraisal - Participatory Rural Appraisal - Surveys, Case studies, observation - Participant Observations		

Practicals

Field experience in Village (s)/ Urban slums

a. Practical use of RRA, PRA methods
b. Reporting on Socio-economic analysis of the rural/ urban community

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
IMPROVING HEALTH AND NUTRITION: IEC APPROACHES
Theory
(CORE COURSE)

Course Code: CND 321
Credits: 4 (2T+2P)
Total hrs/ week: 2 hrs
Total hrs/ semester: 32 hrs

COURSE DESCRIPTION

This course provides the basic knowledge and skills necessary to understand the concept, approaches, models and theoriesof communication. It familiarizes students with the IEC approaches to successfully improve health and nutritional status of community.

OBJECTIVES

This course will enable students to

- ✓ Develop understanding regarding the vital aspects of communication and various audio-visual media/ mass media and their use in Nutrition and Health education
- ✓ Be familiar with important IEC programmes
- ✓ Develop skills to plan and use IEC

Unit No.	Contents	No of hrs	% Weightage
I	**Concept of Communication** - Concept of communication and mass communication - Scope of communication - Elements of communication - Models of communication - Communication process - Approaches to communication - Barriers to communication - Communication for Extension education and development	8	25
II	**Introduction to IEC (Information, Education and Communication**) Aims and Objectives , Importance of IEC, relevance to programmes	2	7
III	**IEC for behavioral changes** Behavior and determinants of behavior Need for IEC	1	3
IV	**Different media, their characteristics and use** - Audio-visual aids (graphics aids, puppets, and three dimensional aids, display boards and projected and non-projected aids) **Mass media:** - Print - Radio/recording - Films	4	12

	- Television/ video - Advertising - Journalism		
V	**Methods, techniques and tools** Planning effective IEC Programmes Broad based strategy and for specific objectives Identification of key messages for re-inforcement, preparation of IEC material. Refining of IEC messages Social mobilization, social marketing and role of community. Training to use IEC	4	12
VI	**Implementation – Use of IEC, training supportive supervision and monitoring**	2	7
VII	**IECfor different target groups:** - Policy makers - Managerial level and middle level officials from govt. donor agencies and NGOs - Grass-root functionaries - Community	4	12
VIII	**Impact Assessment**	1	3
IX	**Case studies of various IEC Programmes**	2	7
X	**Specific National programmes and IEC – Influence at mass level**	4	12

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5. Ray GL. 1991. Extension and Communication and Management. NayaPrakashan
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8. Kemp JE. 1975. Planning and Producing Audio Visual Material. 3rd Ed. Thomas Y. Growell
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CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
IMPROVING HEALTHAND NUTRITION: IEC APPROACHES
Practicals

Course Code: CND 321
Credits: 2P
Total hrs/ week: 4 hrs
Total hrs/ semester: 64 hrs

OBJECTIVES

This course will enable students to

- ✓ Develop various audio-visual media/ mass media and their use in Nutrition and Health education
- ✓ Develop skills to plan and use IEC

Practicals to be conducted through:

- Field work
- Placements and
- Project work

1. **Field work:** Study of existing IEC approaches and materials in various programmes at micro and macro levels – Appraisal of techniques, tools, messages, coverage and Outreach, costs and impact
2. **Planning and implementation of a project:** Identification of a problem/area for IEC. Preparation of suitable IEC material for one-to one, group and mass communication including Implementation, monitoring and evaluation.

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
FOOD PRESERVATION - Theory
(CORE COURSE)

Course Code: CND 321
Credits: 3 (2T+1P)
Total hrs/ week: 2 hrs
Total hrs/ semester: 32 hrs

COURSE DESCRIPTION

This course enables students to acquire extensive, in-person training in the latest technology and information available in the field of home food preservation

OBJECTIVES

- ✓ To study the importance microorganisms in food preservation
- ✓ To introduce the basics of various food processing and preservation technologies
- ✓ To impart basic knowledge of Cold Preservation and freezer, Dehydration, Irradiation, Food Packaging, Thermal Processing

Unit No.	Contents	No. of Hrs	% Weightage
I	**Classification of food in relation to shelf life**- Spoilage in food and its control: spoilage caused by microorganism (bacteria, fungi and virus), enzymes, pets and rodents.	7	22
II	**Heat processing** : Mechanism of action, methods of application to foods (Equipments), effect on food and micro-organisms a. sterilization, b. pasteurization, c. blanching, d. canning.	6	19
III	**Cold preservation** : Mechanism of action, methods of application to foods (Equipments), effect on food and micro-organisms a. refrigeration, b. freezing, c. freeze drying, d. refrigerated gas storage	7	22
IV	A. **Food irradiation**: technology, application and safety assessments, effects on food and microorganisms B. Chemicals in food preservation, safety of preserved foods.	6	18
V	**Food Preservation by Moisture control** **Drying and Dehydration -** Definition, drying as a	6	19

	means of preservation, methods of drying, types of dryers, 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, **Concentration** **Evaporation –** Definition, factors affecting evaporation, names of evaporators used in food industry.		

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8. Paul P.C. and Palmer H.H. (1972), Food Theory and Applications, John wiley and Sons, New York.

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
FOOD PRESERVATION – Practicals

Course Code: CND 322 (P)
Credits: 1P
Total hrs/ week: 2 hrs
Total hrs/ semester: 32 hrs

OBJECTIVES

- ✓ To learn about the tradition of canning and preserving.
- ✓ To know the various methods of canning and preserving (such as freezing, canning, drying, smoking, etc.), water bath and pressure canning, tools of the trade.
- ✓ To learn to prepare jams and jellies, and beverages

Unit No.	Contents	No. of Hrs	% Weightage
I	Food preservation techniques (use of different techniques in product formulation and analysis of product for quality standards). Sun drying and dehydration-cereals, legumes, vegetable based.	2	7
II	Preservation with sugar-jams, jelly, preserves, etc.	10	31
III	Preservation - salt, oil, vinegar-pickling.	10	31
IV	Preservation of foods using chemicals –tomato ketchup, squash.	10	31

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
PUBLIC HEALTH NUTRITION Theory
(CORE COURSE)

Course Code: CND 323
Credits: 3 (2T+1P)
No. hours/ week: 2 hrs
No. of hours per semester: 32 hrs

COURSE DESCRIPTION

This course combines principles and practices from nutrition and social and behavioral science to develop, implement and evaluation of programs and policies that promote optimal nutrition and population health and well-being. This course deals with quantitative and qualitative methods, program development and evaluation, health disparities, health behavior change and health policy.

OBJECTVES

This course will enable the students to:

- ✓ Develop a holistic knowledge base and understanding of the nature of important nutrition problems and their prevention and control for the disadvantaged and upper socio-economic strata in society
- ✓ Understand the causes/ determinants and consequences of nutrition problems in society
- ✓ Be familiar with various approaches to nutrition and health interventions, programmes and policies

Unit No.	Contents	No of Hrs	% Weightage
I	**Concept of public nutrition** – relationship between health and nutrition. Role of public nutritionists in health care delivery Sectors and Public Policies relevant to nutrition	2	6
II	**Primary Health Care of the community** National health care delivery system Determinants of health status Indicators of health	4	13
III	**Population Dynamics** Demographic transition, population structure, fertility behavior, population policy, fertility, nutrition and quality of life inter relationship	2	6
IV	**Food and Nutrition security** Food production, access, Distribution availability, losses, consumption, food security. Socio-cultural aspects and dietary patterns: their implications for nutrition and health	4	13
V	**Nutritional Status** Determinants of nutritional status of individual and populations : Nutrition and Non-Nutritional indicators: socio-cultural, biologic, environmental and economic	4	13
VI	**Major Nutritional problems:**	6	19

	Etiology, prevalence, clinical manifestations, preventive and therapeutic measures of: - Macro and micro-nutrient deficiencies - Other nutritional problems like lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis - Overweight, obesity and chronic degenerative diseases		
VII	**National food and nutrition policy, plan of Action and programme**	1	3
VIII	**Approaches and strategies for improving nutritional status and health** Programmatic options: their advantages and demerits. Feasibility, political support, available resources (human, financial and infrastructural) Case studies of selected strategies and programmes: their rationale and context, how to select interventions from a range of possible options: Health based interventions, food based interventions, including fortifications and genetic improvement of foods, supplementary feeding, nutrition education for behavioral change	3	9
IX	**Policy analysis and operational research**	2	6
X	**Programme design, planning, implementation, operation, monitoring, surveillance and evaluation**	2	6
XI	**Health economics and economics of malnutrition – Its impact on productivity and national development. Cost benefit, Cost effectiveness and cost efficiency**	2	6

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CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
PUBLIC HEALTH NUTRITION – Practicals

Course Code: CND 323 (P)
Credits: 1P
Total hrs/ week: 2 hrs
Total hrs/ semester: 32 hrs

OBJECTIVES

- ✓ To enable students to understand rural setup, nutritional problems in rural areas, plan and implement nutritional intervention programs

Unit No.	Contents	No of Hrs	% Weightage
I	Comparison of rural, urban and tribal communities for: (A) determinants of malnutrition (B) socio-economic groups (C) the types of nutritional problems in different segments and age groups through analysis of secondary data	10	31
II	Critical appraisal of existing interventions and programmes in the voluntary sector and government and suggestions to improve the same vis-à-vis target groups in society and specific needs	6	19
III	Development of a plan for a nutrition intervention project in the community (The target group (S) need to be specified) Development of low cost nutritive recipes suitable for vulnerable groups	8	25
IV	Field experience in operational public nutrition programmes: nutrition rehabilitation centres, fortification programmes, cost analysis.	8	25

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
INSTITUITIONAL FOOD ADMINISTRATION- Theory
(SEC)

Course Code: CND 324
Credits: 4 (3T+1P)
No. hours/ week: 3 hrs
No. of hours per semester: 48 hrs

COURSE DESCRIPTION

This course deals with the logistics of successfully managing the food production and service in Food service Institutions. This course deals with the menu concepts, food and beverage cost and budget, supply purchasing and storage, food service and site mapping.

OBJECTIVES

- ✓ To develop a knowledge base in key areas of institutional food administration
- ✓ To provide practical field level experience in Institutional Food Administration
- ✓ To impart necessary expertise to function as a food service manager
- ✓ To equip individual to start their own food service unit leading to entrepreneurship
- ✓ To develop critical abilities and provide basic grounding in research techniques

Unit No.	Contents	No of Hrs	% Weightage
I	**Introduction to Food Service Systems** - Evolution of the food service industry - Characteristics of the various types of food service units	4	8
II	**Approaches to Management** - Theories of management - Aspects of management - Styles of management - Management tools	6	13
III	**Strategies in planning** - Conceptual strategy - Marketing Strategy - Financial strategy - Types of plans	8	16
IV	**Management of Resources** **Finance** - Determining the finance needed to establish or run a unit - Budgets - Sources of Finance - Planning adequate Cash flow **Space and Equipment** - Steps in planning layouts - Determining equipment - Selection and placement - Maintenance of equipment	12	25

	- Layout Analysis **Material** - Menu planning - Planning in the material needed - Methods of selection - Storage - Quantity food production - Service and modes of delivery **Staff** - Manpower planning - Manpower placement - Recruitment, induction, training, motivation and performance appraisal **Time and Energy:** Measures for utilization and conservation		
V	**Techno-economic feasibility of food production/ service enterprise**	1	2
VI	**Cost accounting/ analysis** - Food cost analysis - Record to be maintained - Reports and trend analysis	6	13
VII	**Marketing and sales management** - Marketing strategies - Sales analysis - Market promotion	6	13
VIII	**Quality assurance** - Food quality - Total quality management	4	8
IX	**Computer aided record maintenance and management**	1	2

References

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CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
INSTITUTIONAL FOOD ADMINISTRATION – Practicals

Course Code: CND 324 (P)
Credits: 1P
Total hrs/ week: 2 hrs
Total hrs/ semester: 32 hrs

OBJECTIVES

- ✓ To enable students to assume positions of responsibility in any aspect of the food service management field.
- ✓ To understand principles of administration, theories of interpersonal relations, human resources management, and communications.

Unit No.	Contents	No. of Hrs	% Weightage
I	**Market survey and analysis of processed and finished products**	4	13
II	**Evaluation of Food Service units- 2, Conventional, commissary**	4	13
III	**Market survey of Food service equipment**	4	13
IV	**Layout analysis of Kitchens – 2**	2	6
V	**Planning menus for quantity food production** - Banquets - Outdoor catering - Packed meals - Restaurant	6	18
VI	**Standardizing recipes for quantity – 50,100,250,500**	6	18
VII	**Cost Analysis of menus in** - College canteen - Hostel mess - Hospitals (private, charitable, government)	4	13
VIII	**Analysis of Food Safety and Hygiene**	2	6

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
PROJECT CUM INTERNSHIP- Theory
(SEC)

Course Code: CND 325
Credits: 4 (1T+3P)
No. hours/ week: 1 hr
No. of hours per semester: 16 hrs

OBJECTIVES

This course will enable the student to -

- ✓ Make use of all the knowledge and skills acquired during the entire course in the practical applications of dietetics.
- ✓ Undertake situational analysis of nutrition and health problems of the patients.
- ✓ Devise ways and means to bring about possible improvements in the existing system.

Unit No.	Contents	No of Hrs	% Weightage
I	Meaning of scientific research and its methods. Formulation of project design.	3	19
II	Types of project design – exploratory, descriptive, experimental, cross sectional or longitudinal	3	19
III	Methods – survey, case study, anthropological or experimental.	3	19
IV	Tools and techniques – observation, interviewing, questionnaire schedules or rating scales.	4	25
V	Tabulation and Interpretations – Elementary Statistical procedures. Tabular and graphic representation of data and its interpretations.	3	18

INTERNSHIP

OBJECTIVES:

To enable students to

- ✓ Assess nutritional status and dietary pattern of patients
- ✓ Plan and prepare therapeutic diets
- ✓ Develop skills in feeding patients and supervise food services.
- ✓ Develop skills in diet counselling.
- ✓ Take up dietetics as a profession.

Internship - aspects to be covered.

Unit-1 Placement in hospital dietary department and diet clinics to gain knowledge to

a. Establish rapport with patients – assess the nutritional status and diet history of patients
b. Plan diet sheets after careful study of the patients' case sheets- prepare and provide guidance in the production of therapeutic diets
c. Supervise preparation of diets – assist and guide in tray setting with special emphasis on portion control and therapeutic modifications.
d. Supervise delivery of trays to the patients
e. Get feedback from patients regarding the diets.
f. Discuss/ consult with doctors for modifications.
g. Undertake case study at hospital situations
h. Updating knowledge of presentations and participation through seminars and projects
i. Gain experience in the administrative setup of a dietary department

Unit 2: Project formulation – setting the objectives, steps in execution.

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
ELEMENTARY STATISTICS - Theory
(RESEARCH COURSES)

Course Code: CND 326
Credits: 2 (1T+1P)
No. hours/ week: 1 hrs
No. of hours per semester: 16 hrs

COURSE DESCRIPTION

This course deals with basic statistical methods such as sampling and collecting data, probability, distributions, regression analysis.

OBJECTIVES

This course will enable students

- ✓ To apply statistical techniques to research data for analyzing and for interpretation of data.
- ✓ To summarize data and present it using tables and graphs.
- ✓

Unit No.	Contents	No. of Hrs	% Weightage
I	**Introduction to Statistics** Definition, Advantages, Scope and Limitations Frequency distribution: Construction of Frequency Distribution table. Classification and Tabulation Graphic and Diagrammatic representation of data (frequency, histogram, graphs, bar-Diagram and pie-charts).	2	13
II	**Measures of Central Tendency:** Definition, Characteristics of Satisfactory average. Arithmetic Mean, Median, Mode for grouped and ungrouped data Merits and Demerits of Arithmetic Mean, median, mode. Quartiles, Range	3	19
III	**Measures of Dispersion:** Definition, standard deviation, variance and coefficient of variation.	2	12
IV	**Normal Distribution and its properties. Introduction to Sampling: Types, concept of standard error of Mean.**	1	6
V	**Tests of Significance**: Introduction, Types of errors, Null hypothesis, level of significance and degrees of freedom, steps in testing of hypothesis.	1	6
VI	**Large sample tests:** Test for Means – Z-test, One sample and Two samples with population S.D. known and Unknown. **Small sample tests:** Test for Means – One sample t – test, Two samples t-test and Paired t-test.	4	25
VII	**Chi-Square test in 2x2 contingency table with Yate's correction, F-test**	1	6

VIII	**Correlation**: Definition, types, properties, Scatter diagram, calculation and testing. **Regression**: Definition, Fitting of two lines Y on X and X on Y, Properties, inter relation between correlation and regression.	2	13

References

1. Gupta, S. (2001) ― Research Methodology and statistical Techniques‖, Deep and Deep, New Delhi,
2. Marcello pagano(2008) ― Principles of Biostatistics‖ second edition, brooks/cole,
3. Sarma, K.V.S. (2001) ―statistical made simple: Do it yourself on PC‖, Prentice-Hall, New Delhi,
4. Journals and websites related to application statistics in food and nutrition

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
ELEMENTARY STATISTICS – Practicals

Course Code: CND 326 (P)
Credits: 1P
Total hrs/ week: 2 hrs
Total hrs/ semester: 32 hrs

OBJECTIVES

- ✓ To enable students to perform various statistical calculations and interpret data.

Unit No.	Contents	No. of hrs	% Weightage
I	Construction of Frequency Distribution tables	1	3
II	Computation of Arithmetic Mean for Grouped and Un-grouped data Computation of Median for Grouped and Un-grouped data Computation of Mode for Grouped and Un-grouped data	8	25
III	Computation of Standard Deviation and variance for grouped and ungrouped data Computation of coefficient of variation for grouped and ungrouped data	8	25
IV	SND (Z) test for single sample, Population SD known and Unknown SND (Z) test for two samples, Population SD known and Unknown Student's t-test for single and two samples Paired t-test and F-test	10	31
V	Chi-square test – 2x2 contingency table with Yate's correction Computation of correlation coefficient and its testing Fitting of simple regression equations Y on X and X on Y	5	16

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
IMPROVING HEALTH AND NUTRITION: IEC APPROACHES
Theory
(CORE COURSE)

Course Code: CND 321
Credits: 4 (2T+2P)

Unit No.	Contents	No of hrs	% Weightage
I	**Concept of Communication** - Concept of communication and mass communication - Scope of communication - Elements of communication - Models of communication - Communication process - Approaches to communication - Barriers to communication - Communication for Extension education and development	8	25
II	**Introduction to IEC (Information, Education and Communication**) Aims and Objectives , Importance of IEC, relevance to programmes	2	7
III	**IEC for behavioral changes** Behavior and determinants of behavior Need for IEC	1	3
IV	**Different media, their characteristics and use** - Audio-visual aids (graphics aids, puppets, and three dimensional aids, display boards and projected and non-projected aids) **Mass media:** - Print - Radio/recording - Films - Television/ video - Advertising - Journalism	4	12
V	**Methods, techniques and tools** Planning effective IEC Programmes Broad based strategy and for specific objectives Identification of key messages for re-inforcement, preparation of IEC material. Refining of IEC messages Social mobilization, social marketing and role of community. Training to use IEC	4	12
VI	**Implementation – Use of IEC, training supportive supervision and monitoring**	2	7
VII	**IECfor different target groups:** - Policy makers - Managerial level and middle level officials from	4	12

	govt. donor agencies and NGOs - Grass-root functionaries - Community		
VIII	**Impact Assessment**	1	3
IX	**Case studies of various IEC Programmes**	2	7
X	**Specific National programmes and IEC – Influence at mass level**	4	12

Practicals

Practicals to be conducted through:

- Field work
- Placements and
- Project work

3. **Field work:** Study of existing IEC approaches and materials in various programmes at micro and macro levels – Appraisal of techniques, tools, messages, coverage and Outreach, costs and impact
4. **Planning and implementation of a project:** Identification of a problem/area for IEC. Preparation of suitable IEC material for one-to one, group and mass communication including Implementation, monitoring and evaluation.

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
FOOD PRESERVATION - Theory
(CORE COURSE)

Course Code: CND 321
Credits: 3 (2T+1P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Classification of food in relation to shelf life-** Spoilage in food and its control: spoilage caused by microorganism (bacteria, fungi and virus), enzymes, pets and rodents.	7	22
II	**Heat processing** : Mechanism of action, methods of application to foods (Equipments), effect on food and micro-organisms a. sterilization, b. pasteurization, c. blanching, d. canning.	6	19
III	**Cold preservation** : Mechanism of action, methods of application to foods (Equipments), effect on food and micro-organisms a. refrigeration, b. freezing, c. freeze drying, d. refrigerated gas storage	7	22
IV	A. **Food irradiation**: technology, application and safety assessments, effects on food and microorganisms B. Chemicals in food preservation, safety of preserved foods.	6	18
V	**Food Preservation by Moisture control** **Drying and Dehydration -** Definition, drying as a means of preservation, methods of drying, types of dryers, 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, **Concentration** **Evaporation –** Definition, factors affecting evaporation, names of evaporators used in food industry.	6	19

Practicals

Unit No.	Contents	No. of Hrs	% Weightage
I	Food preservation techniques (use of different techniques in product formulation and analysis of product for quality standards). Sun drying and dehydration-cereals, legumes, vegetable based.	2	7
II	Preservation with sugar-jams, jelly, preserves, etc.	10	31
III	Preservation - salt, oil, vinegar-pickling.	10	31
IV	Preservation of foods using chemicals –tomato ketchup, squash.	10	31

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
PUBLIC HEALTH NUTRITION Theory
(CORE COURSE)

Course Code: CND 323

Credits: 3 (2T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Concept of public nutrition** – relationship between health and nutrition. Role of public nutritionists in health care delivery Sectors and Public Policies relevant to nutrition	2	6
II	**Primary Health Care of the community** National health care delivery system Determinants of health status Indicators of health	4	13
III	**Population Dynamics** Demographic transition, population structure, fertility behavior, population policy, fertility, nutrition and quality of life inter relationship	2	6
IV	**Food and Nutrition security** Food production, access, Distribution availability, losses, consumption, food security. Socio-cultural aspects and dietary patterns: their implications for nutrition and health	4	13
V	**Nutritional Status** Determinants of nutritional status of individual and populations : Nutrition and Non-Nutritional indicators: socio-cultural, biologic, environmental and economic	4	13
VI	**Major Nutritional problems:** Etiology, prevalence, clinical manifestations, preventive and therapeutic measures of: - Macro and micro-nutrient deficiencies - Other nutritional problems like lathyrism, dropsy, aflatoxicosis, alcoholism and fluorosis - Overweight, obesity and chronic degenerative diseases	6	19
VII	**National food and nutrition policy, plan of Action and programme**	1	3
VIII	**Approaches and strategies for improving nutritional status and health** Programmatic options: their advantages and demerits. Feasibility, political support, available resources (human, financial and infrastructural) Case studies of selected strategies and programmes: their rationale and context, how to select interventions from a range of possible options: Health based interventions, food based interventions, including fortifications and genetic improvement of foods, supplementary feeding, nutrition education for behavioral change	3	9
IX	**Policy analysis and operational research**	2	6

X	**Programme design, planning, implementation, operation, monitoring, surveillance and evaluation**	2	6
XI	**Health economics and economics of malnutrition – Its impact on productivity and national development. Cost benefit, Cost effectiveness and cost efficiency**	2	6

Practicals

Unit No.	Contents	No of Hrs	% Weightage
I	Comparison of rural, urban and tribal communities for: (A) determinants of malnutrition (B) socio-economic groups (C) the types of nutritional problems in different segments and age groups through analysis of secondary data	10	31
II	Critical appraisal of existing interventions and programmes in the voluntary sector and government and suggestions to improve the same vis-à-vis target groups in society and specific needs	6	19
III	Development of a plan for a nutrition intervention project in the community (The target group (S) need to be specified) Development of low cost nutritive recipes suitable for vulnerable groups	8	25
IV	Field experience in operational public nutrition programmes: nutrition rehabilitation centres, fortification programmes, cost analysis.	8	25

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
INSTITUITIONAL FOOD ADMINISTRATION- Theory
(SEC)

Course Code: CND 324
Credits: 4 (3T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Introduction to Food Service Systems** - Evolution of the food service industry - Characteristics of the various types of food service units	4	8
II	**Approaches to Management** - Theories of management - Aspects of management - Styles of management - Management tools	6	13
III	**Strategies in planning** - Conceptual strategy - Marketing Strategy - Financial strategy - Types of plans	8	16
IV	**Management of Resources** **Finance** - Determining the finance needed to establish or run a unit - Budgets - Sources of Finance - Planning adequate Cash flow **Space and Equipment** - Steps in planning layouts - Determining equipment - Selection and placement - Maintenance of equipment - Layout Analysis **Material** - Menu planning - Planning in the material needed - Methods of selection - Storage - Quantity food production - Service and modes of delivery **Staff** - Manpower planning - Manpower placement - Recruitment, induction, training, motivation and performance appraisal **Time and Energy:** Measures for utilization and	12	25

	conservation		
V	**Techno-economic feasibility of food production/ service enterprise**	1	2
VI	**Cost accounting/ analysis** - Food cost analysis - Record to be maintained - Reports and trend analysis	6	13
VII	**Marketing and sales management** - Marketing strategies - Sales analysis - Market promotion	6	13
VIII	**Quality assurance** - Food quality - Total quality management	4	8
IX	**Computer aided record maintenance and management**	1	2

Practicals

Unit No.	Contents	No. of Hrs	% Weightage
I	**Market survey and analysis of processed and finished products**	4	13
II	**Evaluation of Food Service units- 2, Conventional, commissary**	4	13
III	**Market survey of Food service equipment**	4	13
IV	**Layout analysis of Kitchens – 2**	2	6
V	**Planning menus for quantity food production** - Banquets - Outdoor catering - Packed meals - Restaurant	6	18
VI	**Standardizing recipes for quantity – 50,100,250,500**	6	18
VII	**Cost Analysis of menus in** - College canteen - Hostel mess - Hospitals (private, charitable, government)	4	13
VIII	**Analysis of Food Safety and Hygiene**	2	6

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
PROJECT CUM INTERNSHIP- Theory
(SEC)

Course Code: CND 325

Credits: 4 (1T+3P)

Unit No.	Contents	No of Hrs	% Weightage
I	Meaning of scientific research and its methods. Formulation of project design.	3	19
II	Types of project design – exploratory, descriptive, experimental, cross sectional or longitudinal	3	19
III	Methods – survey, case study, anthropological or experimental.	3	19
IV	Tools and techniques – observation, interviewing, questionnaire schedules or rating scales.	4	25
V	Tabulation and Interpretations – Elementary Statistical procedures. Tabular and graphic representation of data and its interpretations.	3	18

INTERNSHIP

OBJECTIVES:

To enable students to

- ✓ Assess nutritional status and dietary pattern of patients
- ✓ Plan and prepare therapeutic diets
- ✓ Develop skills in feeding patients and supervise food services.
- ✓ Develop skills in diet counselling.
- ✓ Take up dietetics as a profession.

Internship - aspects to be covered.

Unit-1 Placement in hospital dietary department and diet clinics to gain knowledge to

j. Establish rapport with patients – assess the nutritional status and diet history of patients
k. Plan diet sheets after careful study of the patients' case sheets- prepare and provide guidance in the production of therapeutic diets
l. Supervise preparation of diets – assist and guide in tray setting with special emphasis on portion control and therapeutic modifications.
m. Supervise delivery of trays to the patients
n. Get feedback from patients regarding the diets.
o. Discuss/ consult with doctors for modifications.
p. Undertake case study at hospital situations
q. Updating knowledge of presentations and participation through seminars and projects
r. Gain experience in the administrative setup of a dietary department

Unit 2: Project formulation – setting the objectives, steps in execution.

CLINICAL NUTRITION AND DIETETICS
III YEAR II SEMESTER
ELEMENTARY STATISTICS - Theory
(RESEARCH COURSES)

Course Code: CND 326

Credits: 2 (1T+1P)

Unit No.	Contents	No. of Hrs	% Weightage
I	**Introduction to Statistics** Definition, Advantages, Scope and Limitations Frequency distribution: Construction of Frequency Distribution table. Classification and Tabulation Graphic and Diagrammatic representation of data (frequency, histogram, graphs, bar-Diagram and pie-charts).	2	13
II	**Measures of Central Tendency:** Definition, Characteristics of Satisfactory average. Arithmetic Mean, Median, Mode for grouped and ungrouped data Merits and Demerits of Arithmetic Mean, median, mode. Quartiles, Range	3	19
III	**Measures of Dispersion:** Definition, standard deviation, variance and coefficient of variation.	2	12
IV	**Normal Distribution and its properties. Introduction to Sampling: Types, concept of standard error of Mean.**	1	6
V	**Tests of Significance**: Introduction, Types of errors, Null hypothesis, level of significance and degrees of freedom, steps in testing of hypothesis.	1	6
VI	**Large sample tests:** Test for Means – Z-test, One sample and Two samples with population S.D. known and Unknown. **Small sample tests:** Test for Means – One sample t – test, Two samples t-test and Paired t-test.	4	25
VII	**Chi-Square test in 2x2 contingency table with Yate's correction, F-test**	1	6
VIII	**Correlation**: Definition, types, properties, Scatter diagram, calculation and testing. **Regression**: Definition, Fitting of two lines Y on X and X on Y, Properties, inter relation between correlation and regression.	2	13

Practicals

Unit No.	Contents	No. of hrs	% Weightage
I	Construction of Frequency Distribution tables	1	3
II	Computation of Arithmetic Mean for Grouped and Un-grouped data Computation of Median for Grouped and Un-grouped data Computation of Mode for Grouped and Un-grouped data	8	25
III	Computation of Standard Deviation and variance for grouped and ungrouped data Computation of coefficient of variation for grouped and ungrouped data	8	25
IV	SND (Z) test for single sample, Population SD known and Unknown SND (Z) test for two samples, Population SD known and Unknown Student's t-test for single and two samples Paired t-test and F-test	10	31
V	Chi-square test – 2x2 contingency table with Yate's correction Computation of correlation coefficient and its testing Fitting of simple regression equations Y on X and X on Y	5	16

CLINICAL NUTRITION AND DIETETICS
IV YEAR I SEMESTER
FOOD TOXICOLOGY - Theory
(CORE COURSE)

Course Code: CND 411
Credits: 4 (4T+0P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Principles of Toxicology** - Branches of Toxicology - Dose-Response - Potency - Hormesis - Margin of Safety - Biologic Factors that Influence Toxicity - Absorption - Types of Membrane Transport - Toxin Absorption in the Alimentary Tract - Intestinal Microflora - The Blood–Brain Barrier - Xenobiotic Absorption into Lymph - Translocation - Distribution - Storage a. Organ Storage b. Lipid Storage c. Bone Storage - Excretion - Kidney - Effects of Maturation on Kidney Excretion: Fecal Excretion of Xenobiotics	10	16
II	**Determination of Toxicants in Foods** - Sampling - Qualitative and Quantitative Analyses of Toxicants in Foods - Sample Preparation for Analysis of Toxicants - Isolation and Identification by Chromatography - Biological Determination of Toxicants - Acute Toxicity - Genetic Toxicity - Bioassay - Metabolism - Subchronic Toxicity - Teratogenesis - Chronic Toxicity	8	13
III	**Biotransformation** - Phase I Reactions	10	16

	- Phase II Reactions
	- Phase I Enzymes
	  - Cytochrome P450
	  - CYP3A4
	  - CYP1B1
	  - CYP2E1
	- Peroxidases
	- Flavin-Containing Monooxygenase (FMO)
	- Epoxide Hydrolase (EH)
	- Esterases
	  - Carboxylesterases (CES)
	  - Paraoxonase
	- Phase II Xenobiotic Metabolism
	  - Glucuronide Conjugation
	  - Sulfate Conjugation
	  - Glutathione Conjugation		

IV	**Chemical Carcinogenesis**
	- Definitions
	- Phases of Carcinogenesis
	  - Initiation
	  - Promotion
	  - Progression
	  - Angiogenesis
	- Cancer Epidemiology
	- Dietary Guidelines for Cancer Prevention
		8	12.5

V	**Intentional Direct Additives:** Preservatives, Nitrate, Nitrite and N-nitroso Compounds	4	6
VI	**Indirect Additives, Residues and Contaminants** Multi-contaminant studies Anti-microbial and veterinary drugs, pesticides, polyhalogenated aromatic hydrocarbons, polycyclic aromatic hydrocarbons Other organic residue, packaging materials, heavy metals, radio nuclides in foods	4	6
VII	**Naturally occurring toxicants & food contaminants**Sea food toxins, Toxins from Fungi and other micro-organisms toxicity of mushrooms alkaloids, phenolic compounds, glucosinolates, protease inhibitors, phytate, other anti-nutritional compounds	6	9

VIII	**Toxic Phytochemicals**
	- Phytotoxins
	  - Goitrogens
	  - Environmental Antithyroid Substances
	  - Favism
	  - Neurolathyrism
	  - Cyanogenic Glycosides
	  - Lectins
	  - Vasoactive Amines
	  - Caffeine
	  - Curare
	  - Strychnine
	  - Atropine
	- Phytoalexins
	- Herb-Drug Interactions
		6	9

IX	**Toxicants Formed During Food Processing**
	- Polycyclic Aromatic Hydrocarbons (PAHs)
	  - Occurrence
	  - Benzo[a]pyrene (BP)
	- Maillard Reaction Products
	- Polycyclic Aromatic Amines (PAA)
	  - Occurrence
	  - Toxicity
	- N-Nitrosamines
	  - Precursors
	  - Occurrence in Various Foods
	  - Toxicity
	  - Mode of Toxic Action
	  - General Considerations
	- Acrylamide
	  - Formation Mechanisms of Acrylamide in Foods
	  - Toxicity
	  - Mode of Action
	  - General Considerations
	Food Irradiation
		8	12.5

CLINICAL NUTRITION AND DIETETICS
IV YEAR I SEMESTER
RESEARCH METHODOLOGY - Theory
(CORE COURSE)

Course Code: CND 412

Credits: 4 (4T+0P)

Unit No.	Contents	No. of Hrs	% Weightage
I.	**Science, scientific methods, scientific approach.** - Foundations of Research: Meaning, Objectives, Motivation, Utility. Concept of theory, empiricism,deductive and inductive theory. - Characteristics of scientific method – Understanding the language of research – Concept, Construct, Definition, Variables. Types of variables. - Objectives and types of research: Motivation and objectives – Research methods vs Methodology. Types of research – Descriptive vs. Analytical, Applied vs. Fundamental, Quantitative vs. Qualitative, Conceptual vs. Empirical, case study, social research, participatory research.	8	13
II.	**Research Formulation** - Defining and formulating the research problem, Selecting the problem, Necessity of defining the problem, - Importance of literature review in defining a problem, Literature review, Primary and secondary sources – reviews, treatise, monographs-patents – web as a source – searching the web - Critical literature review – Identifying gap areas from literature review - Development of working hypothesis. Hypothesis – Qualities of a good Hypothesis – Types of Hypothesis Null Hypothesis & Alternative Hypothesis.	8	13
III.	**Sampling Design** Steps in Sampling Design, Characteristics of a Good Sample Design - **Theory of Probability-**Population and Sample - **Probability Sampling:** simple random, systematic random sampling, two stages and multi stage sampling, cluster sampling - **Non-Probability sampling:** Purposive, quota and volunteer sampling/ snowball sampling.	6	9
IV.	**Basic principles of Research Design** - Research design – Basic Principles, Need of research design, Features of good design,Important concepts relating to researchdesign – Observation and Facts, Laws and Theories, Prediction and explanation, Induction, Deduction, Development of Models. Developing a research plan - Exploration, Description, Diagnosis, and Experimentation.	8	13

	- Descriptive Research Designs – concept, types and uses. - Experimental Design: Concept of Independent & Dependent variable (fundamental, applied and action, exploratory and descriptive, experimental, survey and case study, ex-post facto, longitudinal and cross sectional, correlational)		
V.	**Qualitative and Quantitative Research:** Qualitative research – Quantitative research – Concept of measurement, causality, generalization, replication. Merging the two approaches. **Qualitative Research methods** Theory and design in qualitative research Definition and types of qualitative research Methods and techniques of data collection - Group discussions - Interviews: Key informants, in-depth interviews - Observations - Social mapping - Participatory rapid assessment - Participatory learning assessment	6	9
VI.	**Scales of measurements and the appropriate statistical techniques** Measurement: Concept of measurement– what is measured? Problems in measurement in research – Validity and Reliability. Levels of measurement – Nominal, Ordinal, Interval, Ratio.	2	3
VII.	**Data Collection and analysis:** Execution of the research - Observation and Collection of data – Methods of data collection **Data Gathering instruments:** Observation, Questionnaire, interview, scaling methods, case study, home visits, reliability and validity of measuring instruments Data Processing and Analysis strategies	4	6
VIII.	**Critical analysis of research** Correlation and Regression Analysis, Method of Least Squares, Regression Vs. Correlation, Correlation Vs. Determination, Types of Correlation and Their Specific Applications.	4	6
IX.	**Statistical Interference**: - Tests of Hypothesis, Parametric Vs. Non-Parametric Tests, Procedure for Testing Hypothesis, Use of Statistical Techniques for Testing Hypothesis, Sampling Distribution, Sampling theory - Data Analysis with Statistical Packages - Hypothesis-testing - Generalization and Interpretation. - Data Preparation – Univariate analysis (frequency tables, bar charts, pie charts, percentages), Bivariate analysis – Cross tabulations and Chi-square test including testing hypothesis of association. Analysis of Variance and Covariance, Multivariable Analysis.	8	13
X.	**Interpretation of Data and Report Writing** Structure and components of scientific reports – Types of reports Different steps in the preparation – Layout, structure and Language of typical reports – Illustrations and tables -	4	6

	Bibliography, referencing and footnotes -		
XI.	**Research Ethics** Environmental impacts – Ethical and moral issues - ethical committees - Commercialization – Copy right – royalty - Plagiarism tools to avoid plagiarism - Citation and acknowledgement - Reproducibility and accountability.,– Intellectual Property Rights – Copy right laws – Patent rights, Reproduction of published material (Reproducibility) and accountability	4	6
XII.	**Writing research proposal**	2	3

CLINICAL NUTRITION AND DIETETICS
IV YEAR I SEMESTER
FUNCTIONAL FOODS AND NEUTRACEUTICALS - Theory
(CORE COURSE)

Course Code: CND 413

Credits: 3 (3T+0P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Nutraceuticals** Functional foods and nutraceutical – Introduction, Defining the concept Review of the history of functional foods – teleology of nutraceuticals – primary and secondary metabolites in plants general teleology – a) Carotenoids b) Conjugated linolenic acid c) Flavonoids d) Nitrogen and Sulphur containing Amino acid derivatives e) Proteinase and alpha amylase inhibitors f) Omega – 3 PUFA g)Terpenoids, dietary fiber, phytoestrogens; glucosinates; organosulphur compounds	12	25
II	**Classifying nutraceuticals and Organizational models for nutraceuticals** a) Food source – Plant: Soya, olive oil, plant steroid, tea, grape vine, garlic, capsicum, dietary fibre and other fruits. b) Animal: Milk and products, meat, fish. Microbial probiotics. c) Mechanism of action – Anticancer, positive influence on blood lipid profile, anti-oxidation, anti-inflammatory, osteogenetic d) Chemical nature – Isoprenoid derivatives, phenolic substances, fatty acids and structural lipids, carbohydrates and derivatives, amino acid base substances, microbes, minerals.	12	25
III	**Regulation of dietary supplements** – Types – in born errors of metabolism, -	8	17

	obesity, neurological disorder, diabetes mellitus, hypertension, vitamin A deficiency,PEM Instant foods and formulas supplement soups, Herbal and functional food beverages and sports		
IV	**Measurement of functional component and their bioavailability.** Need for measurement, safety quality assurance and cost — bioavailability: Definition, factor affecting, chemical measurement and physical testing and microbiological testing- functional foods and vitro studies.	8	17
V	**Pharmacology andnutraceuticals** - Pharmacology of chemical components derived from plant source and the therapeutic derived from plant source and the therapeutic efficiency of functional food ingredients - Nutrigenomics - Relationship between nutritional supplementation and gene expression and disease prevention	8	16

CLINICAL NUTRITION AND DIETETICS
IV YEAR I SEMESTER
NUTRITONAL GENOMICS - Theory
(CORE COURSE)

Course Code: CND 414
Credits: 4 (3T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I.	Introduction, Concept of Nutritional genomics, Nutrigenetics **GENE–ENVIRONMENT INTERACTIONS** - Introduction - Genetic Variability - How to Detect Genetic Variability - What to Analyze - Environmental Factors - Gene–Environment Interactions: Focus on Diet - Common Genetic Variants and Gene–Diet Interactions - Modulating Plasma Lipoprotein Concentrations - Gene–Microorganisms Interactions - The Microbiome (Microbiota)	4	8
II.	**Metabolomics: Bringing Nutrigenomics To Practice In Individualized Health Assessment** - Introduction - Opportunities for Foods and Health - Nutrigenomics - Metabolomics - Genomics - Metabolome Assembly and Annotation - Bioinformatics: Knowledge Management from Genomics andMetabolomics to Health Assessment	6	13
III.	**Genetic And Molecular Buffering Of Phenotypes** - Introduction - Examples of Buffering - Experimental Concepts for Genetic Buffering Analysis - Experimental Platforms for Global Genetic Interaction Analysis	2	4
IV.	**Nutrients and Gene Expression** - Introduction - Nutrient Regulation of Gene Expression: Nutrigenomics - SREBPs and ChREBP: Transcription Factors Influenced byDietary Lipids and Glucose - Lipid Metabolism: Apolipoproteins and Gene-Diet Interaction - Altered Lipid Metabolism: Ectopic Lipid Storage, - Endoplasmic Reticulum stress, and the Metabolic	6	13

	Syndrome - Superfamily of Nuclear Receptors - Nuclear Receptors: Structure and Function - Nuclear Receptors as Metabolic Sensor - Vitamins - Phytoestrogens: Nutrients Mimicking Estrogens - Polymorphisms		
V.	**Gene–Gene Epistasis And Gene–Environment Interactions Influence On Diabetes And Obesity** - Gene–Gene and Gene–Environment Interactions - Epistasis and Gene–Environment Interactions in - Obesity and Diabetes - Gene–Gene Interaction in Obesity and Diabetes - Dietary Fat in Obesity and Diabetes - Maternal Effects - Glycemic Memory and Epigenetic Changes	4	8
VI.	**Molecular Mechanisms Of Longevity Regulation And Calorie Restriction** - Introduction - A Conserved Longevity Factor, Sir2 - Molecular Mechanisms of Calorie Restriction - Role of NAD/NADH Ratio in Aging and Human Diseases	2	4
VII.	**Maternal Nutrition: Nutrients And Control Of Expression** - Introduction - Methyl Metabolism - Folate and DNA Methylation, Epigenetics, and Imprinting - Endogenous Retroviruses and Genome Integrity - Epigenetics and Nutrition Can Greatly Modulate GeneticPredispositions - Epigenetic Effects Related to Reproduction in Humans - Nutrients and Compounds That May Affect EarlyDevelopment and Epigenetics	6	13
VIII.	**Cancer and Associated Target Genes** - Dietary Components, Epigenetics, and Cancer - Dietary Factors, Histone Modifications, and Cancer Prevention - Role of Epigenetic Machinery and MicRNAs in Diet-InducedHepatocarcinogenesis - Polyphenols and Cancer Prevention - Mechanisms of Action of Polyphenols - Importance of Timing of Exposure to Polyphenols **Green Tea Polyphenols And Cancer Prevention** - Mechanisms of Green Tea Action: Molecular Signaling Pathwaysand Gene Targets	6	13
IX.	**Dietary And Genetic Effects On Atherogenic Dyslipidemia** - Introduction - LDL Represents a Heterogeneous Population of Particles - LDL Subclasses Influenced by Genes and the	2	4

	Environment		
X.	**Interactions between Folate, Other B Vitamins, DNA Methylation, and Neurodevelopmental Disorders**	1	2
XI.	**Epigenetic Mechanisms in Lung Inflammation and ChronicAirway Diseases and Intervention by Dietary Polyphenols**	4	8
XII.	**Nutritional Epigenetics: Impact on Metabolic Syndrome**	4	8
XIII.	**Dietary Factors and the Emerging Role of Epigenetics in Neurodegenerative Diseases**	1	2

Practicals

1. *In vitro* models (cancer cell lines, insulin-secreting cell lines (diabetes-related studies), 3T3-L1 cell lines (obesity-related studies) etc.
2. *In vivo* models for the same
3. mRNA (gene) expression - by RT-PCR
4. Protein expression - Western blot
5. Some ELISA assays for specific markers
6. In silico examination of biomolecules and protein interactions
7. DNA staining - by DAPI

CLINICAL NUTRITION AND DIETETICS
IV YEAR I SEMESTER
FOOD MICROBIOLOGY - Theory
(CORE COURSE)

Course Code: CND 415
Credits: 4 (3T+1P)
No. hours/ week: 3 hrs
No. of hours per semester: 48 hrs

COURSE DESCRIPTION

The course provides a basic understanding of the ecology of microorganisms in foods, detection, enumeration, isolation, and identification of pathogens and/or their toxins and about spoilage, pathogenic, and beneficial microorganisms in the food industry

OBJECTIVES

This course will enable the students to:

- ✓ Gain deeper knowledge of role of micro-organisms in humans and environment
- ✓ Understand the importance of microorganisms in food spoilage
- ✓ Understand the latest procedures adopted in various food operations to prevent food-borne infections and legal aspects involved in these aspects.

Unit No.	Contents	No of Hrs	% Weightage
I	**Introduction to historical developments in food preservation, spoilage, infections and legislation** **Microorganisms of importance in food:** Their primary sources in foods, morphology, cultural characteristics and biochemical activities Food fermentation, putrefaction, lipolysis; Antagonism and synergism in microorganisms;	4	8
II	**Factors affecting growth of micro-organisms in food** Intrinsic and Extrinsic parameters that affect microbial growth	4	8
III	**Methods of Isolation and detection of micro-organisms or their products in food. (only principles in brief)** Conventional method Rapid methods (Newer techniques) Immunological methods: Fluroscent, antibody, Radio Immunoassay, ELISA etc. Chemical methods: Thermostable nuclear, ATP measurement and PCR (Polymers chain reactions)	4	8
IV	**Spoilage of different groups of foods** Cereal and cereal products, milk and milk products, vegetables and fruits, meat and meat products, eggs and poultry, fish and other sea foods, canned food	12	25
V	**Food preservation** Physical methods – Drying, freeze drying, cold storage, heat treatments, Irradiation, High pressure processing Chemical preservatives and Natural antimicrobial	8	18

	compounds Biological based preservation systems and probiotic bacteria.		
VI	**Food Borne diseases** Bacterial and viral food borne diseases, food-borne important animal parasites, Mycotoxins	6	13
VII	**Indicator of food safety and quality** Micro-biological criteria of foods and their significance	4	8
VIII	**The HACCP System and food safety used in controlling microbiological hazards.**	4	8
IX	**Role of microbes in fermented foods and genetically modified foods**	2	4

Practicals

Unit No.	Contents	No of Hrs	% Weightage
I	Microscopic examination of bacteria, and yeast and molds;	2	6
II	Standard plate count; Yeast and mould count; Spore count;	7	22
III	Detection and enumeration of pathogenic and indicator organisms in food; Bacteriological analysis of water and milk: Total count, MPN coli forms (count)	7	22
IV	Enumeration of physiological groups- psychrophile, thermodurics, osmophiles and halophiles.	8	25
V	Evaluation of microbiological quality of commonly consumed street foods.	8	25

CLINICAL NUTRITION AND DIETETICS
IV YEAR I SEMESTER
MINOR PROJECT
(RESEARCH COURSE)

Course Code: CND 416
Credits: 4 (0T+4P)
No. hours/ week: 8hrs
No. of hours per semester: 128 hrs

An independent research project work undertaken by student under the guidance of an advisor. The topic will be selected by the student under the guidance of an advisor, can either be an independent study based on research [experimental, clinical, survey, case study, etc] or based on exhaustive review of literature.

The research project should be submitted at the end of semester in the form of a project report and evaluated. The project work can be undertaken at University departments, affiliated research institutions, quality control laboratories, food industries or other institutions with prior approval.

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
METHODS OF INVESTIGATION - Theory
(CORE COURSE)

Course Code: CND 421
Credits: 3 (1T+2P)

Unit No.	Contents	No of hrs	% Weightage
I	**Electrolytic dissociation** – Acids, Bases, Salts, buffers, Hendersen – Hasselbach equation Theory of indicators and principles of measurement of pH	2	13
II	**Basics of Instrumentation**- Physico-chemical principles and Methodology – Calorimetry, Photometry, Fluorimetry, Flame photometry and atomic absorptiometry.	3	19
III	**Chromatography** Prinicples and applications in paper (Circular, Ascending and Descending), Ion exchange, Column, Thin layer, Gas liquid and High performance liquid, Chromatographic techniques	3	19
IV	**Electrophoresis** – Principles and applications in paper and gel electrophoresis	2	13
V	**Bioassays** – Animal studies , Human studies, Microbiological Assays	2	12
VI	**Use of isotopes – Radioactive and stable isotopes**	1	6
VII	**NMR and its applications.**	1	6
VIII	**Immunological methods – RIA, ELISA**	2	12

Practicals

Unit No.	Contents	No of Hrs	% Weightage
I	**Acid and Alkalis:** Preparation of dilute solutions of common acids and alkalis and determining their exact normalities	10	15
II	**Buffers** Preparation of phosphate, carbonate-bicarbonate, boric acid, acetate, chloride and phthalate buffers and determination of their pH by the use of indicators and pH meters	10	15
III	**Spectrometry** Beer Lambert Law, absorption maximum, Preparation of standard curve and nutrient estimations in UV and Visible range, AAS, AES, Flame photometry	10	16
IV	**Florimetry** Estimation of Thiamine and Riboflavin	8	13
V	**Chromatography** Paper- Identification of Amino acids by circular, Ascending and Descending methods. Ion-exchange separation of amino acids. Column – Separation of proteins, Thin layer-identification of amino acids Gas-liquid – Estimation of fatty acids HPLC- estimation of Beta Carotene and Alpha-Tocopherol	18	28
VI	**Electrophoresis** – Fractionation of plasma proteins	8	13

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
STATISTICS AND COMPUTER APPLICATIONS - Theory
(RESEARCH COURSE)

Course Code: CND 422

Credits: 3 (2T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I	Conceptual understanding of statistical measures Classification and tabulation of data Measurement of central tendency, Measures of variation	6	19
II	Frequency distribution, Histogram, Frequency, Polygons, Ogive	1	3
III	Binomial Distribution	1	3
IV	Normal Distribution – Use of normal probability tables	2	6
V	Parametric and Non Parametric tests Application of student t test for small samples Difference in proportion for means and difference in means	8	25
VI	Testing of Hypothesis Type 1 and Type 2 errors Level of significance Chi-square test. Goodness of fit. Independence of attributes 2*2 and R*C Contingency tables	4	13
VII	Correlation, co-efficient of correlation, Rank correlation	4	13
VIII	Regression and prediction	2	6
IX	Analysis of variance – one way and two-way classification	2	6
X	Experimental designs Completely randomized design Randomized block design Latin square design Factorial Design Trend analysis	2	6

Practicals

Unit No.	Contents	No of Hrs	% Weightage
I	Use of Statistical Packages: SPSS/ SIGMAPLOT - Inserting Data, Coding and Tabulation - Creating variables and tabulations - Performing Descriptive Statistics - Testing of Hypothesis T-test, z-test, F test, Chi-Square Test - Correlation and Regression Analysis	28	88
III	Interpreting the Data	2	6
IV	Graphs: Scatter plots, bar graphs, box plots	2	6

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
INSTRUMENTATION FOR FOOD ANALYSIS – Practicals
(CORE COURSE)

Course Code: CND 423 (P)

Credits: 2P

Unit No.	Contents	No of hrs	% Weightage
I	**Spectrometric methods** - UV and visible molecular absorption spectrometry - Atomic Absorption Spectrometry, Atomic Emission Spectrometry - Fluoroscence spectrometry - Atomic Mass spectrometry - Infra-red spectrometry	15	23
II	**Separation techniques** - Chromatographic separations: Liquid, GC, TLC, super critical fluid extraction chromatography - Electrophoresis	8	13
III	**Radiochemical methods: Use of radio Isotopes**	6	9
IV	**Viscosity and consistency measurements of food. Measurements of rheological properties**	8	13
V	**Instrumental measurements of texture of foods, dough, pasta, baked products, fruits and vegetables, dairy products, meat, starch**	13	20
VI	**Measurement of specific gravity, freezing point, melting point, refractive index, gel strength, Brix, Densitometry, Refractometry, Polarimetry, Measurement of color.**	8	13
VII	**Relative Humidity and water activity**	2	3
VIII	**Aeration/ over run measurement**	4	6

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
RESEARCH METHODS IN FOOD AND NUTRITION - Theory
(RESEARCH COURSE)

Course Code: CND 424
Credits: 2 (2T+0P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Quantitative and Qualitative Research in Foods and Nutrition: An overview**	1	3
II	**Quantitative research** **1. Design Strategies in research – descriptive studies** Brief overview of types of descriptive studies - Correlational studies (population/ individuals) - Case reports and case studies - Cross sectional surveys Use of descriptive studies in research Hypothesis formulation from descriptive studies Issues in design and conduct of descriptive studies **2. Design strategies in research – Analytic studies I** Analytic studies - Observational studies - Case control studies - Cohort studies – Retrospective and prospective - Intervention trials (Clinical trials) Use of Analytic studies Uses in the design and conduct of case-control studies, definition and selection of cases, selection of control, ascertainment of disease, exposure status Issues in Analysis and Interpretation of case-control studies **3. Design strategies in research – Analytic studies II** - Overview of types of cohort studies and intervention studies - Issues in the design of cohort studies (selection of the proposed population, selection of comparison groups, sources of data, sources of exposure, information, sources of outcome data) - Issues in the design and conduct of clinical trials (selection of study population, allocation of study regimens, maintenance and assessment of compliance, issues of factorial design, sample size considerations, statistical power, etc) - Issues in analysis and interpretation of cohort studies (role of bias, effect of losses to follow up, effect of non-participation) - Strengths and limitations of intervention studies	20	64

	- Unique problems of intervention studies - Issues in analysis and interpretation of community trails		
III	**Qualitative research in Clinical Nutrition** - Types of qualitative research - Tools, techniques and methodologies - RRA/PRA/ PLA - Data Analysis and Interpretation - Rapid Assessment procedures: Use of Rapid assessment procedures for nutrition programme, planning, design, training, assessment - Project re-orientation and evaluation	5	15
IV	**Summarizing data , Analyzing trend data**	1	3
V	**Application of non-parametric tests**	1	3
VI	**Introduction to meta-analysis**	1	3
VII	**Study design issues, sample size and power**	1	3
VIII	**Criteria for evaluation of research problem/ programme**	1	3
IX	**Ethics in research**	1	3

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
SENSORY EVALUATION - Theory
(CORE COURSE)

Course Code: CND 425

Credits: 2 (1T+1P)

Unit No.	Contents	No of Hrs	% Weightage
I	Introduction to sensory analysis and uses of sensory tests	1	6
II	Neural networks in sensory perception	1	6
III	General testing conditions	1	6
IV	Selection of test subjects and training of panel	1	6
V	**Types of tests** - Discrimination/ Difference test: Paired test, triangle test and duo-trio test, - Tests for multiple samples, difference from control/reference - Quantitative Difference tests: Ranking, numerical scoring test, magnitude estimation - Descriptive tests: Rating for sensory profile, consensus profiling, conventional profiling, free choice profiling - Threshold tests - Acceptance test: Monadic, paired and sequential monadic	7	46
VI	Descriptive analysis, concept alignment and selection of terms.	1	6
VII	Designing of questionnaire and/or evaluation scorecard	1	6
VIII	Experimental design and data analysis	1	6
IX	Statistical applications and interpretations	1	6
X	Consumer acceptability using sensory evaluation	1	6

Practicals

Course Code: CND 425 (P)

Credits: 1P

Unit No.	Contents	No of Hrs	% Weightage
I	Establishing sensory panels: Selecting and recruiting panelists, orienting, screening for trained panels, training panelists, monitoring performance. Recognition tests for 4 basic tastes, odour and aroma. Tests with other senses. Threshold tests	4	13
II	Analytical tests: (i) Difference, (ii) Ranking, (iii) Descriptive (iv) Scoring and (v) Rating	8	25
III	Planning a sensory experiment: 1. Designing the questionnaire and score card 2. Identifying descriptions	5	16
IV	Designing Sensory Testing Facilities : Permanent and	2	6

	Temporary		
V	Conducting the test: - Preparing samples - Presenting samples - Using reference samples - Reducing panel response error - Consumer oriented tests - Product oriented tests - Shelf life studies - Product matching - Product mapping - Taint investigation and prevention	10	31
VI	Collecting and analyzing sensory data, statistical analysis, interpretations	2	6
VII	Report writing	1	3

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
FOOD PACKAGING - Theory
(DSEC)

Course Code: CND 426

Credits: 2 (2T+0P)

Unit No.	Contents	No of Hrs	% Weightage
I	Packaging- Concepts, Definition, Significance, Classification	4	12
II	Packaging – Development, Unit/ Retail	1	3
III	Packaging of food(s) - Fresh and processed, general characteristics and food preservation	4	13
IV	Primary packaging media – Properties and applications a. Paper boards, metals, plastics, wood, and plywood, glass, flexible, etc b. Labels, caps and closures and wax,adhesives, inks and lacquers, cushioning materials, reinforcements, etc	6	19
V	Testing and evaluation of packaging media – retail packs (including shelf life evaluation) and transport packages	2	6
VI	Packaging systems and methods for food products - Vacuum packaging - Gas flush - Packaging, CAP & MAP, Aseptic and retort packaging, Bag in Box etc	6	19
VII	Storage, handling and distribution of packages (foods) – Including palletisation and containerization	1	3
VIII	Food marketing and role of packaging	1	3
IX	Packaging aesthetic and graphic design	1	3
X	Packaging – laws and regulation – FDA, PFA, Packaging Commodity rules, Weight & Measures act etc	4	13
XI	Coding and marking including bar coding	1	3
XII	Environmental and eco issues and waste disposal	1	3

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
RESOURCE MANAGEMENT - Theory
(DSEC)

Course Code: CND 426

Credits: 2 (2T+0P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Introduction to Resource Management** - Concept, universality and scope of management - Approaches to management - Ethics in management - Motivation Theory	10	31
II	**Resources** - Understanding meaning, classification and characteristics of resources, factors affecting utilization of resources. - Maximizing use of resources and resource conservation. - Availability and management of specific resources by an individual/ family ▪ Money ▪ Time ▪ Energy ▪ Space - Application of Management Process in: Event Planning & Execution	12	38
III	**Functions of Management: An overview** - Decision Making - Planning - Supervising - Controlling - Organizing - Evaluation	10	31

CLINICAL NUTRITION AND DIETETICS
IV YEAR II SEMESTER
PROJECT PLANNING - Theory
(DSEC)

Course Code: CND 426

Credits: 2 (2T+0P)

Unit No.	Contents	No of Hrs	% Weightage
I	**Preparatory work with local people** - Involve people – informal contacts and building rapport - Collect basic data – general needs and community profile - Needs assessment – identification of specific needs, obstacles solutions - Community based support – setting priorities	10	31

	and formation of working group (S)		
II	**Designing the project** - Defining objectives - Identifying resources – materials funds, facilities, people's resources - Methods/approaches - Feasibility - Workplanand budget- objectives, activities, allocation of responsibilities, organizational, structure, regular schedule of monitoring and evaluation , phasing of the project, budget – items, cost according to years	10	31
III	**Proposal writing and funding** - Title Page - Title of the project, name of the person applying for funds, name of the organization sponsoring the proposal, duration of the project - Summary of the proposed project - Background – justification or need for the project - Specific problem (s) to which the project proposes to respond to objectives - Project information – location, people involved, personnel involved - Reporting procedure - Cost estimates in logical categories, voluntary contributions to the project, physical facilities available, existing supplies and equipment, inputs to be used from govt. or from other organizations - Selection of the funding agency - Writing a proposal requesting funds for the project	12	38