પરિપત્ર:

ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટીની સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમ ચલાવતી તમામ સંલગ્ન કોલેજોનાં આચાર્યશ્રીઓને સવિનય જણાવવાનું કે સાયન્સ વિદ્યાશાખા હેઠળનો **NEP**-૨૦૨૦ અંતર્ગત
સ્કીલ એન્હાંસમેન્ટ કોર્સનો સેમેસ્ટર-૪ નો અભ્યાસક્રમ આ સાથે સામેલ છે. આ બાસ્કેટમાં સાયન્સનાં વિષયો આપવામાં આવેલ છે.

માનનીય કુલપતિશ્રીની મંજુરી અનુસાર સદર અભ્યાસક્રમ શૈક્ષણિક વર્ષ જુન,૨૦૨૪ થી અમલવારી કરવાની રહે છે. સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમ ચલાવતી તમામ સંલગ્ન કોલેજો દ્વારા તેની અમલવારી કરવા જણાવવામાં આવે છે.

નોંધ: 1. તા.૧૯/૧૧/૨૦૨૪ પરીપત્ર નં- ૧૫૧૫ માં **"Conversational Skills -2"** કોર્સ ઉમેરવામાં આવ્યો છે અન્ય અભ્યાસક્રમમાં કોઈ ફેરફાર કરવામાં આવેલ નથી.

2. તા.૨૦/૧૨/૨૦૨૪ પરીપત્ર નં- ૧૬૮૦ માં **"Advanced GeoGebra (FOSS)"** કોર્સ ઉમેરવામાં આવ્યો છે અન્ય અભ્યાસક્રમમાં કોઈ ફેરફાર કરવામાં આવેલ નથી.

Bhakta Kavi Narsinh Mehta University Junagadh

ખાસ ફરજ પરના અધિકારી
(એકેડેમિક)

ક્રમાંક/બીકેએનએમયુ/એકેડેમિક/૩૧૪/૨૦૨૪
ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી,
સરકારી પોલીટેકનિક કેમ્પસ,
ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી રોડ,
ખડીયા, જૂનાગઢ-૩૬૨૨૬૩
તા.૨૩/૦૧/૨૦૨૫

પ્રતિ,

- ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી સંલગ્ન સાયન્સ વિદ્યાશાખાનાં અભ્યાસક્રમો ચલાવતી તમામ કોલેજોના આચાર્યશ્રીઓ તરફ....

નકલ સાદર રવાના:-

- માન.કુલપતિશ્રી/કુલસચિવશ્રીનાં અંગત સચિવશ્રી.
- પરીક્ષા નિયામકશ્રી, ભક્તકવિ નરસિંહ મહેતા યુનિવર્સિટી, જુનાગઢ

નકલ રવાના જાણ તથા યોગ્ય કાર્યવાહી અર્થે:

- સીસ્ટમ મેનેજરશ્રી, આઇ.ટી.સેલ વિભાગ (વેબસાઇટ ઉપર પ્રસિદ્ધ થવા અર્થે.)

BHAKTA KAVI NARSINH MEHTA UNIVERSITY

FACULTY OF SCIENCE

SYLLABUS FOR

SKILL ENHANCEMENT COURSE

BASKET FOR SCIENCE (HONOURS) PROGRAMME

(SEMESTER- IV)

EFFECTIVE FROM JUNE, 2024

BHAKTA KAVI NARSINH MEHTA UNIVERSITY

Skill Enhancement Course (SEC)

Syllabus for Faculty of Science as per NEP

Effective from June 2024

SEMESTER-4

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BHAKTA KAVI NARSINH MEHTA UNIVERSITY
Skill Enhancement Course (SEC)
Syllabus for Faculty of Science as per NEP
Effective from June 2024
SEMESTER-4

Course Level	5.0		**Internal Marks**	12
Programme	**B.Sc (Honours)**		**External Marks**	25
Semester	4		**Practical Internal**	13
Course Type	**Skill Enhancement Course-4**		**Practical External**	-
Course Credit	02		**Prac. Ext. Exam Time**	-
Teaching Hours	Theory-15 Practical-30		**Total**	50
Course Code			**Exam Duration**	1 Hour
Course Title	**Operating System**			

Course Objectives: On successful completion of the course, the students will be able to:

1. To disseminate the information about basic operating system objectives, functions and features
2. To impart the know-how of process management and memory management
3. To teach the basics of how to write simple programs to be run on unix/linux OS

Course Learning Outcomes: On successful completion of the course, the students will be able to:

1. Enhance the understanding of OS concepts
2. Developing know how of manipulating files and directories on disc
3. Having knowledge of developing program applications on Unix/Linux

Course Contents

Sem	Unit No.	Syllabi	Teaching Hours

3	1	• **Operating System:**
		  ○ Definition and concept
		  ○ Functions and objectives of OS
		  ○ Types of OS
		• **Process Management:**
		  ○ Definition and concept
		  ○ Process and State Transition Diagram
		  ○ Process Scheduling algorithm (FCFS, SJN, Round Robin, Priority based Scheduling)
		  ○ Interposes communication and synchronization.
		• **Memory Management:**
		  ○ Memory allocation concept
		  ○ Memory allocation Strategies (Paging, segmentation)
			05

		○ Physical and Virtual Memory	
	2	• **Programming with Unix/Linux operating system:** ○ Introduction ▪ History, evolution and features of Unix and Linux ▪ Comparison with other operating systems ○ File System ▪ File system hierarchy ▪ File & Directory Permissions ▪ Login commands (passwd, logout, who, who am i, clear) ▪ Basic file operations (create, delete, copy, move) ▪ File and directory commands (ls, echo, cat, cd, pwd, mv, cp, rm, rmdir, mkdir, umask, chmod, chown, chgrp, find, pg, more, less, head, tail, wc, touch) ○ Basics of Shell programming ▪ Shell Keywords, Variables (Shell, User, System) and operators ▪ Creating interactive shell script ▪ Decision Statements (if then fi, if then else fi, if then elif else fi, case esac) ○ Looping Statements (for loop, while loop, until loop, break, continue)	**10**
	3	**Practical**	**30**

Suggested Reading:

1. Operating System by William Stallings.
2. Unix Shell Programming by Y. Kanetkar.

Website References:

1. https://www.geeksforgeeks.org/operating-systems/
2. https://www.tutorialspoint.com/operating_system/index.htm
3. https://www.geeksforgeeks.org/essential-linuxunix-commands/
4. https://www.tutorialspoint.com/unix/shell_scripting.html

INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03

4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam.

Paper Style

Ques. No.	**Particulars**	**From which Unit**	**Marks**
1	Questions (Any Two Out Of Four)	1	**10**
2	Questions (Any Two Out Of Four)	2	**10**
3	Questions (Any One Out Of Two)	From Each Unit	**05**
		Total Marks	**25**

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SEMESTER-4

Course Level	5.0		**Internal Marks**	25
Programme	**B.Sc (Honours)**		**External Marks**	25
Semester	4		**Practical Internal**	-
Course Type	**Skill Enhancement Course-4**		**Practical External**	-
Course Credit	02		**Prac. Ext. Exam Time**	-
Teaching Hours	30		**Total**	50
Course Code			**Exam Duration**	1 Hour
Course Title	**HOME NURSING AND FIRST AID**			

Course Objectives: The students will be able to understand about the home nursing.

Course Learning Outcomes: To get the alimentary knowledge about first aid treatment needed in Various injuries.

Course Contents

Sem	Unit No.	Syllabi	Teaching Hours
3	1	**HOME NURSING** • The nurse and her duties. • The sickroom-choice, ventilation, heating, lighting and cleaning. • Bed and bedding-choice and care • Lecture/ demonstration on care and comfort of the patient, including: Bed-making and changing bottom sheets.	**15**
	2	**FIRST AID** • Introduction and definition • Principles of First aid • First aid during cuts • First aid during burns • First aid during fractures • First aid during poisons and bites (snake) • 7. First aid during insect bites	**15**

Suggested Reading:

1. Community nursing in developing countries by Monica Byrne & F. J.barnety
2. Text book of First Aid - Published by John Ambulance Association.
3. (ApattiVyavasthapan) Disaster Management by S. N. Parikh, Dr. G. P. Mankad. Dr. K. G. Vyas

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INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03
4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam

Paper Style

Ques. No.	**Particulars**	**From which Unit**	**Marks**
1	Questions (Any Two Out Of Four)	1	**10**
2	Questions (Any Two Out Of Four)	2	**10**
3	Questions (Any One Out Of Two)	From Each Unit	**05**
		Total Marks	**25**

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SEMESTER-4

Course Level	5.0		**Internal Marks**	25
Programme	**B.Sc (Honours)**		**External Marks**	25
Semester	4		**Practical Internal**	-
Course Type	**Skill Enhancement Course-4**		**Practical External**	-
Course Credit	02		**Prac. Ext. Exam Time**	-
Teaching Hours	30		**Total**	50
Course Code			**Exam Duration**	1 Hour
Course Title	**PLANT BREEDING**			

Course Objectives: On completion of the course, the students will be able to:

- Understand the fundamental concepts of pharmacognosy.
- Develop the skills of alkaloids extraction.
- Examine the alkaloids.
- Evaluate the process of screening alkaloids.

Pedagogy: Lectures/ Use of Multimedia / Assignments/ Hands-onexperiments/ Demonstrations/ Field visit.

Course Contents

Sem	Unit No.	Syllabi	Teaching Hours
3	1	**Plant Breeding:** • Introduction, definition and objectives of plantbreeding. • Breeding systems: modes of reproduction in crop plants. • Important achievements and undesirableconsequences of plant breeding. • Vegetatively propagated plants – Procedure, advantages and limitations.	**15**
	2	**Inbreeding depression and heterosis:** • History, genetic basis of inbreeding depression and heterosis; Applications. • Selection methods: Mass selection and Pure line	**15**

		selection. • Hybridization procedure • Role of mutations; Polyploidy; Distant hybridization and role of biotechnology in crop improvement.	

Suggested Reading:

1. Singh, B.D. (2005). Plant Breeding: Principles and Methods. Kalyani Publishers. 7th edition.
2. Chaudhari, H.K. (1984). Elementary Principles of Plant Breeding. Oxford – IBH. 2ndedition.
3. Acquaah, G. (2007). Principles of Plant Genetics & Breeding. Blackwell Publishing.

INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03
4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam.

Paper Style

Ques. No.	Particulars	From which Unit	Marks
1 (A)	Describe in detail (Any One) (1) (2)	**1**	**06**
1 (B)	Write a Short Note (Any One) (1) (2)		**04**
2 (A)	Describe in detail (Any One) (1) (2)	**2**	**06**
2 (B)	Write a Short Note (Any One) (1) (2)		**04**
3	Do as Directed (Any Five from Seven) (1) (2) (3) (4) (5) (6) (7)	**From 1 & 2**	**05**
	Total	**25**	

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Course Level	5.0		**Internal Marks (Practical)**	25
Programme	**B.Sc (Honours)**		**External Marks (Theory)**	25
Category of Course	**Skill Enhancement Course-4**		**Practical Exam Duration**	2 Hrs
Course Credit	2			
Teaching Hours	15T +30P = 45		**Theory Exam Duration**	1 hrs
Course Code			**Total**	50
Course Title	**Chromatographic Techniques**			

Course Objectives:

- To develop the skill of analysing components of various types of mixtures containing amino acids, metal ions, phenols, sugar molecules etc using simple chromatographic techniques.

Course Learning Outcomes: After completion of the course:

- Learners will develop theoretical background and practical skill of using chromatography as a technique in identifying and separating various components from different types of mixtures.
- They will be able to identify the system, type and method most suitable for identification and separation of mixtures. like amino acids, metal ions, phenols, sugar molecules etc.

Sem	Unit No.	Syllabi	Teaching Hours
3	1	**Chromatography** Introduction, Classification of chromatography - types of chromatography, Principle of Chromatography **Column chromatography:** Principle, Adsorbents, Preparation of column, Method, Separation of green leaf pigment, **Paper chromatography:** Introduction**,** Principle, Types of Paper Chromatography (Ascending and Descending, Two dimensional; Circular), Migration parameters (Rf value and Rx value), Spotting and Visualization. Separation of amino acids and metal ions (Fe^{+} , Co^{+2}, $Ni^{+2)}$ mixture using spray reagent ninhydrine and aniline phthalate **TLC:** Introduction, Principle, Method of preparation of chromplate, Experimental techniques, Superiority of TCL over other chromatographic Techniques, Application of TLC.	**7T**

	2	**Gas chromatography;** Introduction, Types, **P**rinciple of GLC and GSC, Instrumentation, Carrier gas and Solvent, Column and Detectors (Briefly), Advantages of gas chromatography Ion Exchange chromatography: Introduction, Definition and Principle, Type of resins, Properties of ion exchange resins, Factors affecting separation of ions, Ion exchange capacity, Applications (Removal of interfering ion, Softening of water, Demineralizationof water, Separation of lanthanides)	**8T**

Practical

Sem	Syllabi	Teaching Hours
3	**Chromatography** Atleast six practicals may be given. 1. To determine Rf value of individual amino acids in a mixture of amino acid by ascending paper chromatography. 2. To determine Rf value of individual and mixture of amino acid by circular paper chromatography. 3. To determine Rf value of individual and mixture of amino acid by thin layer chromatography (TLC). 4. To determine Rf value of individual and mixture of metal ions by ascending paper chromatography. 5. To determine Rf value of individual and mixture of metal ions by circular paper chromatography. 6. To determine Rf value of individual and mixture of two sugars by ascending paper chromatography. 7. Separation of a mixture of o-and p-nitrophenol or o-and p-aminophenol by thin layer chromatography (TLC) 8. Separation and identification of the monosaccharides present in the given mixture (glucose & fructose) by paper chromatography. Reporting the Rf values.	**30P**

Suggested Reading:

1. Principles of Inorganic chemistry – Puri, Sharma & Kalia

2. Concise Inorganic Chemistry - J. D. Lee

3. Advanced Inorganic Chemistry- Cotton and Wilkinson

4. Basic Inorganic Chemistry - Gurdeep & Chatwal

5. Organic Chemistry (Volume I, II & III) by S.M. Mukherji, S.P. Singh and R.P. Kapoor

6. Engineering Chemistry by Jain and Jain

7. Industrial Chemistry by B.K. Sharma

8. Handbook of practical chemistry by shubhash and satish

9. Thin Layer Chromatography by Egal Stall

10. Chromatographic separation by Tata McGraw Hill

11. A Textbook of Quantitative Inorganic Analysis by A. I. Vogel

12. Inorganic qualitative analysis by Vogel and Gehani Parekh

13. Reigel's Handbook of Industrial Chemistry by James A. Kent

14. Fundamental of Analytical Chemistry by Skoog and West

15. Instrumental Methods of Chemical Analysis by B. K. Sharma

16. Instrumental Method of Chemical Analysis by Chatwal Anand

17. Analytical Chemistry by Dick

18. Electrometric Methods of Analysis by Browning

19. Principle of Instrumental Methods of Analysis by Skoog.

20. Mikes, O. & Chalmes, R.A. Laboratory Hand Book of Chromatographic & Allied Methods, Elles Harwood Ltd. London.

21. Ditts, R.V. Analytical Chemistry – Methods of separation.

22. Jack T. Ballinger; Gersshon J. Shugar. Chemical Technicians' Ready Reference Hand bok, 5th Edition, 2011, ISBN:9780071745925, The McGraw-Hill com, Incpanies

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INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03
4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam

Paper Style

Ques. No.	Particulars	From which Unit	Marks
1	Any two out of 3 questions (5 marks each)	**1**	**10**
2	Any two out of 3 questions (5 marks each)	**2**	**10**
3	Any one out of 2 questions (5 marks each)	**One Question from Each Unit**	**05**
	Total Marks		**25**

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SEMESTER-4

Course Level	5.0		**Internal Marks**	-
Programme	**B.Sc (Honours)**		**External Marks**	25
Semester	4		**Practical Internal**	-
Category of Course	**Skill Enhancement Course-4**		**Practical External**	-
Course Credit	01		**Prac. External Exam Duration**	-
Teaching Hours	30		**Total**	25
Course Code			**Exam Duration**	1 Hrs.
Course Title	**Microbial Products: Bio-fertilizer & Bio-pesticides (Theory)**			

Course Objectives: By completing the course, students have to:

- To expand the knowledge about the microbial role in agriculture field.
- To understand the importance of microorganism in production of biopesticides/bioinsecticides.

Course Learning Outcomes: After completion of the course:

- Have developed a very good understanding of practical aspects of production of biofertilizers.
- Have developed a very good understanding of practical aspects of the production of biopesticides/bioinsecticides.

Course Content

Sem	Unit No.	Syllabus	Teaching Hours
3	1	**Symbiotic Nitrogen Fixers as Biofertilizers** • General account of the microbes used as biofertilizers for various crop plants and their advantages over chemical fertilizers. • Symbiotic N2 fixers: *Rhizobium* - Isolation, characteristics, types, inoculum production and field application, legume/pulses plants. *Frankia* - Isolation, characteristics, Alder, Casurina plants, non-leguminous crop symbiosis**.**	**8**
	2	**Non - Symbiotic Nitrogen Fixers as Biofertilizers** • Cyanobacteria as bio-fertilizers- Isolation, characterization, mass multiplication, Role in rice cultivation, Crop response, field application. Non - Symbiotic Nitrogen Fixers. Free living	**8**

		Azospirillum, *Azotobacter*- free isolation, characteristics, mass inoculums, production and field application	
	3	**Solubilizers and Biofertilizers** • Phosphate Solubilizers: Phosphate solubilizing microbes - Isolation, characterization, mass inoculum production, field application. Mycorrhizal Bio-fertilizers: Importance of mycorrizal inoculum, types of mycorrhizae and associated plants, Mass inoculum production of VAM field applications.	**7**
	4	**Bioinsecticides** Bioinsecticides: General account of microbes used as bioinsecticides and their advantages over synthetic pesticides, Bacillus thuringiensis, production, Field applications, Viruses – cultivation and field applications.	**7**

Suggested Reading:

1. Eldor A. Paul. Soil Microbiology. Ecology and Biochemistry. VI Edition: Academic Press, (2007).
2. Eugene L. Madsen. Environmental Microbiology: From Genomes to Biogeochemistry. I Edition, Wiley-Blackwell Publishing (2008).
3. Agrios, G.N. Plant pathology. Harcourt Asia Pvt. Ltd. (2000).
4. Buchanan. B.B., Gruissem, W. and Jones, R.L Biochemistry and Molecular Biology of Plants. I.K. International Pvt. Ltd. (2000).
5. Mehrotra R S and Ashok Agrawal. Plant Pathology. Tata Mc Graw Hill ,6th reprint (2006).
6. K. S. Bilgrami, H. C. Dube. A textbook of modern pathology. 6th Edition, Vani Educational Books, a division of Vikas, (1984).
7. Shalini Suri. Biofertilizer and Biopesticide Aph Publishing Corporation (2011).

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SEMESTER-4

Course Level	5.0		**Internal Marks**	25
Programme	**B.Sc. (Honours)**		**External Marks**	-
Semester	4		**Practical Internal**	-
Category of Course	**Skill Enhancement Course-4**		**Practical External**	-
Course Credit	01		**Prac. External Exam Duration**	1 Hrs.
Teaching Hours	30		**Total**	25
Course Code			**Exam Duration**	-
Course Title	**Microbial Products: Bio-fertilizer & Bio-pesticides (Practical)**			

Course Objectives:

1. To expand the practical knowledge about the microbial bioproducts.
2. To understand the importance of microorganism in production of biopesticides/bioinsecticides.

Course Learning Outcomes: After completion of the course:

1. Have developed a good practical understanding about the biofertilizer as valuable agricultural product.
2. Have developed a good understanding about the effect of biofertilizer and biopesticide.

Suggested Practical

Sr. No	Practical content	Teaching Hrs
1.	Isolation of symbiotic nitrogen fixer from the legume plant root.	30
2.	Isolation of non-symbiotic nitrogen fixer from the plant.	
3.	To microscopic observation of soil cyanobacteria.	
4.	To microscopic observation of Mycorrhiza.	
5.	Isolation of Phosphate Solubilizers from agricultural soil.	
6.	Isolation and examination of biopesticide producers.	
7.	Control and prevention of plant pathogen using biopesticides.	

Suggested reading

1. Patel. R.J., Patel. K.R., Experimental Microbiology, Vol-I, Aditya Publications, Ahmedabad, India.
2. Patel. R.J., Patel. K.R., Experimental Microbiology, Vol-II, Aditya Publications, Ahmedabad, India.

3. Dubey. R.C., Maheshwari. D.K., Practical Microbiology, S.Chand & Company Ltd., New Delhi

INTERNAL EVALUATION SCHEME		
INTERNAL ASSESSMENT		
No.	**Particulars**	**Weightage**
1	Internal test (Theory or practical)	13
2	Assignment/practical assignment	5
3	Field visit report/ class presentation	5
4	Attendance	2
	Total	25

Paper Style:

Ques. No.	**Particulars**	**From which Unit**	**Marks**
Que.1	Question 1 (1) (2)	**1 & 2**	 **05** **05**
	Or		
	Question 1 (1) (2)		 **05** **05**
Que.2	Question 2 (1) (2)	**3 & 4**	 **05** **05**
	Or		
	Question 2 (1) (2)		 **05** **05**
Que.3	Question 1	**From Any Unit**	**05**
	Or		
	Question 2		
	Total	**25**	

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Course Level	5.0		**Internal Marks**	-
Programme	**B.Sc (Honours)**		**External Marks**	-
Semester	4		**Practical Internal**	25
Category of Course	**Skill Enhancement Course-4**		**Practical External**	25
Course Credit	02		**Prac. External Exam Duration**	2 HOURS
Teaching Hours	30		**Total**	50
Course Code			**Exam Duration**	2 HOURS
Course Title	**Basics of Printed Circuit Board (PCB) and Breadboard**			

Course Objectives:

- The course aims to provide hands-on experience in soldering techniques, constructing and testing simple electronic circuits using PCBs and breadboards.
- It covers practical skills in handling resistors, capacitors, diodes, and transistors, ensuring students understand the fundamentals of creating reliable electrical connections.
- Through various practical, students will gain confidence in circuit assembly, component placement, and troubleshooting, laying a solid foundation for advanced electronic design and prototyping.

Course Learning Outcomes:

- Upon completion of the course, students should be able to:
- Demonstrate proficiency in soldering various electronic components.
- Implement simple electronic circuits using resistors, capacitors, diodes, and, transistors on a PCB.
- Understand breadboard layout and effectively connect and disconnect components.
- Build simple electronic circuits using resistors, capacitors, diodes, and, transistors on a breadboard.
- Understand the differences between PCB and breadboard circuit implementations.

Course Contents:

Unit No.	Syllabi	Teaching Hours
List of Experiments	**Practical 1:** Practice soldering of various electronic components. **Practical 2:** Solder the joint connection of wires and components on a PCB and check it. **Practical 3:** Use of PCB to implement simple electronic circuits using resistors.	**60**

	Practical 4: Use of PCB to implement simple electronic circuits using capacitors. **Practical 5:** Use of PCB to implement simple electronic circuits using diode or transistors. **Practical 6:** Introduction to breadboard layout and demonstrate how to connect and disconnect components and wires. **Practical 7:** Use of breadboards to implement simple electronic circuits using resistors. **Practical 8:** Use of breadboards to implement simple electronic circuits using capacitors. **Practical 9:** Use of breadboards to implement simple electronic circuits using diodes or transistors. **Practical 10:** Prepare any simple electronic circuits using general purpose PCB. **Practical 11:** Prepare any simple electronic circuits using Breadboard.	

Suggested Reading:

Text Books:

1. Electronic Component and Materials by S.M.Dhir, Publisher: Tata McGraw Hills
2. Printed circuit boards design and technology by W.C. Bosshart Publisher: Tata McGraw Hills

Reference Books:

1. Electronics Project for Beginners, by A.K.Maini, Publishers: Pustak Mahal
2. Electrical Drawing by J.B.Gupta

INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03
4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03

10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam.

Paper Style

Sr. No.	Particulars	Marks
1	**Understanding of Practical**	**15**
2	**Reading**	**10**
	Total Marks	**25**

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Course Level	**5.0**		**Internal Marks**	25
Semester	**4**		**External Marks**	25
Category of Course	**Skill Enhancement Course-04**		**Practical Internal**	-
Course Credit	02		**Practical External**	-
Teaching Hours	4 Hrs./ Week		**Total**	50
Course Code			**Exam Duration**	**2 hrs.**
Course Title	**Communication skill**			

Sr No.	Syllabus	Teaching Hours/ Week
1	**Importance and process of Communication** Verbal and Non-verbal process of Communication	**4**
2	**How to face an interview** Group Discussion, How to plan and conduct the Interviewer, importance of body language and gesture in interview, eye contact and appearance during interview process.	
3	**Different skills and its importance** Listening Skill, Developing Reading Skills, Developing Conversational skills, Technical Writing skills.	

INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03

4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam.

<u>External Exam</u> **Total Marks: 25**

Sr. No.	Questions	Marks
1	Answer any one in detail. (**Any One**)	**10**
2	Answer any one in detail. (**Any One**)	**10**
3	Answer any one in detail. (**Any One**)	**05**

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Course Level	5.0		**Internal Marks**	25
Programme	**B.Sc (Honours)**		**External Marks**	25
Semester	4		**Practical Internal**	-
Course Type	**Skill Enhancement Course-4**		**Practical External**	-
Course Credit	02		**Prac. Ext. Exam Time**	-
Teaching Hours	30		**Total**	50
Course Code			**Exam Duration**	1 Hour
Course Title	**Economic Zoology**			

Course Objectives: On successful completion of the course, the students will be able to:

- The course is designed with an aim to provide knowledge of fishery biology including aquaculture, culture practices, induced breeding, various fish diseases, and fish by product, and post harvesting techniques.
- The course will create a deep understanding of major animal husbandry techniques like Apiculture, pearl culture and sericulture which helps in entrepreneurship abilities, innovative thinking, planning, and setting up small-scale enterprises.

Course Learning Outcomes: On successful completion of the course, the students will be able to:

Upon completion of the course, students should be able to:

- Learn major techniques and practices of aquaculture of Saurashtra coast.
- Learn about the importance of Animal husbandry with the help of study Apiculture, pearl culture and sericulture. Acquire sound knowledge on different components of apiculture, pearl culture and sericulture industry, Gain skill with hands on training on cultivation and carry forward to field, which helps in entrepreneurship abilities, innovative thinking, planning, and setting up small-scale enterprises.

Course Contents

Sem	Unit No.	Syllabi	Teaching Hours
3	1	**FISHERIES BIOLOGY** 1.1 Basics of aquaculture, definition and scope. History of aquaculture: Present global and national scenario. 1.2 Culture practices: Indian major carps and exotic carps; Shrimps and prawns. 1.3 Induced Breeding: Hormonal regulation of gonadal development, Activity of Gonadotropin releasing	**15**

		hormone, application of hormones in aquaculture. 1.4 Nutrition in fish: Nutrition, Feed formulation, Feed additives, Alternative feed ingredients. 1.5 Fish Diseases (Dropsy, Fungus infection, Gill rot, White spot, Costiasis, Argulus disease) 1.6 Fish by products ○ Post harvesting Techniques in fisheries	
	2	**ANIMAL HUSBANDRY** 2.1 Apiculture: History, Classification and Life Cycle of Honey Bees; Social Organization of Bee Colony; Artificial Bee rearing (Apiary), Beehives – Newton and Langstroth; Methods of Extraction of Honey (Indigenous and Modern); Products of Apiculture Industry and its Uses – Honey, Bees Wax, Propolis, Pollen etc. 2.2 Pearl culture: Important Pearl-Producing Oysters; Distribution in Indian Waters; Biology of Pearl Oyster; Formation of Pearl; Artificial Pearl Culture; Large-Scale Pearl Culture ○ Sericulture: Definition, history and present status; Silk route, Types of silkworms, Mulberry and non-mulberry Sericulture; Life cycle of *Bombyx mori*; Silkworm rearing technology: Early age and Late age rearing, Types of mountages, Spinning, harvesting and storage of cocoons.	**15**

Suggested Reading:

1. Fish & Fisheries of India ---V.G.Jhingram
2. Aquaculture – Principles and Practices --- Pillay, T.,V., R., Kutty, M., N. 2nd Edn. Blackwell Publishing, New Delhi.
3. Fishes an introduction to Ichthyology ---Paper and Moyle
4. Marine fisheries ---D.V.Bal, K.V.Rao
5. Ichthyology ---S.Chand
6. Text book of applied entomology –Srivastava
7. Economic zoology --Shukla &Upadhyaya
8. Pest management & Pesticides Indian scenario --Nyar B.V.

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INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03
4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03
22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam

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SEMESTER-4

Paper Style:

Ques. No.	Particulars	From which Unit	Marks
Que.1	Question 1 (1) (2)	**1**	 **05** **05**
	Or		
	Question 1 (1) (2)		 **05** **05**
Que.2	Question 2 (1) (2)	**2**	 **05** **05**
	Or		
	Question 2 (1) (2)		 **05** **05**
Que.2	Question 1	**1 & 2**	**05**
	Or		
	Question 2		
	Total	**25**	

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SEMESTER-4

Course Level	5.0		**Internal Marks**	25
Programme	**B.Sc (Honours)**		**External Marks**	25
Semester	4		**Practical Internal**	-
Course Type	**Skill Enhancement Course-4**		**Practical External**	-
Course Credit	02		**Prac. Ext. Exam Time**	-
Teaching Hours	30		**Total**	50
Course Code			**Exam Duration**	1 Hour
Course Title	**Conversational Skills -2**			

Course Objectives: On successful completion of the course, the students will be able to:

- To introduce advanced conversational skills in students.
- To develop advanced proficiency in English conversational skills.
- To make students able to understand usage of English language in conversations.
- To enable students for writing in formal situations.

Course Learning Outcomes: After completion of the course:

- Students will be able to understand usage of conversational skills.
- Students will be able to make advanced conversations in English.
- Students will be able to understand usage of English language in conversations.
- Students will be able to write in formal situation.

Course Contents

Sem	Unit No.	Syllabi	Teaching Hours
3	1	• Speaking situations- social gathering and networking (introducing self, small talks, networking conversations) • Cross-cultural communications (conversation with visiting foreigners, conversation in foreign lands) • Feedback writing (for visiting a place, for attending a gathering)	**15**

	2	• Workplace dialogues (with colleagues, with boss, with HR person, with clients) • Group discussion and debates (how to, preparation drafts, academic topics, social topics) • Email writing (workplace, order, complaint etc)	**15**

Suggested Reading:

1. How to talk to Anyone by Leil Londes
2. Business Communication by Urmila Rai and S.M. Rai. Himalaya Publishing House
3. Practical English Usage by Michael Swan
4. English Grammar & Composition by Wren & Martin.

INTERNAL EVALUATION SCHEME		
NO	**Particulars**	**Marks**
1	**Mid Semester Exam (Mandatory)**	**13**
2	Class Test	03
3	Open book exam/test	03
4	Open note exam/test	03
5	Self-test/ Online test	03
6	Essay/Article writing	03
7	Quizzes/Objective test	03
8	Class assignment	03
9	Home assignment	03
10	Reports Writing	03
11	Research/Dissertation	03
12	Case Studies	03
13	Viva/Oral exam	03
14	Group Discussion	03
15	Role Play	03
16	Paper presentation/Seminar	03
17	Language Lab work	03
18	Interview	03
19	Craft work	03
20	Co-curricular work	03
21	Field Assignment	03

22	Poster Presentation	03
23	Attendance	03
24	Project Work	03
	Total	**25**

Note: Sr.No.1 is mandatory. Select <u>any Four</u> from Sr.No.2 to 24. Each Contains three marks. Student should secure 09 Marks for passing in internal Exam

Paper Style

Ques. No.	**Particulars**	**From which Unit**	**Marks**
1	Give appropriate response in following conversation. (5 Marks) Write a dialogue on any one of the following situations. (5 Marks)	1	**10**
2	Write a workplace dialogue on any one of the two given topics. (5 marks) Write draft for given topics for group discussion or debate. (Two option, 5 Marks)	2	**10**
3	Write an email on any one of the two given topics.	2	**05**
	Total Marks		**25**

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Course Level	5.0		**Internal Marks**	--
Programme	**B.Sc (Honours)**		**External Marks**	--
Semester	4		**Practical Internal**	25
Course Type	**Skill Enhancement Course-4**		**Practical External**	25
Course Credit	02		**Prac. Ext. Exam Time**	2 Hours
Teaching Hours	30		**Total**	50
Course Code			**Exam Duration**	2 Hours
Course Title	**Advanced GeoGebra (FOSS)** {Practical Based Course}			

Course Objectives:

- To understand and apply methods to find the row-echelon form and rank of matrices.
- To determine the consistency of systems of linear equations.
- To master the conversion between Cartesian and Polar coordinates.
- To graph functions using Polar coordinates.
- To transform points between Cartesian and Polar, cylindrical, and spherical coordinates.
- To convert various types of equations from Cartesian to Polar form.
- To convert various types of equations from Polar to Cartesian form.
- To compute first-order and second-order partial derivatives.
- To calculate and visualize the curvature of functions and implicit curves.
- To identify and analyze asymptotes of different types of functions.

Course Outcomes:

- Students will be able to compute the row-echelon form and rank of matrices accurately.
- Students will be capable of determining the consistency of a system of linear equations.
- Students will confidently convert Cartesian coordinates to Polar coordinates and vice versa.
- Students will be able to graph and interpret functions in Polar coordinates.
- Students will effectively transform and visualize points between Cartesian, Polar, cylindrical, and spherical coordinates.
- Students will successfully convert linear, circular, parabolic, elliptical, and hyperbolic equations from Cartesian to Polar form.
- Students will convert various Polar equations to Cartesian form, including linear, circular, parabolic, and lemniscate equations.
- Students will accurately compute and evaluate first-order and second-order partial derivatives.
- Students will calculate and plot curvature and osculating circles for functions and implicit curves.
- Students will analyze and visualize the asymptotes of rational, trigonometric, and hyperbolic functions.

1	(A)	Find row-Echelon form for the given matrix.
	(B)	Find rank of the given matrix
	(C)	Determining the Consistency of a System of Linear Equations
2	(A)	Converting Cartesian Coordinates to Polar Coordinates
	(B)	Graphing Functions in Polar Coordinates
	(C)	Transforming Points between Cartesian and Polar Coordinates
	(D)	To visualize and convert points between Cartesian and cylindrical coordinates
	(E)	To visualize and convert points between Cartesian and spherical coordinates
3	(A)	To convert a simple linear equation from Cartesian to Polar form.
	(B)	To convert the equation of a circle from Cartesian to Polar form.
	(C)	To convert the equation of a parabola from Cartesian to Polar form
	(D)	To convert the equation of an ellipse from Cartesian to Polar form
	(E)	To convert the equation of a hyperbola from Cartesian to Polar form
4	(A)	To convert a simple Polar equation to Cartesian form
	(B)	To convert the equation of a line from Polar to Cartesian form
	(C)	To convert the equation of a circle from Polar to Cartesian form.
	(D)	To convert the equation of a parabola from Polar to Cartesian form
	(E)	To convert the equation of a lemniscate from Polar to Cartesian form
5	(A)	To find the first-order partial derivatives of a function of two variables
	(B)	To compute the second-order partial derivatives of a function of two variables
	(C)	To evaluate the partial derivatives of a function at a specific point
6	(A)	To calculate and plot the curvature of a function at a specific point
	(B)	To visualize the osculating circle (circle of curvature) at a point on the function
	(C)	To calculate the curvature of an implicitly defined function at a specific point

7	(A)	To find the vertical asymptotes of a given rational function
	(B)	To determine the horizontal asymptotes of a given function
	(C)	To find the oblique (slant) asymptotes of a given rational function
	(D)	To analyze and plot the asymptotes of a hyperbola
	(E)	To visualize the asymptotes of trigonometric functions
8	(A)	To create and visualize a vector subspace in 2D
	(B)	To find the basis of a given vector subspace
	(C)	To visualize the intersection of two vector subspaces
	(D)	To check and visualize if a given vector belongs to a subspace
	(E)	To perform and visualize the orthogonal projection of a vector onto a subspace
9	(A)	To find the basis of a 2D and a 3D vector space
	(B)	To find the basis of a given subspace
	(C)	To verify if a given set of vectors forms a basis
	(D)	To find the dimension of a 2D and a 3D vector spaces
	(E)	To find the complementary subspace of a given 2D and 3D vector spaces
	(F)	To find the complementary subspace of a plane in 3D
	(G)	To find the complementary subspace of a line in 3D
10	(A)	To find the eigenvectors and eigenvalues of a linear transformation matrix
	(B)	To find the rank and nullity of a given linear transformation matrix
	(C)	To calculate the inner product of two vectors in 2D
	(D)	To calculate the inner product of two vectors in 3D
	(E)	To find the norm of a vector using the inner product
	(F)	To calculate the angle between two vectors using the inner product
	(G)	To apply the Gram-Schmidt process to obtain an orthonormal basis

Suggested Reference:

1. https://www.geogebra.org/search/math%20manual
2. N.B. Use GeoGebra Classic 5 or later version.