Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

ક્રમાંક :ઓથો./પરિપત્ર/૪૧૫૭/૨૦૨૫
તા.૧૩/૦૨/૨૦૨૫

પ્રતિ,
વડાશ્રી,
બાયોટેકનોલોજી ડિપાર્ટમેન્ટ,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષયઃ– શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ ના અભ્યાસક્રમ બાબત.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ ના અભ્યાસક્રમ બાબતે બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૯/૦૧/૨૦૨૫ ની સભાના ઠરાવ ક્રમાંકઃ૦૪ થી નીચે મુજબ કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૧૧/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૫૧ થી સ્વીકારી મંજુર કરેલ છે, જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

<u>બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૯/૦૧/૨૦૨૫ ની સભાના ઠરાવ ક્રમાંકઃ૦૪</u>

:: આથી ઠરાવવામાં આવે છે કે, બાયોટેકનોલોજી વિભાગમાં શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ નો આ સાથે સામેલ અભ્યાસક્રમ મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

<u>એકેડેમિક કાઉન્સિલની તા.૧૧/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ ૫૧</u>

:: આથી ઠરાવવામાં આવે છે કે, ડિપાર્ટમેન્ટ ઓફ બાયોટેકનોલોજી વિભાગમાં શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ ના અભ્યાસક્રમ બાબતે બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૯/૦૧/૨૦૨૫ ની સભાના ઠરાવ ક્રમાંકઃ૦૪ થી કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ સ્વીકારી મંજૂર કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

કુલસચિવ(ઇ/ા)

પ્રતિ,
૧) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા,
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....જાણ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

PROPOSAL to Start New Program at Department of Biotechnology

Bachelor of Science (B. Sc.) Program in

Food Technology

[3 years (Degree) & 4 years (Honours/Honours with Research)]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

B. Sc. Program in Food Technology-Major

Teaching & Evaluation Scheme Semester-I & II

[Academic Year of Implementation 2025-2026]

Semester - I

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours)	(CCE) Internal Marks	(SEE) External Marks		
FT-MJ-101	Food & Health: Bhartiya Heritage	3h	1:30h	37	38	70	3
FTP-MJ-101	Practical	2h	3h	12	13	25	1
FT-MJ-102	Introduction to Food Science & Technology	3h	1:30h	37	38	75	3
FTP-MJ-102	Practical	2h	3h	12	13	25	1
			Total	**98**	**102**	**200**	**8**

Semester - II

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours)	(CCE) Internal Marks	(SEE) External Marks		
FT-MJ-201	Ayurveda in Modern Food Science	3h	1:30h	37	38	70	3
FTP-MJ-201	Practical	2h	3h	12	13	25	1
FT-MJ-202	Molecular Food Composition I	3h	1:30h	37	38	75	3
FTP-MJ-202	Practical	2h	3h	12	13	25	1
			Total	**98**	**102**	**200**	**8**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-I: Course: FT-MJ-101: Food and Health: Bhartiya Heritage

Course Code	FT-MJ-101
Course Title	**Food and Health: Bhartiya Heritage**
Credit	3
Total engagement	3 Credits x 15 Hours = 45 Hours
Teaching per week	3 h
Minimum weeks per semester	15 weeks (Including classwork, examination, preparation & holidays)
Effective from	2025-2026
Purpose of Course	This course introduces students to the rich heritage of food and health in Bhartiya (Indian) culture. It aims to explore ancestral knowledge, traditional food philosophies and their relevance to modern food technology and health sciences. Students will gain an appreciation of the interconnection between food, environment and health as understood in Bhartiya heritage and its potential applications in sustainable and holistic living.
Course Objectives	• To develop an understanding of the linguistic, cultural and historical aspects of food in Indian heritage. • To explore the relationship between climate, crops and prehistory with food practices and agricultural developments in India. • To familiarize students with the principles of Ayurveda, ancient texts on food, and their recommendations for healthy living. • To appreciate the scientific foundations and practical applications of traditional Indian food systems in modern health and nutrition.
Course Outcomes	CO1: Students will understand the linguistic, cultural and philosophical heritage of Indian food, focusing on Satvic principles and their health benefits. CO2: Students will explore the link between climate, agriculture, and prehistory, appreciating the role of crops and the Harappan Civilization in shaping Indian food culture. CO3: Students will grasp Ayurveda food principles and ancient texts, understanding the integration of food and medicine for holistic health.
Mapping between COs with PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								
CO3								

Pre-requisite	12th Pass from Science, Commerce & Arts Stream	
Course Content	**UNIT-1: Ancestral Legacies:** Language and food; Words for food in Sanskrit; Important words and its meaning from a historical dictionary of Indian food; Indian words in foreign language; Satvic Food	Teaching Hours: 15

	Philosophy; Definition and 4 Satvic Food Principles; 21 Satvic Food Laws; Understanding Digestion.	
	UNIT-2: Climate, Crops and Prehistory: The Physical Environment; The Climate; The development of Agriculture: Pulses, Grains, Fruits and Vegetables, Spices; The Harappan Civilization.	Teaching Hours: 15
	UNIT-3: Food and Medicine: Introduction; The Principles of Ayurveda; Food Prescription: Susruta Samhita; Food and Beverage pairings by Susruta; Healthy eating recommendations by Charaka.	Teaching Hours: 15
Reference Books	✓ Sen, C. T. (2016) *Feast and Fast: A History of Food in India*, Speaking Tiger, Chaman Enterprises, New Delhi (ISBN: 978-93-85755-34-7) ✓ Achaya, K. T. (2024) *A Historical Dictionary of Indian Food*, Oxford University Press, New Delhi (ISBN-10: 0-19-565868-X). ✓ Jain Subah (2022) *The Food Book*, Satvik Movement (ISBN-10: 9354935087). ✓ Achaya, K. T. (2021) *Indian Food*, Oxford India Paperbacks, New Delhi (ISBN-13: 978-0-19-564416-6)	
e-learning resources	✓ https://youtu.be/XiQOoS0MQA8?si=nJIhhl765kGXKmQm ✓ https://youtu.be/Cl1Ua8TCDmo?si=C-AxqRNRMsB-gO3f ✓ https://youtu.be/mKHF_cP-XeE?si=rLmSLr7VZ3xJfM-E ✓ https://youtu.be/Cl1Ua8TCDmo?si=6rs4P9QuAmLz7l_z	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 50% SEE: External assessment based on semester end University examination	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-I: Course: FTP-MJ-101: Practical

Course Code	FTP-MJ-101
Course Title	**Practical : Food and Health: Bhartiya Heritage**
Credit	1
Total Engagement	1 Credit x 30 Hours = 30 Hours
Teaching per week	2 h X 1 day = 2 h
Minimum weeks per semester	15 weeks (Including Laboratory work, examination, preparation, holidays etc.)
Effective from	2025-2026
Purpose of Course	This course aims to integrate Indian heritage into food science by exploring historical, cultural, and Ayurvedic perspectives on food and health. It provides students with practical exposure to ancient dietary principles, agricultural practices, and the scientific evaluation of traditional foods.
Course Objectives	• To understand the linguistic and historical significance of Indian food traditions. • To explore and analyse Satvic dietary principles and their nutritional benefits. • To study the relationship between crops, climate and agriculture in India. • To investigate the role of Ayurveda herbal preparations in health and wellness. • To simulate and evaluate digestion processes using traditional foods.
Course Outcomes	CO1: Students will gain an understanding of the cultural and historical significance of Indian food terms, appreciating their evolution and relevance in modern dietary practices. CO2: Students will learn to prepare Satvic dishes as per traditional principles and evaluate their nutritional benefits, gaining insights into their role in promoting health and wellness. CO3: Students will develop an understanding of how climate and geography influence crop distribution in India, with a focus on traditional agricultural practices. CO4: Students will explore Ayurveda herbal remedies, understanding their preparation, sensory properties, and potential health benefits, bridging traditional knowledge with modern applications. CO5: Students will learn about digestion processes and the impact of traditional food preparation techniques on nutrient availability and overall health.
Mapping between COs with PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO 1-5								

Pre-requisite	12th Pass from Science, Commerce & Arts Stream

Course Content	1. Study of Indian Food Terminology and Historical Context. 2. Preparation and Analysis of Satvic Foods. 3. Mapping of Crops and Climatic Adaptations in Indian Agriculture. 4. Study of Ayurvedic Herbal Preparations in Food. 5. Digestion Simulation Using Traditional Foods.
Reference Books	✓ Achaya, K. T. (2003) *The Illustrated Foods of India: A Historical Companion*. Oxford University Press. ✓ Lad, V. (2002) *Ayurveda: The Science of Self-Healing*. Lotus Press. ✓ Pole, S. (2013) *Ayurvedic Medicine: The Principles of Traditional Practice*. Singing Dragon. ✓ Jain, V. (2016) *Handbook of Agriculture*. Indian Council of Agricultural Research (ICAR). ✓ Paroda, R. S. (2004) *Sustaining Our Food Security*. ICAR. ✓ Dash, B., & Sharma, R. K. (2002). *Charaka Samhita: Text with English Translation*. Chaukhamba Sanskrit Series Office. ✓ Gopalan, C., Rama Sastri, B. V., & Balasubramanian, S. C. (1989) *Nutritive Value of Indian Foods*. National Institute of Nutrition, ICMR. ✓ Swaminathan, M. (1985) *Essentials of Food and Nutrition*. The Bangalore Printing and Publishing Co. Ltd.
Teaching Methodology	Laboratory work, Journal preparation
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 50% SEE: External assessment based on semester end University examination

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-I: Course: FT-MJ-102 Introduction to Food Technology

Course Code	FT-MJ-102
Course Title	**Introduction to Food Technology**
Credits	3
Total Engagement	3 Credits x 15 Hours = 45 Hours
Teaching per week	3 hours
Minimum weeks Per semester	15 weeks
Course level	100-199
Effective from	2025-2026
Purpose of Course	The purpose of the course "Introduction to Food Technology" is to provide foundational knowledge about the science and practices involved in food production, processing, and preservation. It covers the social and scientific aspects of food, key terms and concepts in food technology, and the historical development of the food industry.
Course Objective	The objectives of the "Introduction to Food Technology" course are to provide a comprehensive understanding of food science, including its social and scientific aspects. Students will learn about key nutrients, food processing, and preservation techniques, along with the historical development and current trends in the food industry. The course aims to equip students with foundational knowledge essential for understanding food quality, safety, and technology.
Course Outcomes	Upon completion of the Introduction to Food Technology Course, students will: CO1: Students will gain an understanding of food from both social and scientific viewpoints, along with key terms in food technology. They will also explore the historical development of food technology, current industry trends, and factors influencing food acceptability. CO2: Students will be able to classify and understand the role of essential nutrients in human health, including carbohydrates, proteins, fats, vitamins, minerals, and water. They will gain knowledge of the nutritional significance of each nutrient and its impact on the body's functions and overall well-being. CO3: Students will be able to identify various food processing methods and understand their applications. They will gain an understanding of the principles and importance of food preservation and explore different methods used to maintain food safety, quality, and shelf life.

Mapping between Cos with PSOs	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO 1-10								

Pre-requisite	12th Pass from Science, Commerce & Arts Stream	
Course Content	**UNIT-1 FUNDAMENTALS OF FOOD TECHNOLOGY** What is food - socially and scientifically? Various terms used in food technology, Introduction to Food Technology as discipline, Historical development and current trends, Characteristics of Food Industry, Acceptability of food.	Teaching Hours: 15

	UNIT-2 NUTRIENTS IN FOOD Classification of nutrients, Carbohydrates & Proteins, Fats, Vitamins, Minerals, Water	Teaching Hours: 15
	UNIT-3 FOOD PROCESSING AND PRESERVATION TECHNOLOGIES Food Processing Methods, Food Preservation: Importance & Principle, Methods of Food Preservation	Teaching Hours: 15
Reference Books	✓ Mudambi, S. R., Rao, S. M., & Rajagopal, M. V. (2015). *food Science*. New Age International. ✓ Srilakshmi, B. (2003). *Food science*. New Age International. ✓ Potter, N. N., & Hotchkiss, J. H. (2012). *Food science*. Springer Science & Business Media.	
e-learning resources	✓ https://www.researchgate.net/publication/367083176_Historical_Developments_in_Food_Science_and_Technology	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment Laboratory work, Journal preparation	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 50% SEE: External assessment based on semester end University examination	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-I: Course: FTP-MJ-102: Practical

Course Code	FTP-MJ-102
Course Title	**Practical: Introduction to Food Technology**
Credits	1
Total Engagement	1 Credits x 30 Hours = 30 Hours
Teaching per week	2 hours
Minimum weeks Per semester	15 weeks
Course level	100-199
Effective from	2025-2026
Purpose of Course	The purpose of these practical's is to equip students with essential skills in food analysis and technology. By working with laboratory equipment, preparing reagents, and determining the nutritional content of food samples, students will gain practical experience in food testing.
Course Objective	The practical's aim to provide hands-on experience with essential food technology techniques. Students will learn to properly use laboratory equipment, prepare reagents, and determine the carbohydrate and protein content in food samples.
Course Outcomes	Upon completion of the Introduction to Food Technology Practical Course, students will CO1: Students will gain proficiency in using and handling laboratory equipment essential for food technology experiments. CO2: Students will develop the ability to prepare accurate and standardized reagents for food analysis. CO3: Students will learn to apply methods to analyze carbohydrate content in food samples. CO4: Students will be able to determine the protein content in food using different techniques. CO5: Students will acquire skills in performing sensory evaluations to assess food quality based on consumer preferences.

Mapping between Cos with PSOs		PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
	CO 1-5								

Pre-requisite	12th Pass from Science, Commerce & Arts Stream
Course Content	1. To Study Laboratory Equipment & their Usage. 2. To Study Protocol for Preparation of Reagents. 3. To Determine Total Carbohydrate of Food sample. 4. To Determine Protein Content in Food. 5. Sensory Evaluation of Food Products.
Reference Books	✓ Mudambi, S. R., Rao, S. M., & Rajagopal, M. V. (2015). *food Science*. New Age International. ✓ Srilakshmi, B. (2003). *Food science*. New Age International. ✓ Potter, N. N., & Hotchkiss, J. H. (2012). *Food science*. Springer Science & Business Media.
e-learning resources	✓ https://www.researchgate.net/publication/329699625_Estimation_of_protein_by_biuret_method ✓ https://ncert.nic.in/pdf/publication/sciencelaboratorymanuals/classXII

	/chemistry/lelm111.pdf
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment Laboratory work, Journal preparation
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 50% SEE: External assessment based on semester end University examination

MBP- ME-101

EUKARYOTIC CELL STRUCTURE PRACTICALS

1. Observation and examination of yeast cell.
2. Observation and examination of fungal cell.
3. Observation and examination of algal cell.
4. Observation and examination of protozoa.
5. Observation of different eukaryotic cells (permanent slides).
6. Staining of nuclear material.
7. Examination of cell organelles in paramecium.

Student Learning Outcomes:

- ✓ Students shall learn the structure and functions of cell wall and cell membrane as well as cytoplasm and nucleus.
- ✓ They will learn the structure and functions of varied cell organelles.

Recommended Learning Resources:

- Modi H. A., (2014), A Handbook of Elementary Microbiology, Shanti Prakashan, (ISBN: 978-93-5070-1010)
- Willey J., Sandman K. and Wood D., (2020), Prescott's Microbiology, 11th Edition, McGraw Hill, (978-1-260-57002-1)

MB-ME-102

ESSENTIAL OF BIOCHEMISTRY

1. Course description

Course Code: MB- ME-102
Course title: Essential of Biochemistry
Course type: Minor Elective
Course Credits: 02 + 02

2. Course Overview and Course objectives

The course includes the study of atoms and molecules and the solubility of compounds in the solution. It also covers the knowledge of acids and bases and the maintenance of pH. The course includes the understanding of biological compounds and the chemical reactions.

Course Objectives:

- ✓ To learn the fundamentals of atoms and molecules
- ✓ To study the solubility of compounds and its presence in solutions
- ✓ To understand acid and base and its role in pH maintenance
- ✓ To introduce biological compounds and its role in chemical reactions

3. Course Content

UNIT 1	BIOCHEMISTRY FOR MICROBIOLOGY
1.1	Atoms and molecules
1.2	Solubility of compounds
1.3	Concentration of compounds in solution
1.4	Acids, Bases and pH

UNIT 2	BIOCHEMICAL COMPOUNDS AND CHEMICAL REACTIONS
2.1	Important biological compounds
2.2	Introduction to chemical reactions
2.3	Ionization of water
2.4	Buffering against pH changes in biological systems
2.5	Water as reactant

MBP-ME-102

ESSENTIAL OF BIOCHEMISTRY PRACTICALS

1. Preparation of standard solutions.
2. Preparation of buffer solutions.
3. Adjustment of pH.
4. Preparation of molar solution
5. Preparation of molal solution
6. Preparation of normal solution.
7. Solubility test of compounds (Starch, gelatin, lipid).

4. Student Learning Outcomes:

- ✓ Students shall acquire knowledge of atoms and molecules, solubility of compounds and pH.
- ✓ They shall learn about important biological compounds and chemical reactions as well as the role of water as reactants.

Recommended Learning Resources:

- Satyanarayan U., and Chakrapani U., (2013), Biochemistry, Elsevier (9788131236017)
- Rodwell V. W., Bender D. A., Botham K. M., Kennelly P. J., Weil P. A., Harper's Biochemistry, McGraw Hill Education.
- Aneja K. R., (2007), Experiments in Microbiology, Plant Pathology and Biotechnology, New age International
- Godkar P. B., And Godkar P. D., (2003), Textbook of Medical Laboratory Technology, Bhalani Publishing House, Mumbai, India
- Mukherjee K. L., (1962), Medical Laboratory Technology- A procedure manual for routine diagnostic tests. McGraw Hill Education Pvt. Ltd. New Delhi.
- Pelczar M. J., Chan E.C.S Chan, Krieg N. R., (2011), Microbiology: An application-based approach, Tata McGraw Hill Education Private Limited.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty): Multidisciplinary Course

Teaching & Evaluation Scheme
Semester-I & II
[Academic Year of Implementation 2023-2024]

Semester-I

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-MDC-101	Basic Healthcare	4	2:00	50	50	100	4
	Total	**4**	2:00	**50**	**50**	**100**	**4**
BT-MDC-102	Introduction to Bioinformatics and Databases	4	2:00	50	50	100	4
	Total	**4**	2:00	**50**	**50**	**100**	**4**

Semester-II

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-MDC-201	Evolutionary Biology	4	2:00	50	50	100	4
	Total	**4**	2:00	**50**	**50**	**100**	**4**
BT-MDC-202	Environmental Biology and Wildlife	4	2:00	50	50	100	4
	Total	4	2:00	**50**	**50**	**100**	**4**
BT-MDC-203	Basics of Bioinformatics	4	2:00	50	50	100	4
	Total	**4**	2:00	50	50	100	**4**
BT-MDC-204	Bioinstrumentation	4	2:00	50	50	100	4
	Total	4	2:00	**50**	**50**	**100**	**4**

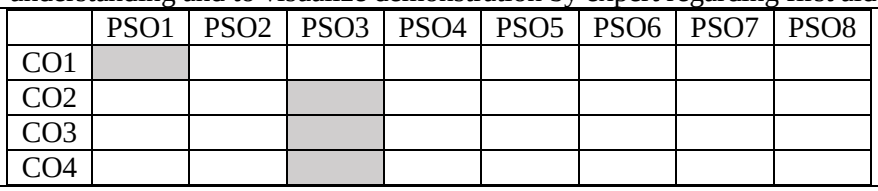
VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty)

(3 Years B. Sc. Degree; 4 Years B. Sc. with Honours/Honours with Research)

Semester-I

Multidisciplinary Course: BT-MDC-101: Basic Healthcare

Course Code	BT-MDC-101
Course Title	**Basic Healthcare**
Credits	4
Course Level	100-199
Total engagement	4 Credits x 15 Hours = 60 Hours
Teaching per week	3 h
Minimum weeks per semester	15 weeks (Including classwork, examination, preparation & holidays)
Effective from	2023-2024
Purpose of Course	This course is for all students who wants to learn fundamental concepts related to self-care and care for others which gives them confidence to take immediate actions during emergencies. Basic health Care course orients learner to understand some important aspects to take care and steps in case of various types of health related emergencies.
Course Objectives	-To understand basic concepts of First aid, this can help to society as well as own self. -Person can deal with current emergency situation on quick base. -Knowledge of First aid can save life or may give temporary relief to prevent worst situation in absence of health professional. -It helps to realize moral duties and values.
Course Outcomes	CO1: Students will able to learn about primary aid skills. CO2: Student will deal to handle present emergency situation with confidence. Students will develop basic skill which is needed to assess the ill or injured person. CO3&4: Students will able to take logical decisions and shall be able to take appropriate immediate actions. Hospital visit is included for brief practical understanding and to visualize demonstration by expert regarding first aid.
Mapping between COs with PSOs	
Pre-requisite	Biology; Chemistry; Public Health; Ethics; Medical Terminology
Course Content	**UNIT-1: Preparing to Help (First Aid)** First Aid Techniques; Aim and The Law; Dealing with an Emergency; Stress when giving First Aid and Resuscitation; Primary and Secondary Assessment; Hygiene and Hand Washing. — Teaching Hours: 15 **UNIT-2: Medical Emergencies** Heart, Blood Circulation, Shock; GI tract, Diarrhoea, Food Poisoning and Diabetes; Respiratory System and Breathing; Nervous System and Unconsciousness; Urinary System, Reproductive System and Emergency Childbirth; Senses, Foreign Bodies in Eye, Ear, Nose or Skin and Swallowed Foreign Objects. — Teaching Hours: 15

	Unit 3: Injury Emergencies Control of Bleeding; Burns: Thermal, Electrical and Chemical; Head, Neck and Back injuries; Minor Injuries: Nosebleed, Injured Tooth; Wounds; Bones, Joints and Muscles.	Teaching Hours: 15
	UNIT-4: Environmental Emergencies Heat and Cold Emergencies; Bites and Stings; Poisoning and Poisonous Plants; Lightning; Emotional Considerations; Visits to Hospital.	Teaching Hours: 15
Reference Books	• Indian First Aid Manual (2016) 7th Edition, Indian Red Cross Society. • Basic First Aid, Student book, version 8.0, American Safety and Health Institute, ISBN 978-1-936515-64-6, 1st Edition (2016)	
e-learning resources	• https://www.indianredcross.org/publications/FA-manual.pdf • https://www.emcmedicaltraining.com/wp-content/uploads/2016/09/ashi-first-aid-student-book.pdf	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty):
Skill Enhancement Course

Teaching & Evaluation Scheme
Semester-I & II
[Academic Year of Implementation 2023-2024]

Semester-I

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-SEC-101	Bacteriological Media and Isolation Techniques	Theory 1	0:30	12	13	25	1
		Practical 2	3:00	13	12	25	1
	Total	**3**	**3:30**	**25**	**25**	**50**	**2**
BT-SEC-102	Study of Soil Profile	Theory 1	0:30	12	13	25	1
		Practical 2	3:00	13	12	25	1
	Total	**3**	**3:30**	**25**	**25**	**50**	**2**

Semester-II

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-SEC-201	Introduction to Staining Techniques	Theory 1	0:30	12	13	25	1
		Practical 2	3:00	13	12	25	1
	Total	**3**	**3:30**	**25**	**25**	**50**	**2**
BT-SEC-202	Aquarium Fish Rearing	Theory 1	0:30	12	13	25	1
		Practical 2	3:00	13	12	25	1
	Total	**3**	**3:30**	**25**	**25**	**50**	**2**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty)

(3 Years B. Sc. Degree; 4 Years B. Sc. with Honours/Honours with Research)

Semester-I

Skill Enhancement Course: BT-SEC-101: Bacteriological Media and Isolation Techniques

Course Code	BT-SEC-101
Course Title	Bacteriological Media and Isolation Techniques
Credits	2 (1 credit theory & 1 credit practical)
Course Level	100-199
Total engagement	1 Credit x 15 Hours + 1 Credit x 30 Hours = 45 Hours
Teaching per week	3 h
Minimum weeks per semester	15 weeks (Including classwork, examination, preparation & holidays)
Effective from	2023-2024
Purpose of Course	This course will give students the introduction, necessity, composition and types of media, isolation techniques and practical skills regarding the preparation of culture media and other basic handling skills required in a lab.
Course Objectives	-To help understand the role of various nutrients in growth of organisms. -To create awareness regarding media preparation. - Types of media formed - Various techniques for the isolation of pure culture.
Course Outcomes	CO1: Students will gain knowledge about media, its ingredients, role, types and various techniques for isolation of pure culture. CO2: Students will gain skills regarding media preparation, cleaning and sterilizing of glassware and media, how to prepare a smear, how to stain a smear and how to perform serial dilution.
Mapping between COs with PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								

Pre-requisite	12^{th} Pass with Biology & Chemistry	
Course Content	**UNIT-1: Nutritional requirements and cultivation media** Introduction to Nutritional requirement and chemical elements required, Steps in preparation of media, Introduction and Basal Ingredients of culture media, Types of media (Solid, Semi-solid and Liquid), Techniques for isolation of pure culture-Single cell, serial dilution, pour plate, streak plate and spread plate techniques.	Teaching Hours: 15
	UNIT-2: Practical 1. Preparation of Culture media (Solid, Semi-solid and Liquid). 2. Cleaning and Sterilization of glassware and media. 3. Preparation, fixation and monochrome staining of a smear. 4. Preparation of Serial dilution. 5. Demonstration of different isolation techniques.	Teaching Hours: 30

Reference Books	• Dubey, M. (2009) *Practical Microbiology*. New Delhi: S. Chand. • Srivastava, M. L. (2008) *Microbial Biochemistry.* Narosa Publishing House. • Madigan, B. B. (2019) *Brock Biology of Microorganisms* (5 ed.). Pearson. • Rakesh Patel, K. P. (2016) *Experimental Microbiology* (9 ed., Vol. I). Aditya Publication.
e-learning resources	https://www.youtube.com/dbtvnsgu
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227148, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

સંદર્ભ: (૧) યુનિવર્સિટી પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૧૬૩૪૫/૨૦૨૩, તા.૦૧/૦૭/૨૦૨૩
(૨) યુનિવર્સિટી પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૨૧૫૪૨/૨૦૨૩, તા.૧૮/૦૮/૨૦૨૩
(૩) યુનિવર્સિટી પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૨૩૧૫૪/૨૦૨૩, તા.૦૪/૦૯/૨૦૨૩

-: પરિપત્ર :-

વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, NEP 2020 અંતર્ગત શિક્ષણ વિભાગના તા.૧૧/૦૭/૨૦૨૩ ના ઠરાવ અન્વયે,શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર અંગ્રેજી વિષયના F.Y.B.Com.Sem- 1 & 2 ના AEC અને SEC ના અભ્યાસક્રમના પ્રશ્નપત્રના માળખા અને ગુણોની ફાળવણીમાં જરૂરી સુધારા વધારા અંગે અંગ્રેજી વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિવતી મંજૂર કરી વાણિજય વિદ્યાશાખાને કરેલ ભલામણ વાણિજય વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વાણિજય વિદ્યાશાખાવતી વાણિજય વિદ્યાશાખાના અધરધેન ડીનશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૭/૦૮/૨૦૨૩ ની સભાના ઠરાવ ક્રમાંકઃ ૯૯ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા ઉપરોકત પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૨૩૧૫૪/૨૦૨૩, તા.૦૪/૦૯/૨૦૨૩ થી જાણ કરવામાં આવેલ છે.

વધુમાં શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર અંગ્રેજી વિષયના F.Y.B.Com.Sem- 1, 2 & 3 ના Multidisciplinary ના અભ્યાસક્રમ અને પ્રશ્નપત્રના માળખાને અંગ્રેજી વિષયની અભ્યાસ સમિતિ વતી અંગ્રજી વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ મંજૂર કરી વાણિજય વિદ્યાશાખાને કરેલ ભલામણ વાણિજય વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વાણિજય વિદ્યાશાખા વતી વાણિજય વિદ્યાશાખાનાં અધરધેન ડીનશ્રીએ મંજૂર કરેલ છે જેમાં F.Y.B.Com.Sem- 1, 2 & 3 ના Multidisciplinary ના અભ્યાસક્રમ એકેડેમિક કાઉન્સિલની તા.૧૭/૦૮/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંકઃ ૨૨ થી મંજૂર કરેલ છે. અને પ્રશ્નપત્રનું માળખું એકેડેમિક કાઉન્સિલની તા.૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૯૯ થી એકેડેમિક કાઉન્સિલ વતી મંજૂર કરવા આપેલ સત્તાની રૂએ માનનીય કુલપતિશ્રી ધ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./પરિપત્ર/૨૩૯૭૪/૨૦૨૩
તા. ૧૪–૦૯–૨૦૨૩

કુલસચિવ

પ્રતિ,
૧) વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોના આચાર્યશ્રીઓ,
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વાણિજય વિદ્યાશાખા,
૩)પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ.ગુ.યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
NEP – 2020 GUIDED

SYLLABUS FOR ABILITY ENHANCEMENT COURSE (AEC)

ENGLISH PROFICIENCY AND LIFE SKILLS- I & II

FOR B.A/ B.COM. /B.SC. (REGULAR) SEMESTER I
FOR THE ACADEMIC YEARS 2023-24 TO 2025-26

B.A./ B.COM. /B.SC. SEM 1 : TEXT : ***English and Soft Skills*** **by S P Dhanavel (OB)**

Course Code	
Course Title	ENGLISH PROFICIENCY AND LIFE SKILLS - I
Credit	2
Teaching per-Week	2 hours
Minimum weeks per Semester	15 (including class work, examination, preparation, holidays etc.)
Effective From	July 2023
Purpose of Course	To prepare the young graduates for the job market today by boosting their linguistic competency and soft skills .
Course Objective	CO1: To encourage the all round development of students by focusing on Soft Skills . CO2 : To develop and nurture the Soft Skills of the students through individual and group activities. CO3 : To expose students to write attitudinal and behavioral aspects and build the same through various tasks and activities.
Course Outcomes	After completing the course the students would have : CO1: understood of what Soft Skills is . CO2: understood the significance of Soft Skills in the working environment. CO3: developed levels in their ability through soft skills.
Mapping between COs with PSOs	
Pre-requisite	Acquaintance with basic grammar and language skills

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

Dr.G.K.NANDA

Course Content	**TEXTBOOK: *English and Soft Skills* by S P Dhanavel (Orient Blackswan)** • Ch. 1.Listening Skills • Ch. 2.Teamwork Skills • Ch. 3.Emotional Intelligence Skills • Ch. 6.Problem – Solving Skills **Note 1.** Understanding the Story ,Vocabulary and Grammar ,Thinking about Soft Skills, Soft Skills from the Story, Proverbs on the Skills ,Soft Skills at workplace, Real life experiences -- these sections from the exercises are to be prepared for the Internal and University Exams. **2.** Understanding People , Places and events , Activity ,Self Assessment -- these sections may be used for homework/ Assignments for the holistic development of students.
Reference Books	1. *Building Soft Skills for Employability* by Tran Le Huu Nghia (Routledge) 2. *Soft Skills* by M. S. Rao (Motivational Press) 3. *Personality Development and Soft Skills* by Sikha Kapoor (Dreamtech Press) 4. *Soft Skills for Success* by G.R.K. Murty (Viva)
Teaching Methodology	Class work, Discussion, Self-Study, Assignment, Homework, Activity , Self- Assessment etc.
Evaluation Method	This course has 02 credits during the semester. The internal evaluation will be out of 25 marks, based on Unit Test marks, class and home assignments and attendance marks; while the external evaluation will be out of 25 marks at the university examination.

Dr.G.K.NANDA

Distribution of Marks for the University Examination as per NEP SOP

Q 1. MCQ from Understanding the Story (4/5)	04 Marks
Q 2. Case Study or Real life experience (1/2)	07 Marks
Q 3. **A.** Short answer type questions (2/4) 04 Marks (To be asked from 'Thinking about Soft Skills 'and 'Soft Skills at the Work Place') **B.** Expansion of an idea/ Proverb relating to soft skills (1/2) 03 Marks	07 Marks
Q 4. Grammar and Vocabulary (7/10)	07 Marks
Total	25 Marks

Dr.G.K.NANDA

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વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

–: પરિપત્ર :–

યુનિવર્સિટી ડિપાર્ટમેન્ટનાં વડાશ્રીઓ અને યુનિવર્સિટી કેમ્પસમાં ચાલતા સ્વનિર્ભર અભ્યાસક્રમનાં કો–ઓર્ડિનેટરશ્રીઓ તથા યુનિવર્સિટી સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી સ્નાતક કક્ષાના તમામ અભ્યાસક્રમો (જે વિદ્યાશાખામાં એપેક્ષ બોડીના નિયમો લાગુ પડતા હોય તે સિવાય) માટે અમલમાં આવનાર હિન્દુ સ્ટડીઝ અભ્યાસ સમિતિની તા.૨૭/૦૫/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ ૨ થી VACહેઠળ મંજૂર કરેલ Bharatiya Knowledge System - an Introduction (BKS) Sem-1નો રિવાઈઝ અભ્યાસક્રમ અંગે વિચારણા કરતા એકેડેમિક કાઉન્સિલની તા.૧૫/૦૮/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ ૯૮ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૧૫/૦૮/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ ૯૮

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી સ્નાતક કક્ષાના તમામ અભ્યાસક્રમો (જે વિદ્યાશાખામાં એપેક્ષ બોડીના નિયમો લાગુ પડતા હોય તે સિવાય) માટે અમલમાં આવનાર હિન્દુ સ્ટડીઝ અભ્યાસ સમિતિની તા.૨૭/૦૫/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ ૨ થી VAC હેઠળ મંજૂર કરેલ Bharatiya Knowledge System - an Introduction (BKS) Sem-1નો રિવાઈઝ અભ્યાસક્રમ મંજૂર કરવામાં આવે છે. તથા સેમે.–૧ માં ફરજીયાત પણે સદર અભ્યાસક્રમનો અમલ કરવાનો રહેશે, અન્ય વિકલ્પ આપી શકાશે નહી.

(બિડાણ : ઉપર મુજબ)

ક્રમાંક : એસ./પરિપત્ર/૧૨૮૦૦/૨૦૨૪
તા. ૧૯–૦૮–૨૦૨૪

કુલસચિવ

પ્રતિ,
૧) યુનિવર્સિટી સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓ,
૨) યુનિવર્સિટી ડિપાર્ટમેન્ટના વડાશ્રીઓ અને યુનિવર્સિટી કેમ્પસમાં ચાલતા સ્વનિર્ભર અભ્યાસક્રમનાં કો–ઓર્ડિનેટરશ્રીઓ.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી, સુરત.
૪) કો–ઓર્ડિનેટરશ્રી, IKS Centre - Centre for Hindu Studies, વી. ન. દ. ગુ. યુનિ. સુરત.

..... જાણ તથા ઘટતું થવા.

એકેડેમિક કાઉન્સિલ તા. 15-06-2024
બાબત....૧૪.....બિડાણ/પરિશિષ્ટ.....16.....

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Course: Bharatiya Knowledge Systems –an Introduction Semester: 1
Credits: 2, Hours: 40

યુનિટ	વિષય
૧	➢ ભારતનાં સ્વ નો સાક્ષાત્કાર . ➢ ગૌરવશાળી ભારત અને તેની જ્ઞાનપરંપરા. ➢ ભારતીય સંસ્કૃતિ અને જ્ઞાન પરંપરાનો વિશ્વસંચાર. ➢ ભારતનું વિશ્વને યોગદાન અને ભારતનાં વિજ્ઞાનની ઉજવળ પરંપરા.
૨	➢ ભારતીય વિચારનું વૈશિષ્ટ અને જીવનદૃષ્ટિ . ➢ ભારતીય જ્ઞાન પરંપરાની પ્રમુખ વિભાવનાઓ. ▪ પુનર્જન્મ ,કર્મનો સિદ્ધાંત ,સુખની અવધારનાં. ➢ ભારતીય જ્ઞાન પરંપરામાં સામાજીક દૃષ્ટિ. ▪ સહઅસ્તિત્વ ,ઉપાસનાનું વૈવિધ્ય ,પ્રકૃતિ અંગેના વિચાર. વસુધૈવ કુટુંબકમની વિભાવનાં અને' સર્વેભવંતું સુખીન'

ઉદ્દેશ્યો

- વિદ્યાર્થીઓમાં ભારતીય જ્ઞાન પ્રણાલીના પરિપ્રેક્ષ્ય ની સમજ કેળવાય અને તેના વિશે સ્વીકૃતિ નો ભાવ કેળવાય.
- વિદ્યાર્થીઓને ભારતના મૂળભૂત સત્વ નો ખ્યાલ સ્પષ્ટ થાય અને ભારતીય અસ્મિતા શું છે તેનાથી પરિચિત કરવા.
- આપણાં પરંપરાગત જ્ઞાન અને તેના ખ્યાલની સમજ કેળવવી.
- ભારતીય જ્ઞાન પ્રણાલી પર ચર્ચા, વિચારોનું આદાન-પ્રદાન અને જોડાણ માટે પ્લેટફોર્મ પૂરું પાડવા માટે.
- સમાજ અને શિક્ષણમાં ભારતીય જ્ઞાન પ્રણાલીઓની સમકાલીન સુસંગતતા અને આવશ્યકતા વિશે જાગ્રત કરવા.
- સમાજ અને શિક્ષણમાં ભારતીય જ્ઞાન પ્રણાલીઓની સમકાલીન સુસંગતતા અને આવશ્યકતા વિશે જાગ્રત કરવા.
- ભારતીય જ્ઞાનનાં રક્ષણની જરૂરિયાત વિષે અને તેનાં મહત્વને જાણવા પ્રત્યે સંવેદનશીલ માનસ કેળવવુ.

અધ્યયન નિષ્પત્તિ

- વિદ્યાર્થીઓમાં ભારતીય જ્ઞાન પ્રણાલીની મૂળભૂત બાબતોની સમજ અને કેળવાશે તથા તેની સુસંગતતા અને વિવિધ ક્ષેત્રોમાં તેની ઉપયોગીતા વિષયક જાગૃતિ આવશે.
- આ અધ્યયન સંબંધિત શૈક્ષણિક શાખાઓનાં ભાવી સંશોધનોમાં અને તેની વર્તમાન ઉપયોગીતામાં પણ પ્રેરણારૂપ થશે.
- IKS, વિદ્યાર્થીના સર્જનાત્મક કૌશલ્યને તથા નવિનનતમ વિચારને પ્રેરીત કરશે.
- વધુમાં, તે વિદ્યાર્થીઓને તેમનો આત્મવિશ્વાસ વધારવામાં મદદ કરશે.
- આ અધ્યયન દ્વારા વિદ્યાર્થી વધુ ખુલ્લા મન થી વિચારતો થશે તથા તેનામાં વધેલા આત્મવિશ્વાસથી તેમની સૌંદર્યલક્ષી સર્જનાત્મકતામાં વધારો થશે.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT.

BKS Syllabus for all UG Programmes Semester-1

Designed by,

Centre For Hindu Studies

भारतीय ज्ञान संपोषण केन्द्रम्,

वीर नर्मद दक्षिण गुजरात यूनिवर्सिटी, सूरत.

Veer Narmad South Gujarat University Surat

Year: 2024-25

Course: Bharatiya Knowledge Systems –an Introduction Semester: 1

Credits: 2, Hours: 30

Unit -1	**Bharatiya Knowledge Systems and Tradition**
	➢ Self – Revelation of Bharat. ➢ Knowledge Tradition of Glorious Bharat. ➢ The Sublime Journey of Bharatiya Culture & Civilization. ➢ Dissemination and contribution of Bharatiya Knowledge systems in the world Glorious tradition of Science and Art in Bharat.
Unit -2	**The Way of Life/ Jivan Darshan in Bharatiya Knowledge Systems**
	➢ Way of life as Bharatiya Knowledge Systems. ➢ The Implicit Concepts in Bharatiya Knowledge Systems. Birth, Death, Rebirth, Law of Karma, Idea of Sukhha, ➢ Social Viewpoint in Bharatiya Knowledge systems. ➢ Co - existence of Nature and Human Nature, Manifold Paths of Upasana, Value co-Existence- Ritam. ➢ Idea of Vasudhaivkutumbkam.

Objectives

- To uphold perspective and reception of the Indian knowledge system among the students.
- To acquaint students to the real essence of Bharat and what is actually Bharatiya Asmita.
- To cultivate the understanding of the concept of traditional knowledge and its importance among the students.

- To provide a platform for discussion, exchange of ideas, and engagement on the Indian knowledge system.
- To explore the contemporary relevance and application of Indian knowledge systems in society and academia.
- Creating sensitivity towards knowing the need and importance of protecting traditional knowledge.

Outcomes

- Students will have an understanding of the basics of the Indian knowledge system and its relevance and applications to various fields.
- This will ideally also inspire future research and applications of these systems in their respective academic disciplines.
- IKS can enhance a student's creative skills by allowing them to inculcate novel thought process.
- Additionally, it will help the students build their self-confidence.
- It will enhance their aesthetic creativity by nurturing them to be more open-minded and confident.

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University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

ક્રમાંક :ઓથો./પરિપત્ર/૪૧૫૭/૨૦૨૫
તા.૧૩/૦૨/૨૦૨૫

પ્રતિ,
વડાશ્રી,
બાયોટેકનોલોજી ડિપાર્ટમેન્ટ,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષયઃ– શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ ના અભ્યાસક્રમ બાબત.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ ના અભ્યાસક્રમ બાબતે બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૯/૦૧/૨૦૨૫ ની સભાના ઠરાવ ક્રમાંકઃ૦૪ થી નીચે મુજબ કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખા વતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૧૧/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૫૧ થી સ્વીકારી મંજુર કરેલ છે, જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

<u>બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૯/૦૧/૨૦૨૫ ની સભાના ઠરાવ ક્રમાંકઃ૦૪</u>

:: આથી ઠરાવવામાં આવે છે કે, બાયોટેકનોલોજી વિભાગમાં શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ નો આ સાથે સામેલ અભ્યાસક્રમ મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

<u>એકેડેમિક કાઉન્સિલની તા.૧૧/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ ૫૧</u>

:: આથી ઠરાવવામાં આવે છે કે, ડિપાર્ટમેન્ટ ઓફ બાયોટેકનોલોજી વિભાગમાં શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી અમલમાં આવનાર B.Sc. Food Technology સેમેસ્ટર–૧ અને ૨ ના અભ્યાસક્રમ બાબતે બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૨૯/૦૧/૨૦૨૫ ની સભાના ઠરાવ ક્રમાંકઃ૦૪ થી કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાવતી મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ સ્વીકારી મંજૂર કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

કુલસચિવ(ઇ/ા)

પ્રતિ,
૧) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા,
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....જાણ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

PROPOSAL to Start New Program at Department of Biotechnology

Bachelor of Science (B. Sc.) Program in

Food Technology

[3 years (Degree) & 4 years (Honours/Honours with Research)]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

B. Sc. Program in Food Technology-Major

Teaching & Evaluation Scheme Semester-I & II

[Academic Year of Implementation 2025-2026]

Semester - I

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours)	(CCE) Internal Marks	(SEE) External Marks		
FT-MJ-101	Food & Health: Bhartiya Heritage	3h	1:30h	37	38	70	3
FTP-MJ-101	Practical	2h	3h	12	13	25	1
FT-MJ-102	Introduction to Food Science & Technology	3h	1:30h	37	38	75	3
FTP-MJ-102	Practical	2h	3h	12	13	25	1
			Total	**98**	**102**	**200**	**8**

Semester - II

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours)	(CCE) Internal Marks	(SEE) External Marks		
FT-MJ-201	Ayurveda in Modern Food Science	3h	1:30h	37	38	70	3
FTP-MJ-201	Practical	2h	3h	12	13	25	1
FT-MJ-202	Molecular Food Composition I	3h	1:30h	37	38	75	3
FTP-MJ-202	Practical	2h	3h	12	13	25	1
			Total	**98**	**102**	**200**	**8**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-II: Course: FT-MJ-201 Ayurveda in Modern Food Science

<table>
<tr><td>Course Code</td><td colspan="2">FT-MJ-201</td></tr>
<tr><td>Course Title</td><td colspan="2">Ayurveda in Modern Food Science</td></tr>
<tr><td>Credits</td><td colspan="2">3</td></tr>
<tr><td>Course Level</td><td colspan="2">100-199</td></tr>
<tr><td>Total engagement</td><td colspan="2">3 Credits x 15 Hours = 45 Hours</td></tr>
<tr><td>Teaching per week</td><td colspan="2">3 h</td></tr>
<tr><td>Minimum weeks per semester</td><td colspan="2">15 weeks (Including classwork, examination, preparation & holidays)</td></tr>
<tr><td>Effective from</td><td colspan="2">2025-26</td></tr>
<tr><td>Purpose of Course</td><td colspan="2">This course will provide students with a comprehensive understanding of the integration of Ayurveda principles with modern food science promoting overall health and wellness.</td></tr>
<tr><td>Course Objectives</td><td colspan="2">This course aims to equip students with the knowledge and skills necessary to apply Ayurveda concepts in the context of contemporary nutrition and food therapeutics.</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">CO1: To introduce students to the history and principles of Ayurveda.
CO2: To explore the concept of diet in Ayurveda, including the classification of foods & dietary guidelines
CO3: To examine the intersection of Ayurveda and modern food science, focusing on food-based therapeutics and the scientific validation</td></tr>
<tr><td>Mapping between COs with PSOs</td><td colspan="2"><table><tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td><td>PSO7</td><td>PSO8</td></tr><tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table></td></tr>
<tr><td>Pre-requisite</td><td colspan="2">12th Pass from Science, Commerce & Arts Stream</td></tr>
<tr><td>Course Content</td><td>UNIT-1: History and Principles of Ayurveda.
Ayurveda-First Life Science & Human Potential, Five elements and man-man as microcosm, Human constitution-Understanding Tridosha, Vata constitution, Pitta constitution, Kapha constitution.</td><td>Teaching Hours: 15</td></tr>
<tr><td></td><td>UNIT-2: Concept of Diet in Ayurveda.
Food and its Healing process, Food-its properties and qualities, Compatibility and Incompatibility, General dietary guidelines, General concept of dining in Ayurveda.</td><td>Teaching Hours: 15</td></tr>
<tr><td></td><td>UNIT-3: Food based Therapeutics: Ayurveda and Modern Science.
Introduction, Food as antioxidants, Food based Therapeutics (Garlic, Ginger, Nutmeg, Onion, Black pepper, Chili, Red pepper, Tamarind, Turmeric, Star anise, Tulsi, Curry leaf, Bitter gourd, Lotus, Grapes), Medicated food.</td><td>Teaching Hours: 15</td></tr>
</table>

Reference Books	✓ Lad, V. (1984). *Ayurveda: The Science of Self-Healing*. Lotus Press ✓ Morrison, J. H. (1995). *The Book of Ayurveda: A Holistic Approach to Health and Longevity*. Simon & Schuster Inc. ✓ Rastogi, S. (2014). *Ayurvedic Science of Food and Nutrition*. Springer.
e-learning resources	www.carakasamhitaonline.com
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 50% SEE: External assessment based on semester end University examination

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-II: Course: FTP-MJ-201: Practical

Course Code	FTP-MJ-201
Course Title	**Practical : Ayurveda in Modern Food Science**
Credits	1
Course Level	100-199
Total engagement	1 Credits x 30 Hours = 30 Hours
Teaching per week	2h
Minimum weeks per semester	15 weeks (Including classwork, examination, preparation & holidays)
Effective from	2025-26
Purpose of Course	The course aims to bridge the gap between traditional Ayurvedic practices and contemporary scientific techniques, enabling students to develop practical skills and a deeper understanding of the integration of these two fields.
Course Objectives	To provide hands-on experience, application of theoretical knowledge in identifying, preparing Ayurvedic functional foods and understanding their health benefits.
Course Outcomes	CO1: To identify and document various Ayurvedic herbs and spices used in traditional medicine. CO2: To assess Prakriti, and create a meal plan following Ayurvedic dietary guidelines. CO3: To create awareness about *virudh* foods and prevent complications. CO4: To prepare common Ayurvedic formulations and understand their therapeutic benefits. CO5: To gain practical application of Ayurvedic principles in patient care and treatment.
Mapping between COs with PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								
CO3								
CO4								
CO5								

Pre-requisite	12th Pass from Science, Commerce & Arts Stream	
Course Content	1. Identify and document uses of various Ayurvedic herbs and spices used in traditional medicine. 2. Plan a balanced Ayurvedic diet based on individual Prakriti using a chart. 3. List combination of incompatible foods and mention their scientific reason. 4. Preparation of Ayurvedic formulation (Triphala Churna/Turmeric Milk/Herbal Tea) and document the therapeutic uses of it. 5. Visit to an Ayurvedic center/hospital/herbal garden.	Teaching Hours: 30

Reference Books	✓ Lad, V. (1984). *Ayurveda: The Science of Self-Healing*. Lotus Press ✓ Lad, U., & Lad, V. (1997). *Ayurvedic Cooking for Self-Healing*. The Ayurvedic Press. ✓ Morrison, J. H. (1995). *The Book of Ayurveda: A Holistic Approach to Health and Longevity*. Simon & Schuster Inc. ✓ Rastogi, S. (2014). *Ayurvedic Science of Food and Nutrition*. Springer.
e-learning resources	www.carakasamhitaonline.com
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 50% SEE: External assessment based on semester end University examination

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-II: Course: FT-MJ-202: Molecular Composition of Food-I

<table>
<tr><td>Course Code</td><td colspan="2">FT-MJ-202</td></tr>
<tr><td>Course Title</td><td colspan="2">Molecular Composition of Food-I</td></tr>
<tr><td>Credits</td><td colspan="2">3</td></tr>
<tr><td>Course Level</td><td colspan="2">100-199</td></tr>
<tr><td>Total engagement</td><td colspan="2">3 Credits x 15 Hours = 45 Hours</td></tr>
<tr><td>Teaching per week</td><td colspan="2">3 h</td></tr>
<tr><td>Minimum weeks per semester</td><td colspan="2">15 weeks (Including classwork, examination, preparation & holidays)</td></tr>
<tr><td>Effective from</td><td colspan="2">2025-26</td></tr>
<tr><td>Purpose of Course</td><td colspan="2">The purpose of the Molecular Composition of Food course is to explore the chemical properties and structures of essential food components. It aims to provide students with a deep understanding of how these molecules influence food quality, processing, and nutritional value.</td></tr>
<tr><td>Course Objectives</td><td colspan="2">The aim is to provide students with the knowledge and skills to analyze the chemical structures and functions of key food components. It aims to enhance understanding of how molecular properties impact food processing, preservation, and overall quality</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">CO1: Understand the molecular composition and chemical properties of key food components, including water, carbohydrates, and lipids, and their roles in food quality, texture, and nutrition.
CO2: Analyse the influence of water activity, carbohydrate types, and lipids on food spoilage, preservation, and processing methods such as frying, hydrogenation, and emulsification.
CO3: Apply knowledge of food chemistry to practical food processing techniques, including water binding in meat, lipid oxidation, and the use of emulsifiers in food products</td></tr>
<tr><td>Mapping between COs with PSOs</td><td colspan="2">
<table>
<tr><th></th><th>PSO1</th><th>PSO2</th><th>PSO3</th><th>PSO4</th><th>PSO5</th><th>PSO6</th><th>PSO7</th><th>PSO8</th></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Pre-requisite</td><td colspan="2">12th Pass from Science, Commerce & Arts Stream</td></tr>
<tr><td>Course Content</td><td>Unit 1: Introduction to Food Chemistry
What is food chemistry? History of food chemistry, Water, Freezing and Ice Structure, Water Activity and Food Spoilage, Water Activity and Packaging, Water Binding of Meat, Water Activity and Food Processing</td><td>Teaching Hours: 15</td></tr>
<tr><td></td><td>Unit 2: Carbohydrates
Introduction, Monosaccharides, Related Compounds, Oligosaccharides, Polysaccharides, Dietary Fibre</td><td>Teaching Hours: 15</td></tr>
</table>

	Unit 3: Lipids Classification, Unsaponifiable, Autoxidation, Photo oxidation, Heated Fats – Frying, Flavour Reversion, Hydrogenation, Interesterification, Fractionation, Cocoa Butter and Confectionery Fats, Emulsions and Emulsifiers	Teaching Hours: 15
Reference Books	✓ Fennema, O. R., Damodaran, S., & Parkin, K. L. (2007). Introduction to food chemistry. In *Fennema's Food Chemistry* (pp. 13-28). CRC Press. ✓ Belitz, H. D., Grosch, W., Schieberle, P., Belitz, H. D., Grosch, W., & Schieberle, P. (2004). *Food chemistry*.	
e-learning resources	✓ https://onlinecourses.swayam2.ac.in/cec20_ag10/preview ✓ https://elearning.icar.gov.in/eLearning_ContentDisplayUG.aspx?CourseCode=lRSZJqz2ljOe67w9qtsOuA==&CourseName=OdcisqqlKapSqbvXGQkQWf48goLsiUwCXfqXtpCSsQg= ✓ https://elearning.icar.gov.in/UserLogin.aspx ✓ http://ecoursesonline.iasri.res.in/mod/page/view.php?id=3971	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 50% SEE: External assessment based on semester end University examination	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Undergraduate Program in Food Technology (B. Sc.)
(3 Years Degree; 4 Years Honours/Honours with Research)

Semester-II: Course: FTP-MJ-202: Practical

Course Code	FTP-MJ-202
Course Title	**Practical : Molecular Composition of Food-I**
Credits	1
Course Level	100-199
Total engagement	1 Credits x 30 Hours = 30 Hours
Teaching per week	2h X 1 day = 2 h
Minimum weeks per semester	15 weeks (Including classwork, examination, preparation & holidays)
Effective from	2025-26
Purpose of Course	This course aims to equip students with practical skills in analyzing key food components. It focuses on determining moisture content using techniques like the hot air oven and Karl Fischer method, isolating starch, estimating reducing sugars, and assessing oil saponification. These methods provide foundational knowledge for food quality and safety evaluation
Course Objectives	This course aims to familiarize students with analytical techniques for evaluating food composition and quality. It focuses on methods like moisture analysis, starch isolation, reducing sugar estimation, and saponification value determination. The objective is to build essential skills for food quality control and research applications.
Course Outcomes	CO1: Demonstrate proficiency in determining the moisture content of solid and liquid foods using the hot air oven and Karl Fischer methods. CO2: Isolate starch from food samples and explain its role in food products. CO3: Accurately estimate reducing sugars in various food samples using standard techniques. CO4: Evaluate the saponification value of oils to assess their quality and applications. CO5: Apply analytical skills in food quality testing, ensuring safety and innovation in food science.
Mapping between COs with PSOs	<table><tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td><td>PSO7</td><td>PSO8</td></tr><tr><td>CO1-5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>
Pre-requisite	12th Pass from Science, Commerce & Arts Stream
Course Content	1. Determination of moisture content by hot air oven. 2. Determination of moisture content of liquid food by karl Fischer method. 3. Isolation of starch from food 4. Estimation of reducing sugar in food. 5. Determination of saponification of oil Teaching Hours: 30
e-learning resources	✓ https://www.researchgate.net/publication/281182948_Evaluation_of_Air_Oven_Moisture_Content_Determination_Procedures_for_Pearl_Millet_Pennisetum_glaucum_L ✓ https://onlinelibrary.wiley.com/doi/abs/10.1002/9780470027318.a8102
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment

Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

ક્રમાંક :ઓથો./પરિપત્ર/૬૬૨૩/૨૦૨૫
તા.૧૭/૦૩/૨૦૨૫

પ્રતિ,
વડાશ્રી,
બાયોટેકનોલોજી ડિપાર્ટમેન્ટ,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષયઃ– NEP-2020 મુજબ બી.એસસી.બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO સાથે CO નાં મેપિંગ અંગે.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, NEP-2020 મુજબ બી.એસસી.બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO સાથે CO નાં મેપિંગને મંજૂર કરવા અંગે ચર્ચા કરી બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ ૫ અન્વયે નીચે મુજબ કરેલ ભલામણ પર વિચારણા કરતા વિજ્ઞાન વિદ્યાશાખાની તા.૨૭/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૩૭ થી સ્વીકારી મંજૂર કરવા એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૦૪/૦૩/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૨૬ થી સ્વીકારી મંજુર કરેલ છે, જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

<u>બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ ૫</u>

:: આથી ઠરાવવામાં આવે છે કે, NEP-2020 મુજબ બી.એસસી.બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO અને CO સર્વાનુમતે મંજૂર કરી વિજ્ઞાનવિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

<u>વિજ્ઞાન વિદ્યાશાખાની તા.૨૭/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૩૭</u>

:: આથી ઠરાવવામાં આવે છે કે, બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ૫ અન્વયે કરેલ ભલામણ સ્વીકારી NEP-2020 મુજબ બી.એસસી. બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર–I થી IV ના અભ્યાસક્રમો માટે PSO અને CO સર્વાનુમતે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૪/૦૩/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૨૬

:: આથી ઠરાવવામાં આવે છે કે, NEP-2020 મુજબ બી.એસસી. બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO અને CO બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ૫ થી વિજ્ઞાન વિદ્યાશાખાને કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૨૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ૩૭ થી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ સ્વીકારી મંજૂર કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

કુલસચિવ

પ્રતિ,
૧) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા,
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત. .....જાણ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

In

Biotechnology

[3 years (Degree) & 4 years (Honours/Honours with Research)]

Program Specific Outcomes (PSOs):

1. PSO-01: Strong foundation in biological sciences: Students will have a comprehensive understanding of fundamental concepts in biology, genetics, microbiology, biochemistry, and molecular biology. This knowledge will provide a solid base for further specialization in biotechnology.
2. PSO-02: Practical laboratory skills: Learners will gain hands-on experience in various laboratory techniques and instrumentation commonly used in biotechnology research and industry. This includes DNA/RNA isolation & purification, DNA sequencing, protein purification, cell culture, genetic engineering, and bioinformatics.
3. PSO-03: Critical thinking and problem-solving abilities: Through coursework, projects, and research opportunities, students will develop analytical skills to identify and address scientific problems in the field of biotechnology. This involves experimental design, data analysis, and interpretation.
4. PSO-04: Knowledge of biotechnological techniques and applications: Students will learn about the latest advancements in biotechnology, including genetic engineering, gene therapy, bio-molecular engineering, biostatistics and synthetic biology. Learners understand how these techniques can be applied in various sectors such as healthcare, agriculture, environmental science and pharmaceuticals.
5. PSO-05: Research experience: Many programs offer research opportunities, allowing students to work on cutting-edge projects alongside faculty members or industry professionals. This hands-on research experience will enhance their understanding of scientific methodologies and foster innovation in biotechnology.
6. PSO-06: Communication and teamwork skills: Collaboration is an essential aspect of biotechnology. Through group projects, presentations, and scientific writing assignments, students will develop effective communication skills and the ability to work collaboratively with peers, scientists, and industry professionals.
7. PSO-07: Ethical considerations: Biotechnology has ethical implications, and learners will gain an understanding of the ethical, legal, and societal aspects associated with the field. This knowledge will help them make informed decisions and contribute responsibly to the biotechnology industry.
8. PSO-08: Entrepreneur Skill: In addition to scientific knowledge, the program may foster entrepreneurial skills and an entrepreneurial mind-set. This includes teaching learners how to identify market opportunities, develop business plans, understand intellectual property rights, and navigate the commercialization process for biotechnological innovations. These skills can empower students to turn scientific discoveries into viable products or services, start their own biotechnology venture, or contribute to the growth of existing biotech companies.

Overall, a 4-year undergraduate program in Biotechnology with honours & honours with research will equip student with a strong theoretical foundation, practical skills, and the ability to contribute to the advancement of biotechnology through research and innovation. It can prepare them for further academic pursuits, such as to provide a solid foundation for various career paths in biotechnology research, industry, or related fields.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty): Minor Elective

Teaching & Evaluation Scheme

Semester-I & II

[Academic Year of Implementation 2023-2024]

Semester-I

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-ME-101	Basics of Biochemistry	2	01:00	25	25	50	2
BTP-ME-101	Practical	4	06:00	25	25	50	2
	Total	**6**	07:00	**50**	**50**	**100**	**4**
BT-ME-102	Ecological Studies	2	01:00	25	25	50	2
BTP-ME-102	Practical	4	06:00	25	25	50	2
	Total	**6**	07:00	**50**	**50**	**100**	**4**

Semester-II

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-ME-201	Water Footprint	2	01:00	25	25	50	2
BTP-ME-201	Practical	4	06:00	25	25	50	2
	Total	**6**	07:00	**50**	**50**	**100**	**4**
BT-ME-202	Introduction to Developmental Biology	2	01:00	25	25	50	2
BTP-ME-202	Practical	4	06:00	25	25	50	2
	Total	**6**	07:00	**50**	**50**	**100**	**4**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty)

(3 Years B. Sc. Degree; 4 Years B. Sc. with Honours/Honours with Research)

Semester-II

Minor Elective: BT-ME-201: Water Footprint

Course Code	BT-ME-201
Course Title	**Water Footprint**
Credits	2
Course Level	100-199
Total engagement	2 Credits x 15 Hours = 30 Hours
Teaching per week	2 h
Minimum weeks per semester	15 weeks (Including classwork, examination, preparation & holidays)
Effective from	2023-2024
Purpose of Course	This course on "Water Footprint" aims to educate undergraduate science students on the intricacies of human-induced water consumption. By exploring the fundamentals of water footprint assessment, environmental impacts, and management strategies, students will gain a holistic understanding of the role of water in various sectors.
Course Objectives	1. Establish foundational knowledge on water footprint concepts and assessment tools. 2. Analyse the environmental impact of water use in agriculture, industry, and daily life. 3. Explore international water policies, governmental roles, and corporate responsibilities. 4. Investigate advanced topics such as water footprint in energy production and biodiversity implications. 5. Apply theoretical knowledge through practical projects and assessments.
Course Outcomes	CO1: Upon completion, students will possess a comprehensive understanding of water footprint dynamics, enabling them to assess and contribute to sustainable water management. CO2: They will develop critical thinking and problem-solving skills through hands-on projects, preparing them to address contemporary and future challenges related to water scarcity and environmental sustainability. The course equips students to become informed advocates for responsible water use in their scientific pursuits and broader societal roles.
Mapping between COs with PSOs	<table><tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td><td>PSO7</td><td>PSO8</td></tr><tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>
Pre-requisite	Biology, Environmental Science
Course Content	**UNIT-1: Fundamentals of Water Footprint** Introduction to Water Footprint, Water Footprint Assessment Tools, Environmental Impact of Water Use, Water Footprint in Daily Life, Water Footprint Policies and Management — Teaching Hours:15 **UNIT-2: Advanced Topics and Applications** Water Footprint in Energy Production, Water Footprint and Biodiversity, Future Challenges and Solutions, Group Projects and Presentations, Assessment and Evaluation — Teaching Hours: 15
Reference Books	• Arjen Y. Hoekstra, Ashok K. Chapagain, Maite M. Aldaya and Mesfin M. Mekonnen (2011) The Water Footprint Assessment Manual, Earthscan [ISBN: 978-1-84971-279-8] • M. M. Mekonnen and A. Y. Hoekstra (2011) National Water Footprint Accounts: The Green, Blue and Grey Water Footprint of Production and

	Consumption, UNESCO-IHE Institute of Water Education, Netherlands. • Winne Gerbens-Leenes, Arjen Y. Hoekstra and Theo H. van der Meer (2009) The water footprint of bioenergy, PNAS, Vol. 106, No. 25, 10219-10223.
e-learning resources	• https://www.chaitanyaproducts.com/blog/water-footprints-india-2019-is-it-sustainable/ • https://www.waterfootprint.org/water-footprint-2/what-is-a-water-footprint/
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

Minor Elective: BTP-ME-201 Practical

Course Code	BTP-ME-201
Course Title	**Practical: Water Footprint**
Credits	2
Course Level	100-199
Total Engagement	2 Credits x 30 Hours = 60 Hours
Teaching per week	4 h
Minimum weeks per semester	15 weeks (Including classwork, examination, preparation, holidays etc.)
Effective from	2023-2024
Purpose of Course	The Water Footprint Practical Course is designed to provide undergraduate science students with practical, hands-on experiences related to water footprint assessment and management. The course aims to deepen students' understanding of the impact of human activities on water resources and instil practical skills to address water-related challenges.
Course Objective	The Water Footprint Practical Course aims to equip undergraduate science students with hands-on skills and knowledge in water footprint assessment and management. Through practical exercises, students will gain proficiency in using calculators, conducting field analyses, and proposing sustainable solutions. The course fosters critical thinking about the environmental impact of human activities on water resources, empowering students to contribute to sustainable water management globally.
Course Outcomes	Upon completion of the Water Footprint Practical Course, students will: 1. Acquire proficiency in using water footprint calculators, enhancing quantitative analysis skills. 2. Demonstrate a comprehensive understanding of water use in agriculture and propose sustainable irrigation practices. 3. Apply water audit techniques to assess and improve industrial water management strategies. 4. Evaluate the water footprints of food products, making informed choices for personal and environmental sustainability. 5. Understand the environmental impact of the textile industry and recommend sustainable alternatives.

<table>
<tr><td></td><td>6. Compare and contrast the water footprints of energy sources, promoting awareness of renewable energy benefits.
7. Conduct biodiversity assessments and propose conservation measures for water ecosystems.
8. Simulate and analyse water scarcity scenarios, developing a holistic understanding of resource challenges.
9. Evaluate corporate water management practices, fostering an understanding of corporate responsibility.
10. Design, implement, and present water footprint reduction projects, showcasing practical problem-solving and communication skills.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td>
<table>
<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td><td>PSO7</td><td>PSO8</td></tr>
<tr><td>CO 1-10</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Pre-requisite</td><td>Biology, Environmental Science</td></tr>
<tr><td>Course Content</td><td>
1. Water Footprint Calculator Exploration (6 hours):
• Introduce students to various water footprint calculators.
• Guide them through the process of calculating personal and household water footprints.
• Discuss and compare results to understand the impact of daily activities.
2. Agricultural Water Use Analysis (6 hours):
• Conduct a field visit to a local farm or agricultural area.
• Measure and analyse water use in irrigation systems.
• Discuss sustainable agricultural practices to reduce water footprints.
3. Industry/Domestic/Corporate Water Audit (8 hours):
• Collaborate with local Institute/Organization for a water audit.
• Calculate the water footprint.
• Propose water-saving measures and assess their feasibility.
4. Food Consumption and Water Footprint (6 hours):
• Analyse food products' water footprints using life cycle assessments.
• Evaluate the impact of dietary choices on personal water footprints.
• Discuss strategies for sustainable and water-efficient food consumption.
5. Textile Industry Water Footprint (6 hours):
• Investigate water usage in the textile industry.
• Calculate the water footprint of a specific textile product.
• Explore textile sector to reduce water footprints.
6. Renewable Energy vs. Water Footprint (8 hours):
• Study the water footprints of different energy sources.
• Compare renewable and non-renewable energy options.
• Analyse the environmental implications of energy choices.
7. Biodiversity and Water Ecosystem Study (8 hours):
• Conduct a field visit to a local water ecosystem.
• Assess the impact of human activities on biodiversity.
</td></tr>
</table>

	• Propose measures to conserve water ecosystems and their biodiversity. **8. Water Scarcity Simulation (4 hours):** • Simulate water scarcity scenarios using a computer model. • Analyse the socio-economic impacts of water scarcity. • Discuss strategies for mitigating water scarcity challenges. **9. Corporate Water Footprint Analysis (6 hours):** • Collaborate with a local company for a water footprint analysis. • Evaluate corporate water management practices. • Suggest improvements for reducing the company's overall water footprint. **10. Water Footprint Reduction Project (8 hours):** • Divide students into groups to design water footprint reduction plans. • Implement projects based on real-world scenarios or hypothetical situations. • Present and discuss the effectiveness of the proposed solutions.
Reference Books	• Arjen Y. Hoekstra, Ashok K. Chapagain, Maite M. Aldaya and Mesfin M. Mekonnen (2011) The Water Footprint Assessment Manual, Earthscan [ISBN: 978-1-84971-279-8] • M. M. Mekonnen and A. Y. Hoekstra (2011) National Water Footprint Accounts: The Green, Blue and Grey Water Footprint of Production and Consumption, UNESCO-IHE Institute of Water Education, Netherlands. • Winne Gerbens-Leenes, Arjen Y. Hoekstra and Theo H. van der Meer (2009) The water footprint of bioenergy, PNAS, Vol. 106, No. 25, 10219-10223.
e-learning resources	• https://www.chaitanyaproducts.com/blog/water-footprints-india-2019-is-it-sustainable/ • https://www.waterfootprint.org/water-footprint-2/what-is-a-water-footprint/
Teaching Methodology	Laboratory work, Journal preparation
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

ક્રમાંક :ઓથો./પરિપત્ર/૬૬૨૩/૨૦૨૫
તા.૧૭/૦૩/૨૦૨૫

પ્રતિ,
વડાશ્રી,
બાયોટેકનોલોજી ડિપાર્ટમેન્ટ,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષયઃ– NEP-2020 મુજબ બી.એસસી.બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO સાથે CO નાં મેપિંગ અંગે.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, NEP-2020 મુજબ બી.એસસી.બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO સાથે CO નાં મેપિંગને મંજૂર કરવા અંગે ચર્ચા કરી બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ ૫ અન્વયે નીચે મુજબ કરેલ ભલામણ પર વિચારણા કરતા વિજ્ઞાન વિદ્યાશાખાની તા.૨૭/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૩૭ થી સ્વીકારી મંજૂર કરવા એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૦૪/૦૩/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૨૬ થી સ્વીકારી મંજુર કરેલ છે, જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

<u>બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ ૫</u>

:: આથી ઠરાવવામાં આવે છે કે, NEP-2020 મુજબ બી.એસસી.બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO અને CO સર્વાનુમતે મંજૂર કરી વિજ્ઞાનવિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

<u>વિજ્ઞાન વિદ્યાશાખાની તા.૨૭/૦૨/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૩૭</u>

:: આથી ઠરાવવામાં આવે છે કે, બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ૫ અન્વયે કરેલ ભલામણ સ્વીકારી NEP-2020 મુજબ બી.એસસી. બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર–I થી IV ના અભ્યાસક્રમો માટે PSO અને CO સર્વાનુમતે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૪/૦૩/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૨૬

:: આથી ઠરાવવામાં આવે છે કે, NEP-2020 મુજબ બી.એસસી. બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર– I થી IV ના અભ્યાસક્રમો માટે PSO અને CO બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ૫ થી વિજ્ઞાન વિદ્યાશાખાને કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૨૭/૦૨/૨૦૨૫ ની સભાનાં ઠરાવ ક્રમાંકઃ૩૭ થી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ સ્વીકારી મંજૂર કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

કુલસચિવ

પ્રતિ,
૧) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા,
૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત. .....જાણ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

In

Biotechnology

[3 years (Degree) & 4 years (Honours/Honours with Research)]

Program Specific Outcomes (PSOs):

1. PSO-01: Strong foundation in biological sciences: Students will have a comprehensive understanding of fundamental concepts in biology, genetics, microbiology, biochemistry, and molecular biology. This knowledge will provide a solid base for further specialization in biotechnology.
2. PSO-02: Practical laboratory skills: Learners will gain hands-on experience in various laboratory techniques and instrumentation commonly used in biotechnology research and industry. This includes DNA/RNA isolation & purification, DNA sequencing, protein purification, cell culture, genetic engineering, and bioinformatics.
3. PSO-03: Critical thinking and problem-solving abilities: Through coursework, projects, and research opportunities, students will develop analytical skills to identify and address scientific problems in the field of biotechnology. This involves experimental design, data analysis, and interpretation.
4. PSO-04: Knowledge of biotechnological techniques and applications: Students will learn about the latest advancements in biotechnology, including genetic engineering, gene therapy, bio-molecular engineering, biostatistics and synthetic biology. Learners understand how these techniques can be applied in various sectors such as healthcare, agriculture, environmental science and pharmaceuticals.
5. PSO-05: Research experience: Many programs offer research opportunities, allowing students to work on cutting-edge projects alongside faculty members or industry professionals. This hands-on research experience will enhance their understanding of scientific methodologies and foster innovation in biotechnology.
6. PSO-06: Communication and teamwork skills: Collaboration is an essential aspect of biotechnology. Through group projects, presentations, and scientific writing assignments, students will develop effective communication skills and the ability to work collaboratively with peers, scientists, and industry professionals.
7. PSO-07: Ethical considerations: Biotechnology has ethical implications, and learners will gain an understanding of the ethical, legal, and societal aspects associated with the field. This knowledge will help them make informed decisions and contribute responsibly to the biotechnology industry.
8. PSO-08: Entrepreneur Skill: In addition to scientific knowledge, the program may foster entrepreneurial skills and an entrepreneurial mind-set. This includes teaching learners how to identify market opportunities, develop business plans, understand intellectual property rights, and navigate the commercialization process for biotechnological innovations. These skills can empower students to turn scientific discoveries into viable products or services, start their own biotechnology venture, or contribute to the growth of existing biotech companies.

Overall, a 4-year undergraduate program in Biotechnology with honours & honours with research will equip student with a strong theoretical foundation, practical skills, and the ability to contribute to the advancement of biotechnology through research and innovation. It can prepare them for further academic pursuits, such as to provide a solid foundation for various career paths in biotechnology research, industry, or related fields.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty): Multidisciplinary Course

Teaching & Evaluation Scheme
Semester-I & II
[Academic Year of Implementation 2023-2024]

Semester-I

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-MDC-101	Basic Healthcare	4	2:00	50	50	100	4
	Total	**4**	2:00	**50**	**50**	**100**	**4**
BT-MDC-102	Introduction to Bioinformatics and Databases	4	2:00	50	50	100	4
	Total	**4**	2:00	**50**	**50**	**100**	**4**

Semester-II

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours: Minutes)	(CCE) Internal Marks	(SEE) External Marks		
BT-MDC-201	Evolutionary Biology	4	2:00	50	50	100	4
	Total	**4**	2:00	**50**	**50**	**100**	**4**
BT-MDC-202	Environmental Biology and Wildlife	4	2:00	50	50	100	4
	Total	4	2:00	**50**	**50**	**100**	**4**
BT-MDC-203	Basics of Bioinformatics	4	2:00	50	50	100	4
	Total	**4**	2:00	50	50	100	**4**
BT-MDC-204	Bioinstrumentation	4	2:00	50	50	100	4
	Total	4	2:00	**50**	**50**	**100**	**4**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program (Science Faculty)

(3 Years B. Sc. Degree; 4 Years B. Sc. with Honours/Honours with Research)

Semester-II

Multidisciplinary Course: BT-MDC-202: Environmental Biology and Wildlife

<table>
<tr><td>Course Code</td><td colspan="2">BT-MDC-202</td></tr>
<tr><td>Course Title</td><td colspan="2">Environmental Biology and Wild life</td></tr>
<tr><td>Credits</td><td colspan="2">4</td></tr>
<tr><td>Course Level</td><td colspan="2">100-199</td></tr>
<tr><td>Total engagement</td><td colspan="2">4 Credits x 15 Hours = 60 Hours</td></tr>
<tr><td>Teaching per week</td><td colspan="2">4 h</td></tr>
<tr><td>Minimum weeks per semester</td><td colspan="2">15 weeks (Including classwork, examination, preparation & holidays)</td></tr>
<tr><td>Effective from</td><td colspan="2">2023-2024</td></tr>
<tr><td>Purpose of Course</td><td colspan="2">The course "Environmental Biology and Wildlife" is designed to provide students with a comprehensive understanding of the interconnections between living organisms and their natural environment.</td></tr>
<tr><td>Course Objectives</td><td colspan="2">Through this course, students will explore the intricate relationships and ecological processes that shape the delicate balance of ecosystems. By merging principles from biology and ecology, students will develop a holistic perspective on environmental and the importance of wildlife diversity.</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">CO1: Students will be able to learn about scope and objectives of ecology.
CO2: Students will learn about conservation of natural resources.
CO3: Students will be familiar with different sources of energy.
CO4: Students will acquire knowledge of wild life conservation and its importance.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td colspan="2">
<table>
<tr><td></td><td>PSO1</td><td>PSO2</td><td>PSO3</td><td>PSO4</td><td>PSO5</td><td>PSO6</td><td>PSO7</td><td>PSO8</td></tr>
<tr><td>CO1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
</td></tr>
<tr><td>Pre-requisite</td><td colspan="2">Biology; Chemistry; Public Health; Ethics; Medical Terminology</td></tr>
<tr><td rowspan="3">Course Content</td><td>UNIT-1: Ecology and Environment
Definition and objectives of ecology, Subdivisions of ecology, Scope of ecology, Structural, Functional and Evolutionary concepts of ecology.</td><td>Teaching Hours: 10</td></tr>
<tr><td>UNIT-2: Ecology and Human Welfare
Conservation of natural resources, Energy and its conservation, Food, Agriculture and Aquaculture, Forestry.</td><td>Teaching Hours: 15</td></tr>
<tr><td>UNIT-3: Resources and energy
Introduction, Solar energy, wave and wind power, liquid hydrogen, energy plantations, liquid fuels from waste, biogas technology, biological conversion of waste.</td><td>Teaching Hours: 15</td></tr>
</table>

	UNIT-4: Wild-life Management Wild life of India, Reasons for depletion of wild life, Necessity for wild life conservation, Modes of wild life conservation, Conservation of flora and fauna-endangered species and forest resources.	Teaching Hours: 20
Reference Books	1. Verma PS and Agarwal PK (2015). Environmental Biology, S. Chand Publications, New Delhi. 2. Subrahmanyam NS and Sambamurty AVSS (2008). Ecology (Second Edition), Narosa Publishing House, New Delhi.	
e-learning resources	Biosphere (nationalgeographic.org)	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.	

Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

-: પરિપત્ર :-

વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન Microbiology વિષયનાં અભ્યાસક્રમ ચલાવતી તમામ કોલેજોનાં આચાર્યશ્રીઓને તથા ડિપાર્ટમેન્ટના વડાશ્રીને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૪–૨૫ થી અમલમાં આવેલ NEP-2020 અંતર્ગત વિજ્ઞાન વિદ્યાશાખાનાં સ્ટ્રકચર મુજબનો B.Sc. Microbiology Sem-1 & 2 નો Major, Minor, MDC અને SEC નાં અભ્યાસક્રમમાં પ્રેકટીકલનાં પેપરમાં સુધારા સાથે રિવાઈઝ કરેલ અભ્યાસક્રમ માઈક્રોબાયોલોજી વિષયની અભ્યાસ સમિતિની તા.૧૪/૦૫/૨૦૨૪ ની સભાનાં ઠરાવ ક્રમાંકઃ૦૩ થી મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વિજ્ઞાન વિદ્યાશાખા વતી વિજ્ઞાન વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણને એકેડેમિક કાઉન્સિલની તા.૦૧/૩/૨૦૨૪ની સભાનાં ઠરાવ ક્રમાંકઃ૧૦૪ અન્વયે માન. કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય ઈ.ચા.કુલપતિશ્રી ધ્વારા મંજૂર કરેલ છે. જેની આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./Microbio:ogy/સિલેબસ/પરિપત્ર/૧૫૦૯૨/૨૦૨૪
તા.૧૧–૦૭–૨૦૨૪

કુલસચિવ

પ્રતિ,

૧) વિજ્ઞાન વિદ્યાશાખા હેઠળની સંલગ્ન Microbiology વિષયનો અભ્યાસક્રમ ચલાવતી તમામ કોલેજોનાં આચાર્યશ્રીઓ તથા ડિપાર્ટમેન્ટનાં વડાશ્રી. .. ...આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા.
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....તરફ જાણ તેમજ અમલ સારૂ.

Veer Narmad South Gujarat University

Surat

B.Sc. (Microbiology) Semester I Syllabus

NEP

(Effective from June 2024)

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

B. Sc. MICROBIOLOGY

B. Sc. in Microbiology is a three-year Bachelor degree course which can be pursued after passing 12th Science. The subject includes the study of different forms of microorganisms and the development of microbiology. It mainly focuses on the understanding of the versatile metabolism of the varied microorganisms and the wide applicability of these life forms in environmental remediation, health and diseases, food and dairy as well as applying them for industrial and commercial utility. The course includes the study of allied subjects for the better understanding and use of microorganisms.

Program Outcome:

- ✓ Students shall learn various aspects of microbiology such as bacteriology, virology, algology, microbial physiology, bacterial genetics, immunology, biochemistry, rDNA technology.
- ✓ Students shall gain knowledge of applied microbiology such as industrial microbiology, environmental microbiology, industrial microbiology, food and dairy microbiology.
- ✓ Students shall learn about the presence of microorganisms in air, water, soil and its role in developing a sustainable environment.
- ✓ Students shall acquire the awareness regarding the importance of microorganisms in plant, animal, human health and diseases.
- ✓ Students shall gain knowledge of microbial technology and its applications in the production of industrially important microbial products.
- ✓ Students shall become aware of the role of microbes in the development of molecular biology and the advancements in genetic modifications technologies.
- ✓ Generate skilled manpower ready to use by industries in various sectors.

Program specific outcome:

- ✓ Students will develop the skill to observe, isolate, identify and cultivate microorganisms.
- ✓ Students will acquire and demonstrate proficiency in good laboratory practices in microbiology laboratories.
- ✓ Students will develop practical skills of tools and techniques used to study microbiology.
- ✓ Students will develop oral and written communication skills, effective presentation skills and interpretation skills from observed results.
- ✓ Students will be graduates in microbiology who shall understand the societal problems and play a vital role by providing microbial solutions.
- ✓ Students will be able to build their careers in public and global health, environmental organizations, food, pharmaceuticals and fermentation industries.



Veer Narmad South Gujarat University

Surat

B.Sc. (Microbiology) Semester II Syllabus

NEP

(Effective from June, 2024)

Course code	Course Title	Course credit	Teaching schedule Hrs./ week	External marks	Internal marks	Total marks	Duration of external exams (h)
MB-ME-202	Atypical Prokaryotes	02	2	25	25	50	01:00
MBP-ME-202	Atypical Prokaryotes Practicals	02	4	25	25	50	04:00
Total				50	50	100	

MULTIDISCIPLINARY COURSE (MDC): CREDIT 04 (THEORY)

Course code	Course Title	Course credit	Teaching schedule Hrs./ week	External marks	Internal marks	Total marks	Duration of external exams (h)
MB-MDC-201	Remedies of Environment Pollution	04	04	50	50	100	02:00

SKILL ENHANCEMENT COURSE (SEC): CREDIT 02 (01 THEORY + 01 PRACTICALS)

Course code	Course Title	Course credit	Teaching schedule Hrs./ week	External marks	Internal marks	Total marks	Duration of external exams (h)
MB-SEC-201	Conventional Methods for Identification of Bacteria	01	01	13	13	26	00:30
MBP-SEC-201	Practicals	01	02	12	12	24	02:00
Total				25	25	50	

OR

4. Student Learning Outcomes:

- ✓ Student will gain knowledge of air pollution causes and Air Pollution Control equipment and systems.
- ✓ Student will gain knowledge of water pollutants and control technologies.
- ✓ Student will gain knowledge of soil pollution and remediation techniques for soil pollution removal.

Recommended Learning Resources:

- ➢ The Science of Environmental Pollution. Frank R. Spellman, second edition, CRC Press Taylor & Francis. ISBN: 978-1-4398-1302-7
- ➢ Pollution Causes, Effects and Control, 5th Edition, R M Harrison. RSC publication, ISBN: 978-1-84973-648-0

SKILL ENHANCEMENT COURSE

MB-SEC-201

CONVENTIONAL METHODS FOR IDENTIFICATION OF BACTERIA

1. Course Description:

Course code: MB-SEC-201
Course Title: Conventional Methods for Identification of Bacteria
Course type: Skill based
Course credits: 01+01

2. Course overview:

This course is mainly designed to study the different isolation techniques for pure cultures as well as mixed cultures. In order to identify and classify an unknown microorganism it is first necessary to learn the characteristics of different microorganisms. Techniques included in this course help us to do so.

Course Objectives:

- ✓ To introduce students to different isolation techniques.
- ✓ To study morphological, growth, colonial, nutritional and biochemical characteristics of different bacteria.
- ✓ To bring awareness in students about the Culture Collection Centers.
- ✓ To study how to maintain and preserve cultures.

3. Course Content:

UNIT 1	Introduction to Bacterial Cultures
1.1	Pure Culture
1.2	Mixed Culture
1.3	Origin of pure culture technique
1.4	Techniques for Isolation
	1.4.1. Streak plate
	1.4.2. Pour plate
	1.4.3. Spread plate
	1.4.4. Serial dilution
1.5	1.4.5. Enrichment culture technique
1.6	Single cell isolation
1.7	Isolation of anaerobe

UNIT 2	Study of pure cultures
2.1	Morphological characterization
2.2	Cultured characterization
	2.2.1. Colony Characteristics on solid media
	2.2.2. Growth Characteristics on liquid media
	2.2.3. Growth Characteristics on agar slants
	2.2.4. Growth Characteristics on agar stabs
2.3	Nutritional requirements and Biochemical characteristics
2.4	Culture collection Centers
	2.4.1. Role of culture collection centers
	2.4.2. Worldwide status of culture collection centers
	2.4.3. Some Important culture collection centers
2.5	Maintenance and preservation of cultures

MBP-SEC-201

CONVENTIONAL METHODS FOR IDENTIFICATION OF BACTERIA PRACTICALS

1. Techniques for isolations and identification of microorganisms
   a) Streak plate technique
   b) Pour plate technique
   c) Spread plate technique

2. Techniques for cultivation of bacteria
   a) Broth cultivation
   b) Stab cultivation
   c) Slant cultivation

3. Cultivation of anaerobic bacteria
4. Isolation of bacteria by loop dilution technique

4. Students learning outcome.

- ✓ Students are introduced to different types of bacterial cultures and techniques for isolation, which is a basic requirement for a microbiology student.
- ✓ Different Pure culture characteristics are also introduced in this course which can help later to identify organisms that can be used for medical purpose, Industrial purpose and Food technology.

Recommended Learning Resources:

- Modi H. A. (2014), A handbook of elementary microbiology, Shanti Prakashan, (ISBN: 978-93-5070-1010)
- Cappuccino J. G. (2016) Microbiology; A laboratory manual, 11th Edition. Pearson Education (Singapore) Pvt. Ltd., (ISBN: 978-9332535190)
- Tortora G.J. and Funke B.R. (2016), Microbiology an Introduction, 12th Edition Pearson (ISBN: 9781292099149)
- Pelczar, chan and Krieg (2001), Microbiology-concepts and Application, 5th Edition, McGraw-Hill, (ISBN: 9780074623206)
- Patel R. J. and Patel R. K. (2016) Experimental microbiology Volume I, 9th Edition. Aditya.

MB-SEC-202

MAINTENANCE OF LABORATORY EQUIPMENT

1. Course Description:

Course code: MB-SEC-202
Course title: Maintenance of Laboratory Equipment
Course type: Skill based Course
Course credits: 02

2. Course overview:

The paper focuses on various maintenance aspects of microbiology laboratory equipment such as pH meter, weigh balance, biological safety cabinet, centrifuge, microscope, incubator.

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VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227148, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

સંદર્ભ: (૧) યુનિવર્સિટી પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૧૬૩૪૫/૨૦૨૩, તા.૦૧/૦૭/૨૦૨૩
(૨) યુનિવર્સિટી પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૨૧૫૪૨/૨૦૨૩, તા.૧૮/૦૮/૨૦૨૩
(૩) યુનિવર્સિટી પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૨૩૧૫૪/૨૦૨૩, તા.૦૪/૦૯/૨૦૨૩

-: પરિપત્ર :-

વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, NEP 2020 અંતર્ગત શિક્ષણ વિભાગના તા.૧૧/૦૭/૨૦૨૩ ના ઠરાવ અન્વયે,શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર અંગ્રેજી વિષયના F.Y.B.Com.Sem- 1 & 2 ના AEC અને SEC ના અભ્યાસક્રમના પ્રશ્નપત્રના માળખા અને ગુણોની ફાળવણીમાં જરૂરી સુધારા વધારા અંગે અંગ્રેજી વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ અભ્યાસ સમિતિવતી મંજૂર કરી વાણિજય વિદ્યાશાખાને કરેલ ભલામણ વાણિજય વિદ્યાશાખાના અધ્યક્ષશ્રીએ વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વાણિજય વિદ્યાશાખાવતી વાણિજય વિદ્યાશાખાના અધરધેન ડીનશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૦૭/૦૮/૨૦૨૩ ની સભાના ઠરાવ ક્રમાંકઃ ૯૯ અન્વયે માન.કુલપતિશ્રીને આપેલ સત્તા અંતર્ગત માનનીય કુલપતિશ્રી દ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા ઉપરોકત પરિપત્ર ક્રમાંકઃએસ./પરિપત્ર/૨૩૧૫૪/૨૦૨૩, તા.૦૪/૦૯/૨૦૨૩ થી જાણ કરવામાં આવેલ છે.

વધુમાં શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર અંગ્રેજી વિષયના F.Y.B.Com.Sem- 1, 2 & 3 ના Multidisciplinary ના અભ્યાસક્રમ અને પ્રશ્નપત્રના માળખાને અંગ્રેજી વિષયની અભ્યાસ સમિતિ વતી અંગ્રજી વિષયની અભ્યાસ સમિતિના ચેરમેનશ્રીએ મંજૂર કરી વાણિજય વિદ્યાશાખાને કરેલ ભલામણ વાણિજય વિદ્યાશાખાની મંજૂરીની અપેક્ષાએ વાણિજય વિદ્યાશાખા વતી વાણિજય વિદ્યાશાખાનાં અધરધેન ડીનશ્રીએ મંજૂર કરેલ છે જેમાં F.Y.B.Com.Sem- 1, 2 & 3 ના Multidisciplinary ના અભ્યાસક્રમ એકેડેમિક કાઉન્સિલની તા.૧૭/૦૮/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંકઃ ૨૨ થી મંજૂર કરેલ છે. અને પ્રશ્નપત્રનું માળખું એકેડેમિક કાઉન્સિલની તા.૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંકઃ ૯૯ થી એકેડેમિક કાઉન્સિલ વતી મંજૂર કરવા આપેલ સત્તાની રૂએ માનનીય કુલપતિશ્રી ધ્વારા મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

ક્રમાંક : એસ./પરિપત્ર/૨૩૯૭૪/૨૦૨૩
તા. ૧૪–૦૯–૨૦૨૩

કુલસચિવ

પ્રતિ,
૧) વાણિજય વિદ્યાશાખા હેઠળની સંલગ્ન તમામ કોલેજોના આચાર્યશ્રીઓ,
..... આપશ્રીની કોલેજના સંબંધિત શિક્ષકોને જાણ કરી અમલ કરવા સારૂ.
૨) અધ્યક્ષશ્રી, વાણિજય વિદ્યાશાખા,
૩)પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ.ગુ.યુનિવર્સિટી, સુરત.
.....તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY
NEP – 2020 GUIDED

SYLLABUS FOR ABILITY ENHANCEMENT COURSE (AEC)

ENGLISH PROFICIENCY AND LIFE SKILLS- II

FOR B.A/ B.COM. /B.SC. (REGULAR) SEMESTER II
FOR THE ACADEMIC YEARS 2023-24 TO 2025-26

B.A./ B.COM. /B.SC. SEM 2 : TEXT : ***English and Soft Skills*** **by S P Dhanavel (OB)**

Course Code	
Course Title	ENGLISH PROFICIENCY AND LIFE SKILLS- II
Credit	2
Teaching per Week	2 hours
Minimum weeks per Semester	15 (including class work, examination, preparation, holidays etc.)
Effective From	July 2023
Purpose of Course	To prepare the young graduates for the job market today by boosting their linguistic competency and soft skills .
Course Objective	CO1: To encourage the all round development of students by focusing on Soft Skills . CO2 : To develop and nurture the Soft Skills of the students through individual and group activities. CO3 : To expose students to write attitudinal and behavioral aspects and build the same through various tasks and activities.
Course Outcomes	After completing the course the students would have : CO1: understood of what Soft Skills is . CO2: understood the significance of Soft Skills in the working environment. CO3: developed levels in their ability through soft skills.
Mapping between COs with PSOs	
Pre-requisite	Acquaintance with basic grammar and language skills

	PSO1	PSO2	PSO3	PSO4	PSO5
CO1					
CO2					
CO3					

Dr.G.K.NANDA

Course Content	**TEXTBOOK:** ***English and Soft Skills*** **by S P Dhanavel (Orient Blackswan)** • Ch. 4. Assertive Skills • Ch. 5. Learning Skills • Ch. 8. Adaptability Skills • Ch. 9. Non – Verbal Communication Skills **Note 1.** Understanding the Story ,Vocabulary and Grammar ,Thinking about Soft Skills, Soft Skills from the Story, Proverbs on the Skills ,Soft Skills at workplace, Real life experiences – these sections from the exercises are to be prepared for the Internal and University Exams. **2.** Understanding People , Places and events , Activity ,Self Assessment – these sections may be used for homework/ Assignments for the holistic development of students.
Reference Books	5. *Building Soft Skills for Employability* by Tran Le Huu Nghia (Routledge) 6. *Soft Skills* by M. S. Rao (Motivational Press) 7. *Personality Development and Soft Skills* by Sikha Kapoor (Dreamtech Press) 8. *Soft Skills for Success* by G.R.K. Murty (Viva)
Teaching Methodology	Class work, Discussion, Self-Study, Assignment, Homework, Activity , Self- Assessment etc.
Evaluation Method	This course has 02 credits during the semester. The internal evaluation will be out of 25 marks, based on Unit Test marks, class and home assignments and attendance marks; while the external evaluation will be out of 25 marks at the university examination

Distribution of Marks for the University Examination as per NEP SOP

Q 1. MCQ from Understanding the Story(4/5)	04 Marks
Q 2. Case Study or Real life experience (1/2)	07 Marks
Q 3. A. Short answer type questions (2/4) 04 Marks (To be asked from 'Thinking about Soft Skills 'and 'Soft Skills at the Work Place') B. Expansion of an idea/ Proverb relating to soft skills (1/2) 03 Marks	07 Marks
Q 4. Grammar and Vocabulary (7/10)	07 Marks
Total	25 Marks

Dr.G.K.NANDA

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VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

–: પરિપત્ર :–

યુનિવર્સિટી સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓ, ડિપાર્ટમેન્ટનાં વડાશ્રીઓ તથા યુનિવર્સિટી કેમ્પસમાં ચાલતા સ્વનિર્ભર અભ્યાસક્રમનાં કો–ઓર્ડિનેટરશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૫–૨૬ થી NEP-2020 અંતર્ગત વિવિધ વિદ્યાશાખાનાં સ્નાતક કક્ષાના તમામ અભ્યાસક્રમોમાં (એપેક્ષ બોડી સિવાયના) એકેડેમિક કાઉન્સિલની તા.૦૫/૦૫/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ૭૪ થી નીચે મુજબ ઠરાવેલ છે, જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૫/૦૫/૨૦૨૫ની ઠરાવ ક્રમાંકઃ ૭૪

:: આથી ઠરાવવામાં આવે છે કે, યુનિવર્સિટીના વિભાગ/ સંલગ્ન કોલેજ દ્વારા વિદ્યાર્થીઓને વિવિધ વિદ્યાશાખાનાં સ્નાતક કક્ષાના તમામ અભ્યાસક્રમોમાં (એપેક્ષ બોડી સિવાયના) સેમેસ્ટર–૧ માં VAC હેઠળ ભારતીય જ્ઞાન પરંપરા પરિચય તથા સેમેસ્ટર–૨ માં VAC હેઠળ એન્વાયરમેન્ટ એજયુકેશન અભ્યાસક્રમ ફરજીયાત પણે આપવાના રહેશે. તેમજ સેમેસ્ટર–૩ માં VAC-ભારતીય જ્ઞાન પરંપરા(IKS) અને સેમ. ૪ માં VAC માં સંબંધિત અભ્યાસ સમિતિ દ્વારા બાસ્કેટમાં સમાવેશ કરેલ વિવિધ અભ્યાસક્રમો પૈકીના અભ્યાસક્રમો VAC હેઠળ આપવાનાં રહેશે.

વધુમાં, બોર્ડ ઓફ ડીન્સની તા.૦૫/૦૪/૨૦૨૫ની સભાનાં ઠરાવ ક્રમાંકઃ ૨ અનુસાર NEP-2020 અંતર્ગત યુનિવર્સિટીના વિભાગ / સંલગ્ન કોલેજનાં વિદ્યાર્થીઓએ સ્નાતક કક્ષાએ ત્રીજા વર્ષ દરમ્યાન ૧૨૦ કલાકની ઈન્ટર્નશીપ પૂર્ણ કરવાની રહેશે.

(બિડાણ : ઉપર મુજબ)

ક્રમાંક : ઓથો./પરિપત્ર/૧૩૪૬૬/૨૦૨૫
તા.૨૮–૦૫–૨૦૨૫

કુલસચિવ

પ્રતિ,
૧) યુનિવર્સિટી સંલગ્ન તમામ કોલેજોનાં આચાર્યશ્રીઓ,
૨) યુનિવર્સિટી ડિપાર્ટમેન્ટના વડાશ્રીઓ અને યુનિવર્સિટી કેમ્પસમાં ચાલતા સ્વનિર્ભર અભ્યાસક્રમનાં કો–ઓર્ડિનેટરશ્રીઓ.
૩) ડીનશ્રીઓ– તમામ વિદ્યાશાખા.
૪) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી, સુરત.
૫) કો–ઓર્ડિનેટરશ્રી, IKS Centre - Centre for Hindu Studies, વી. ન. દ. ગુ. યુનિ. સુરત.

..... જાણ તથા ઘટતું થવા.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Programme
Value Added Course
Environment - I
Semester- II
[3 Years (Degree) &
4 Years (Honours/Honours with Research)]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Programme
B.A./B.Com./B.Sc./BRS/BSW
Value Added Course

Environment - I

Teaching & Evaluation Scheme
Semester- II

[Academic Year of Implementation 2025-2026]

Semester-2

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours)	(CCE) Internal Marks	(SEE) External Marks		
ZO – VAC ENV - 201	ENVIRONMENT - I	2	1:00	25	25	50	2
			Total	**25**	**25**	**50**	**2**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program, Value Added Course

(B.A./B.Com./B.Sc./BRS/BSW)

(3 Years Degree; 4 Years Honours/Honours with Research)

SEMESTER – 2 Course: ZO – VAC –ENV – 201, ENVIRONMENT - I

Name of Program	B.A./B.Com./B.Sc./BRS/BSW
Objective of Program	The Environmental Science program aims to equip students with an understanding of ecosystems, human-environment interactions, and current environmental challenges. It emphasizes critical thinking, sustainable solutions, and the application of scientific methods to address issues like climate change and resource management. Students are also encouraged to engage in environmental advocacy and promote ethical responsibility toward sustainability.
Program Outcome	**PO-01:** Scientific Knowledge & Conceptual Understanding: Develop a strong foundation in scientific principles, theories and concepts across disciplines, fostering interdisciplinary learning, advance knowledge and problem-solving abilities. **PO-02:** Analytical & Critical Thinking: Apply critical thinking and analytical reasoning to evaluate scientific data, hypotheses and real-world problems, leading to evidence-based conclusions. **PO-03:** Research & Inquiry-based Learning: Develop investigative skills through experimentation, data analysis and scientific inquiry to contribute to research and innovation. **PO-04:** Laboratory & Technical Skills: Gain hands-on experience with laboratory techniques, instrumentation and computational tools relevant to scientific research and industry applications. **PO-05:** Digital & Computational Literacy: Utilize digital tools, computational techniques and emerging technologies such as AI, bioinformatics and statistical modelling to enhance scientific learning and problem-solving. **PO-06:** Environmental & Societal Responsibility: Understand the role of science in addressing environmental, health and societal challenges, promoting sustainability and ethical responsibility. **PO-07:** Effective Communication & Collaboration: Develop proficiency in scientific communication, both written and oral, for effective dissemination of knowledge while collaborating in multidisciplinary teams. **PO-08:** Innovation & Entrepreneurship: Foster an entrepreneurial mind-set by applying scientific knowledge for innovation, technology development, and industry-oriented applications. Develop sustainable solutions to address real-world challenges in research and environmental management. **PO-09:** Lifelong Learning & Professional Growth: Cultivate curiosity and adaptability for continuous learning, equipping students for higher

	education, research, and professional careers. **PO-10:** Ethical Leadership & Value-based Education: Develop leadership qualities, ethical values, and a sense of responsibility in applying science for societal progress, aligning with Indian knowledge systems and global perspectives.
Program Specific Outcomes	**1. Remembering (Knowledge)** **PSO1:** Recall fundamental concepts of environmental science, including ecosystems, biodiversity, and conservation. Identify key environmental issues, such as climate change, pollution, and deforestation. **2. Understanding (Comprehension)** **PSO2:** Explain the relationships between human activities and environmental impacts. Interpret environmental data, including graphs, charts, and maps. **3. Applying (Application)** **PSO3:** Apply environmental principles to real-world scenarios, such as sustainable development and environmental policy. Use environmental concepts to analyze case studies and propose solutions. **4. Analyzing (Analysis)** **PSO4:** Break down complex environmental issues into component parts and evaluate the relationships between them. Critique environmental policies and management strategies. **5. Evaluating (Synthesis)** **PSO5:** Design and propose environmental solutions, including sustainable practices and conservation strategies. Evaluate the effectiveness of environmental policies and programs. **6. Creating (Evaluation)** **PSO6**: Develop innovative approaches to environmental problem-solving, including the use of technology and interdisciplinary collaboration. Communicate environmental information effectively to diverse audiences.

Course code	ZO – VAC – ENV – 201
Course title	ENVIRONMENT - I
Course level	100-199
Credit	02
Total engagement	2 Credits X 15 hrs. = 30 hrs
Teaching per week	02 hrs.
Minimum weeks per semester	15 weeks
Effective from	2025-26

<table>
<tr><td>Purpose of course</td><td>The course aims to provide students with a comprehensive understanding of environmental systems, challenges, and the impact of human activities on the environment.</td></tr>
<tr><td>Course objective</td><td>Examine ecological principles and the relationships between organisms and their environments.
Analyze current environmental issues such as climate change, pollution, and resource depletion.
Promote sustainable practices and solutions for environmental preservation and conservation.</td></tr>
<tr><td>Course outcomes</td><td>CO1: Program Outcome of learning environment studies aims to enlighten the students to realize our prime social responsibility to conserve our environment in the face of increasing human population and anthropogenic activities which is the major cause of depletion of environmental resources and ecological balance.
CO2: An Environmental Studies major will be able to apply lessons from various courses through field experiences. These experiences will allow students to develop a better sense of not only individual organisms, but of the systems in which these organisms live. Students will also see how natural systems and human-designed systems work together, as well as in conflict with each other.
CO3: An Environmental Studies major will be able to do independent research on human interactions with the environment.
CO4: Developing values and attitudes towards comprehending intricate environmental economic-social issues and actively taking part in resolving present environmental issues and averting those that arise in the future.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td>
<table>
<tr><th></th><th>PSO1</th><th>PSO2</th><th>PS03</th><th>PSO4</th><th>PSO5</th><th>PSO6</th></tr>
<tr><td>CO1</td><td>✓</td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO2</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>CO3</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>CO4</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>
</td></tr>
<tr><td>Pre-requisite</td><td>Biology</td></tr>
<tr><td>Course content</td><td>UNIT: 1 Introduction to Environment and Environmental Studies
1.1.1 Definition and Components of Environment
1.1.2 Relationship between the different components of Environment
1.1.3 Man and Environment relationship
1.1.4 Impact of technology on Environment
1.1.5 Environmental Degradation
1.1.6 Multidisciplinary nature of the Environment studies
1.1.7 Its scope and importance in the present day Education System
UNIT: 2Natural Resources
2.1.1 Renewable and Non-renewable resources, exploitation and</td></tr>
</table>

	conservation, Role of individual in conservation of natural resources. 2.1.2 Water resources: Water sources Surface and Ground water sources, Indian and Global Scenario. 2.1.3 Land as a resource, social issues 2.1.4 Forest resources: Definition and Classification of Forests Ecological and Economic importance and benefits of forest, Indian scenario, Deforestation: causes and effects remedial measures. 2.1.5 Food resources: Sources of food, Global and Indian food demand scenario, Limits of food production, Environmental effect of Agriculture.
Reference books	• Agarwal, K.C.: 2001 Environmental Biology. Nidi publication Ltd., Bikaner. (TB) • BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt.Ltd. Ahmedabad -380013. India. • Brunner R.C., 1989, Hazardous West incineration, McGraw Hill Inc.480p. (R) • Clark R.S.Marine Pollution, Clanderson Press Oxford (TB) • Cunningham, W.P.Cooper, T.H.Grohani, E. & Hepworth, M.T. 2001, Environmental Encyclopedia,Jaico Pub. House, Mumbai, 1196p. (R) • De A.K., Environmental Chemistry. Wiley Eastern Ltd. (R) • Down to Earth, Centre for Science and Environment (R) • Gleick, H.P., 1993. Water in criss. pacific Institute for Studies in Dev. Environment & Security. • Stockholm Env. Institute. Oxford Univ. Press. 473p. (R) • Hawkins, R.E., Encyclopedia of Indian Natural History. Bombai Natural History Society, • Heywood, V.H. &Waston R.T. 1995, Global Biodiversity Assessment. Cambridge Univ. Press.1140p. (R) • Jadhav, H &Bhonsale, V.M. 1995. Environmental Protection and Laws. Himalaya Pub. House,Delhi. 284p. (R) • Mckinne, M.L. &Schoel R.M. 1996. Environmental Science System & Solutions, Web enhancededition. 639p.(R) • Mhaskar A.K. Matter Hazardous, Techno-Science Publication (TB) • Miller T.G. Jr. Environmental Science. Wadsworth Publishing Co., (TB) • Odum, E.P.1971. Fundamentals of Ecology. W.B. Saunders Co. USA. 574p. (R) • Rao M.N &Datta, A.K. 1987. Water treatment. Oxford & IBH Publ. Co. Pvt. Ltd. 345p. (R)

	• Sharma, B.K. 2001. Environmental Chemistry. Goel Publ. House, Meerut. (TB) • Survey of Environmental. The Hindu @ • Townsend C., Harper J, and Michael Begon. Essentials of Ecology. Blackwell Science (TB). • Trivedi R.K. Handbook of Environmental Laws, Rules, Guidelines, Compliances Publications (TB). • Trivedi R.K. and P.K. Goel, Introduction to air pollution. Techno-Science Publications (TB). • Wagner K.D. 1998. Environmental. W.B. Saunders Co. Philadelphia, USA. 499p. (R)
e-learning resources	Sawyam Portal
Teaching methodology	Class work, Discussion, Self Study, Projects, Seminars or / and Assignment

Re-Accredited 'B++' 2.86 CGPA by NAAC
VEER NARMAD SOUTH GUJARAT UNIVERSITY
University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી
યુનિવર્સિટી કેમ્પસ, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
Tel : +91 - 261 - 2227141 to 2227146, Toll Free : 1800 2333 011, Digital Helpline No.- 0261 2388888
E-mail : info@vnsgu.ac.in, Website : www.vnsgu.ac.in

ક્રમાંકઃઓથો./પરિપત્ર/૧૩૬૪૩/૨૦૨૬
તા.૧૯/૦૬/૨૦૨૬

પ્રતિ,
વડાશ્રી,
બાયોટેકનોલોજી ડિપાર્ટમેન્ટ,
વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી,
સુરત.

વિષયઃ– શૈક્ષણિક વર્ષ ૨૦૨૬–૨૭ થી અમલમાં આવનાર B.Sc. Food Technology Program Sem.-3 & 4 (Major) ના અભ્યાસક્રમ બાબત.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૬–૨૭ થી અમલમાં આવનાર B.Sc. Food Technology Program Semester-3 & 4 (Major) નો પેટાસમિતિ દ્વારા તૈયાર કરેલ અભ્યાસક્રમ બાયોટેકનોલોજી વિષયની અભ્યાસ સમિતિની તા.૦૨/૦૪/૨૦૨૬ ની સભાના ઠરાવ ક્રમાંકઃ૦૪ થી મંજૂર કરી વિજ્ઞાન વિદ્યાશાખાને કરેલ ભલામણ વિજ્ઞાન વિદ્યાશાખાની તા.૦૪/૬/૨૦૨૬ ની સભાના ઠરાવ ક્રમાંકઃ૧૬ થી મંજૂર કરવા એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૧૮/૦૬/૨૦૨૬ની સભાના ઠરાવ ક્રમાંકઃ૧૫ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

(બિડાણઃ ઉપર મુજબ)

કુલસચિવ(વ.)

પ્રતિ,
(૧) અધ્યક્ષશ્રી, વિજ્ઞાન વિદ્યાશાખા,
(૨) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

.....જાણ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Department of Biotechnology, VNSGU, Surat

TEACHING & EVALAUTION SCHEME (As per NEP 2020)

Programme Name: Undergraduate Program in Food Technology (B. Sc. Food Technology - Semester - III)

Structure																	
Course Category	**Course Code**	**Course Title**	**Mark Sheet Title in English**	**Level of Course**	**Teaching Hours/Week**		**Exam Duration (Hours)**		**Credit**		**Internal Marks**		**External Marks**		**Total**	
					TH	**PR**	**TH**	**PR**	**TH**	**PR**	**TH**	**PR**	**TH**	**PR**	**TH**	**PR**
Bachelor of Science	FT-MJ-301	Food Microbiology	Food Microbiology	200-299	2		1		2		25		25		50	
	FTP-MJ-301	Food Microbiology: Practical	Food Microbiology: Practical			4		4 to 6		2		25		25		50
	FT-MJ-302	Molecular Food Composition II	Molecular Food Composition II		2		1		2		25		25		50	
	FTP-MJ-302	Molecular Food Composition II: Practical	Molecular Food Composition II: Practical			4		4 to 6		2		25		25		50
	FT-MJ-303	Food Safety, Quality & Regulatory Standards	Food Safety, Quality & Regulatory Standards		4		2		4		50		50		100	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT
Department of Biotechnology, VNSGU, Surat
TEACHING & EVALAUTION SCHEME (As per NEP 2020)
Programme Name: Undergraduate Program in Food Technology (B. Sc. Food Technology - Semester - IV)

Structure																	
Course Category	**Course Code**	**Course Title**	**Mark Sheet Title in English**	**Level of Course**	**Teaching Hours/Week**		**Exam Duration (Hours)**		**Credit**		**Internal Marks**		**External Marks**		**Total**	
					TH	**PR**	**TH**	**PR**	**TH**	**PR**	**TH**	**PR**	**TH**	**PR**	**TH**	**PR**
Bachelor of Science	FT-MJ-401	Food Process Engineering	Food Process Engineering	200-299	2		1		2		25		25		50	
	FTP-MJ-401	Food Process Engineering: Practical	Food Process Engineering: Practical			4		4 to 6		2		25		25		50
	FT-MJ-402	Food Preservation Technology	Food Preservation Technology		2		1		2		25		25		50	
	FTP-MJ-402	Food Preservation Technology: Practical	Food Preservation Technology: Practical			4		4 to 6		2		25		25		50
	FT-MJ-403	Food Certification and Global Compliances	Food Certification and Global Compliances		4		2		4		50		50		100	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

In

Food Technology

[3 years (Degree) & 4 years (Honors)]

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program in Biotechnology - Major

Teaching & Evaluation Scheme
Semester - III

[Academic Year of Implementation 2026-2027]

Semester - III

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours)	(CCE) Internal Marks	(SEE) External Marks		
FT-MJ-301	Food Microbiology	2	1:00	25	25	50	2
FTP-MJ-301	Food Microbiology: Practical	4	4:00 to 6:00	25	25	50	2
FT-MJ-302	Molecular Food Composition-II	2	1:00	25	25	50	2
FTP-MJ-302	Molecular Food Composition-II: Practical	4	4:00 to 6:00	25	25	50	2
FT-MJ-303	Food Safety, Quality & Regulatory Standards	4	2:00	50	50	100	4
Total		**16**	**16**	**150**	**150**	**300**	**12**

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	III
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability and Skill Development
Subject Type	Discipline Specific
Course Code	FT-MJ-301
Course Level	200-299
Course Title	Food Microbiology
Credit	2
Effective From	Academic Year: 2026-2027
Course Outcomes	**CO1:** Students will gain knowledge of the general characteristics, classification, and identification of molds relevant to food microbiology. **CO2:** Students will develop an understanding of the characteristics, classification, identification, and industrial importance of yeasts and yeast-like fungi, including false yeasts.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								

Course Content	**UNIT – 1: Microorganisms Important in Food Microbiology** Introduction to food microbiology, Intrinsic and Extrinsic factors affecting microbial growth and survival in food, Microflora of food (**Bacteria**: Morphological Characteristics, Cultural and Physiological Characteristics, Groups of Bacteria Important in Food Bacteriology **Molds**: General characteristics of Molds, Classification and Identification; **Yeast and Yeast Like Fungi:** General characteristics of Yeast, Classification and Identification, Industrial Importance, False Yeast)	Teaching Hours: 15
	UNIT – 2: Food Born Pathogen and Spoilage Food borne outbreaks- Bacterial, fungal and algal agents for foodborne illnesses, Spoilage, classification of foods by Ease of Spoilage, Factors affecting kinds and numbers of Microorganisms in food, Factors Affecting the growth of microorganisms in food, Chemical changes caused by Microorganisms	Teaching Hours: 15

Reference Books	• Frazier, W. C., Westhoff, D. C., & Vanitha, N. M. *Food Microbiology* (5th ed.). **PDF:** https://pa.welib.org/md5/9d53e26411c15689946cd5a1960c703b • Modi, H.A. *Microbial Spoilage of Foods*. https://epdf.pub/microbial-spoilage- of-foods.html • Blackburn, C. de W. *Food Spoilage Microorganisms*. https://epdf.pub/food-spoilage-microorganisms.html • Dilbaghi, N. & Sharma, S. *Food and Industrial Microbiology*. https://www.saetw.org/ebooks/biomicro/230.pdf • *Food Microbiology: Principles into Practice*. https://www.hchsc.edu.in/img/fsn-e-notes/fmb.pdf
Teaching Methodology	Class work, Discussion, Self-Study, Assignments, Project, seminar
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	III
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability and Skill Development
Subject Type	Discipline Specific
Course Code	FTP-MJ-301
Course Level	200-299
Course Title	Food Microbiology: Practical
Credit	2
Effective From	Academic Year: 2026-2027
Course Outcomes	CO: Students will apply safe and ethical laboratory practices, perform isolation, staining, identification, and microbial load assessment of food-related microorganisms, analyze environmental and preservative effects on microbial growth, interpret spoilage changes, and demonstrate professionalism, teamwork, and ethical responsibility in recording and reporting food microbiology experiments.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO								

Course Content

1. Isolation and identification of yeasts from food samples.
2. Microscopic examination of molds,
3. Microscopic examination of microorganisms from different food samples using (Staining method: Simple staining/Gram staining/Spore staining.)
4. Effect of preservatives on microbial growth (Sugar, salt, acid)
5. Identification of spoilage signs in milk, bread, or fruits.
6. Determination of microbial load using the standard plate count method.
7. Detection of pathogens from the food samples using selective and differential media

Teaching Hours: 60

Reference Books	• Patel, R. J. & Patel, K. R. *Experimental Microbiology* • Roberts, D., & Greenwood, M. (2013). *Practical food microbiology* (3rd ed.). Vet https://www.vet-ebooks.com/practical-food-microbiology-3rd-edition/ • Indira Gandhi National Open University (IGNOU). (n.d.). *Food safety & food microbiology practical manual*. eGyanKosh. https://egyankosh.ac.in/handle/123456789/93471 • Anonymous. (2013). *Microbiological examination methods of food and water– A laboratory manual*. KU. https://kupdf.net/download/ebook-2013- microbiological-examination-methods-of-food-and-water-a-laboratory-manual_5af3f865e2b6f56059d1f4a7_pdf
Teaching Methodology	Class work, Discussion, Self Study, Assignments, Project, seminar
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	III
NCrF Credit Level	5.0
Course Type	Major
Course Subtype	Skill Development
Subject Type	Discipline Specific
Course Code	FT-MJ-302
Course Level	200-299
Course Title	Molecular Food Composition - II
Credit	2
Effective From	Academic Year: 2026-27
Course Outcomes	**CO1:** Analyze the classification, structural organization, and functional properties of food proteins, and evaluate the effects of denaturation and aggregation during food processing and storage. **CO2:** Identify and describe major bioactive compounds in foods, including natural pigments, dietary fibres, vitamins, and minerals, and explain their molecular characteristics and functional roles. Interpret the concept of nutraceuticals and functional foods and evaluate the role of bioactive compounds in promoting health and preventing diet-related disorders.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								

Course Content

UNIT – 1: Proteins and Enzymes in Food Systems Classification of food proteins (plant, animal, microbial), Amino acid composition and protein quality, Levels of protein structure and food relevance, Functional properties of proteins, Protein denaturation and aggregation	Teaching Hours: 15
UNIT – 2: Bioactive Compounds and Functional Food Components Introduction to Bioactive Food Components, Natural Food Pigments: Chlorophylls, Carotenoids and Anthocyanins, Dietary Fibre: Soluble and Insoluble Fibres, Vitamins as Bioactive Molecules, Minerals and Trace Elements in Foods, Nutraceuticals and Functional Foods	Teaching Hours: 15

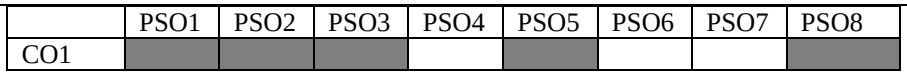
Reference Books

- Belitz, H. D., Grosch, W., & Schieberle, P. (2009). *Food chemistry*. Berlin, Heidelberg: Springer Berlin Heidelberg.

	• *Socaciu, C. (2007). Food colorants: chemical and functional properties. CRC press.* • *Lehninger, A. L. (2004). Lehninger Principles of Biochemistry: David L. Nelson, Michael M. Cox. New York: Recording for the Blind & Dyslexic.*
Teaching Methodology	Class work, Discussion, Self Study, Assignments, Project, seminar
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	III
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability and Skill Development
Subject Type	Discipline Specific
Course Code	FTP-MJ-302
Course Level	200-299
Course Title	Molecular Food Composition – II: Practical
Credit	2
Effective From	Academic Year: 2026-27
Course Outcomes	CO: Estimate the protein content in food samples using biochemical methods and interpret the results for nutritional analysis; separate and identify amino acids in food samples using paper chromatography by understanding their Rf values; analyze the effect of acids and alkali on natural food pigments by observing color changes and relating them to pH-dependent pigment stability; conduct sensory evaluation of functional food products by assessing organoleptic properties and interpreting results for food quality and consumer acceptability; study protein denaturation due to heat and pH by observing changes in solubility and coagulation and understanding their relevance to food processing and functionality; and determine the Vitamin C content in food samples by applying appropriate methods, understanding the underlying chemical principles, and interpreting the results for nutritional significance.
Mapping between Cos and PSOs	
Course Content	1. Estimation of proteins by Folin Lowry method. 2. Separation of amino acids using paper chromatography. 3. Effect of Acids and Alkali on Food Pigments. 4. Sensory evaluation of functional food products. 5. Study of protein denaturation due to heat and pH. 6. Determination of Vitamin C content in food sample by titration. Teaching Hours: 60
Reference Books	• Experimental Microbiology by Rakesh Patel. • Dissanayake, M., Ramchandran, L., Donkor, O. N., & Vasiljevic, T. (2013). Denaturation of whey proteins as a function of heat, pH and protein concentration. *International Dairy Journal*, *31*(2), 93–99. https://doi.org/https://doi.org/10.1016/j.idairyj.2013.02.002 • Socaciu, C. (2007). *Food colorants: chemical and functional properties*. CRC press.

	• Belitz, H. D., Grosch, W., & Schieberle, P. (2009). *Food chemistry*. Berlin, Heidelberg: Springer Berlin Heidelberg.
Teaching Methodology	Class work, Discussion, Self Study, Assignments, Project, seminar
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	III
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability
Subject Type	Discipline Specific
Course Code	FT-MJ 303
Course Level	200-299
Course Title	Food Safety, Quality & Regulatory Standards
Credit	4
Effective From	Academic Year: 2026-27
Course Outcomes	**CO1:** Students will learn the concept, importance, terminology, historical development, WHO guidelines and basic elements of food safety management systems. **CO2:** Students will learn food contaminants, food additives and their safety, food adulteration, and sanitation practices in food service establishments. **CO3:** To apply principles of quality control and quality assurance to raw materials, in-process operations, and finished food products, and implement GMP, GLP, and HACCP concepts in the context of the Indian food industry. **CO4:** To Interpret and apply Indian food standards and regulations, including the Food Safety & Standards Act, licensing and registration of food businesses, voluntary certification systems and the role of international organizations such as Codex Alimentarius, WTO, and WHO in food standardization.
Mapping between Cos and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1	■				■			
CO2	■	■			■			
CO3	■	■				■		
CO4	■		■		■			

Course Content	**UNIT -1: Introduction to Food Safety** Concept of Food safety & its definition; Terms related to Food Safety; Importance & Significance of Food Safety; History of Food Safety; WHO's "FIVE KEYS" & "GOLDEN RULES" for safe food preparation; Elements of Food Safety Management.	Teaching Hours: 15

	UNIT – 2: Food Sanitation & Safety. Food Contaminants -Biological, Chemical, Physical; Food Additives-classification & functional role of different additives (Antioxidants, Preservatives & Food colour); Safety issues; Food Adulteration-Common Adulterants & Classification; Sanitation in Food Service Establishments, Cleaning Agents & Disinfectant	Teaching Hours: 15
	Unit – 3: Food Quality & Assurance Basic concept of Quality control & Assurance; Quality Control of raw material- Plant & Animal origin; GMP, GLP; In Process Food Control; Quality Control of Finished Products; HACCP- History, Need, Principle, Application & status in India.	Teaching Hours: 15
	UNIT – 4: Food Laws & Regulations Food Standard & Regulation in India (Food Safety & Standard Act 2006, Food Safety & Standards Regulations 2011); Licensing & Registration of Food Business; Voluntary based product Certification (BIS & Agmark); Role of International organization in Food Standardization (CODEX Alimentarious, WTO & WHO)	Teaching Hours: 15
Reference Books	• Indira Gandhi National Open University. (2019). *MFN-003: Food microbiology and safety*. New Delhi, India: Author. Retrieved from http://egyankosh.ac.in//handle/123456789/73112 • Lásztity, R. (2009). *Food quality and standards* (Vol. 1). Oxford, UK: Eolss Publishers • Motarjemi, Y., & Lelieveld, H. (2014). *Food safety management: A practical guide for the food industry*. San Diego, CA: Academic Press. • Roberts, C. A. (2001). *The food safety information handbook*. Westport, CT: Oryx Press. • Roday, S. (2011). *Food hygiene and sanitation* (2nd ed.). New Delhi, India: Tata McGraw Hill Education. • Sehgal, S. (2024). *Unit-11: Introduction to food safety and quality* (MVP-002). New Delhi, India: Indira Gandhi National Open University. Retrieved from http://egyankosh.ac.in//handle/123456789/107504	
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignments	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program in Biotechnology - Major

Teaching & Evaluation Scheme
Semester – IV

Semester - IV

Course Code	Course Title	Teaching Schedule Hours/Week	Exam Duration & Marks			Total Theory/Practical Marks	Credit
			Duration (Hours)	(CCE) Internal Marks	(SEE) External Marks		
FT-MJ-401	Food Process Engineering	2	1:00	25	25	50	2
FTP-MJ-401	Food Process Engineering: Practical	4	4:00 to 6:00	25	25	50	2
FT-MJ-402	Food Preservation Technology	2	1:00	25	25	50	2
FTP-MJ-402	Food Preservation Technology: Practical	4	4:00 to 6:00	25	25	50	2
FT-MJ-403	Food Certification and Global Compliances	4	2:00	50	50	100	4
Total		**16**	**16**	**150**	**150**	**300**	**12**

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SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	IV
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability and Skill Development
Subject Type	Discipline Specific
Course Code	FT-MJ-401
Course Level	200-299
Course Title	Food Process Engineering
Credit	2
Effective From	Academic Year: 2026-2027
Course Outcomes	**CO1:** Explain the physical properties of foods and fundamental engineering principles applied in food processing, and relate these principles to basic food processing operations. Describe and compare the rheological behavior of processed foods, including fluid foods, suspensions, granular materials, and solid foods, with respect to their flow and deformation characteristics. **CO2:** Explain the principles of thermal processing and microbial death kinetics, and discuss their significance in ensuring food safety and quality during food processing. Explain the working principles and applications of major food engineering unit operations such as evaporation, drying, freezing, size reduction, mixing, separation, extraction, and non-thermal processing techniques
Mapping between Cos and PSOs	

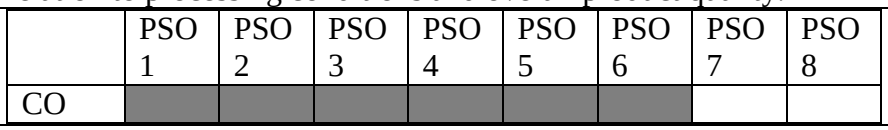
	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								

Course Content	**UNIT – 1: Fundamentals and Rheology of Processed Foods** Physical properties of foods, **Engineering principles applied to food processing**, Rheology of Processed Foods (Properties of Fluid Foods, Properties of Suspensions and Concentrated Products, Properties of Granular Foods and Powders, Properties of Solid Foods)	Teaching Hours: 15
	UNIT– 2: Thermal Processing and Food Engineering Operations Thermal processing and microbial death kinetics, Evaporation and concentration, Heat exchangers, drying technology, Freezing and freeze drying, Size reduction, Mechanical separation techniques, Mixing and agitation, Leaching and extraction, Non-thermal processing.	Teaching Hours: 15

Reference Books	• Heldman, D. R. (Ed.). (2012). *Food process engineering*. Springer Science & Business Media. • Fellows, P. J. (2022). *Food processing technology: principles and practice*. Woodhead publishing.
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	IV
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability and Skill Development
Subject Type	Discipline Specific
Course Code	FTP-MJ-401
Course Level	200-299
Course Title	Food Process Engineering: Practical
Credit	2
Effective From	Academic Year: 2026-2027
Course Outcomes	Estimate and interpret microbial load in diverse food materials using standard microbiological techniques; determine rehydration ratios and evaluate quality changes during dehydration and rehydration; analyze the impact of microwave heating on physical and functional properties of foods; detect common food adulterants using qualitative and analytical methods to ensure safety and authenticity; and assess expansion characteristics and oil absorption capacity of fried snacks in relation to processing conditions and overall product quality.
Mapping between Cos and PSOs	
Course Content	1. Study on the estimation of microbial load in food materials. 2. Determination of rehydration ratio of dehydrated foods. 3. Experiment on properties of food through microwave oven heating. 4. Experiment on detection of food adulteration 5. Experiment on expansion and oil absorption characteristics of snacks on frying.
Reference Books	• Mrs.P. Dhivya, A. P. (n.d.). *Food Process Engineering Laboratory*.
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

Teaching Hours: 60

[Subject code-2703001604021201]

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SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	IV
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability and Skill Development
Subject Type	Discipline Specific
Course Code	FT-MJ-402
Course Level	200-299
Course Title	Food Preservation Technology
Credit	2
Effective From	Academic Year: 2026-27
Course Outcomes	**CO1:** Explain the importance of food preservation in industry and society, identify the major causes of food deterioration, and describe various thermal and non- thermal preservation methods along with the use of chemical and natural preservatives, fermentation, and bio-preservation in extending food shelf life. **CO2:** Demonstrate understanding of food packaging as an essential preservation technique, classify various packaging materials used for foods, and apply food safety and quality systems such as FSSAI, HACCP, and GMP while assessing emerging technologies like edible coatings, nanotechnology, and hurdle technology in modern food preservation.
Mapping between Cos and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								

Course Content	**UNIT – 1: Principles and methods of Food Preservation** Importance of food preservation in industry and society, Causes of Food Deterioration, Thermal and Non-Thermal Preservation Methods, Use of chemical preservatives, Natural preservatives, Fermentation and bio-preservation.	Teaching Hours: 15

	UNIT – 2: Packaging, Storage, and Food Safety Packaging as a Preservation Technique, Types of Packaging Materials Used for Foods, Regulatory standards (FSSAI, HACCP), Good Manufacturing Practice (GMP), Emerging trends: edible coatings, nanotechnology, hurdle technology.	Teaching Hours: 15
Reference Books	• Rahman, M. S. (Ed.). (2020). *Handbook of food preservation*. CRC press. • Jay, J. M., Loessner, M. J., & Golden, D. A. (2005). *Modern food microbiology*. Boston, MA: Springer US. • Coles, R., McDowell, D., & Kirwan, M. J. (Eds.). (2003). *Food packaging technology* (Vol. 5). CRC press. • Pal, M., Devrani, M., & Hadush, A. (2019). *Recent developments in food packaging technologies*. *46*(1), 21–25. • Majid, I., Nayik, G. A., Dar, S. M., & Nanda, V. (2018). Novel food packaging technologies: Innovations and future prospective. *Journal of the Saudi Society of Agricultural Sciences*, *17*(4), 454–462. https://doi.org/10.1016/j.jssas.2016.11.003	
Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignments	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.	

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SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	IV
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability and Skill Development
Subject Type	Discipline Specific
Course Code	FTP-MJ-402
Course Level	200-299
Course Title	Food Preservation Technology: Practical
Credit	2
Effective From	Academic Year: 2026-27
Course Outcomes	Students will apply dehydration, concentration, pasteurization, edible coating, adulterant detection, and hurdle technology techniques, analyze microbial load and food safety, and critically evaluate emerging technologies like nanotechnology in food preservation, packaging, quality retention, and shelf-life extension.

Mapping between Cos and PSOs

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								

Course Content

1. Dehydration of food and preparation of concentrate and powder.
2. Assessment of microbial load in fresh or preserved food.
3. Pasteurization of milk and quality evaluation by MBRT.
4. Preparation and evaluation of edible coating.
5. Detection of common food adulterants in selected food samples.
6. To demonstrate the concept of hurdle technology by applying multiple preservation factors (hurdles) to improve the shelf life and safety of a food product.
7. Case study on nanotechnology in food packaging.

Teaching Hours: 60

Reference Books

- Experimental Microbiology by Rakesh Patel.
- Navya, P., Raju, K., & Sukumaran, M. K. (2017). *International Journal of Advances in Scientific Research Analysis of Food Adulterants in Selected Food Items Purchased From Local Grocery Stores * Article History : 03*(07), 82–89.
- Mahendra Pal, Abiy Shimelis, Wondu Mamo, Amit M. Barot, Suneeta V. Pinto, J. P. P. (n.d.). *Hurdle Technology: A Novel Approach for Food Preservation.*

Teaching Methodology	Classwork, Discussion, Self-Study, Seminars and/or Assignments
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.

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SYLLABUS

Program Name	B. Sc. Food Technology Honors
Semester	IV
NCrF Credit Level	5
Course Type	Major
Course Subtype	Employability / Skill Development
Subject Type	Discipline Specific / Intra-disciplinary
Course Code	FT-MJ-403
Course Level	200-299
Course Title	Food Certification and Global Compliance
Credit	4
Effective From	Academic Year: 2026-2027
Course Outcomes	**CO1:** Students will be able to explain food safety principles and identify different types of food hazards and control measures. **CO2:** Students will be able to describe national and international food regulations and their role in ensuring food quality and safety. **CO3:** Students will be able to interpret food safety management systems and understand the process of food certification and auditing. **CO4:** Students will be able to apply concepts of food labelling, traceability and global compliance in food industry practices.
Mapping between Cos and PSOs	

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								
CO3								
CO4								

Course Content	**UNIT - 1: Fundamentals of Food Safety and Hazards** Basics of food safety and its importance, Identification of physical, chemical and biological food hazards, Introduction to food allergens, contaminants, and adulterants, Basic principles of Good Manufacturing Practices (GMP) and Good Hygienic Practices (GHP), Introduction to HACCP and its 7 basic principles.	Teaching Hours: 15

	UNIT - 2: Overview of National and International Food Regulations Need for food regulations; mandatory vs. voluntary compliance. Food Safety and Standards Act (2006), FSSAI: Basic functions, licensing, and registration overview, Overview of Indian agencies: AGMARK and BIS, Introduction to global bodies: CODEX Alimentarius Commission (CAC) and FAO.	Teaching Hours: 15
	UNIT - 3: Introduction to Food Safety Management Systems Concept of Food Safety Management Systems (FSMS), Introduction to ISO 9000 (Quality) and ISO 22000 (Food Safety) principles, Importance of food certification for businesses, Basic steps in food safety auditing, certifying bodies, and the certification process.	Teaching Hours: 20
	UNIT - 4: Basics of Food Labeling and Global Compliance Fundamentals of food labeling based on FSSAI and Codex guidelines, Introduction to traceability concepts and product recall systems, Basic case studies on export compliance failure and rejections.	Teaching Hours: 10
Reference Books	• Alli, I. (2004) Food Quality Assurance: Principles and Practices. CRC Press, Boca Raton, FL, USA. • Andersen, V., Lelieveld, H. L. M., & Motarjemi, Y. (Eds.). (2023) *Food Safety Management: A Practical Guide for the Food Industry* (2nd ed.). Academic Press (Elsevier). • Cramer, M. M. (2013) Food Plant Sanitation: Design, Maintenance, and Good Manufacturing Practices. CRC Press, Boca Raton, FL, USA. • Early, R. (1995). *Guide to Quality Management Systems for the Food Industry*. Blackie Academic & Professional (Springer Science & Business Media). • Food and Agriculture Organization (FAO) & World Health Organization (WHO) (Ongoing). *Codex Alimentarius Commission Publications and Standards*. Rome: FAO/WHO. Available from: https://www.fao.org/fao-who-codexalimentarius • Food Safety and Standards Authority of India (FSSAI). (2011). *Food Safety and Standards Regulations Manuals* (and subsequent amendments). Ministry of Health and Family Welfare, Government of India, New Delhi. Available from: https://www.fssai.gov.in • Hester, R. E. and Harrison, R. M. (2001) Food Safety and Food Quality. Royal Society of Chemistry, Cambridge, UK. • Schmidt, R. H. and Rodrick, G. E. (2003) Food Safety Handbook. John Wiley and Sons, Inc., Hoboken, New Jersey, USA.	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment	
Evaluation Method	50% CCE: Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 50% SEE: External assessment based on semester end University examination.	