



C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

BACHELOR OF SCIENCE (BIOTECHNOLOGY)

DEPARTMENT OF ARTS & HUMANITIES

SEMESTER: V

CODE: 4SC05PEF1

NAME: Professional Etiquettes-I

Detail Course Content:

Unit No.	Detailed Contents
	Section-A: Career Advancement Program (CAP)
1	Soft Skills <ul style="list-style-type: none">• Introduction to soft skills• Difference between soft skills & hard skills• Importance of soft skills• Intelligence quotient, Emotional quotient, Spiritual quotient• Classification of soft skills:• Thinking Skills-Self Awareness, Problem-Solving, Decision Making, Critical Thinking, Creative Thinking• Social Skills-Interpersonal Relationships, Effective Communication, Empathy• Emotional Skills-Managing Feelings/emotions, Stress Management
2	Positive Attitude <ul style="list-style-type: none">• Introduction• Importance of positive attitude• Ways to develop positive attitude• External and internal factors in bulging positive attitude
3	Leadership <ul style="list-style-type: none">• Who is Leader?• Characteristics of Leader• Types of Leader• Importance of Leadership in Professional life• Case study of Swami Vivekanand Steve Jobs, Abdul Kalam, Bill Gates etc.
4	Self Esteem <ul style="list-style-type: none">• Definition• Theory of Maslow• Advantages of High Self Esteem• High Self Esteem vs. Low Self Esteem• Causes of Low Self Esteem• How to Improve Self Esteem
5	Goal Setting <ul style="list-style-type: none">• Introduction• Importance• 5 D's of Goal Setting: Direction, Dedication, Determination, Discipline, Deadline• Steps of Goal• Action Plan



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6	Notice, Agendas of Meeting, Minutes of Meeting <ul style="list-style-type: none"> • Preparing notice • Preparing a list of agendas for meeting • Drafting minutes of conducted meeting
7	Meeting <ul style="list-style-type: none"> • Introduction • Participation in meeting • Key features • Etiquettes
	Section-B: Literature
8	Wings of Fire by Abdul Kalam-Orientation & Creation chapters

Resources:

Sr No.	Title	Author	Publisher
1	Effective Personal Communication Skills for Public Relations	Green Andy	Kogan age Limited Tata Mc Graw hill
2	Effective Technical Communication	M Ashraf Rizvi	OUP Tata Mc Graw hill
3	Personality Development and Soft Skills	Mitra Barun	Tata Mc Graw hill
4	Resumes and Interviews	M Ashraf Rizvi	Tata Mc Graw hill
5	Managing Soft Skills for Personality Development	B.N. Ghosh	Harper Collins
6	You Can Win	Shiv Khera	University Presss
7	The Monk Who Sold His Ferrari	Robin Sharma	
8	Wings of Fire	Abdul Kalam	



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DEPARTMENT OF BIOTECHNOLOGY

SEMESTER: V

CODE: 4SC05BME1

NAME: Bio-molecular engineering

Course outline:

Sr. No.	Course contents	Teaching Hours
1	Microorganisms as a tool in genetic engineering, Isolation and characterization of particular DNfragments Vectors- Plasmids, bacteriophages (lytic and lysogenic phages) Single stranded DNA phages,	10
2	Genetic engineering and its application Joining of DNA molecules, insertion of a particular DNA molecule in to a vector, Detection of recombinant molecules Screening for particular recombinants Applications of genetic engineering, commercial possibilities, uses in research, production and application of eukaryotic proteins.	10
3	Nanobiotechnology Nanoscale systems,nanoparticles,nanowires, thin films and multilayers; Properties of nanomaterials. Synthesis of nanostructures - physical, chemical and biological, microbiological methods - a. Biomolecules as nanostructures. b. Nanoparticulate carrier systems, Micro and Nanofluidics. c. Applications: Biosensors, drug and gene delivery systems, chip technologies, nano imaging,Nanomedicine and Cancer diagnostics and treatment.	10
Total Hours		30

Books Recommended:

1. Bacterial and Bacteriophage Genetics 4th Edition by Brige.
2. DNA Repair and Mutagenesis by Errol Friedberg. 1995.
3. Gene VIII by Benjamin Lewin. 2007.
4. Methods of General and Molecular Bacteriology by Philip. 1993.
5. Microbial Genetics by Freifelder- 4th Edition.
6. Microbial Genetics by Maloy. 1994.
7. Modern Microbial Genetics by Streips and Yasbin. 1991.
8. Molecular Biology of Gene- 4th Edition by Watson. 1987.
9. Molecular Genetics of Bacteria by Dale. 1994
10. Organization of Prokaryotic Genome by Robert Charlebois. 1999.



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SEMESTER: V

CODE: 4SC05RMD1

NAME: Research Methodology

Course outline:

Sr. No.	Course contents	Teaching Hours
1	RESEARCH METHODOLOGY Meaning of research - Objectives of research - motivation of research - Types, approaches and significance - Methods versus methodology - Research in scientific methods - Research process - Criteria for good research - Problem encountered by research in India - Funding agencies.	10
2	RESEARCH DESIGN Research Problem: Selecting the problem - Necessity of defining the problem - Techniques involved in defining the problem - Research design - Needs and features of good design - Different research design - Basic principles of experimental designs.	10
3	DATA COLLECTION AND DOCUMENTATION Data collection methods - Data types - Processing and presentation of data - Techniques of ordering data - Meaning of primary and secondary data - The uses of computers in research - The library and internet - Uses of search engines - virtual libraries - common software for documentation and presentation	10
Total Hours		30

Learning Outcomes:-

The aim of the course is to provide students with in-depth knowledge of different research methods, with an overview of different data collection procedures. A further aim of the course is to provide students with increased knowledge of the interpretation, critical review and assessment of research publications and with insight into the processes that lead to the publishing of research.

Teaching & Learning Methodology:-

The teaching methods will comprise of theory lectures as prescribed.

Books Recommended:

1. Research Methodology, Methods and Techniques - C.R. Kothari - Wishwa Prakasam Publications, II Edition.
2. Research: An introduction - Robert Ross - Harper and Row Publications.



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3. Research methodology - P. Saravanavel - Kitlab Mahal, Sixth Edition.
4. A Hand book of Methodology of Research - Rajammal P.A. Devadass - Vidyalaya Press
5. Introduction to Computers - N. Subramanian
6. Research Methodology Methods and Statistical Techniques - Santosh Gupta.
7. Scientific social surveys and research - P. Young - Asia Publishers, Bombay.



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SEMESTER: V

CODE: 4SC05IIT1

NAME: Immunology & Immunotechnology

Course outline:

Sr. No.	Course contents	Teaching Hours
1	The overview of immune system 1.1 The historical perspective 1.2 Types of immunity : Natural, Acquired, herd, Innate, specific 1.3 Cells and organs of immune system : An overview 1.4 Hematopoiesis 1.5 Primary response and generation of memory	15
2	Antigen and Antibody: 2.1 Antigen a. Immunogenicity versus antigenicity b. Factors influencing Immunogenicity c. Adjuvant, Epitopes and Haptens. d. Antigen processing and presentation 2.2 Antibody a. Basic structure of Antibody b. Immunoglobulin classes and their Biological activities. Epitopes and Receptors on immunoglobulin molecule Antibody Diversity and Clonal Selection Theory Overview of Monoclonal Antibody 2.3 Strength of antigen – antibody reaction: Antibody affinity and avidity	15
3	Host immune response 3.1 Complement fixation pathway : Primary and alternative pathway 3.2 B-cell response 3.3 T-cell response 3.4 Inflammation 3.5 Chemokines	15
4	Dysfunctional immunity : 3.1 Immunodeficiency Diseases 3.2 Hypersensitivity 3.3 Autoimmune diseases	15



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	Overview of Transplantation immunity	
5	Serology A) <i>In vitro</i> antigen: antibody reaction a. Precipitation (in fluid and gel, immunoelectrophoresis) b. Agglutination (Haemagglutination, Bacterial Agglutination, Passive Agglutination and agglutination inhibition) c. Radioimmunoassay d. ELISA e. Western Blot f. Immunofluorescence	15
6	Immunoglobulin gene: genetic basis of reation of antibody diversity; Effect of T cell functions, Fusion of myeloma cells with lymphocytes, production of monoclonal antibodies and their application, Tissue and organ transplant.	15
Total Hours		90

Learning Outcomes:-

Teaching & Learning Methodology:-

Books Recommended:

1. Immunology – 5th edition – J.Kuby, R. A. Goldsby , T.J.Kindt , B.A. Osborne – W.H. Freeman and Company , New York
2. Principles of Microbiology- 2nd edition – R.M.Atlas – Wm.C.Brown Publishers
3. Microbiology – 5th edition – Prescott , Harley , Klein – McGraw-Hill Publishers
4. Instant Notes in Microbiology – P.M. Lyolyard , A. Whelan, M.W. Fanger



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SEMESTER: V

CODE: 4SC05IIT1

NAME: Immunology & Immunotechnology (Practical)

S.No	Experiment
1	Physical, chemical and microscopic analysis of urine.
2	Examination of throat & mouth specimen.
3	Isolation & identification of organisms from clinical samples (Gram positive)
4	Isolation & identification of organisms from clinical samples (Gram negative)
5	Isolation & identification of organisms from clinical samples (Fungi)
6	Blood grouping (slide method)
7	Blood grouping (tube method)
8	Widal test.
9	RPR test
10	Pregnancy test
11	ELISA (Demonstration)
12	Compatibility test by cross matching
13	Serum urea estimation by Barfoed method (Demonstration).
14	Blood sugar by Folin Wu
15	Blood urea Berthelot method



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ENVIRONMENTAL BIOTECHNOLOGY

SEMESTER: V

Course Code: 4SC05EBT1

Credit Units: 04

Course content:

Sr. No.	Course contents	Teaching Hours
1	Environmental components, Environmental pollution and its types, Non-renewable and renewable energy resources.	10
2	Conventional fuels and their major impacts: Global warming and greenhouse effect, Global Ozone Problem, Acid rain, Eutrophication, Biomagnification, Concept of clean fuel technology: Biomass energy and biofuels	10
3	Biodegradation and bioremediation of major pollutants Biominalisation: Use of microbial technology for mining	10
4	Treatment of municipal solid and liquid wastes, Environmental impact assessment and Environmental audit, Bioassessment of Environmental Quality, Biofertilizers and Biopesticides	10
Total Hours		40

Text & References:

Text:

1. Environmental Science, S.C. Santra,
2. Environmental Biotechnology, Pradipta Kumar Mohapatra

References:

1. Environmental Biotechnology – Concepts and Applications, Hans-Joachim Jordening and Jesef Winter
2. Waste Water Engineering, Metcalf and Eddy, Tata McGraw hill
3. Agricultural Biotechnology, S.S. Purohit
4. Environmental Microbiology : Methods and Protocols, Alicia L. Ragout De Spencer, John F.T. Spencer
5. Introduction to Environmental Biotechnology, Milton Wainwright



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ENVIRONMENTAL BIOTECHNOLOGY (Practical)

SEMESTER: V

Course Code: 4SC05EBT1

Credit Units: 04

S.No	Experiment
1	Types of water-soft and hard.
2	Determination of hardness and alkalinity of water sample
3	Study of water from different sources.
4	Detection of coliforms for determination of the purity of potable water
5	Determination of chemical oxygen demand (COD) of sewage sample
6	Production of biofertilizers.
7	Survey of microbes growing in polluted environment
8	Sample collection from polluted areas- oil and water
9	Isolation of oil degrading microbes.
10	Estimation of pH of soil samples.