

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

### TEACHING AND EXAMINATION SCHEME

Programme	Bachelor of Science	Branch/Spec.	Biotechnology																	
Semester	III																			
Effective from Academic Year	2016-17	Effective for the batch Admitted in													July 2015					
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	TW	Total	L	TU	Total	P	TW	Total							
UBTA301CEM	CELLULAR METABOLISM-I	03		03				03		03				40	60	100				
UBTA302GAT	GENETICS AND ANALYTICAL TECHNIQUES	03		03				03		03				40	60	100				
UPBA303PRA	PRACTICAL MODULE:III				03		03					06		06					100	100
UCHA301IPC	INORGANIC AND PHYSICAL CHEMISTRY-III	03		03				03		03				40	60	100				
UCHA302OAC	ORGANIC AND ANALYTICAL CHEMISTRY-IV	03		03				03		03				40	60	100				
UPCA303PRA	PRACTICAL MODULE-III				03		03					06		06					100	100
UENA301ENG	ENGLISH-III	02		02				02		02				40	60	100				
	OPEN SUBJECT – 1	02		02				02		02				40	60	100				
<b>Total</b>		16		16	06		06	16		16	12		12	240	360	600		200	200	

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme		Bachelor of Science				Branch/Spec.		Biotechnology	
Semester		III				Version		1.0.0.0	
Effective from Academic Year			2016-17			Effective for the batch Admitted in			July 2015
Subject code		UBTA 301 CEM		Subject Name		Cellular Metabolism –I			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	03				10	Theory	40	60	100
Hours	03				07	Practical	--	100	100
Pre-requisites:									
Students should have basic knowledge of Metabolism of Biomolecules of 10+2 level									
Learning Outcome:									
The course will help the student to understand basic aspects of cellular metabolism.									
Theory syllabus									
Unit	Content								Hrs
1	1.1 Bioenergetics: Definitions of System, universe, Enthalpy, Entropy, Endothermic and Exothermic reactions, Gibbs Free energy, Equilibrium constant & its biological significance. 1.2 Laws of thermodynamics, Relationship between standard free energy change, free energy change and equilibrium constant 1.3 ATP as a universal energy currency of biological system s. 1.4 Biological oxidation: Redox reactions and Reduction potential, standard reduction potential E° Free-Energy Change								15
2	2.1 Enzymes: Enzyme as a biocatalyst, coenzyme, cofactor, Nomenclature and Classification of enzyme, Basic concept of enzyme substrate reaction. 2.2 Factors affecting on enzyme catalyzed reaction 2.3 Overview of catalytic mechanisms of enzymes								15
3	3.1 Enzyme kinetics: : M- M kinetics , Double reciprocal plot 3.2 Inhibition of enzyme. 3.3 Quaternary structure of protein: Hemoglobin 3.4 Regulation of enzymes - allosteric and Covalent regulation : 3.5 Basic concept of metabolism.								15
4	4.1 Glycolysis and fate of pyruvate (Alcohol and lactic acid fermentation.) 4.2 Overview of Citric Acid cycle, 4.3 Pentose phosphate pathway, Gluconeogenesis. 4.4 Regulation of Glycolysis and citric acid cycle								15
Practical content									
Text Books									
1	Textbook of Biochemistry by satyanarayan								
Reference Books									
1	<b>Boyer</b> ,1999, Concepts in Biochemistry, Thomson								
2	<b>Lehninger</b> , Principles of Biochemistry								
3	<b>Voet Donald</b> , Fundamentals of Biochemistry								

4	<b>Voet Donald</b> , Fundamentals of Biochemistry
5	<b>Trevor Palmer</b> , Enzymes, 2 <sup>nd</sup> Edition, AWP publisher, New Delhi
6	<b>Palmer and Trevor</b> , Enzymes: Biochemistry, Biotechnology, Clinical Biochemistry, 1 <sup>st</sup> edition, AWP pub.
7	<b>Nicholas Price and Levis Stevens</b> , Fundamentals of Enzymology, 3 <sup>rd</sup> edition, OUP publisher, Delhi
8	<b>Hans Bisswanger</b> , Enzyme Kinetics: Principles and Methods

<b>GANPAT UNIVERSITY</b>									
<b>FACULTY OF SCIENCE</b>									
Programme		Bachelor of Science			Branch/Spec.		Biotechnology		
Semester		III			Version		1.0.0.0		
Effective from Academic Year			2016-17		Effective for the batch Admitted in			July 2015	
Subject code		<b>UBTA 302 GAT</b>		Subject Name		<b>Genetics and Analytical Techniques</b>			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	03		03		06	Theory	40	60	100
Hours	03		-		03	Practical	--	-	-
Pre-requisites:									
Students should have basic knowledge of Genetics and Analytical techniques of 10+2 level									
Learning Outcome:									
The course will help the student to understand basic fundamentals of Genetics and some commonly used Analytical techniques.									
Theory syllabus									
Unit	Content								Hrs
1	1.1 Mendel's laws of heredity, Test cross 1.2 Types of linkages, Sex linkage in drosophila & Mechanism of Crossing over 1.3 Multiple alleles 1.4 Epistasis, incomplete and complete dominance								15
2	2.1 Physical and Chemical mutagens and their mechanism 2.2 Chromosomal mutation: Variation in Number & Structure: Euploidy, Aneuploidy, Polyploidy, Deletion, Duplication, Inversion, Translocation, Position Effect, Centromeric & Non-centromeric breaks in chromosomes, Chromosomal Mosaics 2.3 Mutation at Molecular level 2.4 Inborn errors of metabolism in human beings								15
3	3.1 Basics of Microscopy: Principles and methods 3.2 Interaction of EM radiation with matter : Overview of Electromagnetic spectrum; physical phenomenon ,Absorption, Resonance fluorescence, Emission, Refraction and Diffraction. 3.3 UV-Vis spectrophotometer: Principle, Instrumentation, working and Application 3.4 Atomic spectroscopy: Principles and application of Atomic Absorption/ Emission Spectrometer Basics of IR, X-Ray diffraction and NMR and their application in biotechnology								15
4	4.1 Chromatography: Chromatography theory and principles, Partition theory and solvent extraction, Partition and adsorption chromatography, Application - Planner Chromatography, (Paper Chromatography, TLC) solvent extraction. 4.2 Column Chromatography: Ion Exchange, GC, Gel exclusion , Affinity and HPLC,FPLC 4.3 Centrifugation: Principles and Applications 4.4 Electrophoresis: Principles and Use of Agarose gel Electrophoresis and PAGE								15
Text Books									
1	Genetics, B.D. Singh								
Reference Books									

1	<b>Weaver Hedrick</b> , Genetics
2	<b>Griffith et al</b> , An introduction to Genetic Analysis
3	<b>Hertwell et al</b> , Genetics: From Genes to Genome
4	<b>Wilson and Walker</b> , Principles and Techniques of practical Biochemistry, Cambridge University, Press
5	<b>Monroe.W.Strickberger</b> , Genetics
6	<b>Sharma B K</b> , Instrumental method of chemical analysis
7	<b>D.A.Skoog</b> , Instrumental methods of analysis
8	<b>Chatwal and Anand</b> , Instrumentation

<b>GANPAT UNIVERSITY</b>								
<b>FACULTY OF SCIENCE</b>								
Programme	Bachelor of Science				Branch/Spec.	Biotechnology		
Semester	III				Version	1.0.1.0		
Effective from Academic Year	2016-17			Effective for the batch Admitted in	July 2015			
Subject code	<b>UPBA 303 PRA</b>		Subject Name	<b>PRACTICAL MODULE - III</b>				
Teaching scheme				Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total
	L	TU	P	TW				
Credit			03		03	Theory		
Hours			06		06	Practical	--	100
<b>Pre-requisites:</b>								
Students should have basic knowledge of Estimation of Biomolecules and nature of enzyme of 10+2 level.								
<b>Learning Outcome:</b>								
The course will help the student to understand Estimation of various biomolecules and enzyme kinetics.								
<b>Practical content</b>								
Content								
01 Estimation of protein using by Biuret method								
02 Estimation of protein using by Folin -Lowry method								
03 Estimation of protein using by Bradford's method								
04 Estimation of Reducing sugar by DNSA method								
<b>Assaying of various enzymes (any three):</b>								
05 Amylases								
06 Phosphatases								
07 Invertase.								
08 Proteolytic enzymes.								
09 Lipases								
10 Effect of Substrate concentration (Determination of Km and Vmax) on enzyme activity.								
11 Determine temperature optima of the enzyme.								
12 Effect of pH on enzyme activity								
13 Effect of enzyme concentration								
14 To determine maximum absorption spectra of colored solution.								
15 Paper Chromatography and Thin Layer Chromatography								
16 PAGE and Agarose gel Electrophoresis								
<b>Text Books</b>								
1	Practical Biochemistry, Jayraman							
<b>Reference Books</b>								

GANPAT UNIVERSITY							
FACULTY OF SCIENCE							
Programme	Bachelor of SCIENCE			Branch/Spec.	Biotechnology		
Semester	III			Version	1.0.1.0		
Effective from Academic Year	2016-17			Effective for the batch Admitted in	July 2015		
Subject code	UCHA 301 IPC	Subject Name	Inorganic and Physical Chemistry-III				
Teaching scheme				Examination scheme (Marks)			
(Per week)	Lecture(DT)	Practical(Lab.)		Total	CE	SEE	Total
	L	TU	P	TW			
Credit	3			3	Theory		
Hours	3			3	Practical		
Pre-requisites:							
<ul style="list-style-type: none"> <li>Before learning inorganic and physical chemistry, student should aware about basic principles and theories of physical chemistry, thermodynamics, chemical reactions, inorganic compounds, periodic table and other UG level chemistry.</li> </ul>							
Learning Outcome:							
<ul style="list-style-type: none"> <li>Basic knowledge of wave mechanics.</li> <li>Knowledge of Nobel gases and their properties.</li> <li>Understanding of bonding and geometry of xenon complexes.</li> <li>Knowledge of various theories and equations in thermodynamics.</li> <li>Understanding of physical properties.</li> <li>Measurement of surface tension and viscosity.</li> </ul>							
Theory syllabus							
Unit	Content						Hrs
1	<b>Wave Mechanics</b>						
		Black body Radiation & Quantum Theory. Photo Electric effect: Wave particle duality of radiation. Compton effect. Basic Postulates of Quantum Mechanics. Operator : Definition, Algebra of operators, Addition, Multiplication, Commutative properties, Linear operator, Commutator operators, Laplassion operator. Free particle system. Particle in one dimension box.					
02	<b>Chemistry of Nobel Gases</b>						
		Introduction. Discovery of Noble gases: Occurrence, Isolation of Non-radioactive of Noble gases. Electronic configuration of Noble gases. Compound of Noble Gases. <ol style="list-style-type: none"> <li>Non real compounds prepared by different methods.</li> <li>True Compounds : <math>\text{XeF}_2</math>, <math>\text{XeF}_4</math>, <math>\text{XeF}_6</math>, <math>\text{XeOF}_2</math>, <math>\text{XeO}_3</math>, <math>\text{XeO}_2\text{F}_2</math>, <math>\text{XeO}_4</math>, <math>\text{XeOF}_4</math></li> </ol>					
03	<b>Thermodynamics</b>						
	<b>Phase in Equilibrium</b>						
		Clapeyron-clausius equation. Integrated form of Clapeyron-clausius equation. Application of Clapeyron-clausius equation from various phase in equilibrium					

		Trouton's law. Craft equation. Elevation in boiling point (K <sub>b</sub> ). Depression of freezing point (K <sub>f</sub> ). Numericals.	
04	<b>Physical Properties and Molecular Structure</b>		
		The Vacancy Theory of Liquid, Vapor-Pressure. Surface Tension <ol style="list-style-type: none"> <li>1. Measurement of surface tension by stalagmometer.</li> <li>2. Perachore and its applications.</li> </ol> Viscosity Measurement of viscosity by Ostwald-viscometer. Refractive Index <ol style="list-style-type: none"> <li>1. Specific refraction.</li> <li>2. Molar refraction.</li> <li>3. 3. Measurement of Refractive index by Abbe's Refractometer. Numericals.</li> </ol>	
<b>Text Books</b>			
1	Quantum Chemistry by R.K. Prasad, Revised IIIrd Edition.		
2	Physical Chemistry (Question and Answers) by R. N. Madan, G. D. Tually, S. Chand..		
<b>Reference Books</b>			
1	Advance Physical Chemistry by Gurdeep Raj.		
2	Concise Inorganic Chemistry, J.D. Lee, 4th ed., ELBS Publication.		
3	Principal of Physical Chemistry by Puri, Sharma & Pathania.		
4	Chemical Thermodynamics by R.P. Rastogy and R.R. Mishra.		
5	Essential of Physical Chemistry by B.S. Bahal, Arn Bahal and G.D. Tully.		
6	Physical Chemistry by P.W. Atkins.		
7	Physical Chemistry by R.A. Alberty and R. J. Silbey		
8	Physical Chemistry by G.H. Barrow, 5th ed., Mac Graw Hill, 1998.		
9	Physical Chemistry by W.J. Moore, 4th ed., Orient Longmans, 1969.		



GANPAT UNIVERSITY								
FACULTY OF SCIENCE								
Programme	Bachelor of SCIENCE				Branch/Spec	CHEMISTRY		
Semester	III				Version	1.0.1.0		
Effective from Academic Year	2015-16			Effective for the batch Admitted in	July 2015			
Subject code	UCHA 302 OAC		Subject Name	Organic and Analytical Chemistry-IV				
Teaching scheme				Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total
	L	TU	P	TW				
Credit	3					Theory		
Hours	3					Practical		
Pre-requisites:								
<ul style="list-style-type: none"> <li>Before studying organic and analytical chemistry all students have basic knowledge of organic compounds, molecular structure, Molecular orbital theories, basics of analytical chemistry and knowledge related to UG level chemistry.</li> </ul>								
Learning Outcome:								
<ul style="list-style-type: none"> <li>Basic concept and theories of acids and bases.</li> <li>Understanding of electrophilic aromatic substitution reactions and their mechanism.</li> <li>Knowledge of principle, instrumentation and applications of colorimetry and spectrophotometry.</li> <li>Understanding of the principle of photometry and its uses.</li> </ul>								
Theory syllabus								
Unit	Content							Hrs
1	<b>Acid-Base Properties</b>							
		Proton Acids-Bases and Lewis Acids-Bases. Scale of Acidity-Basicity. Factor effecting on acidity and basicity of compounds. <ul style="list-style-type: none"> <li>Resonance effect (Drawing resonance structures and the conditions for resonance).</li> <li>Inductive and electronic effects..</li> <li>Effect of Hybridization.</li> <li>Steric effects.</li> <li>Effect by hydrogen bonding.</li> </ul>						
02	<b>Electrophilic Aromatic Substitution</b>							
		Introduction. Effect of Substituent groups. Determination of Orientation. Classification of Substituent groups. Orientation in disubstituent Benzenes. Orientation and Synthesis. Mechanism of Nitration, Sulfonation, Fridal-Kraft alkylation and Helogenation. Electrophilic aromatic substitution (Two Step). Theory of reactivity. Theory of orientation. Electron release via resonance.						
03	<b>Colorimetry and Spectrophotometry</b>							

	<p>Law of absorbance,  Visual colorimetric method.  Spectrophotometric Instrumentation.  Light sources optical system,  The wave length Selectors.  Accuracy and error in spectrophotometry.  Analysis of mixture.</p>	
--	--	--

<b>04</b>	<b>Potentiometry</b>	
	<p>The scope of Potentiometric titration.  Graphical methods including Grans plot of selecting end point.  Deferential potentiometric titration.  Dead stop titration.  Ion selective electrode elementary.  Glass Electrode.</p>	
Practical content		
Text Books		
1	Textbook of Organic Chemistry by Arun Bahal, B.S. Bahal & S. Chand.	
2	Organic Chemistry by Morrison and Boyd. 4th ed., Pearson Education-2003.	
Reference Books		
1	Organic Chemistry by Pine, Hendrickson, Cram and Hammond 4th ed. By P. S. Kalsi.	
2	Advance Organic Chemistry by Jerry March.	
3	Advance Organic Chemistry by Arun Bahal and B. S. Bahal.	
4	Organic Chemistry Vol. I & II by S. M. Mukherji, S. P. Singh & R. P. Kapoor.	
5	Reaction mechanism and Reagents in Organic Chemistry by Gurdeep R. Chatwal 4th ed., Himalaya Public House.	
6	Concise Inorganic Chemistry, J.D. Lee, 4th Edition, ELBS.	
7	Organic Spectroscopy by P.S. Kalsi.	
8	Organic Chemistry by I.R. Finar.	
9	Analytical Chemistry by G.D. Christian, J. Wiley	
10	Fundamental of Analytical Chemistry by D.A. Skoog, D.M. West and F.J. Holler.	
11	Analytical Chemistry Principals by J. H. Kennedy, W. B. Saunders.	
12	Analytical Chemistry Principals and Techniques by L.G. Hargis, Prentice Hall.	
13	Principles of Instrumental Analysis by D. A. Skoogs, J. L. Loary, W.B. Saunders.	
14	Qualitative Analysis by R.A. Day, Jr and A.L. Underwood, Pr entice Hall.	

# GANPAT UNIVERSITY

## FACULTY OF SCIENCE

Programme	Bachelor of SCIENCE			Branch/Spec	Biotechnology			
Semester	III			Version	1.0.0.0			
Effective from Academic Year		2016-17		Effective for the batch Admitted in		July 2015		
Subject code	UENA 301 ENG		Subject Name	English III				
Teaching scheme				Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total
	L	TU	P	TW				
Credit	2					Theory		
Hours	2					Practical		
<b>Pre-requisites:</b>								
<ul style="list-style-type: none"> <li>Students should have basic knowledge of English Language and grammar.</li> <li>Students should have ability to speak and write correct sentences in their day to day language.</li> <li>Students should be familiar with correct usage of language.</li> </ul>								
<b>Learning Outcome:</b>								
<ul style="list-style-type: none"> <li>Knowledge of English grammar.</li> <li>Understanding of prose and composition.</li> <li>Development of communication skills.</li> <li>Development of vocabulary.</li> <li>Knowledge of letter writing.</li> </ul>								
<b>Theory syllabus</b>								
<b>Unit</b>	<b>Content</b>							<b>Hrs</b>
<b>1</b>	Selected Prose							
	The Post Master- Rabindranath Tagore A cup of tea- Katherine Mansfield Blow up with the ship- Wilkie Collins							
<b>2</b>	Basic English Grammar							
	Use of relative pronouns, Synthesis of the sentences, Noun clause							
<b>3</b>	Vocabulary							
	Confusing words, compound words							
<b>4</b>	Composition							
<b>5</b>	Joining Letter, Resignation Letter Retirement Letter, Promotion Letter, Reference Letter							

GANPAT UNIVERSITY									
FACULTY OF SCIENCE									
Programme		Bachelor of SCIENCE				Branch/Spec		BIOTECHNOLOGY	
Semester		III				Version		1.0.1.0	
Effective from Academic Year			2015-16			Effective for the batch Admitted in			June 2015
Subject code		UDMB 301 DMT		Subject Name		DISASTER MANAGEMENT- I			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	2	-	0	-	2	Theory	40	60	100
Hours	2	-	0	-	2	Practical	00	00	00
Pre-requisites:									
<ul style="list-style-type: none"> <li>• Students should have basic knowledge of Environment and environmental problems.</li> <li>• Students should have acquaintances with natural resources.</li> </ul>									
Learning Outcome:									
<ul style="list-style-type: none"> <li>• Knowledge of Natural Disasters.</li> <li>• Understanding of seismic engineering.</li> <li>• Development of thinking to take necessary actions during disaster.</li> </ul>									
Theory syllabus									
<b>Unit</b>	<b>Content</b>								<b>Hrs</b>
<b>1</b>	<b>Natural Disasters</b>								<b>15</b>
	<b>1.1 Types of Natural Disasters:</b> Cyclone, Flood, Fire, Desert Storms, Land Slides and Snow avalanches. <b>1.2 Cyclone:</b> Introduction, Fundamentals, Characteristics, Causes and Effects, Preventive and Remedial measures. <b>1.3 Flood:</b> Introduction, Fundamentals, Causes and Effects, Preventive and Remedial measures. <b>1.4 Fire:</b> Fundamentals, Causes and Effects, Preventive and Remedial measures.								
<b>2</b>	<b>Fundamentals of Seismic Engineering</b>								<b>15</b>
	<b>2.1</b> Introduction, Definition, History of earthquake, Earth and its structure, Terminology, Epicentre, Hypocenter, Focus, Epicentre distance <b>2.2</b> Waves generated due to earthquake, P waves, S waves, Causes and Measurement of earthquake, Intensity and magnitude of earthquake, Sysmo-graph, Sysmo-scope, Sysmo-meter, Richter scale <b>2.3</b> Zoning of earthquake as per I.S. Effects of earthquake on Soil, Low-rise and high-rise buildings, Human psychology, Communication, Geology <b>2.4</b> General instructions for protection of people during earthquake. General guidelines for construction and maintenance of earthquake proof/resistant masonry structure								