C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

BACHELOR OF SCIENCE (MICROBIOLOGY)

DEPARTMENT OF ARTS & HUMANITIES

SEMESTER: VI CODE: 4SC06PEF1

NAME: Professional Etiquettes-II

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
						Theory				Practical			Total marks
		Th	Tu	Pr	Total	Sessional Exam		University Exam		Internal		University	
						Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4SC06PEF1	Professional Etiquettes-II	1	0	2	3	20	1	50	2	20	10	----	100

Objectives:

Prerequisites:

Course outline:

Sr. No.	Course Content (Title of the Unit)	Minimum Number of Hours
1	Interview-2	**6**
2	Group Discussion	**6**
3	Debate	**4**
4	Public Speaking	**4**
5	Technical Presentation/Talk	**6**
6	Resume Building	**4**
7	Official (Job) Letters	**7**
8	Circular, Memorandum	**4**
9	Technical Research Paper and Thesis/Dissertation	**5**
10	Competitive Exam Guidance	**4**
11	**Wings of Fire by Abdul Kalam-Propitiation & Contemplation Chapters**	**10**
	Total	**60**

Detail Course Content:

Unit No.	Detailed Contents
	Section-A
1	Interview • Introduction Importance Procedure Types Qualities observed by the employer Frequently asked questions Failure factors • Practice of interview and revision of important aspects of interview
2	**Group Discussion** • Introduction • Importance • Characteristics of successful group discussion • Types **Debate** • Introduction • Difference between group discussion and debate • Importance • Assessment criterions
3	**Public Speaking** • Introduction • Difference between presentation and public speaking • Qualities of good speaker • Non verbal communication **Technical Presentation/Talk** • Introduction • Preparing technical presentation • Language of the presentation • Using technological aids for presentation
4	**Resume Building** • Introduction • Difference between curriculum vitae and resume • Types • Formats • Sample of resumes
5	**Official (Job) Letters** • Cover letter/job application: solicited & unsolicited • Follow-up application • Job acceptance letter • Job refusal letter • Resignation letter • Termination letter

	• Relieving letter
6	**Circular, Memorandum** • Objectives of circular and memorandum • Drafting circular and memorandum
7	**Technical Research Paper and Thesis/Dissertation** • Introduction to research paper, thesis and dissertation • Types of research paper • Difference between research paper and article • Elements in research paper • Writing components: language, vocabulary, punctuation, cohesion, clarity etc.
8	**Competitive Exam Guidance** • Introduction to various competitive exams conducted by government • How to crack the competitive examination-tips • Major areas for preparation • Helping tools: websites, magazines, newspapers, employment news papers
	Section-B: Literature
9	**Wings of Fire by Abdul Kalam-Propitiation & Contemplation Chapters**

References:

Sr No.	Title	Author	Publisher
1	Effective Personal Communication Skills for Public Relations	Green Andy	Kogan age Limited
2	Advanced Buisness Communication	John M. Penrose Jr., Robert W. Rasberry, Robert J. Myers	Thomason/South-Western
3	Technical Communication	D.K.Chakradev	Tech-max Publication
4	Basic Buisness Communication	Flatly and Lesikar	
5	From Sentence to Paragraph	William J. Kelly and Deborah L. Lawton	Longman
6	Technical Communication: Principles and Practice	Meenaxi Raman & Sangeeta Sharma	Oxford University Presss
7	Principles and Practice of Business Communication	Rhoda Doctor	Sheath publishers
8	Effective Technical Communication	M Ashraf Rizvi	Tata Mc Graw hill
9	Personality Development and Soft Skills	Mitra Barun	OUP
10	Resumes and Interviews	M Ashraf Rizvi	Tata Mc Graw hill
11	Business Communication	Asha Kaul	Prentice-Hall of India Ltd
12	Business Communication	Lesikar Raymond V & Pettit John D	AIIBS Publishers & Distributers
13	Hand Book of Practical Communication Skills	Chrissie Wrought	Jaico Publishing House
14	Communication Today – Understanding Creative Skills	Ray Reuben	Himalaya Publishing House
15	Managing Soft Skills for Personality Development	B.N. Ghosh	Tata Mc Graw hill
16	Wings of Fire	Abdul Kalam	University Press

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FACULTY OF SCIENCES

BACHELOR OF SCIENCE (MICROBIOLOGY)

DEPARTMENT OF MICROBIOLOGY

SEMESTER: VI CODE: 4SC06EEB1

NAME: ECOLOGY & EVOLUTIONARY BIOLOGY

Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
						Theory				Practical			Total marks
		Th	Tu	Pr	Total	Sessional Exam		University Exam		Internal		University	
						Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4SC06EEB1	Ecology & evolutionary biology	3	0	0	3	30	1	70	3	----	----	----	100

Objectives:

To acquaint the students with ecological parameters and evolutionary biology.

Prerequisites:

The student should have basic knowledge of environmental science & biology.

Course content:

Sr. No.	Course contents	Teaching Hours
1	**Introduction to Ecology** History of ecology; Definition, scope and importance **Environmental Factors** Climatic; Topographic; Biotic (species interactions); and Edaphic (soil profile, physicochemical properties); Soil erosion and conservation.	05
2	**Population Ecology** Introduction; Population characteristics, Genecology (Ecads, ecotypes and ecospecies. **Community Ecology** Introduction; Qualitative, Quantitative and Synthetic characteristics; Methods of analysis. **Ecosystem Ecology** Structure (components) and functions (trophic levels, food chains, food webs, ecological pyramids and energy flow.	10
3	Primitive earth; Major events in the history of life; Modern (Chemosynthetic) theory of life origin; Miller's experiment;	05

	Organic Evolution Meaning and evidences (Anatomical, Embryological, Physiological and Paleontological	
4	**Lamark's theory of inheritance of acquired characters**; Darwin's theory of natural selection; Hardy-Weinberg principle and its applications; Macro, Micro and Molecular evolution; Molecular clocks; Agents of evolutionary change (Mutation, Gene flow, Non-random mating, Genetic drift and Selection); Coevolution; Cataclysmic evolution; Enzyme polymorphism; Species concept (Biological, Evolutionary and Ecological); Isolating mechanisms and type of speciation; Modern interpretation of Darwinism.	10
	Total Hours	**30**

Learning Outcomes:-

At the end of the course the student would have gained requisite knowledge about the evolutionary processes and their relationship with biology of the organism.

Teaching & Learning Methodology:-

- Use of audiovisual aids.
- Use of charts.
- Student interaction, group discussion, seminar, quizzes, assignment, brain storming session.

Books Recommended:

- Bhatia, A.L. 2010. Text Book of Environmental Biology. I.K.International Publishing House Pvt. Ltd.
- Bhatia, K.N. 2002. A Treatise on Plant Ecology. Pradeep Publications.
- Dash, M.C. 2001. Fundamentals of Ecology. Tata McGraw-Hill Education.
- Jr. Miller, G.T. and Spoolman, S.E. 2011. Essentials of Ecology. Brooks /Cole. CENGAGE Learning.
- Jr. Molles, M.C. Ecology; Concepts and Applications. 2008. McGraw-Hill.
- Kormondy, E.J. 1996. Concepts of Ecology. Prentice Hall of India Pvt. Ltd. New Delhi.
- Odum, E.P.1971. Fundamentals of Ecology. Saunders, Philadelphia.
- Odum, E.P. and Barrett, G.W. 2005. Fundamentals of Ecology. Thomson Brooks / Cole.
- Sharma, P.D. 2012. Ecology and Environment. Rastogi Publications.
- Brooker, R.J. 2012. Concepts of Genetics; **(Chapter-27: Evolutionary Genetics).** McGraw-Hill.
- Gardner, E.J., Simmons, M.J. and Snustad, D.P. 1991. Principles of Genetics; **(Chapter-22: Evolutionary Genetics).** John Wiley & Sons, Inc.
- Kay, L.E.1993. The Molecular Vision of Life. 1993. Oxford University Press.

- Klug, W.S., Cummings, M.R., Spencer, C.A. and Palladino, M.A. 2012. Concepts of Genetics; **(Chapter-25: Population and Evolutionary Genetics).** Pearson Benjamin Cummings.
- Raven, P.H., Johnson, G.B., Mason, K.A., Losos, J.B. and Singer, S.R. 2014. Biology; **(Part-IV: Evolution)**. McGraw-Hill.

- Snustad, D.P. and Simmons, M. J. 2012. Principles of Genetics; **(Chapter-24: Evolutionary Genetics).** John Wiley and Sons, Inc.
- Savage, J.M. 1969. Evolution. Oxford & IBH Publishing House.
- Verma, P.S. and Agarwal, V.K. 2012. Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand& Co. Ltd.
- Volpe, E.P. 1992. Understanding Evolution. Universal Book St

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FACULTY OF SCIENCES

BACHELOR OF SCIENCE (MICROBIOLOGY)

DEPARTMENT OF MICROBIOLOGY

SEMESTER: VI CODE: 4SC06PIP1

NAME: Patents & IPR

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
						Theory				Practical			Total marks
		Th	Tu	Pr	Total	Sessional Exam		University Exam		Internal		University	
						Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4SC06PIP1	Patents & IPR	2	0	0	2	30	1	70	3	----	----	----	100

Objectives:

This part of the syllabus helps the students to understand the ethical, social and legal aspects in biology

Prerequisites:

The student must have good knowledge of research methodology.

Course outline:

Sr. No.	Course contents	Teaching Hours
1	**Introduction to Intellectual Property Law** The Evolutionary Past The IPR Tool Kit Para -Legal Tasks in Intellectual Property Law Ethical obligations in Para Legal Tasks in Intellectual Property Law Introduction to Cyber Law Innovations and Inventions Trade related Intellectual Property Right TRIP- GATT and PBR, WTO	10
2	**Introduction to Trademark** Trademark Registration Process Post registration Procedures Trademark maintenance Transfer of Rights Inter parties Proceeding Infringement Dilution Ownership of Trademark Likelihood of confusion Trademarks claims	10

	Trademarks Litigations International Trade mark Law	
3	**Introduction to Copyrights** Principles of Copyright The subjects Matter of Copy right The Rights Afforded by Copyright Law Copy right Ownership, Transfer and duration Right to prepare Derivative works Rights of Distribution Rights of Performing the work Publicity Copyright Formalities and Registrations - Limitations Copyright disputes and International Copyright Law	10
	Total Hours	**30**

Learning Outcomes:-

This course introduces students to Intellectual Property (IP) Law in general and its three common categories: Industrial Property (mostly patents), Trademarks and Copyright. The course provides an overview of the main principles and legal rules of IP Law, focusing specifically on the theoretical and practical connections between IP and academic/scientific works/studies and on the IP issues with which the students are likely to come into contact in their different areas of knowledge.

Teaching & Learning Methodology:-

Theory Lectures as recommended in the teaching scheme.

Books Recommended:

1. Debirag E.Bouchoux: "Intellectual Property". Cengage learning , New Delhi
2. M.Ashok Kumar and Mohd.Iqbal Ali: "Intellectual Property Right" Serials Pub.
3. Cyber Law. Texts & Cases, South-Western's Special Topics Collections
4. Prabhuddha Ganguli: ' Intellectual Property Rights" Tata Mc-Graw –Hill, New Delhi
5. Singh K, Intellectual Property rights on Biotechnology, BCIL, New Delhi, 2010
6. Beier, F.K., Crespi, R.S. and Straus, T. Biotechnology and Patent protection-Oxford and IBH Publishing Co. New Delhi, 1985

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BACHELOR OF SCIENCE (MICROBIOLOGY)

DEPARTMENT OF MICROBIOLOGY

SEMESTER: VI CODE: 4SC06FDM1

NAME: Food & Dairy Microbiology

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
						Theory				Practical			Total marks
		Th	Tu	Pr	Total	Sessional Exam		University Exam		Internal		University	
						Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4SC06FDM1	Food & Dairy Microbiology	6	0	4	10	30	1	70	3	30	--	70	200

Objectives: Introduce students to basic fundamentals of food microbiology and give them process overview of fermented food product

Prerequisites: Basic knowledge of microbiology is prerequisit

Course outline:

Sr. No.	Course contents	Teaching Hours
1	**Introduction to food microbiology :** Food as substrate (H^+ion concentration,water activity,OR potential, neutrient content, Inhibitory substances)Important microorganism in food microbiology(Molds, yeasts and bacteria),	15
2	**Food preservation :** General principals of food preparation(asepsis, anaerobic condition,removal of microorganism and maintenance), Preservation by high temprature, preservation by low temperature, drying, food additives, radiation method	15
3	**Spoilage of food :** Sugar and sugar product, meat and meat product, vegetables and fruit, Milk and milk product	15
4	**Microbiology of fermented food:** Culture preparation for food fermentation, Microbiology of cheese production, microbiology	15

	of Bread production, Malt beverages and wine	
5	**Food borne disease:** Bacterial (*Clostridium perfringens, Escherechia coli, Bacillus cereus, Plesiomonas shiegelloides),*mycotoxin, virus and fungus	15
6	**Food sanitation and control :** Microbiology of water, Microbiology of seawage and waste water disposal, Sanitation and hazard control, microbiological criteria of foods	15
	Total Hours	**90**

Learning Outcomes:- The student would have gained sufficient knowledge of Food microbiology at the end of the course.

Teaching & Learning Methodology:-

- Use of audiovisual aids.
- Use of charts.
- Student interaction, group discussion, seminar, quizzes, assignment, brain storming session.

Books Recommended:

1. William c. Frazier (2002) Food microbiology 4th edition

2. Lansing /M. Prescott (2002) Microbiolgy 5th edition

3. James M. Jay (2000) Modern food microbiology 6th edition

4. Charles W. Bamforth (2005) Food, fermentation and microorganism

5. Bibek Ray (2005) Fundamentals of food microbiology

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BACHELOR OF SCIENCE (MICROBIOLOGY)

DEPARTMENT OF MICROBIOLOGY

SEMESTER: VI CODE: 4SC06AGM1

NAME: Agricultural Microbiology

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
						Theory				Practical			Total marks
		Th	Tu	Pr	Total	Sessional Exam		University Exam		Internal		University	
						Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4SC06AGM1	Agricultural Microbiology	4	0	4	8	30	1	70	3	20	10	70	200

Course outline:

Sr. No.	Course contents	Teaching Hours
1	**Microorganisms in the rhizosphere, root surfaces and phylloplane** - Biofertilizers- Biological Nitrogen fixation- symbiotic and asymbiotic, mass production by Rhizobium, Azotobacter and Cyanobacteria i.e nitrosofying, nitrifying ammonifying and photosynthetic bacteria, Denitrification of nitrate fertilizers to N2 and NO (a green house gas) by denitrifying bacteria. free living and in association with Azolla, Phosphate solubilizing bacteria. Soil anerobic methanogens in rice field.	15
2	**Plant Pathology** A. Classification of disease based on symptoms (with one example of each disease): canker, powdery mildew, downy mildew, rust. smut, wilt,spots, mosaic galls and rots B. Epidemiology of plant diseases C. Methods of plant disease control i. Eradication ii. Chemical control iii. Biological control (employing bacterial and fungal cultures) iv. Integrated pest management	15
3	**Composting:** Compost production with reference to organic waste, availability of microorganisms, aeration, C:N:P ratio, moisture control, temperature, pH and time a) Green manure	10

	b) Farm yard manure c) Town compost d) Vermicompost B) Biodegradation of Cellulose, Lignin, Pesticides and Hydrocarbons	
4	**Dairy Microbiology** Composition of milk. Normal flora of milk, changes produced by microorganisms in milk. Pasteurization – basis of pasteurization, methods of pasteurization Milk borne diseases.	10
5	**Biofertilizers** Production and field applications of Biofertilizers: a) Rhizobium b) Azotobacter c) Blue green algae d) Mycorhizae e) Azospirillum	10
	Total Hours	**60**

Books Recommended:

1. Mexander .M. 1977 Introduction to soil microbiology, John Wilery NY.
2. Subarao, N.S. 1977. Soil Microorganisms. Oxford. IBH. New Delhi.
3. Dube. H.C. and Bilgrami. K.S.1976 Text book of modern pathology.
4. Vikas publishing house. New Delhi.
5. Rangaswami. G. 1979. Recent advances in biological nitrogen fixation.
6. Oxford and IBH. New Delhi.
7. Fundamentals of Dairy Microbiology Prajapati
8. Microbial dynamics and diversity – Desy Staley
9. Biology of Microorganisms – Brock, Parker, Madigen, 9th edition
10. Agricultural Microbiology- Bagyaraj and Ghosh
11. Plant Diseases- Singh R.S.
12. Soil Microbiology – Alexander.

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DEPARTMENT OF MICROBIOLOGY

SEMESTER: VI CODE: 4SC06AGM1

NAME: Agricultural Microbiology (Practicals)

S.No	Experiment
1	Soil analysis (physical parameters) pH moisture etc
2	Soil analysis (chemical parameters) NPK etc
3	Soil analysis (biological parameters) soil enzyme eg phosphatase
4	Enrichment, isolation, preparation and application of bioinoculants (*Azo-rhizo*, blue green algae (cyanobacteria), phosphate solubilizer – any one.
5	Isolation and identification of *Xanthomonas citri* from infected sample
6	Microscipical examination of rust and smut infections of plants (Demonstration only)
7	Slide culture technique for actinomyctes
8	Microbiological analysis of milk- Standard plate count, direct count, reduction tests,
9	Study of composting
10	Biodegradation study of cellulose
11	Analysis of cellulose hemi cellulose and lignin in plants
12	phosphatase test Grades of milk
13	Study of soil flora eg fungi isolation and identification
14	Visit to the field