



# C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

BACHELOR OF SCIENCE (BOITECHNOLOGY)

DEPARTMENT OF ARTS & HUMANITIES

SEMESTER: III

CODE: 4SC03CSE1

NAME: COMMUNICATION SKILLS IN ENGLISH (CSE)

### 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		Univ	
						Marks	Hrs	Marks	Hrs	Pr	TW		Pr
4SC03CSE1	Communication Skills in English	2	2	0	4	30	1	70	3	---	20	30	150

### Objectives:

- To train them in basic fundamentals skills of Communication – LSRW through study of Literature

### Prerequisites:

- Students should have basic knowledge of English Language and grammar.
- Students should have ability to speak and write correct sentences in their day to day language.
- Students should be familiar with correct usage of language.

### Detail Course Content:

Unit No.	Content In details including Its Sub Topics	Min.Hours
	<b>Part-A Communication</b>	
<b>1</b>	<b>Fundamental Concepts of Communication</b>	<b>10</b>
	<ul style="list-style-type: none"> <li>• Meaning and objectives of communication</li> <li>• Functions of communication</li> <li>• Definitions of communication</li> <li>• Process of communication</li> <li>• Characteristics of communication</li> <li>• Levels of communication</li> <li>• Scope of communication</li> <li>• Non Verbal Communication</li> </ul>	



<b>2</b>	<b>Role of Language In Communication/Language &amp; Communication Relationship</b>	<b>04</b>
	<ul style="list-style-type: none"> <li>- Role of Languages in Communication</li> <li>- Characteristics of Language</li> <li>- English as a Language of Global Communication</li> </ul>	-
<b>3</b>	<b>Reading Skill</b>	<b>06</b>
	<ul style="list-style-type: none"> <li>- Fundamental Concepts of Reading</li> <li>- Techniques of Reading: Scanning &amp; Skimming - Paraphrasing</li> <li>- Reading selected text in the class room, where students will explorer/express their own views/Ideas in Reading, Writing &amp; Speaking.</li> </ul>	-
<b>4</b>	<b>Writing Skills</b>	<b>06</b>
	<p><b>Informal Letter Writing</b></p> <ul style="list-style-type: none"> <li>- Introduction to Informal Letter</li> <li>- Characteristics of Letter</li> <li>- Types of Letter</li> <li>- Official Letters: to the university, college principal, Municipal Corporation etc.</li> </ul> <p><b>Essay Writing</b></p> <ul style="list-style-type: none"> <li>- How to Write Essay(s) effectively?</li> <li>- List of Select Essays for Practice (Technical and Non Technical)</li> </ul>	-
<b>5</b>	<b>Speaking Skills (Students Forum)</b>	<b>08</b>
	<ul style="list-style-type: none"> <li>- Foreign Language Club will be Started(Student Forum)</li> <li>- Students will express their views on Current Topics/ Issues in Group / Individually (Technical &amp; Non Technical Topics)</li> </ul> <p><b>Speaking English through Correct Phonetic Transcription</b></p> <ul style="list-style-type: none"> <li>- Basic Concepts in Phonetics</li> <li>- Articulation of sound</li> <li>- Symbols of vowels and consonants</li> <li>- Phonetic transcription of words</li> </ul> <p><b>Conversation Skills</b></p> <ul style="list-style-type: none"> <li>- An Introduction</li> <li>- Situation based conversation</li> <li>- Telephonic conversation</li> </ul>	
<b>6</b>	<b>Concepts of Grammar</b>	<b>06</b>



	<ul style="list-style-type: none"><li>• Degree of Comparison</li><li>• Transformation of Sentences</li><li>• Interchange of Simple, Complex and Compound sentences</li></ul>	
7	<b>Vocabulary Building</b> <ul style="list-style-type: none"><li>• Suffixes</li><li>• Prefixes</li><li>• Confusable</li></ul>	<b>02</b>
	<b>Part-B Literary Text</b>	
	“One Night @ the Call Centre” by Chetan Bhagat- Rupa Publication	<b>18</b>

**Resources:**

- “One Night @ the Call Centre” by Chetan Bhagat- Rupa Publication
- Green Andy, Effective Personal Communication Skills For Public Relations, Kogan Page, Limited, 2006
- Basic Business Communication, by Flatly and Lesicar
- Basic Communication Skills for Technology, by Andrea J. Rutherford, by Pearson Education
- From sentence to paragraph, by William J. Kelly and Deborah L. Lawton, by Longman
- Technical Communication : Principles and Practice, by Meenaxi Raman and Sangeeta Sharma, Oxford University Press
- An Intermediate English Grammar, Raymond Murphy, Cambridge University Press
- A High School English Grammar, Wren & Martin, S. Chand Publication
- A Course in Phonetics for Spoken English, Sethi & Dhamija



# C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES

BACHELOR OF SCIENCE (BOITECHNOLOGY)

DEPARTMENT OF BOITECHNOLOGY

SEMESTER: III

CODE: 4SC03PBT1

NAME: PLANT BIOTECHNOLOGY (THEORY)

## Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							Total marks
		Th	Tu	Pr	Total	Theory				Practical			
						Sessional Exam		University Exam		Internal		Univ	
Marks	Hrs	Marks	Hrs	Pr	TW	Pr							
4SC03PBT1	Plant biotechnology	3	0	4	7	30	1	70	3	30	--	70	200

**Objectives:** - To make the student understand the concept of plant biotechnology and its applications.

**Prerequisites:-** Fundamental knowledge of plant biology is essential.

## Course outline:

Sr. No.	Course contents	Teaching Hours
1	<b>Introduction to Plant Tissue Culture.</b> <b>Laboratory organization of PTC</b> Washing and drying room, media preparation room, culture room, various sterilizing techniques used in plant tissue culture work, Green house <b>Designing of culture media for PTC</b> Composition of nutrient media and use of growth regulators. <b>Applications of PTC</b> Micropropagation, plant improvement, production of biochemicals, Gene conservation banks, applications in forestry	10
2	<b>Techniques in Plant Tissue Culture.</b> Principle, Methodology and Application of: Callus culture	



	Suspension culture Somatic Embryogenesis Protoplast culture Somatic hybridization Organ Culture: Root, shoot tip/meristem, ovary culture	17
<b>3</b>	<b>Transgenic Plants</b> History and Concept of Transgenic Plant. <b>Methods to Develop Transgenic Plants:</b> Electroporation,	18
	Microinjection, Particle Bombardment, Liposome Mediated Gene Transfer. Agrobacterium Mediated Gene transfer vectors- Ti plasmid, Transformation technique. <b>Applications of Transgenic Plants</b> Herbicide Resistance Resistance against Insects and Pests	
<b>Total Hours</b>		<b>45</b>

**Learning Outcomes:-**

The concept of Plant biotechnology shall be clear.

**Teaching & Learning Methodology:-**

- Use of multimedia, charts and models.
- Student interaction, group discussion, seminar, quizzes, assignment, brain storming session, expert talks.

**Books Recommended:**

1. **Narayanswamy S**, Plant cell and Tissue Culture.
2. **Kumar U**, Methods in plant tissue culture.
3. **H.S Chawla**, Introduction to Plant Biotechnology, 2nd Edition, Oxford and IBH publishers.
4. **M.K. Razdan**, An Introduction to Plant Tissue Culture, Oxford and IBH Publishing.
5. **S.S. Bhojwani and M.K. Razdan**, Plant Tissue Culture: Theory & Practice, Elsevier Health Sciences.
6. **P.K. Gupta**, Elements of Biotechnology – (1st Edition -2000) Rastogi Publications.
7. **Ravishankar G.A and Venkataraman L.V**(1997) Biotechnology applications of Plant Tissue & cell culture. Oxford & IBH Publishing co., Pvt Ltd.
8. **Mitra.S**, Genetic Engineering. Mc Milan India Ltd.



9. **Bhojwani and Razdan**, Essentials of Plant Tissue Culture. Kluwer Academic Press.
10. **B.D.Singh**, Plant Biotechnology.
11. **K.G. Ranawat**, Plant Biotechnology. S.Chand & Company.

**E-Resources:**

1. <http://lecturenotesfree.blogspot.in/2013/03/tissue-culture-tissueculture-is-culture.html>
2. [https://www.msu.edu/course/css/451/Lecture/CSS451plant%20tissue%20culture%20\(2010\).pdf](https://www.msu.edu/course/css/451/Lecture/CSS451plant%20tissue%20culture%20(2010).pdf)
3. <http://www.plant-genetics.kais.kyoto-u.ac.jp/Iden/Courses/Houben/files/Plant%20tissue.pdf>

**FACULTY OF SCIENCES**

**BACHELOR OF SCIENCE (BOITECHNOLOGY)**

**DEPARTMENT OF BOITECHNOLOGY**

**SEMESTER: III**

**CODE: 4SC03PBT1**

**NAME: PLANT BIOTECHNOLOGY (PRACTICALS)**

<b>S.No</b>	<b>Experiment</b>
1	Laboratory setup
2	Sterilization of glassware
3	Sterilization of media
4	Preparation of various types of media
5	Preparation of stock solutions
6	Induction of Callus cultures of various plants
7	Immobilization of enzymes in alginate beads
8	Induction of suspension



# C. U. SHAH UNIVERSITY

FACULTY OF SCIENCES  
BACHELOR OF SCIENCE (BOITECHNOLOGY)  
DEPARTMENT OF BIOTECHNOLOGY

SEMESTER: III

CODE: 4SC03IMA1

NAME: Instrumental methods of analysis I

**Teaching & Evaluation Scheme:-**

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
		Th	Tu	Pr	Total	Theory				Practical			Total marks
						Sessional Exam		University Exam		Internal		Univ	
						Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4SC03IMA1	Instrumental methods analysis I	2	0	0	2	30	1	70	3	---	----	-----	100

**Objectives:** - The course aims at enlightening the students with the various theories of instrumental analysis.

**Prerequisites:-** Basic knowledge of Electromagnetic spectrum is essential.

**Course content:**

Sr. No.	Course contents	Teaching Hours
1	<b>Spectroscopic Methods (UV Visible) :</b> Nature and properties of electromagnetic radiations, Process of emission, absorption and fluorescence. UV and visible spectroscopy - Theory, Instrumentation, Lambert-Beer's law, deviations.	10
2	<b>Spectroscopic Methods (FES and AAS)</b> Flame Emission and Atomic Absorption Spectroscopy – Theory, Instrumentation, and applications of these techniques.	10
3	<b>IR</b> Introduction, basic principles, Instrumentation and Applications. <b>NMR</b> Basic principles, elementary ideas and instrumentation chemical shifts, spin-spin coupling, instrumentation and applications.	10
<b>Total Hours</b>		<b>30</b>

**Learning Outcomes:-**

At the end of the course the student would be well versed in the theoretical aspects of spectroscopic techniques.



## Teaching & Learning Methodology:-

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

## Books Recommended:

1. **Willard, Hobert H.** *et. al: Instrumental Methods of Analysis*, 7th Ed. Wardsworth Publishing Company, Belmont, California, USA, 1988.
2. **Skoog, D.A. Holler F.J. and Nieman, T.A.** *Principles of Instrumental Analysis*, Thomson Asia Pvt. Ltd. Singapore.
3. **H.H.Wilard, L.L.Merritt, J A Dean**, Instrumental methods of analysis.

## E-Resources:

1. <http://web.mit.edu/5.33/www/lec/spec1.pdf>
2. <http://en.wikipedia.org/wiki/Spectroscopy>
3. <http://metameso.org/nri/library/free-books/SpectroscopyOvrview.pdf>



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FACULTY OF SCIENCES

BACHELOR OF SCIENCE (BOITECHNOLOGY)

DEPARTMENT OF BOITECHNOLOGY

SEMESTER: III

CODE: 4SC03GEN1

NAME: GENETICS (THEORY)

### Teaching & Evaluation Scheme:-

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
						Theory				Practical			
		Th	Tu	Pr	Total	Sessional Exam		University Exam		Internal		Univ	
						Marks	Hrs	Marks	Hrs	Pr	TW		Pr
4SC03GEN1	Genetics	6	0	6	12	30	1	70	3	30	--	70	200

### Objectives: -

This subject aims to improve the knowledge on genomic structure of microbes and applications of genetic engineering. The content throws light on genomic structure of microbe and various molecular tools used for genetic manipulation.

### Prerequisites:-

Basic knowledge of gene structure and function is required.

### Course content:

Sr. No.	Course contents	Teaching Hours
1	<b>Mendelian Genetics</b> History of molecular biology, Nucleic acids as hereditary material, Mendel's experiment, principle of segregation, Symbols, Principles of independent assortment, Genetic vs environmental effects, probability in Mendelian Inheritance.	15
2	<b>DNA replication</b> DNA structure (Watson & Crick model), Semiconservative replication of DNA: Meselson Stahl experiment, DNA polymerases and <i>in vitro</i> DNA synthesis. Various models of replication.	15
3	<b>Central dogma of molecular biology</b> Types of RNA- rRNA, tRNA and mRNA; structure of ribosomes; Nucleic acid sequencing; Transcription & post transcriptional modification. Translation & post translational modification.	15



4	<b>Gene transfer methods</b> <b>Transformation</b> Process of transformation, competence, Uptake of DNA, transfection, linkage and gene mapping by transformation. <b>Conjugation</b>	15
	F factor in conjugation, structure of pili, mating process, linear chromosome transfer by Hfr strains, F' factor. <b>Transduction</b> Generalized transduction, specialized transduction, genetic map of <i>E.Coli</i> , plasmids, types of plasmids, transposons, movable genes.	
5	<b>Mutation</b> Mutations and mutagenesis Types of mutations Induction of mutation Expression of mutation Detection and isolation of mutants Reversion & Ames test	15
6	<b>Viral genetics</b> Life cycle of virulent bacteriophages Temperate phages and prophage Genetic recombination in phages Phage lambda RNA phages Tumor viruses and cancer Viriods & prions.	15
<b>Total Hours</b>		<b>90</b>

**Learning Outcomes:-**

Know the various mechanisms of gene transfer in microorganism and extra chromosomal inheritance in detail.

**Teaching & Learning Methodology:-**

- Student interaction, group discussion, seminar, quizzes, assignment, brain storming session.

**Books Recommended:**

1. **Friedfelder**, Microbial genetics.
2. **Old and Primrose**, Principles of gene manipulation.
3. **Darnell, Lodish, Baltimore**, Molecular cell Biology, Scientific American Books, Inc., 1994.



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4. **Stephen L. Wolfe**, Molecular and cellular Biology, Wadsworth publishing company, 1993
5. **D.S.T. Nicholl**, Genetic Engineering - An introduction.
6. **Birge, E.A.** (2006). Bacterial and bacteriophage genetics (Springer).
7. **Dale J., Park S.** (2005) Molecular genetics of bacteria (John Wiley and Sons Inc).
8. **Freifelder, D.** (2005). Molecular biology (Jones and Bartlett).
9. **Karvita B Ahluwalia**, Genetics, New Age International Publishers.
10. **Prescott, Harley & Klein**, Microbiology, Mc Graw Hill Publishers.

### **E-Resources:**

1. <http://www.bact.wisc.edu/downloads/607Text.pdf>
2. <http://www.cliffsnotes.com/sciences/biology/microbiology/microbial-genetics/introduction-tomicrobial-genetics>
3. <http://plato.acadiau.ca/courses/biol/Microbiology/transfer.htm>
4. [http://iws.collin.edu/mweis/Microbiology/Lecture/Micro%20Lecture%20Notes/micro\\_lecture\\_notes\\_genetics\\_BITC.htm](http://iws.collin.edu/mweis/Microbiology/Lecture/Micro%20Lecture%20Notes/micro_lecture_notes_genetics_BITC.htm)



# C. U. SHAH UNIVERSITY

## FACULTY OF SCIENCES

### BACHELOR OF SCIENCE (BOITECHNOLOGY) DEPARTMENT OF BOITECHNOLOGY

SEMESTER: III

CODE: 4SC03GEN1

#### NAME: GENETICS (PRACTICALS)

S.No	Experiment
1	Isolation of DNA from Bacteria.
2	Estimation of DNA by DPA method.
3	U.V Spectroscopic analysis of DNA.
4	Isolation of RNA from <i>S.cervisiae</i> .
5	Estimation of RNA by Orcinol method.
6	Isolation of streptomycin resistant mutant of <i>E.coli</i> .
7	Isolation of Plasmid DNA.
8	Transformation of <i>E.coli</i> .
9	Isolation of Ampicillin resistant bacteria by Replica plating method.
10	Isolation & Quantitation of Nucleic acid.
11	U.V mutagenesis
12	Demonstration of conjugation
13	Ames test-carcinogenicity testing



NAME: **Animal Biotechnology** (THEORY)

**Teaching & Evaluation Scheme:-**

Subject Code	Subject Name	Teaching Hours/week				Evaluation scheme/Semester							
						Theory				Practical			
		Th	Tu	Pr	Total	Sessional Exam		University Exam		Internal		University	
						Marks	Hrs	Marks	Hrs	Pr	TW	Pr	
4SC03ABT1	Applied Biotechnology	3	0	4	7	30	1	70	3	30	--	70	200

**Objectives:** - The application of Animal Biotechnology covers major areas related to commercial applications. Importance will also be given to areas like *in vitro* fertilization, animal cell and tissue culture, hormone vaccine and important enzyme production through animal biotechnology.

**Prerequisites:-** Basic cell biology concepts along with structure and functions of animal cell.

**Course outline:**

Sr. No.	Course Content	No. of hours
1	Structure and organization of animal cell. Equipments and materials for animal cell culture technology Primary and established cell line cultures. Introduction of animal cell culture substrate, culture media, preservation and maintenance of cell lines. Introduction to the balanced salt solution and simple growth medium Role of carbon dioxide Role of serum and supplements	10



2	Introduction to immune system, cellular and humoral immune response, history of development of vaccines, introduction to the concept of vaccines, conventional methods of animal vaccine production, recombinant approaches to vaccine production, hybridoma technology	5
3	Structure of sperms and ovum, cryopreservation of sperms and ova of livestock, artificial insemination, super ovulation, <i>in vitro</i> fertilization, culture of embryos, cryopreservation of embryos, embryo transfer, embryo-splitting, embryo sexing, animal cloning basic concept, cloning from-embryonic cells and adult cells, cloning of different animals, cloning for conservation of endangered species, ethical, social and moral issues related to cloning, <i>in situ</i> and <i>ex situ</i> preservation of germplasm, <i>in utero</i> testing of foetus for genetic defects, pregnancy diagnostic kits, anti-fertility animal vaccines, gene knock out technology and animal models for human genetic disorders.	10
4	Transgenic animals. In vitro fertilization and embryo transfer. Genetically engineered animals for pharmacological research. Animals as bioreactors: production of IFN/TNF in milk/egg white	05
<b>Total Hours</b>		<b>30</b>

**Learning Outcomes:- Students will be able to understand the process and application of animal biotechnology.**

**Teaching & Learning Methodology:- PPT, GD, Quize and seminar etc.**

**Books Recommended:**

**Text: *Culture of Animal Cells, R.I Freshney, Wiley-Leiss.***

**References:**

- Animal Cell Culture – A Practical approach, J.R.W. Masters, Oxford.
- Animal Cell Culture Techniques, M. Clynes, Springer Verlag.
- Cell Culture Lab Fax, M. Butler and M. Dawson, Bios scientific Publications Ltd.
- Cell Growth and Division – A Practical approach, R. Basega, IRL Press.
- Comprehensive Biotechnology, Moo-Young, Alan T. Bullm Howard Dalton, Panima Publication.



S.No	Experiment
1	Introduction to Animal cell culture lab set up
2	Packing and sterilization of glass and plastic wares for cell culture
3	Preparation of reagents and media for cell culture.
4	Primary culture technique chicken embryo fibroblast
5	Secondary culture of chicken embryo fibroblast.
6	Cultivation of continuous cell lines.
7	Quantification of cells by trypan blue exclusion dye
8	Isolation of lymphocytes and cultivation of lymphocytes
9	Study of effect of chemicals on cultured mammalian cells
10	Study of effect of virus on mammalian cells.
11	Demonstration of Cryopreservation of cell- primary cultures
12	Demonstration of Cryopreservation of cell lines
13	Study of toxicity on cell lines
14	Demonstration of expression of recombinant proteins.