PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS)

KAKINADA - 533 001, AP.

Affiliated to Adikavi Nannaya University

NAAC Accredited with "A" Grade (3.17 CGPA)

BOARD OF STUDIES OF BIOCHEMISTRY

B.Sc. BIOCHEMISTRY under CBCS

Meeting Minutes/Resolutions

Convened on 31 August 2023

AY 2023-24

DEPARTMENT OF CHEMISTRY

PITHAPUR RAJAH'S GOVERNMENT COLLEGE (AUTONOMOUS)

Opp. Mc Laurin High School, Raja Ram Mohan Roy Road, Kakinada

www.prgc.edu.in; e-mail: chemistry@prgc.edu.in

VISION AND MISSION OF THE COLLEGE:

Vision

To provide the right academic environment paving way for intellectual excellence, humane feelings and social commitment. The college believes in providing quality education for the socially disadvantaged, economically weaker sections of the society and thereby help them move up the ladderof success and social order.

Mission

- To impart holistic education with special emphasis on character, culture, updatedknowledge and skill oriented learning.
- To make the students enjoy the fruits of globalization without prejudice to their local and cultural environment.
- To impart necessary life skills so as to make them face any challenge in the bigger world – Social, ethical, psychological or professional

P.R. GOVT. COLLEGE (AUTONOMOUS)KAKINADA

DEPARTMENT OF BIOCHEMISTRY

BOARD OF STUDIES MEETING IN BIOCHEMISTRY

2022-2023

LIST OF EXAMINERS

S. No	Name of the Examiner	Subject	Name of the College
1	D. Kalyani	Assistant professor in Biosciences	Adikavi Nannaya University RAJAHMAHENDRAVARM.
2	Dr. P. Jyothi Kumari	Lecturer in Biosciences	St. Theresa Degree College,Eluru.
3	Dr. Srirangam	Lecturer in Food Technology	Layola College Vijayawada.
4	G. V. Sowmya	Lecturer in Biosciences	Dr.V.S.Krishna Degree College, Visakhapatnam.
5	Dr. Sandeep	Assistant Professor in Biosciences	Gitam University, Visakhapatnam.
6	Dr.B.Sreenu	Lecturer in Biochemistry	Aditya degree college, Kakinada

P.R. GOVT. COLLEGE (A), KAKINADA

Department of Chemistry

Bio- Chemistry
Minutes of board of studies (BOS) meeting 2023-24 conducted on 31-08- 2023

Meeting of Board of Studies in **Bio-Chemistry** is convened on **31-08- 2023** through offline at P.R. Govt. College (A), Kakinada.

Venue: Conference Hall, Dt: **31-08- 2023**

The Principal: **Dr. B.V. Tirupanyam**,

Chairman: **Sri. V. Sanjeeva Kumar,**

Chairman and lecturer in charge.

University Nominee**:** **Smt. M. Suvarchala**

Lecturer in Home Science, ASD Govt. Degree

College(Autonomous), Kakinada.

Industrialist: **Dr. B. Ramesh Babu,** Founder & M.D.,

BogaR laboratories, Peddapuram,

Subject Expert 1 **:** **Smt. V. Ananthalakshmi**

Lecturer in Chemistry Govt. Degree College, Pithapuram

Subject Expert 2 **:** **Dr. B. Sreenu**, HOD in Life Sciences

Lecturer in Bio-Chemistry, Aditya Degree College, Kakinada

All the faculty members of Chemistry Department and student alumni attended the meeting.

AGENDA:

- To discuss the Semester System and revised Choice Based Credit System (CBCS) being implemented for the past 03 years, i.e., w.e.f. 2020-21.
- To discuss and approve the Continuation/Modifications of the syllabus for the Odd & Even Semesters of III, IV & V Years for 2023-24.
- Grant of Extra credits for Online SWAYAM MOOCs etc.
- Syllabus, Model Question Papers and Model Blue Prints for III, IV, V and VI Semesters.
- Teaching learning methodology for the present II- and III-Year Students and 50:50 (External: Internal) ratio I Year Students w.e.f. 2023-24.

- Panel of paper setters and examiners.
- Proposals for Community Service Projects/Extension activities for the benefit of the society.
- To make it mandate to possess 75% of attendance to allow the students for each mid Examination and Semester examinations.
- To make it flexible the semester academic schedule in V & VI semesters keeping in view of availability of Embedded Industrial Apprenticeship.
- Department action plan for 2023-24.
- Any other items with the permission of the chair.

- **RESOLUTIONS:**

The Meeting Of Board Of Studies In Bio-Chemistry is convened on 31-08-2023 at LCD Hall-1 in P.R. Govt. College (A), Kakinada. The Principal Dr. B. V. Tirupanyam, M. Suvarchala, University Nominee, Subject Expert1 Smt. V. Ananta Lakshmi, GDC, Pithapuram, Subject Expert2, Dr. B. Sreenu, Aditya Degree college, Kakinada, all members of the faculty of Chemistry and student representatives attended the meeting. Agenda items are discussed and the following resolutions were made.

Following resolutions were made.

1. It is resolved to follow the revised Choice Based Credit System for Biochemistry Courses scrupulously as per the directions of Andhra Pradesh State Council of Higher Education(APSCHE), Vijayawada and also as per the directions of Adikavi Nannaya University, Rajamahendravaram with effect from the academic year 2023-24.
2. It is resolved to follow the revised curricular framework for Biochemistry courses scrupulously as per the directions of Andhra Pradesh State Council of Higher Education (APSCHE), Vijayawada and also as per the directions of Adikavi Nannaya University, Rajamahendravaram with effect from the academic year 2023-24.
3. It is resolved to choose Life Skill courses and Skill Development Courses in concurrence with the vocational course.
4. It is resolved to conduct industrial visits for Biochemistry students to make them acquainted with the industrial environment.
5. It is resolved to organize Guest lectures by eminent professors and Industrial Experts.
6. It is resolved to implement a pass minimum for internal assessment for CBSE pattern students as the pattern is learner oriented.
7. It is resolved to submit proposals to conduct a faculty development programme in instrumentation techniques/advanced topics with the assistance of industry representatives and university representatives.
8. It is resolved to conduct Industrial Internship for a period of two months during the summer after completion of semester end examinations.
9. It is resolved to make it mandatory for the students in the entire V semester to undergo industrial internship for a period of 6 months in a Medicinal Industry.
10. It is resolved to follow strictly the guidelines of UGC under NSQF scheme for the recruitment and engagement of faculty and non-teaching staff.
11. It is resolved to follow the same syllabi for English, Second Language, Life Skill Courses and Skill Development Courses as those prescribed for UG Courses by APSCHE, Vijayawada.
12. It is resolved to follow the same syllabi for main subjects namely Food Science, Biochemistry and Chemistry as it is , as they prescribed for UG Courses by APSCHE, Vijayawada, and as they are implementing in our College for other courses.

13. It is resolved to implement 50% external & 50% internal marks for theory & 100% external marks in practical's from the academic year 2020-21 for first second and third year students only.
14. It is resolved that the students should posses (maintain)75% attendance for both theory and practical in order to attend the mid and semester examination.
15. Resolved to reduce 50 marks of theory internal to 25 marks for mid exams and 25 marks for co-curricular activities (Seminar / Assignment / Quiz / Group Discussion.
16. Resolve to conduct practical examinations semester wise with external examiners in even semesters only
17. Resolved to conduct evaluation on project submitted Embedded Industrial apprenticeship in V/VI semester with internal examiners only.
18. Resolved to send the students to Embedded Industrial apprenticeship in semester V or in semester VI or even in middle of semester V/VI whenever opportunities available and that may be in continuation with Internship to be done at the end of 2 semester.
19. Resolved to follow the Action plan of Dept. chemistry as the Biochemistry course is anchoring by Dept. of chemistry.
20. Resolved to recommend the following faculty as paper setters.

    i)D. Kalyani, Adikavi Nannaya University, Rajamahendravaram ii) Dr. P. Jyothi Kumari, St. Theresa Degree College, Eluru iii) Dr.Srirangam, Layola College, Vijayawada iv) Smt. G. V. Sowmya, Dr.V.S.Krishna Degree College, Visakhapatnam about Biochemistry.

Objectives of Department of Biochemistry

- To acquaint students with various fields of Biochemistry and their applications.
- To acquaint students with concept of Cell Biology and Cytogenetics.
- To acquaint students with basic techniques in Staining and Sterilization.
- To understand the structure and biological functions of Carbohydrates, Amino Acids, Lipids and Nucleotides.
- To familiarize students with the various cells and organs of the immune system, ImmuneEffector Mechanisms and various Immuno techniques.
- To acquaint students with DNA Replication, Repair, gene expression and regulation.

To gain awareness about different Types of Environmental Pollution and Related Issues

Course Objectives:

To make student

1. Understand the basic concepts of Biochemistry
2. Understand different types of Metabolic reactions
3. Acquire knowledge on each and every organ functional analysis
4. Develop skills in the usage and application of laboratory instruments
5. Understand the mechanisms of various amino acid reactions
6. Understand various forms of proteins and amino acids.
7. Acquire knowledge on different types of instrumentation techniques in biochemistry analysis.
8. Acquire knowledge on the basic concepts of medical information.
9. Develop communication and soft skills.
10. Visit the hospitals and laboratories and to know the every health situation and importance of biochemistry.

Course Outcomes:

At the end of the course, the student will be able to

1. Acquire competence and skills in various techniques in biochemistry analysis.
2. Choose for an academic progression under vertical mobility for higher studies.
3. Eligible for various competitive examinations in various posts recruited by State and Central Governments.

Members who invited for the Board of studies meeting in Bio-Chemistry to be held On 31st August 2023

Mode of Conduct of meeting: **Offline & online**

S. No	Name of the Nominee	Designation
1	V.Sanjeeva Kumar	Chairman & lecturer in chemistry
2	Smt.M.SuvarchaIa Lecturer in Home Science,A S D Govt. Degree College Autonomous ,Kakinada.	University Nominee
3	Smt. V. Ananthalakshmi Lecturer in Chemistry Govt Degree College, Pithapuram.	Subject Expert
4	Dr. B. Sreenu Lecturer in Bio-chemistry, Aditya Degree College, Kakinada.	Subject Expert
5	Dr. B. Ramesh Babu Managing Director, BogaR Laboratories Peddapuram	Representative From Industry
6	T.V.V.Satya Narayana	Member
7	P.Vi'ayKumar	Member
8	V. Rambabu	Member
9	G. Pavani	Member
10	Dr.N.Bujji Babu	Member
11	Dr.Ch.Praveen	Member
12	V. Venkateswara Rao	Member
13	Sri. USN Prasad	Member
14	J.Prameela Rani	Member
15	M,B.S.S.Gurudev	Student member
16	S. Mohini Lakshmi 111 FBC	Student Member
17	N.M.R.G. Vinay 111FBC	Student Member
18	V. Ganesh IIFBC	Student Member
19	K. Abhinaya Tulasi 111FBC	Student Member

Signatures of the members who attended the Board of studies in Bio-Chemistry On 31st August 2023

Mode of Conduct of meeting: Offline & online

P.R. GOVT. COLLEGE(AUTONOMOUS)KAKINADA

DEPARTMENT OF BIOCHEMISTRY

BOARD OF STUDY MEETING 2022-23

CHOICE BASED CREDIT SYSTEM

II YEAR FBC

YEAR	SEMESTER	PAPER	TITLE	No. of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
II	III	III	Enzymology and bioenergetics	4	4	50	50	100
			Practical–III	2	1		50	50
	IV	IV	Intermediate metabolism	4	4	50	50	100
			Practical–IV	2	1		50	50
		V	Physiology, clinical Biochemistry and Immunology	4	4	50	50	100
			Practical– V	2	1		50	50

SIGNATURES OF THE MEMBERS WHO ATTENDED THE BOARD OF STUDIES IN BIOCHEMISTRY ON 31.08.2023 AT 11:00AM

Mode of Conduct of Meeting: Offline/Online

NAME	SIGNATURE	CONTACT NO.
V.Sanjeeva Kumar	V. S L	9849324967
Smt.M.Suvarchala	M. Suvarchala	9346512694
Smt. V. Ananthalakshmi	V. Ananthalakshmi	9296655201.
Dr. B. Sreenu	B. Sreenu	9440713335
Dr. B. Ramesh Babu	B Ramesh Babu	9701712028
T.V.V.Satya Narayana		9490876913
P.VijayKumar	Pvijay	9652703082
V.Rambabu	Babu	9948488537
G.Pavani		9912526493
Dr.N.Bujji Babu	31/8	9441384792
Dr.Ch.Praveen	praveen 31/8/23	9491185518
V.Venkateswara Rao	V. Venkateswara Rao	9885165588
Sri. USN Prasad	USN P 31/8/23	6300882584
J.Prameela Rani	J Prameela Rani.	7989551382.
M.B.S.S.Gurudev	MBSS Gurudev	7281382803
S. Mohini Lakshmi III FBC	S. Mohini Lakshmi	8639861323
N.M.R.G. Vinay III FBC	N.M.R.G. Vinay	9963131477
V. Ganesh IIFBC	V. Ganesh	6305843651
K. Abhinaya Tulasi IIIFBC	Abhinayatulasi	8500799852

P.R. GOVT. COLLEGE(AUTONOMOUS)KAKINADA

DEPARTMENT OF BIOCHEMISTRY

BOARD OF STUDY MEETING 2022-23

CHOICE BASED CREDIT SYSTEM

III YEAR FBC SEMESTER-V

YEAR	SEMESTER	PAPER	TITLE	No. of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
III	V	V	Molecular biology and Recombinant DNA Technology	3	4	50	50	100
			Practical– V	2	1		50	50
		VI	Biochemical correlation and Disorders	3	4	50	50	100
			Practical–VI	2	1		50	50

P.R. GOVT. COLLEGE(AUTONOMOUS)KAKINADA

DEPARTMENT OF BIOCHEMISTRY

BOARD OF STUDY MEETING 2022-23

CHOICE BASED CREDIT SYSTEM

III YEAR FBC SEMESTER-V

YEAR	SEMESTER	PAPER	TITLE	No. of Hrs./ Week	No of credits	Evaluation		
						Internal	External	TOTAL
III	V	V	Molecular biology and Recombinant DNA Technology	3	4	50	50	100
			Practical– V	2	2		50	50
		VI	Biochemical correlation and Disorders	3	4	50	50	100
			Practical–VI	2	2		50	50

	P.R .GOVERNMENT COLLEGE(A),KAKINADA.	Program &Semester II B.SC., BIOCHEMISTRY (III Semester)			
Course CodeBC3212	**TITLE OF THE COURSE** **ENZYMOLOGY AND BIOENERGETICS**				
Teaching	HoursAllocated:60(**Theory**)	L	T	P	C
Pre-requisites	To learn about enzymes To impart the knowledge about biological oxidation	-	4	-	3

Course Objectives:

To make the student

1. This curriculum gives an opportunity to learn about Enzymes.
2. This also imparts knowledge about Biological oxidation & their enzymes, mitochondrial electron transport chain, oxidative phosphorylation and about photo phosphorylation

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	To learn about enzymes and their properties function and their activity
CO2	To know the mechanism of enzyme action
CO3	To understand the concept of bio energetics
CO4	To know the biological oxidation of mitochondria

With focus on employability /entrepreneurship /Skill Development modules

Skill Development		**Employability**		**Entrepreneurship**	

P.R. GOVERNMENT COLLEGE(A) KAKINADA
CHOICEBASED CREDIT SYSTEM

II B.Sc. BIOCHEMISTRY SYLLABUS

IIISEMESTER PAPER-III

Enzymology and Bioenergetics

ADMITTED BATCH 2023-2024

COURSE CODE–BC3212 Hrs:60

CREDITS-2

Unit-I: Classification of Enzymes , Physical factors and enzyme activity **24hours**

Introduction to biocatalysts, differences between chemical and biological catalysis. Nomenclature and classification of enzymes. Enzyme specificity. Active site. Principles of energy activati

Fundamentals of enzyme assay, enzyme units. Factors affecting the catalysis- substrate concentration, *p*H, temperature. Michaelis – Menden equation for uni-substrate reaction (derivation not necessary), significance of *K*M. Enzyme inhibition-irreversible and reversible, types of reversible inhibitions – competitive and non - competitive.

Unit-II: Mechanism of enzyme action ***12hours***

Outline of mechanism of enzyme action – acid –base catalysis, covalent catalysis, electrostatic catalysis, and metal ion catalysis. Zymogen activation – activation of trypsinogen and chymotrypsinogen. Isoenzymes (LDH). Multi enzyme complexes (PDH). Ribozyme.

Unit-III: Bio energetics ***12hours***

Bioenergetics: Thermodynamic principles–Chemical equilibria; free energy, enthalpy(H), entropy (S). Free energy change in biological transformations in living systems; High energy compounds. Energy, change, oxidation – reduction reactions.

Unit IV: Biological Oxidations in Mitochondria ***12hours***

Organization of electron transport chain and enzyme complexes, inhibitors of electron transport. Oxidative phosphorylation Uncouplers and inhibitors of oxidative phosphorylation.

Unit No	Additions	Deletions	Expected levels of learning as per Blooms taxonomy for assessment of CO	Percentage added/deleted
1	…….	……..	K4 & K2	-
2	……...	-----	K3	-
3	……...	……..	K1	-
4	……	---	K2	-

K1 = Remembering, K2= Understanding, K3= Applying,
K4 = Analysing, K5 = Evaluating, K6 = Create

Textbooks:

S.NO	AUTHOR	TITLE	PUBLISHER
1	DICTION AND WEB	ENZYME CLASSIFICATION	DOIS
2	JAMES-C	BIOCHEMICAL RESOURSE	BLACK STOCK

Reference books

S.NO	AUTHOR	TITLE	PUBLISHER
1	KEITH TIPTON	ENZYME OF NOMENCLATURE	ACADEMIC PRESS
2	NS PUNIKAR	ENZYME CATALYSIS AND KINETICS AND MECHANISM	SPRINGER

CO-POMapping:

(1:Slig ht[Low]; 2:Moderate [Medium]; 3:Substantial [High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	1	2	2	3	2	3	3
CO2	3	2	3	3	2	3	3	1	3	3	2	3	2
CO3	3	3	3	3	2	2	2	2	2	3	3	3	2
CO4	3	2	2	2	2	2	3	3	1	1	3	3	3

PROGRAMME OUTCOMES

At the completion of the B.Sc. Bio-Chemistry program, the students of our Department will be able to:

(P01) Knowledge and understanding of:

Students will be able design, conduct experiments, analyze an interpret data for investigating problems in Biotechnology and allied fields.

(P02). Intellectual skills-be able to:

Think logically and organize tasks into a structured form. Assimilate knowledge and ideas based on wide reading and through the internet. Transfer of appropriate knowledge and methods from one topic to another within the subject.

(PO3). Practical skills:

Understand the importance of laboratory security as it applies to working with hazardous chemicals, biohazards, recombinant material, and general biotechnology security precautions.

(PO4). Environment and sustainability:

Understanding of the causes, types and control methods for Environmental Pollution. Application of different life forms in Environmental Remediation.

(PO5). Problem analysis

Identify the taxonomic position of animals. Design solutions from medicinal animals for health problems, disorders and disease of human beings. Animals which meet the specified needs

(PO6). Ethics:

Apply ethical principles and commit to environmental ethics and responsibilities and norms the environment

(PO7). Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multi- disciplinary settings.

B.SC (FBC) BIOCHEMISTRY
SECOND YEAR SEMESTER-III
COURSE-3 : ENZYMOLOGY AND BIOENERGETICS

WEIGHTAGE TO CONTENT

Time:2hours **Maxmarks:50**

MODULE NO.	ESSAY QUESTIONS 10MARKS	SHORT ANSWER QUESTIONS5 MARKS	MARKS AL LOTED TO THE UNIT	AS PER BOOLMS TAXONOMY
UNIT– I	03	02	40	Analysing a understanding
UNIT–II	01	02	20	Creating applying
UNIT–III	01	01	15	Remembering
UNIT–IV	01	02	20	Understanding
Total no. of Questions	**06**	**07**	95	

P.R. GOVERNMENT COLLEGE (A), KAKINADA

B.SC (FBC) BIO CHEMISTRY
SECOND YEAR III SEMESTER
Course–: ENZYMOLOGY AND BIOENERGETICS
Model Question Paper

Time: 2hrs. **Marks:50M**

SECTION-I

Answer any THREE questions choosing at least one from each part.
Each question carries ten marks 3X10=30Marks

PART-A

1. Write the factors affecting the enzyme catalysis.
2. Write an account one Enzyme classification.
3. Write an essay on enzyme inhibition.

PART- B

4. Explain about the Mechanism of Acid –Base catalysis
5. Discuss about the High energy compounds.
6. Write an account on mitochondrial electron transport chain.

SECTION-II

Answer any FOUR of the following questions. Each question carries FIVE marks **4×5=20**

7.Enzyme specificity and active site

8. Metal ion catalysis.
9. Oxidation and reduction reaction
10. Oxidative phosphorylation.
11. Mitochondria.
12. Free energy
13. Inhibitors of electron transport chain.

LABORATORY COURSE

Practical Paper –III :: ENZYMOLOGY AND BIOENERGITICS

(at the end of semester III) 30hrs (2h/W) 50Marks

Learning Out comes:

On successful completion of this practical course, student shall be able to:

Students understand the process of digestion of starch by salivary amylase.

- Students understand the effect of temperature and pH on the activity of salivary amylase on starch.
- Students do the experiment better in the real lab having gone through the animation and simulation.

Practical (Laboratory) Syllabus

1. Assay of amylase
2. Assay of urease 3. Assay of catalase.
4. Assay of phosphatase
5. Determination of optimum temperature for amylase.
6. Determination of optimum *p*H for phosphatase

Lab References:

S.NO	AUTHOR	TITLE	PUBLISHER
1	L. Stevens	Understanding enzymology	Oxford press
2	T. Ellies Harwood	.Understanding Enzymes	East-west press
3	D.L.Nelson	Lehninger's Principles of Biochemistry	Freeman & co
4	J.M. Berg	Biochemistry history	John Wiley& son`s

Co-Curricular Activities:

Mandatory:(Lab/field training of students by teacher:(lab:10+field:05): **For Teacher:** Training of students by teacher in laboratory and field for not lessthan15 hours on the field techniques/skills of preparation of assay of amylase, urease, catalase and phosphatase and determination optimum temperature of amylase are assays of enzymology and biophysical techniques in bio-chemistry. **For Student:** Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe enzymology and bio-physical techniques in bio-chemistry. Write their observations and submit a hand written fieldwork/project work report not exceeding10 pages in the given format to the teacher.

SCHEME OF VALUATION

a. Principle and Procedure 10 marks
b. Conduct of experiment 15 marks
c. Report 10 marks
d. Record 10 mark
e. Viva voce 05 marks

TOTAL **50 marks**

	P.R.GOVERNMENTCOLLEGE(A),KAKINADA	**Program &Semester** II B.SC, BIOCHEMISTRY (IV Semester)			
Course Code 4212	**TITLE OF THE COURSE INTERMEDIARY METABOLISM**				
Teaching	HoursAllocated:60(**Theory**)	L	T	P	C
Pre-requisites	TO UNDRESTAND THE BIOLOGICAL T RANSFORMATION	-	4	-	3

Course Objectives:

After the successful completion of this course, the student shall be able to:
1.This course aims at the biological energy transformations
This also imparts knowledge about metabolism of carbohydrates fatty acids amino acids ,nucleic acids and In born errors.

Course Outcomes:

On Completion of the course, the students will be able to	
CO1	This course aims at the biological energy transformations
CO2	To impart the knowledge about the metabolism of carbohydrates fatty acids
CO3	To understand and learn about the metabolism of amino acids
CO4	To learn about the nucleotide metabolism
CO5	To learn about the various in born errors of different metabolism

Skill Development		**Employability**		**Entrepreneurship**	

Syllabus:

Unit-I: Carbohydrate Metabolism and Lipid metabolism 24hours

Concept of anabolism and catabolism. Glycolytic pathway, energy yield. Fate of pyruvate- formation of lactate, Pasteur effect. Citric acid cycle, regulation, energy yield, amphipathic role.

. Photosynthesis-Light and Dark reactions. Catabolism of fatty acids (β-oxidation) with even and odd number of carbon atoms, Keto-genesis. Bio synthesis of fatty acids.

Unit-II: Metabolism of Amino acids 12hours

General reactions of amino acid metabolism -transamination, decarboxylation and deamination, Urea cycle and regulation, glycogenic and ketogenic amino acids. Metabolism of glycine, Biosynthesis of creatine

Unit-III: Metabolism of Nucleic acid, heme. 12hours

Biosynthesis and regulation of Purine and Pyrimidine nucleotides, *denovo* and salvage pathways. Catabolism of purines and pyrimidines. Bio synthesis of Deoxy ribonucleotides - Ribonucleotide.

Unit-IV: Integration and Inborn Errors of Metabolism: 12hours

Disorders of carbohydrate Metabolism: hypoglycaemia's, hyperglycaemia, glycosuria. *Diabetes mellitus* -classification, glucose tolerance test(GTT).

Disorders of Amino acid metabolism: Phenylketonuria, Alkaptonuria, Maple syrup urine disease (MSUD). Disorders of nucleotide metabolism - Gout, Lesch – Nyhan syndrome, Reye syndrome

Disorders of Lipid Metabolism: lipoproteinemias, hypercholesterolemia, atherosclerosis

Unit No	Additions	Deletions	Expected levels of learning as per Blooms taxonomy for assessment of CO	Percentage added/deleted
1	……..	Nil	K5	……
2	…… .	……..	K4	…….
3	……	Nil	K4 & K5	NIL
4	…….	…….	K1 & K2	NIL

K_1 = Remembering, K_2= Understanding, K_3= Applying,
K_4 = Analyzing, K_5 = Evaluating, K_6 = Create

Textbooks:

S.NO	AUTHOR	TITLE	PUBLISHER
1	Shashank Kumar	Carbohydrate metabolism	Nova science
2	Otto Hoffmann-Ostenhof	Intermediary metabolism	Van Nostrand Reinhold

Reference books

S.NO	AUTHOR	TITLE	PUBLISHER
1	Nelson David .L	Lininger's Principles of Biochemistry	M.M.Freeman & CO
2	Berg.J.M.,Tymoczko .J.L	Biochemistry	.,Freeman&Co.
3	Jain,J.L.,Jain,S.,Jain	Fundamentals of Biochemistry	N.S.Chand&Co.
4	Satyanarayana.U	Biochemistry	.U,Books&AlliedPvt.Ltd.

Web Links:

1.https://youtu.be/VzAjOPzUIP4?si=Xm4Sj_ggiXIStSd7
2. https://youtu.be/0M-B2dOfcUo?si=WSkohJfpzkNSYXVZ
3. https://youtu.be/4GFKdLy2fOE?si=duwVQ5twWx0AHr4R

Course outcome & Program outcome mapping

On Completion of the course, the students will be able to	
CO1	This course aims at the biological energy transformations
CO2	To impart the knowledge about the metabolism of carbohydrates fatty acids
CO3	To understand and learn about the metabolism of amino acids
CO4	To learn about the nucleotide metabolism
CO5	To learn about the various in born errors of different metabolism

CO-PO Mapping:

(1:Slight[Low];2:Moderate [Medium]; 3:Substantial [High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	1	2	2	3	2	3	3
CO2	3	2	3	3	2	3	3	1	3	3	2	3	2
CO3	3	3	3	3	2	2	2	2	2	3	3	3	2
CO4	3	2	2	2	2	2	3	3	1	1	3	3	3

PROGRAMME OUTCOMES

At the completion of the B.Sc. Bio-Chemistry program, the students of our Department will be able to:

(P01) Knowledge and understanding of:

Students will be able design, conduct experiments, analyze an interpret data for investigating problems in Biotechnology and allied fields.

(P02). Intellectual skills-be able to:

Think logically and organize tasks into a structured form. Assimilate knowledge and ideas based on wide reading and through the internet. Transfer of appropriate knowledge and methods from one topic to another within the subject.

(PO3). Practical skills:

Understand the importance of laboratory security as it applies to working with hazardous chemicals, biohazards, recombinant material, and general biotechnology security precautions.

(PO4). Environment and sustainability:

Understanding of the causes, types and control methods for Environmental Pollution. Application of different life forms in Environmental Remediation.

(PO5). Problem analysis

Identify the taxonomic position of animals. Design solutions from medicinal animals for health problems, disorders and disease of human beings. Animals which meet the specified needs

(PO6). Ethics:

Apply ethical principles and commit to environmental ethics and responsibilities and norms the environment

(PO7). Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multi- disciplinary settings.

B.SC (FBC) BIOCHEMISTRY
SECOND YEAR SEMESTER-III
COURSE-4 : INTERMEDIARY METABOLISM
WEIGHTAGE TO CONTENT

MODULENO.	ESSAY QUESTIONS 10MARKS	SHORT ANSWER QUESTIONS5 MARKS	MARKS ALLOTEDTO THEUNIT	AS PER BLOOMS TAXONOY
UNIT– I	02	01	25	Evaluating
UNIT–II	01	02	20	analyzing
UNIT–III	02	02	30	Evaluating analyzing
UNIT–IV	01	02	20	Understanding and remembering
Total no. of Questions	**06**	**07**	95	

P.R. GOVERNMENT COLLEGE(A), KAKINADA

B.SC(FBC) BIOCHEMISTERY
SECONDYEAR IVSEMESTER
Course–INTERMEDIARY METABOLISM
Model Question Paper

Time:2hrs **Max.Marks-50M**

SECTION-I

Answer any THREE of the following questions. And attempt one question from Each section part Each question carries TEN marks 3X10=30Marks

PART-A

1.Write an essay on urea cycle and it's regulation

2. Explain about the Photosynthesis-Light and Dark

3. Describe citric acid cycle and its regulate

PART- B

4 .Explain the catabolism of purines.

5. Explain the biosynthesis of purines by denovo pathway.

6 .Give a detailed account Disorders of nucleotide metabolism.

SECTION-II

Answer any FOUR of the following questions. Each question carries FIVE marks

4 X 5=20Marks

7.Gluconeo genesis

8.Glycogenic and ketogenic amino acids.

9.Biosynthesis of creatine.

10.Ribonucletides synthesis.

11. Decarboxylation reaction of amino acid metabolism.

12. .Lipoproteinemias,

13.Lesch-nyhansyndro

LABORATORY COURSE

Practical Paper – IV :: Intermediary Metabolism

(at the end of semester IV) 30hrs (2h/W) 50Marks

Learning Out comes:

On successful completion of this practical course, student shall be able to

1. The learning outcomes of using ninhydrin to detect amino acids include understanding the principle of the Ninhydrin tes
2. Students will develop practical laboratory skills such as pipetting, preparing standard solutions,
3. setting up spectrophotometers, and following precise protocols to conduct the biuret assay.
4. Learning outcomes of this method might include understanding how to prepare the DNS reagent
5. The principle behind the reaction between reducing sugars like glucose and DNS, the steps involved in the colorimetric measurement, and how to calculate the glucose

Practical (Laboratory) Syllabus

1. Estimation of amino acid by Ninhydrin method.
2. Estimation of protein by Biuret method.
3. Estimation of protein by Lowry method.
4. Estimation of glucose by DNS method.
5. Estimation of glucose by Benedict's titrimetric method.
6. Estimation of total carbohydrates by Anthrone method.

Lab References:

S.NO	AUTHOR	TITLE	PUBLISHER
1	Nelson David .L	Lehninger's Principles of Biochemistry	M.M.Freeman & CO
2	Berg.J.M.,Tymoczko .J.L	Biochemistry	.,Freeman&Co.
3	Jain,J.L.,Jain,S.,Jain	Fundamentals of Biochemistry	N.S.Chand&Co.
4	Satyanarayana.U	Biochemistry	.U,Books&AlliedPvt.Ltd.

Co-Curricular Activities:

Mandatory:(Lab/field training of students by teacher:(lab:10+field:05): **For Teacher:** Training of students by teacher in laboratory and field for not lessthan15 hours on the

field techniques/skills of preparation of various solutions and how they are react with other compounds.

For Student: Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe the techniques used for the separation of glucose percentage ,amino acid concentration in the samples. Write their observations and submit a hand written fieldwork/project work report not exceeding10 pages in the given format to the teacher.

SCHEME OF VALUATION

a. Principle and Procedure 10 marks
b. Conduct of experiment 15 marks
c. Report 10 marks
d. Record 10 mark
e. Viva voce 05 marks

TOTAL 50 marks

	P.R.GOVERNMENT COLLEGE(A),KAKINADA	**Program & Semester** II B. SC BIO CHEMISTRY PAPER-V (IVSemester)			
Course Code	**TITLE OF THE COURSE** PHYSIOLOGY CLINICAL BIOCHEMISTRY& IMMUNOLOGY				
Teaching	Hours Allocated: 60 (**Theory**)	L	T	P	C
Pre-requisites	TO LEARN ABOUT THE PHYSIOLOGY AND NUTRITION CONCEPTAND KNOW ABOUT THE IMMUNE SYSTEM	-	4	-	3

Course Objectives: After the successful completion of this course, the student will be able to

COURSE OUTCOMES

1. This gives an insight into the digestion, absorption of carbohydrates, protein and lipid. and endocrine system.
2. This is to provide knowledge to the students to learn about human nutrition concepts and disorders associated and vitamins and minerals.

3. To provide basic knowledge about organization of immune system and antibodies function and activity.

On Completion of the course, the students will be able to	
CO1	an insight into the digestion, absorption of carbohydrates, protein and lipid. .
CO2	Gain knowledge about the organization of endocrine system
CO3	to learn about human nutrition concepts and disorders associated and vitamins and minerals.
CO4	Understand the energy and dietary requirements for pregnant and lactating women
CO5	TO know the concept of blood coagulation
CO6	To provide basic knowledge about organization of immune system
CO7	To learn about the antibodies function and activity.

Skill Development		**Employability**		**Entrepreneurship**	

Course with focus on Skill Development/Employability/Entrepreneurship module Syllabus:

Unit-I:

Physiology & Endocrinology:

Digestion and absorption of carbohydrates, lipids and proteins. Composition of blood and coagulation of blood. Endocrinology- Classification of hormones. Outlines of chemistry , physiological role and disorders of hormones of pituitary, thyroid, pancreatic hormones .

Unit-II:

Nutritional Biochemistry

Classification of Nutrients, calorific values of foods and their determination by bomb calorimeter. BMR and factors affecting it. Significance of BMR..Sources of complete and incomplete proteins. Bulk and trace elements-Ca,,Mg,Fe,I,Cu,Mo,Zn,,Se and F **Unit-III:**

Clinical Biochemistry

Disorders of blood coagulation(hemophilia).Types of anemias, hemoglobinopathies– sickle cell anemia.

Liver: Structure and functions of Liver, jaundice.

Kidneys- structure of nephron, urine formation, normal and abnormal constituents of urine. Role of kidneys in maintaining acid- base and electrolyte balance in the body.

Unit-IV:

Immunology

Organization of immune system. Innate and acquired immunity. Structure of IgG, Classification of immunoglobulins, Epitopes

antigenic determinants. Concept of haptens. Adjuvants. Antigen –antibody reactionsagglutination,

Precipitation,immunoprecipitation,immunodiffusion..ImmunodiagnosticsELISA,RIA.

Unit No	Additions	Deletions	Expected levels of learning as per Blooms taxonomy for assessment of CO	Percentage added/deleted
1	…….	……..	K1 & K2	-
2	……	-----	K4 &K2	-
3	…….	……..	K2 &5	-
4	……...	---	K3&K4	-

K1 = Remembering, K2= Understanding, K3= Applying,
K4 = Analyzing, K5 = Evaluating, K6 = Create

Textbooks:

S.NO	AUTHOR	TITLE	PUBLISHER
1	DR. KISHORE AND DR. ASHOK	PHSIOLOGY AND ENDOCHRINOLOGY	NIRALI
2	NANDA MAHESWARI	CLINICAL BIOCHEMISTRY	JAYPEE

Reference books

S.NO	AUTHOR	TITLE	PUBLISHER
1	E. MOLINA	PHSIOLOGY AND ENDOCHRINOLOGY	LANGE
2	ASHISH SHARMA AND ANITHA SHARMA	CLINICAL BIOCHEMISTRY	JAYPEE

WEB LINKS:

1. **https://youtu.be/tJtFVHMR_hs?si=sUft8SG193VKE_RN**
2. **https://youtu.be/EuJebIu4TAU?si=-8inPD0vd0VUDNdY 3. https://youtu.be/VWw75Icud2s?si=xWC2la9dT8fdzfGe**

On Completion of the course, the students will be able to	
CO1	an insight into the digestion, absorption of carbohydrates, protein and lipid. .
CO2	Gain knowledge about the organigation of endocrine system
CO3	to learn about human nutrition concepts and disordersassociated and vitamins and minerals.
CO4	Understand the energy and dietary requirements for pregnant and lactating women
CO5	TO know the concept of blood coagulation
CO6	To provide basic knowledge about organization of immune system
CO7	To learn about the antibodies function and activity.

CO-POMapping:

(1:Slig ht[Low];2:Moderate [Medium]; 3:Substantial [High],No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	1	2	2	3	2	3	3
CO2	3	2	3	3	2	3	3	1	3	3	2	3	2

CO3	3	3	3	3	2	2	2	2	2	3	3	3	2
CO4	3	2	2	2	2	2	3	3	1	1	3	3	3

PROGRAMME OUTCOMES

At the completion of the B.Sc. Bio-Chemistry program, the students of our Department will be able to:

(P01)Knowledge and understanding of:

Students will be able design, conduct experiments, analyze an interpret data for investigating problems in Biotechnology and allied fields.

(P02).Intellectual skills-be able to:

Think logically and organize tasks into a structured form. Assimilate knowledge and ideas based on wide reading and through the internet. Transfer of appropriate knowledge and methods from one topic to another within the subject.

(PO3).Practical skills:

Understand the importance of laboratory security as it applies to working with hazardous chemicals, biohazards, recombinant material, and general biotechnology security precautions.

(PO4).Environment and sustainability:

Understanding of the causes, types and control methods for Environmental Pollution. Application of different life forms in Environmental Remediation.

(PO5).Problem analysis

Identify the taxonomic position of animals. Design solutions from medicinal animals for health problems, disorders and disease of human beings. Animals which meet the specified needs **(PO6).Ethics:**

Apply ethical principles and commit to environmental ethics and responsibilities and norms the environment

(PO7).Individual and team work:

Function effectively as an individual, and as a member or leader in diverse teams, and in multi- disciplinary settings.

COURSE-5 : PHYSIOLOGY CINICAL BIOCHEMISTRY AND IMMUNOLOGY

WEIGHTAGE TO CONTENT

Time:2hours
Maxmarks:50

UNIT NO.	ESSAY QUESTIONS 10 MARKS	SHORT ANSWER QUESTIONS 5 MARKS	MARKS ALLOTED TO THE UNIT	AS PER BOOLMS TAXONOMY
UNIT– I	02	02	30	Analyzing a understanding
UNIT– II	02	02	30	Creating applying
UNIT– III	01	01	15	remembering
UNIT–IV	01	02	20	understanding
Total no. of Questions	**06**	**07**	95	

P.R.GOVERNMENT COLLEGE (A), KAKINADA

B.SC (FBC)BIO CHEMISTRY PAPER-V

SECOND YEAR IV SEMESTER

Course – PHYSIOLOGY CILINICAL BIO CHEMISTRY AND IMMUNOLOGY

Model Question Paper

Time 2hrs. **Max. Marks-50**

PART-I

Note: -Answer any **THREE** questions choosing atleast **ONE** question from each section

Section – A **10x3=30M**

1. Describe the digestion and absorption of carbohydrates and proteins.
2. Describe the chemistry and physiological role of posterior pituitary hormones.
3. Define BMR? Discuss the factors affecting the BMR.

Section –B

4. Describe antigen and antibody reactions.
5. Describe the mechanism of urine formation.
6. Explain the classification of immune globulins

PART–II

Answer any **FOUR** questions **4x5=20M**

7. Composition of Blood
8. Thyroid gland.
9. Sources of complete and incomplete proteins
10. Iron
11. Jaundice
12. Structure of nephron
13. Immuno diagnostics

LABORATORY COURSE

Practical Paper-V: PHSIOLOGY CLINICAL BIOCHEMISTRY AND IMMUNOLOGY

(at the end of semester-V) 30hrs (2h/W) 50Marks

Learning Out comes:

On successful completion of this practical course, student shall be able to:

1. Explain the purpose of performing total RBC and platelet counts
2. State the important properties of diluting fluid for counting RBC and platelets.
3. Perform manual cell counts for RBC and platelets Calculate the results using the general formula for calculating cell counts.
4. Describe the different methods and analyzers used to measure Hb in clinical laboratories and field settings
5. Describe the preanalytical factors including blood source of collection, postural effect, and environmental factors.

6. Describe analytical and postanalytical factors and training requirements, which can potentially influence Hb concentrations.
7. Compare the performance of different methods and analyzers of Hb

Practical (Laboratory) Syllabus

1. Estimation of vitamin C by2,6-dichlorophenol indophenol method
2. Estimation of hemoglobin in blood.
3. Total count-RBC and WBC.
4. Differential count Of WBC
5. Urine analysis for albumin, sugars and ketone bodies.
6. Estimation of Serum creatinine..
7. Estimation of serum total cholesterol

Lab References:

S.NO	AUTHOR	TITLE	PUBLISHER
1	SURYA PRAKASH	PRACTICAL BOOK OF BIOCHEMISTRY	NIRALI PRAKASHAN
2	DR. P.H. AGARKAR	PRACTICAL BOOK OF BIOCHEMISTRY	NIRALI PRAKASHAN
3	M. VASUDEV AN	PRACTICAL BOOK OF BIOCHEMISTRY	JAYPEE

Co-Curricular Activities:

Mandatory:(Lab/field training of students by teacher:(lab:10+field:05): **For Teacher:** Training of students by teacher in laboratory and field for not less than15 hours on the field techniques/skills of estimation of vitamins ,hemoglobin in blood and total count of RBC&WBC and urine analysis in bio-chemistry. **For Student:** Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe clinical labs and bio-physical techniques in bio-chemistry. Write their observations and submit a hand written fieldwork/project work report not exceeding10 pages in the given format to the teacher.

SCHEME OF VALUATION

a. Principle and Procedure 10 marks
b. Conduct of experiment 15 marks
c. Report 10 marks
d. Record 10 mark
e. Viva voce 05 marks

TOTAL 50 marks

	P.R.GOVERNMENTCOLLEGE(A),KAKINADA	Program &Semester			
Course Code 5224A	**TITLEOFTHECOURSE** MOLECULAR BIOLOGY AND RECOMBINANT DNA TECHNOLOGY	III BSC (FBC)BIO CHEMISTRY (V Semester) PAPER-VI			
Teaching	Hours Allocated:60(**Theory**)	L	T	P	C
+- Prerequisites	TO KNOW ABOUT REPLICATION TRANSCRPITON TRANSLATION AND MOLECULAR BIOLOGY AND RECOMBINANT DNA TECHNOLOGY	-	4	-	3

Course Objectives:

After the successful completion of this course, the student will be able to

1. This Is to provide knowledge about protein synthesis & their events, regulation of gene expression
2. This is to provide knowledge to the students to learn about recombinant DNA technology
3. This also imparts knowledge about molecular biology blotting techniques

COURSEOUTCOMES

On Completion of the course, the students will be able to	
CO1	Understand the concept OFREPLICATION
CO2	Gain knowledge about Enzymology of replication
CO3	To know the process of transcription
CO4	To know the process of translation
CO5	Illustrate about routes in recombinant DNA technology
CO6	To know the various blotting techniques in molecular biology

Skill Development			Employability			Entrepreneurship	

Syllabus:

Unit-I:DNA Replication and Transcription **24 hours** Nature and structure of the gene. DNA as genetic material DNA replication– models of replication, Meselson-Stahl's experiment proof for semi–conservative model. DNA Polymerases I, II and III of *E.coli* ,helicase, topoisomerases, primase, ligase. Mechanism DNA Replication in E.Coli. Inhibitors of DNA replication.Transcription – RNA polymerases of prokaryotes, Mechanism of Transcription .Initiation– sigma factors and their recognition sites, Promoters, Elongation, Termination

Unit-II: Protein Synthesis and Regulation of Gene Expression **12 hours**

Genetic code: features of genetic code, wobble hypothesis, degeneracy of genetic code. Protein synthesis – Ribosome structure t-RNA, activation of amino acids (amino acyl t-RNA synthetases). Initiation, elongation and termination of protein synthesis. Post – translational modifications. Inhibitors of protein synthesis.

Unit-III: Recombinant DNA technology **12 hours**

Basic steps in r-DNA technology. Tools of r-DNA technology : Enzymes – Restriction Endonucleases, ligase, phosphatases, reverse transcriptase, polynucleotide kinases, terminal transferase nucleases -S1 and RNAaseH.Cloning vectors - Plasmids,Cosmids, λphages vectors.Applications of gene cloning – production of insulin and human growth hormone, production of Bt cotton and edible vaccines.

Unit-IV: Molecular biology Techniques and Bioinformatics **12 hours**

Construction of c-DNA and genomic libraries DNA sequencing–Maxam Gilbert and Sanger's methods. Polymerase chain reaction–principle and applications. Outlines of blotting techniques -Southern, Northern and Western. Introduction to Bioinformatics- definitions of proteomics and genomics .Gene bank, NCBI, DDBJ, Swissprot, PDB. Sequence alignments –BLAST and FASTA.

Unit No	Additions	Deletions	Expected levels of learning as per Blooms taxonomy for assessment of CO	Percentage added/deleted
1	……..	–rho dependent and rho independent. Inhibitors of Transcription.	K3 & K4	5%
2	…….	……..	K2 & K5	…….
3	……	Nil	K2 & K4	NIL
4	…….	…….	K3	NIL

K_1 = Remembering, K_2= Understanding, K_3= Applying,
K_4 = Analyzing, K_5 = Evaluating, K_6 = Create

Textbooks:

S.NO	AUTHOR	TITLE	PUBLISHER
1	Alexander Jonson	Molecular biology	Garland science
2	Keya Chaudhuri	Recombinant DNA Technology	TERI

Reference books

S.NO	AUTHOR	TITLE	PUBLISHER
1	Hervé ıann Selig	The study of DNA advanced human knowledge	DOI
2	Gary H. Perdew	REGULATION OF GENE EXPRESSION	Humana
3	Keya Chaudhuri	Recombinant DNA Technology	The Energy and Resources Institute

4	Alexander Jonson	Molecular biology	Garland science

WebLinks:

1.https://www.youtube.com/live/_uzZSwHc0rQ?si=SDliXol-MwZQV33l

2.https://youtu.be/6PjVyXGqJSQ?si=lz3v7uOJG5ssc8nC

3.https://www.youtube.com/live/xgd4LK_C7_8?si=uKFXIyUkE_CpNym2

4.https://youtu.be/pIk6IxLC3dY?si=xs2F0BGY82EEw20S

Course outcome & Program outcome mapping

On Completion of the course, the students will be able to	
CO1	Understand the concept OFREPLICATION
CO2	Gain knowledge about Enzymology of replication
CO3	To know the process of transcription
CO4	To know the process of translation
CO5	Illustrate about routes in recombinant DNA technology
CO6	To know the various blotting techniques in molecular biology

CO-PO Mapping:

(1:Slight[Low]; 2:Moderate [Medium]; 3:Substantial [High], '-':No Correlation)

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	1	2	2	3	2	3	3
CO2	3	2	3	3	2	3	3	1	3	3	2	3	2
CO3	3	3	3	3	2	2	2	2	2	3	3	3	2
CO4	3	2	2	2	2	2	3	3	1	1	3	3	3

PROGRAMME OUTCOMES

At the completion of the B.Sc. Bio-Chemistry program, the students of our Department will be able to:

(P01)Knowledge and understanding of:

Students will be able design, conduct experiments, analyze an interpret data for investigating problems in Biotechnology and allied fields.

(P02).Intellectual skills-be able to:

Think logically and organize tasks into a structured form. Assimilate knowledge and ideas based on wide reading and through the internet. Transfer of appropriate knowledge and methods from one topic to another within the subject.

(PO3).Practical skills:

Understand the importance of laboratory security as it applies to working with hazardous chemicals, biohazards, recombinant material, and general biotechnology security precautions.

(PO4).Environment and sustainability:

Understanding of the causes, types and control methods for Environmental Pollution. Application of different life forms in Environmental Remediation.

(PO5).Problem analysis

Identify the taxonomic position of animals. Design solutions from medicinal animals for health problems, disorders and disease of human beings. Animals which meet the specified needs **(PO6).Ethics:**

Apply ethical principles and commit to environmental ethics and responsibilities and norms the environment

WEIGHTAGETOCONTENT

Time:2.30hours **Maxmarks:50**

UNITNO.	ESSAY QUESTIONS10MARKS	SHORT ANSWER QUESTIONS5MARKS	MARKS ALLOTD TO THEUNIT	AS PER BLOOMS TAXONOMY
UNIT -1	02	02	30	Analyzing applying
UNIT–II	02	02	30	Understanding evaluting
UNIT–III	01	01	15	Creating analyzing
UNIT–IV	01	02	20	Creating applying
Total no .of Questions	**06**	**07**	95	

P.R. GOVERNMENT COLLEGE (A), KAKINADA

III YEAR B.Sc (Bio-chemistry)

Paper-6A MODEL PAPER

Duration: 2hrs. **Max.Marks:50**

SECTION-I

Answer any THREE of the following questions. And attempt one question from Each section part Each question carries TEN marks 3X10=30Marks

PART-A

1.Write the experiments to prove DNA as genetic material.
2.Explain the process of replication in prokaryotes.
3.What is genetic code ? Explain the properties of genetic code.

PART- B

4.Describe the process of protein synthesis in prokaryote 5.Describe the Restriction endonucleases and with examples
6.Write an account on Blotting techniques.

SECTION-II

Answer any FOUR of the following questions. Each question carries FIVE marks

4 X 5=20Marks

7.Messelson'sandstahl'sexperiment
8.Nature and structure of gene.
9.Inhibitors of protein synthesis
10.Structure of RNA
11. Human Growth Hormone.
12. PCR
13. NCBI

LABORATORY COURSE

Practical Paper –6A :: MOLECULAR BIOLOGY AND RECOMIBINANT DNA TECHNOLOGY

(at the end of semester V) 30hrs (2h/W) 50Marks

Learning Out comes:

On successful completion of this practical course, student shall be able to:

1.They learn about plasmids, vectors and gain knowledge on the construction of cDNA
Libraries

2. Student of this course have knowledge on gene manipulation, gene expression,
etc which prepares them for further studies in the area

Practical (Laboratory) Syllabus

1.Isolation of DNA from onion/liver coconut endosperm

2.Estimation of DNA by diphenylamine method.

3.Estimation of RNA by orcinol method.

4.Sequence alignments of insulin / BSA with other proteins usingBLAST and FASTA.

5.Immobilization of microorganisms.

6.Ethylalcohol production from grapes

Lab References:

S.NO	AUTHOR	TITLE	PUBLISHER
1	P V G K Sarma	Molecular biology	MJP Publisher
2	, Dr. BHASKAR SARMA	Molecular biology	Mahaveer Publications
3	Ashok Kumar	Recombinant DNA technology	Narendra Publishing House
4	Kumar, Ashok.	Molecular biology & recombinant technology	Hard Back

Co-Curricular Activities:

Mandatory:(Lab/field training of students by teacher:(lab:10+field:05):

For Teacher: Training of students by teacher in laboratory and field for not lessthan15 hours on the field techniques/skills of preparation of isolation of DNA from coconut techniques in bio-chemistry.

For Student: Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe enzymology and bio-physical techniques in bio-chemistry. Write their observations and submit a hand written fieldwork/project work report not exceeding10 pages in the given format to the teacher.

SCHEME OF VALUATION

a. Principle and Procedure 10 marks

b. Conduct of experiment 15 marks

c. Report 10 marks

d. Record 10 mark

e. Viva voce 05 marks

TOTAL **50 marks**

	P.R.GOVERNMENTCOLLEGE(A),KAKINADA	**Program &Semester** III B.SC BIOCHEMISTRY PAPER-VII (V Semester)			
Course Code	**TITLEOFTHECOURSE** BIOCHEMICAL CORRELATION IN DISORDERS				
Teaching	Hours Allocated:60(**Theory**)	L	T	P	C
Pre-requisites	TO PROVIDE KNOWLEDGE ABOUT DISORDERS OF ENDOCRINE GLANDS AND PROTEIN MAL NUTRITIONS	-	4	-	3

Course Objectives:

After the successful completion of this course, the student will be able to understand

1.This is to provide knowledge about disorders of endocrine glands -pituitary & thyroid gland.
2.This also imparts knowledge about protein malnutrition, disorders of vitamins &digestive system.

COURSEOUTCO**MES**

On Completion of the course, the students will be able to	
CO1	This is to provide knowledge about disorders of endocrine glands
CO2	This also imparts knowledge about protein malnutrition
CO3	To learn about disorders of vitamins

CO4	This is also imparts knowledge about disorders of vitamins.

Skill Development		**Employability**		**Entrepreneurship**	

Syllabus:

Unit-I: **15 hours**

Outline of hormone reaction and imbalances leading to disease–precocious puberty, hyper And hypo pituitarism.
Hyper and hypothyroidism. Hype rand hypo disorders of adrenal gland.

Unit-II: **15 hours**
Protein calorie malnutrition -Kwashiorkor, Marasmus

DISORDERS OF VITAMINS WATER SOLUBLE: Beriberi, Scurvy, Pellagra Pernicious anemia,

DISORDERS OF VITAMINS FAT SOLUBLE: Night blindness, Rickets, Osteomalacia, and Osteoporosis .Obesity ,cardio vascular diseases,

Unit-III: **15 hours**

Alzheimer's, Huntington's disease, Creutzfeldt- Jakob disease, Haemoglobinopathies: Sickle cell anemia, Thalassemia.

Wilson's disease , Menken's disease, Goiter

Unit-IV: Organ Specific disorders 15 hours

Digestive system: Gastritis, peptic ulcers, pancreatitis, steatorrhea, cirrhosis of liver, gall stones , appendicitis

Renal Disorders: Acute and chronic renal failure, kidney stones[Renal calculi]Acute and Chronic Glomerular nephritis

Unit No	Additions	Deletions	Expected levels of learning as per Blooms taxonomy for assessment of CO	Percentage added/deleted
1	……..	…….	K2	5%

2	…….	……..	K3	…….
3	……	Nil	K1	NIL
4	…….	…….	K1 & K2	NIL

K_1 = Remembering, K_2= Understanding, K_3= Applying,
K_4 = Analyzing, K_5 = Evaluating, K_6 = Create

Textbooks:

S.NO	AUTHOR	TITLE	PUBLISHER
1	**Simmi Kharab's**	Clinical Correlations	**Paperback/softback**
2	Thomas m Devlin	BIOCHEMISTRY WITH CLINICAL CORRELATION	**CBS Publishers**

Reference books

S.NO	AUTHOR	TITLE	PUBLISHER
1	Delvin	Biochemistry with clinical correlation	T.M.John Wiley& sons
2	Coico, R and Sunshine	Immunology	T.M.John Wiley& son`s
3	J.M.Berg	Biochemistry	W.H.Freemanand Co.
4	M.J.Simmons	GENETICS	T.M.John Wiley& son`s

WebLinks:

https://youtu.be/X3TAROotFfM?si=H9FtI6VMDM2tyHPy

https://youtu.be/dtCvYfhzPQ0?si=r5Ic0Jp0PQQ72Oge

https://youtu.be/OOXLylm4XD0?si=wzDPmM4j1-9fe8qM

Course outcome & Program outcome mapping

On Completion of the course, the students will be able to	
CO1	This is to provide knowledge about disorders of endocrine glands
CO2	This also imparts knowledge about protein malnutrition
CO3	To learn about disorders of vitamins
CO4	This is also imparts knowledge about disorders of vitamins.

CO-PO Mapping:

(1:Slight[Low];	**2:Moderate [Medium]; 3:Substantial [High], '-':No Correlation)**

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2	PSO3
CO1	2	3	2	3	3	3	1	2	2	3	2	3	3
CO2	3	2	3	3	2	3	3	1	3	3	2	3	2
CO3	3	3	3	3	2	2	2	2	2	3	3	3	2
CO4	3	2	2	2	2	2	3	3	1	1	3	3	3

PROGRAMME OUTCOMES

At the completion of the B.Sc. Bio-Chemistry program, the students of our Department will be able to:

(P01)Knowledge and understanding of:

Students will be able design, conduct experiments, analyze an interpret data for investigating problems in Biotechnology and allied fields.

(P02).Intellectual skills-be able to:

Think logically and organize tasks into a structured form. Assimilate knowledge and ideas based on wide reading and through the internet. Transfer of appropriate knowledge and methods from one topic to another within the subject.

(PO3).Practical skills:

Understand the importance of laboratory security as it applies to working with hazardous chemicals, biohazards, recombinant material, and general biotechnology security precautions.

(PO4).Environment and sustainability:

Understanding of the causes, types and control methods for Environmental Pollution. Application of different life forms in Environmental Remediation.

(PO5).Problem analysis

Identify the taxonomic position of animals. Design solutions from medicinal animals for health problems, disorders and disease of human beings. Animals which meet the specified needs **(PO6).Ethics:**

Apply ethical principles and commit to environmental ethics and responsibilities and norms the environment

P.R.GOVERNMENT COLLEGE(A),KAKINADA
B.SC (FBC) BIOCHEMISTRY THIRD YEAR SEMESTER-VII
COURSE-7A – BIOCHEMICAL CORRELATION IN DISORDERS

WEIGHTAGETOCONTENT

Time:2.30hours Maxmarks:50 marks

UNIT	ESSAY QUESTIONS 10 MARKS	SHORT ANSWER QUESTIOS 5 MARKS	MARKS ALLOTED TO THE UNIT	AS PER BLOOMS TAXNOMY
UNIT–I	01	02	20	Understanding
UNIT–II	02	01	25	Analyzing
UNIT–III	01	02	20	remembering
UNIT-IV	02	02	30	Understanding &rembering
Total no. of Questions	**06**	**07**	95	

P.R. GOVERNMENT COLLEGE (A), KAKINADA
III YEAR B.Sc (Bio-chemistry)
Paper-6A MODELPAPER

Duration: 2hrs. **Max.Marks:50**

SECTION-I

Answer any THREE of the following questions. And attempt one question from Each section part Each question carries TEN marks 3X10=30Marks

PART-A

1. Discuss the various disorders of Adrenal gland?

2. Write an essay on disorders of Water soluble vitamins?

3. Write about the diseases of Alzheimer's and Wilson's disease?

PART- B

4. Write about the any two disorders of digestive systems?

5..Describe the any two Renal disorders?

6. Write an essay on disorders of Fat soluble vitamins?

SECTION-II

Answer any FOUR of the following questions. Each question carries FIVE marks

4 X 5=20Marks

7.Hyerpitutarism

8.Kwashiorkar.

9.Goiter

10.Sickle cell anemia

11.Chronic Glomerular nephritis

12.Appendicitis

13.Hyperthyroidism

LABORATORY COURSE

Practical Paper – 7A :: BIOCHEMICAL CORRELATION IN DISORDERS

(at the end of semester V) 30hrs (2h/W) 50Marks **Learning Out comes**:

1. The ability to utilize carbohydrates can be determined by Glucose tolerance test. Initially fasting blood glucose is estimated
2. A loading dose of glucose is given. The blood glucose levels are estimated at regular intervals after the glucose load
3. In conditions of insulin deficiency, blood glucose levels get elevated due to impaired utilization of glucose.

Practical (Laboratory) Syllabus

1. Glucose tolerance test.
2. Lipid profile: triglycerides and total cholesterol.
3. Obesity parameters.
4. RBC counting and hemoglobin estimation.
5. Blood pressure measurements.

Lab References:

S.NO	AUTHOR	TITLE	PUBLISHER
1	SAHI NITA	Clinical correlation	**JAYPEE BROTHERS MEDICAL PUBLISHERS**
2	Poonam Agrawal	Practical biochemistry	**CBS Publishers**
3	Thomas M. Devlin	biochemistry	Drexel University School of Medicine.

Co-Curricular Activities:

Mandatory:(Lab/field training of students by teacher:(lab:10+field:05): **For Teacher:** Training of students by teacher in laboratory and field for not lessthan15 hours on the field techniques/skills of preparation of counting of WBC techniques in bio-chemistry.

For Student: Student shall visit a related industry/chemistry laboratory in universities/research organizations/private sector facility and observe techniques in bio-chemistry. Write their observations and submit a hand written fieldwork/project work report not exceeding10 pages in the given format to the teacher.

SCHEME OF VALUATION

a. Principle and Procedure	10 marks
b. Conduct of experiment	15 marks
c. Report	10 marks
d. Record	10 marks
e. Viva voce	05 marks
TOTAL	**50 marks**