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

સંદર્ભ: યુનિવર્સિટી કાર્યાલયના તા.૨૭–૦૬–૨૦૨૩, ક્રમાંક : એસ./સાયન્સ/પરિપત્ર/૧૬૦૮૮/૨૦૨૩

ક્રમાંક :એસ./પરિપત્ર/૨૧૫૪૭/૨૦૨૩
તા.૧૮/૦૮/૨૦૨૩

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

વિષય:– બી..એસસી.બાયોટેકનોલોજી વિષયનાં સેમેસ્ટર–૧ ના અભ્યાસક્રમ બાબત.

સુજ્ઞશ્રી,

સવિનય જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૩–૨૪ થી અમલમાં આવનાર NEP-2020 અંતર્ગત નવા ક્રેડિટ સ્ટ્રકચર મુજબ બી.એસસી.બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર–૧ ના Minor Courses (Elective), Multidisciplinary Courses અને SEC Cours અંગે વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૮/૨૦૨૩ ની સભાનાં ઠરાવ ક્રમાંક:૭ અન્વયે સુચવેલ સુધારા મુજબ Biotechnology Sem - 1 & 2 ના માઈનર અને મલ્ટિડિસિપ્લિનરી અને SEC Courses ના અભ્યાસક્રમ બાયોટેકનોલોજી વિષયની એડહોક અભ્યાસ સમિતિ વતી કન્વીનરશ્રીએ અને વિજ્ઞાન વિદ્યાશાખા ની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલની તા.૧૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક:૦૭ થી મંજૂર કરેલ છે. જેનો અમલ કરવા આથી જાણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૭/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક:૦૭

:: આથી ઠરાવવામાં આવે છે કે, NEP-2020 અંતર્ગત નવા ક્રેડિટ સ્ટ્રકચર મુજબ બી.એસસી.–બાયોટેકનોલોજી પ્રોગ્રામના સેમેસ્ટર–૧ ના Minor Courses (Elective), Multidisciplinary Courses અને SEC Cours અંગે વિજ્ઞાન વિદ્યાશાખાની તા.૦૨/૦૮/૨૦૨૩ની સભાનાં ઠરાવ ક્રમાંક:૭ અન્વયે સુચવેલ સુધારા મુજબ Biotechnology Sem- 1 & 2 ના માઈનર અને મલ્ટિડિસિપ્લિનરી અને SEC Courses ના અભ્યાસક્રમ બાયોટેકનોલોજી વિષયની એડહોક અભ્યાસ સમિતિ વતી કન્વીનરશ્રીએ અને વિજ્ઞાન વિદ્યાશાખા ની મંજૂરીની અપેક્ષાએ વિદ્યાશાખા વતી વિદ્યાશાખાનાં અધ્યક્ષશ્રીએ મંજૂર કરી એકેડેમિક કાઉન્સિલને કરેલ ભલામણ નો સ્વીકાર કરી મંજૂર કરવામાં આવે છે.

(બિડાણ: ઉપર મુજબ)

કુલસચિવશ્રી

પ્રતિ,
૧) 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

Undergraduate Program

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

Semester-I

Minor Elective: BT-ME-101: Basics of Biochemistry

Course Code	BT-ME-101
Course Title	Basics of Biochemistry
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	The purpose of course to provide knowledge about physical and evolutionary foundation. It makes students to aware about pH meter, acids, bases, buffers and role of buffers in biological system.
Course Objectives	The objective of the course is to give knowledge about law of thermodynamics, Role of enzyme in regulations and functions of different buffer in body. Another objective is to provide knowledge regarding instrument, buffers, and enzyme activity.
Course Outcomes	CO 1: To learn evolution process of organisms as well as physical process. CO 2: To learn acids, base, pH, buffers and enzymes.
Mapping between COs with PSOs	See table below
Pre-requisite	Fundamental understanding about science, biology and chemistry
Course Content	See table below

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO1								
CO2								

UNIT-1: Evolutionary and Physical Foundation A possible RNA world scenario and evolution of eukaryotic cells, Dynamic steady state of living organisms, Energy transformation in living organisms, Flow of electrons as source of energy, Requirement of work and energy for creation and maintenance, Energy coupling links reactions in biology, Enzymes promote sequences of chemical reactions, Metabolism is regulated to achieve Balance and Economy.	Teaching Hours: 20
UNIT-2: Concept of pH and types of Buffers Hydrogen ion concentration, Handerson-hasselbalch equation, Ionization of water, weak acids and weak bases, pH meter-instrumentation and application, pH scale, Buffer-definition, types & its preparation, buffers of biological importance, Mechanism of action of buffers in biological systems.	Teaching Hours: 10

Reference Books	• Cox, M. M., & Nelson, D. L., (2017) Lehninger: *Principles of Biochemistry*, 7th Edition, W.H. Freeman, New York. • Jain, J. L. (2004) Fundamentals of Biochemistry, S. Chand.
e-learning resources	---
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment
Evaluation Method	30% Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc.70% External based on semester end University examination

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

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

Semester-I

Minor Elective: BTP-ME-1 Practical

Course Code	BTP-ME-1
Course Title	Practical: Basics of Biochemistry
Credits	2
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 purpose of this course is to provide comprehensive understanding of buffer preparation, pH measurement, enzyme extraction and determination of enzyme activity.
Course Objective	The objective of this course is to equip students with the necessary knowledge and skills related to instrument, buffers, titration and enzyme activity.
Course Outcomes	Students are expected to know about how to calibrate pH meter and find out pH of solutions. To learn about buffer preparation. To gain vast knowledge about enzyme extraction, effect of various parameters on enzyme activity.
Mapping between COs with PSOs	
Pre-requisite	Basics of Biology and Chemistry

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8
CO 1-10								

Course Content	1. Preparation of 0.5 M solution. 2. Preparation of stock and working solutions. 3. Preparation of buffer solutions (Phosphate, Glycine-NaOH, Glycine-HCl). 4. Working principle of pH meter. 5. Estimation of xylose by orcinol method. 6. Estimation of proline by ninhydrine method. 7. Demonstration of enzyme extraction. 8. Titration curve of amino acids. 9. Effect of temperature on enzyme activity. 10. Effect of pH on enzyme activity.
Reference Books	• Shanmugam, S., Kumar, T. S. & Pareer Selvam K. (2019) Laboratory Handbook on Biochemistry, PHI Learning Pvt. Ltd. • Singh, R. (2000) Introductory Practical Biochemistry, Alpha Science International Ltd.
Teaching Methodology	Laboratory work, Journal preparation
Evaluation Method	30% Internal assessment based on class attendance, participation, internal examination, etc.70% External based on semester end University examination

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

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

Semester-I

Minor Elective: BT-ME-102: Ecological Studies

<table>
<tr><td>Course Code</td><td colspan="2">BT-ME-102</td></tr>
<tr><td>Course Title</td><td colspan="2">Ecological Studies</td></tr>
<tr><td>Credits</td><td colspan="2">2</td></tr>
<tr><td>Course Level</td><td colspan="2">100 to 199</td></tr>
<tr><td>Total engagement</td><td colspan="2">2 Credits x 15 Hours = 30 Hours</td></tr>
<tr><td>Teaching per week</td><td colspan="2">2 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 basic knowledge (or facts) of ecosystems and ecosystem management are known as ecological notions. Ecological ideas serve as the foundation for ecological principles, which are fundamental presumptions (or beliefs) regarding ecosystems and how they work.</td></tr>
<tr><td>Course Objectives</td><td colspan="2">The objective of this paper is to study the interactions between living things, such as humans, and their natural surroundings. It aims to comprehend the crucial interconnections that exist between living things such as plants, animals, and humans.</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">CO1: Students will gain knowledge of and interest in how nature works, how everything is connected, and how different aspects of an ecosystem can be integrated to create a functional environment. Studying the interactions between animals and plants as well as how human influence and climatic changes affect ecosystems are all included in this.
CO2: Students will be able to understand how environmental factors and an organism's evolutionary past influence behaviour, which in turn influences evolutionary processes.</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></table></td></tr>
<tr><td>Pre-requisite</td><td colspan="2">Basic Science</td></tr>
<tr><td>Course Content</td><td>UNIT-1: Population Ecology and Species Interactions
Characteristics of a population, Population growth curves, Population regulation, Life history strategies (r and K selection), Concept of meta-population, Types of interactions, intra and Interspecific competition.</td><td>Teaching Hours: 14</td></tr>
</table>

	UNIT-2: Animal Behaviour Introduction, Types and characteristics of Animal Behaviour, Types of Learning Behaviour Ecological Behaviour: Habitat-Food Selection, anti-predator mechanism, Aggregation, Territoriality and Dispersal Social Behaviour: Flocking in birds, herding in mammals, kin selection, altruism, inclusive fitness Reproductive Behaviour: Evolution of sex, Reproductive Strategies, Mating Systems, Courtship, Sperm Competition, Sexual Selection and parental care.	Teaching Hours: 16
Reference Books	• Eugene, O. P., & Gray, B. W. (2005). *Fundamentals of ecology* (5th ed). Cengage Learning, ISBN 978-81-315-0020-0. • Dash, M., & Dash, S. (2009). *Fundamentals of ecology*. McGraw-Hill Education, ISBN 978-0-07-008366-0. • Rockwood, L. L. (2015). *Introduction to population ecology, Wiley desktop editions series, (2)*. John Wiley & Sons Publications, ISBN 1118947576, 9781118947579.	
e-learning resources	*https://www.researchgate.net/publication/215622242_Textbook_of_Animal_Behaviour*	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment	
Evaluation Method	30% Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 70% External based on semester end University examination	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

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

Semester-I

Minor Elective: BTP-ME-2 Practical

Course Code	BTP-ME-2
Course Title	Practical: Ecological Studies
Credits	2
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 purpose of ecological practical is to make small scale comparisons among biotic and abiotic community and relationship between different populations in respect to environment.
Course Objective	Students will able understand local and geographic distribution and abundance of an organism respect to living and non-living world.

<table>
<tr><td>Course Outcomes</td><td>CO1: To make familiar the students regarding community present in fresh water ecosystem and how they interact with environment.
CO2: To provide practical knowledge on population density\diversity\richness present in surrounding environment.
CO3: To sensitize students towards presence of repeated species present during environmental concerns, issues, and impacts of climate change and related mitigation strategies.
CO4: To provide basic understanding to students that how animals response to various environmental stimulus.
CO5: To make the students to apply their knowledge for better description of population diversity (richness\evenness) present in ecosystem.
CO6: To sensitize students regarding relationship between weather condition and ecosystem
CO7: To improve student’s observation regarding monitor biodiversity, conservation, restoration and sustainable management of nature
CO8: To sensitize students regarding presence or absence of animal biodiversity present in surrounding habitat.
CO9: To provide practical knowledge how to create miniature and enclosed ecosystem at laboratory level.
CO10: To make familiar the students how to enrich various microbes from sediments and soils.</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>Basics of Biology, Biotechnology, Biochemistry, Microbiology</td></tr>
<tr><td>Course Content</td><td>1. To study pond ecosystem.
2. Study the plant population density by quadrant method.
3. Study the plant population frequency by quadrant method.
4. Report writing on Animal Behaviour Experiment.
5. Estimation of species diversity by Shanon-Weiner diversity index method.
6. Measurement of atmospheric humidity.
7. Preparation of field report based on the survey of local flora.
8. Study the fauna of local area/college campus.
9. Constructions of Winogradsky’s Column.
10. Measurement of primary productivity of water body.</td></tr>
<tr><td>Reference Books</td><td>• Patel, R. (2019) Experimental Microbiology vol 1 and vol 2, 5th ed. Aditya Publication.
• Aneja, K. R. (2014) Laboratory Manual of Microbiology and Biotechnology, MedTech, Scientific International Pvt. Ltd., New Delhi.</td></tr>
<tr><td>Teaching Methodology</td><td>Laboratory work, Journal preparation</td></tr>
<tr><td>Evaluation Method</td><td>30% Internal assessment based on class attendance, participation, internal examination, etc. 70% External based on semester end University examination</td></tr>
</table>

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

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

Semester-I

Multidisciplinary Course: BT-MDC-101: Basic Healthcare

<table>
<tr><td>Course Code</td><td colspan="2">BT-MDC-101</td></tr>
<tr><td>Course Title</td><td colspan="2">Basic Healthcare</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">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">2023-2024</td></tr>
<tr><td>Purpose of Course</td><td colspan="2">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.</td></tr>
<tr><td>Course Objectives</td><td colspan="2">-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.</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">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: 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.</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">Biology; Chemistry; Public Health; Ethics; Medical Terminology</td></tr>
<tr><td rowspan="2">Course Content</td><td>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.</td><td>Teaching Hours: 15</td></tr>
<tr><td>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,</td><td>Teaching Hours: 15</td></tr>
</table>

	Reproductive System and Emergency Childbirth; Senses, Foreign Bodies in Eye, Ear, Nose or Skin and Swallowed Foreign Objects.	
	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	30% Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 70% External based on semester end University examination	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

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

Semester-I

Multidisciplinary Course: BT-MDC-102: Introduction to Bioinformatics and Databases

<table>
<tr><td>Course Code</td><td colspan="2">BT-MDC-102</td></tr>
<tr><td>Course Title</td><td colspan="2">Introduction to Bioinformatics and Databases</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 purpose of the course is to give knowledge to the students regarding the fundamentals of bioinformatics and databases using computers.</td></tr>
<tr><td>Course Objectives</td><td colspan="2">Any use of tools and databases is based on bioinformatics. Biological databases are becoming more and more importance in today life for better knowledge.</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">CO1: The student will be able clarify the fundamentals of computer including applications, generations, components, hardware, softwares and networking.
CO2: The student will be able to get knowledge of basic bioinformatics and various biological databases.</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></table></td></tr>
<tr><td>Pre-requisite</td><td colspan="2">Biology; Chemistry; Computer Science</td></tr>
<tr><td rowspan="3">Course Content</td><td>UNIT-1: Computer Fundamentals - 1
Overview, Applications, Generations and its types; Components, CPU, Input Devices and Output Devices; Memory, RAM, ROM, Motherboard, Memory units and Ports.</td><td>Teaching Hours: 15</td></tr>
<tr><td>UNIT-2: Computer Fundamentals - 2
Hardware and Software; Number system, Number Conversion, Data and Information; Networking, Operating System, Internet and Intranet.</td><td>Teaching Hours: 15</td></tr>
<tr><td>UNIT-3: Introduction to Bioinformatics
What is Bioinformatics and its applications; Scope of Bioinformatics; Structure visualizing tools; Examples of related tools (FASTA, BLAST, RASMOL, SWISS PORT, Cn3D).</td><td>Teaching Hours: 15</td></tr>
</table>

	UNIT-4: Biological Databases General Introduction of Biological Databases; Nucleic acid databases (NCBI, GENBANK, PubMed, DDBJ and EMBL); Protein databases (PDB and MMDB); Structure databases (CATH, SCOP and PDBsum); Metabolic pathway databases (KEGG)	Teaching Hours: 15
Reference Books	• E. Balagurusamy (2009), *Fundamentals of Computers*, Tata McGraw Hill Education Private Limited, New Delhi, ISBN 13: 978-0-07-014160-5 • S. C. Rastogi (2018), *Bioinformatics Methods and Applications (Genomics, Proteomics and Drug Discovery)*, PHI Learning Private Limited, Delhi, ISBN 978-81-203-4785-4	
e-learning resources	https://www.tutorialspoint.com/computer_fundamentals/index.htm https://www.ncbi.nlm.nih.gov/ https://www.embl.org/ https://www.rcsb.org/ https://www.cathdb.info/ https://scop.mrc-lmb.cam.ac.uk/ https://www.genome.jp/kegg/	
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment	
Evaluation Method	30% Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 70% External based on semester end University examination	

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

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

Semester-I

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

<table>
<tr><td>Course Code</td><td colspan="2">BT-SEC-101</td></tr>
<tr><td>Course Title</td><td colspan="2">Bacteriological Media and Isolation Techniques</td></tr>
<tr><td>Credits</td><td colspan="2">2 (1 credit theory & 1 credit practical)</td></tr>
<tr><td>Course Level</td><td colspan="2">100-199</td></tr>
<tr><td>Total engagement</td><td colspan="2">1 Credit x 15 Hours + 1 Credit x 30 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">2023-2024</td></tr>
<tr><td>Purpose of Course</td><td colspan="2">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.</td></tr>
<tr><td>Course Objectives</td><td colspan="2">-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.</td></tr>
<tr><td>Course Outcomes</td><td colspan="2">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.</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></table></td></tr>
<tr><td>Pre-requisite</td><td colspan="2">12th Pass with Biology & Chemistry</td></tr>
<tr><td>Course Content</td><td>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.</td><td>Teaching Hours: 15</td></tr>
<tr><td></td><td>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.</td><td>Teaching Hours: 30</td></tr>
</table>

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	30% Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 70% External based on semester end University examination

VEER NARMAD SOUTH GUJARAT UNIVERSITY, SURAT

Undergraduate Program

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

Semester-I

Skill Enhancement Course: BT-SEC-102: Study of Soil Profile

<table>
<tr><td>Course Code</td><td colspan="3">BT-SEC-102</td></tr>
<tr><td>Course Title</td><td colspan="3">Study of Soil Profile</td></tr>
<tr><td>Credits</td><td colspan="3">2 (1 credit theory & 1 credit practical)</td></tr>
<tr><td>Course Level</td><td colspan="3">100-199</td></tr>
<tr><td>Total engagement</td><td colspan="3">1 Credit x 15 + 1 Credit x 30 Hours = 45 Hours</td></tr>
<tr><td>Teaching per week</td><td colspan="3">3 h</td></tr>
<tr><td>Minimum weeks per semester</td><td colspan="3">15 weeks (Including classwork, examination, preparation & holidays)</td></tr>
<tr><td>Effective from</td><td colspan="3">2023-2024</td></tr>
<tr><td>Purpose of Course</td><td colspan="3">This course is for all students who wants to learn fundamental concepts related to understand Formation of soil and Properties of soil. Also, to learn about soil organism correlation.</td></tr>
<tr><td>Course Objectives</td><td colspan="3">- This paper is meant to make students understand the importance of soil in agriculture and soil science.
- Student will know various physical and chemical properties of soil. Also, will know about soil biology soil microbes’ interaction.</td></tr>
<tr><td>Course Outcomes</td><td colspan="3">CO1: Students will able to define soil texture.
CO2: They can identify soil types accordingly to texture characteristics.
CO3: They can identify source of organic matter in soil.
CO4: They will able to define soil pH.
CO5: Identify types of soil organisms and their functions within a soil ecosystem.</td></tr>
<tr><td>Mapping between COs with PSOs</td><td colspan="3"><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></td></tr>
<tr><td>Pre-requisite</td><td colspan="3">12th Pass with Biology and Chemistry</td></tr>
<tr><td rowspan="2">Course Content</td><td>UNIT-1: Soil Profile
What is soil? Weathering-Formation of soil, Soil formation factors and processes, Soil Profile, Soil biology, Soil physical properties, Soil Structure and Consistency, Soil water, Concept of Soil pH and Nutrient Availability, Soil organic matter.</td><td>Teaching Hours: 15</td></tr>
<tr><td>Practical:
1. Determination of Soil pH
2. Identification of soil texture- clay, sand, loamy by sieve method.
3. Identification of soil types-red soil, black soil.
4. Analysis of soil organic matter.
5. Microbiological analysis of soil (SPC/TVC)</td><td>Teaching Hours: 30</td></tr>
</table>

Reference Books	• Mehra, R. K. (2011). *Textbook of Soil Science*. Indian Council of Agricultural Research. • Brady, N. C., Weil, R. R., & Weil, R. R. (2008). *The nature and properties of soils* (Vol. 13, pp. 662-710). Upper Saddle River, NJ: Prentice Hall.
e-learning resources	• https://agrimoon.com/wp-content/uploads/Fundamentals-of-Soil-Science-with-Practicals.pdf • https://agrigyan.in/fundamentals-of-soil-science-pdf-download-free/#preview-download-pdf • https://www.agriexam.com/introduction-to-soil-science-book-pdf
Teaching Methodology	Classwork, Discussion, Self-Study, Projects, Seminars and/or Assignment
Evaluation Method	30% Internal assessment based on class attendance, participation, class test, quiz, assignment, seminar, internal examination, etc. 70% External based on semester end University examination.