B.Sc. Hons. Biotechnology 1st year

Unit plans

SESSION 2021-22

THEORY: 67 MARKS

B.Sc. HONS. BIOTECHNOLOGY- I SEM **ASSESSMENT: 08 MARKS**

SUBJECT: INTRODUCTION TO BIOTECHNOLOGY

Sr. no.	Topic	Teaching points	Specific objectives	Methods /approaches /techniques	Resources and links
Y1	**Biotechnology Basics:** **Introduction to model organisms**	• Advent, scope and basics of biotechnology. • Bacteria as workhorses of biotechnology; E. coli as the model bacterium. • Yeast and fungi in Biotechnology • Introduction to multicellular organisms as research models: 1. Drosophila melanogaster 2. Caenorhabditis elegans 3. Daniorerio 4. Musmusculus 5. Arabidopsis thaliana as model for plant genetics. • Role of viruses and bacteriophages in biotechnology	To give introduction about Biotechnology. Brief introduction to workings of Biotech. Model organisms. vectors	Classroom teaching. Examples from textbooks, life. Presentation.	1. Comprehensive Biotechnology, Murray Moo-Young, 2nd edition (2011), Pergamon Press. 2. Introduction to Biotechnology, William J. Thieman& Michael A. Palladino, 3rd edition (2012), Benjamin Cummings. 3. Biotechnology Expanding Horizons, BD Singh, 4th edition (2012), Kalyani Publishers. 4. The Ethics of Biotechnology (Biotechnology in the 21st
2	**Structure and Functioning of**	• Structure and	Basic introduction	Classroom teaching.	

	cells. **Biotechnological techniques.**	function of the cell: the basic unit of life • Prokaryotic and Eukaryotic cells • Biomolecules in a cell (DNA, RNA and proteins) • Introduction to genomics, transcriptomics, proteomics and metabolomics; bioinformatics and its role in biotechnology. • Introduction to basic techniques like sterilization, centrifugation, electrophoresis, chromatography, sonication. • Fundamentals of recombinant DNA technology: Restriction Enzymes, Vectors and their properties.	to cell biology, Genetics Biochemistry Bio-informatics Genetic engineering	Examples from textbooks, life. Presentation.	Century), Jonathan Morris, Chelsea House Pub (L), 1st edition (2005). 5. Biotechnology, Applying the Genetic Revolution, David P. Clark & Nanette J. Pazdernik, 1st edition (2008), Academic Cell. 6. Molecular Biotechnology, Sandy B. Primrose, 2nd edition (1991), Blackwell Scientific Publications, ISBN. 7. Biotechnology: Demystifying the concepts, David Bourgaize, Thomas R. Jewell & Rodolfo G. Buiser, 1stedition(1999), Benjamin Cummings. 8. Ethical Issues in Biotechnology, Richard Sherlock & John D. Morrey, 1st
3	**Applications of Biotechnology**	• Applications of biotechnology: today and tomorrow • Basics of Biotechnology in fermentation and pharmaceutical processes. • Green technology to control pollution. • Role of biotechnology in	Introduction to various applications of biotechnology Fermentation Environmental Diagnostic and medical biotech.	Classroom teaching. Examples from textbooks, life. Presentation.	

		diagnostics, introduction to gene therapy.			edition (2002), Rowman & Littlefield Publishers.
4	**Ethics and issues in Biotechnology.**	• Biotechnology and society: genetically modified organisms (GMOs) - transgenic plants and animals and their applications in biotechnology. • Public concerns and risks associated with genetic engineering: Bioterrorism and biowarfare. • Ethical, social and legal implications of biotechnology.	Bioethics	Classroom teaching. Examples from textbooks, life. Presentation.	

Question bank:

1. DEFINE BIOTECHNOLOGY
2. WHAT DO YOU UNDERSTAND BY BLOTTING?
3. DEFINE VECTORS
4. GIVE PROPERTIES OF VECTORS
5. DESCRIBE THE GENE THERAPY
6. EXPLAIN THE IMPORTANCE OF MODEL ORGANISMS IN BIOTECHNOLOGY
7. WHAT DO YOU UNDERSTAND BY BIOWARFARE?
8. WHAT ARE THE ETHICAL ISSUES RELATED TO THE EXPERIMENTS IN BIOTECHNOLOGY?
9. GIVE THE IMPORTANCE OF BIOTECHNOLOGY IN MEDICAL FIELD.
10. WHAT DO YOU UNDERSTAND BY GREEN BIOTECHNOLOGY?
11. EXPLAIN THE NOMENCLATURE, NATURE OF CLEAVAGE AND TYPES OF RESTRICTION ENDONUCLEASES.
12. DESCRIBE DIFFERENT TYPES OF ENZYMES USED IN RECOMBINANT DNA TECHNOLOGY
13. DEFINE METABOLOMICS.
14. DEFINE GENOMICS.
15. WHAT DO YOU UNDERSTAND BY TRANSCRIPTOMICS?
16. EXPLAIN THE ROLE OF *E. coli* AS MODEL ORGANISM IN BIOTECHNOLOGY
17. GIVE THE ROLE OF YEAST AND FUNGEI IN BIOTECHNOLOGY
18. DESCRIBE THE APPLICATIONS OF BIOTECHNOLOGY IN IMPROVING THE ENVIRONMENT BY REMOVING POLLUTANTS
19. WHAT IS BIOREMEDIATION?
20. EXPLAIN THE DIFFERENT TYPES OF MULTICELLULAR MODEL ORGANISMS
21. EXPLAIN IN BRIEF THE ADVENT OF BIOTECHNOLOGY

22. WHAT ARE THE DIFFERENT RISKS ASSOCIATED WITH THE GMO'S?

B.Sc. Hons Biotechnology 2021-22

Semester 1

Subject:- Life Sciences

Total units= 4

Theory marks=67
Internal assessment= 8
Total marks =75

Unit 1

Topic	Teaching points	Specific objectives	Methods /approaches /techniques	Resources and links
1. Plant Anatomy and Physiology	Structure of land plants. Nutrition and Transport phenomena in plants. Plant reproduction and development. Plant responses to the environment	To learn about the anatomy and physiology of plants and plant systems	Lecture cum discussion	Life Sciences (2001) by Rastogi and Dubey, S. Chand & Co., New Delhi. Biology- P.S. Dhami Pradeep publisher

Question Bank

Long answer type questions

1. Explain the transportation phenomenon in plants
2. Write about the structure of xylem and phloem
3. Explain the plant reproduction and development
4. Write about the transpiration pull in plants
5. Explain transpiration
6. Describe plant responses to the environmental factors such as gravity, stress, light etc
7. Explain macronutrients and micronutrients required for plant nutrition.

Short answer type questions

1. Define transpiration
2. Define guttation
3. Define osmosis and diffusion
4. Write about the vernalization in plants
5. Give the role of xylem and phloem in plants

Unit 2

Topic	Teaching points	Specific objectives	Methods /approaches /techniques	Resources and links
1. *Ecology* 2. *Ecosystems*	Community interactions Definition and components. Food chain and food web. Habitat. Ecological succession. Types of succession. Animal behaviour:- Definition and learning.	To study ecology, ecosystems and its biotic and abiotic components	classroom teaching with examples. Students will prepare the examples of food chain and food web from daily life	Life Sciences (2001) by Rastogi and Dubey, S. Chand & Co., New Delhi. Biology- P.S. Dhami Pradeep publisher

Question Bank

Long answer type questions

1. Explain different types of community interactions such as symbiotic and competitive interactions
2. Write about the different components of ecosystem
3. Explain grazing food chain and food chain in pond ecosystem
4. Write about the habitat
5. Define ecological succession and explain its types
6. Define ecosystem and explain different types of ecosystem
7. Write about the animal behavior and learning

Short answer type questions

1. Define ecology
2. Who gave the term ecology
3. Define ecosystem
4. Define ecological succession

5. Define habitat
6. What are mutualistic interactions
7. Define food chain
8. How energy is flowed in the universe
9. Define food web

Unit 3

Topic	Teaching points	Specific objectives	Methods /approaches /techniques	Resources and links
1. Animal Anatomy and Physiology	Homeostasis and organization of animal body. Circulation. Respiration. Nutrition and digestion. Urinary system and homeostasis. The immune response.	To learn about the anatomy and physiology of animals and animal systems.	Lecture cum discussion of the topic from the animated presentation	Life Sciences (2001) by Rastogi and Dubey, S. Chand & Co., New Delhi. Biology- P.S. Dhami Pradeep publisher

Question Bank

Long answer type questions

1. Explain the different types of circulatory mechanisms in animals
2. Write about the working of heart
3. Define homeostasis and explain the organization of animal body
4. Explain the working of lungs
5. Describe respiration in animals
6. Explain the working of kidneys
7. Describe nephron with well labeled diagram
8. Write about the first line of defense mechanism in animals
9. Write about the specific immune response
10. Explain the urinary system in animals

Short answer type questions

1. Define tidal volume
2. Define pulmonary respiration
3. Write about the lub-dub sound
4. Write about blood pressure

5. Define homeostasis

SESSION 2021-22

THEORY: 67 MARKS

B.Sc. HONS. BIOTECHNOLOGY- 2 SEM

ASSESSMENT: 08 MARKS

BASIC BIOCHEMISTRY

Sr. no.	Topic	Teaching points	Specific objectives	Methods /approaches /techniques	Resources and links
1	**Water:** **Carbohydrate**	Physico chemical properties of water, dissociation and association constants. pH and buffers, pI, pka, Henderson Hasselbatch equation and its implications. Structure of important mono, di-, oligo- and polysaccharides, glycoproteins, peptidoglycan, glycolipids and lipopolysaccharides. Reaction of monosaccharides	To make student conversant with the biochemical aspect of cell, chemical structure & function of various biomolecules.	Classroom teaching. Examples from textbooks, life. Presentation.	1. Lehninger A.L., Nelson D.L. and Cox M.M. (2005).Principles of biochemistry (W. H. Freeman, USA). 2. Stryer L, J. M. Berg, J.L. Tymoczko (2001). Biochemistry (W.H. Freeman and Company, New York). 3. j.l. Jain biochemistry
2	**Lipids**	Classification of lipids and fatty acids, general functions of major lipid subclasses, acylglycerols, phosphoglycerols, phosphoglycerides, sphingolipids, glycosphingolipids and terpenes, sterols, steroids:	Knowledge of lipids	Classroom teaching. Examples from textbooks, life. Presentation.	4. G.L. Zubay, W.W. Parson, D.E. Vance. (1995). Principles of biochemistry:Student study art notebook (Wm.C. Brown).

		Prostaglandins..			5. H.R. Horton, A.J. Scism, L.A. Moran, R.S. Ochs, J.D Rawn, K.G. Scrimgeour. (2006). Principles of biochemistry (Prentice Hall).
3	**Vitamins and hormones:**	• Types of vitamins and their chemistry, vitamins as cofactors, steroids and peptide hormones.	Understanding the need and functions of vitamins	Classroom teaching. Examples from textbooks, life. Presentation.	
4	**Proteins**	• Structure of amino acids, non-protein and rare amino acids and their chemical reactions. Structural organization of proteins (primary, secondary, tertiary and quaternary domain structure), protein classification and function. Forces stabilizing primary, secondary and tertiary structure.	Essential and non- essential proteins and amino acids	Classroom teaching. Examples from textbooks, life. Presentation.	

Question bank:

1. What are the different properties of water
2. Explain the types of carbohydrates
3. What are essential amino acids
4. Write on structures of proteins
5. Give the examples of tertiary structure of proteins
6. What are lipids?
7. Explain the types and examples of steroids
8. Explain endocrine hormones
9. Explain exocrine hormones

10. What are terpenes
11. Explain polysaccharides
12. Derive Henderson Hasselbatch equation and its implications.
13. Write about dissociation and association constant
14. What are the different types of structures of proteins?
15. Describe the major classes of proteins

SESSION 2021-22

THEORY: 67 MARK
2 SEM
ASSESSMENT: 08 MARKS

Cell biology

Sr. no.	Topic	Teaching points	Specific objectives	Methods /approaches /techniques	Resources and links
1	**Cell as a basic unit of living systems:** **Ultrastructure of cell membrane and cell organelle**	cell theory, pre-cellular evolution, artificial creation of "cells", broad classification and ultrastructure of cell types (PPLOs, Bacteria, eukaryotic microbes, plant and animal cells), tissue, organ and organism at different level of organization of other genetically similar cells; biochemical composition of cells (proteins, lipids, carbohydrates, nucleic acids and metabolic pool). structure and function of cell organelles, ultrastructure of cell membrane, cytosol, golgi bodies, vacuoles, endoplasmic reticulum (rough and smooth), ribosomes, cytoskeletal structures (actin microtubules etc), mitochondria, chloroplast, lysosomes, peroxisomes,	To understand the detailed overview of eukaryotic cell and its inner components	Classroom teaching. Examples from textbooks, life. Presentation.	1.The World of the Cell (2008) Becker, Klein Smith & Hardin Pearson education Inc 2.Cell and Molecular Biology (2010) E.D.P De Robertis and E.M.F. De Robertis, Jr. 3.Molecular Cell Biology (2007) Lodish et al.

		nucleus (nuclear membrane, nucleoplasm, nucleolus)			Freeman & Co 4.Molecular Biology of the Cell (2007) Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, Peter Walter. 5.The Cell: A Molecular Approach (2013) Geoffrey M. Cooper and Robert E. Hausman 6.Cells and Cell Function: Advanced Level (2007) Sally Morgan 7.Stem Cells: An Insider's
2	**Cellular transport**	Passive & active transport, permeases, sodium, potassium, Calcium, ATPase pumps, lysosomal and vacuolar membrane, ATP dependent proton pumps, co-transport, symport, antiport, transport into prokaryotic cells, endocytosis and exocytosis, entry of viruses and toxins into cells.	To understand the processes of cell transport and cell locomotion	Classroom teaching. Examples from textbooks, life. Presentation.	
3	**Cell locomotion: Amoeboid, Flagellar and Ciliar. Chromosomes**	• discovery, morphology, chemical composition, structural organization of chromatids, centromere, telomere, chromatin, nucleosome organization, euchromatin and heterochromatin, special chromosomes (polytene, lampbrush chromosomes), banding patterns in human chromosomes.	Understanding movement of cells	Classroom teaching. Examples from textbooks, life. Presentation.	
4	**Basics of stem cells**	• introduction to concepts in stem cell biology, Cell differentiation in multicellular organisms: (renewal, potency:	Introduction to stem cells and their applications	Classroom teaching. Examples from textbooks, life.	

		Totipotent, pleuripotent, multipotent); types of stem cells: early embryonic stem cells, blastocyst embryonic stem cells, fetal stem cells, umbilical cord stem cells, adult stem cells; applications; ethical issues related to stem cells.		Presentation.	Guide (2013) Paul Knoepfler

Question bank:

1. define cell biology
2. draw the structure of eukaryotic cell
3. draw the structure of prokaryotic cell
4. differentiate between prokaryotic and eukaryotic cell
5. what are stem cell?
6. Difference between pluripotent and multipotent cell
7. What are the applications of stem cells?
8. What do you understand by chromosomes?
9. What is heterochromatin and euchromatin?
10. Explain different types of cell locomotion
11. Describe cell theory
12. Explain cell doctrine
13. Draw the stuctures of polytene chromosomes
14. Describe telomeres.
15. Explain ATP dependent proton pumps
16. Explain the process of endocytosis and pinocytosis
17. Describe ribosomes
18. Explain different types of cell organelles with structures
19. What is symport and antiport?
20. What are microtubules . explain

B.Sc. HONS. BIOTECHNOLOGY- 2 SEM

ASSESSMENT: 08 MARKS

GENERAL MICROBIOLOGY

Sr. no.	Topic	Teaching points	Specific objectives	Methods /approaches /techniques	Resources and links
1	**History of Microbiology**	• A. Leewenhook, L. Pasteur, R. Koch, J. Lister,	Microbes play significant role in understanding medical science	Classroom teaching. Examples	1. Tortora, G.J., Funke, B.R. and Case, C.L. (2009)

	Principle of microscopy	J.Tyndall, Koch postulates, • Discovery of antibiotics. • Bright field, dark field, phase contrast, fluorescent, electron microscopy.	and industries so study of microbes from basic to advance level.	from textbooks, life. Presentation.	Microbiology: An introduction (Benjamin/ Cummings publishing company, Inc). 2. R. Y. Stanier, M. Doudoroff, E. A. Adelberg (1999). General microbiology (MacMillian Press London). 3. M.J. Pelczar, E.C. Sun Chan, N.R. Krieg (2007). Microbiology (Tata McGraw Hill Publication, New Delhi). 5th edition. 4. S.C. Prescott, C.G. Dunn (1959). Industrial microbiology (McGraw-Hill). 5. Purohit, S.S. (2003). Microbiology: Fundamentals and applications
2	**Microbial classification:**	Bacteria, fungi • Morphology of bacteria, viruses and fungi with major emphasis on bacterial structure specially cell wall. Gram positive and Gram negative bacteria. Microbial spores, sporulation/ germination process. Enzymes, Vectors and their properties.	UNDERSTANDING THE CELL STRUCTURE OF MIROBES.	Classroom teaching. Examples from textbooks, life. Presentation.	
3	**Microbial growth, nutritional biodiversity.**	• phases of growth, generation time, growth rate, • monoauxic, diauxic and synchronous growth. Chemostat • Physical and chemical agents to kill microbes,	UNDERSTANDING THE BIOCHEMISTRY AND NUTRITIONAL BIODIVERSITY OF MICROBES.	Classroom teaching. Examples from textbooks, life. Presentation.	

		sterilization and pasteurization processes.			(Agrobios, India) 6. Postgate, J.R. (2000). Microbes and man (Cambridge University Press).
4	**Normal micro flora AND MICROBIAL INTERACTIONS**	• Normal micro flora in human/ animals. Types of microbial pathogens and diseases caused by them. • Microbial interactions like symbiosis and antibiosis. Host defense mechanism against pathogens.	Discussion of application of microbes	Classroom teaching. Examples from textbooks, life. Presentation.	

Question bank:

23. DEFINE microbiology
24. What is the difference between bacteria and virus?
25. Define fungi
26. What is symbiosis?
27. What is antibiosis?
28. Explain the different methods of sterilization
29. Describe physical methods of sterilization
30. Explain normal microflora of human skin
31. Give different types of nutritional biodiversity of microbes
32. Explain confocal microscopy
33. Describe bright field microscopy
34. Give classification of bacteria
35. Explain the discovery of antibiotics
36. Describe growth kinetics of microbes
37. Explain chemostat and turbidostat
38. Describe different types of microbial interactions .
39. Differentiate between gram positive and gram negative microbes
40. Explain different types of pasteurization
41. Explain TEM and SEM
42. Describe sporulation and germination of microbes.

UNIT PLAN
Class: BSC Biotechnology I (Semester II)
Paper: English
Session: January 2019 – May 2019
Text: Varieties of Expression

Total Marks: 50
Assessment: 05
Project: 05
Written: 40

January – February

Objectives

To make the students familiar with the following:

- Definition and features of language in general.
- Role of language in human development.
- Meaning of mother tongue/local language, national language, global language, dialect, pidgin, creole, etc.
- Introduction to Communication and communication skills
- Types of Communication.
- Barriers of communication and how to remove these barriers.
- Brief introduction to prose and drama.
- Grammar and composition: Precis writing.

Learning outcomes

Students will be able to:

- Define the meaning and scope of language.
- Explain the meaning of mother tongue/local language, national language, global language, dialect, pidgin, creole, etc.
- Elucidate Meaning, characteristics and scope and use of communication.
- Define what is the meaning of literature, prose and drama.
- Write précis.

Detail of Unit Plan:

Topics	**Teaching points**	**Specific objectives**	**Methods, Approaches and techniques**	**Resources & Links**
a) Language and literature b) Prose c) Drama	**Language and literature**: Meaning, features, varieties	a) To make the students familiar with language and literature.	Classroom teaching, reading, writing, practice.	Tak AH and Aslam Mohammad. *Varieties of*

d) Communication e) Grmmar	of language. Introduction to English language and literature in general. **Prose:** Conjuror's Revenge, JC Bose **Drama:** The Proposal **Communication:** Meaning, characteristics, scope. **Grammar:** Precis writing.	b) To make the students understand the selected prose and drama. c) To make the students understand communication and communication skills. d)To make the students practise the selected grammar topics.		*Expression.* Foundation Books, 2013. Hudson, WH. *An Outline History of English Literature.* G. Bell & Sons, 1913. Wren & Martin, *High School English Grammar & Composition.* S.Chand, 2004.

Question Bank:

1. Discuss the significance of the title of the prose *The Conjuror's Revenge.*
2. Inanimate things also feel and have life. How does the author make this point in the prose *J.C. Bose?*
3. Discuss the title and theme of the play *The Proposal.*
4. On what ground does the proposal remain unmade till the end of the play *The Proposal*?
5. Grammar based questions.

March

Objectives

To make the students familiar with the following:

- Critical appreciation of prose and drama.
- Literature in India.
- Brief introduction to Indian English literature.
- Understanding modern forms of communication.
- Translation practice.

- Practice of spoken English.
- Commencement of Project.

Learning outcomes

Students will be able to:

- Understand critical appreciation of prose and drama.
- Explicate the scope of literature in India.
- Elucidate briefly Indian English literature.
- Explain modern forms of communication.
- Translate simple and compound sentences.
- Practise spoken English. .

Detail of Unit Plan:

Topics	**Teaching points**	**Specific objectives**	**Methods, Approaches and techniques**	**Resources & Links**
a) Critical appreciation b) Prose c) Drama e) Communication f) Project	**Critical appreciation** of prose and drama. **Prose:** Hardy and Ramanujan, The Position of Women in Ancient India. **Drama:** Riders to the Sea **Modern forms of Communication** **Project:** A project to be prepared within a given time limit.	a) To make the students practise critically appreciate the prose and drama. b) Understanding prose and drama. c) Understanding modern forms of communication. d) To start the project work on given topics.	Classroom teaching, reading, writing, practice, class tests	Tak AH and Aslam Mohammad. *Varieties of Expression.* Foundation Books, 2013. Hudson, WH. *An Outline History of English Literature.* G. Bell & Sons, 1913. Wren & Martin, *High School English Grammar & Composition.* S.Chand, 2004.

Question Bank:

1. How did Hardy discover Ramanujan? Who helped him in this? (Hardy and Ramanujan)

2. In what ways was life in England rewarding for Ramanujan in the prose *Hardy and Ramanujan*?
3. What was the status of women in ancient India? How did it change? What reason does the author find for this? (The Position of Women in Ancient India)
4. Discuss the significant of the title *Riders to the Sea.*
5. Analyze the play *Riders to the Sea* as a predicament of human destiny.
6. Describe the modern forms of communication and their uses.
7. Grammar based questions.

April - May

Objectives

To make the students familiar with the following:

- The use of modern forms of communication.
- Meaning and usage of report writing.
- Practice of English speaking and listening skills.
- Practice of translation.
- Proverbs, Idioms, Phrases, One word substitution.
- Practice of text-based vocabulary.
- Class Tests.

Learning outcomes

Students will be able to:

- Use the modern forms of communication.
- Define and write reports.
- Talk about selected topics and understand listening to simple English.
- Translate simple and compound sentences.
- Learn to use proverbs, idioms, phrases, one word substitutions.

Detail of Unit Plan:

Topics	**Teaching points**	**Specific objectives**	**Methods, Approaches and techniques**	**Resources & Links**

a)Modern form of Communication b) Prose c) Drama f) Project	**Usage of Modern form of Communication.** **Revision of Prose and Drama.** **Report writing:** Meaning, usage and practice. **Project:** Students will submit the given project works on a given date.	a) To make the students understand the usage of modern forms of communication. b) Revising prose and drama. c) To submit the project works. d) Practice of English language speaking and listening skills.	Classroom teaching, reading, writing, practice, class tests	Tak AH and Aslam Mohammad. *Varieties of Expression.* Foundation Books, 2013. Hudson, WH. *An Outline History of English Literature.* G. Bell & Sons, 1913. Wren & Martin, *High School English Grammar & Composition.* S.Chand, 2004.

Question Bank:

1. What is the meaning and significance of Report writing?
2. Choice based Questions on Report writing.
3. Grammar based questions.

UNIT PLAN
Class: BSC Biotechnology I (Semester I)
Paper: English
Session: July 2018 – November 2018
Text: Varieties of Expression

Total Marks: 50
Assessment: 05
Project: 05
Written: 40

July – August

Objectives

To make the students familiar with the following:

- Meaning and characteristics of language in general.
- Scope of language in general.
- Varieties of language for instance mother tongue/local language, national language, global language, dialect, pidgin, creole, etc.
- History and scope of English language.
- English language in India.
- Introduction to literature in general.
- Introduction to prose and drama.
- Letter writing.

Learning outcomes

Students will be able to:

- Define the meaning and scope of language.
- Explain various types of language for instance mother tongue/local language, national language, global language, dialect, pidgin, creole, etc.
- Explain the history and scope of English language in India and the world.
- Define what is literature, poetry, drama and prose.
- Writing letters.

Detail of Unit Plan:

Topics	**Teaching points**	**Specific objectives**	**Methods, Approaches and techniques**	**Resources & Links**
a) Language and literature b) Prose c) Drama	**Language and literature**: Meaning, features, scope,	a) To make the students familiar with language and literature.	Classroom teaching, reading and writing.	Tak AH and Aslam Mohammad. *Varieties of*

d) Letter writing	varieties of language. Introduction to English language and literature in general. **Prose:** The Judgement-Seat of Vikramaditya, The Selfish Giant. **Drama:** The Rising of Moon **Letter Writing:** Formal and Informal	b) To make the students understand the selected poems and prose. c) To make the students understand the selected grammar topics.		*Expression.* Foundation Books, 2013. Hudson, WH. *An Outline History of English Literature.* G. Bell & Sons, 1913. Wren & Martin, *High School English Grammar & Compositio.* S.Chand, 2004.

Question Bank:

1. Why is Vikramaditya called the greatest judge in the history? What was he famous for?
2. How and why did the seat of Vikramaditya disappear from the earth?
3. Write the summary and central idea of the prose The Selfish Giant.
4. What is the central idea of the play The Rising Moon?
5. Formal and Informal letter writing exercises.

September

Objectives

To make the students familiar with the following:

- Role of literature in transforming the world.
- Various genres of literature: Poetry, Drama, Fiction, Novel, Stories, etc.
- Literature in India.
- Place of English literature in India.
- Writing and understanding prose and drama.

Learning outcomes

Students will be able to:

- Define the role of literature in transforming the world.

- Explain the various genres of literature: Poetry, Drama, Fiction, Novel, Stories, etc.
- Explicate the scope of literature in India.
- Elucidate the place of English literature in India.

Detail of Unit Plan:

Topics	**Teaching points**	**Specific objectives**	**Methods, Approaches and techniques**	**Resources & Links**
a) Literature b) Prose c) Drama e) Composition f) Project	**Literature:** Role and genres. Scope in India **Prose:** Engine Trouble, Uncle Pdger Hangs a Picture **Drama:** Waterloo **Composition:** Notices and Memos **Project:** A project to be prepared within a given time limit.	a) scope and genres of literature. Literature in India. b) Writing and understanding poetry. c) Learning writing notices and memos.	Classroom teaching, reading, writing, class tests	Tak AH and Aslam Mohammad. *Varieties of Expression.* Foundation Books, 2013. Hudson, WH. *An Outline History of English Literature.* G. Bell & Sons, 1913. Wren & Martin, *High School English Grammar & Compositio.* S.Chand, 2004.

Question Bank:

1. What impression do you get of the Battle of Waterloo?
2. What is the central idea of the play Waterloo?
3. How did the Talkative Man get the road-engine in the prose Engine Trouble?
4. What is the theme of the prose Engine trouble?
5. How would Uncle Podger create commotion in the whole house before hanging the picture? Was he successful in hanging it?
6. Notice and Memo based questions.

October - November

Objectives

To make the students familiar with the following:

- Meaning and scope of communication.
- Types of communication: Formal/Informal, Verbal/Non-verbal
- Barriers in communication and how to remove them.
- Revision of all chapters.
- Composition: Revising prescribed topics.
- Class Tests

Learning outcomes

Students will be able to:

- Define the meaning and scope of communication.
- Differentiate between the various types of communication: Formal/Informal, Verbal/Non-verbal
- Define business communication and how communication is used at different levels of an organization.
- Identify the barriers in communication and how to remove them.
- Revise the prescribed topics of grammar.

Detail of Unit Plan:

Topics	**Teaching points**	**Specific objectives**	**Methods, Approaches and techniques**	**Resources & Links**
a) Communication b) Prose and drama c)Project d) Class tests	**Communication:** Meaning, scope, types, barriers. **Prose and Drama:** Revision. **Project.** **S**ubmission of project. **Class test:** textual and Composition.	a) To make the students understand the meaning, scope, types, barriers of communication and business communication. b) Revising composition. c) Assessing students' understanding of the subject	Classroom teaching, reading, writing, classtests	Tak AH and Aslam Mohammad. *Varieties of Expression.* Foundation Books, 2013. Hudson, WH. *An Outline History of English Literature.* G. Bell & Sons, 1913.

				Wren & Martin, *High School English Grammar & Compositio.* S.Chand, 2004.

Question Bank

1. What do you understand by language and communication?
2. Grammar based exercises.
3. Project based exercises.
4. Write summary and theme of the given prose/drama.

Sanatan Dharma College, Hoshiarpur
UNIT PLAN

Bsc (hons) biotechnology (Semester - 2)

STATISTICS AND COMPUTER FUNDAMENTAL

Total Marks 100
Theory=67
Internal= 8
Practical =22
internal=3

Objective: The objective of the course is to acquaint students with the concepts of micro economic theory and their use in business decision making. The effort is to make them capable of using various concepts to deal with business problems in a global economic environment.

Unit	Topics	Teaching methods	References
I	An introduction, types of data, collection, classification and tabulation of the primary data, secondary data, discrete data and continuous data, diagramatic and graphical representation of grouped data, frequency distribution {univariate and bivariate},cumulative frequency distribution and their graphical representation, histogram frequency polygon. Concept of central tendency or location and their measures, partition values: quantiles, deciles and percentiles, dispersion and their measures, relative dispersion.	Lecture methods Chalk and board method Project method Group discussion	1. P.N. Arora & P.K. Malhotra (1996).Biostatistics (Himalaya PublishingHouse, Mumbai). 2. Sokal&Rohlf(1973). Introduction to biostatistics (Toppan Co. Japan). 3. W.J. Evens, G.R. Grant (2005). Statistical methods in bioinformatics: Anintroduction (Springer).
II	Binomial distribution, Poisson distribution as a limiting form of binomial distribution and properties of these distributions, moments, moment generation function, cumulate generating function, geometric distribution and exponential distribution and properties of these distributions. Normal distribution Correlation and regression analysis Hypothesis testing Markov models Cluster analysis Nearest		

	neighbour search Search using stem numbers Search using text signature Concepts of Probability	Debate	4. P.K. Sinha (2004). Computer fundamentals (BPB). 5. Suresh K. Basandra (2008). Computers today (Galgotia Publications Pvt.Ltd., New Delhi).
iii	Computers: General introduction to computers, organization of computers, digital and analogue computers, computers algorithms. Introduction to computers and its uses: Milestones in hardware and software-batch oriented/online/real time applications. Compute as systems: Basic concepts, stored programs, functional units and their interrelation-communication with computer.		
iv	Data storage devices: Primary storage: Storage address and capacity, type of memory. Secondary storage devices: Magnetic tape-data representation and R/W Magnetic disks, fixed and removable, data representation and R/W; Floppyand hard disks, optical disks CD-Rom, mass storage devices. Input/output devices: Key-tape/diskette devices, light pin Mouse, joystick, source data automation. Printed outputs: Serial, line, page, printers, plotters, voice response units		