

GANPAT UNIVERSITY

FACULTY OF SCIENCE

**Teaching Scheme, Examination Scheme
&
Syllabus**

**B.Sc. Biotechnology
Semester I**

Effective from July 2018

GANPAT UNIVERSITY

FACULTY OF SCIENCE

TEACHING AND EXAMINATION SCHEME

Programme		Bachelor of Science	Branch/Spec.		Biotechnology																
Semester		I																			
Effective from Academic Year			2018-19		Effective for the batch Admitted in									July 2018							
Sr. No.	Subject Code	Subject Name	Teaching scheme											Examination scheme (Marks)							
			Credit						Hours (per week)					Theory			Practical				
			Lecture(DT)			Practical(Lab .)			Lecture(DT)			Practical(Lab.)		CE	SEE	Total	CE	SEE	Total		
			L	TU	Total	P	T W	Total	L	T U	Total	P	T W							Total	
1	BBIT1CBL	Cell Biology	4	--	4	2	2	4	--	4	3	1	4	40	60	100	40	60	100		
2	BMIC1IMB	Introduction to Microbiology	4	--	4	2	2	4	--	4	3	1	4	40	60	100	40	60	100		
3	BCHE1CHE	Chemistry: I	4	--	4	2	2	4	--	4	3	1	4	40	60	100	40	60	100		
4	BOPE1CSK	Communication Skills: I	2	1	3	--	--	2	1	3	--	--	--	40	60	100	--	--	--		
5	BELE1ESC	Environmental Science	2	1	3	--	--	2	1	3	--	--	--	40	60	100	--	--	--		
	BELE1CFA	Computer Fundamentals and Applications	2	1	3	--	--	2	1	3	--	--	--	40	60	100	--	--	--		
Total			16	02	18	06	06	16	02	18	09	03	12	200	300 0	500 0	120	180	300		

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FACULTY OF SCIENCE									
Programme		Bachelor of Science				Branch/Spec.		Biotechnology	
Semester		I				Version		2.0.0.0	
Effective from Academic Year			2018-2019			Effective for the batch Admitted in			July-2018
Subject code		BBIT1CBL		Subject Name		Cell Biology			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	04	--	2		06	Theory	40	60	100
Hours	04	--	3	1	08	Practical	40	60	100
Pre-requisites:									
Students should have basic knowledge of Plant, Animal biology and basics of Microorganisms of 10 +2 level.									
Learning Outcome:									
The course will help the student to understand basic fundamentals and History of Cell biology, basic aspects related to organization of prokaryotic and eukaryotic cell. It also provide base for studying microorganisms by using various techniques of microscopy.									
Theory syllabus									
Unit	Content								Hrs
1	<ul style="list-style-type: none"> - Introduction to cell biology - History of cell biology, Origin and evolution of cell, Cell Theory, Protoplasm Theory, Organismal Theory, Contribution of various scientists in the field of Cell biology - Difference between prokaryotic and eukaryotic cell. - Cell Membrane and Permeability: Chemical components of biological membranes, organization and Fluid Mosaic Model, membrane as a dynamic entity, cell recognition and membrane transport. 								15
2	<ul style="list-style-type: none"> - Membrane Vacuolar system, cytoskeleton and cell motility: Structure and function of microtubules, Microfilaments, Intermediate filaments. - Endoplasmic reticulum: Structure, function including role in protein segregation. - Golgi complex: Structure, biogenesis and functions including role in protein secretion. 								15
3	<ul style="list-style-type: none"> - Lysosomes: Vacuoles and micro bodies: Structure and functions - Ribosomes: Structures and function including role in protein synthesis. - Mitochondria: Structure and function, Genomes, biogenesis. - Chloroplasts: Structure and function, genomes, biogenesis 								15
4	<ul style="list-style-type: none"> - Nucleus: Structure and function, chromosomes and their structure. - Cell cycle and mitosis- general events of interphase, Prophase, Metaphase, anaphase, Telophase, cytokinesis, Kinds of Meiosis, Process of meiosis, significance and comparison of mitosis and meiosis. 								15
Reference Books									
1	P.S. Verma and V.K.Agrawal, 2016. 'Cell biology, Genetics, Molecular Biology, Evolution and Ecology'S.Chand.								
2	Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASMP ress& Sunderland, Washington, D.C.; Sinauer Associates, MA.								
3	H. A. Modi, 2014, 'A Handbook of Elementary Microbiology' Shanti Prakashan.								

4	De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia.
5	W.M., Kleinsmith, L.J., Hardin. J. and Bertoni, G. P. 2009. The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.
6	Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.
7	Powar C.B., Cell and Molecular Biology, Himalaya Publication
List of Practicals	
1	Study the effect of temperature and organic solvents on semi permeable membrane
2	Demonstration of Osmosis and Turgid pressure
3	Study of plasmolysis and de-plasmolysis
4	Study of Bar body
5	Study of structure of any Prokaryotic and Eukaryotic cell by using electron micrograph
6	Cell division in onion root tip/ <i>Allium cipa</i>
7	Preparation of Nuclear, Mitochondrial & cytoplasmic fractions by gradient/density centrifugation

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FACULTY OF SCIENCE									
Programme	Bachelor of Science				Branch/Spec.	Biotechnology			
Semester	I				Version	2.0.0.0			
Effective from Academic Year			2018-2019		Effective for the batch Admitted in			July-2018	
Subject code	BMIC11MB		Subject Name		Introduction to Microbiology				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	04	--	2		06	Theory	40	60	100
Hours	04	--	3	1	08	Practical	40	60	100
Pre-requisites:									
Students should have basic knowledge about Microorganisms of 10 +2 level.									
Learning Outcome:									
The course will help the student to get knowledge about history and scope of Microbiology. It will also help students to learn basic techniques of staining and microscopy. In addition, Students will get knowledge of pure culture techniques.									
Theory syllabus									
Unit	Content								Hrs
1	History and Development of Microbiology: <ul style="list-style-type: none"> – Development of microbiology as a discipline; Spontaneous generation vs biogenesis. – Contributions of scientists in the field of microbiology: Anton van Leeuwenhoek, Robert Koch, Iwanowsky, Winogradsky, Beijerinck, Alexander Fleming, Selman A. Waksman, Paul Ehrlich, Elie Metchnikoff and Edward Jenner. – Role of microorganisms in fermentation, Germ theory of disease, Development of various microbiological techniques and golden era of microbiology, 								12
2	Scope of Microbiology: <ul style="list-style-type: none"> – Taxonomic and integrative approaches for subdivisions of microbiology, Concept of classification and position of microorganisms, Major groups of Microorganisms. – Distribution of microorganisms in nature. – Applied areas of Microbiology: Medical, Agricultural, Soil, Veterinary, Food, Dairy, Aquatic, Sanitary, Geochemical, Petroleum, Industrial microbiology, Space Microbiology 								12
3	Staining and Microscopy: <ul style="list-style-type: none"> – Stains and staining: Chemistry of dyes and stains, types of dyes, Principles of staining technique in Bacteria, Theory of staining, Steps in staining process, Role of intensifier and mordents, Role of decolorizer. – Types of staining: Simple staining, Negative staining, Differential staining (Gram staining and acid fast staining), Supra vital and Intra vital staining. – Microscopy: Microscopes and Microscopy, Bright field microscopy, Dark field microscopy, Fluorescence microscopy, Phase contrast microscopy. – Electron microscopy - TEM & SEM, Limitations of electron microscopy. 								18
4	Pure culture techniques and Sterilization: <ul style="list-style-type: none"> – Pure culture isolation: Streaking, serial dilution and plating methods; cultivation, 								18

	<p>maintenance and preservation/stocking of pure cultures (Sub culturing, Oil overlay, Sand cultures, Storage at low temperature, Lyophilization, Liquid Nitrogen); cultivation of anaerobic bacteria, and accessing non-culturable bacteria.</p> <ul style="list-style-type: none"> – Role of culture collection centers. – Sterilization and disinfection techniques: Principles and methods of sterilization 	
Reference Books		
1	Pelczaret <i>al.</i> , Microbiology, Tata McGraw Hill Publishing Co.	
2	Dubey and Maheshwari, General Microbiology, S. Chand, New Delhi.	
3	Madigan <i>et al.</i> , Brock biology of microorganisms, Pearson.	
4	Willey <i>et al.</i> , Prescott's Microbiology, McGraw Hill Publishing Co.	
5	Modi HA, Handbook of Elementary Microbiology, Shanti Prakashan.	
List of Practicals		
1	Microbiology Good Laboratory Practices and Biosafety.	
2	To study the principle and applications of important instruments (Laminar Air flow, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter) used in the microbiology laboratory.	
3	Calibrations of microscopic measurements (Ocular & stage micrometers)	
4	Simple (Monochrome) and differential staining (Gram staining), negative staining.	
5	Preservation of bacterial cultures.	
6	Preparation of culture media for bacterial cultivation. Cultivation methods for bacteria: Broth culture, Agar slope/slant culture, Agar plate.	
7	To perform streaking, serial dilution and plating methods (spreading and pouring) to obtain isolated colonies.	

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FACULTY OF SCIENCES									
PROGRAMME	Bachelor of Science				Branch/Spec.	Biotechnology			
SEMESTER	I				Version	2.0.0.0			
Effective From Academic Year			2018-19		Effective for the batch Admitted in			July-2018	
Subject Code	BCHE1CHE		Subject Name		Chemistry-I				
Teaching Scheme					Examination Scheme (Marks)				
Per Week	Lecture		Practical		Total		CE	SEE	Total
	L	Tu	P	Tw					
Credit	04	-	02		06	Theory	40	60	100
Hours	04	-	03	01	08	Practical	40	60	100
Pre-requisites									
Before studying Chemistry, all students have basic knowledge of chemistry up to 10+2 level, Inorganic, Organic, Physical and Analytical chemistry concepts.									
Learning Outcome									
After the successful completion of the course, students will be able to understand									
<ul style="list-style-type: none"> ✓ Basics of Inorganic, Organic, Physical and Analytical chemistry concepts ✓ Periodic properties, Bonding, organic reactions, atomic and molecular) structure of compound. ✓ Thermodynamics, surface chemistry, laws of thermodynamics ✓ Concentration, Error, classification of error, Statistical Terms 									
Unit	Content								Hours
01	Inorganic Chemistry: Periodic Properties Mendeleev's Periodic Law & Modern Periodic Law, Definitions of Family or Group and Period, Explanation and General Trends of the following Periodic properties Atomic and Ionic Radii, Ionization Potential or Energy, Electron affinity and electro negativity, Pauli's method for the determination of ionic radius of isoelectronic ions and problems based on it. Transition metal: Introduction, role of transition metal, oxidation state, solubility. Bonding and Shapes of Molecules Valence Bond Theory and its limitations, Hybridization – Concept of hybridization sp { C_2H_2 , $BeCl_2$ }, sp_2 { BF_3 , C_2H_4 }, sp_3 { CH_4 }, sp_3d { PCl_5 }, sp_3d_2 { SF_6 } Stereochemistry of inorganic molecules, Sidgwick Powell Rule, VSEPR Theory								15

02	<p>Organic Chemistry Substitution and Elimination Reactions Definition of Substitution and Elimination reactions, Types of Reactions SN1& SN2 Reaction Mechanism with energy diagram, Substitution Reactions of alkylhalide: Reaction with aqueous KOH or moist Ag₂O, Alkoxides or dry Ag₂O, NaSH or KSH, Na₂S or K₂S, Alcoholic KCN, AgCN, Alcoholic NH₃, KNO₂ or AgNO₂. E1 & E2 Reaction Mechanism. Comparison of Substitution Nucleophilic & Elimination mechanisms. Factors affecting to the properties of organic molecule Intramolecular forces (dipole-dipole interaction, Vander waals forces), Electromeric effect, Inductive effect, Resonance effect(draw resonating structures of Nitro benzene, Chlorobenzen, Phenoxide ion, Anillinium ion, Acetate ion), Hyper conjugation (o,p-directing effect of Alkyl group, Stability of Carbonium ion and Free radicals)</p>	15
03	<p>Physical Chemistry: Thermodynamics Introduction, system and surrounding- work & heat, state function, thermodynamic process, internal energy, enthalpy, free energy, maximum work function. First law of thermodynamics, heat capacity, specific and molar heat capacity, heat capacity at constant volume and pressure and their relationship, work done in adiabatic and isothermal reversible expansion of an ideal gas. Second law of thermodynamics, Carnot cycle and its efficiency, Concept of entropy; entropy change for an ideal gas under different conditions, entropy change for mixture of ideal gases. Gibbs-Helmholtz equation, Numerical Adsorption: Introduction, Types of adsorption, Uses of adsorption, Langmuir adsorption isotherms at high & low pressure and its limitations, Freundlich adsorption isotherms and its limitations, Surface energy, surface tension, physisorption, chemisorptions, desorption.</p>	15
04	<p>Analytical Chemistry: Introduction to Analytical Chemistry, Classification of Classical and Electroanalytical Techniques. Criterion for Selection of analytical Techniques. Error, Types of errors, Accuracy and Precision. Statistical Terms: Mode, Average, Median, Deviation, Average Deviation, Relative Average Deviation, Standard Deviation & Coefficient of variance. Q-Test for the rejection of result and related numerical. Modes of Concentration [Concentration Concept with Numerical], Preparation of Standard Solutions, Equivalent weight of acid and base, Equivalent weight of acid salt, Equivalent weight of an ion, Molarity with numerical, Normality with numerical, Molality with numerical, Strength of solutions, % Concentration w/v, Weight Fraction</p>	15
Reference Books		

1. 'Inorganic Chemistry', James E. Huheey (3rd Edition), Harper International SI Edition.
2. 'Concise Inorganic Chemistry', J. D. Lee, *ELBS*.
3. 'Magneto Chemistry', Shyamal&Datta.
4. 'Advanced Inorganic Chemistry (3rd Edition)', FA. Cotton and G. Wilkinson, *Wiley Eastern Pvt. Ltd.*
5. 'Valence and Molecular Structure', Cartmell and Fowels.
6. 'A Textbook of Organic Chemistry', K.S. Tewari, N.K. Vishnoi and S.N. Mehrotra.
7. 'Organic Chemistry' Morrison and Boyd.
8. 'Organic Chemistry (Volume I, II & III)', S.M. Mukherji, S.P. Singh and R.P. Kapoor.
9. 'Advanced Organic Chemistry', ArunBahl and B.S. Bahl.
10. 'Text Book of Organic Chemistry for BSc students', B.S. Bahl
11. 'Thermodynamics for Chemists', Samuel Glasstone.
12. 'Principles of Physical Chemistry', Puri, Sharma, Pathania.
13. 'A Textbook of Physical Chemistry', P. L. Soni, O.P. Dharmarha and U.N. Dash.
14. 'Physical Chemistry', Dr. D. R. Pandit, A. R. Rao and Padke.
15. 'Progressive Physical Chemistry', Dr. Snehi, *Merrut Publications*.
16. 'Instrumental Method & Chemical Analysis', B.K. Sharma.
17. 'Fundamental of analytical chemistry', Skoog & West.
18. 'Electrometric Methods of Analysis', Browning.
19. 'Water Analysis and Water pollution', V.P. Kudesia.

List of Practicals

Sr. No.	Content
01	Demonstrative practical's: <ul style="list-style-type: none"> ✓ Calibration of Glassware (Burette & Pipette) ✓ Crystallization of Inorganic compounds ✓ Preparation of standard stock solution by w/v method and their different dilutions. Preparation of standard stock solution of HCl by v/v method and their different dilutions.
02	Inorganic Chemistry Semi micro Analysis:- <ul style="list-style-type: none"> • Cation analysis; separation and identification of ions from group I, II, III-A, III-B, IV, V-A, V-B. Anion analysis like: Cl⁻, Br⁻, I⁻, NO₃⁻, NO₂⁻, SO₄⁻², SO₃⁻², S⁻², CrO₄⁻², CO₃⁻², PO₄⁻³ (Water Soluble and insoluble). Students should perform the analysis of at least 10 compounds.
03	Inorganic Volumetric Analysis: (Standard Solutions should be given) <ol style="list-style-type: none"> 1. Estimation of the amount of Cu²⁺ in the given CuCl₂.2H₂O solution using 0.01 M EDTA solution. 2. Estimation of the amount of Ni²⁺ in the given NiSO₄.7H₂O solution using 0.01 M EDTA solution. 3. Estimation of the amount of Zn²⁺ in the given ZnCl₂ solution using 0.01 M EDTA solution. 4. Estimation of total, temporary & permanent hardness of water. 5. Determination of acetic acid in commercial vinegar using 0.1 M NaOH. Standardization <ol style="list-style-type: none"> 1. Preparation of standard solution of succinic acid and standardization of NaOH/KOH solution. 2. Preparation of standard solution of Na₂S₂O₃ and standardization of I₂ solution. 3. Preparation of standard solution of EDTA and estimation of Ca⁺²/Mg⁺² in CaCl₂/MgCl₂ solution.

Reference Books

1. Textbook of quantitative analysis, A. I. Vogel.
2. Textbook of qualitative analysis, A. I. Vogel.
3. Experimental physical chemistry by R. C. Das & B. Bahera 'Practical in inorganic chemistry & analytical chemistry', H.G. Raval, Nirav & RupalPrakashan.

4. A. I. Vogel, A Text Book of Practical Organic Chemistry.
5. A. Ault, Techniques and Experiments for Organic Chemistry.
6. N. K. Vishnoi, Advanced Practical Organic Chemistry.
7. B. B. Dey and M.V. Sitaraman, Laboratory Manual of Organic Chemistry.
8. Raj K. Bansal, Laboratory Manual in Organic Chemistry.
9. W. J. Popiel, Laboratory Manual of Physical Chemistry, ELBS, London 1970
10. Findlay's Practical Physical Chemistry, B. P. Levitt, Longman, London, 1985
11. D. P. Shoemaker, C. W. Garland, Experiments in Physical Chemistry, McGraw-Hill, New York, 1967.
12. A.K. De, Environmental Chemistry, New Age publishers, New Delhi, 3, 4 & 5th Edn., 2003.
13. B.K. Sharma and H.Kaur, Environmental Chemistry, Goel Publishing House, Meerut, 3rd Edn, 1996.

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FACULTY OF SCIENCE									
Programme	Bachelor of Science				Branch/Specialty	Biotechnology			
Semester	I				Version	2.0.0.0			
Effective from Academic Year	2018-19				Effective for the batch Admitted in	July 2018			
Subject code	BOPE1CSK		Subject Name		Communication Skills – I				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	02	01	0	0	03	Theory	40	60	100
Hours	02	01	0	0	03	Practical	0	0	0
Pre-requisites:									
Familiarity with basics of English language, strong determination and will-power for skill-set enhancement.									
Learning Outcomes:									
At the end of the course, the students shall acquire satisfactory competency in the fundamental communication skills so as to be able to:									
<ul style="list-style-type: none"> • listen, understand and respond effectively • read, comprehend and apply the acquired knowledge/information in various practical situations • speak efficiently under various conditions • write various drafts in clear and concise manner 									
Theory syllabus									
Unit	Content								Hrs
1	Basics of Communication:								
	Definition, Principles, Process, Functions, and Forms of communication (Formal – Informal, Verbal – Non-verbal, Electronic and Visual), Language as a tool of Communication, Barriers to communication with remedies								07
2	Functional Grammar and Vocabulary:								
	Articles, Verb forms, Conjunctions, Collocations, Sentence Construction, Phrasal verbs.								06
3	Receptive Language Skills:								
	Listening Skill: Definition and process of listening, Rudiments of effective listening, Modes of listening, Barriers to listening, Tips for effective listening, Traits of a good listening. <i>Listening comprehension practice using audio-visuals (IELTS Listening)</i> Listening to Announcements- (railway/ bus stations/ airport /sports announcement/ commentaries etc.) Reading Skill: Definition, Purposes & types of reading, Techniques for effective reading comprehension, <i>reading comprehension practice through simple to advanced passages.</i>								07
4	Productive Language Skill – I (Oral Communication):								

	<p>Productive Skills of Communication</p> <p>Speaking:</p> <p>Significance of effective interpersonal oral conversation competence</p> <p>Familiarity with tone, stress and voice modulations and paralinguistic features</p> <p>Characteristics of an erudite speaker</p> <p><i>Oral practice of speaking in different situations (IELTS Speaking)</i></p> <p>Writing:</p> <p>Significance of effective writing skill</p> <p>Coherence and cohesion</p> <p>Points to ponder (fundamentals) for producing impressive written drafts</p> <p>Significance of language quality (4 Cs) and attractive appearance of the draft</p> <p>Difference in structures of formal and informal</p> <p><i>Writing practice for preparing drafts of various informal, semi-formal and formal letters (IELTS General Training Writing task-1)</i></p>	10
Text Books		
1	Technical Communication - Principles and Practice by Meenaksi Raman & Sangeeta Sharma (Oxford University Press)	
Reference Books		
1	Effective Technical Communication by M Ashraf Rizvi (TMH Publication)	
2	Cambridge IELTS 1-10, Cambridge University Press	
3	A Communicative Grammar of English by Geoffery Leech and Fan Svartvik (Pearson Longman)	
4	Online resources: You Tube - Daily Video Vocabulary, Vocab 24, TED Lectures, Inspirational speeches/addresses of success people, parliamentary speeches, interviews, various internet channels devoted to learning and improving communication in English	

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FACULTY OF SCIENCES									
PROGRAMME		B.Sc.			Branch/Spec.			Biotechnology	
SEMESTER		I			Version			2.0.0.0	
Effective From Academic Year				2018		Effective for the batch Admitted in			July-2018
Subject Code		BELEIESC		Subject Name		Environmental Science			
Teaching Scheme					Examination Scheme (Marks)				
Per Week	Lecture		Practical		Total		CE	SEE	Total
	L	Tu	P	Tw					
Credit	02	01	00	0	03	Theory	40	60	100
Hours	02	01	00	0	03	Practical	00	30	00
Pre-requisites									
Basic understanding of concepts related to environment and awareness about the harmful effects of pollution are required to understand the concept better									
Learning Outcome									
The course provides knowledge regarding conservation of environment which is very crucial in the present day scenario.									
Unit	Content								Hours
01	Introduction to environmental studies Multidisciplinary nature of environmental studies; Scope and importance; Concept Of sustainability and sustainable development. Ecosystems What is an ecosystem? Structure and function of ecosystem; Energy flow in An ecosystem: Food chains, food webs and ecological succession. Case studies of the following ecosystems: a) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)								13
02	Environmental Pollution Environmental pollution : types, causes, effects and controls; Air, water, <ul style="list-style-type: none"> • Soil and noise pollution • Nuclear hazards and human health risks • Solid waste management: Control measures of urban and industrial Waste. • Pollution case studies. 								10
03	Conservation of Environment: The concepts of conservation and sustainable development, why to conserve, aims and objectives of conservation, policies of conservation; conservation of life support systems-soil, water, air, wildlife, forests.								12
04	Biodiversity: What is biodiversity, levels and types of biodiversity, importance of biodiversity, causes of its loss, how to check its loss; Hotspot zones of the world and India, Biodiversity Act, 2002. Field work <ul style="list-style-type: none"> • Visit to an area to document environmental assets: river/ forest/flora/fauna, etc. • Visit to a local polluted site---Urban/Rural/Industrial/Agricultural. • Study of common plants, insects, birds and basic principles of identification. • Study of Simple ecosystems---pond, river, Delhi Ridge, etc. 								10
Reference Books									

1. 'Introduction to Environmental Engineering and Science', G. M. Masters, Prentice Hall of India Pvt. Ltd.
2. 'Environmental Science', B. J. Nebel, Prentice Hall of India Pvt. Ltd.
3. 'Ecology: The Link between the natural and social sciences', E. P. Odum, IBH Publishing Com., Delhi.
4. 'Environmental Studies', Snehal Popli, Mahajan Publication.
5. 'Environmental Studies', R. Rajagopalan, Oxford University Press.
6. 'Environmental Pollution: Causes, Effects and Control', K.C. Agrawal, Nidhi Publishers, New Delhi.

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Programme	Bachelor of SCIENCE				Branch/Spec.	Biotechnology			
Semester	I				Version	2.0.0.0			
Effective from Academic Year	2018-19				Effective for the batch Admitted in	July 2018			
Subject code	BELE1CFA		Subject Name		Computer Fundamentals And Applications				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	01	00	-	03	Theory	40	60	100
Hours	2	01	00	-	03	Practical	00	00	00
Pre-requisites:									
<ul style="list-style-type: none"> Eagerness to be familiar with the generation wise technological advancement. Awareness regarding Computer utility among various sectors. Basic historical information regarding Computer technology. 									
Learning Outcome:									
<ul style="list-style-type: none"> Knowledge pertains to Computer fundamentals and its applications. Knowhow of various Computer peripheral devices. Better understanding of Graphical User Interface and icons. Understand the concepts of digital document and presentation. Knowledge pertains to Hypher Text Markup Language. 									
Theory syllabus									
Unit	Content								Hrs
1	Computer Fundamentals: What is Computer, Basic Applications of Computer; Components of Computer System, Central Processing Unit (CPU), input/output Devices, Computer Memory								4
2	Microsoft Office: MS Word : Concepts of word, Applications of word processing, Features of Word, Inserting, Deleting, Formatting, Opening, Saving, Protecting, Managing and Printing Document, Footnote and Endnotes, Mail Merge, Hyperlink, Macros, Insert Table, chart, shapes, Table Operations MS Excel: Introduction to Worksheet and Work Book, Application of Excel, features of excel, Cell, Addressing modes, Formatting a Worksheet, Charts, Naming Ranges, Conditional Formatting, Sort and Filter, Freeze Panes, What-If Analysis , Pivot table and chart, Functions: Statistical, Mathematical, Financial and Database functions MS Power Point: Introduction to Power Point, Creating a Presentation, features of power point, Power Point views, Slideshow set up, Printing a Presentation, Formatting slides, Slide transition & Custom animation, Inserting pictures, chart & tables								12
3	Internet: An Introduction to Internet, Internet Address, Uniform Resource Locator, Internet Service Provider, Intranet, Extranet, Working of Internet ,Hypertext Transfer Protocol, , World Wide Web , Search Engines								4
4	Basic HTML Concepts: What is HTML?, HTML document Structure, HTML Basic Tags – underline, bold, italic, small, super script, sub script, working with list, image, table ,link, block and inline elements, HTML form								10

List of Practical	
List of programs specified by the subject teacher based on above mention topics.	
Text Books	
1	PC Software for windows made simple by R.K. Taxali -Tata McGraw-Hill Publishing Co. LTD.
2	The complete reference Web Design by Thomas A. Powell
Reference Books	
1	Working with Personal Computer by RP Soni, Harshal Arolkar and Sonal Jain–Books India Publication
2	The Complete Reference Office 2000 by Stephen L. Nelson. Tata McGraw-Hill Publishing Co.LTD.
3	Learning Web Design (A beginner’s guide to HTML, CSS ,JavaScript and Web Graphics) by Jeniifer Niederst Robbins