SNDT Women's University

www.sndt.ac.in

Syllabus for
Degree of Bachelor of Science in
Food Science and Quality Control
(Faculty of Home Science)

With effect from
Academic Year 2013-14

INDEX

COURSE STRUCTURE

I NOMENCLATURE :

Bachelor of Science in Food Science & Nutrition

1. Bachelor of Science inFood Science & Nutrition
2. Bachelor of Science inNutrition & Dietetics
3. Bachelor of Science inFood Science & Quality Control (Vocational Course)

Bachelor of Science in Textile Science & Apparel Design

4. Bachelor of Science inTextile Science & Apparel Design
5. Bachelor of Science inApparel Design
6. Bachelor of Science in Fashion Apparel Design (Vocational Course)

Bachelor of Science in Resource Management

7. Bachelor of Science in Interior Space Design & Management
8. Bachelor of Science inHospitality Management

Bachelor of Science in Human Development

9. Bachelor of Science in Early Childhood Education
10. Bachelor of Science inHuman Development

Bachelor of Science in Extension Education

11. Bachelor of Science inExtension and Communication

Bachelor of Science in Human Ecology and Consumer Services

Note – The Degree offered is B.Sc. in respective specializations

II Duration: Three years degree programme divided into 6 Semesters

- 1 Semester Duration – 15 weeks approx.
- No. of teaching days in 1 Semester – 90; 180 / year
- No. of working days in a year - 220
- 1 Credit Theory - 1 period of 50 minutes/week
- 1 Credit Practical - 2 periods of 50 mins. each (100 mins.)/week
- Total No. of Credits – 120

III Eligibility

A candidate for being eligible for admission to the three year course leading to the degree of Bachelor of Home Science must have passed the Higher Secondary School Certificate (Std. XII) examination conducted by the different Divisional Boards of the Maharashtra State Board of Secondary and Higher Secondary Education with the following subjects :-

• English
• Any one of the Modern Indian Languages or Modern Foreign Languages or any classical Language or Information Technology/ Any four subjects carrying 100 marks each**.**

OR

• English
• Any one vocational subject carrying 200 marks.
• Any three subjects carrying 100 marks each.

OR

Must have passed the Higher Secondary School Certificate (Std. XII) examination with the Minimum Competency based vocational courses (MCVC) conducted by the different Divisional Boards of the Maharashtra State Board of Secondary and Higher Secondary Education.

OR

Must have passed an examination of any other recognised Board or Body Recognized as equivalent thereto.

OR

For Fashion and Apparel Design – 12th Standard (any Stream) or Three years Government recognized Diploma in "Dress Design & Garment Construction" after 10th Standard.
For Food Science & Quality Control, 12th Std. with Science/Home Science with Science with 50% marks.

B.Sc II Year:

• For a student from this University - should have cleared second year in the same subject or has passed with admissible ATKT.
• Students from B.A. Home Economics are eligible for admission to Second Year Home Science after completing their First Year.
• Students from other Faculties (Non Home Science) will be admitted with prerequisites of 4 credits of specialization and 4 credits of General Home Science (irrespective of Theory or Practical).
• For students from other universities – should have completed first year of Home Science without ATKT.
• **Pre-requisite** for each student is to be decided after looking at the subjects completed at the First Year level.
• From the following pre-requisites courses any 2 courses (total 8 credits) will be offered to the students:

Courses:

1. Design & Aesthetics 4 Credits
2. Life Span Development 4 Credits
3. Food Science & Nutrition 4 Credits

4. Textile Science & Apparel Design 4 Credits

Science students will take 'Design & Aesthetics' and 'Life Span Development' whereas students from Arts & Commerce will take 'Food Science & Nutrition' and 'Textile Science & Apparel Design'.

B.Sc III Year:

- For a student from this University - should have cleared second year in the same subject or has passed with admissible ATKT.
- For students from other Universities – should have completed their first and second Year in Home Science (with same specialisation) without ATKT.

IV Promotion to Various Semesters (SNDT Women's University rules from time to time are applicable)

V Grading System:

Grade	Grade Points	Percentage Equivalent
'O' = Outstanding	6.00	80-100
'A+' = Very Good	5.00 - 5.99	70-79
'A' = Good	4.00 - 4.99	60-69
'B' = Average	3.00 -3.99	50-59
'C' = Below Average	2.00 - 2.99	45-49
'D' = Poor	1.00 - 1.99	40-44
'F' = Fail	0 - 0.99	<=39

VI Structure of Home Science Curricula :

Total Credits for Semester I-VI

Type of Component	Weight age	No. of Credits	No. of Courses (Subject Paper)
a. Core Courses	48%	58	14.5
b. Applied Courses	27%	32	8.0
c. Foundation Courses	5%	6	1.5
d. Inter & Intra Discipline Courses	20%	24	6.0
	100%	**120**	**30**

*** Note : Women Studies Course of 2 credits as Foundation Course is introduced in Sem V with Seminar (Seminar (b) 2 credits + Women Studies (c) 2 Credits)

Detailed distribution of Credits (Component wise & Semester wise)

Component	Sem I	Sem II	Sem II	Sem IV	SemV	Sem VI	Total
a	-	-	-	20	18	20	58
b	8	12	12	-	-	-	32
c	4	-	-	-	2	-	06
d	8	8	8	-	-	-	24
	20	**20**	**20**	**20**	**20**	**20**	**120**

a – Core Courses

b – Applied Courses

c – Foundation Courses

d – Inter & Intra disciplinary Courses

The above course structure of Semesters I to III is common for all programmes under B.Sc. Home Science except FSQC & FAD (Voc).

Syllabus for

B.Sc. Food Science and Quality Control

Specialization: Food Science and Nutrition

Sub Specialization: Food Science and Quality Control

Duration: Three years degree program (6 Semesters)

- 1 Semester Duration – 15 weeks approx.
- No. of teaching days in 1 Semester – 90; 180 / year
- No. of working days in a year - 220
- 1 Credit Theory - 1 period of 50 minutes/week
- 1 Credit Practical - 2 periods of 50 mins. each (100 mins.)/week
- Total No. of Credits – 120
- University Examinations: University will conduct the exam for Semester V & VI i.e. for 40 credits.

Eligibility Criteria for Admission to the Degree Course:

1. **Admission for students to First/Second/Third years, open/reserved categories will be applied to the program.**
2. **Admission to First Year**

   Students passing 12th Std. with Science/Home Science with Science with 50% marks, from any recognized Board, with one paper of English are eligible.

SNDT Women's University
Framework for
Degree of Bachelor of Science
(under Faculty of Home Science)
With effect from
Academic year 2013-2014

Faculty of Home Science- UG Programme

NOTE : Code Number is in 4 digits
First Two numbers are of specialization (as below)
3rd digit is of Semester
4th digit is Sr.No.

Specialization Programme	Code No.	Board of Studies
Extension Education	01	Extension Education
Nutrition Dietetics	02	Food Science & Nutrition
Hospitality Management	03	Resource Management
Human Development	04	Human Development
Textile Science & Apparel Design	05	Textile Science & Apparel Design
Human Ecology & Consumer Services	06	Human Ecology & Consumer Services
Food Science & Nutrition	07	Food Science & Nutrition
Interior Space Design	08	Resource Management
Food Science & Quality Control	09	Food Science & Nutrition
Fashion Apparel Design	10	Textile Science & Apparel Design
Apparel Design	11	Textile Science & Apparel Design

Early Childhood Education	12	Human Development

I NOMENCLATURE

Bachelor of Science in Food Science & Nutrition

7. Bachelor of Science inFood Science & Nutrition
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9. Bachelor of Science inFood Science & Quality Control (Vocational Course)

Bachelor of Science in Textile Science & Apparel Design

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Bachelor of Science in Resource Management

8. Bachelor of Science inInterior Space Design & Management
9. Bachelor of Science inHospitality Management

Bachelor of Science in Human Development

11. Bachelor of Science inEarly ChildhoodEducation
12. Bachelor of Science inHuman Development

Bachelor of Science in Extension Education

13. Bachelor of Science inExtension Education & Communication

Bachelor of Science in Human Ecology and Consumer Services

Structure of Home Science Curricula:

Total Credits for Semester I - VI

Type of Component	Weight age	No. of Credits	No. of Courses (Subject Paper)
a. Core Courses	48%	58	14.5
b. Applied Courses	27%	32	8.0
c. Foundation Courses	5%	6	1.5
d. Inter & Intra Discipline Courses	20%	24	6.0
	100%	**120**	**30**

***** Note : Women Studies Course of 2 credits as Foundation Course is introduced in Sem V with Seminar (Seminar (b) 2 credits +Women Studies (c) 2 credits)**

Detailed distribution of Credits (Component wise & Semester wise)

Component	Sem I	Sem II	Sem III	Sem IV	Sem V	Sem VI	Total
a	-	-	-	20	18	20	58
b	8	12	12	-	-	-	32
c	4	-	-	-	2	-	06
d	8	8	8	-	-	-	24
	20	**20**	**20**	**20**	**20**	**20**	**120**

a - Core Courses

b - Applied Courses

c - Foundation Courses

d - Inter & Intra Discipline Courses

The above course structure of Semesters I to III is common for all programmes under B.Sc. Home Science except FSQC & FAD (Voc).

FRAMEWORK OF SEMESTERS
CODE NO: 09

Specialization : **Food Science & Nutrition** Sub Specialization : **Food Science & Quality Control (Vocational)**

SEMESTER I

Code No.	Course	TC	Th C	Pr / Tutorial C	Int M	Ext M	Total
1103	Food Hygiene and Sanitation (a)	4	4	-	25	75	100
1104	Human Ecology and Family Science I (b)	4	4	-	25	75	100
9101 9101(A)	English I (H.L) (c) English I (L.L)	4	3	1	25	75	100
9102	Applied Science (c)	4	2	2	50	50	100
9105	Environment Studies (d)	4	4	-	25	75	100
	TOTAL	**20**	**17**	**3**	**150**	**350**	**500**

SEMESTER II

Code No.	Course	TC	Th C	Pr/ Tutorial C	Int M	Ext M	Total
1203	Physical and Analytical Chemistry (a)	4	2	2	50	50	100
1205	Human Ecology and Family Science II (b)	4	4	-	25	75	100
9201 9201(A)	English II(H.L)(c) English II(L.L)	4	3	1	25	75	100
9202	Human Physiology (c)	4	3	1	25	75	100
9204	Fundamentals of Food Science and Nutrition (a)	4	2	2	50	50	100
	TOTAL	**20**	**14**	**6**	**175**	**325**	**500**

Food Science & Nutrition (Food Science and Quality Control)

SEMESTER III

Code No.	Course	TC	Th C	Pr C	C/ U	Int M	Ext M	Passing		Total	Final Total
								Int	Ext		
0931	Nutrition for Life Span (a)	4	-	4	C	100	-	40	-	40	100
0932	Entrepreneurship Development (b)	4	-	4	C	100	-	40	-	40	100
0933	Food Science and Sensory Evaluation(a)	4	3	1	U C	25	75	10	30	40	100
0934	Organic and Inorganic Chemistry (a)	4	4	-	U	25	75	10	30	40	100
0935	Post Harvest Technology - I (a)	4	4	-	U	25	75	10	30	40	100
	TOTAL	**20**	**11**	**9**		**275**	**225**	**110**	**90**	**200**	**500**

The above course structure of Semesters I to III is common for all Specializations under B.Sc. Home Science programme except FSQC & FAD (Voc).

TC = Total Credits, Th C = Theory Credits, Pr C = Practical Credits
Int M = Internal Marks, Ext M = External Marks

SEMESTER IV

Code No.	Course	TC	Th C	Pr C	C/ U	Int M	Ext M	Passing		Tot al	Final Total
								Int	Ext		
0741	Advanced Chemistry (b)	4	2	2	U C	50	50	20	20	40	100
0742	Food Microbiology (a)	4	2	2	U C	50	50	20	20	40	100
0744	Food Analysis (b)	4	-	4	C	100	-	40	-	40	100
0944	Post Harvest Technology - II (a)	4	4	-	U	25	75	10	30	40	100
0945	Food Commodities(a)	4	4	-	U	25	75	10	30	40	100
	TOTAL	**20**	**12**	**8**		**250**	**250**	**100**	**100**	**200**	**500**

Food Science & Nutrition (Food Science and Quality Control)

SEMESTER V

Code No.	Course	TC	Th C	Pr C	C/U	Int M	Ext M	Passing		Total	Final Total
								Int	Ext		
0751	Biochemistry (a)	4	3	1	U C	25	75	10	30	40	100
0952	Food Standards & Quality Control (a)	4	4	-	U	25	75	10	30	40	100
0953	Quality Control in Foods (a)	4	-	4	C	100	-	40	-	40	100
0954	Diet Therapy (a)	4	2	2	U C	50	50	20	20	40	100
0955	Recent Advances in Food Science and Quality Control (Seminar) (b)	2	-	2	C	50	-	20	-	20	50
9356	Women's Studies (c)	2	2	-	C	50	-	20	-	20	50
	TOTAL	**20**	**11**	**9**		**300**	**200**	**100**	**80**	**200**	**500**

SEMESTER VI

Code No.	Course	TC	Th C	Pr C	C/U	Int M	Ext M	Passing		Total	Total
								Int	Ext		
0961	Food Processing and Applications(a)	4	-	4	C	100	-	40	-	40	100
0962	Food Toxicology and Industrial Waste Water Management (a)	4	3	1	U C	25	75	10	30	40	100
0963	Food Equipment and Packaging(a)	4	4	-	U	25	75	10	30	40	100
0964	Professional Applications in Food Science and Quality Control (Internship) (b)	8	-	8	C	100	100	40	40	80	200
	TOTAL	**20**	**7**	**13**		**250**	**250**	**100**	**100**	**200**	**500**

TC = Total Credits, Th C = Theory Credits, Pr C = Practical Credits
Int M = Internal Marks, Ext M = External Marks,
U = Exam at University level C = Exam at College level

PROGRAMME: B.Sc. Food Science and Quality Control

Semester I

English I (Higher Level)

OBJECTIVES:

1. To enable the student to read with fluency while simultaneously comprehending passages in English
2. To equip the student with skills to participate independently in conversations and discussions conducted in English
3. To develop written communication skills for everyday and professional communication
4. To develop the student's creatively so that she may express her ideas descriptively and creatively.

Code No.	Course	TC	Th C	Pr C	Int M	Ext M	Total
9101	**English I (Higher Level)**	4	3	1	25	75	100

Module No.	Objective	Content	Evaluation

1	The learners will be able • To understand the structure of different types of letter patterns • To write social and business letters effectively	**Written communication skills** 1. Types of layout 2. Social correspondence: Request/apology/ thank you 3. Letters of enquiry/ complaints (both personal and social) 4. Letters to the editor / Appeals (social/ civic issues) **Assignment:** 1 Writing a letter to the editor on a relevant social issue 2. Invitation letter (formal) 3. Thank you letter (formal) 4. Consumer complaint letter 5. Request letter (formal)	(5 marks per letter) 25 marks
2	The learner will be ableto - • identify different types of reports • understand sequencing in a project report • use the correct tense while writing a report • effectively present a report verbally	**Report Writing** Kinds of reports 1. Sequencing 2. Use of correct tense 3. Reporting an event 4. Structure of a project report **Assignments** : 1. Preparing a simple project report based on class assignment 2. Presenting the same as group of 3-4 students	Assign.1:(structure/ outline) 5 marks (delivery) – 5 marks =10 marks Assign.2:(15 marks)
3	The learner will be able to - • read the narrative with understanding and enjoyment • enhance their vocabulary • express their personal responses descriptively • express ideas lucidly	**Enhancing Comprehension skills** Exercises based on Selections from prescribed text *Insight: A course in English Literature and Language.*By K. Elango. (Orient Black Swan). Unit IV (life stories) and Unit VII (Mass media) 1. Comprehending narratives 2. Articulating ideas /critical analysis using descriptive language 3. Expressing personal responses creatively 4. Vocabulary enhancement **Assignments** : 1. Comprehension 2. Articulating ideas/critical analysis 3. Expressing personal response to the select narratives	Assign.1:(5 marks) Assign.2:(10 marks) Assign.3:(10 marks)

4	The learner will be able to - • participate independently in conversations and discussions conducted in English • familiarize them with formal and non-formal modes of conversation • develop questioning skills	**Interpersonal communication skills:** Conventions of Social Interaction 1. Greetings 2. Starting a conversation 3. Introducing self and others 4. Asking questions 5. Requesting 6. Apologizing 7. Thanking 8. Inviting 9. Accepting 10. Ending a conversation **Conventions of public speaking**: Hints on effective delivery (verbal and non-verbal) **Assignments**: 1. Pair work for dialogue writing 2. Oral presentation on an everyday situation 3. Descriptive question on conventions of public speaking	1. (written dialogue 10 + delivery of dialogue 5) = 15 marks 2. 5 marks 3. 5 marks

EVALUATION :

1. Continuous Evaluation of all four Modules = Internal - 25 marks
2. External - 75 marks
3. Total : Internal – 25 + External – 75 = 100 marks

Semester I

English I (Lower Level)

OBJECTIVES:

1. To enable the student to read with fluency while simultaneously comprehending passages in English
2. To equip the student with skills to participate independently in conversations and discussions conducted in English
3. To develop written communication skills for everyday and professional communication
4. To develop the student's creatively so that she may express her ideas descriptively and creatively

Code No.	Course	TC	Th C	Pr C	Int M	Ext M	Total
9101 (A)	**English I (Lower Level)**	4	3	1	25	75	100

Module No.	Objective	Content	Evaluation
1	The learners will be able to : • employ techniques of skimming and scanning while reading a passage • identify key points while summarizing • make notes effectively so as to improve study skills	1. Skimming and Scanning 2. Note taking 3. Note Making 4. Summary **Assignments**: 1. Passages for note taking 2. Exercises on note making 3. Passage for summarization 4. Passage for skimming and scanning	1. 5 marks 2. 10 marks 3. 5 marks 4. 5 marks
2	The learner will be able to - • familiarize themselves with basic letter patterns • prepare a report of an event with correct usage of grammar and tense • understand the importance of linking words required when reporting an event	**Written Communication Skills** **Basic Letter patterns** (i) Invitation/request/ apology / thank you (ii) Letters of enquiry/complaints/ **Report writing** 1. Types of reports 2. Reporting an event 3. Linking devices **Assignments**: Letter writing. Any 3 of the following: 1 Invitation **or** Request **or** Apology **or** Thank you **or** enquiry **or** Complaint 2. Reporting an event in college	Assign.1: (Written -10 marks + oral delivery - 5 marks) = 15 marks Assign.2: 5 marks per letter 2x 5= 10 marks

3	The learner will be able to - • develop effective reading skills • express their ideas coherently • write with proper sentence construction and paragraph development • enhance their vocabulary	**Developing Reading and Writing Skills** 1st + 2nd story from the Prescribed Text Yuva Katha 7 1. Sentence construction for grammatically correct English 2. Paragraph development 3. Vocabulary building 4. Expressing ideas 5. Reading with fluency **Assignments**: 1. Comprehension of story 2. Vocabulary based exercises 3. Personal responses to the narrative	1.10 marks 2. 5 " 3. 10 "
4	The learners will be able to - • familiarize themselves with formal and informal modes of social interaction • confidently converse in English • confidently make short presentations in English	**Conventions of Social Interaction** Conventions of Social Interaction 1. Starting a conversation 2. Greetings 3. Introducing self and others 4. Asking questions 5. Requesting 6. Apologizing 7. Thanking 8. Inviting 9. Accepting 10. Ending a conversation Conventions of public speaking : Hints on effective delivery (verbal and non-verbal) **Assignments**: 1. Pair work-dialogue writing **2.** Oral presentation on an everyday situation	**Assign 1**: Written script =10 marks + Oralpresen-tation = 5 marks **Assign 2**: Written outline = 5 marks + Delivery =5 marks

Prescribed Texts: (Lower Level)

KeertiRamachandran. 1996 (rpt 2010).YuvakathaVol 7. Katha Books. New Delhi.

(Higher Level English.

(Higher Level English)

K. Elango. (2009). *Insight. A course in English Literature and Language* .Orient Black Swan. Hyderabad, ( )

REFERENCE BOOKS:

1. Asoka Rani, T. (1989). *English for career development: A course in functional English*. Hyderabad: Orient Longman Ltd.
2. Baker, Joanna (2003). *Essential speaking skills. A handbook for English language teachers.* Westrup, Heaths: London Continuum.
3. David, A. (2005). *Teaching English as a second language*. New Delhi: Commonwealth Publishers.
4. Das, Susmita (2004). *English language and grammar a resource book of ideas and activities for teachers.* Jaipur: Mangal Deep Publications.
5. Gibson, Miiko Tan (2003). *Creative English - a comprehensive approach: 6*. Singapore: Singapore Federal Publications.
6. McArthur, Tom (1983). *A Foundation course for language teachers.* Cambridge: Cambridge University Press.
7. Nagaraj, Geetha (1996). *English language teaching: Approaches, methods, techniques.* Hyderabad: Orient Longman Ltd.
8. Ur, Penny and Wright, Andre (1996). *Five-minute activities.* Cambridge: Cambridge University Press.
9. Reutten, Mary K. (2004). *Focus on writing: 1: developing composition skills through instruction and practice*. Singapore: Singapore Learners Publishing.
10. Sood, S.C.(ed) et al. (1991). *Developing language skills: 1: oral communication and reading comprehension, writing skills and words.* New Delhi: Manohar.

Semester I

Applied Science

OBJECTIVES:

1. To know the importance of science in daily life
2. To develop analytical attitude.
3. To develop scientific way of thinking.
4. To impart knowledge to apply.

Code No	Course	TC	Th C	Pr C	Int M	Ext M	Total
9102	**Applied Science**	4	2	2	25	75	100

(Theory)

Module No.	Objectives	Content	Assessment
1	This will enable students to: 1) Inculcate scientific temper in the students and develop scientific, analytical attitude. 2) Develop to understand the importance of knowledge of chemistry with respect to food, textiles, medicine, harmful chemicals & industries. 3) Understand the use and importance of chemistry in day to day life.	**Applied Chemistry** **1) Review of Basic Chemistry** • Important definitions • Difference between Organic & Inorganic compounds • Functional groups • Bohr's model of atom • Atomic number & electronic configuration **2) Soaps & Detergents** • Saponification reaction • Cold and hot process of soap making • Difference between soaps and detergents • Cleansing action **3) Drugs and Pharmaceuticals** • Properties of good drug • Meaning of important terms with e.g. Analgesic, Antipyretic, Antacid, Antibiotic, Diuretic, anti-inflammatory, Laxatives, Sulfa drugs • Common drugs- use and side effects of Aspirin, Paracetamol, Sulphanilamide **4) Dyes** • Definition, important terms like chromophore, Auxochrome, chromogen • Classification based on application • e.g. and uses of different dyes in food, textile,	Assignment / Quiz (1) Multiple Choice Questions (MCQs) 2) Objective 3) Descriptive = 10 marks

		medicine, laboratory, etc. & their hazards **5)Polymers** • Introduction • Define-monomer, polymer, polymerization Some important polymers and their structure &uses polyethylene, polyester, polyvinyl chloride	
2	This will enable the students to - 1) Acquire the basic knowledge of the fundamentals of biological sciences. 2) Apply the knowledge of the biological processes to everyday life.	**Cell** • As the basic unit of life • Types of cells • Salient features of animal cell **Introduction to Micro-organism** • Bacteria-Structure, Classification based on response to O_2 , nutrition, Importance of bacteria • Fungi- Morphology of molds and yeasts, classification, beneficial and harmful aspects • Virus- Morphology, Classification based on nucleic acid content and hosts **Genetics and Heredity** • Origin of the term gene • Chemical basis of heredity- organization of human genome, sex determination, monogenic and polygenic traits, patterns of inheritance- autosomal, recessive and sex-linked inheritance • Mutation and its type, abnormalities in chromosome number **Genetic Engineering and Biotechnology** • Definition of the terms • Methodology of gene cloning-in brief 1. Application of genetic engineering in plants-insects & virus resistant plants, plants with improved characters. 2. Application in human medicine-pharmaceuticals, thallessemia oncogenes, interferon, production of growth hormone, human insulin ELISA.	Assignment / Quiz 1 Multiple Choice Questions (MCQs) 2Objective 3 Descriptive 15 marks

EVALUATION :

1) Internal (Practical) - 25 marks Internal (Theory) - 25 marks. Total Internal =50/2 = 25
2) External Practical - 25 marks + Theory - 50 marks = 75 marks
3) Internal -25 + External - 75 marks = 100 marks

REFERENCES:

George A. (1984): Shreeve's Chemical Process Industries

Glazer A. Na Ni Baido H (1995) Microbial Biotechnology W.H. Freemen Company.

K. Venkatraman (1952): The Chemistry of Synthetic Dyes, Vol. I, Academic Press, New York.

Kent S.A. (1974): Riegel's Handbook of Industrial Chemistry.

Loewy A. and Sckevilz (1995) Cell Structure and Functions, Hold, New-York

Nicholl D.S.T. (1994) An Introduction to Genetic Engineering-Cambridge University, Press.

Pelczar N.S, Chan F.C.S. Krieg N.R.(1998) Microbiology, Tata Mc Grow Hill.

Person D. (1983): The Chemical Analysis of Food, Churchill Livings Tone, Edunburgh, London, New York.

Porter K.R., Bonnevile M.A. (1964) Fine Structure of Cells and Tissues,**Lea & Blanchard, Philadelphia.**

Prof. V. A. Shenal (1991): Introduction to the Chemistry of Dyestuffs, sevsk Publications.

Rao C.V. (1994) Foundation to Mol. Biol, R. Chenda. Co. Publisher

Thomsen E.G. (1985): Modern Cosmetics Universal publishing corp

Zhdanov L.S. (1980): Physics for the Technician, MIR Publications. Moscow.

(Practical)

Module No	Objective	Content	Evaluation
3	This will enable student to: 1) Develop in students the ability to work systematically in laboratory. 2) Develop in them the skill for simple chemical procedures	**Applied Chemistry** 1) Introduction to chemistry lab & apparatus. 2) Neutralization of strong acid with strong base (HCl&NaOH) 3) Neutralization of weak base with strong acid (Na_2CO_3& H_2SO_4) 4) Neutralization of weak acid with strong base (Oxalic acid &NaOH) 5) Oxidation- reduction reaction (Oxalic acid & $KMnO_4$) 6) pH determination of various solutions: acid, base and neutral (two household example for each) 7) Preparation of soap bar 8) Viscosity measurement: water, oil, shampoo by Oswald's viscometer	Daily work Journal Performing experiment 8 marks

4	This will enable student to: 1) Acquire knowledge of various micro-organisms and the required skills to study them. 2) Apply this knowledge in day to day life	**Applied Biology** 1) Study and care of microscope 2) Observation of motility of bacteria by Hanging drop method (*E.coli*/ *Proteus*) 3) Observation of bacteria by the simple: monochrome staining method (Hay infusion culture or milk) 4) Gram staining of bacteria in buttermilk 5) To observe common pathogenic bacteria (any 6 – permanent slides) 6) Observation of fungi on different food materials 7) To observe common pathogenic protozoa (permanent slides of *Entamoebahistolytica* and *Plasmodium vivax*) 8) Study of medicinally important plants (projects)	Daily work Journal Performing experiment 7 marks

Semester I

Food Hygiene and Sanitation

Objectives

This course will enable the students to

1. Identify critical control points
2. Describe food borne illness symptoms and preventative methods.
3. Describe personal hygiene and health habits.
4. Describe how to prepare potentially hazardous food according to safe time andtemperature principles.
5. Recognize signs of food spoilage
6. Recognize safe receiving, storing and handling raw and prepared foods.

Code No	Subject	TC	Th	Pr	Int	Ext	Total
1103	**Food Hygiene and Sanitation**	4	4	-	25	75	100

ModuleNo.	Objectives	Contents	Assessment
1	This module will enable the students to 1) Identify the sources of food contamination 2) Have an understanding of food borne illness and its prevention	**Food contamination and spoilage** 1) Sources of contamination 2) Characteristics of microbes 3) Conditions leading to food spoilage 4) Signs of spoilage in different food categories 5) Bacterial food intoxication- Staphylococcus aureus, Bacillus cereus 6) Bacterial food infection- E.coli, Salmonella 7) Parasitic infestations **8)** Source and control of food borne illness	**25 marks** Quiz Objective Descriptive

2	This module will enable the students to 1) Comprehend the importance of sanitation in every phase of food handling **2)** Have a deeper knowledge of clean food practices	**Sanitation and food** 1) Sanitary aspects to be observed during food purchase and storage 2) Sanitary procedures to be followed while preparation, cooking and holding food 3) Need for an efficient cleaning program 4) Sanitary practices to be observed by food handlers	25 marks Multiple choice questitions
3	This module will enable the students to 1.Develop awareness of the importance of following operating and cleaning procedures strictly 2.Gain an insight into the importance of pest control	**Plant sanitation** 1) Sanitary requirements for equipments 2) Cleaning agents and tests for sanitization strength 3) Importance of water in the cleaning process 4) Pest control	25 marks Descriptive
4	This module will enable the students to 1.Comprehend the need for personal hygiene & sanitary food handling 2.Examine the necessity for properly planned and executed training programmes	**Personal hygiene, management and sanitation** 1) Sanitary practices to be observed by food holders 2) Importance of good habits exercise and recreation 3) Need for training in sanitation 4) Planning a training in program 5) Role of management in ensuring safe working conditions	25 marks Descriptive

References

1) Roday. S. (1999) Food Hygiene and Sanitation, Tata McGrow Hill
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3) Hobbes B.C. and Gylbert R.J. (1974) Food Poisoning and Food Hygiene 4thEdition, Edward Arnold
4) Hobbs, Betycad JS McLintock Hygiene Food handling St. Johns Ambulance Assocaiation, London, 1999

Semester I

Human Ecology and Family Science-I

Objectives
The course enables the students to:

1) Develop an understanding of self in relation to family and society.
2) Understand their roles and responsibilities as productive individuals, as members of family, community and society.
3) Integrate learning across diverse domains and form linkages with other academic subjects of human ecology.

Code No	Subject	T C	Th	Pr	Int	Ext	Total
1104	**Human Ecology and Family Science-I**	4	4	-	25	75	100

Module	Objectives	Content	Assessment
1	This will enable Students to 1. know oneself and the significance of developing a positive sense of self. 2. learn the analysis of the period of adolescence. 3. know the characteristics of self during infancy, childhood and adolescence. 4. know about nutrition and fitness. To identify various resources and classify into human and non human resources. 5. discuss the diversity in fabrics and classify the fabrics commonly seen around. 6. define the concept of	Understanding oneself: 1. Traits and Needs of Adolescence Changes during Adolescence and their influences on identity 2.Biological and Physical changes Socio – Cultural context Emotional changes 3. Cognitive changes. 4.Nutrition and fitness during adolescence 5. Time, money, management, energy, space. 6. Fabric and apparel: 7.Impact of Media and communication 8. Communication Skills. 9. Living and working in a global society. Alcohol and dry abuse.	25 marks Quiz/ Assignment/ projects/ Presentations

	Communication and analyze the various communication technology. 7. Understand the relationship among the individual, the family community and global society		
2	This will enable Students to 1. develop an understanding of self in relation to family and society. 2. understand their roles and responsibilities as productive individuals, as members of family, community and society. 3. understand the interrelationship of health, nutrition and hygiene. 4. know the interdependence among activity, work and environment. 5. describe the role of education, learning and extension in the context of family.	Understanding family, community and society: 1.Family and community Relations 2.Family, Community health, nutrition and hygiene 3. Activity, work and environment 4.Resource availability and management 5. Learning, education and extension. 6.Textile heritage of India	25 marks Quiz/ Assignment/ projects/ presentations
3	This will enable Students to 1. analyse the relationship between growth and health. 2. know the significance of care and education. 3. identify general clothing needs of children from different age group.	Childhood: 1.Survival,Growth and Development 2.Nutrition, health and wellbeing 3.Care and education 4.Clothes and apparel 5.Children with special needs 6. Socio-cultural influence on children.	25 marks Quiz/ Assignment/ projects/ presentations

4	This will enable Students to 1. know the importance of health and wellness 2. understand the concept of financial management and different types of income. Describe the function of water in the body and the ways electrolytes/fluids are balanced and maintained in the body. 3. know the procedures of removing stains & processes in laundry and use and care of fabric. 4. know the processes in communication. 5. analyse one's own responsibility towards self, family, community and the larger society.	Adulthood: 1.Health and Wellness 2.Financial planning and management 3.Care and maintenance of fabrics and apparel 4.Perspectives in Communication 5.Citizen's responsibilities and rights	25 marks Quiz/ Assignment/ projects/ presentations

References:

1. Chattopadhyay, K. 1985. Handicrafts of India. Indian council for Cultural Relations. New Delhi.
2. Chisti, R. K. and Jain, R. 2000. Handcrafted Indian textiles. Roli Books. New Delhi.
3. Damhorst, M. L., Miller, K. A., and Michelman, S.O. 2001. The Meaning of Dress. Fairchild Pub. New York.
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6. Gupta, C. B. 2004. Management Concepts and Practices (5thEd.). Sultan Chand & sons. New Delhi
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17. RaoRaja, ST. 2000. Planning of Residential Buildings. Standard Distributors. New Delhi.
18. Saraswati , T.S. 1999. Culture, Socialisation and Human Development. Sage. New Delhi.
19. Sawhney, H.K., and Mital, M. 2007. Family Finance and Consumer Studies. Elite Publishing House. New Delhi.
20. Sharma, D. 2003. Childhood, Family and Socio-Cultural Change in India: Reinterpreting the inner world.OUP. New Delhi.
21. Sharma, N. 2009. Understanding Adolescence. National Book Trust. New Delhi.
22. Srivastava, A.K. 1998. Child Development: An Indian Perspective. NCERT. New Delhi.
23. Sturm. M.M., and Grieser, E.H. 1962. Guide to Modern Clothing. McGraw Hill. New York.
24. Vidyasagar, P.V. 1998. Handbook of Textiles. Mittal Pub. New Delhi.
25. Wadhwa, a. and Sharma, S. 2003. Nutritions in the Community. Elite Pub. New Delhi.
26. Yadava, J.S., and Mathur, P. 1998. Issues in Mass Communication, the Basic Concepts. Vol. 1. Kanishka Pub. New Delhi.w

Semester I

Environment Studies

OBJECTIVES:

1. To make students aware about the importance, current situation of natural resources and the need to conserve them.
2. To give information about concept, types of various ecosystems.
3. To make aware about biodiversity, and need of conservation.
4. To create awareness about social issues and the solutions to solve them.

Code No	Course	TC	Th C	Pr C	Int M	Ext M	Total
9105	**Environment Studies**	4	4	0	25	75	100

Module No.	Objective	Content	Evaluation
1	This will enable students to: 1. Get acquainted with physical environment and its components 2. Know various natural resources, their importance, over use 3. Develop the concept of sustainable development	**The Multidisciplinary Nature of Environmental Studies** • Definition, Scope and Importance, Need for public awareness **Natural Resources** • Renewable and Non-Renewable Resources • Natural Resources and Associated Problem **Forest Resources:** Use and Over exploration, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people. **Water Resources:** Use and over utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems. **Mineral Resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies. **Food Resources:** World food problems, changes cause by agriculture and over grazing, effects of modern agriculture, fertilizers, pesticide problems, water logging, salinity, case studies. **Energy Resources:** Growing energy needs, renewable and non-renewable energy sources and use of alternate energy sources, case studies. **Land Resources:** Land as a resources, land degradation, man induced landslides, soil erosion and desertification • Role of individual in conservation of natural resources • Equitable use of resources for sustainable lifestyles	• ShortQuestions/Multiple Choice Questions **Assignment or display on ecosystems** 10 marks

		Ecosystems Concept of ecosystem Structure and function of ecosystem Producers, consumers and decomposers Energy flow in the ecosystem	
2	1. Develop the concept of ecology and its components 2. Study the impact of human activities and ecology and need to conserve the resources	**Biodiversity and its Conservation** • Introduction-Definition: Genetic, Species and Ecosystem Diversity • Bio-geographical classification of India • Value of biodiversity, consumptive use, productive use, social, ethical, aesthetic and option values • India as a mega-diversity nation • Hot-spots of biodiversity • Threats to biodiversity: habitat, loss, poaching of wild life, man wildlife conflicts • Endangered and endemic species of India • Conservation of bio-diversity: *In-situ* and *Ex-situ* conservation of biodiversity.	Display/ Assignment 5 marks
3	1. Make the students aware of various types of pollutions and solutions to the problem. 2. Make the students aware of social problems.	**Environmental Pollution:** • Definition, causes, effects and control measures of - Air, water, soil, marine, noise and thermal pollutions; Nuclear hazards • Solid Waste Management: causes, effects and control measures of urban and industrial waste • Role of individual in prevention of pollution • Pollution case studies • Disaster Management: Floods, earthquake, cyclone and landslides **Social Issues and the Environment:** • From unsustainable to sustainable development • Urban problems related to energy • Water conservation, rain water harvesting, water shed management • Resettlement and rehabilitation of people, its problem and concerns. case studies • Environmental ethics: Issues and possible solutions • Climate changes, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. case studies • Waste land reclamation • Consumerism and waste products • Environment Protection Act • Air, Water (Prevention and control of pollution) Act • Wildlife Protection Act	Assignment on local problems 5 marks

		• Forest Conservation Act • Issues involved in enforcement of environmental legislation • Public awareness	
4	1. Make the students aware of population problems. 2.Develop the love and interest about nature by being in nature itself. 3.Create awareness about Biodiversity pollution and social issues.	**Human Population and the Environment** • Population growth, variation among nation • Population explosion-family welfare programme • Environment and Human Health • Human Rights • Value Education • HIV/AIDS • Women and child welfare • Role of Information Technology in Environment and Human health • Case studies Visitto local area to document environmental assets a) Rivers/forest/grassland/ hill/ mountain b) Local Pollution Site-Urban/Rural/Industrial/ Agricultural c) Study of common plants/ insects/ birds d) Study of simple ecosystems-ponds, rivers, hill, slopes etc.	Report on the local visit 5 marks

EVALUATION:

1) On Four Modules, 1 or 2 assignments = 25 marks
2) External - 75 marks
3) Total : Internal - 25 + External - 75 = 100 marks

REFERENCES:

1) Agarwal, K.C. (2001) Environmental Biology, Nidi Publication Ltd. Bikaner.
2) BharuchaErach, The Biodiversity of India, MapinPublising Pvt. Ltd., Ahamadabad-380013, India, Email: mapin@icenet.net(R)
3) Brunner R. C. (1989), Hazardous Waste Incineration, McGraw Hill Inc. 480p
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6) De A. K., Environmental Chemistry, WileelyEastem Ltd.
7) Down to Earth, Center for Science and Environment(R)
8) Gleick, H. P. (1993), Water in Crisis, Pacifics Institute for Studies in dev., Environment & Security, Stockholm Env. Institute, Oxford University, Press. 473p

SEMESTER II

English II (Higher Level)

OBJECTIVES:

The student should be able to -

1. Prepare and deliver an effective presentation
2. Write an effective resume
3. Appear for an interview process with confidence
4. Develop skills of reading literary narratives with understanding and appreciation

Code No	Course	TC	Th C	Pr C	Int M	Ext M	Total
9201	**English II (Higher Level)**	4	3	1	25	75	100

Module No.	Objective	Content	Evaluation
1	The learners will be able to- • understand the different techniques of presentations • understand the concept of sequencing of presentations • be equipped with the required vocabulary and correct use of grammar • be competent enough to give an effective presentation	**Presentation Skills :** 1. Structure of a presentation 2. Sequencing 3. Commonly used verbs 4. Use of signaling, signposting and listing techniques 5. Use of visual and electronic aids (OHP/PPT etc.) **Assignments**: 1. Structure of a presentation – (descriptive question) 2. Small group presentation on a given topic	**Assign.1** :Written script - 5 marks + orals -10 marks **Assign.2** Group presentation - 10 = 20 marks
2	The learners will - • familiarize themselves with basic norms of business correspondence • produce effective resumes in accordance with various contexts	**Job Applications** 1. How to write applications for jobs in response to advertisements 2. Types of resume 3. Electronic formats for resumes **Assignments**: 1. Job Application Letters in response to advertisement 2. Writing a student's resume	**Assign.1:** 2 x 5 = 10 marks **Assign.2** 15 marks

3	The learners will - • develop skills of literary appreciation • enhance their descriptive writing skills • enrich their vocabulary	**Literary Appreciation** The following stories from the prescribed Text 'Let's Go Home and Other Stories' . Ed. By Meenakshi Mukherjee. "The Shadow" "Meeting Pool" "Death of a Hero" "White Dove' "Zamindar of Palipuram' **Assignments**: 1. 2 Questions on expressing personal responses 2. 2 Character sketches 3. Vocabulary enhancement exercises	**Assign.** **1:**(2 x 5) = 10 marks **2.** (2 x 5) =10 **3.** 5 marks
4	The learners will - • be competent enough to appear for an interview process • confidently participate in a group discussion	**Soft skills enhancement through effective communication in English** Content-point (only of that module): 1. Types of Interviews 2. How to prepare for an interview 3. Language and Etiquette 4. Role play/mock interviews 5. Methods and Procedures of Group Discussions 6. Practice sessions in Group Discussions **Assignments**: 1. Descriptive question on how to prepare for an interview 2. Mock Interview 3. Mock Group Discussion	**Assign.** **1.** 5 marks **2.** 10 marks **3.** 10 marks

EVALUATION :

4. Internal= Continuous Evaluation of all four Modules to be taken = 25 marks
5. External = 75 marks
6. Total : Internal = 25 + External =75 = 100 marks

SEMESTER II

English II (Lower Level)

OBJECTIVES:

The student should be able to -

1. Prepare and deliver an effective presentation
2. Write an effective resume
3. Appear for an interview process with confidence
4. Develop skills of reading literary narratives with understanding and appreciation

Code No	Subject	TC	Th C	Pr C	Int M	Ext M	Total
9201 (A)	**English II (Lower Level)**	4	3	1	25	75	100

Module No.	Objective	Content	Assessment
1	The learners will be able to - • use appropriate technical words, tense and linking devices • adopt different techniques of presentations • be competent enough to give an effective presentation in English	**Presentation Skills** Structure of a presentation 1. How to prepare the outline of a presentation 2. Commonly used verbs and connectors 3. Use of signaling, signposting and listing techniques 4. Use of visual and electronic aids (OHP/PPT etc.) **Assignments:** 1. Exercise based on use of signposting and listing techniques 2. Preparing outline of presentation 3. Presentation on given topic (oral)	**Assign.** **1.** 5 marks **2.** 10 marks **3.** 10 marks

2	The learners will - • be familiar with the requirements of a job application letter • be able to write an effective resume	**Job Applications** 1. How to respond to an advertisement and write job applications 2. How to write an effective resume 3. Electronic formats for resumes **Assignments:** 1. Job Application Letters in response to an advertisement 2. Writing a student's resume	**Assign.** **1.** (2 x 5)= 10 marks **2.**15 marks
3	The learner will learn how to - • read with emphasis on fluency, tone and voice modulation • enhance their vocabulary • express themselves creatively • be able to connect the narrative to the larger society and their lives	**Reading and comprehension skills:** **3rd and 4th stories from Prescribed Text 'YuvaKatha 7'** 1. Comprehension Skills 2. Reading a passage with fluency, tone, modulation, fluency 3. Personal responses to the prescribed stories 4. Vocabulary building 5. Expressing ideas creatively **Assignment**: 1. Comprehension Skills 2. Reading a passage with - fluency, tone, modulation 3. Personal responses to the prescribed stories	**Assign.** **1.** 10 marks **2.** 5 marks **3.**10 marks
4	The learner will be able to- • verbally describe objects, images and pictures • use appropriate words and sentence structures to seek information, give replies, instructions etc. • confidently appear for an interview	**Verbal communication skills for interpersonal communication** 1. Asking for information and replying 2. Giving instructions and replying 3. Visual to verbal communication : interpreting pictures 4. Describing objects 5. Verbal skills required during an interview **Assignments**: 1. Visual to verbal interpretation 2. Writing instructions/asking for information 3. Describing objects 4. Mock Interview References (for all module):	**Assign.** **1.** 5 marks **2.** 5 marks **3.** 5 marks **4.**10 marks

REFERENCE BOOKS:

Prescribed Texts: (Lower Level English)

KeertiRamachandran. 1996 (rpt 2010).YuvakathaVol 7. Katha Books. New Delhi.

(Higher Level English)

Meenakshi Mukherjee (ed.) (2009 rpt). *Lets Go Home and Other Stories*. : Orient Longman, New Delhi.

Prescribed Texts: (Higher Level)

REFERENCE BOOKS:

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10. Singh, O.P. (2012). Art of effective communication in group discussion and interview for competitive examinations. New Delhi: S.Chand& Co Ltd.

Semester II
Human Physiology

OBJECTIVES:

1. The students will understand the basic structure and functions of the human body
2. Student will be acquainted with common diseases/disorders of each system

Code No	Course	TC	Th C	Pr C	Int M	Ext M	Total
9202	**Human Physiology**	4	3	1	25	75	100

Human Physiology Theory

Module No.	Objective	Content	Evaluation
1	This will enable students to: 1.Introduce students to basic terminologies 2.Understand the basic structure of human body 3.Understand the functioning of cardio vascular, respiratory , gastro intestinal 4.Brief knowledge about common diseases affecting each system. 5.To create awareness about interdependence and co-	**INTRODUCTION** • General terms- anatomy, physiology, symmetrical arrangement, anatomical position. Median plane / lateral plane, internal/ external, superficial /deep, superior/ inferior, anterior/posterior. • Basic human tissues. • Introduction to human skeleton. • Structure of bone and cartilage. • Classification of various types of muscle. **BLOOD AND LYMPHATIC SYSTEM** • Physical characteristics of blood • Blood volume, composition of plasma and functions of plasma protein • RBC formation and functions • Information about anaemia and thalessemia. • Blood groups, their importance , Rh-incompatibility. • WBC- types, functions, importance of CBC • Platelets and mechanism of coagulation • Lymph and lymphatic system, spleen and its functions. **HEART** • Its structure and circulation of blood. • Cardiac cycle • Information about hypertension & ischemic heart disease **RESPIRATORY SYSTEM** Respiratory organs-nose, sinuses, larynx, trachea,	• Multiple choice questions • Short notes • Display • Quiz 5 marks

	ordination between different systems of the body for normal functioning.	bronchi lung brief structure and functions. Mechanism of respiration, factors affecting efficacy of respiration. Various lung volumes and capacities. Common diseases- TB, asthma, bronchitis, cough, pneumonia sinusitis. **GASTRO - INTESTINAL SYSTEM** Oral cavity, tonsils, pharynx, oesophagus, stomach small and large intestine - brief structure and functions. Liver, gall bladder, pancreas structure and functions. Common disorders- Dental caries, vomiting. diarrhoea, constipation. Hyperacidity, diabetes.	
2	This will enable students to: 1. Understand the functioning of excretory system and brief knowledge about common diseases affecting this system. **2.** Know more about the nervous system	**EXCRETORY SYSTEM** • Structure and function of organs of urinary system (in brief). • Mechanism of urine formation • Common diseases- urinary tract infection and renal stones. • Structure and function of skin • Regulation of body temperature • Common disorders - acne dandruff and burns. **NERVOUS SYSTEM** • Classification of nervous system • Structure and functions of different parts of brain, spinal cord and reflex action. • Eye - structure and mechanism of vision • Common problems - conjunctivitis, cataract. • Ear - structure and mechanism of hearing • Common problems - deafness, vertigo, motion sickness	• Multiple choice questions. • Short notes. • Display. • Quiz. • PPT present-ation 5 marks
3	This will enable students to: 1. know more about the endocrine system 2. Have knowledge of reproductive system and importance of	**ENDOCRINE SYSTEM** • Listing of endocrine glands and their location • Functions of pituitary, thyroid, parathyroid and adrenal. **REPRODUCTIVE SYSTEM** **FEMALE REPRODUCTIVE SYSTEM** • Structure • Menstrual cycle • Fertilization • Breast- Structure, function, importance of breast hygiene and breast feeding • Physiological changes in pregnancy	• Multiple choice questions. • Short notes. • Display. • Quiz. • PPT present-ation 5 marks

	reproductive health	• Importance of ante-natal care. **MALE REPRODUCTIVE SYSTEM** • Structure • Sex education • Contraception and infertility • Sexually transmitted diseases-syphilis, gonorrhoea, AIDS	

EVALUATION:

1) Internal – Theory 15 marks + Practical 10 marks = 25 marks
2) External : Theory 50 marks + Practical 25 marks = 75 marks
3) Total : Internal -25 + External - 75 = 100 marks

REFERENCES :

1) Guyton, A.C., Hall J.E.- Textbook of Medical Physiology - Prism Books Pvt Ltd., Bangalore.
2) Concise Medical Physiology - Chaudhari.
3) API Text Book of Medicine.
4) Textbook of Gynaecology - Datta.
5) Winwood - Sear's Anatomy and Physiology for Nurses - London, Edward Arnold .
6) Wilson -Anatomy and Physiology in Health and Illness, Edinburgh, Churchill Livingstone.
7)ChatterjeeChandiCharan -Textbook of Medical Physiology - London. W.B. Saunder's company.

Human physiology (Practical)

Module No.	Objective	Content	Evaluation
4	This will enable students to: 1. Introduce the students to human skeleton and enable them to identify various bones in the body 2. perform simple clinical tests like estimation of haemoglobin and blood group and blood	1. Study of human skeleton and identification of bones. 2. Estimation of haemoglobin 3. Estimation of blood groups, 4. Demonstration of peripheral blood smear. Importance of complete blood count. 5. Measurement of pulse rate and blood pressure. 6. Discussion of normal components of urine. Test for abnormal components like sugar, albumin and acetone and discussion on diseases in which they are found. 7. **FIRST AID** -Definition, aims, qualities of first aider, contents of first aid box. -Different types of bandages and bandaging techniques. ***WOUNDS***	10 marks

	pressure 3. Utilize the knowledge learnt to administer first aid for common emergency situations. 4. Acquaint the students with the basic principles of home nursing.	-Classification, dressing and management of haemorrhage- basic principles and discussion about bleeding from various parts of body. ***FRACTURE*** -Types, symptoms, management. Sprain and dislocation ***First Aid for***- foreign bodies in eye, ear, nose, skin. ***First Aid for -*** fainting, burns, heat stroke, asthma, convulsions, electric shock and heart attack. ***First Aid for -*** common poisoning, dog bite, snake bite, bee-sting and scorpion bite. ***BASIC PRINCIPLES OF HOME NURSING-*** Measuring body temperature, steam inhalation, body sponging, taking care of bed ridden patient and enema. 8. Cardio pulmonary resuscitation	

External : Practical exam - 25 marks + Theory - 50 marks = 75 marks

REFERENCES :

S. No.	Title of the Book	Author
1.	Book of Clinical Medicine	Hutchinson's
2.	First Aid	St .John's Ambulance Association

Semester II
Physical and Analytical Chemistry

Objectives:

1. To acquaint the students to fundamental principles of physical and analytical chemistry
2. To understand the diverse analytical processes and the various steps involved in the same
3. To develop analytical skills
4. To understand the various instrumentation techniques applied

Code No	Subject	TC	Th	Pr	Int	Ext	Total
1203	**Physical and Analytical Chemistry**	4	2	2	25	75	100

Physical and Analytical Chemistry Theory

Module no	Objective	Content	Evaluation
1	This module will enable students to: 1. Acquire knowledge of fundamentals of physical chemistry 2. Understand and analyze the scientific information	Physical Chemistry Instrumental methods of chemical analysis a. Potentiometry: Brief mention of electrode potential, Hydrogen electrode, glass electrode and applications b. Conductometry: Definition of specific conductance, equivalent conductance and applications c. Refractometry: Simple theory, instrumentation, Application, Abbe'srefractometer d. Colorimetryand spectrophotometry: b. Definition, absorbance, absorbility, Beer and Lambert law, instrumentation of colorimeter and spectrophotometer, factors affecting absorbility like temperature, solvent, wavelength, difference between colorimeter and spectrophotometer and applications	Question-Answer- 10 Marks + Assignment -5 Marks or Presentation- 5 Marks
2	This module will enable students to : 1. Acquire knowledge about	**Analytical Chemistry** a)Gravimetric Analysis -Common ion effect, solubility product, completeness of precipitation,	Question-Answer- 10 Marks or Assignment -5

	different analytical methods 2. Understand the various steps involved in analytical processes	complexions effect of acids, effect of acid, temperature and solvent upon solubility of precipitate, super saturation, and precipitate formation, re-precipitation b)Solvent extraction and Chromatography -Principle, Distribution co-efficient, distribution ratio, relation between distribution ratio and distribution co-efficient, solvent extraction methods i.e. ion association, salvation, chelate formation and its applications -Principle of chromatography, types (absorption, partition, coloumn) , principle, diameter of coloumn, packing, loading of sample, elution -Ion exchange chromatography, principle, cation and anion exchange resins, anion acids, deionization of water -Paper chromatography, Thin layer chromatography and Gas-Liquid chromatography - principle, techniques involved and applications. Detection of water	Marks + Presentation- 5 Marks

Physical and Analytical Chemistry Practical

Module no	Objective	Content	Evaluation
1	**This module will enable students to :** 1. Understand the principles of physical chemistry 2. Learn the various instrumentation techniques	**Physical Chemistry** 1.To determine the heat of neutralization of strong acid or strong base 2.To determine the relative fuel value of kerosene to ethyl alcohol 3.To determine the λ max and concentration of $CuSO_4$colourimetrically 4.To determine the λ max and concentration of ascorbic acid colourimetrically 5.To determine the molar absorptivity coefficient of $K_2Cr_2O_7$colourimetrically 6.To study the adsorption of acetic acid on charcoal from its solution 7.To study the hydrolysis of ester and find out the order of reaction 8.To determine the total soluble solids content of various food samples	Experiment- 10 Marks + Assignment -5 Marks or Presentation- 5 Marks

2	**This module will enable students to:** 1. Learn the various analytical techniques 2. Develop analytical skills	**Analytical Chemistry** 1. To prepare 1N $KMnO_4$ solution 2. To prepare $KMnO_4$ solutions of different normalities using dilution method 3. To separate and identify a binary mixture of inorganications by paper chromatography 4. To separate and identify a binary mixture of amino acids by paper chromatography 5. To separate the mixture of ortho and para nitro aniline by thin layer chromatography 6. To separate the cations from the given mixture bycoloumn chromatography using cellulose 7. To determine the amount of Nickel gravimetrically as Ni-DMG	Experiment- 10 Marks or Quiz -5 Marks + Assignment- 5 Marks

References:

1. Chatwell and Anand Instrumental methods of chemical analysis
2. Willard, Dean, Merit1994, Instrumental methods of chemical analysis, 6thed.
3. Bassette, Denney, Tuffery, Mendham (1968) Vogel's text book of Quantitative inorganic analysis, 3rd edition, London, Longman
4. S. Ranganna, (1987) Handbook of Analysis and Quality Control for Fruit and Vegetable Products, 2nd edition, Tata McGraw Hill Publishing Company Limited, New Delhi.
5. YeshajahuPomeranz, Clifton E. Meloa, (2000), Food Analysis: Theory and Practice, 3rd edition, Aspen Publishers, United States of America,
6. S M Khopkar, (2004), Basic Concepts Of Analytical Chemistry, 2nd edition, New Age International publishers, New Delhi.

Semester II

Fundamentals of Food Science and Nutrition

Objectives:

The course will enable the students to:

1. Understand the inter-relationship between food, nutrition and health
2. Know the methods and principles involved in cooking.
3. Understand the knowledge of food science and the changes occurring during food preparation
4. Know the methods and principles involved in cooking.
5. Learn to relate foods with their nutrient content

Code No	Course	T C	Pr C	Th C	Int M	Ext M	Total
9204	**Fundamentals of Food Science and Nutrition**	4	2	2	25	75	100

Fundamentals of Food Science and Nutrition Theory

Module No.	Objectives	Content	Assessment
1	This will enable students to: 1. Know nutritional aspects of foods and their functions. 2. Understand the importance and role of macronutrients in health 3. Identify food sources **4.** Understand the principles of food science and discuss the relation between Food Science and Nutrition	**Introduction to Nutrition** 1: Terms used in Nutrition and Health. Definitions - Health, Nutrition, Nutrients, Foods, Diet, R.D.A., Balanced diet, Malnutrition, Under nutrition, Over nutrition, Optimum nutrition. 2**:** Five Food Groups and Food guide, relationship between food and nutrition, functions of food, classification of nutrients, factors affecting food consumption and food acceptance. **Macronutrients** 1. Carbohydrates 2. Proteins 3. Fats 4. Water - Classification, functions, sources, requirements, deficiencies - Digestion, Absorption, Transport - Food Science principles	25 Marks Quiz / assignments

2	This will enable students to: 1. Know the role of Vitamins and minerals in health 2. Identify the color pigments in foods 3. Understand the changes in color pigments	**Micronutrients:** Classification of Vitamins: A, D, E, K, Thiamin, Riboflavin, Niacin, Ascorbic Acid and Minerals: Calcium, Iron and Iodine - Functions, deficiencies sources, requirements - Digestion, Absorption, transport - Conservation of nutrients Color Pigments	25 Marks Quiz / assignments

Fundamentals of Food Science and Nutrition Practical

Objectives:

The course will enable the students to:

a. Relate weight and measures of raw foods with cooked amounts and associate them with serving size.
b. Apply the knowledge of food science and observe the changes occurring during food preparation.

c. List rich food sources of various nutrients and plan and prepare recipes

Module No.	Objectives	Content	Assessment
1	This will enable students to: 1. Understand the concept of portion size 2. Know the specified amounts and proportion of ingredients used in the recipe 3. Understand the basic scientific principles and the preparation of food 4. Learn the	**Basics of Food Preparation** 1. Cereal, pulse, milk, egg and vegetable and fruit preparation - Weights and measures - Standardization, portion size - Methods of food preparation - Food Science principles - Calculation of nutrients - Conservation of nutrients	25 marks Quiz

	preparation methods to optimize nutrient content and conserve nutrients		
2	This will enable students to: 1. Plan recipes and calculate nutrients 2. Understand and relate the principles of food science to the preparation and methods to conserve nutrients	**Plan and Prepare Recipes for One Serving:** - Energy: high and low calorie - Proteins - Calcium - Iron - Vitamin C - Vitamin A B- complex vitamins	25 marks Planning and Cooking

References:

1. Mudambi, S.R. andRajgopal, M.V**. (**2012), *Fundamentals of Foods and Nutrition* New Age International Pvt. Ltd.
2. Food Science 1st Edition (2012) Sheth Publications. Maharashtra State Board of Secondary and Higher Secondary education Pune.
3. Roday S. (2012) *Food Science and Nutrition* (2nd Ed.) Oxford University Press.
4. Joshi S. (2009) *Nutrition and Dietetics*Mcgraw Hill Higher Education
5. Robinson, and Lawler (1990) *Normal and Therapeutic Nutrition* (17thEdn) Macmillan Pub. Co.
6. Guthrie Helen (1986) Introductory Nutrition, Mosby College Publishing. Times Mirror
7. Wardlaw G.M (1997) *Contemporary Nutrition, Issues and Insights*, 3rd Edition Tata McGrawHill Inc. Boston.
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Semester II
Human Ecology and Family Science-II

Objectives

1. The course enables the students to:
2. Understand various streams of Human Ecology and family sciences
3. Integrate learning across various domains of human ecology

Code No	Subject	TC	Th	Pr	Int	Ext	Total
1205	**Human Ecology and Family Science-II**	4	4	-	25	75	100

Module No	Objectives	Content	Assessment
1	This module will enable students to - Understand the scope of Human Ecology and family Science. - Learn about the clinical aspects of nutrition and dietetics. - Understand the relation of public nutrition and health. - Learn about the catering, food services, food processing,technology, food quality and safety.	Scope of Human Ecology and family sciences in higher education. Major concepts, relevance and skills in Nutrition, Food Science And Technology: - Clinical nutrition and dietetics - Public Nutrition and health. - Catering and food services management - Food processing and technology - Food quality and food safety.	25 Marks Quiz/ Assignment/ projects/ presentations
2	This module will enable students to - Learn about the early childhood care and education. - Understand the significance of, Special education, guidance and counseling. - Learn about the support services for children.	Major concepts, relevance and skills in Human Development And Family Studies: - Early Childhood Care and Education - Guidance and counseling - Special Education and support services - Support services for children in difficult circumstances - Child labor. - Millennium Development goals Aging/Elderly - Management of institutions and	25 Marks Quiz/ Assignment/ projects/ presentations

	- Understand laws against for child labor - Learn about the Millennium plan for the elderly and management of institutions and programs for children, youth and elderly.	programs for children, youth and elderly.	
3	This module will enable students to - Learn about the care and maintenance of fabrics in institution. - Understand the design the design of fabric and apparel. - Learn about the concept of retailing and merchandizing. - Learn about quality control in garment industry, museum logy and textile conservation.	Major concepts, relevance and skills in Fabric And Apparel - Care and maintenance of fabrics in institutions - Design for fabric and apparel - Retailing and merchandising - Production and quality control in garment industry - Museumology and Textile Conservation	25 Marks Quiz/ Assignment/ projects/ presentations
4	This module will enable students to - Learn about human resource, event and hospitality management - Understand the designing and ergonomics of interior and exterior space. - Learn about the consumer services - Learn about the development and corporate communication ,journalism, media management and development programs	Major concepts, relevance and skills in Resource Management - Human Resource Management - Hospitality Management - Designing of interior and exterior space - Event management - Consumer services - Ergonomic Interior/Space Communication And Extension - Management of Development programs - Development Communication and Journalism - Media management and Advocacy - Media Design and production - Corporate communication and public relations.	25 Marks Quiz/ Assignment/ projects/ presentations

References:

1. Nickel P. and Dorsy J. M. (1991), Management in family living , 4th edition wiley and eastern, New Delhi.
2. Swanson V. (1981), Introduction to Home Management; Mac- Milan & Co Inc, New York, Collier. Macmillan Publishers London
3. Singh, P. N. (1993), Developing and Managing Human Resource – 2nd edition- Bombay: Suchandra publications.
4. Fontana and David, (1996). Managing Time, Excel Books, New Delhi.
5. Athinson Jacqueline, (1993). Better Time Management Indus, New Delhi.
6. Batra et al.,(1993). Management thoughts for the family in business, Think Inc.,New Delhi.
7. Nickell P.,(1967). Management in Family Living, 4th ed.Wiley eastern Ltd. New Delhi.
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16. Sturm. M.M., and Grieser, E.H. (1962) Guide to Modern Clothing. McGraw Hill. New York.
17. Vidyasagar, P.V. (1998) Handbook of Textiles. Mittal Pub. New Delhi.
18. Wadhwa, a. and Sharma, S. (2003) Nutrition in the Community. Elite Pub. New Delhi.
19. Yadava, J.S., and Mathur, P. (1998) Issues in Mass Communication, the Basic Concepts. Vol. 1. Kanishka Pub. New Delhi.

Semester III

Nutrition for Life span

Objectives:

The course will enable students to -

- Understand the physiological changes, special needs and health concerns of people at different stages of life
- Understand the importance of nutrition to physical, psychological growth and development and ageing.

Code No	Course	TC	Th C	Pr C	Int M	Ext M	Total
0931	**Nutrition for Life span**	4	**-**	4	100	-	100

Module No.	Objectives	Content	Assessment
1	This will enable students to: 3. Know the nutritional requirements and understand the concept of RDA **4.** Comprehend the concept of food guide and translate the same into planning	**Basics of Meal Planning** 1. Overview of nutritional requirements 2. Food Guide/ Food Pyramid and its use 3. Food Exchange List 4. Balanced diet 5. Factors affecting meal planning **6.** Maintaining a dietary record	Quiz/ Assignments / Projects Viva
2	This will enable students to: 1. Plan balanced diets for individuals keeping in mind their physical activity, income group, social and cultural background 2. Suggest dietary modifications for common ailments	**Nutrition in Adulthood** 1. Planning meals for sedentary, moderate and heavy workers 2. Dietary modifications for common ailments: diarrhea, constipation, Underweight, obesity and fever	Quiz Planning and Cooking Practical Viva
3	This will enable students to: 1. Learn the physiological changes during pregnancy and lactation	**Nutrition during Pregnancy and Lactation** Planning meals for various physiological conditions	Quiz Planning and Cooking Practical

	2. Understand the effect of physiological changes on nutritional requirements Understand the role of nutrition in pregnancy outcome and during lactation	- Pregnancy - Lactation	Viva
4	This will enable students to: Understand the physiological changes during growth, development and ageing and their effect on nutritional needs	**Nutrition during Life cycle** 1. Planning meals for different age groups - Infancy - Childhood - Adolescence - Old age	Quiz Planning and Cooking Practical Viva

Evaluation:

- **Planning = 50 marks** (including projects and assignments)
  (Each plan to be evaluated out of 10 marks and average to be taken)
- **Cooking practical = 30 marks**
  (Each cooking practical to be evaluated out of 10 marks and average to be taken)

- **Quiz = 20 marks (**including viva**)**
- **Total = 100 marks.**

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1. Mudambi, S.R., Rajgopal, M.V.(2012), Fundamentals of Foods and Nutrition, New Age International Pvt. Ltd.
2. Food Science (2012), Maharashtra State Board of Secondary and Higher Secondary education Pune, 1st Edition, Sheth Publications.
3. RodaySunetra, (2012), Food Science and Nutrition, 2nd Edition, Oxford University Press.
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6. C. Gopalan, B.V. Rama Sastriand S.C. Balasubramanium, Nutritive Value of Indian Foods, NIN, ICMR, Hyderabad.
7. Robinson, and Lawler, (1990), Normal and Therapeutic Nutrition 17th Edition MacMillan Pub. Co.
8. Guthrie Helen (1986). Introductory Nutrition, Times Mirror/ Mosby College Publishing.
9. Wardlaw G.M, (1997), Contemporary Nutrition, Issues and Insights, 3rd Edition Tata McGrawHill Inc. Boston.
10. Guthrie, Helen (1994), Human Nutrition, William C Brown Pub.

Semester III

Entrepreneurship Development

Objectives:
The course enables the students to-

1. Understand the concept of entrepreneurship
2. Acquire knowledge about the world of entrepreneurs
3. Understand and inculcate entrepreneurial values, attitudes, qualities and desires.
4. Sow the seed of entrepreneurship in fertile mind

Code No	Course	TC	Th C	Pr C	Int M	Ext M	Total
0932	**Entrepreneurship Development**	4	-	4	100	-	100

Module No	Objectives	Content	Assessment
1	This module will enable the student to -Understand the market and develop new ideas as per market demands -Understand the types of entrepreneurship. -know available techniques for opportunity development,	**Introduction to Entrepreneurship:** - Definition, Concept and Need for entrepreneurship. - Types of entrepreneurs: Spontaneous, Motivated and Induced. - Kinds of Entrepreneurship: Proprietary, Partnership and Group Entrepreneurship. **Exploring the World of Entrepreneurs:** - Legendary, Business, Social and Environmental, Artistic and Aesthetic Entrepreneurs - Entrepreneurs in Shadows, failed entrepreneurship - New Internet Entrepreneurs.	case studies presentations using different audiovisual aids individual or group activity Quiz 7 marks
2	This module will enable the student to -Understand the characteristics of an entrepreneur -Assess ones readiness to be an entrepreneur,	**Entrepreneurial Assets** - Entrepreneurial Values and attitudes. - Entrepreneurial Qualities. - Role demands and Requirements of Entrepreneurs. **Entrepreneurial Motivation**	case studies projects presentations using different audiovisual aids individual or

	-know available techniques for opportunity development -understand the elements of a successful business venture	- Definition and Meaning of Achievement Motivation. - Need for Achievement Motivation Unit 3- Motivating Factors: Internal and External	group activity Quiz 6 marks
3	This module will enable the student to -Develop effective communication skills required to be a successful entrepreneur. -Able to develop and appreciate theories that have been proposed to explain entry and success in business	**Gaining Personal Focus and Developing Skills** - Communication Skills: Written and verbal communication. - Barriers to communication. - Developing Listening skills. - Personality Development: experts in the field to take sessions with students. - Gaining Personal Focus: Defining ones own Intentions, goals and purpose. <u>Internal Intentions:</u> <u>External Intentions</u>	case studies presentations using different audiovisual aids individual or group activity Quiz 6 marks
4	This module will enable the student to -Prepare a project report. -apply all fundamentals required to write a well-structured business plan -understand the development of a formal business plan -gain experience in developing key components of the business plan into an executive summary	**Entrepreneurial Ideas** - Creativity and Idea Generation-Searching and selecting Entrepreneurial Ideas. -Dynamics of project Identification. - Matching Project and enterprise. - Gather Information on what works, How to succeed and Mistakes to avoid. (Students to interact with particular business persons related to their identified project/ field of interest, have Brainstorming sessions and share Ideas and Strategies in class) - Research select articles written about the industry related to their product or service. **Organize Visits** to Industries and Organizations helping entrepreneurship.	case studies presentations using different audiovisual aids individual or group activity Quiz 6 marks

References:

1. Bolton, B. & Thompson, J (2001): Entrepreneurs: Talent, Temperament, Technique, Replika Press Private Ltd, Delhi, 110 040, India.
2. Taneja, S. & Gupta, S.L. (1992) Entrepreneurship Development, New Venture Creation, Galgotia Publishing Company, New Delhi
3. Hisrich, R.D. & Peters, M.P. (1995) Entrepreneurship: Starting, Developing and Managing a New Enterprise, Richard, D. USA, Irwin, INC
4. Desai, V. (1991, 97, 99, Vol I & II,) Entrepreneurial Development, Himalaya Publishing House. Mumbai.

SEMESTER III

Food Science and Sensory Evaluation

OBJECTIVES:
This course will enable students to:

1. Understand nature and composition of food
2. Know the role of different ingredients along with methods and principles used in food preparation
3. Understand the changes occurring in foods during cooking.
4. Learnt the sensory evaluation and its applications.

Code No	Subject	TC	Th	Pr	Internal	External	Total
0933	**Food Science and Sensory Evaluation**	4	3	1	25	75	100

Food Science and Sensory Evaluation Theory

Module No	Objectives	Content	Assessment
1	**This module will enable students to:** 1. Understand the importance of Sensory evaluation and use different Sensory Evaluation Techniques. 2. Understand the role of water and be familiar with composition of different beverages. 3. Understand the stages of sugar cookery and their uses in food	• **Introduction to Food Science.** • **Sensory Evaluation** Sensory characteristics of food, Importance and objectives of Sensory evaluation and its Prerequisites, Tests for Sensory Evaluation**:** Sensitivity Threshold test Difference test – paired comparison, triangle and Duo-trio test, Rating test – Hedonic, Numerical, Composite scoring and ranking test • **Water:**Role of water in cookery, Forms of water – Bound and free water. Types of water - Hard and Soft. • **Beverages:** Types and Classification. Coffee, Tea, Cocoa Processing.(In Brief) • **Sugar Cookery:** Types of sugar, stages of sugar cookery and inversion of sugar. Crystallization and factors affecting crystallization. Crystalline candies and Non Crystalline candies • **Fats and Oils:** Physical properties – plasticity, smoke point and flash point. Functional role of fats – flavor, texture, tenderness, emulsification, shortening and leavening effects.	25 Marks Quiz/ Assignments/ Projects/ Presentations

	preparations. 4. Know the composition and properties of fats and their role in food preparation and processing.	Emulsions – Types of Emulsions. Rancidity - types and prevention. Antioxidants flavor reversion. Fat absorption and factors affecting it	
2	**This module will enable students to:** Know the composition of specific foods of plant origin 1.Understand the changes occurring in various food components during cooking with their applications. 2.Know the role of various foods in cookery	• **Cereals :**Structure and composition of a cereal grain, Properties of starch – Thickening and Gelatinization, Gel Formation, syneresis, Retrogradation and Lump formation, Dextrinization, Identity of grains, Gluten formation – Factors affecting Gluten formation. • **Leavening agents:** Natural and Chemical and their action. • **Pulses and legumes**: Composition, toxic factors, their effects, and elimination, soaking, fermentation and germination, • **Vegetable and Fruits:** Composition, nutritive value, color pigments and effect of cooking on them. Enzymatic and Non enzymatic Browning. • Pectic substances: forms – Pectin, Protopectin, Pectic acid, Pectinic acid, Theory of gel formation. Vegetables gums and their commercial uses.	25 Marks Quiz/ Assignments/ Projects/ Presentations
3	**This module will enable students to:** 1.Know the composition of specific foods of animal origin 2. Understand the changes occurring in various food components during cooking with their applications.	• **Milk:** Composition, effect of heat,acid, alkali and enzymes on milk, scum formation, maillard reaction • **Egg:** Structure and composition of egg, protein in egg white and egg yolk. Methods to judge egg quality (grading). Physical and chemical changes during egg storage, Egg foamsand uses.Role of egg in cookery and methods of cooking egg. • **Meat, Fish and Poultry-**Composition, Structure, post mortem changes, ripening of meat, tenderization of meat and changes during meat cooking. • **Fish**: Classification, quality indicators of fish, types of fish spoilage, gelatin, and Fish Protein Concentrate (FPC).	25 Marks Quiz/ Assignments/ Projects/ Presentations

Evaluation:
1.Internal – Theory 25 marks + Practical 25 marks = 50 /2 = 25 marks
2.External – Theory 75 marks

References

1. Srilakshmi, B: (2010) Food Science, 5th Edition, New Age International Pvt Ltd Publishers

2. Shadaksharaswamy, M, Manay, S, (2010): Food facts and Principles, 3rd Edition, New Age International Publishers
3. Bennion, M.Scheule, B.: (2009): Introductory Foods,13th Edition, Prentice Hall Publications
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Food Science and Sensory Evaluation Practical

Objectives:
This course will enable students to:

1. Understand nature and composition of food
2. Observe the principles of Food Science
3. Comprehend the role of different ingredients used in food preparation / processing.
4. Learn various tests of sensory evaluation of and their applications.

Module No	Objectives	Content	Assessment
I	**This module will enable students to**: 1. Understand the importance of Sensory evaluation 2. Comprehend and understand the role of ingredients and their behavior during preparation and processing.	**1. Tests for Sensory Evaluation** Sensitivity Threshold test, difference test – paired comparison, triangle and duo-trio test, scoring and ranking test. **2. Sugar Cookery** Preparation ofsugar syrups for example: 1 thread, 2 threads,softball, crack stage and caramelization. 3. **Starch Cookery** Stiffness of starch gel and factors affecting it Factors affecting gluten formation i.e. kneading time, types of cereal and flours, effect of amount of fat etc. 3. **Fat Cookery**: Shortening effect and factors affecting fat absorption. 4. **Milk Cookery**- Preparation of Curd, Paneer, Maillard Reaction. 5. **Egg Cookery-** Role of Egg – Boiled, poached, Omelet, French toast and mayonnaise.	25 Marks Continuous assessment.

***Evaluation Pattern:**

- Each cooking practical to be evaluated out of 10 marks
- Average marks for each module to be aggregated at 25 marks

Semester III
Organic and Inorganic Chemistry

Objectives

1. To understand the basis and significance of atomic models and the different types of bonds
2. To understand the fundamental principles of titration
3. To acquaint the students to the principles of organic chemistry
4. To gain the knowledge about the different functional groups in detail

Code No	Subject	TC	Th C	Pr C	Int M	Ext M	Total
0934	**Organic and Inorganic Chemistry**	**4**	**4**	**-**	**25**	**75**	**100**

Module no	Objective	Content	Evaluation
1	This module will enable students to: - Understand the basis and significance of atomic models - Acquire knowledge about different types of bonds	Atomic structure, Electronic configuration and Bonding: 1. Different models of atomic structure 2. Electronic configuration 3. S,p,d orbitals 4. Quantum numbers 5. Wave nature of electron 6. Valency 7. Stable configuration attainment 8. Types of bonds 9. Valence bond theory 10. Bonding of molecules using pure s and p orbitals 11. Hybridization	25 marks Presentation-Quiz
2	This module will enable students to: - Understand the basics of titration - Know all the aspects of acid-base titrations	**Theory of titrimetric analysis and Acid-Base titrations** 1. Classification of reactions 2. Equivalent weight of different substances 3. Expressing the concentration of solutions 4. Standard solutions 5. Definition of acids and bases 6. Different acid-base indicators 7. Titration curves for different strengths of acids and bases 8. Displacement titrations	25 marks Presentation-Quiz
3	This module will	**Principles of Oxidation-Reduction,**	25 marks Presentation

	enable students to: - Know the basic terms used in redox reactions, iodometry, iodimetry and argentiometry - Understand the principles of titrations involving redox reactions, Iodine solution and silver nitrate solution	**Iodometry and Argentiometry:** **A) Redox Reactions** 1. Definition of terms a) Oxidation b) Reduction c) Oxidising agent d) Reducing agent 2. Principle of redox reaction 3. Redox indicators and detection of end point 4. Titration curve with reference to ferrous and ferric **B) Iodometry and Iodimetry** 1. Preparation and standardization of $Na_2S_2O_3$ solution and Iodine solution 2. Detection of end point **C) Argentiometry** 1. Preparation of standard $AgNO_3$ solution 2. Srtandardization of $AgNO_3$ solution using Mohr's and Fajan's method 3. Determination of chloride, bromide and iodide individually and in the mixture	Quiz
4	This module will enable students to: - Understand the basics of organic chemistry - Learn different functional groups in detail	**Chemistry of functional groups** Introduction, structure, classification, properties, preparation and reactions of: 1. Alkanes 2. Alkenes 3. Alkynes 4. Benzene 5. Alkyl Halides 6. Alcohols 7. Aldehydes and ketones 8. Acids and their functional derivatives 9. Amines 10. Phenols	25 marks Presentation- Quiz Assignment

References:

1. Cotton and Wilkinson, Basic Inorganic Chemistry, Page 209 -216
2. SatyaPrakash, Advanced Inorganic Chemistry Page 301-305, 319-324
3. Cristain G.D., John Wiley and Sons, Analytical Chemistry, 4th Ed. Pauling Linus, College Chemistry, Page 338 -349.
4. Sarine and Sarine,Numerical Problems in Chemistry, Page 331-349.

5. Morrison.R.T. and Boyd R.N., Organic Chemistry, 5th Ed, Prentice Hall of India Pvt. Ltd, New Delhi, 1989.
6. Peter Sykes, Guide Book to Mechanism in Organic Chemistry, (1981) 4th Ed, Orient – Longman.
7. Jean Louis Burgoit (2005), Ionic equilibria in Analytical Chemistry, Springer Science Ltd., 603-609.
8. AmitArora (2006), Hydrocarbons- Alkanes, Alkenes, Alkynes, Discovery Publishing House.
9. David Cooper (2002), Valence Bond Theory, Library of Congress.

Semester III

Post Harvest Technology - I

Objectives

The course enables the students to:

1) Know methods of purchasing and storing materials.
2) Understand post harvest techniques for Foods.
3) Learn packaging of the final product
4) Gain knowledge of the basic principles and the procedures in the production of bakery and other cereal products.

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0935	**Post Harvest Technology – I**	4	4	-	25	75	100

Module	Objectives	Content	Assessment
1	The module enables the students to: -Learn about the cereal & millets crop, milling, wheat and rice products and breakfast foods.	**Processing of Cereals and Pulses** Introduction -Main cereal crops grown in the country and their importance Milling of Cereals: -Care during storage of cereals Technology of Wheat Products: -Variety of wheat, structure and composition, milling of wheat, Baking technology- Bread, biscuits, cake and pasta foods. Technology of Rice and Rice Products: Varieties of rice, drying of harvested paddy, parboiling, curing of rice, milling of rice, rice products- Instant mixes from rice and rice based instant foods. Processing of millets: • Polishing, pearling Production of Breakfast Food : • Puffed and flake products- Oat, maize and other millets. Process of milling of pulses	25 Marks Quiz/ Short notes/ Assignments/ Presentations
2	The module enables the	**Processing and Preservation of**	

	students to: - Learn about the varieties and post harvest handling of fruits and vegetables. - Understand the preservation techniques for fruits and vegetables	**Vegetables and Fruits:** Important varieties, Detection of maturity, Harvesting and transportation of fruits and vegetables- care during storage. Preservation: Canning of fruits and vegetables- Peas, pineapple etc. Precooking and Freezing of Fruits and vegetables Dehydration of Fruits and vegetables	25 Marks Quiz/ Short notes/ Assignments/ Presentations
3	The module enables the students to: Learn about the beverages, concentrates, pickles and preserves	**Fruit Beverages and Concentrates:** Manufacture of fruit juice, squashes, Fruit syrups and cordial- changes during storage of juices and squashes. High acid and High sugar products: Manufacture of jams, jellies. Marmalades and guava cheese. Material, blanching. Common defects in jams and marmalades. Preservation of candies: Crystallized and Glazed fruits Pickles and Chutneys: Manufacture of oil and vinegar pickles process of manufacture of chutneys	25 Marks Quiz/ Short notes/ Assignments/ Presentations
4	The module enables the students to: Learn about tomato processing, dehydration of ginger and turmeric and oilseeds.	Processing of tomato juice, puree, ketchup and common defects. Dehydrated Ginger and Turmeric Processing of Nuts and Oil Seeds. Major oil seeds of food importance, production and composition, Oil extraction methods Refining, hydrogenation, unconventional oils.	25 Marks Quiz/ Short notes/ Assignments/ Presentations

References:

1. Pomeranz and Shellenberges, Bread science and technology.
2. Matz, Cookie and Crackers Technology.
3. Joslyn and Heid, Food Processing Operation.
4. Matz S. A., (1996), Bakery Technology and Engineering, 3rd ed. , New Delhi, CBS Publishing.

5. Potter N.N, (1968), Food Science, West Port (connection) AVI Pubs. Co.
6. Kaomer, Quality Control for Food industry, Vol. I and II.
7. Kent Jouus, Cereal Chemistry.
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9. D.R. Salunke, Storage, Processing and Nutritional Quality of Fruits and Vegetables-Encyclopedia of food and technology, Avi Publication.
10. Cullinian and Sood, Materials Blanching-.
11. Matz S.A., (1996), The Chemistry and Technology of Cereals as Food, 2nd ed., New Delhi, CBS Publications.

Semester IV

Advanced Chemistry

OBJECTIVES:

The course will enable students to:

1. Lay the foundation of biological chemistry.
2. Give insights about the chemical reactions that occur in biological systems.
3. Impart knowledge about the structures of the principle components present in biological systems.

Code No	Course	TC	Th	Pr	Int	Ext	Total
0941	**Advanced Chemistry**	4	2	2	25	75	100

Advanced Chemistry Theory

Module No	Objectives	Content	Evaluation
1	This module will enable students to: **1)** Understand the fundamentals of carbohydrates and their importance in metabolism. **2)** Understand importance of lipids and their role in biological systems.	**Carbohydrates:** • General formula, Classification, Structure, properties and uses of monosaccharides (Glucose, Fructose), disaccharides (Lactose, Maltose and Sucrose), oligosaccharides, and polysaccharides (Starch, Glycogen). • Introduction to the structure of D & L forms. Optical and stereo isomers. Anomers. Cyclic forms of monosaccharides of glucose and fructose including structures. • Reactions of Monosaccharids- Oxidation and reduction reactions, esterification reaction, osazone formation **Lipids:** • Definition and Introduction, Structural formula and difference between saturated and unsaturated fatty acids, • Chemical Constants of fats-iodine value, saponification value, acid value and	25 Marks Assignments Quiz

		Richert- Miesel numbers. • Rancidity Sterols-Structure and function of cholesterol, 7 dehydro- cholesterol and ergosterol.	
2	**1)** Understand the fundamentals of proteins and nucleic acid chemistry. **2)** Know the role of enzymes and factors that affect enzyme actions.	**Proteins:** • Classification of amino acids with structure. • Zwitter ionic form. • Peptide bond. • Structure of proteins (primary, secondary, tertiary and quaternary structure. • Denaturation of proteins. • Salting out of proteins and isoelectric precipitation. **Nucleic Acid Structure:** **Enzymes:** • Definition, general properties, Nomenclature, classifications and specificity. • Mechanism of enzyme action. • Factors affecting enzyme activity. • Enzyme inhibition-competitive and non competitive. Coenzymes and isoenzymes and their role in metabolism.	25 Marks Assignments Quiz

References : 3, 4, 6, 7 & 9

Advanced Chemistry Practical

OBJECTIVES:

The course will enable students to:

1. Impart practical training in chemistry.
2. Develop understanding of the fundamentals of chemical reactions through hands on training.
3. Impart the necessary knowledge in identification of important compounds in biological systems.

Module No	Objectives	Content	Evaluation
1	This module will enable students to: Apply the basic knowledge of chemical reactions.	Preparations of basic solutions for titration: 1. Preparation of standard solution of NaOH and H_2SO_4 (Strength of 1N – 0.1N or 0.25N or 0.5N etc.), Calculations for normality, morality and g/l concentration. 2. Oxidation reduction titration- A) Ferrous ammonium sulphate with $K_2Cr_2O_7$ B) $KMnO_4$ with oxalic acid. Using a standard solution of $KMnO_4$and Na OH determine the strength of a mixture of H_2SO_4 and $H_2C_2O_4$. $2H_2O$.	25 Marks Practical test
2	This module will enable students to: Apply theoretical knowledge of carbohydrate, proteins and lipid chemistry**.**	1. Qualitative analysis of carbohydrates, Glucose, fructose, sucrose, lactose, maltose, starch. 2. Estimation of glucose by DNSA (colorimetric method) 3. Estimation of sucrose using Benedict's Quantitative method. 4. Qualitative tests for proteins (colour reactions and precipitation reactions) Qualitative tests for fats.	25 Marks Practical test

References : 1, 2 and 3

References:

1) Finar I.L. "Organic Chemistry Vol. I" 6th Edition, (2009), Pearson Education India.
2) Finar I.L "Organic Chemistry, Volume 2": Stereochemistry and the Chemistry of Natural Products, 5th Edition, 2009.
3) Rastogi S.C. "Biochemistry", 2nd Edition, (2003) Tata MacGraw Hill Publishing Co. Ltd.

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6) Apps D.K. and Cohen B.B. and Steel C.M. "Biochemistry: A Concise Text for Medical Students" (1992), BailliereTindall,
7) Debajyoti D, "Biochemistry" 2nd Edition, (1980) Academic Publishers,.
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9) Chatterjee M.N., Shinde R. "Textbook of Medical Biochemistry" 8th Edition (2012) Jaypee Brothers, Medical Publishers.
10) Vasudevan D.M. and Sreekumari S – (2007) "Textbook of Biochemistry for Medical Students". 5th Edition, Jaypee Brothers, Medical Publishers.
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14) Berg J.M. Tymoczko J.L., and Stryer. L. "Biochemistry", 5th edition, (2002). W.H. Freeman.
15) Mendham J., RC Denney - Vogel's textbook of quantitative chemical analysis – Pearson education ltd.
16) Textbook of practical Chemistry Std. 11 Gujarat and Maharashtra secondary education Board.

Semester IV

Food Microbiology

Objectives

The course enables the students to-

1. **To understand the nature and the role of microorganisms in food.**
2. **To have a knowledge of the basic principles of food sanitation and safety.**
3. **To acquire a perspective of the importance of microorganisms in environmental microbiology.**

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0942	**Food Microbiology**	4	2	2	25	75	100

Food Microbiology Theory

Module No	Objectives	Content	Evaluation
1	**This module will enable the students to :** 1. To be acquainted with microorganisms important in food 2. To understand their characteristics in relation to preservation and spoilage of food 3. To have a knowledge of the various sources of contamination	**Food Microbiology –Basic concepts and History in brief** **General characteristics** • Morphological Characteristics • Reproductive characteristics • Physiological characteristics • Molds of industrial importance Molds, Yeasts and Bacteria Brief introduction to the following: Viruses,Algae and Parasites **Sources And Types Of Contamination** **Water** • Microbial flora-(types of micro organisms) • Water -As a source of contamination • Water purification • Microbial examination • Indicator organisms • Water borne illnesses- (names)	25 Marks Assignments / Presentations

		• Microbial flora • Sources of contamination **Sewage** • Introduction Sewage as a source of contamination • Sewage treatment (brief) **Air** • Air micro flora • Air as a source of contamination **Other Sources of contamination** • Humans, Pests, Animals, Birds and Inanimate objects **Food safety** Basic concepts of Physical, Chemical and Biological hazards associated with foods. **Sanitation in Food Service Establishment** 1. Cleansing agents, Disinfectants & sanitizers used in Food service Establishment. 2. Personal hygiene • The food handler • Cleanliness with regard to hand, habits, working attire/cloths, jewellery, • Health of a food handler 3. HACCP Principles, Need and benefits	
2	**This module will enable the students to :** 1. Understand the beneficial effects of micro-organisms 2. Food Spoilage and pathogenesis of micro-organisms	**Micro Organisms and Food:** **Beneficial effects of microorganisms.** Microorganisms responsible for commercial production of acid, alcohols, solvents, antibiotics, vitamins, hormones, enzymes, amino acid etc. **1. Microbial fermentation and role of micro organisms in Food fermentations** • Beer, Wine, Bread • Indian pickles	25 Marks New research developments in fermentation technology Assignments / Presentations

		• Fermented dairy products - curd, yoghurt and cheese • Vinegar Indian fermented products –idli, dhokla andkhaman. 2**. Food Spoilage And Food Borne Diseases** (1) Contamination and spoilage of cereals,grains and cereal products. (2) Contamination and spoilage of meat and meat products. (3) Contamination and spoilage of milk and milk products. **Food Poisoning and Infections:** Definitions and differentiation between: ➢ Food poisoning and infections. ➢ Salmonella and Botulism ➢ E.coli and S. aureus	

References

1. Frazier,W. C. and Westhoff,D. (1988) Food Microbiology .Tata McGraw-Hill
2. Guthrie,R. K. (1972) Food sanitation Inc.Eaglewood Cliff,N.J
3. Jay,1978.Modern food microbiology.Van Nostr and Reinhold Company,New York
4. Marriot. N.G. (1995)Principles of Food Sanitation .4th edition Edward Arnold
5. Pelczar,M. L. and R.D Reid (1972)Microbiology. McGraw &Hill,New York
6. Reid,G.[ed]1982.Prescott and Dunn's industrial microbiology AVI Publishing Co.,Inc ., Westport ,Conn
7. Stanier,R.Y.,E.A.Adelbergand Ingraham .1976 .The microbial world .4th ed.Prentice Hall.

Food Microbiology Practical

Objectives

This course will enable students to:

1. **To understand the principles, working and use of various equipments.**
2. **To have knowledge of the underlying principles in practical food microbiology.**
3. **To develop awareness about the different techniques used for isolation and primary identification of microorganisms.**

Module No	Objectives	Contents	Evaluaiton
1	**The module will enable the student to:** 1. To have a knowledge of the commonly used staining techniques. 2. To make the student familiar with the various culture media	Study of laboratory equipments- Principle, working and use of Microscope, Autoclave, Incubator, Refrigerator, colony counter. 1. Study of motility: Hanging drop preparation. 2. Staining techniques: Simple staining Gram staining Spore staining **Capsule staining** 3. Preparation of culture media composition and uses.	Performing Practical 15 marks
2	**The module will enable the student to:** 1. To enable students to isolate micro-organisms fro different soures. 2. To make a preliminary identification of some micro-organisms	**Isolation and observation of fungi** 1. Isolation of bacteria: Using serial dilution streak plate and pour plate techniques: • From air • From soil 2. Bacteriological Analysis of Water. 3. Bacteriological analysis of milk. 4. Test for surface sanitation. 5. Permanent slides of pathogenic micro organisms	Performing practical 10 marks

References

1. Frazier ,W.C, and Westhoff, D.1988 Food Microbiology. Tata Mc. Graw-Hill
2. Guthrie,R.K.[ed] (1972)Food sanitation Inc. Eaglewood Cliff, N. J
3. Jay,1978.Modern food microbiology. Van Nostrand Reinhold Company ,New York
4. Marriot. N.G. (1995)Principles of Food Sanitation .4th edition Edward Arnold
5. Pelczar, M.L. and R.D Reid -1972 Microbiology, Mc. Graw and Hill, New York
6. Reid,G.[ed](1982) Prescott and Dunn's industrial microbiology AVI Publishing Co.,Inc ., Westport ,Conn
7. Stanier R.Y., E. A. Adelberg and Ingraham .1976 .The microbial world 4th ed. Prentice Hall.

Semester IV

Food Analysis

Objectives:

This course will enable the students to:

1. **Acquire basic skills to do laboratory work.**
2. **Know general principles involved in instrumental method.**
3. **Understand the principles involved in the estimations.**
4. **Analyze different food components or constituents.**
5. **Use simple tests to detect food adulterants from commonly consumed foods.**
6. **Be familiar with the qualitative standards and specifications laid down by Food Safety and Food Standards Authority of India.**

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0943	**Food Analysis**	4	-	4	25	75	100

Module No	Objectives	Content	Assessment
1	**This module will enable students to:** 1. Understand the significance of food analysis. 2. Learn about sampling, and the techniques used in sampling. 3. Have knowledge about various instruments used in food analysis.	**Introduction to food analysis and its importance.** **Sampling** Definition of sampling Sampling methods/ techniques. Sampling Techniques in food analysis General classification of sampling methods. Advantages and disadvantages of Sampling Best sampling technique for particular foods **General instrumental methods -** Working principles and uses of various laboratory instruments used in food analysis-Colorimeter, Spectrophotometer, centrifuge, Kjeldahl's apparatus for protein estimation, Soxhlet apparatus for fat estimation, different balances, Muffle furnace, water bath, glass distillery unit.	25 Marks Quiz Journal Assignments on working principles of various instruments Performing practical Viva

2	**This module will enable students to:** 1. Know analytical methods used in estimation of proximate principles. 2. Determine the chemical constants of fats and oils and understand the significance. 3. Know the food standards laid down by FSSAI.	**Quantitative Analysis of proximate principles:** - Estimation of moisture by AOAC method. - Estimation of crude fat/oil by solvent extraction method. (Demonstration only) - Estimation of total ash by A.O.A.C. method of ashing. - Estimation of protein by Macrokjeldahl method. (Demonstration only) **Chemical constants of fats and oils.** - Determination of Acid value. - Determination of Saponification value. - Determination of Iodine value.	25 Marks Quiz Journal Assignments Performing practical Viva
3	**This module will enable students to:** Learn analytical methods used in estimation of various food components.	**Estimation of Food Components** - Estimation of total and free sugar from honey by Benedict's/ Lane and Eynon's quantitative reagent method**.** - Determination of Ascorbic acid (Vit.C) from food sources by 2, 6, dichlorophenol indophenol method. - Estimation of sodium chloride (NaCl) salt from butter by Mohr's titrimetric method. - Estimation of calcium by titrimetric method (Clerk &Collips)**.** - Estimation of phosphorus by Fiske andSubbarao's or Vandate-Molybdate colorimetric method. - Estimation of Iron by dipyridyl reagent method. - Estimation of Acidity in milk by titrimetric method.	25 Marks Quiz Journal Assignments Performing practical Viva
4	**This module will enable students to:** Gain knowledge about food adulterants and know methods of detection.	**Qualitative analysis of common food adulterants.** Fats and oils Spices and condiments Milk and milk products Cereals and pulses Honey andJaggery Tea and coffee Sweets and confectionary	25 Marks Quiz Journal Assignments Performing practical Viva

References

1. Harold Egan,Ronald S. Kirk, Ronald Sawyer, David Pearson(1981)"Pearson's Chemical Analysis of Foods. 8th Edition,. Churchill Livingstone.
2. C. Gopalan, B V Rama Sastri;S C Balasubramanian " Nutritive Value of Indian Foods." 6th Edition, 1996, Reprinted 2011.National Institute of Nutrition, Hyderabad.
3. "Official Methods of Analysis, of AOAC INTERNATIONAL", 18th Edition, 2005, AOAC INTERNATIONAL.
4. N.Raghuramulu, K.Madhavan, S.Kalyanasundaram (2003)"A Manual of Laboratory Techniques", 2nd Edition, National Institute of Nutrition.
5. A.Y.Sathe,(1999) "A first course in Food Analysis" 1st Edition New Age International (P) Limited.
6. Manual of Methods of Analysis of Foods. Directorate General of Health Services, Ministry of Health and Family WelfareGovernment of India, 2005.
7. Morris Boris Jacobs(1951)"The Chemical Analysis of Foods and Food Products". 2nd Edition, 1951. D. Van NostradCompany , .

Semester IV

Post Harvest Technology-II

Objectives

The course will enable Students to:

1) Know methods of purchasing and storing materials.
2) Understand post harvest techniques for Foods.
3) Learn packaging of the final product.
4) Be aware of the basic principles and the procedures in the production of milk and milk products, marine products and other animal products.

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0944	**Post Harvest Technology-II**	4	4	-	25	75	100

Module	Objectives	Content	Assessment
1	**This module will enable the student to:** - Understand the processing and post harvest handling of milk and milk products	**<u>Milk Processing:</u>** Milk industry in India, Processing of milk: Cream, butter, cheese, condensed milk, dry milk Preparation of Ice creams, Preparation of Indigenous milk products: Khoa, channa, rasgulla, ghee, cottage cheese Cultured milk products	25 Marks Quiz/ Short notes/ Assignments/ Presentations
2	**This module will enable the student to:** - Understand the processing and post harvest handling of fish and fish products	**<u>Fish Processing</u>:** Development of sea food industry, Spoilage of fish, Handling and transportation of fish. Heat Processing of Fish canning: Cold storage and freezing of fish, Salt curing and drying, Smoking Specialized fish products: Fish paste, Fish fingers, Fish pickles, Wafers, Fish protein	25 Marks Quiz/ Short notes/ Assignments/ Presentations

		concentrates	
3	**This module will enable the student to:** - Understand the processing and post harvest handling of meat and meat products	**<u>Meat :Processing, Spoilage, Preservation:</u>** Thermal, low temperature storage, preservation by lowering moisture, preservation by direct microbial inhibition (Irradiation, Antibiotics) Meat Products: Corned beef, Sausages, Frankfurters, Salami, Luncheon meat Sources and uses of Bone meat: Gelatin, Casing, Plasma and lard	25 Marks Quiz/ Short notes/ Assignments/ Presentations
4	**This module will enable the student to:** - Understand the processing and post harvest handling of poultry products, fermented foods and convenience foods.	**<u>Poultry Products, Fermented Products, Convenience Foods</u>** Preparation of Chicken products Egg Products: Dehydrated egg powder, frozen egg Fermentation Technology: Definition general media used for fermentation and yeast manufacture. Convenience Foods: Technology, Examples, From all the food groups	25 Marks Quiz/ Short notes/ Assignments/ Presentations

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1. Mary Chandy N.V.T, India- The Land and the people, Fishes, 639.3.

2. Jane Bowers, Food Theory and application, 664, Macmillan Publishing Company, New York.

3. Sukumar De, Outlines of Dairy Technology, (1994), Delhi, Oxford University Press.

Semester IV

Food Commodities

Objectives:

The course will enable the students to:

1) Understand the basic food commodities (raw and processed) used in food industries.
2) Develop an in depth understanding of knowledge of the properties of food commodities and products
3) Develop a comprehensive awareness of the parameters that will affect food nutritional value/quality and the ability to consider/apply these in purchasing and/or marketing food commodities and products.

Code No	Subject	TC	Th	Pr	Internal	External	Total
0945	**Food Commodities**	**4**	**4**	**-**	**25**	**75**	**100**

Module	Objectives	Content	Assessment
I	**This module will enable the student to:** Develop an in depth understanding of knowledge of the properties of food commodities and products.	**Types, Selection, Storage, cost,nutritive value and uses of** - Cereals and Millets - Breakfast Cereals - Extruded food products - Sugar and - Sugar Products - Salt - Jaggery, - Honey, - Golden syrup - Fats and Oils	25 Marks Quiz/ Short notes/ Assignments/ Presentations
II	**This module will enable the student to:** Have a know-how on the various processed foods of milk, meat, fish, egg and plantation products	**Types, Selection, Storage, cost,nutritive value and uses of** - Pulses and Legumes - Milk and Milk Products - Nutritional aspects of curd, buttermilk, paneer, khoa, cheese, ice-cream - Meat, Fish and Poultry Different kind of cuts of meat and nutritional aspects Processed products - Egg and Egg Products	25 Marks Quiz/ Short notes/ Assignments/ Presentations
III	**This module will enable the student to:**	**Fruits and Vegetables** Classification of Fruits and Vegetables	25 Marks

	Know the various uses of different products and their uses of fruits and vegetables	and their varieties Selection, cost, uses and nutritive value of raw and processed fruits and vegetables.	Quiz/ Short notes/ Assignments/ Presentations
IV	**This module will enable the student to:** Know the various uses of different food commodities, their nutritive value and cost.	**Beverages** Types, storage, use, cost and nutritive value tea, coffee, chocolate and cocoa. Storage, use, cost and nutritive value of carbonated beverages Food Adjuncts Classification, description, storage, use, cost and nutritive value of spices, condiments, herbs, extracts, concentrates essences and food colors. Convenience Foods Classification, role, advantages, cost and nutritive value of all convenience food.	25 Marks Quiz/ Short notes/ Assignments/ Presentations

References

1. Davis B., (1988), Food Commodities, Heinerman Ltd.

2. Khader V., (2004), Text Book on Food Storage and Preservation, Kalyani Publishers, NewDelhi.

3. Bennion M. and Hughes O, (1986), Introductory Foods, 7thed, Macmillon, New York.

4. Manay S. U, Shadaksharaswami, (1987), Foods: Facts and principles, Wiley Eastern Ltd. Bombay.

5. Srilakshmi, Food Science, (2003), 3rd ed., New Age International Publishers.

Semester V

Biochemistry

Objectives:

This course will enable students to:

1. Know the fundamentals of metabolic processes / pathways occurring in the body.
2. Understand the significance of various metabolic processes / pathways.
3. Understand the integration of these metabolic processes.
4. Develop the ability to apply the significance of these processes to different physiological / metabolic conditions.

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0951	**Biochemistry**	4	3	1	25	75	100

Biochemistry Theory

Module No.	Objectives	Content	Evaluation
1	**This module will enable students to:** 1. Understand the various ways of carbohydrate utilization in the body. 2. Create awareness of regulation of the pathways. 3. Realize the significance of the pathways. 4. Understand the process of energy yield from the organic substrates.	**Carbohydrate metabolism:** • Various Biological pathways -- site, significance, intermediates with chemical structures, enzymes, coenzymes involved, Regulation and energetic • Glycolysis,TCA [Kreb's cycle], Pentose phosphate pathway Gluconeogenesis, Glycogenesis Glycogenolysis. • Alcohol metabolism and biochemical alterations in alcoholism • Biological oxidation and electron transport chain	**25 marks** Power point presentations/ Assignments / Displays on various pathways

2	**This module will enable students to:** 1. Understand the various ways of utilization of lipids in the body. 2. Create awareness of regulation of the pathways. 3. Realize the significance of the pathways.	**Lipid Metabolism:** • Lipogenesis and Lipolysis • Oxidation of saturated, unsaturated and odd chain fatty acids, regulation. energetics • Biosynthesis of fatty acids, regulation of synthesis. • Elongation and desaturation of fatty acid chains • Ketosis and Ketogenesis • **Triglycerides** synthesis **---** Intestinal resynthesis of triglycerides, synthesis in Liver. • Introduction of Cholesterol – Parent steroid sources, Cholesterol biosynthesis with structures, mode of utilization, Control of cholesterol metabolism • Plasma Lipoproteins, Metabolism of Chylomicrons, LDL, HDL and VLDL	**25 marks** Power point presentations/ Assignments/ Displays on variouspathways
3	**This module will enable the students to** 1. Explain the various metabolic pathways 2. Understand the significance, regulatory mechanisms and synthesis of various essential non nitrogenous compounds synthesized from amino acids.	**Protein Metabolism** • Trans-amination – with diagrammatic representation,role of pyridoxine,significance • Oxidative and non oxidative De-amination. • Metabolic fate of Ammonia-- Formation of glutamate,Formation of Glutamine • Urea cycle –pathway with structures. • Metabolism of non protein nitrogenous compounds: Structures of purines,pyrimidines and uric acid,catabolic pathways without structures of the intermediates • Uric acid and gout. Synthesis (without structures) and significance of glutathione. Synthesis, catabolism and significance of	25 **marks** Power point presentations/ Assignments/ Displays On variouspathways

		Creatnine. • Transmethylation and one carbon transfer –scheme of interconversion and disposition of one carbon fragments derived from catabolism of amino acids (without structures) • Metabolic fate of the carbon skeleton of amino acids – glucogenic, ketogenic and glucogenic and ketogenic amino acids.	

References:

1. Rastogi S.C.(2003) ,2nd Edition "Biochemistry", , Tata MacGraw Hill Publishing Co. Ltd., New Delhi
2. Jain, J, L., S. Jain and N. Jain (2005) "Fundamentals of Biochemistry". 6th Edition,. S.Chand Company Ltd.
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5. Debajyoti D, "Biochemistry" 2nd Edition, (1980) Academic Publishers,.
6. Satyanarayana U and Chakrapani U "Biochemistry", 3rd Edition, (2008), Books & Allied Publishers.
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8. Nelson DL & Cox MM. 5th Edition, (2009). "Lehninger's Principles of Biochemistry". Freeman and Co.
9. Berg J.M. Tymoczko J.L., and Stryer. L. "Biochemistry", 5th edition, (2002). W.H. Freeman.
10. Vasudevan D.M. and Sreekumari S – (2007) "Textbook of Biochemistry for Medical Students". 5th Edition, Jaypee Brothers, Medical Publishers.
11. "Murray Harper's Illustrated Biochemistry" 29th Edition, (2012) Prentice Hall Int.

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Biochemistry Practical

Objectives:

The course will enable students to:

- Enable students learn the principles and procedures of biochemical analysis of blood and urine.
- Develop ability to interpret the results of the estimations of the commonconstituents of biological fluids.

Module No	Objectives	Content	Assessment
1	**This module will enable students to:** 1. Know the principles on which the selected estimations are based. 2. Know the procedures used for the estimations. 3. Draw inferences from the results.	1. Qualitative Estimation of Normal Constituents of Urine. 2. Qualitative Estimation of Abnormal Constituents of Urine. **Quantitative Estimation in Urine**. 1. Urea 2. Uric acid 3. Glucose **Quantitative Estimation in Serum / Blood**. 1. Urea 2. Uric acid 3. Total protein 4. Albumin, Globulin, A/G Ratio. 5. Glucose 6. Cholesterol	25 Marks Quiz Journal Practical Tests Interpretation of case studies

References

1. Oser, B. L. Ed (1979),"Hawk's Physiological Chemistry", 14th.Rep. edTata McGraw-Hill Publishing Company Ltd.
2. H. Varley, A. H. Gowenlock, and M. Bell, "Practical Biochemistry, Vol. 1", London, UK, 5th Edition, (1976), Edited by: I. W. Heinemann.
3. Godkar P.B. Godkar D.P. (2006) Textbook of Medical Laboratory Technology 2nd Edition, Bhalani Publishing House.
4. Burtis C.A, Ashwood E.R, Bruns D.E. (2007), "Tietz Fundamentals of Clinical Chemistry", 6th Edition, Elsevier Health Sciences.
5. Davidsohn, I (Editor) & Henry, J B (Editor) (1984), "Todd-Sanford Clinical Diagnosis by Laboratory Methods"17thEdition.W.B. Saunders.

Semester V

Food Standards and Quality Control

Objectives

The course enables students to

1) Know the importance of quality assurance in food industry.
2) Be aware of standards for quality assessment.
3) Familiarize the students with the fundamentals considered for successful quality control program

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0952	**Food Standard and Quality Control**	4	4	-	25	75	100

Module	Objectives	Content	Assessment
1	This module will enable students to - Understand aspects of quality control - Significance of sampling in quality evaluation - Importance of labeling - Understand laws and certifications for food quality	Introduction to quality control Sampling techniques for quality evaluation Food Labeling Nutritional labeling Food laws and standards Introduction to ISO, HACCP, CODEX Alimentarius	25 Marks Quiz Presentations Assignments
2	This module will enable students to - Understand the quality aspects of vegetable foods - Apply relevant food laws	Quality Aspects of Vegetable Foods - Cereals and cereal Products - Pulses and Legumes - Vegetables and vegetable products - Fruits and fruit products	25 Marks Quiz Presentations Assignments
3	This module will enable students to - Understand the quality aspects of animal foods - Apply relevant food laws	Quality Aspects of Animal Foods - Milk and Milk products - Seafood	25 Marks Quiz Presentations Assignments

		- meat - poultry and eggs	
4	This module will enable students to - Understand the quality aspects of other food products - Apply relevant food laws	Quality aspects of Other Products - Fats and Oils - Spices - Condiments - Chocolate - Beverages. - Food Additives	25 Marks Quiz Presentations Assignments

References

1. Herschdoerfer S.M.,(Ed.), (1972), Food science and technology A series of monographs, Academic press, London and New York

2. James C.S., Analytical chemistry of foods, (1995), Chapmon and Hall

3. Sathe A.Y., (1999), First course in food analysis, New Age International Pvt. Ltd.

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5. Mirajkar M. and Menons , (2001) ,Food Science and processing technology Vol 2, Kanishka publishers, New Delhi

6. Ranganna S., (1995) Handbook of analysis and quality control of fruits and vegetable products, 2nd ed., Tata McGraw Hill Publishers

7. Jacob, (1976), Food Adulteration, McMillan Co., New Delhi

8. Winton A. and Winton K., (1999), Techniques of food analysis. Allied Scientific Publishers, Bikaner

9. Nielsen. S. (Ed.) ,(1994), Introduction to the chemical analysis of foods. Boston: Jones and Barlett Publishers

Semester V

Quality Control in Foods

Objectives

To enable the students to

1. Develop skills in analyzing foods
2. Assess the quality food using food standards.

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0953	**Quality Control in Foods**	4	-	4	100	-	100

Module	Objectives	Content	Assessment
1	**This module will enable students to** -Analyze and evaluate the quality aspects of various milk and milk products	**Quality analysis of Milk and Milk Products** - **Milk** - **Cheese** - **Ice cream**	25 Marks Quiz Journal Performing practical Viva
2	**This module will enable students to** -Analyze and evaluate the quality aspects of various cereal and cereal products	**Quality analysis of Cereal and Cereal Products** - **Wheat Flour** - **Bread** - **Biscuits**	25 Marks Quiz Journal Assignments Performing practical Viva
3	**This module will enable students to** -Analyze and evaluate the quality aspects of various Fats and oils	**Quality analysis of Fats and Oils** - **Oil** - **Butter**	25 Marks Quiz Journal Assignments Performing practical Viva
4	**This module will enable students to** -Analyze and evaluate the quality aspects of food preserves	**Quality analysis of Food Preserves** - **Jam** - **Squash** - **Ketchup** - **Pickle** - **Vinegar** - **Canned Fruits**	25 Marks Quiz Journal Assignments Performing practical Viva

References:

1. James C.S., (1995), Analytical chemistry of foods, Chapmon and Hall.
2. Sathe A.Y., (1999), First course in food analysis, New Age International Pvt. Ltd.
3. Aylword F.,(2001), Food technology processing and laboratory control, Agrobios India.
4. Mirajkar M. and Menons, (2001), Food Science and processing technology Vol 2, Kanishka publishers, New Delhi.
5. Ranganna S. ,(1995) ,Handbook of analysis and quality control of fruits and vegetable products, 2nd ed., Tata McGraw Hill Publishers.
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8. Nielsen, S. (Ed.) (1994) Introduction to the chemical analysis of foods. Boston: Jones and Barlett Publishers.

Semester V

Diet Therapy

Objectives

This course will enable students to:

1. Understand the etiological factors and physiological changes associated with specific disease conditions.
2. Develop an insight into the role of modified diets in specific conditions.
3. Acquire the ability to modify the normal diet to suit individuals suffering from specific diseases and lifestyle disorders.

Code No	Subject	TC	Th	Pr	Int	Ext	Total
0954	**Diet Therapy**	4	2	2	25	75	100

Diet Therapy Theory

Module No	Objectives	Content	Assessment
1	**This module will enable students to:** a. Understand the basic concepts involved in formulating therapeutic diets. b. Understand the role and scope of the Indian Dietetic Association. c. Know the etiological factors in the development	**Basic Concepts of Diet Therapy** Principles of planning therapeutic diets. Modification of normal diet - consistency, nutrients Role of Registered dietitian in Nutritional care Indian Dietetic Association and its role. **Modification of diet in Fever and Infection:** Fever – Definition, Classification and causes. Metabolic Changes in the body during	25 marks Quiz Assignments Projects

	of specific physiological conditions and their nutritional management	fever. Principles of dietary planning for T.B, Typhoid and Malaria. **Pre and Post Operative Diets:** General Dietary Guidelines. **GI disorders:** Etiology, symptoms and Nutritional management of the following: • Peptic Ulcer • Diverticulitis. Terms: Achlorhydria, Dumping Syndrome, Steatorrhoea. **Liver disorders:** Etiology, symptoms andNutritional management of the following: • Infective Hepatitis • Cirrhosis of liver. Terms : Ascites, Esophagealvarices and Hepatic Coma	
2	**This module will enable students to:** a. Understand the causes and implications of specific non-communicable diseases. b. Develop an understanding of the association of lifestyle factors and specific non-	**Weight management - underweight and overweight** • Definition of overweight and obesity, types and grades of obesity, Theories of obesity. • Causes of obesity Assessment techniques • Dietary modification • Importance of behaviour modification, limitations of fad diets (very low calories, extreme energy restrictions) **Underweight.** • Definition, causes, assessment, and dietary modification.	25 marks Quiz Assignments Projects

	communicable disease prevention. c. Learn the nutritional management of specific non-communicable diseases. **d.** Acquire the ability to suggest lifestyle modifications as a management methodology for NCD management and prevention	**Dietary management in hypertension:-** Hypertension - classification (mild, moderate, severe) Blood pressure control – Renin-Angiotensin system flow diagram. Dietary modification, Low Sodium Foods and Salt Alternatives. Terms: Ischemia, Hyperproteinemia, P\S ratio, Thrombus Infarct Atherosclerosis, Myocardial Infarction, Stroke, Coronary Artery Disease, Rheumatic Heart Disease, Salt Sensitive/Resistant Hypertension. **Diabetes Mellitus: -** Classification of Diabetes, causes, diagnosis, symptoms. - Metabolic changes in NIDDM. - Dietary Management of NIDDM - Meal Exchange Glycemic Index, Glycemic Load **Diet in Renal Disorders:** Physiology of Kidney. Causes of Renal Disorders. (in brief) - Introduction to Acute and Chronic Nephritis. - Renal Calculi - types of stones, etiology , symptoms - Principles of Diet therapy - Alkaline and acid ash diet.	

References

1) Srilaksmi, B.6th Edition,(2011): Dietetics, New Age International Pvt Ltd Publishers.

2) Mahan, K.L , Escott-Stump, S, Raymond, J.L (2011)Krause's Food and the Nutrition Care Process, 13 edition, Saunders Publishers.

3) Nix, S. 14 edition (2012): Williams' Basic Nutrition and Diet Therapy, Mosby publishing.

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5) IDA Mannual.

Diet Therapy Practical

Objectives

The course would enable the students to:

1. Apply principles of diet therapy in planning and preparing foods for specific health conditions.
2. Plan foods for specific disease conditions keeping in mind cost, availability and other factors

Module	Objectives	Content	Evaluation
I	**This module will enable students to:** a. Understand the principles of dietary management for specific health conditions and apply the same to modify the diet as per need. b. Become aware of the various categories of products available in the market and their potential uses.	**Planning and preparation of normal diet for adult sedentary man / woman** **Planning and preparation of recipes for progressive hospital diets** Clear Liquids such as Cereal kanjis, dal water, clear vegetable soups clear fruit juices, beverages without milk. Full Liquid recipes such as beverages, milkshakes, and Soft diet. -Nutritional facts of nutraceuticals and their incorporation in therapeutic diets -Protein supplements (concentrates hydrolysates and isolates), Planning and preparation of recipes using these products. - Sugar substitutes and non caloric sweeteners such as Sucralose, FOS (inulin) and Aspartame. Planning and preparation of recipes using these products - Brands and blends of oils and fats available in the market with their benefits - Weight Management. - Planning and preparation of high fibre diets. - Planning and preparation of diet for Diarrhoea.	25 Marks Diet planning and cooking **Assignments:** Market Survey of available Nutraceuticals and nutritional supplements Market Survey of 1. protein supplements 2. sugar substitutes and non caloric sweeteners 3. brands and blends of oils and fats

		- Planning and preparation of a high caloric High Protein Diet (additional minimum 1500kcal and 20- 25 g of protein) generally used for patients with Tuberculosis / convalescence period. - Planning and preparation of foods for person with Peptic Ulcer and Constipation	
II	**This module will enable students to:** Understand the principles of dietary management for specific health conditions and apply the same to modify the diet as per need.	- Planning and preparation of low calorie diet providing 1200-1400 kcal and 50 g of proteins - Planning of a diet for person with Hypertension and preparation of few selected recipes - Planning a diet for person with Diabetes Mellitus and preparation of few selected recipes - Identifying foods with low GI and low GL. – Modifying for lowering GI and GL and Preparation.	25 Marks Diet planning and cooking

References

1) Srilaksmi, B.(2011): Dietetics, 6th Edition,New Age International Pvt Ltd Publishers

2) Mahan, K.L , Escott-Stump, S ,Raymond, J.L (2011)Krause's Food & the Nutrition Care Process, 13 edition, Saunders Publishers.

3) Nix, S. (2012): Williams' Basic Nutrition & Diet Therapy, 14 edition, Mosby publishing.

4) Whitney, E.N., Cataldo, C.B, Rolfes, S.R (2001): Understanding Normal and Clinical Nutrition, Brooks Cole Publishing.

Semester V

Recent Advances in Food Science and Quality Control

(Seminar)

Objectives

The course enables the students to-

1. **Be aware of areas of research in the field.**
2. **Enrich themselves with recent advances.**
3. **Develop competence in reviewing the research papers.**
4. **Develop competence in presentations.**

Code No	Subject	Total credits	Th	Pr	Int	Ext	Total
0955	**Recent Advances inFood Science and Quality (Seminar) and Women's Issues**	**2**	**-**	**2**	**50**	**-**	**50**

Students have to

- **Refer to the research work from journals,done in the last 10 years**
- **Prepare a powerpoint presentation of 15-20 min each on any recent research in the field of nutrition and dietetics**
- **Submit a detailed report of the presentations with bibliography**

Criteria of Assessment

- Review of Literature 15
- Report Writing 10
- Power point Slide Preparation and Presentation 15
- Oral Communication skills 10
- **Total** **50**

WOMEN'S STUDIES

Objectives:

This course will enable students to:

1. Know the demographic profile of women in India.
2. Understand the present situation and changes in the status of women.

Code No	Subject	TC	Th	Pr	Int	Ext	Total
9356	**Women's Studies**	**2**	**2**	**-**	**50**	**-**	**50**

Module No	Objectives	Content	Evaluation
			25 Marks
1. Demographic profile of women in India and towards change	This module will enable students to: 1. Understand the demographic profile of women in India 2. To create awareness about the role and importance of media portraying women	1.Sex Ratio 2.Health 3.Education 4.Employment 5.National Policy of Empowerment of women 2001 6.The role and importance of media portraying women	Debate Discussion Presentation

Module No	Objectives	Content	Evaluation
			25 Marks
2. Women, work and development	1.To understand the present situation and changes in the status of women.	1.Women in the unorganized sector. 2.Women in the Organized	Discussion Presentation

	2.To create awareness about Governmental policies and strategies for women's development and role of voluntary organizations and NGO's in women's development.	sector. 3.Legal provision for the protection of working women 4.Governmental policies and strategies for women's development 5.Role of voluntary organizations and NGO's in women's development	

References:

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Gopalan S.(2002): Towards Equality- The Unfinished Agenda, Status of Women in India. National Commission for Women, New Delhi.

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Kumar S.A (2007): Women in the face of Globalization, Serial Publication, New Delhi.

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Tandon R.K. (1994): Women in Modern Indi. Indian Publication Distributors. Delhi.

Semester VI

Food Processing and Application

Objectives

The course enables the students to:

1. Acquire knowledge of basic principles of food processing.
2. Comprehend the role of different ingredients used in food processing
3. Develop skills in production of some food products
4. Develop a discriminating appreciation of quality and standard of commodities available

Code No.	Subject	TC	Th	Pr	Int	Ext	Total
0961	**Food Processing and Application**	4	-	4	100	-	100

Module	Objective	Content	Assessment
1	**This module will enable students to:** Have necessary technical knowledge, skills and aptitudes required to successfully contribute to solving problems related to food safety during food processing	**Preparation of the following products:** Bakery Products - Cakes - Biscuits - Cookies - Bread	25 Marks Continuous assessment
2	**This module will enable students to:** Apply scientific principles in solving food processing problems and improving product quality and safety.	Various aspects of development of new food products	25 Marks Continuous assessment
3	**This module will enable students to:** 1. Understand designing and standardization of a	Identify a food product to be developed using Market surveys	25 Marks Continuous assessment

	food product	Standardization of the food product.	Report of Market Survey
4	**This module will enable students to:** Have a comprehensive understanding of the aspects required to be controlled during food processing	Sensory evaluation and shelf life study of the food product. Designing of Packaging Nutritional labeling Costing of the product	25 Marks Continuous assessmentReport writingPresentation of the report Viva

References

1. Girdharilallal, Siddappa .G.S. and Tandon .G.L., (1986), Preservation of fruits and vegetables, ICAR publication, New Delhi.

2. Dauthy M. E., (1995), Fruit and vegetable processing, FAO, International book distribution Co. pub., Delhi.

3. Barrett D.M., Somogyi L. and Ramaswamy H., (2005), Processing Fruits- Science and technology, 2nd ed., CRC Press, New York.

Semester VI

Food Toxicology and Industrial WasteWater Management

Objectives

The course enables the students to:

1) Have knowledge of the various toxins occurring naturally or introduced into food.

2) Acquire knowledge of the physical, chemical and microbiological parameters in food

Code No.	Subject	TC	Th	Pr	Int	Ext	Total
0962	**Food Toxicology and Industrial Waste Management**	**4**	**3**	**1**	**25**	**75**	**100**

Food Toxicology and Industrial Waste Management Theory

ModuleNo.	Objectives	Content	Evaluation
1	**The module will enable the students:** 1. To develop an understanding of the possible effects of different toxins in foods. 2. To obtain a knowledge of the various de-toxification methods. 3. To acquire knowledge of the pathogenesis of some bacterial and fungal species.	**Naturally Occurring Toxins in different foods:** • Protease Inhibitors,Haemagglutinins, Goitrogens,Cyanogens, Cycads,Saponins, Gossypol, Lathyrogens,Favism, Allergens • Miscellaneous Toxic factors. **Types of toxins:** • Staphylococcus aureus • Bacillus cereus • Clostridium welchii • Mycotoxins • Bioassay of toxin.	**25 marks** **Quiz** **Assignments** **Projects**
2	**The module will enable the students:** 1. To be aware of the possible toxicity of chemicals introduced during food processing. 2. To be aware of the sources of various carcinogens.	**Residual Chemicals present during food production and processing:** • Chemical preservatives • Anti-oxidants • Pesticides. • Heavy Metals **Carcinogens**	**25 marks** **Quiz** **Assignments** **Projects**

		• Naturally occurring carcinogens • Carcinogens produced during food processing and preservation and food colors.	
3	**The module will enable the students to:** 1. have an analytical knowledge of the various physical and chemical parameters in water. 2. develop an understanding of the common sources of contamination and awareness of the potable water standards. **3.** be aware of the various water treatment methods.	**Characteristics of Water:** • Sources • General physical and chemical parameters of water • Characteristics of industrial and domestic waste water • Nature of effluents discharge from different food industry. **Water Quality:** Common impurities and contamination of water General purification methods Standards for potable water Quality Requirements for water used in different food industries **Water Treatment** Kinds of filters Disinfection methods Water softening methods Treatment of domestic water supplies and industrial effluent treatment.	**25 marks** **Quiz** **Assignments** **Projects**

References:

1. A.P.H.A 1986.(Standard, Methods for the Examination of Water and Waste Water 16ed(American Public Health Association. Washington)
2. Conrung D.M. andLandsdown A.D.C. , (1983), Toxins Input.
3. Furman N.H., Standard Method of Chemical Analysis.
4. Magnus Pyke, Food Science Technology.
5. Rangwala. S.C., Fundamentals of Water Supply and Sanitary Engineering.\
6. Rudolf.W. (1997) Industrial Waste., Allied Scientific Publishers,India.

Food Toxicology and Industrial Waste Water Management Practical

Objectives:

This course will enable the student to:

1) **Develop analytical skill.**
2) **Understand the nature of contaminants in water and food.**

Module No.	Objectives	Topic and Details	Assessment
	The Module will enable the students to: 1. To analyze some important chemical parameters in water. 2. Understand the nature of bacterial and fungal contamination. To have a knowledge of probable contamination in some foods.	Estimation of the following 1. Acidity. 2. Chlorides. 3. Calcium. 4. Alkalinity. 5. Hardness. 6. COD. 7. DOD. 8. Dissolved oxygen. 9. Monosodium Glutamate (MSG). 10. Boric acid in milk. 11. SO_2. Culture studies of Bacillus cereus. - Culture studies of E. coli. - Isolation of toxigenic fungi.	**Performing practicals-20 marks Journal-5 marks**

References:

1. American Public Health Association. 16ed, Washington.
2. Rakesh. J.P andKiran.R.P (2000)-Microbiology Vol.2 Aditya., Ahmadabad.
3. 1. A.P.H.A 1986, Standard, Methods for the Examination of Water and Waste Water.
4. Sirockin.G.&Cullimore,S. (1969) Practical Microbiology.

Semester VI

Food Equipment and Food Packaging

OBJECTIVES:

The course enables the students to:

- **Acquire knowledge and understanding of basic engineering principles in the fields ofFood Processing.**

Code No.	Subject	TC	Th	Pr	Int	Ext	Total
0963	**Food Equipment and Food Packaging**	4	4	-	25	75	100

Module No.	Objectives	Topic and Details	Assessment
1	**The course enables the students to:** - learn basic engineering concepts and - gain knowledge about machines used for transportation of matter - learn the working principles and applications of different separation techniques in food industry	**Mechanical power transmission, Transportation of solid, liquid, gases and Mechanical Separation** • Mechanical power transmission- Introduction of drives, gears, bearing, friction, speed regulation and control definitions • Transportation of solid, liquid, gases Solids- Conveyor Fluids- Flow of fluids, pumps Gases- Blowers, chimneys, compressors • Mechanical Separation Grading, Filtration, Centrifugation, Solvent extraction,Osmosis, Floating and sedimentation Principles involved and Applications of all above methods in food industries	**25 Marks** Quiz and Assignments
2	**The course enables the students to:** - Learn different equipments used for mixing and blending - Understand the working principles and applications of various size reduction	**Mixing and Blending, Size reduction, Psychrometry** • Mixing and Blending Different types of mixers: for liquid, for dry powders Kneaders • Size reduction: Size reduction equipment-Grinders(wet	**25 Marks** Presentations Assignments

	equipments - Gain knowledge about basic concepts of psychrometry	and dry grinding), Hammer mills, Cryogenic mill, Ball mills, pulpers, mixers, pulverizer • Introduction to psychrometry: Definition and principle involved, humidity, Definition of dry bulb temperature and wet bulb temperature, Applications	
3	**The course enables the students to:** - Understand different modes of heat transfer and the principles involved in heat exchangers - Learn refrigeration cycle and its application in food industry - Know different methods of freezing - Understand the working principles of concentrators, dehydrators, evaporators - Apply the principles of heat transfer and exchange in food industry	**Heat transfer and Heat Exchangers, Refrigeration, Freezing, Concentration and Dehydration, Evaporation** • Heat transfer and Heat Exchangers: Conduction, convection, radiation – Principle, Different types of heat exchangers, definition, principles of working and application • Refrigeration: Principle, Properties of common refrigerants their comparison and the basis of selection. • Freezing: Principle, Various requirements and methods used for freezing • Concentration and Dehydration, Evaporation: Moisture calculation: Dry and wet basis Equipments for concentration and dehydration- Dehydrator, Evaporators: different types, Dryers: different types Osmotic Drying, Vacuum drying	**25 Marks** Presentations Assignment
4	- Understand the functions, types, properties of packaging and packaging materials - Gain knowledge about different packaging forms and methods - Learn about the food labeling, packaging laws. - To gain knowledge about latest packaging materials and techniques	**Food Packaging and Labeling** • Function of packaging • Types of packaging materials • Packaging forms and methods • Food packaging/ food interactions • Importance of labeling, Rules, Laws, Govt. Regulations and Barcoding • Latest packaging materials and techniques	**25 Marks** Assignment Presentations

REFERENCES:

1. Singh, Paul R and Heldman, Deeneis R, Introduction of food engineering, 2 nd ed. Academic Press Inc.

2. Petter, Norman N, Herchkiss, Joseph H,(1996), Food Science, 5th ed., Chapman and Hall, New Delhi CBS.

3. Teledo, Romes.T. ,(1994), Fundamentals of Food Process Engineering, Chapman and Hall, 2nd ed., New York, Chapman and Hall.

4. Le Magves and Jalen.P., (Editor), Food Engineering and process application, Vol. 2 Unit operation.

5. Patel R.C. ,Karamchandani C.J. , (1989), Elements of Heat Engines, Vol. III,14th ed., Acharya Book Depot, Vadodara.

6. Diamond P.S., Denmann R.F., (1973), Laboratory Techniques in Chemistry and Biochemistry, 2nd ed., London, Butterworths.

Semester VI

Professional Applications in Food Science and Quality Control

(Internship)

Objective:

The course enables the students to:

1. Get hands-on experience in working in thrust areas.
2. Develop technical and communication skills.
3. Develop confidence and enhance soft skills.

Code No.	Course	TC	Th	Pr	Int	Ext	Total
0964	Professional Applications In Food Science and Quality Control(Internship)	8	-	8	100	100	200

Duration: 30 working days

The students should complete training in any of the following:

1. Food Industries
2. Pharmaceutical /Nutraceuticals Industries
3. Analytical Labs
4. Research Organizations

Assessment

1. Internal assessment: Submission of report and oral presentation by the student.
2. External assessment: Evaluation criteria to be provided by the college to the organization to be filled in and submitted by the supervisor.