

GANPAT UNIVERSITY

FACULTY OF SCIENCE

Teaching and Examination scheme

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Syllabus of

B.Sc. Biotechnology

Semester II

Effective from July 2018

GANPAT UNIVERSITY																				
FACULTY OF SCIENCE																				
TEACHING AND EXAMINATION SCHEME																				
Programme		Bachelor of Science				Branch/Spec.		Biotechnology												
Semester		II																		
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	BBIT2PAP	Plant Anatomy and Physiology	4	--	4	2	2	2	4	--	4	3	1	4	40	60	100	40	60	100
2	BMIC2FOB	Fundamentals of Bacteriology	4	--	4	2	2	2	4	--	4	3	1	4	40	60	100	40	60	100
3	BCHE2CHE	Chemistry: II	4	--	4	2	2	2	4	--	4	3	1	4	40	60	100	40	60	100
4	BOPE2CSK	Communication Skills: II	2	1	3	--	--	--	2	1	3	--	--	--	40	60	100	--	--	--
5	BELE2ESC	Environmental Science	2	1	3	--	--	--	2	1	3	--	--	--	40	60	100	--	--	--
	BELE2CFA	Computer Fundamentals and Applications	2	1	3	--	--	--	2	1	3	--	--	--	40	60	100	--	--	--
Total			16	02	18	06	06	06	16	02	18	9	03	12	200	300	500	120	180	300

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme	Bachelor of Science				Branch/Spec.	Biotechnology			
Semester	II				Version	2.0.0.0			
Effective from Academic Year		2018-2019			Effective for the batch Admitted in		July-2018		
Subject code	BBIT2PAP		Subject Name		Plant Anatomy and Physiology				
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 Sciences 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 plant anatomy, Meristem and Permanent tissue, Meristem tissue: apical, lateral, intercalary and simple & complex permanent tissues. - The shoot and root apical meristem and its histological organization, primary structure of shoot & root, secondary growth, growth rings, leaf anatomy (dorsi-ventral and isobilateral leaf) 							15	
2	<ul style="list-style-type: none"> - Plant water relations: Importance of water to plant life, diffusion, osmosis, plasmolysis, imbibition, guttation, transpiration, stomata & their mechanism of opening & closing. - Micro & macro nutrients: criteria for identification of essentiality of nutrients, roles and deficiency systems of nutrients, mechanism of uptake of nutrients, mechanism of food transport 							15	
3	<ul style="list-style-type: none"> - Photosynthesis- Photosynthesis pigments, concept of two photo systems, photphosphorylation, calvin cycle, CAM plants,Kranz anatomy - Respiration in plant :Anaerobic respiration :Glycolysis,Krebs cycle &Oxidative phosphorylation and photorespiration, 							15	
4	<ul style="list-style-type: none"> - Nitrogen metabolism- inorganic & molecular nitrogen fixation, nitrate reduction and ammonium assimilation in plants. - Growth and development: Definitions, phases of growth, growth curve, Plant hormones (auxins, gibberlins, cytokinins, abscisic acid, ethylene) 							15	
Reference Books									
1	P.S. Verma and V.K.Agrawal, 2016. 'Cell biology, Genetics, Molecular Biology, Evolution and Ecology' S.Chand.								
2	Nelson, D.L., Cox, M.M. 2004 Lehninger Principles of Biochemistry, 4 th edition, W.H. Freeman and Company, New York, USA.								
3	H.S.Chawla,Introduction to plant Biotechnology,CRC publishers,3 rd edition (2009).								
4	Farn,Plant anatomy								
5	Earu,Plant anatomy								
6	Pandey,Plant anatomy								

7	R. C. Dubey, Text Book of Biotechnology, S.Chand Publisher,3 rd edition (2001).
8	Satyanarayana U., Biotechnology,Books and allied P.Limited publisher,1st edition (2013)
List of Practicals	
1	Introduction of laboratory environment and Safety measure in Biotechnology Laboratory
2	Introduction to Instrumentsused in Biotechnology laboratory
3	Types and Methods of cleaning of glassware, Sterilization and Plugging, Use of chemicals and Precautions, Disposal of Laboratory waste and cultures.
4	Preparation of Standard solutions
5	Preparation of stained mounts of anatomy of monocot and dicot's root, stem & leaf.
6	Separation of photosynthetic pigments by paper chromatography.
7	Mounting and staining of root nodules from a leguminous plant.
8	Effect of Light intensity on rate of photosynthesis
9	Effect of different types of light on rate of photosynthesis

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Programme	Bachelor of Science				Branch/Spec.	Biotechnology			
Semester	II				Version	2.0.0.0			
Effective from Academic Year			2018-2019		Effective for the batch Admitted in			July-2018	
Subject code	BMIC2FOB		Subject Name		Fundamentals of Bacteriology				
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 organization of prokaryotic cellular structures and bacterial systematics. It also will give better understanding of microbial growth, nutrition and control via different methods.									
Theory syllabus									
Unit	Content								Hrs
1	Organization of prokaryotic cell – Cell-wall: Composition and detailed structure of Gram-positive and Gram-negative cell walls, Archaeobacterial cell wall, Gram and acid fast staining mechanisms, lipopolysaccharide (LPS), sphaeroplasts, protoplasts, and L-forms. Effect of antibiotics and enzymes on the cell wall. – Cell Membrane: Structure, function and chemical composition of bacterial and archaeal cell membranes. Cytoplasm: Ribosomes, mesosomes, inclusion bodies, nucleoid, chromosome and plasmids – Endospore: Structure, formation, stages of sporulation.								15
2	Microbial Growth and Nutrition – Nutritional requirements in bacteria and nutritional categories. – Culture media: components of media, natural and synthetic media, chemically defined media, complex media, selective, differential, indicator, enriched and enrichment media. – Reproduction in bacteria: Asexual methods of reproduction (Binary fission, Fragmentation, Budding), logarithmic representation of bacterial populations, phases of growth, calculation of generation time and specific growth rate.								15
3	Microbial control: – Physical methods of microbial control: Heat, low temperature, high pressure, filtration, desiccation, osmotic pressure, radiation. – Chemical methods of microbial control: Disinfectants, types and mode of action. – Radiation methods: UV rays, gamma rays, ultrasonic methods.								15
4	Bacterial Systematics:								15

	<ul style="list-style-type: none"> – Aim and principles of classification, systematics and taxonomy, concept of species, taxa, strain. – Conventional, molecular and recent approaches to polyphasic bacterial taxonomy, evolutionary chronometers, rRNA oligonucleotide sequencing, signature sequences, and protein sequences. – Eubacteria, Archaeobacteria, Difference between Eubacteria and Archaeobacteria.
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.
6	Stanieret <i>al.</i> , General Microbiology, Printice Hall of India Pvt. Ltd., New Delhi.
List of Practicals	
1	Study of Motility using hanging drop preparation and motility agar.
2	Vital staining of yeast.
3	Study of bacterial structure by structural staining: Spore, Capsule, Cell Wall.
4	Special staining: Spirochete by Fontana's method.
5	Cultivation and morphological characteristics of selected bacterial genera: Escherichia, Bacillus, Pseudomonas, etc.
6	Study of pigmented bacteria.
7	Effect of temperature and pH on growth of bacteria.
8	Study of effect (Bacteriostatic & Bactericidal) of chemicals on bacterial growth: heavy metals, phenol, mercuric chloride, crystal violet; Antibiotics by different methods: strip method, agar ditch method, agar cup method.

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Programme	Bachelor of Science			Branch/Spec.	Biotechnology				
Semester	II			Version	2.0.0.0				
Effective From Academic Year	2018-19			Effective for the batch Admitted in	July 2018				
Subject Code	BCHE2CHE		Subject Name	Chemistry-II					
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 ✓ Ionic solids, organic functional groups, IUPAC, structure of compound. ✓ Chemical kinetics, EMF, order reaction, electrode ✓ Qualitative Analysis, water analysis, TDS, hardness of water 									
Unit	Content							Hours	
01	Inorganic Chemistry: Ionic Solids Introduction, Characteristics of ionic solids, Born-Haber Cycle, Max Born Equation Limiting radius ratio, Relation between radius ratio, coordination number and crystal structure, Derivation of r^+/r^- ratio in trigonal, square planar, body centered and tetrahedral crystal lattice, Crystal structure of ionic solids: HCP, BCP and FCC Crystal structure of ionic solids, AB type - CsCl and ZnS (zinc blende), AB ₂ type - CaF ₂ and TiO ₂ , Defects in Ionic Crystal Lattice (stoichiometric and non-stoichiometric) Semi-conductors Molecular Orbital Theory Basic Concepts of Molecular Orbital Theory, Characteristics of molecular orbitals with necessary diagram (i.e. bonding, anti-bonding, gerade and ungerade orbitals) Energy level diagram of diatomic molecules of First and Second row elements of periodic table and NO & CO molecules, Electronic configuration of the above mentioned molecules and calculation of bond order and magnetic moment Comparison of MO and VB Theories							15	

02	<p>Organic Chemistry</p> <p>Alcohols, Phenols and Ethers</p> <p>IUPAC Nomenclature of alcohols (mono, di and trihydric alcohols), phenols and ethers, Physical properties of alcohols, Chemical properties of alcohols [Reactions of O-H bond cleavage and C-O bond cleavage - only reactions]. Industrial production of phenol, Dow Process, Cumene Process, Physical properties of phenol, Chemical properties of phenol, Reactions of O-H group. Reactions of aromatic ring [Electrophilic substitution reactions, Reimer Tiemann Reaction, Kolbe Schmitt Reaction, Fries Rearrangement – with reaction mechanism], Relative acidity of alcohols and phenols, Preparation of ethers – Williamson Synthesis, Physical properties of ethers, Chemical properties of ethers, Substitution reaction [Reaction with Cl₂ in dark & Reaction of Cl₂ in light], Reactions involving C-O bond cleavage [hydrolysis, reaction with H₂SO₄, cold HI and hot HI]\</p> <p>Amines</p> <p>Classification and Nomenclature, Basicity of amines, Physical properties of amines</p> <p>Preparation of primary amines [Reduction of nitro compounds, reaction of organic halides with ammonia, Hoffmann degradation of amides], Chemical properties of primary amines [Reaction with acid chlorides, aryl sulphonyl chlorides, reaction with alkyl halides].</p> <p>Chemical properties of Aniline [Reactions of Aniline with acid chlorides, aryl sulphonyl chlorides, Reaction with bromine (formation of 2,4,6 –tri bromo aniline and p- bromo aniline), Diazotization of Aniline and reactions of Diazonium salt Hinesburg Reaction to distinguish between primary, secondary and tertiary amines</p>	15
03	<p>Physical Chemistry:</p> <p>Chemical Kinetics.</p> <p>Introduction of following terms. Rate of reaction, Order of reaction, Molecularity, Rate equation for First, second order reaction. (a=b) & (a b). Characteristics of first second order reaction. Rate equation for third order reaction. Characteristics of third order reaction. Numerical.</p> <p>Electromotive Force</p> <p>Introduction, Types of Cell, Half-cell, Reversible and irreversible cell, Convention sign, Types of Electrodes, Standard Electrode Potential, Electrolytic Cell, Galvanic Cell, EMF series, Representation of Cell, Relation between <i>G</i>, <i>H</i> and <i>K</i>, Nernst Equation and its applications.</p>	15
04	<p>Analytical Chemistry:</p> <p>Basic Principles of Qualitative Analysis</p> <p>Introduction, Factors affecting qualitative analysis: common ion effect, solubility product (<i>k_{sp}</i>), Use of NH₄Cl and NH₄OH in Qualitative analysis, Use of HCl and H₂S in Qualitative analysis, Numerical on common ion effect.</p> <p>Explanation with chemical equations in, Charcoal test, Cobalt nitrate test, Borax bead test, Flame test</p> <p>Acids and Bases</p> <p>Strong acid-weak base, Strong base- weak acid, Weak acid-weak base</p> <p>Buffers solution- buffer capacity, Mechanism of acidic and basic buffer solution</p> <p>Water Analysis</p>	15

	Analysis of hardness of water in terms of Total solid and volatile solid, Non-filterable solid and non-filterable volatile solid, Filterable solid, Total solid, Total Suspended Solid, Acidity, Basicity or Alkalinity, Turbidity, Various methods for determination of hardness of water.	
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Reference Books

1. 'Organic Chemistry', Morrison and Boyd.
2. 'Organic Chemistry', T.W. Graham Solomons and Craig B. Fryhle.
3. 'Organic Chemistry', Francis A. Carey.
4. 'Organic Chemistry', Clayden.
5. 'Fundamentals of Organic Chemistry', Solomon, *John Wiley*.
6. 'Textbook of Organic Chemistry', P.L. Soni and H.M. Chawla.
7. Atomic Structure and Chemical Bonding', Manas Chanda.
8. 'Inorganic Chemistry', Suretker Thate.
9. 'Inorganic Chemistry', James E. Huheey (3rd Edition), Harper International SI Edition.
10. 'Coordination Chemistry', Gurdeep Chatwal and M.S. Yadav, *Himalaya Publishing House*.
11. 'Principles of Inorganic Chemistry', B.R. Puri, L.R. Sharma & K.C. Kalia, *Vallabh Publications, Delhi*.
12. A text book of Physical Chemistry', B.K. Sharma.
13. 'Emf', B.K. Sharma.
14. 'Principles of Physical Chemistry', S.H. Maron and C.F. Prutton.
15. 'Elements of Physical Chemistry', B.R. Puri, L.R. Sharma, M.S. Pathania.
16. 'Advanced Physical Chemistry', J.N. Gurtu.
17. 'Physical Chemistry', N. Kundu and S.K. Jain.
18. 'Physical Chemistry', K. L. Kapoor.
19. 'Thermodynamics', Gurudeep Raj.
20. 'Book for Water Analysis', R. K. Trivedi, V. P. Kudesia.
21. 'Analytical Chemistry', Dick.
22. 'Inorganic Qualitative Analysis', Vogel and Gehani Parekh.
23. 'Electrometric Methods of Analysis', Browning.
24. 'Principle of Instrumental Analysis', Skoog.

List of practicals

Sr. No.	Content
01	Demonstrative practical's: <ul style="list-style-type: none"> ✓ Melting point and Boiling point of an organic compound. ✓ Cleaning of glassware's Calibration of Glassware (Measuring Cylinder & flasks). ✓ Crystallization of Organic compounds. Preparation of standard solutions (Primary & Secondary).
02	Organic Chemistry <ol style="list-style-type: none"> 1. Identification of an organic compound through the functional group analysis, 2. Determination of melting point and boiling point, preparation of suitable derivative. 3. Candidate should perform the analysis of at least 10 compounds. List of Compounds <i>Acids:</i> Benzoic acid, Phthalic acid, Succinic acid

	<p><i>Phenols:</i> α-Naphthol, β-Naphthol <i>Bases:</i> p-Toludine, Aniline, N-methylaniline <i>Neutrals:</i> Naphthalene, Anthracene, Acetamide, Benzamide, Acetanilide, m-Dinitrobenzene, Urea, Thiourea, Toluene, Acetone, Benzaldehyde, Methyl acetate, Ethyl acetate, Ethanol, 1-Propanol, Glycerol, Chloroform, Carbon tetrachloride, Chlorobenzene, Nitrobenzene.</p>
03	<p>Volumetric Titrations</p> <ol style="list-style-type: none"> To determine the strength of NaOH and Na₂CO₃ present in the solution mixture of NaOH & Na₂CO₃ and to find out their percentage composition. To determine the strength of NaHCO₃ and Na₂CO₃ present in the solution mixture of NaHCO₃ & Na₂CO₃ and to find out their percentage composition. To determine the Normality, gram/liter and molarities of H₂C₂O₄, 2H₂O and H₂SO₄ present in the solution mixture of H₂C₂O₄, 2H₂O & H₂SO₄ by using X N NaOH and Y N KMnO₄ solutions. To determine the Normality, gram/liter and molarity of H₂C₂O₄, 2H₂O and K₂C₂O₄ present in the solution mixture of H₂C₂O₄, 2H₂O & K₂C₂O₄ by using X N NaOH and Y N KMnO₄ solutions. To determine the amount of Ca⁺² and Mg⁺² ion by EDTA solution from the mixture solution of CaCl₂ and MgCl₂. <p>Water analysis: Water hardness, temporary hardness, permanent hardness, TDS, TSS.</p>
<p>Reference Books</p> <ol style="list-style-type: none"> Textbook of quantitative analysis, A. I. Vogel. Textbook of qualitative analysis, A. I. Vogel. Experimental physical chemistry by R. C. Das & B. Bahera 'Practical in inorganic chemistry & analytical chemistry', H.G. Raval, Nirav & RupalPrakashan. A. I. Vogel, A Text Book of Practical Organic Chemistry. A. Ault, Techniques and Experiments for Organic Chemistry. N. K. Vishnoi, Advanced Practical Organic Chemistry. B. B. Dey and M.V. Sitaraman, Laboratory Manual of Organic Chemistry. Raj K. Bansal, Laboratory Manual in Organic Chemistry. W. J. Popiel, Laboratory Manual of Physical Chemistry, ELBS, London 1970 Findlay's Practical Physical Chemistry, B. P. Levitt, Longman, London, 1985 D. P. Shoemaker, C. W. Garland, Experiments in Physical Chemistry, McGraw-Hill, New York, 1967. A.K. De, Environmental Chemistry, New Age publishers, New Delhi, 3, 4 & 5th Edn., 2003. 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/Spec.	Biotechnology			
Semester	II				Version	2.0.0.0			
Effective from Academic Year	2018-19				Effective for the batch Admitted in	July 2018			
Subject code	BOPE2CSK		Subject Name		Communication Skills - II				
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 • gain greater proficiency in language without wading through dull and insipid. 									
Theory syllabus									
Unit	Content								Hrs
1	Remedial English Grammar, Usage and Vocabulary:								
	Modals, Conditionals, Concord, Commonly Confused Pairs of words, One Word Substitutes, Synonyms and Antonyms, Word Formation: Prefixes, Roots and Suffixes (Derivational & Inflectional), Error Analysis (Correction of Errors in a given sentence - errors in the use of words - errors of Indianisms - use of slang - errors in punctuation)								07
2	Oral Communication in Context								
	Asking for and giving information, offering and responding to offers, requesting and responding to requests, congratulating people on their success, expressing sympathy, expressing condolences, apologizing and forgiving, giving instructions, seeking and giving permission, expressing opinions (likes and dislikes), agreeing and disagreeing.								06
3	Skills for Career Building – I								

	<p>Presentation Skills: Definition of presentation, Components of presentation, planning to prepare effective presentation, Steps for preparing effective presentation, Boredom Factors in presentation, Attention grabbers in presentation</p> <p>Group Discussion: Definition and nature of group discussion, Pre-requisites for group discussion, Objectives of group discussion, Characteristics of group discussion, how to prepare for group discussion, Dos and don'ts in group discussion</p>	07
4	Skills for Career Building – II	
	Official Correspondence - Letters to higher authorities, Significance & types of advertisements, drafting advertisements - Classified and Display, Notice, Agenda & Minutes of Meeting, Memo writing, E-Mails, Press release	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	

GANPAT UNIVERSITY									
FACULTY OF SCIENCES									
PROGRAMME	B.Sc.				Branch/Spec.	Biotechnology			
SEMESTER	II				Version	2.0.0.0			
Effective From Academic Year			2018-19		Effective for the batch Admitted in			July 2018	
Subject Code	BELE2ESC		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	00	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	<p>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)</p>	13
02	<p>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. </p>	10
03	<p>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.</p>	12
04	<p>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. </p>	10
Reference Books		
<ol style="list-style-type: none"> 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	II				Version	2.0.0.0			
Effective from Academic Year	2018-19				Effective for the batch Admitted in	July 2018			
Subject code	BELE2CFA	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	-	3	Theory	40	60	100
Hours	2	01	00	-	3	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:								4

	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	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
Practical content		
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	

