

Board of Studies
Meeting
Dept. of Biochemistry

SEMESTER PATTERN

w.e.f.

THE ACADEMIC YEAR 2017-2018

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)
Vijayawada 520004

AIMS AND OBJECTIVES OF THE COURSE

Aims:

- Understand the scientific basis of life processes at the molecular level.
- Orient towards the application of knowledge acquired in solving clinical problems.

OBJECTIVES:

Knowledge Based:

- Broad understanding of fundamental biological processes
- Describe the molecular & functional organization of a cell & list its sub cellular components.
- Delineate structure, function & interrelationship of various biomolecules & consequences of deviation from normal.
- Summarize the fundamental aspects of enzymology & clinical applications wherein regulation of enzymatic activity is altered.
- Describe digestion & assimilation of nutrients & consequences of malnutrition.
- Integrate the various aspects of metabolism & their regulatory pathways.
- Explain biochemical basis of inherited disorders with their associated sequelae.
- Outline the molecular mechanisms of gene expression.
- Describe the principles of genetic engineering & their applications in medicine.
- Summarize the molecular concepts of body defenses & their applications in medicine.
- Familiarize with principles of various lab investigations & instrumentation analysis & interpretation of a given data.
- Suggest experiments to support theoretical concepts & clinical diagnosis.

Skill Based:

- Make use of conventional techniques/instruments to perform biochemical analysis relevant to clinical screening & diagnosis.
- Demonstrate the skills of solving scientific & clinical problems & decision making.
- Prepare students for higher studies or for employment in industry, academia.

Integration:

- Integrate molecular events with structure & function of the body in health & disease.

SRR & CVR GOVERNMENT DEGREE COLLEGE (AUTONOMOUS)
Vijayawada 520004
Minutes of the meeting of the Board of Studies in the subject of
BIOCHEMISTRY

The meeting of the Board of Studies in the subject of
BIOCHEMISTRY was held on 18 April 2017 in Dept. of Biochemistry ,
SRR & CVR Govt . Degree College (Autonomous), Vijayawada 520004.
The following members attended the meeting:

LIST OF BOS MEMBERS

S.NO	NAME	QUALIFICATION	DESIGNATION	ADDRESS
1.	Mrs.Syed Vaziha Tahaseen	M.Sc,M.Phil,B.Ed	Chairman	I/c. Dept. of Biochemistry SRR&CVR GDC (Autonomous),
2.	Dr. J. Rajeswari	M.Sc, Ph.D	University Nominee	HOD, Dept. of Biochemistry, ANU, Guntur
3.	Dr. P. Kiranmayi	M.Sc, M.Phli, Ph.D	Subject Expert	Asst. Professor, Dept. of Biochemistry, ANU, Guntur
4.	Mrs. Dorka Vijaya Kumari.B	M.Sc, B.Ed	Subject Expert	I/c. Dept. of Biochemistry GCW (Autonomous), Guntur

AGENDA FOR BOS MEETING

Type of meeting: Board Of Studies meeting in Biochemistry subject.

Facilitator & Note Taker: Mrs.Syed Vaziha Tahaseen I/c. Dept. of
Biochemistry.

Attendees: BOS Members.

Time & Date: 10 AM ON 18th April 2017, Tues day

Location: To be held at Dept. of Biochemistry, SRR&CVR GDC

Agenda Items:

- Item 1: Approval of syllabus for Semester I and II for the academic year 2017-18
- Item 2: Approval of Question paper, blue print and model paper
- Item 3: Approval for Internal assessment component, Minimum marks in internal assessment
- Item 4: Approval for Panel of paper- setters and examiners.
- Item 5: Approval for syllabus for UGC sponsored Medical lab Technology course.

Discussions made on the Krishna University biochemistry CBCS syllabus

Paper 1 Biomolecules

The chairperson of the BoS Sd V Tahaseen welcomed the members and introduced the Krishna university syllabus

Agenda: Approval of the syllabus for semester I and II for the academic year 2017-18

Discussion: The following points are discussed

1. The new CBCS syllabus already introduced by KRU was adopted by Autonomy
The board members appreciated the acceptance of university syllabi
2. University nominee Dr. Rajeswari suggested introducing the topic Biological relevance of PH in substitution to ion selective electrodes and oxygen electrodes. The electrodes topic students will learn in chemistry
3. Subject expert Mrs. Dorca Vijaya kumari B suggested to give specific importance to only one polypeptide which is naturally exists instead of learning many polypeptides
The board members decided to keep the glutathione in syllabus
4. Subject expert Dr. P. Kiranmayi suggested to change the title of the topic sequencing of proteins to determination of amino acid composition of proteins
5. Students participating in BoS meetings appreciated the autonomy of the college to make modifications in syllabus up to 20% .

Semester 2 Nucleic acids and biochemical techniques

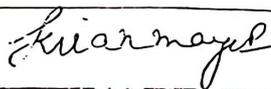
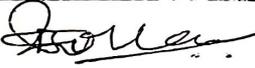
1. No further modifications done, the krishna university syllabus is approved by board of members

RESOLUTIONS

The Chairperson, Board of Studies welcomed the members and initiated discussion on the syllabus for I and II year semesters. She apprised the members of the guidelines of the UGC and the CCE regarding the framing of syllabus, and the recommended evaluation ratio for internal and external examinations. The members discussed in detail the various aspects presented before them and unanimously resolved the following:

Resolutions:

1. Resolved to adopt the present University CBCS syllabus for semester I and II. Medical lab Technology course with the suggested modifications.
2. Resolved to approve the division of marks for internal and external examination along with the suggested blue print and model paper.
3. Resolved to approve the list of paper setters and examiners submitted by the department

S.NO	NAME	DESIGNATION	SIGNATURE
1.	Mrs.Syed Vaziha Tahaseen	Chairman	
2.	Dr. J. Rajeswari	University Nominee	
3.	Dr. P. Kiranmayi	Subject Expert	
4.	Mrs. Dorka Vijaya Kumari.B	Subject Expert	



Principal

Title of the paper_ **Biomolecules**

Unit – I: Biophysical Concepts

12 hours

Water as a biological solvent and its role in biological processes. Biological relevance of pH, PKa of functional groups in biopolymers such as proteins and nucleic acids. Importance of buffers in biological systems. Donnan membrane equilibrium. Significance of osmotic pressure in biological systems.

Unit – II : Carbohydrates

12 hours

Carbohydrates: Classification, monosaccharides, D and L designation, open chain and cyclic structures, epimers and anomers, mutarotation, reactions of carbohydrates (due to functional groups - hydroxyl, aldehyde and ketone). Amino sugars, Glycosides. Structure and biological importance of disaccharides (sucrose, lactose, maltose, , structural polysaccharides (cellulose, chitin, pectin) and storage polysaccharides (starch, inulin, glycogen). Glycosaminoglycans, Bacterial cell wall polysaccharides blood group substances.

Unit – III Lipids

12 hours

Lipids: Classification, saturated and unsaturated fatty acids, structure and properties of fats and oils (acid, saponification and iodine values, rancidity). General properties and structures of phospholipids, sphingolipids and cholesterol. Prostaglandins- structure and biological role of PGD₂, PGE₂ and PGF₂ . Lipoproteins: Types and functions. Biomembranes: Membrane composition and organization – Fluid mosaic model.

Unit-IV : Amino Acids and Peptides

12 hours

Amino Acids: Classification, structure, stereochemistry, chemical reactions of amino acids due to carbonyl and amino groups. Titration curve of glycine and pK values. Essential and non-essential amino acids, non-protein amino acids. Peptide bond - nature and conformation. Naturally occurring peptides – glutathione, enkephalin.

Unit-V: Proteins

12 hours

Proteins: Classification based on solubility, shape, and function. Determination of amino acid composition of proteins. General properties of proteins, denaturation, and renaturation of proteins. Structural organization of proteins- primary, secondary, tertiary, and quaternary structures (Eg Hemoglobin and Myoglobin), forces stabilizing the structure of protein.

B.Sc. BIOCHEMISTRY SEMESTER-II SYLLABUS
(w.e.f. 2017 2018)

Module -II: Nucleic acids and Biochemical Techniques

Unit-I: Nucleic Acids 12 hours

Nature of nucleic acids. Structure of purines and pyrimidines, nucleosides, nucleotides. Stability and

formation of phosphodiester linkages, Structure of Nucleic acids- Watson-Crick DNA double helix structure, introduction to circular DNA, super coiling, helix to random coil transition, denaturation of nucleic acids- hyperchromic effect, T_m -values and their significance.

Reassociation kinetics, cot curves and their significance. Types of RNA and DNA.

Unit-II: Porphyrins 9 hours

Structure of porphyrins; Protoporphyrin, porphobilinogen properties Identification of Porphyrins.

Structure of metalloporphyrins – Heme, cytochromes and chlorophylls.

Unit-III: Biochemical Techniques I 15 hours

Methods of tissue homogenization: (Potter-Elvehjem, mechanical blender, sonicator and enzymatic). Principle and applications of centrifugation techniques- differential, density gradient.

Ultracentrifugation-preparative and analytical..

Principle and applications of chromatographic techniques- paper, thin layer, gel filtration, ion-exchange and affinity chromatography. Elementary treatment of an enzyme purification.

Electrophoresis- principles and applications of paper, polyacrylamide (native and SDS) and agarose gel electrophoresis.

Unit-IV: Biochemical Techniques II 12 hours

Colorimetry and Spectrophotometry- Laws of light absorption- Beer-Lambert law. UV and visible absorption spectra, molar extinction coefficient, biochemical applications of spectrophotometer.

.Tracer techniques:, use of radioactive isotopes in biology.

Unit- V : Techniques employed in metabolic studies 12 hours

Broad outlines of Intermediary metabolism, methods of investigation, Intermediary metabolism in vivo studies such as analysis of excretion, Respiratory exchange, Removal of organs and perfusion studies, in vitro studies such as tissue slice techniques; Homogenates and purified enzyme systems; isotope tracer studies, use of inhibitors and antimetabolites.

List of Recommended Books for Biochemistry

General Biochemistry

1. Lehninger's Principles of Biochemistry . Nelson.D.L. and Cox.M.M., Freeman &Co.
2. Biochemistry . Berg.J.M., Tymoczko.J.L. and Stryer.L., Freeman & Co.
3. Biochemistry . Voet.D and Voet., J.G., John Wiley & Sons .
4. Textbook of Biochemistry . West.E.S., Todd.W.R., Mason.H.S. and. Bruggen, J.T.V., Oxford & IBH Publishers.
5. Principles of Biochemistry: General Aspects-Smith, E. L., Hill, R.L. Lehman, I. R. Lefkowitz, R.J. Handler, P., and White, A. McGraw-Hill
6. Outlines of Biochemistry . Conn.E.E., Stumpf.P.K., Bruening, G and Doi.R.H., John Wiley & Sons .
7. Harper's Illustrated Biochemistry . Murray, R.K., Granner.D.K. & Rodwell, V.W., McGraw-Hill
8. Biochemistry-Lippincott's Illustrated Reviews. Champe, P.C. and Harvey, R. A. Lippincott
9. Fundamentals of Biochemistry .Jain, J.L., Jain, S., Jain, N. S. Chand & Co.
10. Biochemistry . Satyanarayana. U and Chakrapani. U, Books & Allied Pvt. Ltd.
11. Biochemistry . Rama Rao. A and Ratna Kumari. D, Kalyani Publishers.
12. Biochemistry- The Molecular Basis of Life . McKee. T and McKee, J. R, McGraw-Hill.
13. Biophysical Chemistry by C.R. Cantor and P.R. Schimmel
14. Physical Biochemistry by K.E.van Holde, C. Johnson and P. S. Ho
15. Biophysical Chemistry by Upadhyay
16. Biophysical Chemistry by Gurtu

B.Sc., BIOCHEMISTRY
(w.e.f. 2017- 2018)
SEMESTER - I; MODULE-I EXAMINATIONS

Pattern of question Paper: Model question papers were set according to the semester pattern. Total marks for question paper is set for maximum 60 marks. The question paper is divided into two sections as Part **A**, Part **B**, as follows.

Part	Type of Questions	Total No. of questions	Marks for each question	No. of questions to be attempted	Total Marks
Part - A	Short answer questions	8	4 M	5	20 M
Part - B	Long answer questions	5 questions of internal choice	8 M	5	40 M
TOTAL		18 Questions		10 Questions	60 M

The question paper is designed to test the student in analytical, knowledge and in applied skills.

B.Sc., BIOCHEMISTRY
MODEL QUESTION PAPER (THEORY)
(w.e.f. 2017- 2018)

MODULE-I: Bimolecular and biophysical techniques

Time: 3hrs Max.

Marks: 60 M

Part-A

Answer any **FIVE** of the following questions

5×4 M=20 M

Each question carries **FOUR** marks

1. Significance of osmotic pressure in biological systems.
2. Water as a biological solvent
3. Structure and biological importance of disaccharides
4. Blood group substances.
5. Structure and biological role of prostaglandins
6. Types and functions of lipoproteins
7. Titration curve of glycine
8. Naturally occurring peptides
9. Denaturation and renaturation of proteins
10. Forces stabilizing the structure of protein

Part-B

Answer **ALL THE** following questions.

Each question carries 8 marks

11. Henderson- Hasselbalch equation

12. List the chemical reactions of carbohydrates with relevant equations
OR
List the bacterial cell wall polysaccharides discuss about their structural organization in bacterial cell wall
13. Discuss about the structure and classification of lipids
OR
Structure of biological membrane
14. Discuss about the structure of DNA
OR
Give notes on denaturation and renaturation of DNA

14.

15. Significance of Osmotic pressure in biological systems

5X8 M = 40 M

OR

Biologically important buffers

B.Sc. BIOCHEMISTRY SEMESTER - I;
(w.e.f. 2017- 2018)
MODULE - I BIOMOLECULES AND BIO PHYSICAL CONCEPTS

BLUEPRINT FOR QUESTION PAPER

S.No	Type of Questions→ Units ↓	SA	SA	LA	LA	Total
		4 marks	4 marks	8 marks	8 marks	60 Marks
		Questions to attempt	Total marks	Questions to attempt	Total marks	Total 60 Marks
1	UNIT- I: Carbohydrates	2 Q	8 M	1 Q	16 M	26 M
2	UNIT-II : lipids	2 Q	8 M	1Q	16 M	26 M
3	UNIT-III :	2 Q	8 M	1Q	16 M	26 M
4	UNIT- IV:	2 Q	8 M	1 Q	16 M	26 M
5	UNIT- V:	2 Q	8 M	1 Q	16 M	26 M
	Total	5 Q	20 M	5 Q	40 M	60 M

B.Sc., BIOCHEMISTRY
MODEL QUESTION PAPER (THEORY)
(w.e.f. 2017- 2018)

MODULE-I: Carbohydrates, Lipids & Nucleic acids

Time: 3hrs Max.

Marks: 60 M

Part-A

Answer any FIVE of the following questions

5×4=20

1. Name the storage polysaccharide present in animals.
2. Who proposed open chain structures for carbohydrates?
3. What is the specific rotation value of D-Glucose & L-Glucose
4. Give an example & structure of saturated fatty acid.
5. Write the name of any one essential fatty acid.
6. Mention different types of DNA.
7. Name the metal ion present in the structure of chlorophyll.
8. Who proposed clover leaf structure of tRNA?
9. Donnan membrane equilibrium
10. Henderson- Hasselbalch equation

Part-B

Answer any SIX questions.

Each question carries 2 marks

6X2m = 12m

11. Epimers
12. Draw cellulose structure.
13. Define acid number
14. Name the types of lipoproteins.
15. What is super coiling of DNA?
16. Structure of ATP.
17. Mention different types of rRNAs in prokaryotes and eukaryotes.
18. What is the net charge present on DNA? Why?

Part-C

Answer any **FOUR** questions.

Each question carries 5 marks

4X5m = 20m

19. Ring structure of glucose.
20. Structure & importance of maltose.
21. Lecithins.
22. Fluid mosaic model.
23. Denaturation of DNA & T_m values.
24. Write any five differences between DNA & RNA.

Part-D

Answer **all** questions.

Each question carries 15 marks

2X15m = 30m

25. Describe storage polysaccharides.

(OR)

Describe the structure of cholesterol.

26. Explain the structure of DNA with a neat labelled diagram.

(OR)

Describe the structure & function of heme.

NOTE TO PAPER SETTERS: Questions under **Part – A** are purely one word answer questions of difficulty level of **easy & medium** level. Questions should be clear so as to give only one word as answer.

Questions under **Part – B** should not be more than **two to three lines**.

Questions should be clear and without scope of ambiguity.

Annexure-II
B.Sc. BIOCHEMISTRY SEMESTER - I;
(w.e.f. 2014- 2015)
MODULE - I (Carbohydrates, Lipids, Nucleic acids & Porphyrins)

BLUE PRINT FOR QUESTION PAPER

S.No	Type of Questions → Units ↓	Blanks (or) One word answers 1 mark each	Blanks (or) One word answers 1 mark each	VSA 2 marks	VSA 2 mar ks	SA 5 marks	SA 5 mar ks	LA 15 marks	LA 15 mar ks	Total 80 Mar ks
		Questio ns to attempt	Total mark s	Questio ns to attempt	Total mar ks	Questio ns to attempt	Total mar ks	Questio ns to attempt	Total mar ks	Total 80 Mar ks
1	UNIT- I: Carbohydr ates & Lipids	5q	5 m	3q	6 m	2q	10 m	1q	15 m	36 m (11q)
2	UNIT-II : Nucleic Acids and Porphyrins	3q	3 m	3q	6 m	2q	10 m	1q	15 m	34 m (9q)
	Total	8q	8 m	6q	12 m	4q	20 m	2q	30 m	70 m (20 q)

One word answers – 1 mark; VSA - Very Short Answers – 2 marks; SA – Short Answers – 5 marks; LA – Long Answers – 15 m

Annexure-II

BIOCHEMISTRY SEMESTER - II; MODULE-II EXAMINATIONS
(w.e.f. 2014- 2015)

MODEL QUESTION PAPER (THEORY)
MODULE-II: Proteins & Enzymes

Time: 3hrs Max.

Marks: 70

Part-A

Answer all questions in one word.

Each question carries 1 mark. **8X1m = 8m**

1. Name any two aromatic amino acids.
2. What is the protein present in nails & hair?
3. Define pH.
4. What is the function of insulin
5. Define activation energy.
6. Name the enzyme required for activating chymotrypsinogen.
7. Name the scientists who proposed Lock & key model and induced fit theory.
8. Significance of K_m & V_{max} .

Part-B

Answer any SIX questions.

Each question carries 2 marks **6X2m = 12m**

9. Write the formation of peptide bond between two aminoacids.
10. Glutathione
11. Write Henderson – Hasselbalch equation.
12. Hydrogen bonds
13. Write Michaelis – Menten equation.
14. Define isoenzyme. Give the reaction catalyzed by lactate dehydrogenase.
15. Define apoenzyme & coenzyme.
16. Name the aminoacids present in the active site of trypsin.

Part-C

Answer any **FOUR** questions.

Each question carries 5 marks

4X5m = 20m

17. Titration curve of glycine.
18. Classification of proteins based on shape.
19. Ninhydrin & sanger's reactions.
20. Write any five features of active site.
21. Describe stereo & reaction specificity of enzymes.
22. Enzymes used in diagnosis of myocardial infarction & cancers.

Part-D

Answer **all** questions.

Each question carries 15 marks

2X15m = 30m

23. Write about the secondary level of organization of proteins. Add a note on collagen structure.

(OR)

Describe the structure & function of myoglobin & hemoglobin.

24. Write about the factors affecting the enzyme activity.

(OR)

Give a detailed account on the enzyme inhibition.

NOTE TO PAPER SETTERS: Questions under **Part – A** are purely one word answer questions of difficulty level of **easy & medium** level. Questions should be clear so as to give only one word as answer.

Questions under **Part – B** should not be more than **two to three lines**.

Questions should be clear and without scope of ambiguity.

BLUE PRINT FOR QUESTION PAPER

S.No.	Type of Questions → Units ↓	Blanks (or) One word answers 1 mark each	Blank s (or) One word answe rs 1 mark each	VSA 2 marks	VSA 2 mark s	SA 5 marks	SA 5 mark s	LA 15 marks	LA 15 mark s	Total 80 Mar ks
		Questio ns to attempt	Total marks	Questio ns to attempt	Total mark s	Questio ns to attempt	Total mark s	Questio ns to attempt	Total mark s	Total 80 Mar ks
1	UNIT-I : Amino Acids & Proteins	4q	4 m	3q	6 m	2q	10 m	1q	15 m	35 m (10 q)
2	Module-II : Enzymes	4q	4 m	3q	6 m	2q	10 m	1q	15 m	35 m (10 q)
	Total	8q	8 m	6q	12 m	4q	20 m	2q	30 m	70 m (20 q)

One word answers – 1 mark; VSA - Very Short Answers – 2 marks; SA – Short Answers – 5 marks;
LA – Long Answers – 15 m

Annexure-III

Practical examination pattern for year end examinations

(w.e.f. 2014- 2015)

Practical – I :

Practical examination in Dept. of Biochemistry is held before 2nd semester exam once in a year to test practical skills among the students.

Total marks allotted for practicals are 50 marks for the duration of **three** hours.

The division of marks is as follows

Major Expt.	Minor Expt.	Viva	Record	Total Marks	Max. Time
25 marks	10 marks	5 marks	10 marks	50 marks	3 hours

List of practicals

PRACTICAL – I:

Max. Marks: 50

Qualitative Analysis and Enzymology:

Introduction to Good Laboratory Practice (GLP). Principles of Laboratory Hygiene and Safety.

List of experiments:

1. Preparation of buffers (acidic, neutral and alkaline) and determination of pH.
2. Qualitative identification of carbohydrates- glucose, fructose, maltose, sucrose, lactose, starch/glycogen.
3. Qualitative identification of amino acids - histidine, tyrosine, tryptophan, cysteine, arginine.
4. Qualitative tests for lipids: solubility, saponification, acrolein test, Salkowski test,
5. Lieberman-Burchard test.
6. Preparation of Osazones and their identification.
7. Absorption maxima of colored substances- *p*-Nitrophenol / Methyl orange.
8. Absorption spectra of protein-BSA; nucleic acids- Calf thymus DNA.
9. Assay of amylase

Annexure-IV

INTERNAL ASSESSMENTS

(w.e.f. 2014- 2015)

A total of 30 Marks is allotted for internals in Dept. of **Biochemistry**, which facilitate continuous assessment of students, to know their progress. It also facilitates the teacher to take necessary remedial activity for slow learners and to encourage the bright students by giving respective tasks.

Mid Semesters: Among the 30 marks of internals, 20 marks are given for common Written test as Mid sem exam. Two mid sem exams each of 20 marks will be conducted and the **average** is taken.

5 marks will be given for attendance for making students to attend regularly to the classes.

Remaining 5 marks are allotted for completing Assignment/ Poster/ Viva/ PPT/ Student Seminars etc.

Division of 30 Marks of Internal assessment :

1	2	3	4	5	6
1 st Mid semester exam	2 nd Mid semester exam	Total of Mid semester exams	Assignment/ Poster/ Viva/ PPT/ Student Seminars	Attendance	Total Marks of Internal
Written test	Written test	Average of 1 & 2 exams			Average of (3+4+5)
20 marks	20 marks	20 marks	5 marks	5 marks	30 marks

Annexure-V

*Choice Based Credit System for 1st & 2nd semesters
(w.e.f. 2014- 2015)*

- CBCS (Choice Based Credit System) has been introduced according to UGC guidelines which ensure curricular flexibility & learner's mobility.
- Credits are weightage given to a course in relation to the instructional hours assigned to it per week. It defines the quantum of syllabus prescribed for the course.
- 3 Hrs. Course per week is assigned 2 credits per Semester.
- 4 Hrs. Course per week is assigned 3 Credits per Semester.

Credit pattern for semester I & II

Semester	Core (or) Elective	Title of the paper	Instructional hours per week	Credits	Duration of Exam	Max. Marks		
						External	Internal	Total
I	Core	Module - 1: Biomolecules (Carbohydrates, Lipids & Nucleic acids)	4	3	3 hrs	70	30	100
II	Core	Module - 2: Proteins & Enzymes	4	3	3 hrs	70	30	100
II		Practical - I	3	2	3 hrs	50	-	50

Panel of examiners & Paper setters

S.No	Name	Qualification	Designation & Address	Contact No.
1.	Dr. J. Rajeswari	M.Sc, Ph.d	Asst. Professor, Dept. of Biochemistry, ANU, Guntur	9494595897
2.	Dr.P. Kiranmayi	M.Sc, M.Phli, Ph.D	Asst. Professor, Dept. of Biochemistry, ANU, Guntur	9441748123
3.	Mrs. K. Ratna Kumari	M.Sc, M.Ed, (Ph.D)	Asst. Professor (Contractual) Dept. of Biochemistry, Krishna University Machilipatnam, Krishna District	9848441153
4.	Mr. K.Yesuratnam	M.Sc, B.Ed	HOD , Dept. of Biochemistry Vignan Degree College, Guntur.	9440754416
5.	Mrs. B. Dhanasree	M.Sc., M.Phil	I/c. Dept. of Biochemistry KVR Govt. Degree College for Women, Kurnool.	9247164712
6.	Mr. Satheesh Kumar. B	M.Sc., (Ph.D)	Lecturer in Biochemistry Dept of Chemistry Sri ABR GDC, Repalle, Guntur.	9951104576
7.	Mrs. Padmaja. M	M.Sc	Lecturer in Biochemistry Dept of Chemistry GDC, Bhadrachalm Khammam.	9985748090
8.	Mrs. Sarala	M.Sc	Lecturer in Biochemistry Silver Jubilee College (Autonomous), Kurnool.	8125877332
9.	Mr. A. Chandra Sekhar	M.Sc	Lecturer in Biochemistry SR & BGNR Govt. College Khammam.	9963871117