MES MAMPAD COLLEGE

(AUTONOMOUS)

Affiliated to

UNIVERSITY OF CALICUT

Syllabus for B.Voc.

in

Nutrition Science and Dietetics

In accordance with Regulation of

CHOICE BASED CREDIT AND SEMESTER SYSTEM FOR VOCATIONAL UNDER GRADUATE (B.VOC) CURRICULUM - 2021 (CBCSS VUG 2021) of UNIVERSITY OF CALICUT

2021-' 22 Admission onwards

Contents

Preamble

MES Mampad College prepared revised syllabus & scheme of **B.voc**. **Nutrition Science and Dietetics** for the academic year 2021-22 according to University of Calicut Regulation of CHOICE BASED CREDIT AND SEMESTER SYSTEM FOR VOCATIONAL UNDER GRADUATE (B.VOC) CURRICULUM - 2021 (CBCSS VUG 2021).It is also prepared based on outcome based education. we acknowledged those who helped to shape up this revised syllabus.

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About the Programme

This programme is structured according to the "Regulations for Choice Based Credit Semester System for Vocational Under Graduate Curriculum 2021" (CBCSS VUG 2021) of University of Calicut

1. Title of the programme

B.voc. Nutrition Science and Dietetics refers to the entire course of study and examinations for the award of the B. Voc degree.

Hereafter **programme** means **B. Voc. Programme** , **B.Voc. programme** means **B.voc. Nutrition Science and Dietetics programme, college** means **MES MAMPAD COLLEGE** and university means **UNIVERSITY OF CALICUT**

2. Objectives of the programme

a) To provide judicious mix of skills relating to a profession and appropriate content of General Education.
b) To ensure that the students have adequate knowledge and skills, so that they are work ready at each exit point of the programme.
c) To provide flexibility to the students by means of pre-defined entry and multiple exit points.
d) To integrate NSQF within the undergraduate level of higher education in order to enhance employability of the graduates and meet industry requirements. Such graduates apart from meeting the needs of local and national industry are also expected to be equipped to become part of the global workforce.
e) To provide vertical mobility to students coming out of 10+2 with vocational subjects.

3. Programme Outcomes (POs)

Program outcomes are

a) They should live with moral ethical value and live in the society with responsible citizen
b) They should be able to communicate with others effectively
c) They should take readily any challenge before them and solve those problems persist
d) They must understand the environmental issues and to accept the adaption

4. Programme Specific Outcomes (PSOs)

Programme Specific Outcomes are

a) They should take care of a person's eating habits so as to improve his/her health.

b) They should take care of either inpatient or outpatient along with medical specialties as clinical nutritionist / dietician
c) They will have to prepares a proper diet for the sportspersons so that they become able to give optimum output in the field.
d) They should put evidence-based skilful conversation and clinical interventions to use so as to safely engage the patients into a health behaviour change.
e) They will have to work with government, non-government and government-aided bodies to meet the provided standards of health.
f) They should to conduct researches in specific areas of nutrition and dietetics via. Clinical trials and interventions.
g) They should work in companies as nutritionist who can work in marketing, quality control, and development.
h) They could work for their own in the areas such as Diabetes management, weight management, eating disorder and etc.,
i) They could be in schools, clubs, hotels, restaurants, etc to check the quality and examines the food being served in that place.
j) They could be a medical nutrition therapist who try to put food into use to treat a specific condition.

5. Duration of Programme

Programme is about six semesters distributed over a period of three academic years. Each semester has 90 working days inclusive of all examinations.

6. Academic Week

A unit of five working days with six contact hours of one hour duration on each day. A sequence of 18 such academic weeks (90 working days) constitute a semester.

7. Semester : A term consisting of 18 weeks (16 instructional weeks and 2 weeks for examination)

- Total credits in a semester are 30 (equivalent to 450 hours).
- For final semester internship and project, total credit is 30 with duration of 900 hrs.

8. Course

It is portion of the subject matter to be covered in a semester. A semester contains five or six such courses from general and skill development areas

9. Course Outcomes (COs)

Course outcomes are statements that describe significant and essential learning that learners have achieved, and can reliably demonstrate at the end of a course. Generally, three or more course outcomes are specified for each course based on its weightage. They are listed along with the detailed syllabus of each course.

10. General terms, definitions, abbreviations and their expansion

a) **B. Voc**: Bachelor of Vocation- a scheme introduced by UGC for skill development based higher education as part of college /university education.

b) **NSQF:** National Skills Qualifications Framework is a quality assurance framework. Under NSQF, the learner can acquire the competency needed at any level through formal, nonformal or informal learning. B.Voc programme is mapped as NSQF Level 5, 6 and 7.

c) **National Occupational Standards (NOS) or Occupational Standards (OS)**: defines one key function in a job role. NOS specify the standard of performance an individual must achieve when carrying out a function in the workplace.

d) **Qualification Pack (QP)** : QP defines the set of NOS / OS which are aligned to Job Roles. Qualification Pack certifies a person for a specific job role.

e) **Job Role**: Job role defines a unique set of functions that together form unique employment opportunity in an organization.

f) **Sector**: Sector refers to conventional branch. Sectors and specializations for BVoc programmes shall be considered as per the guidelines of BVoc published by UGC.

g) **Exit Level**: B.Voc has multiple exit points at each year and successfully completing a year (2 semesters) the candidate will be awarded Diploma. Higher Diploma and/or B.Voc Degree will be awarded accordingly mentioned (in Item 9)

h) **Credit**: A unit of academic input measured in terms of weekly contact hours /course contents assigned to a course

i) **Extra Credit**: The additional credit awarded to a student over and above the minimum credits required in a programme, for achievements in co-curricular activities and social activities conducted outside the regular class hours, as decided by the university. For calculating CGPA, extra credits will not be considered.

j) **Letter Grade** or simply **Grade** in a course is a letter symbol (O, A+, A, B+, B, C, P, F, I and Ab). Grade shall mean the prescribed alphabetical grade awarded to a student based on his/her performance in various examinations. The Letter grade that corresponds to a range of CGPA

k) **Grade point (G)** Each letter grade is assigned a Grade point (G) which is an integer indicating the numerical equivalent of the broad level of performance of a student in a course. Grade Point means point given to a letter grade on 10 point scale.

l) **Semester Grade Point Average (SGPA)** is the value obtained by dividing the sum of credit points obtained by a student in the various courses taken in a semester by the total number of credits in that semester. SGPA shall be rounded off to three decimal places. SGPA determines the overall performance of a student at the end of a semester.

m) **Credit Point (P)** of a course is the value obtained by multiplying the grade point (G) by the credit (C) of the course: P = G x C s. Cumulative Grade Point Average (CGPA) is the value obtained by dividing the sum of credit points in all the semesters taken by the student for the entire programme by the total number of credits in the entire programme and shall be rounded off to three decimal places.

n) **Grade Card** means the printed record of students' performance, awarded to him / her.

o) **Course Teacher**: A teacher nominated by the Head of the Department shall be in charge of a particular courses.

p) **BVoc Steering Committee**: A University Level Committee (Refer clause 19)

q) **Strike off the roll**: A student who is continuously absent for 14 days without sufficient reason and proper intimation to the Principal of the college shall be removed from the roll.

11. Programme structure

The programme is a mix of General Education Components (GEC), Skill Development Components (SDC) and Ability Enhancement Courses/Audit Courses.

A. **General Education Components (GEC)**

a) GEC courses A01-A04 is taught by English teachers and A07-A08 by teachers of additional languages respectively. GEC courses A11-A14 are offered by departments teachers of SDC courses concerned.

b) The courses (A11-A14) under LRP (Alternative Pattern), as per the regulations of CBCSS UG 2019. **of group 4**. Biochemistry, Biotechnology, Aquaculture and Plant Science

No	Semester	Course No	Course Code	Course Name
1	1	1.1	A01	ENG1A01
2		1.2	A02	ENG1A02
3		1.3	A07(3)	MAL1A07(3) HIN 1A07 (3) ARA1A07(3)
4	2	2.1	A03	ENG2A03
5		2.2	A04	ENG2A04
6		2.3	A08(3)	MAL2A08 (3) HIN 2A08 (3) ARA2A08(3)
7	3	3.1	A11	BIODIVERSITY – SCOPE AND RELEVANCE
8		3.2	A12	RESEARCH METHODOLOGY
9	4	4,1	A13	NATURAL RESOURCE MANAGEMENT
10		4.2	A14	INTELLECTUAL PROPERTY RIGHTS

B**. Skill Development Components (SDC)** details of the courses are given in the scheme and structure of the programme

Skill Gaps Identified:

In the line of Great Greek Physician Hippocrates (400 BC)"Let thy food be thy medicine and thy medicine be thy food "elucidate a strong relation between food and health. This statement further reinforced when British navy physician Dr.James Lind (1747) used vitamins for the treatment of deficiency diseases. It started a wave of revolution around the globe and people started to realize the worth of food than ever before. Subsequently, in the 1930s the Nutritional studies kicked off in Indian Subcontinent which has now joined the league of most productive and promising academic areas. Kerala is the one of the state which leads in the field of education and health. Keralites are well placed either in the state itself or in abroad after completion of their studies. They are even placed in throughout of our nation. Health care sectors are growing like anything especially situations like Covid-19 pandemic, people are now having very health conscious.

C. **Ability Enhancement Courses/Audit Courses (AEC /AC)**: These are courses which are mandatory for a programme but not counted for the calculation of SGPA or CGPA. There is one Audit course each in the first four semesters. These courses are not meant for class room study. The students can attain only pass (Grade P) for these courses. At the end of each semester there will be examination conducted by the college from a pool of questions (Question Bank) set by the University. The students can also attain these credits through online platform like SWAYAM, MOOC etc (optional). The list of courses in each semester with credits is given below

Course name	credit	Semester
Environment Studies	4	1
Disaster Management	4	2
*Human Rights /Intellectual Property Rights /Consumer Protection	4	3
*Gender Studies/Gerontology	4	4

D**. Electives**: Students are permitted to take elective courses available in the programme

Credit Distribution of B.Voc. Nutrition Science and Dietetics

Semester	General Education Component				Skill Development Component	Total
	English	Additional Language	General			
I	3+3	4			20	30
II	4+4	4			18	30
III		-	4	4	22	30
IV		-	4	4	22	30
V	-	-	-	-	30	30
VI	-	-	-	-	30	30
Total	14 Credits (350 Marks)	8 Credits (200 Marks)	16 credits (400 Marks)		142 Credits (2900 Marks)	180
	38 Credits (950 Marks)				142 credits(2900)	**3850**

Mark Distribution

Subject	Marks Allotted	Total	G.Total
English	2x100 2x75	350	550
Additional: Mal/Arabic.....	2x100	200	
GEC	4x100	400	400
SDC	23x100, 2x200,2x75 1x50	2900	3850

12. Credit System

a) A student is required to acquire a total of 180 credits for the completion of the programme which shall be counted for SGPA and CGPA.

b) Each semester has a credit of 30..

c) **Extra Credits**: The maximum credit acquired under extra credit will be 4. If more extra credit activities are done by a student, that will be mentioned in the grade card. Extra credits are mandatory for the programme. Extra credits will be awarded to students who participate in activities like NCC, NSS, and Swatch Bharath. Extra credits are not counted for SGPA or CGPA.

d) **Credit Assessment**

- One Credit would mean equivalent of 15 periods of 60 minutes each, for theory, practicals / workshops / IT and tutorials;
- For internship/field work 1 credit = 30 periods of 60 minutes each.

13. Admission

A. Eligibility

a) The admission to all B Voc programme will be as per the rules and regulations of the University for UG admissions.

b) The eligibility criteria for admission shall be as announced by the University from time to time.

c) Candidates who have passed (Eligible for Higher Studies) the HSE of the Kerala State Board of Higher Secondary Examination or any other examination recognised as equivalent there to with science subjects are eligible for admission.

d) Separate rank lists shall be drawn up for reserved seats as per the existing rules.

h) Grace Marks may be awarded to a student for meritorious achievements in co-curricular activities such as Sports/Arts/ NSS/NCC/ Student Entrepreneurship. i) Preferred subjects & index mark calculations will be decided by the Board of Studies (FT)

B. **Diploma Holders** Diploma holders (after 10+2) in the parent courses, approved by the University, who satisfies eligibility criteria can be admitted to the higher diploma (3 rd semester) based on the availability of the seats and is under the sole discretion of the principal / Governing Council of the college.

C. **Reservation for Vocational Students** 25 marks weightage in index mark shall be given to all B.Voc programmes to compute ranking of candidates who successfully completed VHSE/HSE with vocational / NSQF course general to all vocational students at Higher secondary level.

D. **Reservation /Quota**:The reservation rules for Government/Aided Colleges are as same as that of the regular UG programmes conducted in colleges affiliated to the university.

E. Readmission

a) There shall be provision for Readmission of students in CBCSS VUG 2021.

b) The Principal can grant readmission to the student, subject to the conditions detailed below and inform the matter of readmission to the Controller of Examinations within one month of such readmission.

c) This readmission is not to be treated as college transfer.

d) There should be a gap of at least one semester for readmission.

e) The candidate seeking readmission to a particular semester should have registered for the previous semester examination.

f) Readmission shall be taken within two weeks from the date of commencement of the semester concerned.

g) For readmission, the vacancy should be within the sanctioned strength in the college.

h) If change in scheme occurs while readmission, provision for credit transfer is subject to common guidelines prepared by Board of Studies/ Faculty concerned. For readmission to CBCSS VUG 2021 involving scheme change, the Principal concerned shall report the matter of readmission to Controller of Examinations with the details of previous semesters and course undergone with credits within two weeks in order to fix the deficiency/excess papers.

F. **Multiple Entry**

The students can discontinue after the successful completion of 2nd semester or 4th semester can re-join to the programme as lateral entry to 3rd or 5th semester respectively. In such cases, the multiple entries shall be completed within 6 years from the date of first registration of the programme.

When Re-joining through multiple entry, the following points to be considered:

1. If re-joining is sought for a student of this college and in the same programme, the principal / Governing Council in the institution can grant the readmission.

2. In all other cases in multiple entry, readmission can be granted only after getting the approval from B.Voc Steering Committee of the university.

3. Rejoining the programme will be allowed to only if the candidate has secured a minimum CGPA of 2.5.

4. The candidate should remit the fees prevailing at that time.

14. EXAMINATION

a) There shall be end semester examinations at the end of each semester.

b) Practical examinations shall be conducted by the college as prescribed by the Board of Studies (FT). External viva-voce, if any, shall be conducted along with the practical examination/project evaluation.

c) The medium of examination is in English only

d) A student shall be permitted to appear for the semester examination, only if he or she secures not less than 75%attendance in each semester. Practical Examination shall be conducted by the college at the end of 2nd,4th & 6thsemester

e) **Audit course:** The student should pass all the audit course examinations before the commencement of fifth semester examination.

f) **Improvement course :**Improvement of a particular semester can be done only once. The student shall avail of the improvement chance in the succeeding year after the successful completion of the semester concerned. The students can improve a maximum of two courses in a particular semester. The internal marks already obtained will be carried forward to determine the new grade/mark in the improvement examination (for regular students). If the candidate fails to appear for the improvement examination after registration, or if there is no change in the results of the improved examination, the mark/grade obtained in the first appearance will be retained. Improvement and supplementary examinations cannot be done simultaneously.

g) **Moderation :**Moderation is eligible as per the existing rules of the college.

15. EVALUATION AND GRADING : Mark system is followed instead of direct grading for each question. For each course in the semester letter grade and grade point are introduced in 10-point indirect grading system

Method of Indirect Grading

Evaluation (both internal and external) is carried out using Mark system .The Grade on the basis of total internal and external marks will be indicated for each course, for each semester and for the entire programme.

Ten Point Indirect Grading System

% of Marks (Both Internal &External put together)	Grade	Interpretation	Grade point Average (G)	Range of grade point	Class
95 and above	o	Out standing	10	9.5-10	First Class with Distinction
85 to below 95	A+	Excellent	9	8.5-9.49	
75 to below 85	A	Very good	8	7.5-8.49	
65 to below 75	B+	Good	7	6.5-7.49	First Class
55 to below 65	B	satisfactory	6	5.5-6.49	
45 to below 55	C	Average	5	4.5-5.59	Second Class
35 to below 45	P	Pass	4	3.5-4.49	Third Class
Below 35	F	Failure	0	0	Fail
Incomplete	l	Incomplete	0	0	Fail
Absent	Ab	Absent	0	0	Fail

B. **Course Evaluation**

The evaluation scheme for each course shall contain two parts internal assessment and external assessment.

1) Internal Assessment

a) 20% of the total marks in each course are for internal examinations.

b) The internal assessment shall be based on a predetermined transparent system involving written tests, Class room participation based on attendance in respect of theory courses and lab involvement, records and attendance in respect of Practical Courses.

c) Internal assessment of the project will be based on its content, relevance, method of presentation, final conclusion and orientation to research aptitude.

To ensure transparency of the evaluation process, the internal assessment marks awarded to the students in each course in a semester shall be notified on the notice board at least one week before the commencement of external examination. There shall not be any chance for improvement for internal marks. The course teacher(s) shall maintain the academic record of each student registered for the course, which shall be forwarded to the University by the college Principal after obtaining the signature of both course teacher and Head of the Department. The Split up of marks for Test paper and Class Room Participation (CRP) for internal evaluation are as follows.

Distribution of Marks for Theory 4 to 5 credits (Max Internal 20)

Attendance		**Test paper**		**Seminar/Assignment/Viva**	
85% and above	4 marks	85%-100	8 marks	Outstanding	8 marks
75- <85%	2 marks	65 to 85%	6 marks	Excellent	7 marks
50- < 75%	1 mark	55 to 65%	4 marks	Very good	6 marks
		45 to 55%	3 marks	Good	5 marks
		35 to 45%	2 marks	Average	4 marks
		Less than 35	1 Marks	Poor	1 Mark
Maximum	**4 marks**	**Maximum**	**8 marks**	**Maximum**	**8 marks**

Internal Test Papers - 60marks Pattern

Duration	Pattern	No. of Questions	Marks	Ceiling of Marks
1 hour	Short answer	6	5x2	**10**
	Paragraph	4	2x5	**10**
	Essay	2	1x10	**10**
Total marks				**30**

Distribution of Marks for Theory 1 to 3 credits (Max Internal 15)

Attendance		**Test paper**		**Seminar/Assignment/Viva**	
85% and above	3 marks	85%-100	6 marks	Outstanding	6 marks
75- <85%	2 marks	65 to 85%	5 marks	Excellent	5 marks
50- < 75%	1 marks	55 to 65%	4 marks	Very good	4 marks
		45 to 55%	3.0 marks	Good	3 marks
		35 to 45%	2 marks	Average	2 mark
		Less than 35	1 Marks	Poor	1 Mark
Maximum	**3 marks**	**Maximum**	**6 marks**	**Maximum**	**6 marks**

Internal Test Papers -80 marks pattern

Duration	Pattern	Total number of questions	Marks for each question	Ceiling of marks
1.5 Hour	Short answer	6	5x2	10
	Paragraph	4	4x5	20
	Essay	2	1x10	10
Total marks				**40**

Distribution of Marks for Practical 4-5 credits

Components	Maximum 20 Marks
Attendance	5
Lab performance	5
Viva-voce	10

Distribution of Marks for Practical 1-3 credits

Components	Maximum 15 marks
Attendance	5
Lab performance	2.5
Viva-voce	7.5

2) External Evaluation

a) External evaluation carries 80% of marks.

b) All question papers shall be set by the college.

c) The external question papers may be of uniform pattern with 80/60 marks

d) 2/3 credits will have an external examination of 2 hours duration with 60 marks and courses with 4/5 credits will have an external examination of 2.5 hours duration with 80 marks.

e) The external examination in theory courses is to be conducted by the college with question papers set by external experts. The evaluation of the answer scripts shall be done by examiners based on a well-defined scheme of valuation and answer keys shall be provided by the college.

f) The external examination in practical courses shall be conducted by two examiners – one internal and an external, the latter appointed by the college.. The practical board meeting should be conducted before conducting the external practical examination with the concerned examiners. The instructions for conducting the practical examinations, the mark distribution, question paper distribution and related matters should be discussed in the practical examination board meeting. The scheme of valuation must be strictly followed so as to ensure uniformity.

Theory Question Paper pattern (for 60 marks/1 to 3 Credits)

Duration	Pattern	No. of Questions	Marks	Ceiling of Marks
2 Hours	Short answer	12	2	20
	Paragraph	7	5	30
	Essay	2	1x10	10
Total Marks				**60**

Theory Question Paper pattern (for 80 marks/4 to 5 Credits)

Duration	Pattern	No. of Questions	Marks	Ceiling of Marks
2.5 Hours	Short answer	15	2	25
	Paragraph	8	5	35
	Essay	4	2x10	20
Total Marks				80

Practical Exam Pattern of 4-5credits

Record	Procedure	Work done	Spot test	Viva-voce	Total
5	5	20x2	20	10	80

Practical Exam Pattern 1-3credits

Record	Procedure	Work done	Spot test	Viva-voce	Total
5	5	15x2	10	10	60

C. Revaluation

In the new system of grading, revaluation is permissible. The prevailing rules of revaluation are applicable to CBCSS VUG 2021. Students can apply for photocopies of answer scripts of external examinations. Applications for photocopies/scrutiny/revaluation should be submitted within 10 days of publication of results. The fee for this shall be as decided by the University.

D. Internship and Project

a) Internship or the mini/main project should be carried out in the industry, not necessarily with industry partner. The major idea for internship is to implement the things learned and to get a real life experience.

b) The Evaluation process follows 20% internal assessment & 80% external assessment.

c) There will be internship/project at the end of 2nd and 4th semesters.

d) The sixth semester includes one internship and project for the whole semester along with a term paper. Every student shall undergo one internship for the whole semester and along with that they should do a project based on their internship. At the end of the semester they should submit internship report and project.

e) Every student will be assigned an internal guide, allotted from the parent department concerned or an expert available in the college appointed by the principal or the head of the department. The student has to make regular discussions with the guide while choosing the subject/area and throughout the life time of the project.

f) At least three reviews will be conducted to evaluate the progress of work.

g) External examination is conducted as single. The evaluation (internal as well as external) will be done separately for internship and project. In the mark sheet and Grade Card, the split up mark will be shown.

h) External examiner is allotted by the college from the approved examination panel and a faculty from the institution. External examiner may be from the industry is find in the panel.

i) Students should submit a report of their work. A valid certificate of internship from the organization should be produced as a proof that the work is carried out in the respective organization. Attendance statement also should be produced.

j) Students are required to make the presentations of their work to present before the panel of examiners. A viva will be conducted based on the report and students are supposed to clarify the queries regarding their work.

Mark distribution for Mini Project/internship

Distribution	External	Internal
Report	40	5
Viva-voce	20	10
Total	60	15

Mark distribution for internship

Distribution	External	Internal
Report	100	10
Viva-voce	60	30
Total	160	40

Mark distribution for Project

Marks Distribution	Total marks	Internal Assessment Marks
Topic selection	20	5
Result	40	5
Presentation	30	10
Report/Dissertation	20	10
Viva-voce	50	10
Total	160	40

E. Evaluation of Audit courses

The examination shall be conducted by the college itself from the Question Bank prepared by the University. The Question paper shall be of 100 marks of 3 hour duration.

F. Evaluation of Term Paper / Report/Thesis

The term paper shall be in the sixth semester along with internship and project. It should be in the standard format which is eligible for publishing. It has no external evaluation but only internal assessment.

G. Minimum for pass

Each course pass percentage is 35% and above. The successful completion of all the courses prescribed for the diploma/degree programme with P grade shall be the minimum requirement for the award of diploma/degree.

Notes: 1. For Project/internship, the minimum for a pass shall be 50% of the total marks assigned to the respective examination. A student who does not secure this pass marks in Project/internship will have to repeat the respective subject.

2. If a candidate has passed all examinations of B.Voc. Programme (at the time of publication of results of last semester) except Internship and Project in the last semester, a re-examination for the same should be conducted within one month after the publication of results. Each candidate should apply for this Save-A-Year examination within one week after the publication of last semester results.

H. Results

a) A minimum of 20% marks in external evaluation is needed for a pass in a course. But no separate pass minimum is needed for internal evaluation. No separate grade/mark for internal and external will be displayed in the grade card; only an aggregate grade will be displayed. Also the aggregate mark of internal and external are not displayed in the grade card.

b) student who fails to secure a minimum grade for a pass in a course is permitted to write the examination along with the next batch. After the successful completion of a

semester, Semester Grade Point Average (SGPA) of a student in that semester is calculated using the formula given below. For the successful completion of a semester, a student should pass all courses. However, a student is permitted to move to the next semester irrespective of SGPA obtained

SGGPA of the student in that semester is calculated using the formula

$$\text{SGPA} = \frac{\text{Sum of the Credit points of all courses in a semester}}{\text{Total Credits in that semester}}$$

The Cumulative Grade Point Average (CGPA) of the student is calculated at the end of a programme. The CGPA of a student determines the overall academic level of the student in a programme and is the criterion for ranking the students. CGPA can be calculated by the following formula

$$\text{CGPA} = \frac{\text{Total credit point obtained in 6 semesters}}{180}$$

16. AWARD OF DEGREE

The successful completion of all the courses (General Education Components, Skill Development Components and Audit courses) prescribed for the degree programme with 'P' grade shall be the minimum requirement for the award of degree.

Levels of Awards

B. Voc is a programme with multiple exits. Following table shows the various certificates and their duration.

Awards	Duration	NSQF Levels
Diploma in Nutritional Assistant	2 semester	Level 5
Advance Diploma in Dietician Assistant	4 semester	Level 6
B. Voc Degree in Nutrition science & dietetics	6 semester	Level 7

a) Students are free to exit at any point in the duration of the programme.

b) Only those students who successfully complete the courses and clear the examination are eligible for the certificate.

c) Separate certificate will be awarded for each year for successful candidates. A candidate who successfully completes first two semesters shall be awarded a Diploma Certificate, first

four semesters shall be awarded an Advanced Diploma Certificate and clearing all the semester shall be awarded B.Voc Degree certificate.

d) Students who fail in any course may be allowed to move the higher level but won't be eligible for any certificates until he/she clears previous courses.

e) B. Voc degree will confer to those whose successfully complete the diploma, higher diploma and internship and project at the sixth semester

Scope of the programme

Sector Skill Council	Health care
Sub Sector	Allied Health And Paramedics
NSQF Level	**QP Code/NOS/Job Role**
Level 5(1 year completion)	Level 5(1 year) –Asst. Nutritionist
Level 6 (2 Year completion)	Level 6 (2 Year)- Asst. Nutritionist
Level 7(3 Year completion)	Level 7(3 Year)- Nutritionist /Dietitians

B.Voc. Nutrition Science & Dietetics Programme – Structure, Work load and Credit distribution

Sem. No	Course No.	Course code	Name of the course	Credits	Marks		
					Internal	External	Total
1	1.1	A01	ENG1A01-English	3	15	60	75
	1.2	A02	ENG1A02-English	3	15	60	75
	1.3	A07(3)	MAL1A07(3) HIN 1A07 (3) ARA1A07(3)-Additional Language	4	20	80	100
	1.4	SDC1HC01	Basic Nutrition	5	20	80	100
	1.5	SDC1HC 02	Human Physiology	5	20	80	100
	1.6	SDC1HC 03	Food Science	5	20	80	100
	1.7	SDC1HC 04	Family Meal Management	5	20	80	100
Audit course I							
2	2.1	A03	ENG2A03-English	4	20	80	100
	2.2	A04	ENG2A04-English	4	20	80	100
	2.3	A08(3)	MAL2A08 (3) HIN 2A08 (3) ARA2A08(3) Additional Language	4	20	80	100
	2.4	SDC2HC 05	Community Nutrition	5	20	80	100
	2.5	SDC2HC 06(P)	Food Science Practical	5	20	80	100
	2.6	SDC HC 07(P)	Human Physiology Practical	5	20	80	100
	2.7	SDC2HC 08 Pr.	Mini project/Internship	3	15	60	75
Audit Course II							
3	3.1	A11	Biodiversity -Scope and Relevance	4	20	80	100
	3.2	A12	Research Methodology	4	20	80	100
	3.3	SDC3 HC 09	Basic & Food Microbiology	5	20	80	100
	3.4	SDC3 HC 10	Nutritional Biochemistry	4	20	80	100
	3.5	SDC3 HC 11	Basic Dietetics	5	20	80	100
	3.6	SDC3 HC 12	Health Psychology	4	20	80	100
	3.7	SDC3 HC 13	Health & Fitness	4	20	80	100
Audit Course III							
4	4.1	A13	Natural Resource Management	4	20	80	100
	4.2	A14	Intellectual Property Rights	4	20	80	100
	4.3	SDC4 HC 14	Hospital Food Service management	4	20	80	100
	4.4	SDC4 HC 15	Nutraceuticals & Functional Foods	4	20	80	100
	4.5	SDC4 HC 16	Diet Counselling & Patient care	5	20	80	100
	4.6	SDC4 HC 17	Sports Nutrition	5	20	80	100
	4.7	SDC4HC 18(P)	Nutritional Practical	4	20	80	100
Audit Course IV							
5	5.1	SDC5 HC 19	Advanced Diet Therapy	5	20	80	100
	5.2	SDC5 HC 20	Bio ethics	3	15	60	75
	5.3	SDC5 HC 21	Nutrition through Life cycle	5	20	80	100
	5.4	SDC5 HC 22	Food Toxicology & Adulteration	4	20	80	100
	5.5	SDC5 HC 23	Nutrigenomics	4	20	80	100
	5.6	SDC5 HC 24	Statistical Methods for Biology	4	20	80	100
	5.7	SDC5HC 25(P)	Dietetics Practical	5	20	80	100
6	6.1	SDC6 HC 26Pr	Internship, Project Work+Term paper	30	40+40 +50	160+160	450
Total				180	810	3040	3850

SEMESTER I

Course code	Title of course	Hours per week	No. of credits	Total credits
A01	ENG1A01-English Transaction	3	3	30
A02	ENG1A02-English Ways with words	3	3	
A07(3)	MAL1A07(3) HIN 1A07 (3) ARA1A07(3)-Additional Language	4	4	
SDC1HC01	Basic Nutrition	5	5	
SDC1HC02	Human Physiology	5	5	
SDC1HC03	Food Science	5	5	
SDC1HC04	Family Meal Management	5	5	
	Audit Course I*		4*	

* Credit will not be counted for CGPA or SGPA calculation

SDC1HC01 BASIC NUTRITION (5 CREDITS)

Objectives:

To enable the students

1.Understand the meaning of nutrition.

2.Understand the role of nutrition in human life.

3.Increase the ability to overcome deficiency

UNIT 1 (5 Hours)

History of Nutrition – Development of Nutrition as a Science – Definition of Nutrition – Under nutrition, over nutrition and malnutrition. Introduction to nutrition – food as a source of nutrients, function of foods, definition of nutrients , adequate , optimum and good nutrition, malnutrition. Inter relationship between nutrition and health, visible symptoms of good health.

UNIT 2 (15 Hours)

Energy-Energy units – Kilocalories, Megajoules, determination of energy valueof foods, using Bomb calorimeter, diagram of Bomb Calorimeter – gross calorific values. Physiological energy, value of foods, relation between oxygen used and calorific value. Determination of energy requirements, direct calorimetry. Relation between Respiratory quotient and energy output – Specific dynamic action of food (Thermogenic food in REE) indirect calorimetry – Basal metabolism – definition, determination – Benedict Roth basal Metabolism Apparatus – factors affecting BMR – determination of energy metabolism, during work – energy requirements for various types of activities, factorial methods for calculation of the daily energy requirements of an adult forvarying degrees of physical activity – recommended allowances for calories, energy requirements of adults expressed in terms of Reference man and Reference woman – FAO committee and ICMR committee percent calories supplied by carbohydrates, fats and proteins in average Indian diets – Energy requirements for different age groups.

UNIT 3 (10 Hours)

Carbohydrates: Definition and composition, classification, Review of digestion, absorption and metabolism – word diagram – Regulation of blood sugar, Hormonal controls, functions of carbohydrates in the body. Dietary fibre– Definition, soluble and insoluble fibres, sources of fibre, components, physiological effects of dietary fibre; Role of fibre in human nutrition, sources and requirements.

UNIT 4 (10 Hours)

Lipids: Classification, Composition function – essential fatty acids, deficiency, food sources of EFA, Function of TGL, Characteristics of animal and vegetable fats, sterols –

cholesterol – function, food sources, phosopholipids – function, ketone bodies – fat requirements – food sources.

UNIT5 (10 Hours)

Proteins: Composition – structure and classification, function of protein, Amino acids – Indispensable and dispensable amino acids – special function of amino acids – protein deficiency – Protein Energy Malnutrition – KWASHIORKOR and MARASMUS –etiology, clinical features, treatment and prevention – Evaluation of protein quality – PER, BV, NPU and NPR, chemical score, mutual and amino acid supplementation of proteins.

UNIT 6 (10 Hours)

Fat soluble Vitamins : vitamins A, D, E and K:Functions, deficiency, food sources & requirements.

Water soluble Vitamins: Vit-C and B Complex vitamins: Functions, deficiency, food sources and requirements.

UNIT 7 (10 Hours)

Macro Minerals- Calcium, Phosporous, Magnesium, Potassium, Sodium and Chloride-Distribution in the body; functions, effects of deficiency, food sourcesand RDA.

Micro Minerals in human nutrition - Iron, Zinc, Fluoride and Copper Distribution in the body; functions, effects of deficiency, food sources and requirements for different age groups.

Ultratrace Minerals: Iodine and Cobalt. Distribution in the body; functions, effects of deficiency, food sources and requirements.

UNIT 8 (5 Hours)

Water: as a nutrient, functions, sources, requirements. Distribution of water in the body, exchange of water in the body, composition of body fluids, water exchange between plasma and interstitial fluid.Water imbalance – dehydration- water intoxication, water and electrolyte mechanism - ADH , vasopressin.

Outcomes :

The student will be able to

1.Apply basic nutrition knowledge in making foods choices and obtaining an adequate diet.

2.Gain knowledge about energy requirements and the Recommended Dietary Allowances.

3.Understand the functions and role of macronutrients, their requirements and the effect of deficiency and excess

4.Analyze the role of various minerals and vitamins important in maintaining health.

5.Appreciate the importance of water and electrolytes in the human body

6.Learns the impact of various functional foods on our health

References:

1. Essential of food & Nutrition –Vol. 1 M. Swaminathan,Bappco,Bangalore.
2. Human Nutrition and Dietetics –Davidson S. Passmore
3. Normal and Therapeutic Nutrition- Corinne .H.Robinson & Marilyn Lawler
4. Contemporary Nutrition - Gordon M. Wardlaw, Paul Insel et, al., (2000) Mosby,Chicago.
5. Nutrition- concepts and controversies- Eleanor Whitney –Eighth Edition
6. (2000)
7. Basic principles of Nutrition- Seema Yadav, First edition (1997)
8. Essentials of Nutrition and Diet therapy -Sue Rodwell Williams, fifth edition,Times Mirror Mosby College Publishing, 1990.
9. Understanding Nutrition -Whitney P.N. and Roes S.R., West PublicationCo,1996.
10. Swaminathan,M.Essential of Food & Nutrition,1974.Bappco,Bangalore. 10.Jussawalla,JM.Natural Dietics,A hand book on Food,Nutrion and
11. Health.Wikas publishing house.
12. Sumati R Mudambi,Rajogopal,M.V.Fundamentals Food,nutrition & Diet Therapy,1982.New Age PLtd.
13. Education planning group.Food & Nutrition,1980.Arya publishing group,New Delhi
14. National Institute of Nutrition, Food & Health,I.C.M.R,Hyderabad

SDC1HC02 HUMAN PHYSIOLOGY (5 CREDITS)

Course Objectives:

To enable the students to

1. Understand the structure and physiology of various organs in the body.

2. Obtain a better understanding of the principles of nutrition and dietetics through the study of physiology.

UNIT 1 (5 hours)

Cell: Introduction - cell under e/m. Recent concepts.

Tissues: Classification, structure and function.

UNIT-2 (5 Hours)

Blood: Composition, constituents, functions, wounds, hemorrhage, reticulo- endothelial system, body defence against diseases.

UNIT-3(10 Hours)

Blood circulation: clotting, blood groups – Blood Vessel Artery, Vein, capillary, pulse, systolic, diastolic, anaemia, leukemia, varicose veins, atherosclerosis, Angina pectoris

Heart: Anatomy of the heart-structure of .the heart properties of cardiac muscle, origin and conduction of heart beat, cardiac cycle, cardiac output, heart sounds, blood pressure - definition and factors affecting blood pressure and ECG.

UNIT 4 (10 Hours)

Respiratory system: Anatomy and physiology of respiratory organs. Gaseous exchange in the lungs, mechanism of respiration. Organs of respiration – Nose, larynx, Trachea, bronchi, lungs and its capacity – structures and functions, mechanism of respiration – chemical respiration – Tissue respiration.

UNIT 5(10 Hours)

Digestive system: Anatomy of gastro-intestinal tract. , structures, functions– Teeth, tongue, salivary glands, saliva, composition and function. Oesophagus, Stomach, Small intestine, Large intestine, Pancreas, Liver, Gallbladder.

UNIT 6 (10 Hours)

Muscle and nerve: Types of muscles – striated, non-striated, cardiac - similarities and differences. Conduction of nerve impulses - Physiology of muscle contraction.

Nervous system: General anatomy of nervous system, functions of the differentparts, reflexes, autonomic nervous system. Structure of a nerve cell, nerve fibres & an outline classification of nervous system. Conduction of nerve impulse, synapse, Reflex action,

UNIT 7(15 Hours)

Excretory system: Structure of kidney, formation of urine, acid-base balance, skin-temperature regulation, water balance. Organs, structure and functions of kidney, Ureter, Urinary bladder. Formation of Urine, composition of normal urine

Endocrinology : Hormones – Endocrine glands – their structure and functions Pituitary, thyroid, parathyroid, adrenal and pancreas - functions of the hormones and their relationships. Endocrine system – disorders of over and under secretion.

UNIT 8(5 Hours)

Reproductive system : Anatomy of male and female reproductive organs, hormonal regulation of female reproductive function, menstruation, fertilization, pregnancy, lactation - hormone influence.

UNIT 9 (5 Hours)

Sense organs: Physiology of vision, hearing, taste, smell and cutaneous sensations.

Skin: Structure and function. Disorders of Skin - burns.

Course outcomes:

1. Able to understand the composition and functions of blood and lymph
2. Understand the physiology of Respiratory system and Cardiovascular system
3. Able to integrate the physiological functions of the digestive system and excretory system
4. Apply the physiological concepts of the reproductive system and endocrine system
5. Analyse the vital organ functions in respect to maintenance of human health

References:

1. Gordeon Sears, W. and R.S. Winwood 1986. Anatomy and physiologyfor nurses, London
2. https://www.khanacademy.org/science/health-and-medicine/human- anatomy-and-physiology
3. www.sciencedaily.com/articles/h/human_physiology.html
4. **Gary.A Thibodeau and Kelvin. T.Patlon, Anthony's** Text Book of Anatomy And Physiology, Seventeeth edition, Mosby Publications, Indiana Print, 2004.
5. **Anne Waugh and Allison Grant Ross and Wilson** Anatomy And Physiology In Health and Illness Elsevier Publication, Ninth Edition, 2005.
6. **Guyton, A.C,** Text Book of Medical Physiology, 4th Edition, W.B. Saunders Co. Philadelphia, 1996.

SDC1HC03 FOOD SCIENCE (5 CREDITS)

Course Objective

1.Understand to use the four food groups in daily life

2.Apply various preparation methods for various foods

3.Explain the nutrient in foods and the specific functions in maintaining health.

4.Apply food science knowledge to describe the functions of ingredients in food.

5.Identify various changes in cooking the food

UNIT 1(5 hour)

Introduction to Food science:

Food: Definition: Food, Food Science. Basic Four, Functions of food –Energyyielding, Body Building and Protective foods.

Cooking Methods: Objectives of cooking, cooking methods-Moist, Dry and Combination methods of cooking.

UNIT 2(35 hours)

Study of Foods-Plant Source:

Cereals: Structure, composition and nutritive value – Rice,Wheat and Millets-ragi, bajra, jowar and maize Changes in cooked starch- Gel formation, Retrogradation, syneresis. Effects of Dry heat - Dextrinisation. Cereal protein- Gluten, Role of cereals in cookery.

Pulses: Types, Composition and Nutritive value, cooking process- soaking, germination, advantages of germination, fermentation. Toxic constituent presence and removal, factors affecting cooking quality, Germination- Process and its advantages. Role of pulses in cookery.

Vegetables: Classification, composition and nutritive value. Changes occur during cooking of vegetables, Role of Vegetables in cookery.

Fruits: Classification, composition and nutritive value, Ripening of fruits, Enzymatic browning reaction and its preventive measures.

Nuts and Oil seeds: Composition and nutritive value of oil seeds (Flaxseed, Pumpkin seed, Gingelly seed) and specific fats and oils(butter, margarine, sesame oil, coconut oil, groundnut oil) Effects of heat on cooking of fat, Rancidity- Types and its prevention. Role of fats and oils in cookery and role of oil seeds in cookery.. Composition of specific nuts - almonds, coconut, groundnut, walnut and their importance, role of nuts in cookery.

Beverages: Classification - coffee, tea, fruit beverages, soup and malted beverages.

Spices and condiments – Specific spices, medicinal properties of Indian spices,role of spices

UNIT 3(25 Hours)

Animal source:

Milk: Composition and nutritive value. Milk products - Non fermented and fermented products. Cooking process- Effect of heat- Scum formation, Boiling over. Pasteurization and its general methods.

Egg :Structure,composition and nutritive value, quality of egg, Role of egg in cookery

Fleshy foods: Meat- Structure, composition and nutritive value, postmortem changes, ageing and tenderizing of meat, factors affecting cooking quality of meat.

Poultry: Classification, composition and nutritive valueUNIT 4 (5 Hours)

Marine Source

Fish: Classification, composition and nutritive value, selection of fish and fish cookery.

UNIT 5(10 Hours)

Food Preservation: Objectives of food preservation. Methods of food preservation- high and low temperature, drying and dehydration, chilling & freezing, , radiation, chemical preservatives.

Course Outcome:

Upon successful completion of this course, the student will be able to:

1.Understand the nutrient content, different stages of milling process and by products of cereals, millets, pulses and oil seeds.

2.Ability to develop various fruit and vegetable products with quality assurance and safety. and Understand principles and methods of preservation of fruits and vegetables.

3.Be able to understand the different processing and preservation methods in milk, meat, poultry, egg and fish.

4.Depict the functions and types of packaging and packaging materials, labelling.

5.The students once they complete their academic projects, shall get an adequate knowledge on patent and copyright for their innovative research works.

6.During their research career, information in patent documents provide useful insight on novelty of their idea from state-of-the art search. This provide further way for developing their idea or innovations

References:

1. Potter, N. 2005. Food Science, CBS Publishers and Distributors, Delhi.
2. Srilakshmi, B. 2005. Food Science. New Age International (P) Ltd.,Publishers, New Delhi
3. Paul and Paulmer, Food Theory and Application – John Wiley and sons,New York, 1972.
4. Swaminathan M., Food Science and Experimental foods, Ganesh and Co., Mafras, Reprint 1979.
5. Manay Shakunthala, N and Shadaksharaswamy M. Foods facts andPrinciples, New Age International (P) Ltd Publishers, Reprint 2005.
6. Swaminathan M. Essentials of Food and Nutrition, Vol I & II BappoPublications, 1996.
7. Swaminathan M., Food Science, Chemistry and Experimental foods,Bappo Publishers company Ltd,1997

SDC1HC04 FAMILY MEAL MANAGEMENT (5 Credits)

Objectives :

1. Determine physiological changes at different stages of lifecycle.
2. To discuss, contrast and evaluate the roles of nutrition within the complex processes of pregnancy, lactation, child development and ageing.
3. To discuss the impact of socioeconomic, cultural and psychological factors on food and nutrition behavior.

UNIT 1 (13 hours)

Introduction to meal management: Balanced diet - food guide, food pyramid. Basic principles of meal planning - objectives - steps in meal planning , Meal planning for the family.- food cost

UNIT 2 (12 hours)

Nutrition in pregnancy: physiological stages, food selection - complications of pregnancy. Nutrition during lactation - Physiology of lactation – nutrition requirements, special foods given during lactations.

UNIT 3 (12 hours)

Nutrition during infancy: Growth and development – nutrition requirements - Breast feeding - Infant formula – Introduction of supplementary foods. Nutrition during early childhood (Toddler/ Pre school) Growth and Nutritional needs - nutrition related problems. Feeding patterns - acceptance

UNIT 4 (13 hours)

Nutrition of school children: Nutritional requirement - Importance of snacks - school lunch. Nutrition during Adolescence Growth development and nutrient needs - food choices, eating habits – factors influencing them.

UNIT 5 (12 hours)

Nutrition during adulthood: Geriatric nutrition - Factors affecting food intake and nutrient use - nutrient needs -nutrition related problems

UNIT 6(13 hours)

Meal planning for the family. Indian meal patterns - vegetarian & non- vegetarian. Food faddism & the faulty food habits. Nutritive value of common Indian recipes.

Outcomes:

The student will

1. Learn and apply the latest in research-based nutrient needs of pregnant and lactating females.
2. gains knowledge about the changing nutritional needs of an infant and about complementary feeding.
3. able to relate nutrient needs to developmental stages and plan diets which will adequately meet nutritional needs during childhood.
4. learn the impact of growth and development in arriving at the nutritional needs of adolescents.
5. able to connect the role of changing metabolism, risk of chronic diseases and impact of functional foods in effectively planning diets for adults.
6. gains competence on meeting nutrition needs and establishing dietary patterns to promote optimum health and reducing the impact of chronic diseases in the elderly.

References:

1. Guthrie H.A. & Others, "Introductory Nutrition", 1986, 6th ed. TimesMirror/Mosby College Pub Louis.
2. Anderson L. et al, "Nutrition in Health and Disease', 1982, 17th ed, J.BLippincott Co Philadelphia.
3. Whitney E.N., Hamilton E.N. & Raffes S.R., "Understanding Nutrition", 5thed. West Pub.Co. New York.
4. Recommended Dietary Intakes for Indians, I.C.M.R. 1989.
5. Mudambi, S.R. & M.N. Rajagopal - "Fundamentals of Food and Nutrition",3rd ed.Wiley Eastern Ltc New Delhi-19.
6. Guthrie, H.A,, "Introductory Nutrition", 6th ed., Times Mirror/MosbyCollege Publ.- St Louis 1989.
7. Worthington Roberts, Bonnie S & others - "Nutrition in Pregnancy &Lactation", 3rd ed. Times Mirror Mosby College, St. Louis, 1985.

SEMESTER II

Course code	Title of course	Hours per week	No. of credits	Total credits
A03	ENG2A03-English Writing for Academic & professional success	4	4	30
A04	ENG2A04-English Zeitgeist	4	4	
A08(3)	MAL2A08 (3) HIN 2A08 (3) ARA2A08(3) Additional Language	4	4	
SDC2 HC05	Community Nutrition	5	5	
SDC2HC06(P)	Food Science Practical	5	5	
SDC2HC07(P)	Human Physiology Practical	5	5	
SDC2HC08 Pr	Mini Project	3	3	
	Audit Course II*		4*	

* Credit will not be counted for CGPA or SGPA calculation

SDC2NSD05 COMMUNITY NUTRITION (5 CREDITS)

Course Objective:

1.Assess the nutritional status of the community.

2. Addressing the nutrition problems in the community through proper evaluation.

UNIT 1 (10 hours)

Community nutrition: Definition, Concept of Community, types of Community, Factors affecting health of the Community.ecology of malnutrition: Dietary factors, economic factors, socio cultural factors and environmental factors; vicisious and virtuous cycle of malnutrition; Types of malnutrition - under nutrition and over nutrition. Characteristics of community- Demography, Vital statistics,Definition: IMR, NMR and MMR. morbidity. Causes of malnutrition- prevalence of Malnutrition in India.Balance between food and population growth. Effects of malnutrition on general health, physical, mental and national development.

UNIT 2 (10 hours)

Nutritional problems of the community: Nutritional problems of the community, causes and incidence of nutritional problems in infancy,pre-school children, adolescents, pregnant and lactating mothers and old age. Under nutrition - Protein Energy malnutrition - Prevalence, classification - Kwashiorkor and Marasmus - etiology, symptoms, pathological changes, biochemical metabolicchanges. Anaemia, Vitamin A deficiency - Prevalence, etiology, symptoms.Over nutrition – obesity, coronary heart disease, diabetes.Other problems- Goitre andFluorosis.

UNIT 3 (30 hours)

Nutritional Assessment and Surveillance: Meaning, need, objectives and importance. Methods of assessment of nutritional status and their merits and demerits-Sampling techniques- Identification of risks groups.

I. Direct assessment –

a.Diet surveys-Need and importance, methods of dietary survey, Interpretation -concept of consumption unit, individual and total distribution of food in family,adequacy of diet in respect to RDA, concept of family food security.

b.Authropometry- Nutritional anthropometry:Need and importance, standard for reference, techniques of measuring height, weight, head, chest and armcircumference, interpretation of these measurements. Use of growth chart.

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

d. Biochemical estimations.

II. Indirect assessment – food balance sheets and Agricultural data, Ecological parameters and vital statistics. Use of growth charts.

UNIT 4 (5 hours)

Breast feeding and its implications, Hazards of bottle feeding – Review. Weaning foods-planning, formulating and preparing importance of correct and timely weaning – Review

UNIT 5 (5 hours)

Nutrition and infection-relationship, immunization and its importance.Recent advances in Community Nutrition research – Fortification & food adulteration.

UNIT 6(10 hours)

Nutrition intervention programs**-** Schemes and programs for various nutritional problems in India: Prophylaxis programs, mid day meal program, SNP and ICDS-Objectives and services. , National Nutrition Anemia Prophylaxis Programme (NNAPP) and Vitamin A Prophylaxis Programme (VAPP) and Goiter Control.Role of National organizations (ICAR, ICMR, NIN) and International organizations (FAO, WHO, UNICEF, CARE) and National Nutrition Policy in Community Nutrition and Health.International, national, regional agencies and organisations. Nutritional intervention programmes to combat malnutrition.

UNIT 7 (5 hours)

Nutrition education: Meaning, objectives, types and methods; Principles of planning, execution and evaluation of nutrition education program; Merits and limitations.

Course Outcome :

1.Upon successful completion of this course, the student will be able to:

2.Demonstrate effective and professional oral and written communication and documentation

3.Develop interventions to affect change and enhance wellness in culturally diverse individuals and groups (measured through the grant writing process assignment).

4.Assess the impact of a public policy position on nutrition and dietetics practice.

5.Demonstrate cultural competence/sensitivity to diverse groups and environments.

6. Explain the impact of a public policy position on dietetics practice.

7. Explain the impact of health care policy and different health care delivery systems on food and nutrition services.

References:

1. McLaren.D.S., ED-1983. Nutrition in the Community. John Weley and sons.

2. Jelliffe. D.B.-1996. The Assessment of Nutritional status on the community- WHO Monograph series No. 53-geneva.
3. Reh, Emma-1976. Manual on Household Food consumption surveys, FAO.Nutritional studies No.18 Rome
4. Shukla, P.K.- 1982. Nutritional problem of India-prentice Hall of India Pvt.Ltd., New Delhi.
5. Shanti ghosh-1977. The feeding and care of infants and young children,voluntary Health Association of India-New Delhi.
6. Ibrahim. G.J-1983. Nutrition in mother and children Health. London,Macmillan.
7. Ritchey, S.J. and J. Taper-1983. Maternal and child Nutrition. Harper and Row publishers, New Delhi.

SDC2HC06 (P) FOOD SCIENCE PRACTICAL (5CREDITS)

Objectives

1. To know the chief nutrition provided by each category of food groups.
2. To know the methods and principles involved in cooking.
3. To Get familiar with weights, measures of both raw ingredients and cooked foods
4. To Enable students to understand the basics of planning menu and prepare food items for different age and income groups
5. To Understand the role of a dietitian, home maker in planning and preparing a menu

1. Introduction to Laboratory:

(a) laboratory rules (b) Familiarizing with laboratory equipments, weighing methods and preliminary preparation for cooking.(c)testing quality of prepared food (sensory attributes)-Hedonic scale-9 point scale

2. Cereals and cereal products:

Determination of Gluten content in Wheat, Maida and rice flour- percentage of water absorption,weight of wet and dry gluten**.** Separation of gluten content of wheat.

Prepare the Recipes for Idli, Ragi Adai, Tomato rice

3. Pulses:

Germination of few pulses-soaking and germination

Prepare the Recipes for Sambar, kootu, black gram dhal vadai

4. Vegetables and Fruits

Vegetables – study on the effect of acid, alkali, heat and time on the colour,texture and flavor.

Fruits – Enzymatic browning and its prevention by blanching experiment. Prepare the recipe for Vegetable- Avial and vegetable briyani Fruit salad andapple milk shake.

5. Milk and Milk products:

Preparation of Milk products-curd, paneer, whey water.

Prepare the Recipes for Payasam, Mour curry and adaprathaman.

6. **Egg**:

Quality of egg-Floating test, candling and test for interior quality.

Prepare the Recipes for scrambled, poached egg, custards (double boilingmethod), omelette, egg curr

7. Sugar and Jaggery – Experimental cookery.

preparation of candy, fondant, mysore – pak. Identify the stages of sugar cookery using food thermometer- refined sugar and country's jaggery powder (Thread test, cold water test, plate test, temperature test)

prepare the Recipes for chocolate fudge, peanut brittle, laddu, mysore pak and Athirasam

8. **Fats and oils**:

Smoking point temperature of different fats and oils (gingelly oil, groundnut oil& coconut oil)

Prepare the Recipes: for Puri, potato chips, masal vadai and dough nuts.

9. Beverages:

Preparation and evaluation of Coffee (Filter and instant method),Tea, Soup,fruit and milk based drinks,malted beverages-any 2 recipes on each class

10. Spices:

Prepare the Recipes :for using spices and condiments- , Rasam, Panagam,Cinnamon tea and detoxifying drink

Outcomes:

The student will be able to

1. apply basic nutrition knowledge in making foods choices and obtaining an adequate diet.
2. gain knowledge about energy requirements and the Recommended Dietary Allowances.
3. understand the functions and role of macronutrients, their requirements and the effect of deficiency and excess
4. analyze the role of various minerals and vitamins important in maintaining health.
5. appreciate the importance of water and electrolytes in the human body. impact of various functional foods on our health
6. gain competence in connecting the role of various nutrients in maintaining health and learn to enhance traditional recipes.

SDC2HC7 (P) HUMAN PHYSIOLOGY PRACTICALS (5 CREDITS)

Objectives :

To enable the students to :

1. Gain knowledge to examine the features of tissues, muscles and organs under microscope.
2. Become familiar in estimation of haemoglobin and in measuring the blood pressure

Experiments:

1. Study of Human (manekin) : - Abdominal cavity of Human observe & draw liver, kidney, appendix, spleen, Pancreas, stomach, gall bladder, large and smallintestines, ureter, bladder, diaphragm
2. Types of Cells: Microscopic examination of prepared slides.
3. Cell division – Resting stage, prophase, metaphase, anaphase, telophase.Examine and draw the tissues.
4. Histology of tissues- columnar, cubical, ciliated, squamous and stratified squamous. Epithelial, connective- Adipose, Bone, areolar, connective tissue,muscular -– smooth, cardiac, stratified and nervous tissues.
5. Histology of muscles- cardiac, striated and non-striated.
6. Microscopic structure of organs- stomach, liver, ovary and pancreas.
7. Histology of Artery and Vein.
    a) Lung Section. b) Trachea.
8. Estimation of haemoglobin by Shali's method.
9. Measurement of blood pressure using Sphygmomanometer-Before and after exercise.- At different positions standing, sitting and reclined.
10. Determination of pulse rate.
11. Determination of blood group.
12. Bleeding time, clotting time
13. Enumeration of Red Blood Cells -Demonstration.
14. Enumeration of White Blood Cells.
15. Respiratory rate and pulse rate
16. Visit to a clinical laboratory.

Course Outcomes:

1. By the completion of the course the graduate should able to
2. Know the composition of Blood
3. Understand the features of tissues, muscles and organs.
4. Acquire skills in estimating the haemoglobin and measuring the blood pressure.
5. Determine the normal and abnormal value of blood constituent
6. Demonstrate the organ functions using apparatus.

SEMESTER III

Course code	Title of course	Hours per week	No. of credits	Total credits
A11	Biodiversity -Scope and Relevance	4	4	30
A12	Research Methodology	4	4	
SDC3HC09	Basic & Food Microbiology	5	5	
SDC3HC10	Nutritional Biochemistry	4	4	
SDC3HC11	Basic Dietetics	5	5	
SDC3HC12	Health Psychology	4	4	
SDC3HC13	Health & Fitness	4	4	
	Audit Course III*		4*	

* Credit will not be counted for CGPA or SGPA calculation

SDC3HC09 BASIC & FOOD MICROBIOLOGY (5 CREDITS)

Course Objective:

1.Learn about morphological characteristics of different micro-organism associated to food.

2. Learn about the spoilage and factors affecting the growth of microorganisms in food .
3. Impart the knowledge about the role of micro-organisms in fermentation of foods.

4 Create awareness about hygiene and sanitation in food industry.

UNIT 1(5 hrs)

Introduction

Importance of study of micro organism. classification of microorganism

UNIT 2 (10 hrs)

Evolution: History of Microbiology, - theory of spontaneous generation, Germ theory of disease, Koch's postulates, pure culture concept.

Microscopy: Parts of microscope, Resolving power, Limits of resolution, Refractive index, Magnification. Light microscope – Bright field, Dark field. Electron microscope-Transmission Electron microscope, Scanning electron microscope

UNIT 3 (10 hrs)

Bacteria & Bacterial disease: Morphology, factors affecting growth, reproduction, spore formation, Structure, growth curve. Reproduction -Binary fission, Transformation, Transduction and conjugation. Nutritional requirements. –phototrophs, chemotrophs, Autotrophs, Heterotrophs. Pneumonia, tuberculosis,

meningitis, gonorrhoea, syphilis, typhoid, cholera & tetanus

UNIT 4 (10 hrs)

Mold &Yeast: Fungus: Morphology, Classification, Reproduction –Sexual and A sexual. Yeast: Structure, Morphology, Reproduction –Budding Reproduction-–Sexual and Asexual

UNIT 5 (10 hrs)

Viruses and viral disease: Classification, Composition, Morphology, Replication of virus. chicken box, mumps, poliomyelitis, rabies, infective hepatitis, chickungunya, dengue and AIDS

UNIT 6 (10 hrs)

Culture Media: Bacteriological Media – Selective, Differential, EnrichmentMedia. Methods of isolating pure culture: Serial dilution, Pour plate, streak plate,stroke Culture

UNIT 7 (5 hrs)

Immunity: Classification-innate and acquired, active & passive immunization. schedule for children

UNIT 8 (15 hrs)

Food Spoilage: Sources of contamination, factors responsible for spoilage, factors affecting kinds and number of microorganisms in food. Chemical changes due to spoilage. Contamination and spoilage of Fruits and Vegetables, Meat & Meat products, Milk & Cream, Cereal & Cereal products, Spoilage of canned food.

Microbes in fermented foods: Fermented vegetable products, Sauer Kraut, pickles, soy sauces, idli Fermented dairy products – Cheese, yoghurt

Course Outcome:

1. Upon successful completion of this course, the student will be able to:
2. Recall the history of microorganisms in food. Identify the microorganisms found in food
3. Explain the factors that affect microbial growth in food.Discuss microbial spoilage of food.Experiment the techniques in control of food spoilage. List foodborne diseases
4. Differentiate foodborne infection and intoxication.Practice the methods for microbial examination for food.Identify the importance and properties of indicator organisms
5. Explain the principle of quality control.Discuss the role of HACCP in food safety.Identify the codes of good manufacturing practices

References:

1. Banwart GJ ,1989. Basic Food Microbiology. AVI publishers
2. Jay JM, Loessner MJ & Golden D A,2005. Modern Food Microbiology
3. .Springer Verlag
4. Ananthanarayanan R Jayaram Paniker CK ,2009 Text book of microbiology.University Press Pvt Ltd, Hyderabad
5. Prescott, L.M, Harley, J.P and Klein, D.A Microbiology . McGraw Hill NewYork
6. Frazier J& Westhoff DC,1988. Food Microbiology. McGraw Hill, NewYork.
7. Pelczar JM & Reid RD . Microbiology. Tata McGraw Hill
8. Stainer R. General Microbiology. MacMillan
9. Black, JG. Microbiology .Principles and Explorations John Wiley

SDC3HC10 NUTRITIONAL BIOCHEMISTRY (4 CREDITS)

Objectives:

To enable the students to

1. Gain basic knowledge on nutrients and their role in human health

2. Acquire scientific knowledge on health problems associated with imbalance of nutrient consumption.

UNIT 1(10Hours)

Carbohydrates: occurrence and classification. Structure of monosaccharides, oligosaccharides and polysaccharides. Physical and chemical properties of carbohydrates – optical isomerism, optical activity, mutarotation, reducing property, reaction with acids and alkalies. Glycoconjugates - Glycoproteins and Lectin - structure and significance. Definition of glycogenesis, glycogenolysis and gluconeogenesis.

UNIT 2(10 Hours)

Lipids: occurrence and classification. Storage lipids - fatty acids, triacyl glycerol, essential fatty acids, waxes. Structural lipids - role of lipids in biological membrane - glycolipids and phospholipids - types and importance; Sterols - basic structure and their importance. Physical and chemical constants of oils. Rancidity of oils. Definitions- Ketone bodies, ketogenesis and ketosis.

UNIT 3(15 Hours)

Amino acids: Types, definition of deamination, transamination and decarboxylation. classification and structure. Essential amino acids. Properties of amino acids - amphoteric nature and isomerism. **Proteins:** Classification of proteins based on functions and solubility. Structure ofproteins: primary structure, secondary structure, tertiary structure and quaternary structure - protein folding and denaturation. Properties and reactions of proteins.

Enzymes - Properties, classification and nomenclature. Mechanism of enzyme action. Factors affecting enzyme activity. Enzyme inhibition - Competitive, Non-competitive and Uncompetitive inhibition; Allosteric enzymes. Coenzymes, cofactors and isoenzyme.

UNIT 4(15 Hours)

Carbohydrate metabolism - breakdown of starch by amylases, glycolysis, TCA cycle and pentose phosphate pathway. Respiration - electron transport chain and oxidative phosphorylation. Bioenergetics of glucose.

Lipid metabolism - lipases and phospholipases. Beta-oxidation of fatty acids and bioenergetics. Biosynthesis of fatty acids and triacyl glycerol. General catabolic pathway for amino acids - transamination, deamination and decarboxylation. Elementary

knowledge of biosynthesis of protein. Ammonia assimilating enzymes. Metabolic inter-relationship.UNIT 5(5Hours)

Secondary metabolites: occurrence,classification and functions of phenolics, terpenes and alkaloids

UNIT 6 (5 Hours)

Introduction to genetic control of metabolism: Nucleic acids-Types,composition, structure, functions, replication and transcription

UNIT 7 (5 hours)

Acid – base balance: Acid-base balance in normal health, definition of buffers, principles of buffers, major sources of acid produced in the body, physiological buffer system and role of different buffer systems. Fluid and electrolyte balance**-** Maintenance in normal health.

Course outcomes

1. Understand the role of nutrients in human health
2. Provide scientific knowledge on the signs and symptoms of nutrient deficiency and Toxicity
3. Acquire knowledge in energy determination and expenditure
4. Able to differentiate the functions and deficiency of vitamins
5. Know the role of water and electrolyte balance in the human body

References:

1. **Pattabiraman. T.N.** Concise text Book of Bio- chemistry, 2nd edition, all India publishers and distributors Regd., 998.
2. **Deb. A.C.,** Fundamental of Biochemistry, New centrul book agency(p)Ltd, reprint 2004.
3. **Ambika shanmugam,** Fundamentals of biochemistry for Medicalstudents, Karthik printers, 7th edition, 1992.

SCD3 HC11 BASIC DIETETICS (5 CREDITS)

Course Objectives

To enable the students to

1. Understand the physiology, metabolism and special requirements of critically ill.
2. Know the effect of various diseases on nutritional status.
3. Learn recent concepts in dietary management of recent concepts.

UNIT 1 (15 hrs)

Diet therapy - Definition, – importance -purposes of a therapeutic diet, principles and types. Concept of Diet therapy : growth and source of dietetics, classification of therapeutic diets.modification of the normal diet -clear fluid, full fluid, soft, light, bland and regular diet – basic concepts of oral and tube feeding, pre operative and post operative nutritional care. Growth and source of Dietetics. interpersonal relationship with patient, planning and implementary dietary care, Team approach to nutritional care

Dietitian – Types, qualities, qualification and role of dietician in managing hospital dietary. – definition and responsibilities-The Hospital and community

UNIT 2 (20 hrs)

Nutritional care for weight management- Obesity and overweight: Identification, etiology, dietary management and behavioral modifications. Under weight: Etiology, assessment and dietary management.

Nutritional care for febrile condition – Acute, chronic and recurrent: Malaria, Typhoid and TB – Etiology, symptoms and dietary management.

UNIT 3 (20 hrs)

Basic concepts of Diet therapy

a.) Therapeutic Adaptation of Normal Diet.b.) Routine Hospital Diet

Enteral Nutrition –Normal diet, Soft diet, liquid diet and Tube feeding.

Parenteral Nutrition – Peripheral Nutrition and Total Parenteral Nutrition(TPN).

c. Specially modified therapeutic diets, High calorie low calorie, high and low protein, bland, high and low residue diets.

UNIT 4 (10 hrs)

Special Feeding methods- Enteral nutrition- methods- nasogastric, gastrostomy and jejunostomy types of food, infusion techniques. TPN- Types ofinfusion, TPN formula for adults.

UNIT 5 (10 hrs)

Nutritional care for deficiency disorders- PEM, Nutritional anemia, vitamin- A deficiency, Iodine deficiency, osteoporosis and osteomalacia- Etiology, symptoms and dietary management.

Course outcomes:

At the end of the course student will be able to

1. aware about the role and responsibilities of dietitian and diet counselling process
2. apply various methods and techniques in the therapeutic modification of diet
3. relate the principles of diet for allergy, burns, obesity, and underweight
4. modify dietary management for gastrointestinal disorder and malabsorption syndrome
5. describe the dietary treatment for liver, gall bladder and pancreatic disorder

References:

1. *Srilakshmi, B. Dietetics* New Age International P. Ltd., New Delhi, 2011.
2. *Dietary Guidelines of Indians – A Manual, National Institute of Nutrition,*Hyderabad, 2011.
3. *Garg, M. Diet, Nutrition and Health*, ABD Publishers, 2006.
4. *Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick, Normal and Therapeutic Nutrition,* MacMillan Publishing CO, New York,1982
5. 5.. *Krause, M.V. and Mahan, L.K. Food, Nutrition and Diet Therapy*, 9th Ed.,W.B. Saunders Company, Philadelphia, 2009.
6. *Maimun Nisha, Diet Planning for Diseases*, Kalpaz Publishers, 2006.

SDC3HC12 HEALTH PSYCHOLOGY (4 CREDITS)

Course Objective:

1. To Understand, explain, develop and test theory
2. To Evaluating the role of behavior in the etiology of illness

UNIT 1(10 hrs)

Foundation of Health Psychology: Health and health psychology-health and llness-trends that shape health psychology-perspectives in health psychology

UNIT 2 (10 hrs)

Stress and Health: measurement-physiology of stress-sources- psychological factors in stress-stress response-factors affecting the ability to cope stress management.

UNIT 3 (10 hrs)

Health psychology through life span :Childhood and adolescence-childhood nutrition, childhood obesity, adolescents and risk taking interventions, adulthood and ageing theories of ageing life style and aging.

UNIT 4 (15 hrs)

Nutrition and Illness :Nutrition-obesity-treatment-eating disorders-substance abuse-alcoholism and tobacco abuse, chronic and life threatening illness- Psychological factors in cardio vascular disease, managing stress following CVD, Health psychology and diabetes, coping with cancer, Intervention strategy for AIDS, Coping with AIDS or HIV

UNIT 5(15 hrs)

Intervention Strategies :Applications of principle of counseling and psychotherapy in disease management and health care. Relaxation technique, somatic oriented cognitive and behavioral skills in the management of diseases. Support group-family counseling, alternative healing systems.

Course Outcomes :

Upon successful completion of this course, the student will be able to
1.Understand the role of behavior in illness
2.Understand the beliefs that predict behaviors
3.Understand beliefs of health and help these beliefs to be changed.

REFERENCES:

1) Taylor.S.E. (1995), "Health Psychology", McGraw Hill Inc, New York.
2) Richard. O. Straub (2002) "Health Psychology", Worth Publishers, NewYork.
3) Ogden. J. (2000). "Health Psychology", 2nd Ed., open University Press, U.K.
4) Tones. K and Tillofrd. S (2001), "Health Promotopn Effectiveness-Efficiency and Equity", 3rd Ed., Nelson theories Ltd., U.K.

SDC3HC13 HEALTH AND FITNESS (4 CREDITS)

Course Objectives

To enable the students to

1. Introduce the fundamental concepts of physical education, health and fitness.
2. Provide a general understanding on nutrition, first aid and stress management.
3. Familiarize the students regarding yoga and other activities for developing fitness.
4. Create awareness regarding various measures of fitness and health assessment.

UNIT 1(10hour)

Health- Concept of Health, changing concepts, definitions of health, dimensions of health, concept of well being, spectrum of health, determinants ofhealth, ecology of health, right to health, responsibility for health and indicators of health. Factors affecting health and wellness. Physiological, psychological and social health. FITNESS - Definition, parameters of fitness, cardiovascular endurance, muscular strength, muscular endurance, physical fitness tests- for flexibility.

UNIT2 (5 hour)

Exercise and Health related fitness- Health related fitness, health promotion and physical activity for health benefits, Sports related fitness- Role of nutrition in sports and nutrition to athletic performance.

UNIT3 (5 hour)

Body weight and composition for Health and Sports- Ideal body weight, values and limitations of the BMI, composition of the body; Diet during training, prior to competition, during and after competition; dietary supplements for athletes.

UNIT 4(5 hour)

Warm up exercises & basic asanas - Simplified physical exercises and body stretching practices. Basic asanas, suryanamaskar, breathing exercise- pranayama

UNIT5 (5 hour)

Exercise performance- Energy expenditure during physical activity, carbohydrate metabolism and performance, fat metabolism and performance, effect of exercise on protein requirements, physique and sports performance.

UNIT 6(5 hour)

Exercise programs- Resistance exercise training, aerobic exercise, types of exercise, effective weight control - dieting or exercise; weight reduction program for young athletes.

UNIT 7(5 hour)

Physical Fitness and Management: Fitness – Types and Components of Fitness - Types of Physical Fitness - Health related Physical Fitness - Performance Related Physical Fitness - Cosmetic fitness - Modern Lifestyle andHypo kinetic Diseases – Prevention and Management

UNIT 8(10 hour)

Rehabilitation and Assessment : Sports injury and rehabilitation- Stress and strain, Basic injuries of sports persons-Evaluate the effectiveness of nutritionalsupplementation and ergogenic/ ergolytic aids -Health related Physical Fitness and Assessment -Body mass Index/ Skin folds Measurement, BMR, Pulse Rateand Blood Pressure Health Related Physical Fitness Test.

UNIT 9(5 hour)

Yoga and Fitness: principles of yoga therapy, social skills and living value based education. Yogic concepts in various diseases like diabetes, CVD, digestion and immune system.

UNIT 10(5 hour)

Special Nutrition: Basic knowledge on sports nutrition, special nutritional needs for sea voyage, military and space [basic only]

Course Outcomes

1. Demonstrate an understanding of the physiological benefits of movement, physical activity and wellness.
2. Define principles involved in increasing and maintaining physical fitness.
3. Evaluate and apply fitness and wellness concepts to individual lifestyle.
4. Design, implement, and evaluate personal wellness and fitness programs.

References:

1. K. Park Test book of preventive and social medicine, 15th edition, MISBanarsidas Bhano Publishers, Jabalpur, 1997.
2. Melvin H. Williams, Nutrition for Health, fitness and Sports, 7th edition,MC Graw Hillinternational Edition, 2005.
3. Michael J.GIbney, lan A Macdonald and Helen M.Roche, Nutrition and Metabolism,Blackwell Publishing company, Bangalore, Reprint 2004.
4. *Werner W. K Hoejer (1989), Life time Physical Fitness and Wellness,* Morton Publishing Company, Colorado.
5. *Mishra, S. C (2005) Physiology in Sports. Sports Publication*, New Delhi
6. *Greenberg, S. J and Pargman, D (1989) Physical Fitness* – A WellnessApproach Prentice Hall International (UK) Limited, London

7. *Swaminathan T, (2008) Essentials of Food and Nutrition* BangalorePrinting Publishing Co.
8. *McArdle, W. D, Frank I. Katch, F. I and Victor L. Katch (1996) Exercise Nutrition: Energy Nutrition and Human Performance*. William & WilkinPublishing USA.
9. *Mahan, K and Stump, E. S (1996) Krause Food and Nutrition and Diet Therapy* W.B Saunders Company

SEMESTER IV

Course code	Title of course	Hours per week	No. of credits	Total credits
A13	Natural Resource Management	4	4	**30**
A14	Intellectual Property Rights	4	4	
SDC4HC14	Hospital Food Service management	4	4	
SDC4HC15	Nutraceuticals & Functional Foods	4	4	
SDC4HC16	Diet Counselling & Patient care	5	5	
SDC4HC17	Sports Nutrition	5	5	
SDC4HC18(P)	Nutritional Practical	4	4	
	Audit Course IV*		4*	

* Credit will not be counted for CGPA or SGPA calculation

SDC4HC14 HOSPITAL FOOD SERVICE MANAGEMENT

(4 CREDITS)

Objectives:

To enable the students to

1. Gain knowledge about various types of food services.
2. Gain knowledge about the Principles and functions of Management.
3. To understand about personnel Management, financial management and legal aspects of catering.
4. To realise the importance of sanitation and hygiene in food service institutions like Hospitals

UNIT 1 (10hrs)

Hospital based health care and its changing scenario, Effects of globalization onhealth care, concepts of corporate hospitals in developing countries, infrastructure and lay out of an ideal corporate hospital, functioning of modern, hospital and changing needs of patients, hospitality in hospital care

UNIT 2(10 hrs)

Patient Care Services Patient Admission / discharge, cafeteria and dietary services, front office services, housekeeping services, blood bank, diagnostic services, lab, physiotherapy, pharmacy operation theatre, outpatient and inpatient ward –admission

UNIT 3 (15 hrs)

Principles of Hospital management Managerial activities for effective hospital functioning duties and responsibilities of hospital managers, qualities of office managers, effective inter and intra departmental co-ordination, understanding functioning of corporate multi specialty hospital

UNIT 4 (15 hrs)

Marketing and Material management, Human resource management, managerial accounting and financial management, importance of material management, principles of material management, inventory management. Typesof computer systems used for reservation systems, point of sale systems (POS) and property management systems.(PMS)

UNIT 5 (10 hrs)

Hospitality in hospital care Management of dietary department, diet planning for hospital diets, purchasing, storage and quantity food production, patient compliance,

food production, serving to patient- tray and trolley service, plate waste management, washing and garbage disposal.

Course Outcomes:

Upon successful completion of this course, the student will be able to:

1.Understand hospital functions and administration

2. Acquire skills in maintaining medical records

3. Understand the management of resources and food service management in hospitals

4. Plan and execute various managerial roles in a food service management within the hospitals.

REFERENCES:

1. Sudhir Andrews, Front Office Management and Operations, 2008, Tata McGraw – Hill Publishing Company Ltd.
2. Sakharka B M, Principles of Hospital Administration and Planning, 2009, 2nd Edition, Jaypee Brothers Medical Publishers (p) Ltd.
3. Sherry Glied and Peter Smith, The Oxford Handbook of HealthEconomics,2011
4. Jan Abel Olsen, Principles in Health Economics and Policy, 2009, OxfordUniversity Press.
5. Mohinder Chand, Managing Hospitality Operations, 2009, 1st Edition, Anmol Publications Pvt. Ltd. New Delhi.
6. Goel S.L, Health Care System and Hospital Administration, 2009, Vol.7,Deep and Deep Publications Pvt. Ltd.
7. Kalkar S.A, Hospital Information Systems, 2010, Published by AsokeK.Ghosh, PHI Learning Pvt. Ltd.
8. http://eurpub.oxfordjournals.org/content.

SDC4HC15 FUNCTIONAL FOODS, PROBIOTICS AND PREBIOTICS(4 CREDITS)

Course Objectives

To enable the students to

1. gain knowledge about functional foods and Nutraceuticals
2. have thorough understanding about the health effects
3. develop Comprehensive understanding of different nutraceuticals and functional foods
4. understand the potential of various functional foods in promoting human health
5. recognize factors that increase the risk of developing metabolic syndrome.
6. learn the role of probiotics in patient care as supported by evidence based medicine.

UNIT 1 (10 hrs)

Definition, history, classification. scope & future prospects of functional foods: Probiotics, prebiotics and synbiotics, Nutraceuticals ; Nutrient vs. Non-nutrient. Non- nutrient effect of specific nutrients: Proteins, Peptides and nucleotides, Conjugated linoleic acid and n-3 fatty acids, Vitamins and Minerals. Antinutrients present in food: phytate, saponin, haemagglutinins, protease, amylase and lipase inhibitors. Spices and Condiments-nutritive value and uses in cooking.

UNIT 2(10 hrs)

Nutraceuticals:Properties, structure and functions of various nutraceuticals - Glucosamine, Octacosanol, Lycopene, Carnitine, Melatonin and Ornithine alpha ketoglutarate. Use of proanthocyanidins, grape products, flaxseed oil as Nutraceuticals

Functions of nutraceuticals: Applied aspects of the nutraceutical science: Sources of Nutraceuticals. Relation of Nutraceutical Science with other Sciences: Medicine, Human physiology, genetics, food technology, chemistry and nutrition

UNIT 3(5 hrs)

Plant metabolites and non- nutrient effect of specific nutrients :Alkaloids, Glucosinolates, Terpenoides and Phenolics- Chemistry, classes, sources, bioavailability and effects on human health

UNIT 4 (5 hrs)

Probiotics : Taxonomy and important features of probiotic micro- organisms. Health effects of probiotics including mechanism of action. Probiotic micro- organisms in fermented milk products and non-milk products. Quality assurance of probiotics and safety.

UNIT 5(5 hrs)

Prebiotics - chemistry, sources and bioavailability, effect of processing, effects on human health and potential applications in risk reduction of diseases, perspective for food applications for the following: Non-digestible carbohydrates/oligosaccharides: Dietary fibre, Resistant starch, Gums.

UNIT 6 (5hrs)

Nutraceutical supplements and remedies :Nutraceutical rich supplements - Bee pollen, Caffeine, Green tea, grape tea, wheat grass, Lecithin, Mushroom extract, Chlorophyll, Kelp and Spirulina, *Garcinia cambogia* , *Aloe vera* and Blue Tea4.

UNIT 7 (5 hrs)

Food as remedies: Nutraceuticals bridging the gap between food and drug, Nutraceuticals in treatment for cognitive disorders. Medicinal plant derived nutraceuticals: Anti aging, anti- inflammatory compounds.

UNIT 8 (5 hrs)

Nutraceutical remedies for Arthritis, Bronchitis, circulatory problems, hypoglycemia. Nephrological disorders, Liver disorders, Osteoporosis, Psoriasisand Ulcers.

UNIT 9(5 hrs)

Nutrigenomics: Definition of nutrigenomics, gene expression – transcription, translation, post translational modification, nutrition in the omics era- elementary concepts on epigenetics, transcriptomics, proteomics, metabolomics;genetic variation and nutritional implications

UNIT 10 (5 hrs)

Nutrition and gene expression and nutrigenomics and complex diseases :Nutrient control of gene expression – amino acids, nucleotides, basic concepts of nutrigenomics and complex diseases – diabetes, cancer and obesity

Outcomes

1. Describe components of nutraceutical and functional foods
2. Evaluate the standards of evidence required for efficacy and safety assessment of nutraceutical and functional foods
3. Evaluate and compare the regulatory and efficacy-claim controls in India, America, Europe and Asia
4. Explain the regulatory framework required in India and globally for substantiated health claims
5. Work effectively as a group member on a specific problem related to functional foods and nutraceutical products

6. Know the importance of probiotics and prebiotics in human health

References :

1. Dhiraj A. Vattem, Vatsala Maitin, 2016. Functional Foods, Nutraceuticals and Natural Products: Concepts and Applications, DEStech Publications, Inc.
2. Joyce I. Boye, 2015. Nutraceutical and Functional Food ProcessingTechnology (IFST Advances in Food Science), Wiley-Blackwell.
3. Cho S. S. and Dreher, M.L, 2001. Handbook Dietary Fibre, Marcel DekkerInc., New York.
4. Wildman, R.E.C, 2000. Handbook of Nutraceuticals and Functional Foods,CRC Press, Boca Raton.
5. Yurawecz, M.P., M.M. Mossoba, J.K.G. Kramer, M.W. Pariza and G.J. Nelson, 1999. Advances in Conjugated Linoleic Acid Research, Vol. 1.AOCS Press, Champaign.
6. Heller IR, et al. 1999. Report by CSPI. Functional foods: public health boonor 21st century quackery? Washington, DC: Center for Science in the PublicInterest.
7. Thomas PL, Earl R, 1994. Opportunities in nutrition and food sciences.Washington, DC: National Academy Press; p 109.

SDC4NSD16 DIET COUNSELLING AND PATIENT CARE (5 CREDITS)

Objectives

1. Identify the forces that influence an individual's eating pattern.
2. Demonstrate knowledge of the dietary goals and guidelines set for indians by listing these guidelines and specifying ways to implement them into the planning of healthful diets.
3. Know the types of guidance and counseling
4. Analyze the nutritional adequacy of daily food intake by calculating the daily intake of specific nutrients and comparing them to an established standard and identifying alternative diet plans.
5. Identify food myths, fads, and fallacies and why each is incorrect.

Unit 1 (5 hrs)

Meaning and principle of Guidance and Counselling: Guidance and Counselling - definition, meaning and functions, Principles of guidance and counselling. Historical development of guidance and counselling. Maslow's Theory of Motivation - Hierarchy of Needs.

Unit2 (5 hrs)

Counselling process and Qualities of Counsellor: Counselling process- steps in counsellor process and follow up ; Variables affecting the counselling process .Qualities and skills required for the counsellor-educational and professional.

Unit 3 (5 hrs)

Types of Guidance and Counselling : Types of guidance –educational , vocational, personal and Health . types of counselling-directive, non directive and elective counselling . Methods of guidance and counselling –individual and group counselling. Ethical and Legal Issues in Counselling. Ethical Standards and Laws. Ethical Decision Making.

Unit 4 (5 hrs)

Family and Special areas in counselling: Family counselling –counselling the individual for marriage and family life, the parents of children with ADHD and behavioural problems - teen counselling, counselling the family in depression, suicide, stress and single parenting. Special areas in counselling –old age, women's issues, stress management and relief, post-traumatic stress, grief and depression.

Unit 5 (10 hrs)

Diet Counselling : Diet Counselling - definition, concept, the role of clinical dietician, the recipients, counselling environment. Factors to be considered for counselling - Nutritional and health conditions, psychological conditions, food allergies, aging, gender related and other problems. Assessment component - Methods of interview – verbal and nonverbal techniques. Counselling models – data analysis (dietary, biological, environmental, behavioural data). Designing of counselling plans – goals and objectives, resource planning – client care plan and designing evaluation instruments. Implementation component – counselling the client/patient – client concurrence, co-ordination of care plans-the provision of learning experience. Evaluation component - Measuring the success of performance of client and evaluating the counselling process.

Unit 6(10 hrs)

Nutritional screening and assessment: Health problems - exploration and clarification - developing new perspectives and setting goals - implementation follow up and evaluation. Nutritional screening and assessment of nutritional status of hospitalized and outdoor patients. Identification of high risk patients. Assessment of patient needs based on interpretation of patient data – clinical, biochemical, biophysical, personal etc.

Unit 7 (5 hrs)

Dietary counselling: Newer trends in delivery of nutritional care and dietary counselling. Understanding drug and nutrition interactions. Counselling Theories and Approaches: Key Concepts and Techniques. Counselling techniques, strategies and communication skills. Rapport building and opening techniques. Group Counselling - Developing resources and aids for education and Counselling

Unit 8(5 hrs)

Management of Dietetic Departments : Management of dietetics department - guidelines for establishing a diet counselling centre ; requirement for establishing diet counselling centre. Development of guidelines for counselling for normal nutrition, development of guidelines for various disorders - techniques for diet counselling. Development of facts list for various disorders - diet counselling tips sheets for various disorders.

UNIT 9(5hrs)

Patient education and counselling: Assessment of patient needs, establishing rapport, counselling relationship, resources and aids to counselling.

Unit 10(5 hrs)

Practical consideration in giving dietary advice and counselling - a) Factors affecting and individual food choice. b) Communication of dietary advice c) Consideration of behaviour modification d) Motivation.

Unit 11(5 hrs)

Counselling and educating patient a) Introduction to nutrition counselling b) Determining the role of nutrition counsellor c) Responsibilities of the nutrition counsellor d) Practitioner v/s client managed care e) Conceptualizing entrepreneur skills and behavior f) Communication and negotiation skills.

Unit 12(5 hrs)

Teaching aids used by dieticians- charts, leaflets, posters etc., preparation of teaching material for patients suffering from Digestive disorders, Hypertension, Diabetes, Atherosclerosis & Hepatitis and cirrhosis.

Unit 13(5 hrs)

Computer application a) Use of computers by dietician b) Dietary computations Dietetic management d) Education/ training e) Information storage f) Administrations g) Research

Outcomes:

1. Knowledge of basic/introductory nutrition concepts
2. Critical thinking scientific and quantitative reasoning

References:

1. Anne Payne 2010. Advancing Dietetics and Clinical Nutrition. ChurchillLivingstone
2. Aronson V 1990 Effective Nutrition Counseling, Van Nostrand Reinfold,New York
3. Madhukar,I.2007. Guidance and Counseling; Authors press publication;New Delhi.
4. Chandra, R.2007.Guidance and Counseling, KalpazPublication , NewDelhi.
5. Agrawal, R. 2006. Elementary Guidance and Counseling. ShirpraPublication, Delhi.,
6. Muhammad, M. 2007. Teacher's Handbook of Counseling. SaujanyaPublisher, New Delhi.
7. Pushpa, G, Amutha, S. and Poornakala, S.J. 2015. Teaching manual onFamily Guidance and Counseling

SDC4HC17 SPORTS NUTRITION (5 CREDITS)

Course Objectives:

To enable the students to

1. Gain the knowledge and understanding of nutrition required for sports in order to enhance performance.
2. Learn the role and significance of macro nutrients and micronutrients in achieving fitness.
3. Understand the basic physiology and nutrition/fuelling demands specific to a sporting event.

UNIT 1(10 hrs)

Fuel Sources for Muscle and Exercise Metabolism :Sources of energy for muscle force generation – fuel stores on skeletal muscle – energy pathways – regulation of energy metabolism – metabolic response to exercise – metabolic adaptation to exercise training – factors influencing choice of fuels – Components of energy expenditure – energy balance

UNIT 2 (20 hrs)

Macro and Micro Nutrients in Sports Nutrition : Role of carbohydrates before, during and after exercise – carbohydrates loading – protein requirementsfor exercise – techniques to study protein and amino acid metabolism – effect ofprotein intake on protein synthesis – amino acids as ergogenic aids – health risks with excessive protein intake – Fat as a fuel during exercise – fat supplementation and exercise supplements that increase after oxidation.

Micronutrients – role of antioxidants – essential function of vitamins and minerals for athletes, ergogenic effect

Water – thermoregulation and exercise in the heat – effect of dehydration in exercise performance – heat illness – fluid guidelines before, during and after exercise.

UNIT 3 (15 hrs)

Weight Management and Body Composition :Weight management- Ideal body weight and composition – weight loss – making weight and rapid weight loss strategies

Eating disorders – types, prevalence, risk factors, effect on sports performance, treatment and prevention

Body composition analysis-importance of body composition, different techniques-normative values for comparison.

UNIT 4(15 hrs)

Practical Sports Nutrition :Pre event and post event meal- preparing for competition, dealing with cramps, stitch GI distress-electrolyte balance-sports drinks Eating for anaerobic power-aerobic power timing of meals and snacks- guidelines for the travelling athlete-recovery food. Food for power sports, endurance sports, combined power Nutrition for special population: child athlete, ageing athlete, athletic diabetes, vegetarian and disabled athlete.

UNIT 5 (15 hrs)

Ergogenic aids and supplements : Overview of supplements and sports foods. use of performance enhancing substances among athletes – finding proof of efficacy of supplements and sports foods-anabolic steroids-sports foods (cereal bar, sports drinks, carbohydrate gels, liquid meal replacements, vitamins)- different types of protein supplements, creatine, glutamine, BCAA, HMB, caffeine, glycerol, bicarbonate, citrate – WADA-Anti doping rules and regulations.

Course outcomes:

1. To acquaint students with the structure, function and interaction of nutrients and the concept of energy to maintain optimal health and fitness.
2. To understand the basic functioning of human body and the role of different organs to maintain homeostasis.
3. Students will be acquainted with nutrients and their timing in sports performance related fitness among athletes
4. Students will be acquainted with nutrients and their timing in sports performance across varying intensities of training

References:

1. Deakin, Burke (2006), 3rd Ed, Clinical Sports Nutrition, McGraw-HillAustralia.
2. Bean, Anita (2006), 5th Ed, Sports Nutrition
3. Bourns, Fred (2002), Essentials of Sports Nutrition, 2nd Ed. John and Wiley.
4. Suzanne Girard Eberle (2000), Endurance Sports Nutrition, Human Kinetics.
5. Benardot, Dan (2000), Advanced Sports Nutrition, Human Kinetics
6. Burke, Louise (2007), Practical Sports Nutrition, Human Kinetics
7. Gleeson, Jeukendrup (2004), Sports Nutrition: An Introduction to EnergyProduction and Performance, Human Kinetics

SDC4HC18 (P) NUTRITION PRACTICALS (4 CREDITS)

Objectives:

To enable the students to

1. Understand the principles and methods for the proximate analyses of foods.
2. Operate Instrumental methods to analyze the chemical and physical properties foods
3. Design of experiments in food analysis
4. Apply of Food analysis in research, government, trade and the food industry

Experiments:

1. Introduction to laboratory equipments.
2. Estimation of energy values of foods.
3. Determination of basal metabolic rate of an individual.
4. Calculation of energy requirements of an individual per day.
5. Estimation of moisture content of foods.
6. Estimation of protein content of foods.
7. Estimation of protein content of foods.
8. Estimation of fat content of foods.
9. Estimation of reducing sugars.
10. Estimation of total sugars.
11. Estimation of acidity and pH.
12. Estimation of vitamin C content of foods.
13. Estimation of crude fibre.
14. Estimation of ash content of foods.
15. Estimation of iron content of foods.
16. Estimation of beta carotene content of foods

Outcomes

1. Understand the principles behind in analytical techniques when presented with a practical problem
2. Demonstrate competency in the use of standard techniques of food analysis
3. Apply modern instrumental methods to analyse chemical and physical properties of foods
4. Compare the purposes and methods of food analysis in research, government and food industry

SEMESTER V

Course code	Title of course	Hours per week	No. of credits	Total credits
SDC5HC19	Advanced Diet Therapy	5	5	30
SDC5HC20	Bio ethics	3	3	
SDC5HC21	Nutrition through Life cycle	5	5	
SDC5HC22	Food Toxicology & Adulteration	4	4	
SDC5HC23	Nutrigenomics	4	4	
SDC5HC24	Statistical Methods for Biology	4	4	
SDC5FP25(P)	Dietetics Practical	5	5	

SDC5HC19 ADVANCED DIET THERAPY (5 CREDITS)

Course Objectives

To enable the students to

1. Understand the principles of diet and diet therapy.
2. Understand the modifications of normal diet for therapeutic purposes.
3. Develop capacity and attitude for taking dietetics as a profession.
4. Develop skills and techniques in the planning and preparation of therapeutic diets for febrile conditions and gastrointestinal disorders

UNIT 1(10 hrs)

Dietetics – importance : Dietetics – importance – principles of diet therapy – modification of the normal diet – clear fluid, full fluid diets, soft diets and solid foods – basic concepts of oral and tube feeding, preoperative and post operative nutritional care. Role of dietician – definition and responsibilities

UNIT 2(10 hrs)

Diet therapy in gastrointestinal and liver diseases: Gastrointestinal disorders–peptic ulcer – diarrhea, dysentery, constipation – etiology symptoms and dietary modification. Diseases of the liver – hepatitis, cirrhosis, hepatic coma, cholecystitis and cholelithiasis – disease condition – etiology – symptoms – dietary management

UNIT 3(15 hrs)

Diet therapy in obesity, leanness, diabetes mellitus and cardiovascular diseases : Obesity – theory of obesity, etiology, diagnosis – dietary treatment. Leanness – etiology, symptoms – dietary management. Diabetes mellitus – etiology, symptoms, complications – dietary management. Cardiovascular diseases – hypertension – etiology, symptoms – complications – dietary management

UNIT 4 (10 hrs)

Diet therapy in kidney diseases, febrile conditions, burns and allergy: Diseases of the kidney – glomerulonephritis, nephritic synodrome, nephrosclerosis, renal failure, kidney stones – etiology, symptoms, complications – dialysis - dietary management. Febrile conditions – AIDS – etiology, symptoms, nutritional care. Burns - area of burns – dietary management. Food allergy – common food allergies, symptoms, tests, dietary management.

UNIT 5 (10 hrs)

Diet therapy in inborn errors of metabolism, neoplastic diseases and deficiency states: Inborn errors of metabolism – phenylketonuria, lactose intolerance. Neoplastic diseases – goals of nutritional care for cancer patients. Nutritional modification of diet for protein energy malnutrition, vitamin A deficiency and anaemia.

UNIT 6(5 hrs)

Nutritional care for the children with special needs – overview of the disability,food and nutritional needs and their modification. Attention deficit hyperactivity disorder-Autism-Cerebral palsy-Down's syndrome

UNIT 7(5 hrs)

Nutritional care for patients with cancer- definition, causes, types, grades, normal cell to cancer cell, nutritional requirement, nutritional problems of cancer therapy. Nutritional care in HIV – Pathophysiology, aetiology, stages of HIV infection, ART, opportunistic infections, women and HIV, nutritional management

UNIT 8(8 hrs)

Nutritional care in diseases of the musculoskeletal system – arthritis, osteoporosis, gout, dental caries. Nutritional care for patients having gastro intestinal surgery and burns. Allergies – food allergy and intolerance – mechanism, factors influencing, symptoms, tests for allergy, nutritional care andelimination diet.

Unit 9(2hrs)

Principles of diet therapy, Routine hospital diet, diet in diarrhea and constipation, diet in fever

Course outcomes:

1. Describe well about nutrition, bioavailability and the current scenario of deficiency disease
2. Acquire knowledge on the current trends in food science
3. Able to understand the beneficial effects of functional foods
4. Acquire skills in institutional management
5. Analyze the life style disorder and acquire skills in imparting diet counselling

References:

1. ***Srilakshmi, B. Dietetics*** New Age International P. Ltd., New Delhi, 2011.
2. ***Dietary Guidelines of Indians – A Manual, National Institute of Nutrition,*** Hyderabad, 2011.
3. ***Garg, M. Diet, Nutrition and Health***, ABD Publishers, 2006. 4.***Corinne H.Robinson, M.R.Lawber, W.L.Chenoweth and A.E.Garwick,***
4. ***Normal andTherapeutic Nutrition,*** MacMillan Publishing CO, New York,1982

5. ***Krause, M.V. and Mahan, L.K. Food, Nutrition and Diet Therapy***, 9th Ed.,W.B. Saunders Company, Philadelphia, 2009.
6. ***Maimun Nisha, Diet Planning for Diseases***, Kalpaz Publishers, 2006.
7. Shils et al. 1994. Modern Nutrition in Health and Disease. Vol. I and II. NewYork,
8. Lea and Febiger. X Williams S.R.. 1993. Nutrition and Diet Therapy. New York, Mosby Publishers *
9. **Antia, F.P.,** Clinical Dietetics and Nutrition, Oxford University Press, Delhi,2001.
10. **Mahan, L.K.,** Arlin, M.T., Krause's Food, Nutrition and Diet Therapy,W.B. Saunders Company, London, 8th edition, 1992.
11. **Raheena, Begum,** A textbook of Foods, Nutrition and Dietetics, SterlingPublishers, New Delhi, 1989.
12. **Joshi, S.A.** Nutrition and Dietetics, Tata McGraw Hill Publications, NewDelhi, 1992.

SDCHC20 BIOETHICS (3 CREDITS)

UNIT 1 (10 hrs)

Introduction to Bio-ethics: 1.Understanding ethics and bioethics 2.Humandignity and human rights 3.Principles of benefit and harm

UNIT 2(10 hrs)

Autonomy, Consent and Privacy: 1.Autonomy and individual responsibility2.Consent 3.Persons without the capacity to consent 4.Respect for human vulnerability and personal integrity 5.Privacy and confidentiality

UNIT 3(15 hrs)

Justice, Diversity and Co-operation:1.Equality, justice and equity 2.Non-discrimination and non-stigmatization3.Respect for cultural diversity and pluralism 4.Solidarity and cooperation

UNIT 4(10 hrs)

Health and Responsibility: 1.Social responsibility and health 2.Sharing of benefits 3.Protecting future generations4.Protection of the environment, the biosphere and biodiversity

References:

1. URL http://unesdoc.unesco.org/images/0016/001636/163613e.pdf
2. Barilan,Yechiel M. (2014) Human Dignity, Human Rights, and Responsibility The new Language of Global Bioethics and Biolaw, U.S.A.: MIT.
3. Kuhse, H. and Singer, P. (2008) Bioethics: An Anthology, 2nd Ed.Blackwell.
4. Singer, Peter A. and Viens, A. M. (2008) The Cambridge Textbook of Bioethics, Cambridge: Cambridge University Press.
5. Vaughn, L. (2012) Bioethics: Principles, Issues and Cases, Oxford:Oxford university press

SDC5HC21 NUTRITION THROUGH LIFE CYCLE (5 CREDITS)

Objectives

To enable the students

1. Understand the nutritional demand in various stages of life cycle.
2. Acquire skills in planning adequate meals in different stages of life cycle.

UNIT 1 (15 hrs)

Nutrition in adulthood, pregnancy and lactation: Nutrition in adult hood – recommended dietary allowances, nutritional guidelines, Nutrition and work efficiency. Energy balance and healthy food choices. Pregnancy – RDA, Dietary guidelines, physiologic and biochemical changes – weight gain. Complications during various stages of pregnancy – hyper emesis gravid arum, preeclampsia and eclampsia and their management at family level. Nutrition during Lactation - Function of breast, physiology of lactation, hormonal control and relaxation, Milk output and factors affecting it, frequency of nursing- supply and demand, nutritional components of colostrum and mature milk. Nutritional requirements of lactating women. Common nutrition related problem of pregnancy and Lactation.

UNIT 2(15 hrs)

Nutrition in infancy :Infancy - Growth and development, factors influencing growth, RDA, nutritional guidelines, Advantages of breast feeding, difference between breast feeding and bottle feeding, factors to be considered in bottle feeding. Different types of milk formulae. Weaning foods and commercially prepared baby foods. Weaning foods developed by different organizations. Uses of growth chart to monitor growth and development. Rate of growth, weight as the indicator. Problems of feeding in normal and premature infants. Premature infant and their feeding infant formulas. Lactose intolerance.

UNIT 3 (15 hrs)

Nutrition in childhood: Preschool age - Growth and development of preschoolchildren. Food habits and nutrient intake. Recommended dietary allowances andsupplementary foods. School going age - Physical development, food habits andnutritional requirement. Eating problems of children and their management, preparation of supplementary foods using available low cost foods.

UNIT 4(15 hrs)

Nutrition in adolescence :Adolescence – Changes of growth characteristics of adolescents. Nutritional needs of the adolescents. Physical Growth- changes andfactors

affecting height and weight, increments during menarche, Nutritional requirements. Eating disorders - anorexia nervosa and bulimia nervosa. Nutritional problems in adolescence- Iron deficiency anemia, obesity and their management

UNIT 5(15 hrs)

Nutrition during Old Age :Elderly – Physiological changes in ageing- Nutritional problems of aged and their management. Nutrition allowance s - Dietary Guidelines - Nutrition and work efficiency, modifications in diet. Psycho-social and economic factors affecting eating behavior, social situation, knowledge and belief, institutionalization, common health problems.

Couse Outcomes :

Upon successful completion of this course, the student will be able to:

1.List factors which will influence nutritional requirements through the life cycle including pregnancy, lactation, infancy, childhood, adolescence, and aging.

2. Explain the interrelation of the biochemical and physiological function of nutrients through the life cycle.

3. Explain the role nutrition may play in certain disease states in the life cycle. 4. Discuss the criteria of an adequate diet through the life cycle.

References:

1. *Mahtab, S, Bamji, Kamala Krishnasamy, G.N.V. Brahmam, Text Book ofHuman Nutrition,* Third Edition, Oxford and IBH Publishing Co. P. Ltd., New Delhi, 2012.
2. *Srilakshmi, B., Dietetics,* New Age International (P) Ltd., New Delhi, 2013.
3. *Swaminathan, M., Advanced Textbook on Food and Nutrition*, Vol. 1, Second Edition, Bangalore Printing and Publishing Co. Ltd., Bangalore,2012.
4. *Dietary Guidelines for Indians, ICMR, National Institute ofNutrition*,Hyderabad, 2013.
5. *Gopalan, C. Rama Sastri B.V. and Balasubramanian*, Nutritive Value ofIndian Foods, NIN, ICMR, Hyderabad, 2014.
6. *Krause, M.V. and Hunscher, M.A., Food, Nutrition and Diet Therapy*,14thEdition, W.B. Saunders

SDC5HC22 FOOD TOXICOLOGY & ADULTRATION (4 CREDITS)

Course Objectives :

1.To discuss the basic principles, classifications of toxicology
2. To discuss toxicological pathology and characteristics in relation to food toxins
3. To provide an overview of potentially toxic constituents present in food products
4. To Apply laboratory skills associated with toxicology

UNIT 1 (5 hrs)

Scope and classification of toxicants : Food toxicology – Definitions, Introduction and scope, Classification of toxic constituents. Toxicants in plant and animal foods - pulses, oil seeds, sea foods, processed animal foods

UNIT 2(10 hrs)

Characteristics and inactivation of plant toxicants : General characteristics, occurence, properties and inactivation of protease inhibitors, trypsin inhibitors, haemagglutinins, goitrogens, gossypol. General characteristics, occurence, properties and inactivation of saponins, lathyrogens, avidin and other antimetabolites

UNIT 3(10 hrs)

Characteristics and inactivation of microbial toxicants : Microbial toxins – classification, occurrence and properties, effects and preventive measures. General characteristics, occurrence and properties of Mycotoxins, Aflatoxin, Ochrotoxin Patulin. Methods to detect and Prevention of mycotoxins

UNIT 4 (10 hrs)

Derived Food toxicants- Processing & Packaging; Toxicants generated during food processing such as nitrosamines, acrylamide, benzene, dioxins and furans; persistent organic pollutants.

UNIT 5 (10 hrs)

Characteristics and inactivation of mineral toxicity: Mineral toxicity – Chlorine and Fluorine, Heavy metals toxicity – Lead and Chromium, Mercury, Arsenic and Iron. Pesticide and insecticide residual toxicity – sources and healthhazards.

UNIT 6(10 hrs)

Toxicology & food additives; Toxicological aspects of nutrient supplements; Chemicals from processing such as fumigants, chlorinated solvents, autoxidation products,

carcinogens in smoked foods and pyrolysis, agrochemicals; heavy metals; intentional and unintentional

UNIT 7 (5 hrs)

Food adulteration : Adulteration – definition – reasons – common adulterants in various foods and control measures. Food Adulteration Act – legal standards. Food safety – regulations to prevent health hazards.

Course Outcomes :

Upon successful completion of this course, the student will be able to:

1. differentiate between natural constituents that are toxicants and natural contaminants that act as toxicants;
2. differentiate between the various types of toxicants, chemistry, their mode of action, significance, food sources, and possible detoxification methods; and
3. qualitatively and quantitatively analyze for toxicants in food and determine the different toxicity levels.

References:

1. Tonu Pussa, 2013. Principles of food toxicology, CRC Press
2. Steven L.Taylor, Richard A.Scanlan and Marcel deckker, 1985. Food Toxicology A perspective on the relative risks, INC. publishing, New York

SDC5NSD23 NUTRIGENOMICS (4CREDITS)

Objectives:

1. Gain knowledge about functional foods, nutraceutical and nutrigenomics.
2. Understanding the molecular level interaction between nutrients and other dietary bioactive with human genome.
3. Know the applications of Nutrigenomics in wellness and disease management.

UNIT 1(10 hrs)

Introduction to nutrigenomics : Introduction to genomics – definition, scope and importance. Global impact of genomics - genomics in health care, agriculture and environment. Overview of nutrigenomics – definition, nutrition, genetics and disease. Genomics from nutritional perspective – principles, tools, polymorphisms, genotypes, phenotypes.

UNIT 2(15 hrs)

Gene and nutrient interaction : Genes – nature, concept and synthesis; chemical nature of DNA, nucleotides and nucleosides; structure of RNA – RNAsplicing; units of gene – gene expression, regulation and transcription; Nutrient sensors - regulation of gene expression; lipids as ligands for nuclear receptors - PPAR, RXR, SREBP; glucose and insulin signaling; gene–diet and gene –gene interactions. Genetic individuality and dietary responses - Single-nucleotide polymorphisms and Bioinformatics in Nutritional Sciences. Genetic susceptibility to diets.

UNIT 3(15 hrs)

Genetic Engineering : Genetic engineering for human health - production of human peptide hormone genes; Single cell protein. Role of genomics in enzymology and product development - processes and products of biotechnology - application of genomics in development of nutritious foods - fermentation process, fruit juice extraction and genetic improvement of food grade microorganisms. Nutritional significance of food products developed by biotechnological techniques;

UNIT 4(10 hrs)

Functional Nutrigenomics : Transcriptomics and Proteomics, metabolamics, methyl donors and epigenetics. Metabolic Syndrome - Polymorphism of genes genetic influences, molecular biomarkers for preventive therapies. Molecular approach – inborn errors of metabolism – lactose intolerance, gluten enteropathy and phenlyketonuria.

UNIT 5 (10 hrs)

Target validation: Biomarkers – Evidence based nutrition and epidemiology – screening for bioactive nutrients and compounds. Cell line testing – zebrafishmodel and animal model - practical application of nutrigenomics – genomic screening. Scientific, technological and resource constraints on genomics - important factors affecting development in nutrigenomics.

Outcomes:

1. Know about Functional foods and its sources
2. Understand about the effects of pre & probiotics on human health and potential applications in risk reduction of diseases.
3. Gain knowledge about Herbal Supplements and their effects on health.
4. Interrelations of Nutrigenomics in Human Health.
5. Role of Nutrigenomics and Disease Condition

References:

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

SDC5HC24 STATISTICAL METHODS FOR BIOLOGY (4 CREDITS)

Objectives:

To enable the students to

1. Understand the importance of research
2. Learn about the various applications of students in the research
3. Familiarize on writing the project reports

UNIT 1(15 hrs)

Classification & tabulation of Data: Meaning, objective and types of classification, formation of discrete and continuous frequency distribution, tabulation of data, parts of a table, General Rule of tabulation, Types of tables, Diagrammatical and graphical presentation of data: significance, types and limitation of different types of diagrams and graphs used for presentation of data.

UNIT 2 (15 hrs)

Measure of Central tendency: Mean, Median, Mode and their uses with examples and their advantages and disadvantages, Measure of Dispersion: significance and methods used in studying dispersion (range, quartile deviation, mean deviation and standard deviations) with their uses, advantages and disadvantages.

UNIT 3(15 hrs)

Test of Relationship; Meaning, types and methods used to study correlation (simple Co-efficient of correlation, rank correlation, co-efficient of concurrent deviation and other methods), regression along with their uses, advantages & disadvantages. Testing of Hypothesis, Meaning, basic concept concerning testing of hypothesis, procedure for testing hypothesis, Errors in testing hypothesis.

UNIT 4 (15 hrs)

Parametric and Non-parametric tests: uses of chi square test, student't' test, and 'z' test in testing hypothesis. Analysis of variance Interpretation & Report writing; meaning, technique of interpretation,significance, steps followed, layout of report writing, Types of report and techniques of writing a report, The computer system, important characteristics and application in Research.

Outcomes:

1. Act as an educated consumer of data

2. Prepare a preliminary research design for projects in their subject matter areas Accurately collect, analyze and report data
3. Present complex data or situations clearly
4. Review and analyze research findings that affect their agency

References:

1. Aggarwal BL. 2003. *Basic Statistics*. New Age.
2. Brookes CJ, Betteley IG & Loxston SM. 1966. *Mathematics andStatistics for Chemists*. John Wiley & Sons.
3. Gupta SC & Kapoor VK. 2003. *Fundamentals of Mathematical Statistics*.S. Chand & Sons.
4. Gupta SP. 2004. *Statistical Methods*. S. Chand & Sons.

SDC5HC25 (P) DIETETICS PRACTICAL (4 CREDITS)

Objectives

1. Understand the principles of diet and diet therapy.
2. Understand the modifications of normal diet for therapeutic purposes.
3. Develop skills and techniques in the planning and preparation of therapeutic diets for febrile conditions and gastrointestinal disorders
4. Develop capacity and attitude for taking dietetics as a profession

CLINICAL AND THERAPEUTIC NUTRITION

1. Preparation of hospital diets - routine hospital diets, regular diet, soft diet,full fluid diet and tube feeding blends.
2. Diet in febrile conditions - Acute & chronic fevers – typhoid, tuberculosis.
3. Diet in - Peptic ulcer, gastritis, diarrhea
4. Diet in constipation, malabsorption syndrome.
5. Diet in Cirrhosis, hepatitis, cholelithiasis and pancreatitis.
6. Diet in hypothyroidism, hyperthyroidism, gout, phenyl ketonuria, Lactose intolerance.
7. Diet in Atherosclerosis, hypercholesterolemia, hypertension, myocardialinfarction.
8. Diet in cancer.

DIETETICS IN LIFE STYLE DISEASES,

1. Diet in Diabetes mellitus and Gestational Diabetes.
2. Diet in obesity and underweight
3. Diet in Glomerulonephritis, nephrosis, nephrolithiasis & dialysis.

COMMUNITY NUTRITION

1. Diet in Anaemia, protein calorie malnutrition,
2. Diet in vitamin A, D, E, K, C and B deficiency.

Outcomes

1. Assess the nutritional status and support for patient care
2. Apply various methods and techniques in the field of therapeutic nutrition
3. Modify dietary management for Pulmonary and Gastrointestinal disorder
4. Describe the pathophysiology and dietary regimen for liver, gall bladder and pancreatic disorder

SEMESTER VI

Course code	Title of course	Hours per week	No. of credits	Total credits
SDC6HC 26Pr	Internship , Project Work & Term paper	900	30	30

Model Question Paper

SDC1HC01 BASIC NUTRITION (5 credits)

Time = 2.5 Hours **Maximum=80 marks**

Section A (Short answers)

Each question carries 2 marks (Max. 25 marks)

1. What are essential fatty acids.
2. What are the two types of malnutrition?
3. Expand RDA & DRI
4. Define simple lipids, write examples
5. What is cholesterol. Mention three types of lipoproteins
6. List out fat-soluble vitamins
7. Define carbohydrates
8. Working principle behind Bomb Calorimeter
9. Write 3 examples for ketone bodies
10. Define the term metabolism
11. Define dietary fibre, classify them with examples
12. What is SDA
13. Write WHO definition of health
14. Define gluconeogenesis
15. Differentiate between dispensable and non -dispensable aminoacids

Section B (Paragraph)

Each question carries 5 marks (Max 35 Marks)

16. What is BMR, what are the factors affecting BMR
17. Write on carbohydrate classification
18. Explain physiological and metabolic effect of dietary fibre
19. Explain any **two** macromineral and micromineral (function, deficiency & important food sources)
20. Explain etiology, clinical features, treatment and prevention of PEM
21. Briefly explain carbohydrate digestion and absorption
22. List out the uses as well as limitations of RDA
23. What do you mean by physiological fuel value, mention the same for carbohydrate, protein and fat

Section C(Essay)

Answer any two of the following (2x10= 20)

24. Explain about the regulatory mechanism of blood sugar in human body
25. Describe importance of the micronutrient- Vitamins
26. Describe importance of the micronutrient- Minerals
27. Justify the importance of studying basic nutrition course as a part of your core curriculum

SDC1HC02 HUMAN PHYSIOLOGY (5 Credits)

Time = 2.5hours **Maximum=80 marks**

Section A (Short answers)
Each question carries 2 marks (Max 20 Marks)

1. Mention the major salivary glands and their location
2. What is endocrinology. Which are the important human endocrine glands
3. What is diabetes insipidus and diabetes mellitus
4. Write about the structure of neuron
5. What is the difference between sympathetic and parasympathetic nervous system?
6. Write a note on physiology of vision
7. Describe mechanism of respiration
8. Define leukemia and atherosclerosis
9. Write about mitosis and meiosis
10. Describe male and female reproductive organs
11. What is electrocardiography
12. Differentiate eukaryotic and prokaryotic cells
13. What is cells?
14. What is wbc?
15. What is tissue?

Section B (Paragraph)
Each question carries 5 marks (Max. 30)

16. Briefly explain the anatomy and physiology of human excretory system
17. Explain reflex arc with an example
18. Explain skin as a sensory organ
19. Explain the process of muscle contraction. Mention types of muscles
20. Write a note on hemorrhage
21. What are the functions of Reticulo-endothelial system?
22. Write about human digestive system
23. Write in short hormones

Section C (Essay) (1x10=10)

24. Explain human nervous system in detail
25. Describe any three human endocrine glands in detail
26. Explain in details lymphatic system
27. Write in detail different sensory organs and their functions

SDC1HC03 FOOD SCIENCE (5 credits)

Time = 2.5 hours **Maximum=80 marks**

Section A (Short answers)
Each question carries 2 marks. (Max. 25 marks)

1. Define the term Rigor mortis
2. How can you define food, write down the important functions of food
3. What are the objectives of cooking
4. Write about fermentation process
5. Write a note on non-enzymatic browning
6. List out role of pulses in cookery
7. Describe fruit beverages in breif
8. What are the objectives of food preservation
9. List out examples for fermented and non-fermented milk products
10. Describe homogenization of fat in milk
11. What are the preventive measures used against enzymatic browning
12. Describe dextrinization and caramelization process
13. Role of vegetables in cookery
14. Classification of fruits
15. Write about food guide pyramid

Section B (Paragraph)
Each question carries 5 marks (Max. 35 Marks)

16. Explain rancidity in detail
17. Explain postmortem changes in meat
18. Write about the toxic constituents present in pulses
19. Explain quality determination methods of egg
20. Write on processing of milk. Explain any one technique in detail
21. Briefly explain nutritive value of fish, selection of good fish
22. Write poultry classification, composition and nutritive value
23. Explain objectives of food preservation

Section C(Essay)
Answer any two of the following (2x10=20)

24. Explain starch cookery in detail
25. Explain the importance of including cereals and pulses in our daily diet
26. Describe composition and nutritional value of fruits and vegetables
27. "Egg is considered as a reference protein food "substantiate the statement

SDC1HC04 FAMILY MEAL MANAGEMENT (5 Credits)

Time= 2.5 hours **Maximum= 80 Marks**

Section A (Short answers)
Each question carries 2 marks (Max. 25 Marks)

1. Define balanced diet
2. What is RDA
3. Write ICMR classification of food groups
4. What is a food guide pyramid?
5. What is gestation diabetes mellitus?
6. Explain pre-eclampsia
7. What is colostrum
8. What is weaning
9. What is geriatric nutrition
10. Define food fad
11. What is osteoporosis
12. Define anorexia nervosa
13. What is prolactin reflux
14. Name the hormones involved in lactation
15. Write about infancy

Section B (Paragraph)
Each question carries 5 Marks (Max. 35 Marks)

16. Write basic principles of meal planning
17. Describe complications in pregnancy
18. Write on special foods given during lactation
19. Describe development during infancy
20. Explain nutrition related health problems of adulthood
21. Give nutritious snack ideas for school going and adolescents
22. Write on eating disorders
23. Explain physiological changes during pregnancy

Section C (Essay)
Answer any 2 of the following (2x10=20)

24. Write the steps in planning a balanced diet
25. Write about nutritional requirement during infancy
26. Write about pregnancy diet
27. Write on importance of geriatric nutrition

SDC2HC05 COMMUNITY NUTRITION (5 Credits)

Time= 2.5 hours **Maximum= 80 Marks**

Section A (Short answers)

Each question carries 2 marks (Max. 25 Marks)

1. Define community
2. Define health
3. Define vital statistics
4. Define malnutrition
5. Expand IDD & IDA
6. Define nutrition education
7. Define nutrition status
8. What is nutritional assessment
9. Write the ABCD of nutritional assessment
10. What is immunization
11. What is weaning
12. What is food balance sheet method?
13. Expand FAO & ICMR
14. Define food fortification and enrichment
15. What is an adulterant

Section B (Paragraph)

Each question carries 5 Marks (Max. 35 Marks)

16. Write on hazards of bottle feeding
17. Explain vicious cycle of malnutrition
18. Explain nutrition and infection relationship
19. Describe importance of immunization
20. Write on ICDS- objectives & services
21. Write on NNAPP & VAPP
22. Explain merits and limitations of nutrition education programme
23. Write on various national and international agencies involved in community health programmes

Section C (Essay)

Answer any 2 of the following (2x10=20)

24. Explain schemes and programs for various nutritional problems in India
25. Write on methods of assessment of nutritional status and their merits and demerits
26. Which are the major community health problems in India
27. "Exclusive breastfeeding for the first six months, is very important for both infants' as well the mother's health" comment on the statement

SDC3HC09 BASIC & FOOD MICROBIOLOGY (5 Credits)

Time = 2.5 hours **Maximum=80 marks**

Section A(Short answers)

Each question carries 2 marks (Max 25 Marks)

1. Differentiate between gram positive and gram-negative bacteria
2. Give any classification of microbes with examples based on carbon and energy source
3. Write a short note on tuberculosis
4. Explain about differential and selective media with example
5. Write about contributions of Louis Pasteur
6. Write a note theory of spontaneous generation
7. Define the microscopy terms- limit of resolution, magnification and resolving power
8. Write four classifications of kingdom fungi
9. Write a note on immunization schedule for children
10. What you mean by food spoilage, which are the major sources of contamination.
11. Describe structure of a typical virus
12. Write two useful as well as harmful activities of fungi
13. Explain Germ theory of disease
14. Write about pasteurization
15. Describe light microscope and electron microscope

Section B(Paragraph)

Each question carries 5 marks (Maximum 35 marks)

16. Write down Koch's postulates
17. Explain part of microscope along with their functions
18. What is immunity. Write the classifications of immunity
19. What are culture media? Classify types of culture media with example
20. Elaborate on methods of isolating pure culture
21. Describe microbial growth and explain growth curve of bacteria
22. Write about any 2 bacterial details
23. Explain the terms food borne illness, food spoilage and food intoxication

Section C(Essay)

Answer any two questions (2x10=20)

24. Write about viruses and viral disease
25. Write about types of microscopes
26. Explain about kingdom fungi
27. Explain importance of studying microorganisms. Explain importance of food microbiology

SDC3HC10 NUTRITIONAL BIOCHEMISTRY (4 Credits)

Time: 2.5hours **Marks: 80**

Section A (Short answers)
Each question carries 2 marks (Max. 25 Marks)

1. Define acid number, saponification number.
2. What is mean by competitive inhibition?
3. What are the main complexes involved in electron transport chain?
4. Define the term co enzymes, list some examples.
5. List out the main classification of lipids.
6. List out classification of enzymes.
7. Define the term RM number, iodine number
8. List out the classification of terpenes.
9. Give any four differences between DNA and RNA
10. Define buffers, what is the principle behind the buffer action?
11. List out the main classification of phenolics.
12. Give the classification of phospholipids
13. Give the classification of amino acids
14. Write down types and composition of nucleic acids
15. Define the terms, deamination, transamination and decarboxylation

Section B (Paragraph)

Each question carries 5 marks (Max. 35 Marks)

16. Write a short note about TCA cycle.
17. List out the any two chemical and reducing property of monosaccharide.
18. Write a short note on competitive and non competitive inhibition of enzymes.
19. Give a short note on secondary structure and tertiary structure of proteins.
20. Short note on glycolysis.
21. What is mean by beta oxidation explain briefly
22. Write about physiological buffer system and role of different buffer systems
23. Briefly explain about secondary metabolites

Section C (Essay)

Answer any two of the following (2x10= 20 marks)

24. Give the classification of enzymes and mechanisms of enzyme action.
25. Note on replication and transcription
26. Give the classification of phenolics and explain the function of phenolics.
27. What are the factors affecting the enzyme activity, define Km value and give its significance?

SDC3HC11 BASIC DIETETICS (5 Credits)

Time= 2.5 hours **Maximum= 80 Marks**

Section A (Short answers)
Each question carries 2 marks (Max. 25 Marks)

1. Define Therapeutic Nutrition
2. Write about routine hospital diets
3. Define obesity and overnutrition
4. Write down aetiology of undernutrition
5. What you mean by "Triple burden of malnutrition"
6. Define bland diet
7. Define Parenteral, enteral and TPN
8. What you mean by febrile condition
9. Write about acute and chronic illness
10. Write the principles of MNT
11. Describe post-operative diet and pre-operative diet
12. What is convalescence period
13. Define high and low-calorie diet
14. Define high and low-residue diet
15. Define jejunostomy

Section B (Paragraph)
Each question carries 5 Marks (Max. 35 Marks)

16. Write about roles and responsibilities of a dietitian
17. Enlist any five therapeutic diets. What do you mean by exclusion diets?
18. Discuss quantitative method used for constructing therapeutic diets
19. How is a clear liquid diet different from a full liquid diet?
20. What are the different areas of specialization for dietitians? Briefly highlight the role of the clinical dietitian.
21. How do you assess an obese and underweight individual?
22. What do you understand by 'energy imbalance'?
23. What are the complications of obesity?

Section C (Essay)
Answer any 2 of the following (2x10=20)

24. Write on nutritional care for deficiency disorders
25. Write on causes, risk factors, pathogenesis, dietary modifications, diet planning and counselling measures for febrile conditions
26. Write on therapeutic adaptation of normal diet.
27. Write about special feeding methods

SDC3HC12 HEALTH PSYCHOLOGY (4 Credits)

Time= 2.5 hours **Maximum= 80 Marks**

Section A (Short answers)
Each question carries 2 marks (Max. 20 Marks)

1. Define stress
2. Define health and illness
3. Obesity and Overweight
4. Define health psychology
5. What are eating disorders
6. What is ageing
7. What is substance abuse
8. Relation of Nutrition and Illness
9. Sources of stress
10. Intra and inter communication
11. Define stressors, give example
12. What is eustress
13. What is adolescence
14. What is social & community health
15. Define -pschology

Section B (Paragraph)
Each question carries 5 Marks (Max. 30 Marks)

16. What are the perspectives in health psychology?
17. What are the trends that shapes health psychology?
18. What are the consequences of stress?
19. Write about coping mechanisms of stress
20. Describe psychological factors in CVD, managing stress following CVD
21. Write about health psychology and Diabetes
22. Explain about ageing theories and health psychology in adulthood
23. Explain distress occur on health related issues

Section C (Essay)
Answer any one of the following (1x10=10)

24. Write about intervention strategies of stress management
25. explain in detail about health psychology through life span
26. write about health psychology
27. write in detail health related stress and remedies

SDC3HC13 HEALTH AND FITNESS (4 CREDITS)

Time :2.5 hours **Maximum Marks:80**

PART A(Short answers)
Each carry 2 marks (maximum 25 marks)

1. Define fitness
2. What is hypokinetic diseases?
3. BMI?
4. Carbohydrate loading.?
5. What is cardiovascular endurance.
6. Expand CVD
7. Write some stretching practices?
8. Write components of fitness.
9. What is spectrum of health ?
10. Define health.
11. Ideal body weight.
12. Steps of surya namskar
13. What is pranayama?
14. Aerobic exercise- types
15. What is cosmetic fitness

PATR B (Paragraph)
EACH CARRY 5 MARKS (MAX.35)

16. Energy expenditure during physical activity.
17. Write 5 basic asanas.
18. Write changing concept of health
19. Factors affecting health and fitness.
20. Weight reduction programme in young athletes.
21. Principles of yoga therapy?
22. Write sport nutrition?
23. Write components of finesss?

PART C(Essay)
Answer any 2 of the following (2x10=20)

24. Explain sport nutrition.
25. Explain components of fitness?
26. Explain warm up exercise and basic asanas
27. Expalain pranayama with all benefits.

SDC4HC14 HOSPITAL FOOD SERVICE MANAGEMENT (4 CREDITS)

TIME:2.5 Hours **MAXIMUM MARKS 80**

Section A (short answers)
Each question carry 2 marks (max.25 marks)

1. Define (POS)
2. Layout of an hospital
3. Tray and trolley services
4. What are the kinds of labs?
5. Define PMS ?
6. What is blood bank?
7. Plate waste management
8. Define hospitality?
9. What is corporate hospital?
10. What is house keeping services?
11. What are the changing needs of patients?
12. What is human resource management.
13. Cafeteria ?
14. What Is OT?
15. Difference between cafeteria and canteen?

PART B (paragraph)
Each question carry 5 marks. (Max.35 marks)

16. Write a short essay on hospital based health care
17. Describe patient care service?
18. Managerial activities for effective hospital functioning?
19. Types of computer system used for reservation system?
20. Effective inter departmental coordination?
21. Infra structure and layout of a corporate hospital?
22. Functions of hospitals?
23. Principles of material management?

PART C (ESSAY)

Answer any 2 of the following (2x10=20)

24. Explain management of dietary department.
25. Explain infrastructure of hospital?
26. Duties and responsibilities and qualification of hospital managers?
27. Principles of material management and material management?

SDC4HC15 NUTRACEUTICALS & FUNCTIONAL FOODS (4 CREDITS)

Time: 2.5 hours **Maximum Marks:80**

PART A(short answers)
Each question carry 2 marks(max.25 marks)

1. Define functional foods
2. What is nutraceuticals?
3. What is glucosamine?
4. Define nutrigenomics
5. What is garcinia cambogia
6. Write anti-ageing foods.
7. Write nutrient v/s non nutrient.
8. Write sources of neutraceuticals.
9. What is lipase inhibitors?
10. Use of spices in cooking?
11. Write bee pollen.
12. What is hypogycemia?
13. Write anti-inflammatory compounds.
14. Write about proteomics.
15. What are the anti-nutrient present in foods?

PART B (PARAGRAPH)
Each question carry 5 marks

16. Explain Nutritive value and use of spices in cooking.
17. Write the Properties, structure and function of nutraceuticals.
18. Explain nutrient control of gene expression.
19. Explain nutraceutical remedies for liver disorders.
20. Briefly explain prebiotics.
21. Explain dietary fibre.
22. Explain quality assurance of probiotic and safety.
23. Anti nutrient present in food-note.

PART C (ESSAY)
Answer any 2 of the following (2x10=20)

24. Explain non nutrient effect of nutrients.
25. Explain nutrigenomics, gene expression, transcription, translation, posttranslation modification
26. Explain sources and bioavailability, effect of processing of prebiotics.
27. Write the properties, structure and function of glucosamine.

SDC4HC16 DIET COUNSELLING AND PATIENT CARE (5 CREDITS)

Time :2.5 hours **Maximum Marks:80**

PART A(short answers)
Each question carry 2 marks.(max.25 marks)

1. Define Maslow's theory of motivation.
2. What is atherosclerosis?
3. Explain diet counselling.
4. Write Types of counselling .
5. What are the variables affecting the counselling process.?
6. What are the methods of interview?
7. What is post traumatic stress?
8. What are the teaching aids used by dietician.
9. Qualities of counsellor.
10. Write the Types of guidance.
11. What is suicide ?
12. Goals of designing of counselling plans.
13. Who is high risk patient?
14. Write conselling relationship.
15. What is diet counselling?

PART B(PARAGRAPH)
Each question carry 5 marks (max. 35 marks)

16. Write Historical development of guidance and counsellling.
17. Qualities and skill required for the counsellor
18. Describe the types of guidance
19. Briefly explain special areas in counselling.
20. Write the Factors to be considered for counselling.
21. Describe nutritional screening and assessment of nutritional status of hospitalised and outdoor patients.
22. How to establish rapport.
23. Determine the role of nutrition counsellor.

PART C(ESSAY)
Write any 2 of the following (2x10=20)

24. Explain steps in counsellor process and follow up. Variables affecting counselling.
25. Describe ethical and legal issues in counselling.
26. Explain the assessment components and evaluation components.
27. Explain Assessment of patient needs based on interpretation of patient data.

SDC4NSD18 SPORTS NUTRITION (5 CREDITS)

Time :2.5 hours **Maximum Marks:80**

PART A(short answers)
Each question carry 2 marks

1. Define ergogenics.
2. Write the components of energy expenditure.
3. What is aerobic exercise.
4. Write types of protein suppliments.
5. What is ideal body weight?
6. Describe anti oxidants.
7. Define post event meal.
8. Write about ageing athlete.
9. What is carbohydrate loading.
10. Define heat illness.
11. What is anti dopping ?
12. What is WADA?
13. Write the body composition.
14. What is the fuel for exercise?
15. Write about Sports food.

PART B(PARAGRAPH)
Each question carry 5 marks (max.35 marks)

16. Explain about pre event and post event meal preparing for competition.
17. Briefly describe Weight management- ideal body weight and composition.
18. Define ergogenic effect and role of anti oxidants.
19. Explain energy pathways.
20. Briefly explain body composition analysis.
21. Write the use of performance enhancing substance among athletes.
22. Fluid guidelines before, during, and after exercise.
23. Describe the source of energy for muscle force generation.

PART C(Essay)
Answer any 2 of the following (2x10=20)

24. Explain role of carbohydrate in exercise and carbohydrate loading.
25. Body composition analysis and different techniques.
26. Elaborately describe nutrition for special population.
27. Explain ergogenic aids and supplements.(performance enhancing supplements and protein supplements).

SDC5HC19 ADVANCED DIET THERAPY (5 CREDITS)

Time:2.5 hours **Maximum Marks:80**

PART A(short answers)
Each question carry 2 marks (max. 25 marks)

1. Define diabetes mellitus.
2. Write the grades of cancers.
3. What is gout.
4. What is ADHD?
5. What are the inborn errors of metabolism?
6. Write the common allergies.
7. Definition of dietician.
8. Note down kidney diseases
9. What is diarrea?
10. What is a full fluid diet?
11. Burn?
12. Write vitamin A deficiency.
13. Down's syndrome
14. Fe deficiency result in .....
15. Define PEM.

PART B(PARAGRAPH)
Each question carry 5 marks (max.35 marks)

16. Explain the principles of diet therapy.
17. Write about cholelithiasis.
18. Briefly explain about the burn and dietary management.
19. Write about basic concepts of oral and tube feeding.
20. Explain the diet for PEM.
21. Describe about anaemia.
22. Explain the nutritional care in HIV.
23. Write a short note on routine hospital diet.

PART C(Essay)
Answer any two of the following (2x10=20)

24. Explain the modification of normal diet .
25. Describe about the preoperative and post operative nutritional care.
26. Explain the diet therapy in febrile conditions.
27. Write down the nutritional care in disease of musculoskeletal system.

SDC5HC20 BIOETHICS (3 CREDITS)

Time:2 hour **maximum marks :60**

PART A(short answers)
Each carry 2 marks (max.20 marks)

1- Define health.
2- What is dignity?
3- What is biodiversity?
4- Differentiate solidarity and cooperation.
5- How equality achieve?
6- Define confidentiality.
7- Explain sharing of benefits.
8- What is benefits?
9- What is biosphere ?
10- What is solidarity?
11- Define ethics.
12- Consent?

PART B(PARAGRAPH)
Each carry 5 marks (max.30 marks)

13- Write an introduction to bioethics.
14- Explain autonomy and individual responsibility.
15- What is non discrimination.?
16- Differentiate biodiversity and biosphere.
17- Briefly explain sharing benefits.
18- What are human rights?
19- Briefly explain cooperation.

PART C(Essay)
Answer any one of the following (1x10=10)

20- write an essay on protection of environment.
21- write upon respect for human vulnerability and personel integrity.

SDC5HC21 NUTRITION THROUGH LIFE CYCLE (5 CREDITS)

Time:2.5 hours **Maximum Marks:80**

PART A (Short answers)
Each question carries 2 marks

1-what is pre eclampsia?
2- define colostrums.
3- what is weaning?
4- write anorexia nervosa
5-What is institutionalisation?
6- what is lactogogue?
7- benefits of breastfeeding.
8- Write lactose intolerance.
9- What is menarche ?
10- Define growth
11- Obesity?
12- What is bulimia nervosa?
13- iron requirement of an adolescent girl.
14- Iron deficiency anaemia- short note.
15- Differentiate growth and development.

PART B(PARAGRAPH)
Each question carry 5 marks (max.35 marks)

16- briefly explain weight gain in pregnancy.
17- Write the complication during various stages of pregnancy.
18- explain changes of growth characteristics in adolescents.
19- Write physiological changes in ageing.
20- Write the difference between breast feeding and bottle feeding.
21- Write preparation of supplementary foods using available low cost foods.
22- Explain the growth in infant.
23- How obesity can managae?

PART C(Essay)
Answer any 2 of the following (2 x 10 =20 marks)

24- Explain RDA, dietary guidelines, physiological and biochemical changes in pregnancy.
25- Explain nutritional problems in adolescents with nutritional requirements.
26- Physical development, food habits and nutritional reqirement of school going child.
27-Explain milk output and factors affecting, with nutritional components of colostrums.

SDC5HC22 FOOD TOXICOLOGY & ADULTERATION (4 Credits)

Time= 2.5 hours **Maximum= 80 Marks**

Section A (Short answers)
Each question carries 2 marks (Max. 25 Marks)

1. Define food toxicology
2. What is goitrogen, give examples
3. Write about lathyrism
4. What is haemagglutinins
5. What is a mycotoxin
6. Define food adulteration
7. What are food additives
8. Write about FSSAI
9. What you mean by derived toxicity
10. Write about packaging of a product
11. Write about PFA
12. Differentiate fortification and enrichment
13. Write on trypsin inhibitors
14. What is gossypol
15. Write example for mineral toxicants

Section B (Paragraph)
Each question carries 5 Marks (Max. 35 Marks)

16. Write classification of toxic constituents
17. Explain various toxicants present in plants and animals
18. Explain general characteristics and inactivation of plant toxicants
19. Describe about toxicants generated during food processing
20. Write on toxicological aspects of nutrient supplements
21. Explain food adulteration act and food safety measures
22. Write about food toxicology and health
23. Explain FSSAI & HACCP

Section C (Essay)

Answer any 2 of the following (2x10=20)

24. Write about common adulterants in various foods and control measure
25. Explain pesticide and insecticide residual toxicity; sources and health hazards.
26. Explain methods to detect and Prevention of mycotoxins
27. Explain general characteristics, occurrence, properties and inactivation of saponins, lathyrogens, avidin and other antimetabolites

SDC5HC23 NUTRIGENOMICS (4 CREDITS)

Time:2.5 hours **Maximum Marks :80**

PART A

Each question carry 2 marks (Max.25 marks)

1-What is biomarkers?
2-Define genetic engineering?
3-Genes?
4-Define genomics?
5-Define nutrigenomics?
6-what is genotype and phenotypes?
7-what is genetic influencers?
8-Tools in genomics?
9- Define polymorphism?
10-What is intolerance?
11-Phenylketonurea?
12- what is fermentation?
13- what is nutrient sensor?
14-what are the tools in genomics?
15-what is PPAR ?

Part B(PARAGRAPH)

Each question carry 5 marks (max.35 marks)

16-Write a short note about practical application of nutrigenomics, genomic screening?
17-Discuss on cell-line testing.
18- Short note on nutritional significance on food products developed by biotechnology.
19- Explain genetic susceptibility to diet.
20- Write an introduction to genomics.
21-Discuss global impact of genomics.
22-Briefly explain inborn errors of metabolism?
23- Explain factors affecting development in nutrigenomics?

PART C(Essay)

Answer Any Two Of The Following (2x10=20)

24- Discuss the definition, scope, and importance of genomics?
25-Write elaborately on functional nutrigenomics- transcripomics and proteomics, metabolamics, methyl donors.
26-Explain chemical nature of DNA, structure of RNA- RNA splicing, units of gene, gene expression?
27- Discuss role of genomics in enzymology and product development- application of genomics in development of nutritious food.

SDC5 HC 24 STATISTICAL METHODS FOR BIOLOGY (4 CREDITS)

Time:2.5 hours **maximum marks :80**

PART A

Each question carry 2 marks (Max.25 marks)

1. What is meant by Independence of attributes?
2. Find the frequency of the class AB if A and B are independent, given N=100, (A)=36,(B) 25.
3. Define conditional probability.
4. If 3% of the electric bulbs manufactured by a company are defective, find the probability that in a sample of 100 bulbs exactly five bulbs are defective(e^{3}=0.0498).
5. Define null hypothesis.
6. What is meant by probable error ? Mention its use.
7. Explain the different type of errors in hypothesis testing.
8. Give an example for one-way classification.
9. What is meant by statistical quality control?
10. Distinguish between np chart and p chart.
11. What is pie chart?
12. What is histogram?
13. what is the formula to calculate the mean of grouped data?
14. What are the different types of mean?
15. What is the formula to calculate the standard deviation?

Part B(PARAGRAPH)

Each question carry 5 marks (max.35 marks)

16. Out of 8000 graduates in a town, 800 are females and out of 1600 graduate employees 120 are females prepare 2 x 2 table and find the co-efficient of prepare a association. Interpret the result.
17. A Sub-Committee of 6 members is to be formed out of a group consisting of 7 men and 4 women. Calculate the probability that the sub-committee will consist of (1) exactly 2 women (2) at least 2 women.
18. Find the probability that atmost 5 defective fuses will be found in a box of 200 fuses if experience shows that 2 per cent of such fuses are defective. (e^{4}=0.0183)
19. The means of two samples of 1000 and 2000 members are respectively 67.5 and 68 inches. Can they be regarded as drawn from the same population with S.D. 2.5 inches? Use 5% level.

20. A machine produced 20 defective articles in a batch of 400. After overhauling it produced. 10 defectives in a batch of 300. Has the machine improved? Test at 5% level.
21. In a sample of 8 observations, the sum of the squared deviations of items from the mean was 94.5. In another sample of 10 observations, the value was found to be 101.7. Test whether the difference in the variances is significant at 5% level.
22. Explain the various types of control charts.
23. The following table gives the number of defective items found in 20 successive samples of 100 items each.

2	6	2	4	4	15	0	4	10	18
2	4	6	4	8	0	2	2	4	0

Comment whether the process in under control. Suggest suitable control limits for monitoring the future. State of the process.

PART C(Essay)
Answer Any Two of The Following (2x10=20)

19(a) A number of school-children were examined for the presence or absence of certain defects of which three chief descriptions were noted; A-development defects; B-nerve signs; C low nutrition. Given the following ultimate frequencies, find the frequencies of the classes defined by the presence of the defects.

(ABC)	57;	(otBC) =	78
(ABC)	281;	(ot§J)	670
(ABC)	86;	(ot§C) =	65
(A§J)	453;	(otBJ)	8310

(b) A Company has four production sections viz. St, Sz, S3 and S4 , which contribute 30%, 20%, 28% and 22% of the total output. It was observed that those sections respectively produced 1%, 2%, 3% and 4% defective units. If a unit in selected at random and found to be defective, what is the probability that the units so selected has come from either St or S4

20(a) If 10% of the screws produced by an automatic machine are defective, find the probability that of 20 screws selected at random, there are

a) exactly two defectives
b) at the most three defectives
c) at least two defectives; and
d) between one and three defectives (inclusive)

Find also the mean, variance and skewness of the number of defective screws.

(b) Assume the mean height of soldiers to be 172 cm with variance (27 cm)^2. How many soldiers in a regiment of 1000 can be expected to be over 182 cm?

21(a) An IQ test was administered to 5 persons before and after they were trained. The results are given below:

Candidates	I	II	III	IV	V
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

Test whether there is any change in IQ after the training programme. Use 5% level of significance.

(b) In a survey of 200 boys, of which 75 are intelligent, 40 had skilled fathers while 85 of the unintelligent boys has unskilled fathers. Do these figures support the hypothesis that skilled fathers have intelligent boys. Use Chi-square test.

22. Perform a Two-way ANOVA on the data given below:

		Treatments		
		A	B	C
Blocks	1	30	26	38
	2	24	29	28
	3	33	24	35
	4	36	31	30
	5	27	35	33