

VANITA VISHRAM WOMEN'S UNIVERSITY

(Managed By: Vanita Vishram, Surat)

1st Women's University of Gujarat



VANITA VISHRAM
WOMEN'S UNIVERSITY
SURAT

SCHOOL OF SCIENCE AND TECHNOLOGY

FACULTY OF SCIENCE

DEPARTMENT OF FOOD AND NUTRITION

B.Sc. FOOD AND NUTRITION

SYLLABUS

AS PER **NEP-2020**

W.E.F 2023-24



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1. PREAMBLE – VVWU

Vanita Vishram Women's University (VVWU) is the First-ever Women's University of Gujarat approved by the Government of Gujarat under the provisions of the Gujarat Private Universities Act, 2009. It is a University committed to achieve Women's Empowerment through Quality Education, Skill Development, and by providing employment opportunities to its girl students through its model curriculum, integration of technology in pedagogy and best-in-class infrastructure. The focus is on prioritizing practical component and experiential learning supported through academia-industry linkages, functional MoUs, skill development training, internships etc. It aims at providing opportunities to the girl students for holistic development and self-reliance.

VISION

Empowerment of women through quality education and skill development, so as to make them strong pillars of stability in the society.

MISSION

To provide Education & Professional Training to all women for their all-round development, so as to enable them to become economically independent and socially empowered citizens.



2. SALIENT FEATURES

1. Based on NEP-2020 & CBCS
2. Interdisciplinary as well as multidisciplinary.
3. Practical-oriented, skill-based & vocation-based.
4. Based on experiential learning.
5. Greater exposure to internship, hands-on training, project work, field work, presentation etc.
6. Mode of teaching shall be Offline
7. Qualified & Competent Faculty Members for effective teaching-learning
8. Employment-Generating



3. INTRODUCTION OF THE PROGRAM

It is a three-year undergraduate course offered after completion of 10+2 schooling. Food & Nutrition is concerned with the field of Science and in this course, the main emphasis is given to food, nutrition, diet and their production, management, preservation, etc. The Bachelor of Science course in Food and Nutrition focuses on the interface between Human Nutrition and Food Science as well as an integration of the two disciplines. The course aims to provide broad and balanced knowledge in Food and Nutrition in addition to understanding of key chemical concepts, principles and theories. It will provide knowledge and skill to the students' thus enabling them to undertake further studies in Food and Nutrition, in related areas or multidisciplinary areas that can be helpful for self-employment / entrepreneurship. The course is designed to provide intellectual and laboratory skills according to the UGC module for CHOICE BASED CREDIT SYSTEM (CBCS) pertaining to B.Sc. Food and Nutrition.

4. OBJECTIVE OF THE PROGRAM

The primary objective of a Food and Nutrition program is to equip students with the skills and knowledge necessary for careers in the food industry and entrepreneurship.

- Introduce the students to the advanced aspects of Nutrition Science and Dietetics.
- Make them understand the role as a Nutritionist or a dietitian in preventive and therapeutic aspects of Health care management.
- Develop skills wherein they understand the role of various foods, nutrients they provide and imply innovative methods in food product development.
- Create awareness among them about the current and future trends in the industry and help to determine food safety and entrepreneurship.
- Create awareness about the need for Nutrition in Community emphasizing the role of Public Health Nutrition.

5. PROGRAMME OBJECTIVES (PO_s)

PO 1. To impart knowledge of biological sciences and application of biological systems in day-to-day life that are technological aspects.

PO 2. To strengthen the in-field practical knowledge of the students by providing them hands-on experimentation, project work and field work.

PO 3. To develop capability of thinking, understanding/analyzing and interpreting and solving problems to meet the need of industries such as agriculture, food and dairy, fermentation, diagnostics, pharma industries, etc. and research.

PO 4. To make learners understand about bioethical aspects, safety aspects and their responsibilities towards the mankind and environments.

PO 5. To make students capable of finding entrepreneurship opportunities for betterment of society, environment.

PO 6. To make the students avail of all the basic knowledge required for various competitive examinations related to the Life Sciences and Biosciences.



6. PROGRAM SPECIFIC OUTCOMES (PSO_s)

Upon completion of the B.Sc. Biotechnology/B.Sc. (Hons) Biotechnology program, the students would:

- PSO 1. Have the knowledge of basic Biology and Biotechnological aspects; its understanding, concept.
- PSO 2. Be able to apply their practical skills and knowledge to identify and resolve the problems related to and serve various Biotechnological Industries such as agriculture, food and dairy, environmental, fermentation, diagnostics, pharma industries, etc, Medical or hospital related organizations, Regulatory Agencies, Environmental problems & Academia.
- PSO 3. Be able to use modern analytical tools/ software/ equipment's and analyze the results used in industry and research through an inter-disciplinary learning habitat.
- PSO 4. Be able to practice professional ethics in Food and Nutrition and Execute their professional careers in society as Dietitian, Nutritionist, Research assistant, Food lab technician, Public health expert, Food inspector, Food Entrepreneur, Wellness consultants, Diet counselor, Diabetes educator, fitness coach, Sports Nutritionist, Researcher.
- PSO 5. Develop high-quality research encouraging scientific thinking and approach for research.
- PSO 6. Develop skills for further higher studies, competitive examinations and employment.

7. PROGRAM HIGHLIGHTS:

Course Level	UG						
Duration	Bachelors in Science						
Examination Type	3 years (6 Semesters)						
Intake	Semester system (1-6 semesters)						
Eligibility	40						
Mapping between POs and PSOs	10 + 2 Open Eligibility						
		PSO 1.	PSO 2.	PSO 3.	PSO 4.	PSO 5.	PSO 6.
	PO 1.						
	PO 1.						
	PO 1.						
	PO 1.						
Job Positions	Dietitian, Nutritionist, Research assistant, Food lab technician, Public health expert, Food inspector, Food Entrepreneur, Wellness consultants, Diet counselor, Diabetes educator, fitness coach, sports Nutritionist, Researcher						



8. SCHEME OF ASSESSMENT

Following is the scheme of assessment followed by the university –

Weightage (%)	Continuous Comprehensive Evaluation (CCE) (50%)	Semester End Evaluation (SEE) (50%)
100%	<ul style="list-style-type: none">• [Internal written Exam] (20%)• [Thread-01 + Thread-02] (10% + 10%) (Any 2 of the following) <p>[1. Assignments/ 2. Project work/ 3. Field work/ 4. Quiz/ 5. Group discussion/ 6. Role play/ 7. (Lab Record/Lab Performance/Lab Work)/ 8. (Seminar/Class Performance/ Poster Presentation)/ 9. Viva-Voice/ 10. Book Review or Article Review/ 11. Case Studies/ 12. Class Test/ 13. Report Writing/ 14. Any other as per the requirement of the subject]</p> <ul style="list-style-type: none">• [Attendance] (10%)	Semester End Evaluation (SEE) Theory Exam Whole Syllabus



9. CREDIT STRUCTURE

B.Sc. Food and Nutrition Credit structure for UG – 2023

According to Curriculum and Credit Framework for Undergraduate Program

Semester	Major	Minor	Multi-Disciplinary	Ability Enhancement Course (AEC)	Skill Enhancement Course (SEC)	Value Added Courses (VAC)/IKS	RP/OJT	Dissertation	Total
1	8	4	4	2	2	2	0	0	22
2	8	4	4	2	2	2	0	0	22
3	12	0	4	2	2	2	0	0	22
4	12	4	0	2	2	2	0	0	22
5	12	8	0	0	2	0	0	0	22
6	12	4	0	2	4	0	0	0	22
Total	64	24	12	10	14	8	0	0	132
7	12	4	0	0	0	0	6	0	22
8	12	4	0	0	0	0	6	0	22
Total	24	8	0	0	0	0	12	0	44
Grand Total	88	32	12	10	14	8	12	0	176

* If anyone wants to exit after 2nd/ 4th Sem and wants a certificate/Diploma respectively, should complete an internship of 4 credits (60 hrs.)

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B.Sc. FOOD AND NUTRITION

SEMESTER 2

SYLLABUS

AS PER **NEP-2020**

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9. COURSE STRUCTURE – PAPER TITLES SEMESTER 1

Proposed Integrated (UG) Course structure for year – 2023									
Sem	Major	Minor	Multi-Disciplinary	Ability Enhancement Compulsory (AEC)	Ability Enhancement Elective – Skill based (SEC)	Value Added Courses (VAC)	Summer Internship/ Project/ Online Course	Dissertation	Total
2	Principles of Macronutrients	Physical Fitness	Food Standards and Laws	Functional English -II	Analytical Tools and Techniques	Environmental Studies	-	-	
	Food Science-I						-	-	





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10. TEACHING AND EVALUATION SCHEME FOR BSC FOOD AND NUTRITION ACADEMIC YEAR 2023-24

Semester	Course Code	Course Category	Course Title	Offering Department	Teaching Scheme				Examination Scheme														
					Contact Hour				Total Credit	Theory						Practical						Total Marks	Total Credits
					Theory	Practical	Total	Credit		Credit	CCE		SEE		CCE +SEE Passing Max	Credit	CCE		SEE		CCE +SEE Passing		
											Max.	Passing	Max.	Passing			Max.	Passing	Max.	Passing			
2	FNM203-1C	Discipline Specific Course (Major)	Principles of Macronutrients	Food and Nutrition	3	0	3	3	3	35	13	35	13	26	0	0	0	0	0	0	70	3	
	-	Discipline Specific Course (Major) - Practical	Principles of Macronutrients	Food and Nutrition	0	2	2	1	0	0	0	0	0	0	1	15	6	15	6	12	30	1	
	FNM204-1C	Discipline Specific Course (Major)	Food Science-I	Food and Nutrition	3	0	3	3	3	35	13	35	13	26	0	0	0	0	0	0	70	3	
	-	Discipline Specific Course (Major) - Practical	Food Science-I	Food and Nutrition	0	2	2	1	0	0	0	0	0	0	1	15	6	15	6	12	30	1	
	FNE202-1C	Discipline Specific Elective (Minor)	Physical Fitness	Food and Nutrition	3	0	3	3	3	35	13	35	13	26	0	0	0	0	0	0	70	3	
	-	Discipline Specific Elective (Minor) – Practical	Physical Fitness	Food and Nutrition	0	2	2	1	0	0	0	0	0	0	1	15	6	15	6	12	30	1	
	MDC202-1C	Interdisciplinary/ Multi-Disciplinary Courses	Food Standards and Laws	Food and Nutrition	4	0	4	4	4	50	18	50	18	36	0	0	0	0	0	0	100	4	





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AEC202-1C	Ability Enhancement Course (AEC)	Functional English -II	English	2	0	2	2	2	25	9	25	9	18	2	25	9	25	9	18	50	2
SEC202-1C	Skill Enhancement Courses (SEC)	Analytical Tools and Techniques	Chemistry	2	0	2	2	2	25	9	25	9	18	2	25	9	25	9	18	50	2
VAC201-1C	Value Added Courses (VAC)	Environmental Studies		2	0	2	2	2	25	9	25	9	18	2	25	9	25	9	18	50	2
TOTAL				16	12	28	22	22	275	99	275	99	198	22	200	72	200	72	144	550	22





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FY B.Sc.
Semester II
FNM203-1C:Principles of Macronutrients (Th)

Credit 3

Contact Hour per week 3

Outline of the Course:

Course type	Theory
Level of the Course	200-299 Intermediate-level
Course Category	Discipline Specific Course (Major)
Purpose of Course	Principles of Macronutrients
Course Objective	CO 1. To understand the macronutrients, their functions and their metabolic utilization. CO 2. To learn about macronutrients, their sources, types, needs and deficiency. CO 3. To understand the processes of digestion, absorption, and transport. CO 4. To gain knowledge about nutrient deficiencies or excesses based on principles of macronutrient
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	2023
Pre-requisite	Nil
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE) 50% Semester End Evaluation (SEE)



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FNM203-1C:Principles of Macronutrients (Th)

Course Content

Units	Particulars	% Weightage of Unit	Hours
1	Carbohydrates <ul style="list-style-type: none">• Types of Carbohydrates & Their Food Sources• Dietary Requirements and Physiological Significance• Digestion, Absorption and Metabolism of Carbohydrate• Glycaemic index of foods Dietary Fiber <ul style="list-style-type: none">• Dietary fiber- types, properties, sources and its role	30	14
2	Proteins <ul style="list-style-type: none">• Composition, Types of Amino Acids & Food Sources• Digestion, absorption, transport, utilization and excretion• Nutritional Classification of Protein & Function• Protein-Energy Malnutrition	20	12
3	Lipids <ul style="list-style-type: none">• Composition & Classification of Lipids• Food Sources & Functions of Lipids• Types of Fatty Acids, Food Sources, Function & Effect of Deficiency• Digestion, absorption, transport, utilization, storage & excretion• Dietary Recommendation of Lipids• Cholesterol- sources, functions and implications• Lipids and Diseases	30	10
4	Water <ul style="list-style-type: none">• Introduction to Water• Functions of Water• Distribution of Water in the Body• Water Recommendation and Balance	20	09

REFERENCE

Core references:

Reference books

1. Srilakshmi.B. Food Science, New age international Pvt. Ltd. New Delhi, 2001.
2. Gopalan, G. RamaShastri B.V &Balasuvramnian, S.C. (2000). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 500-007, India.
3. Swaminathan, M. (2009). Textbook of Food and Nutrition. Bappco publishers, Bangalore.

Web references



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FNM203-1C:Principles of Macronutrients (Th)

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to (keep number of COs according to units)

CO 1	To understand the role of macronutrients in health.
CO 2	To get in-depth knowledge about the sources, functions, and deficiency of macronutrients.
CO 3	To know the basis of energetic and nutritional equilibrium, and its regulation.
CO 4	To know the role of macronutrients in body structure and their toxicity.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes			
		CO1	CO2	CO3	CO4
1	Carbohydrates				
2	Proteins				
3	Lipids				
4	Water				

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						



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FY B.Sc.
Semester II
FNM203-1C: Principles of Macronutrients (Pr)

Credit 1

Contact Hour per week 2

Outline of the Course:

Course type	Practical
Level of the Course	200-299 Intermediate-level
Course Category	Discipline Specific Course (Major)
Purpose of Course	Principles of Macronutrients
Course Objective	CO 1. To learn about the type of macronutrients, their functions and various food sources . CO 2. To plan various recipes by using various food groups. CO 3. To study the calculation of various macronutrients used for the body metabolic process.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	2023
Pre-requisite	Nil
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE) 50% Semester End Evaluation (SEE)



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FNM203-1C: Principles of Macronutrients (Pr)

Course Content

Units	Particulars	% Weightage of Unit	Hours
1	<ul style="list-style-type: none">• Calculation of Energy, Carbohydrates, Protein and Fat content of foods using ICMR tables.• Market survey (Include 2 seasonal food stuff)	10	03
2	Plan and Prepare Recipe with nutrients and food costing: <ol style="list-style-type: none">1. Low, medium and high calorie <ul style="list-style-type: none">• Method of cooking to reduce the calorie, how to modify the high calorie, types of kneading, factors affecting oil absorption while cooking.	30	12
3	Plan and Prepare Recipe with nutrients and food costing: <ol style="list-style-type: none">1. High protein (6 gm/meal) <ul style="list-style-type: none">• Techniques to improve the quality of protein	25	08
4	Plan and Prepare Recipe with nutrients and food costing: <ol style="list-style-type: none">1. Low and high Glycemic Index2. Low and high dietary fiber <ul style="list-style-type: none">• Prevent the loss of dietary fiber during cooking	35	07

REFERENCES

Core references:

Reference books:

1. A Manual on Fundamentals of Food and Nutrition (2006) by Vanita Vishram and SNTD.
2. Srilakshmi.B. Food Science, New age international Pvt. Ltd. New Delhi, 2001.
3. Gopalan, G. RamaShastri B.V & Balasuvramnian, S.C. (2000). Nutritive Value of Indian Foods. National Institute of Nutrition, Indian Council of Medical Research, Hyderabad 500-007, India.
4. National Institute of Nutrition (2017), Indian Food Composition Tables, ICMR.
5. National Institute of Nutrition (2020), Nutrient Requirements For Indians.



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FNM203-1C: Principles of Macronutrients (Pr)

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to (keep number of COs according to units)

CO 1	To understand the concept of serving, exchange sizes and their cooked amount.
CO 2	To determine the nutritive value of different recipes per serving.
CO 3	To learn the use of a food guide.
CO 4	To list rich sources of various nutrients, plan and prepare recipes.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes			
		CO1	CO2	CO3	CO4
1	Calculation of Energy, Carbohydrates, Protein and Fat.				
2	Plan and Prepare recipe with nutrients and food costing (high, medium and low calorie)				
3	Plan and Prepare recipe with nutrients and food costing (high protein)				
4	Plan and Prepare recipe with nutrients and food costing (High and low GI, high and low Dietary fiber)				

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						



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FY B.Sc.
Semester II
FNM204-1C: Food Science-I (Th)

Credit 3

Contact Hour per week 3

Outline of the Course:

Course type	Theory
Level of the Course	200-299 Intermediate-level
Course Category	Discipline Specific Course (Major)
Purpose of Course	Food Science-I (Th)
Course Objective	CO 1. Understand the composition, nutritive value, properties and processing of different food commodities including cereals, pulses, nuts, oilseeds, Fats, Oils, vegetables and fruits CO 2. Apply the knowledge of Difference between various methods of cooking and their significance. CO 3. Analyze the processing and its effect on Nutritional Content of different foods
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	2023
Pre-requisite	Nil
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE) 50% Semester End Evaluation (SEE)



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FNM204-1C: Food Science-I (Th)

Course Content

Units	Particulars	% Weight age of Unit	Hours
1	Introduction to Food science <ul style="list-style-type: none">• Definition of Food Science, Functions of Food, basic food groups, food guide.• Physical properties of foods• Chemical properties of foods	10	03
2	Cereals and Pulses <ul style="list-style-type: none">• Cereals: Composition, Nutritive value and processing of wheat, rice, barley, rye, oats, millets and its products , convenient cereal products. Pulses: Composition and nutritive value, Digestibility of pulses, Processing, Toxic constituents, Pulse cookery.	30	12
3	Vegetables and Fruits <ul style="list-style-type: none">• Vegetables: Classification, Composition and Nutritive value, storage, post harvest losses, changes during maturation, ripening of fruits- Enzymatic browning reaction, Role of Vegetables in Cookery.	25	08
4	Milk and Milk products <ul style="list-style-type: none">• Milk and Milk products: Composition and Nutritive value of milk, properties of milk, Milk cookery, effect of heat on milk, milk products -Non fermented and fermented products- Role of milk in cookery.	35	07

REFERENCES

Reference books:

1. N. Shakuntala Manay, M Shadakshara Swamy, Foods Facts and Principles, New age international Publishers, 4 th Edition, 2020
2. Rick Parker, Miriah Pace, Introduction to Food Science and Food Systems, Cengage Publishers, 2 nd Edition. 2019
3. Swaminathan, M, Handbook of Food and Nutrition, The Bangalore Press, 5 th Edition. 2018
4. Sunetra Roday, Food Science and Nutrition, Oxford university Press, 3 rd Edition. 2018
5. Srilakshmi B, Food Science, New Age International Publishers, 6th Edition. 2015
6. Vijaya khader, Textbook of Food Science and Technology, ICAR Publishers, 2013



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7. B.Poornima ,Fundamentals of Food Science, Technology, Processing and Preservation ,
Centrum Press 2012

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to (keep number of COs according to units)

CO 1	To understand the physical and chemical properties of foods.
CO 2	To prepare and deliver effective presentations to food science and nutrition professionals and to the general public.
CO 3	Acknowledge about classification, composition and nutritive value of different food groups.
CO 4	Be aware about the technicalities and processing of different food products.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes			
		CO1	CO2	CO3	CO4
1	Introduction to Food science				
2	Cereals and Pulses				
3	Vegetables and Fruits				
4	Milk and Milk products				

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						



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FY B.Sc.
Semester II
FNM204-1C: Food Science-I (Pr)

Credit 1

Contact Hour per week 2

Outline of the Course:

Course type	Theory
Level of the Course	200-299 Intermediate-level
Course Category	Discipline Specific Course (Major)
Purpose of Course	Food Science-I (Pr)
Course Objective	CO 1. To inculcate the values of entrepreneurship and that facilitates the food product development at the larger level. CO 2. Apply the knowledge of Difference between various methods of cooking and their significance. CO 3. Analyze the processing and its effect on Nutritional Content of different foods
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	2023
Pre-requisite	Nil
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE) 50% Semester End Evaluation (SEE)



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Department of Food and Nutrition
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FNM204-1C: Food Science-I (Pr)

Course Content

Units	Particulars	% Weight age of Unit	Hours
1	<ul style="list-style-type: none">● Introduction: Composition of food, water in food, types of water, absorption and adsorption phenomenon, Water activity, Water activity and shelf-life.	20	06
2	<ul style="list-style-type: none">● Cereal cookery: Gluten formation and Non Enzymatic Browning Reactions- Maillard reaction, Caramelization, Gelatinization and dextrinization.	25	07
3	<ul style="list-style-type: none">● Pulses cookery: Germination, Fermentation	15	05
4	<ul style="list-style-type: none">● Milk: Specific Gravity, pH of milk.	15	05
5	<ul style="list-style-type: none">● Vegetables and Fruits: Enzymatic browning reactions, Moisture Content	25	07

REFERENCES

Reference books:

1. Fennema, Food Chemistry, 3rd Ed., Marcell Dekker, New York, 1996.
2. Whitehurst and Law, Enzymes in Food Technology, CRC Press, Canada, 2002.
3. Wong, DWS. Food Enzymes, Chapman and Hall, New York, 1995.
4. Potter, N.N. and Hotchkiss, J.H, Food Science, 5th Ed., Chapman & Hall, 1995.
5. DeMan, J.M., Principles of Food Chemistry, AVI, New York, 1980.
6. DeMan, J.M., Principles of Food Chemistry, 3rd Ed., Springer 1999.
7. Nooralabettu, K.P. Enzyme Technology, Pacemaker of Biotechnology, PHI Learning Private Limited, New Delhi. 2011



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COURSE OUTCOMES:

Upon successful completion of the course, students will be able to (keep number of COs according to units)

CO 1	To understand the molecular mechanisms via which genetic information is stored and expressed, regulated and transmitted among generations.
CO 2	To apply the knowledge about the basic techniques used in genetic engineering
CO 3	To analyze environmental toxicology in relation to health.
CO 4	Be aware about the technicalities and processing of different food products.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes			
		CO1	CO2	CO3	CO4
1	Introduction to Food science				
2	Cereals cookery				
3	Pulses cookery				
4	Milk				
5	Vegetables and Fruits				

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						



EFFECTIVE FROM ACADEMIC YEAR 2023-24
VANITA VISHRAM WOMEN'S UNIVERSITY, SURAT
SCHOOL OF SCIENCE AND TECHNOLOGY
Department of Food and Nutrition
B. Sc Food & Nutrition Program
FY B.Sc.
Semester II
FNE202-1C: Physical Fitness(Th)

Credit 3

Contact Hour per week 3

Outline of the Course:

Course type	Theory
Level of the Course	200-299 Intermediate-level
Course Category	Discipline Specific Course (Major)
Purpose of Course	Physical Fitness
Course Objective	CO 1. To understand various aspects of health and fitness. CO 2. To adopt a holistic approach towards health management and disease prevention. CO 3. To develop the ability to provide guidance on healthy diet, exercise & lifestyle modifications in relation to physical fitness.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	2023
Pre-requisite	Nil
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE) 50% Semester End Evaluation (SEE)



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Department of Food and Nutrition
B. Sc Food & Nutrition Program

FNE202-1C: Physical Fitness(Th)

Course Content

Units	Particulars	% Weight age of Unit	Hours
1	Introduction to Fitness <ul style="list-style-type: none">• Definition• Signs of Good Health• Physical and non-physical aspects	20	09
2	Different aspects of fitness <ul style="list-style-type: none">• Evaluation of fitness• Body composition• Exercise practices and injuries• Stress management• Yoga	20	12
3	Nutrition, Exercise and Immunity <ul style="list-style-type: none">• Types of immunity• Role of nutrients in immunity• Stress management• Hygienic practices during workouts	30	10
4	Uses and misconceptions and side effects of <ul style="list-style-type: none">• Ergogenic Aids• Functional Foods & Phytochemicals• Nutritional Supplements• Sports drinks• Meal Replacers• Fat Burners• Appetite Suppressants	30	14

REFERENCE

Core references:

Reference books

1. Wilmore, J.H., Buskirk, E.R. Digirolamo, M., & Lohman, T.G. (1986). Body composition: A round table. The Physician and sports medicine 14(3), 144-162
2. Dietary management in health & fitness. SMT.P.N. Doshi women's college, Mumbai.



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SCHOOL OF SCIENCE AND TECHNOLOGY

Department of Food and Nutrition
B. Sc Food & Nutrition Program

FNE202-1C: Physical Fitness(Th)

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to (keep number of COs according to units)

CO 1	To understand the role of food and nutrients in health and physical fitness.
CO 2	To prepare and deliver effective aspects of fitness towards the health benefits.
CO 3	To understand the interrelationship between nutrients, exercises and immunity.
CO 4	To evaluate the effectiveness of various physical fitness aids.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes			
		CO1	CO2	CO3	CO4
1	Introduction to Health & Fitness				
2	Different aspects of fitness				
3	Nutrition, Exercise and Immunity				
4	Uses and misconceptions and side effects of				

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						



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VANITA VISHRAM WOMEN'S UNIVERSITY, SURAT
SCHOOL OF SCIENCE AND TECHNOLOGY

Department of Food and Nutrition
B. Sc Food & Nutrition Program

FY B.Sc.
Semester II
FNE202-1C:Physical Fitness (Pr)

Credit 1

Contact Hour per week 2

Outline of the Course:

Course type	Practical
Level of the Course	200-299 Intermediate-level
Course Category	Discipline Specific Course (Major)
Purpose of Course	Physical Fitness
Course Objective	CO 1. Teach the students about body Anatomy and how it works. CO 2. To understand the relationship between fitness and wellness. CO 3. Evaluate health related fitness in order to make changes in lifestyle as well as to cure some diseases CO 4. To know the behavior changes needed to ensure a good quality of physical and mental health
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	2023
Pre-requisite	Nil
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE) 50% Semester End Evaluation (SEE)



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SCHOOL OF SCIENCE AND TECHNOLOGY

Department of Food and Nutrition
B. Sc Food & Nutrition Program

FNE202-1C:Physical Fitness (Pr)

Course Content

Units	Particulars	% Weightage of Unit	Hours
1	Warmup <ul style="list-style-type: none">• Definition• Three Categories of Warmup<ul style="list-style-type: none">○ Passive Warmup○ General Warmup○ Formal Warmup	30	08
2	<ul style="list-style-type: none">• Endurance Exercises• Resistance and strength exercises	30	10
3	Yogasanas & Meditation: <ul style="list-style-type: none">• Standing posture (Palm tree posture, Padahasthasana, Ardhasakrasana, Trikonasana), Pranayam,• Sitting posture: (Padmasana, Bhadrasana, Dandasana, Vajrasana, Adhrottarasana, Uttarasana, Sasakasana, Uttaramandukasana, Vakrasana,)• Prone posture, (Makarasana, Bhujangasana, Salabhasana, Setubandhasana, Naukasana, Uttanapadasana, Ardhasasana, Swasana). Surya pranam etc.• Techniques Yoga for concentration & related asanas benefits of meditation.	40	12

REFERENCE

Core references:

Reference books:

1. Rath, S.S. Physical Fitness and Wellness
2. Gore, M.M. Anatomy & Physiology of Yogic Practices
3. Yatendra, A. Yoga & Stress management
4. International Day of YOGA, common protocol: Ministry of Ayurveda, Yoga & Naturopathy, Unani, Siddha and Homeopathy (AYUSH)



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Department of Food and Nutrition
B. Sc Food & Nutrition Program

FNE202-1C:Physical Fitness (Pr)

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to (keep number of COs according to units)

CO 1	Gain knowledge about the human body and importance of yoga in physical fitness
CO 2	Maintain the body and mind by following a better lifestyle.
CO 3	It can become a career option and hence a source of income due to the growing demands of a healthy and fit body and a stable mental health among all age groups.
CO 4	To develop skills competencies and apply an understanding of rules, skills and strategies of various activities.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes			
		CO1	CO2	CO3	CO4
1	Warmup				
2	Endurance Exercises Resistance and strength exercises				
3	Yogasanas & Meditation				

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						



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Department of Food and Nutrition
B. Sc Food & Nutrition Program

FY B.Sc.
Semester II
MDC202-1C : Food Standards and Laws (Th)

Credit 4

Contact Hour per week 4

Outline of the Course:

Course type	Theory
Level of the Course	200-299 Intermediate-level
Course Category	Discipline Specific Course (Major)
Purpose of Course	Food Standards and Laws
Course Objective	CO 1. Understand the quality control measures and strategies in food systems. CO 2. Apply the knowledge of concepts and principles of hygiene and sanitation measures required in food industries. CO 3. Analyze the Hygienic parameters to be followed in food service establishments.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	2023
Pre-requisite	Nil
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE) 50% Semester End Evaluation (SEE)



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SCHOOL OF SCIENCE AND TECHNOLOGY
Department of Food and Nutrition
B. Sc Food & Nutrition Program

MDC202-1C : Food Standards and Laws (Th)

Course Content

Units	Particulars	% Weight age of Unit	Hours
1	Personal Hygiene <ul style="list-style-type: none">• Necessity for personal Hygiene, Health of staff, Personal Appearance, Sanitary practices, Habits, Protective Clothing.• Reporting illness and first aid.	15	10
2	Introduction to Sanitation and Hygiene <ul style="list-style-type: none">• Definition of sanitation and hygiene.• Significance of sanitation in the food industry.• Cross-Contamination, Sanitation Training and Education.• Safety Instructions to Kitchen staff.	25	12
3	Sanitation of Premises and Environment <ul style="list-style-type: none">• Cleaning Procedures: Sterilization and Disinfection- products and methods, use of detergents, heat, chemicals, steps in cleaning utensils and equipments, Post cleaning Storage• Waste Product Handling – Solid Waste, Liquid Waste or Sewage, Gaseous Waste, Pest control.• Hygienic Food Handling• Sanitary procedures while preparing, cooking and holding food• Preparation of Specific Foods, Common faults in food Preparations	25	16
4	Food regulation : Standards and quality control <ul style="list-style-type: none">• Food standards and regulations in India – PFA, FPO, BIS, Agmark• Food Safety and Standards Act, 2006 (FSSA): Prevention of Food Adulteration Act (PFA), Milk and Milk Products Order (MMPO), Meat Food Products Order (MFPO), Fruits Products Order (FPO).	35	22

REFERENCE

Core references:

Reference books:

1. Knechtges P.L. Food Safety-Theory and Practice: Jones & Bartlett Learning, 2012
2. Roday S. Food hygiene and sanitation with case studies, 2nd Ed., Tata McGraw Hill Education Pvt Ltd., 2011
3. Kirk, R.S and Sawyer, R. Pearson's composition and analysis of foods, Longman Scientific and technical. 9th Ed., England, 1991
4. Bryan, F.L. Hazard analysis critical control point evaluation. A guide to identifying Hazards and assessing risks associated with food preparation and storage. WHO, Geneva, 1992 .



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Department of Food and Nutrition
B. Sc Food & Nutrition Program

MDC202-1C : Food Standards and Laws (Th)

COURSE OUTCOMES:

Upon successful completion of the course, students will be able to (keep number of COs according to units)

CO 1	Gain knowledge regarding hygiene and sanitation.
CO 2	To maintain the health and hygiene by minimizing the food hazards.
CO 3	To understand how to prevent illness by focusing on food manufacturing activities.
CO 4	Make aware about the different laws and standards to maintain the quality of food products.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes			
		CO1	CO2	CO3	CO4
1	Personal Hygiene				
2	Introduction to Sanitation and Hygiene				
3	Sanitation of Premises and Environment				
4	Food regulation : Standards and quality control				

COURSE ARTICULATION MATRIX

	PO1	PO2	PO3	PO4	PO5	PO6
CO1						
CO2						
CO3						
CO4						



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Department of Food and Nutrition
B. Sc Food & Nutrition Program
FY BSc
Semester II

Multidisciplinary Elective Course
MDC202-1C: Interdisciplinary perspectives on the Indian Space Program (Theory)

Credit 4

Contact Hour per week 4

Outline of the Course:

Course type	Theory
Purpose of Course	The purpose of this course is to provide students with a comprehensive and interdisciplinary understanding of the Indian Space Program and related scientific disciplines. Through a multifaceted exploration of space science, technology, and applications, students will gain insights into the historical evolution of India's space endeavors, astrobiology, space food technology, and the chemistry of space materials. The course aims to foster a holistic perspective, equipping students with the knowledge to appreciate the interconnectedness of various scientific domains in the context of space exploration. Additionally, the course aims to inspire curiosity, critical thinking, and an appreciation for the advancements and challenges in space-related fields.
Course Objective	<ul style="list-style-type: none">• Comprehensive Understanding of Indian Space Program<ul style="list-style-type: none">● Exploration of Astrobiological Concepts• Proficiency in Space Food Technology and Nutrition• Comprehensive Insight into Space Materials and Their Challenges
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	December 2023
Pre-requisite	<ul style="list-style-type: none">• Prerequisites for the course include a fundamental understanding of physics, biology, chemistry and astronomy principles.
Teaching Methodology	Class Room Teaching, Discussion and Assignment, Demonstration
Evaluation Method	40% Continuous Assessment (CA) 60% End Semester Examination (ESE)



Units	Particulars	% weightage of Unit	Min. No. of Hrs
1.	<p>Overview of the Indian Space Program:</p> <ul style="list-style-type: none"> • Beginning • Sounding Rockets in Kerala • ISRO after Vikram Sarabhai • Rockets • Satellites • Applications: <ul style="list-style-type: none"> ○ Agriculture, ○ Urban Management ○ SATCOM for Education ○ Communication Satellite ○ Satellite Navigation in India 	25%	15
2.	<p>Astrobiology:</p> <ul style="list-style-type: none"> • Introduction to Astrobiology <ul style="list-style-type: none"> ○ Definition and Scope of Astrobiology ○ The Search for Extraterrestrial Life: History & motivation ○ Milestones in Astrobiology • Conditions for Life <ul style="list-style-type: none"> ○ Habitability Factors on Earth and Beyond ○ Extremophiles and Their Astrobiological Significance ○ Goldilocks Zone and Planetary Habitability • Exoplanets and Their Potential for Life 	25%	15
3.	<p>Space Food Technology:</p> <ul style="list-style-type: none"> • Development of space-friendly food products • Packaging and preservation techniques for long-duration missions • Adaptation of traditional food processing methods for space conditions <p>Nutritional Requirements in Microgravity:</p>	25%	15



	<ul style="list-style-type: none"> • Understanding the impact of microgravity on nutrient absorption • Formulating diets to meet the specific nutritional needs of astronauts <p>Bioregenerative Life Support Systems:</p> <ul style="list-style-type: none"> • Integration of food production within closed-loop life support systems • Hydroponics and aeroponics for growing crops in space • Recycling waste materials for use in cultivating plants 		
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4.	<p>Chemistry of Space Material:</p> <ul style="list-style-type: none"> • Importance of materials selection for spacecraft • Historical perspective on materials used in space technology • Properties required for spacecraft materials • Examples of materials commonly used in spacecraft • Role of composites, alloys, and advanced materials • Overview of the space environment • Impact of radiation on materials • Thermal challenges and extremes in space 	25%	15
	<p>Reference books:</p> <ol style="list-style-type: none"> 1. "Introduction to Aerospace Materials" by Adrian P. Mouritz 2. "From Fishing Hamlet to Red Planet: India's Space Journey" by ISRO 3. "India's Space Programme: The Early Years" by P.V. Manoranjan Rao and U.R. Rao 4. "Astrobiology: A Brief Introduction" by Kevin W. Plaxco and Michael Gross 5. "Life in the Universe" by Jeffrey O. Bennett and Seth Shostak 6. "Space Nutrition" by Barbara Storper and Scott M. Smith 		



7. "The Martian" by Andy Weir 8. "Food for Mars: Advanced Life Support Concepts and Food Production Strategies" edited by Daniela Billi and Alberto G. Fairén 9. "Materials and Processes for Spacecraft and High-Reliability Applications" by Barrie D. Dunn 10. "Spacecraft Systems Engineering" by Peter Fortescue, John Stark, and Graham Swinerd		
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COURSE OUTCOMES:

Upon successful completion of the course,

CO 1.	Gain an in-depth understanding of the Indian Space Program, spanning historical evolution, satellite technology, and diverse applications.
CO 2.	Develop a multidisciplinary perspective by exploring astrobiology, space food technology, and the chemistry of space materials, fostering a holistic understanding of space science.
CO 3.	Enhance critical thinking by evaluating the challenges and advancements in space exploration, considering factors like habitability, nutrition in microgravity, and materials science.
CO 4.	Apply theoretical knowledge to real-world scenarios, appreciating the practical implications of space technology in areas such as agriculture, urban management, education, and communication.
CO 5.	Inspire curiosity and interest in advanced space-related studies, encouraging students to pursue deeper exploration in specific disciplines within the realm of space science and technology.



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Department of Food and Nutrition
B. Sc Food & Nutrition Program
FY BSc
Semester II

AEC202-1C : FUNCTIONAL ENGLISH-II

Credit 2

Contact Hour per week 2

Outline of the Course

Course type	Theory
Level of the Course	200-299 Intermediate-level
Course Category	Ability Enhancement Course (AEC)
Purpose of Course	To equip individuals with the necessary language skills and confidence to communicate effectively in English, enabling them to succeed academically, professionally, and in various social settings
Course Objective	CO 1. Utilize their knowledge of functional English effectively for communicative purposes. CO 2. Learn language in authentic contexts. CO 3. Use English efficiently for routine. CO 4. Sharpen Writing and Speaking skills for better expression by providing authentic resources. Make students understand how the development of these skills will lead to their holistic development.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	
Pre-requisite	Elementary knowledge of English Language.
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Continuous Comprehensive Evaluation (CCE)- Formative 50% Semester End Evaluation (SEE)- Summative



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B. Sc Food & Nutrition Program

Course Content

Unit No.	Title of the Unit	% Weightage of Unit	Minimum Nos. of Hours
1	Foundational Grammar (Practical) <ul style="list-style-type: none">· The concept of mood in English grammar (indicative, imperative, subjunctive)· Time and tense relationships in complex sentences· Active and passive voice and their functions· Information structure (focus, topic, comment) in English	34	10
2	Introduction to Productive Skills <ul style="list-style-type: none">● Concept and Characteristics of Speaking<ul style="list-style-type: none">· Qualities of a Good Public Speaker· Introduction to the Writing Skills· Concept and Characteristics of Writing	33	10
3	Productive Skills (Practical) <ul style="list-style-type: none">· Speaking in Public/ Group Discussion/ Debate· Dialogue Writing/ Speech Writing for various occasions· Paragraph/ Essay/ Report Writing	33	10

REFERENCES:

- "An Introduction to Functional Grammar" by M. A. K. Halliday and Christian M. I. M. Matthiessen
- "Functional English Grammar: An Introduction for Second Language Teachers" by Michael A. K. Halliday and Ruqaiya Hasan
- Gupta, S.C. English Grammar & Composition. Arihant Publication. 2022.
- Mitra, Barun K. Personality Development and Soft Skills. Oxford University Press, 2015.
- Urmila Rai and S.M. Rai. Business Communication. 1st Edition, Mumbai:

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Himalaya Publishing House.

- Krishna Mohan and Meera Banerji. Developing Communication Skills. New Delhi: Macmillan India Private Ltd.
- Wren and Martin. English Grammar. MB publication, 2022.
- Ur, Penny. Teaching Listening Comprehension. Cambridge University Press
- Teaching Listening and Speaking : From Theory to Practice
<https://www.professorjackrichards.com/wp-content/uploads/teaching-listening-and-speaking-from-theory-to-practice.pdf>

COURSE OUTCOMES**Upon successful completion of the course, students will be able to:**

CO 1	Enable themselves to express ideas clearly and accurately with writing and speaking skills.
CO 2	Gain confidence in an academic and professional context.
CO 3	Analyze and improve pronunciation. Prepare themselves better for placements and beyond.

COURSE OUTCOMES MAPPING

Unit No.	Unit Name	Course Outcomes		
		CO1	CO2	CO3
1	Foundational Grammar (Practical)			
2	Introduction to Productive Skills			
3	Productive Skills (Practical)			

COURSE ARTICULATION MATRIX

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO1							
CO2							
CO3							



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Department of Food and Nutrition
B. Sc Food & Nutrition Program
SEC202-1C: SEC : Analytical Tools and Techniques

Credit 2

Contact Hour per week: 2

Outline of the Course:

Course type	Theory
Purpose of Course	The course aims to provide a foundation for understanding the fundamental principles, construction and working of laboratory instruments. It equips students with essential skills to operate the instrument with better understanding.
Course Objective	CO 1. Learning the principle of laboratory instruments CO 2. Learning the working mechanism of an instrument provides better accessibility to operate instruments. CO 3. Learning the basic application and uses of a variety of instruments provides a range of application knowledge . CO 4. Understanding operation, care and maintenance of laboratory techniques and instrument handling,
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	July 2023
Pre-requisite	Elementary knowledge of Chemistry
Teaching Methodology	Class Room Teaching, Use of ICT, Class exercise, Discussion and Assignment
Evaluation Method	40% Continuous Assessment (CA) 60% End Semester Examination (ESE)



Units	Particulars	Weightage of Unit	Minimum Nos. of Hours
1	Separation Techniques Introduction, Basic Principles of Chromatography Partition Chromatography, Paper Chromatography, Thin layer Chromatography, Column Chromatography, Gel filtration Chromatography, Ion exchange Chromatography, Gas Chromatography, High Performance Liquid Chromatography, Fast protein liquid Chromatography	50%	15
2	Spectroscopy Introduction, The electromagnetic spectrum and its usage for spectroscopic methods, General Principles, Beer–Lambert's Law, Mechanics of Measurement, UV–Visible Spectroscopy, Definition, Principle, Instrumentation, Analysis of biomolecules using UV and visible range.	50 %	15

REFERENCE:

1. Principles and Techniques of Biochemistry and Molecular Biology Seventh edition by Keith Wilson And John Walker
2. Introduction to Instrumentation in Life Sciences by Prakash Bisen and Anjana Sharma
3. Chromatography And Separation Science By Satindra Ahuja
4. Instrumental Methods of Chemical Analysis by B.K. Sharma
5. Principle of Instrumental Analysis by Skoog, Holler and Crouch.



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B. Sc Food & Nutrition Program

COURSE OUTCOMES:

Upon successful completion of the course,

CO 1.	Students will have an enhanced knowledge of separation techniques.
CO 2.	Students will be able to study the structure through spectroscopy.

COURSE OUTCOMES MAPPING

Unit No.	Title of the Unit	Course Outcomes	
		CO 1	CO 2
1	Separation Techniques		
2	Spectroscopy		

COURSE ARTICULATION MATRIX

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6
CO1						
CO2						



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VANITA VISHRAM WOMEN'S UNIVERSITY, SURAT
SCHOOL OF SCIENCE AND TECHNOLOGY

Department of Food and Nutrition
B. Sc Food & Nutrition Program

Environmental studies
FY B.Sc./B.A./B.Com./B.C.A./B.Voc/B.B.A
Semester II

VAC201-1C: Environmental studies

Credit 2

Contact Hour per week 2

Outline of the Course:

Course type	Theory
Purpose of Course	The students need to learn basic concepts of environment. How environment impact our life on earth and which activities are harmful to our environment and how we can contribute to wellbeing of our earth and environment.
Course Objective	CO 1. To develop the understanding basics concept of our environment and its sustainable development. CO 2. Demonstrate knowledge and understanding different component of environment. CO 3. Demonstrate knowledge and understanding of the ecosystem and its functioning and impact on survival of organism on earth. CO 4. To develop the ability to think critically about sustainable development of our earth environment.
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	Dec 2023
Pre-requisite	10+2
Teaching Methodology	Class Room Teaching, Discussion and Assignment
Evaluation Method	50% Comprehensive Continuous Evaluation (CCE) 50% Semester End Examination (SEE)



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Course Content

Units	Particulars	% Weightage of Unit	Minimum Nos. of Hours
1	Introduction of Environment <ul style="list-style-type: none">● Definition and multidisciplinary nature of environmental studies.● Concept and Components of environment (Atmosphere, Lithosphere and Hydrosphere)● Bio-geochemical cycles● Concept, structure and function of an ecosystem.● Food chains, food webs and Energy flow in an ecosystem● Terrestrial ecosystem: Forest ecosystem and Grassland ecosystem● Aquatic ecosystems: Pond and ocean ecosystem	25	8
2	Natural Resources: Renewable and Non-renewable Resources <ul style="list-style-type: none">● Land as a resource, soil erosion and land degradation, landslides, and desertification● Forests: Use and over-exploitation, deforestation,● Impacts of deforestation on biodiversity and tribal populations.● Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs.	25	8
3	Biodiversity and its Conservation <ul style="list-style-type: none">● Introduction — Definition, ecosystem diversity, Value of biodiversity,● India as a mega-biodiversity nation;● Threats to biodiversity: Habitat loss, poaching of wildlife, man- wildlife conflicts.● Endangered and endemic species of India. Common plant and animal species.● Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity	25	7
4	Environmental pollution Definition Causes, effects and control measures of: <ul style="list-style-type: none">● Air pollution● Water pollution● Soil pollution	25	7



<ul style="list-style-type: none">● Marine● Noise pollution● Thermal pollution● Nuclear hazards		
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List of References & Text Books:

- Bharucha, E. (2013). Textbook of Environmental Studies for Undergraduate Courses. Universities Press.
- Asthana, D. K. (2006). Text Book of Environmental Studies. S. Chand Publishing.
- Basu, M., Xavier, S. (2016). Fundamentals of Environmental Studies, Cambridge University Press, India
- Singh, J.S., Singh, S.P. & Gupta, S.R. 2006. Ecology, Environment and Resource Conservation. Anamaya Publications.
- Sodhi, N.S. & Ehrlich, P.R. (Eds). 2010. Conservation Biology for All. Oxford University Press.
- Tiwari, G.N. & Ghosal. M. K. 2005. Renewable Energy Resources: Basic Principles and Application. Narosa Publishing House.
- R. K. Khitoliya., 2012. Environmental Pollution 2nd edition. S. Chand Publishing
- Pepper, I.L., Gerba, C.P. & Brusseau, M.L. 2006. Environmental and Pollution Science. Elsevier Academic Press.
- Purohit, S.S. & Ranjan, R. 2007. Ecology, Environment & Pollution. Agrobios Publications.

COURSE OUTCOMES:

CO 1.	Students will gain knowledge about Earth structure and its environment and ecology and biodiversity and its role in human welfare and its conservation
CO 2.	Students will develop the understanding about various natural resources and their management.
CO 3.	Students will be able to critically examine all sides of environmental issues and apply understanding from various disciplines such as psychology, law, literature, politics, sociology, philosophy, and religion to create opinions about how to interact with the environment on both a personal and a social level.
CO 4.	Students will understand the global character of environmental problems and ways of addressing them, including interactions across local to global scales.



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COURSE OUTCOMES MAPPING

Unit No.	Title of the Unit	Course Outcomes			
		CO 1	CO 2	CO 3	CO 4
1	Introduction of Environment				
2	Natural Resources: Renewable and Non-renewable Resources				
3	Biodiversity and Conservation				
4	Environmental pollution				



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PO 2. 13 TEACHING METHODOLOGY

A teaching method comprises the principles and methods used by teachers to enable student learning. In order to achieve its objective of focused process- based learning and holistic development, the teacher/faculty may use a variety of knowledge delivery methods:

1.1 LECTURES/CLASS WORKS:

Lectures should be designed to provide the learners with interesting and fresh perspectives on the subject matter. Lectures should be interactive in a way that students work with their teachers to get new insights in the subject area, on which they can build their own bridges to higher learning. Classwork has the ability to enhance relationships between teachers and students. Create goal- oriented tasks for students to prepare and enable self-learning.

1.2 DISCUSSIONS/ SEMINARS/PRESENTATION:

Discussions / seminars / presentation are critical components of learning and can be used as a platform for students to be creative and critical with old and new ideas. Besides developing critiquing skills, arriving at consensus on various real-life issues and discussion groups lead to innovative problem-solving and ultimately to success.

1.3 CASE STUDIES/ SELF-STUDY:

Real case studies, wherever possible, should be encouraged in order to challenge students to find creative solutions to complex problems of individual, community, society and various aspects of knowledge domain concerned. Technology is transforming higher Education learning and teaching through various case studies to improve overall standards.

1.4 PRACTICAL/PROBLEM SHEET:

Practical ability is the essential requirement for computer science undergraduates' ability structure, and it emphasizes that computer science undergraduates should have a good grasp of theory from practice and then apply the theory to practice, improving their own software developing skills and employability.



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1.5 ASSIGNMENTS:

Computer science assignments not only help students overcome their fear and stress but also help them learn more interesting facts about the subjects of computer science which are part of their syllabus and also out of curriculum.

1.6 INDUSTRIAL TOURS:

Computer Science students have to know the things practically through interaction, working methods and employment practices. Moreover, it gives exposure from academic point of view. Main aim industrial visit is to provide an exposure to students about practical working environment.

1.7 TEAM WORK:

Teamwork based projects challenge the student to apply the technical knowledge they gain in college to solve meaningful and complex problems. Positive collaboration in the form of team work is critical in the classroom environment, for which it is necessary to transcend one's prejudices and predilections so as to achieve the desired outcomes. In the process of teamwork, learners will acquire the skills of managing knowledge acquisition and other collaborative learners, thereby understanding how to incorporate and balance personalities.

14. KEYWORDS

- Bachelor of Science (B.Sc.) in Food and Nutrition