HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)
(Affiliated to Osmania University)
Nallakunta, Hyderabad-44

B.SC. III YEAR SEMESTER V & VI
DEPARTMENT OF BIOCHEMISTRY
2018-2019

HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)
(Affiliated to Osmania University)
Nallakunta, Hyderabad-44

B.SC. III YEAR SEMESTER V

DEPARTMENT OF BIOCHEMISTRY

2018-2019

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DEPARTMENT OF BIOCHEMISTRY

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(AUTONOMOUS & NAAC REACCREDITED)
Nallakunta, Hyderabad-44.

University Nominee
Dr. Karuna Rupula
Chairperson – BOS,Assistant Professor,
Department of Biochemistry,University College of Science,
Osmania University, Hyderabad.

Members of BOS
1. Dr. Raju Padiya
   Assistant professor, Department of Biochemistry,
   Osmania University, Hyderabad.

Assistant Professor
Department of Biochemistry
University College of Science
Osmania University, Hyderabad
Telangana - 500 007.

2. Smt. Konda Sumana Yadagiri
   Assistant professor, HOD- Department of Biochemistry,
   Govt. City College ,Nayapool,Hyderabad

3. Dr. Ch. Vidya,
   Asst. Prof. - Department of Biochemistry,
   Govt. City College ,Nayapool,Hyderabad

4. Dr. Ravi Kiran Suripeddi,
   Head – Department of Biochemistry,
   Aurora Degree & PG College, Chikkadpally, Hyderabad

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AGENDA OF THE MEETING

3.1. Welcome address by the chair.

3.2. Previous Meeting Details.

3.3. Details of credit base choice system.

3.4. Discussion and Distribution of Common Core Syllabus.

3.5. Discussion on Pattern of Semester Exam

3.6. Discussion of Pattern of Semester Exam Model Question Paper and Internal Model Question Paper.

3.7. Marks allotted for Internal and end Semester exams.

3.8. Panel of Examiners

3.9. Any other matter

3.10. Vote of Thanks

I/C. PRINCIPAL
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BOARD OF STUDIES
ACADEMIC YEAR – 2018-19

MINUTES OF BOS MEETING

BOS meeting of the Department of Biochemistry was held on 10th July 2018 at 02:30 PM.

The following members were present

Dr. Karuna Rupula	-	University Nominee
Ms. G.Lahari	-	Chairperson
Dr. Raju Padiya	-	Member
Smt.Konda Sumana Yadagiri	-	Member
Dr.Ch.Vidya	-	Member
Dr.Ravi Kiran Suripeddi	-	Member

Department of Biochemistry Hindi Mahavidyalaya (AUTONOMOUS & NAAC ACCREDITED) Nallakunta, Hyderabad-500 001 (T.S.) INDIA

Board of Studies in Biochemistry Department of Biochemistry Osmania University Hyderabad-500 007 Telangana

Head Department of Biochemistry AURORA'S DEGREE & PG COLLEGE Chikkadpally, Hyderabad-20.

3.1 Welcome address by the chair

The chair welcomed the University Nominee, Ex-officio Member BOS, O.U Department of Biochemistry and Members of B.O.S.

3.2 Details of choice based credit system.

Members were informed that TSCHE has referred that from the academic year 2016-17 autonomous institutions have to follow CBCS i.e. From the Academic Year 2016-17 Osmania University has instructed all the Degree colleges including Autonomous Degree colleges to follow CBCS under which after passing the exam student will get the Grade in the Final Result. 3 Credits are given for theory paper and 1 credit is given for practical in semester V & VI of B.Sc III year .

3.3 Discussion and Distribution of Common Core Syllabus.

i. Members were informed by the chair that Department of Biochemistry, Hindi Mahavidyalaya is following common core syllabus prescribed by Osmania University for B.Sc III Year, Semester V and VI.

ii. The syllabus comprises of 3 units each of core and elective. There are two electives(A & B) for each semester from which the student can opt for any one.

(iii) Section B contains 2 Essay type Questions with internal choice. Each Question carries 15 Marks (2X15=30 Marks)

- Pattern of Model Theory Question Papers for DSC(V,VII) and DSE(VI,VIII) A/B and SEC Paper 3 and Paper 4, GE papers 1&2 are enclosed.
- Pattern of Model Theory Question Papers for DSC(V,VII),DSE(VI,VIII) A/B and SEC(3&4) and GE (1&2) was approved by Member of BOS.

3.6 Discussion on Practical Exam Model paper.

It was decided in BOS that for the batch 2018-2019 BSc.III year semester V and VI the no. of credits for the practicals would be considered as 1=50M.This is applicable only for the 2018-2019 outgoing batch, and practical exam will be held for 3 hrs.

- It is decided that the practical examinations held for B.Sc II years (Semester III & IV) from the academic year 2017-18 onwards will have the pattern of 25 marks scheme and the credits will remain the same i.e. 1 credit. The duration of the exam will be 2 hours.
- Pattern of Model Practical Question Papers for Paper III,IV ,V,VI & VII VIII are enclosed.
- Pattern of Model Practical Question Papers was approved by Members of BOS

3.7 Panel of Examiners

The panel of examiners was approved by the members. with addition of 3 more members

- List is enclosed

3.8 Any other matter.

The semester I,II, III& IV syllabus is approved and followed for the academic year 2018-2019.There is no change in the syllabus and pattern

3.9 Vote of Thanks

Meeting concluded with the Vote of Thanks by Miss G.Lahari.

Chairperson	University Nominee	Members	Principal
Lahari Department of Biochemistry Hindi Mahavidyalaya Chikkadpally, Nallakunta, Hyderabad-44.	CHAIRMAN Board of Studies in Biochemistry Department of Biochemistry Osmania University Hyderabad-500 007, Telangana	M.Sc., Ph.D. Professor Dept. of Biochemistry College of Science University, Hyderabad 1. 2. (Dr. S. Ram Kiran) 3. Head Department of Biochemistry AURORA'S DEGREE COLLEGE Chikkadpally, Hyderabad-20.	I/C. PRINCIPAL HINDI MAHAVIDYALAYA Arts, Commerce & Science Nallakunta, Hyderabad

HINDI MAHAVIDYALAYA

(AUTONOMOUS)

Affiliated to Osmania University

Nallakunta, Hyderabad-44

CBCS STRUCTURE for 2016-17 BATCH Admitted

B.SC. BIO-CHEMISTRY, MICROBIOLOGY, CHEMISTRY

THIRD YEAR SEMESTER- V					Semester End exam		Continuous Internal Evaluation	
Code	Course Title	Course Type	HPW	Credits	Duration in HRS	Marks	Exam Duration	Marks
BS501	APPLIED BIOCHEMISTRY	SEC-3	2	2	2	40	30 min	10
BS502	Physiology and Biochemistry	GE-1	2 T	2	2	40	30 min	10
BS503	BIOCHEMISTRY – V Physiology and clinical biochemistry	DSC-1E	3 T + 2P = 5	3+1=4	3	60	30 min	15
BS504	OPTION - II	DSC-2E	3 T + 2P = 5	3+1=4	3	60	30 min	15
BS505	OPTION - III	DSC-3E	3 T + 2P = 5	3+1=4	3	60	30 min	15
BS506	BIOCHEMISTRY – VI A/B	DSE- 1E	3 T + 2P = 5	3+1=4	3	60	30 min	15
	– A- Molecular Biology							
	– B- Cell Biology and Genetics							
BS507	OPTION - II	DSE-2E	3 T + 2P = 5	3+1=4	3	60	30 min	15
BS508	OPTION - III	DSE-3E	3 T + 2P = 5	3+1=4	3	60	30 min	15
			34	28		440		110

Head Department of Biochemistry

I/C. PRINCIPAL
HINDI MAHAVIDYALAYA

CHAIRMAN
Board of Studies in Biochemistry
Department of Biochemistry
Osmania University

M.Sc., Ph.D.
Assistant Professor
Department of Biochemistry
University College of Science
Osmania University, Hyderabad

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DEPARTMENT OF BIOCHEMISTRY

B.SC. III YEAR BIOCHEMISTRY
SEMESTER – V PAPER-V
DISCIPLINE SPECIFIC CORE THEORY

PHYSIOLOGY AND CLINICAL BIOCHEMISTRY

Code: BS503
HPW: 3T+2P

DSC1E
Credits:3T+1P

Objective: The course is aimed at exposing the students to some knowledge of Physiology and Biochemistry in depth.

UNIT- I: Physiology

1. Digestion and absorption of carbohydrates, lipids and proteins
2. Composition of blood and coagulation of blood
3. Hemoglobin and transport of gases in blood (oxygen and CO_2)
4. Heart- structure of the heart, Cardiac cycle, cardiac factors controlling blood pressure
5. Physiology of Vision
6. Muscle- kinds of muscles, structure of myofibril, organization of contractile proteins and mechanism of muscle contraction.
7. Structure of Neuron and propagation of nerve impulse

UNIT- II: Endocrinology

1. Endocrinology- organization of endocrine system. Classification of hormones.
2. Mechanism of hormonal action- Steroid and peptide hormones such as adrenaline, glucocorticoids and insulin.
3. Chemistry, physiological role and disorders of hormones of Pituitary, Hypothalamus and Thyroid
4. Chemistry, physiological role and disorders of hormones of Pancreas
5. Chemistry, physiological role and disorders of hormones of Parathyroid
6. Chemistry, physiological role and disorders of hormones of Gonads, Placenta and Adrenals
7. Gastrointestinal hormones and their physiological role

UNIT- III: Organs and Organ Function tests

1. Structure and functions of the liver.
2. Liver function tests- conjugated and total bilurubin in serum, albumin: globulin ratio, hippuric acid and bromsulphthalein tests. Serum enzymes in liver diseases- SGPT, GGT and alkaline phosphatase.

3. Kidneys-structure of nephron and Mechanism of urine formation
4. Normal and abnormal constituents of urine.

5. Biological buffers. Role of kidneys in maintaining acid-base and electrolyte balance in the body.

6. Renal function tests- creatinine and urea clearance tests, phenol red test.

7. Biochemical tests for the diagnosis of heart diseases- HDL/LDL cholesterol, SGOT, LDH, CK, C-reactive protein, cardiac troponins.

References

1. Textbook of Biochemistry and Human Biology – Talwar, G.P. and Srivastava. L.M., Printice Hall of India
2. Review of Medical Physiology-Ganong. McGraw-Hill.
3. Human Physiology – Chatterjee.C.C, Medical Allied Agency
4. Textbook of Medical Physiology – Guyton.A.G and Hall.J.E., Saunders
5. William's Textbook of Endocrinology – Larsen, R. P. Korenberg, H. N. Melmed, S. and Polensky, K. S. Saunders
6. Mammalian Biochemistry- White, A. Handler, P. and Smith, E. L. McGraw-Hill.
7. Textbook of Human Nutrition- Bamji, Pralhad Rao and Reddy V. Oxford & IBH Publishers.
8. Foods: Facts & Principle- Shakuntala and Shadaksharaswamy. Wiley Ester Press.
9. Essentials of Food and Nutrition – Swaminathan.M. Bangalore Press.
10. Human Nutrition and Dietetics. Davidson, S. and Passmore, J. R. ELBS.
11. A Textbook of Biochemistry: Molecular and Clinical Aspects. Nagini, S. Scitech Publishers.
12. Tietz Fundamentals of Clinical Chemistry- Burtis, A. A. and Ashwood, E. R. Saunders-imprint Elsevier Pub.
13. Textbook of Biochemistry with Clinical Correlations – Devlin.T.M.,Wiley -- Liss
14. Textbook of Medical Biochemistry – Chatterjea.M.N. and Shinde.R, Jaypee Brothers Medical Publishers.
15. Textbook of Medical Biochemistry- Ramakrishnan, S., Prasannan, K. G. and Rajan, R. Orient Longman

Chairperson

University Nominee

Members

Dr. RAJU PADIYA
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1.

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3.

Principal

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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOCHEMISTRY
SEMESTER – V PAPER-V
PRACTICALS

PHYSIOLOGY AND CLINICAL BIOCHEMISTRY

Code: BS503P **DSC1E**
HPW: 2 **Credits:1**

1. Estimation of hemoglobin in blood.
2. Total count - RBC and WBC. Differential count.
3. Urine analysis for albumin, sugars and ketone bodies.
4. Estimation of urinary creatinine.
5. Estimation of blood urea.
6. Estimation of serum total cholesterol.
7. Determination of serum alkaline phosphatase activity.
8. Determination of SGOT and SGPT activity

References

1. Experimental Biochemistry-A student companion-Beedu Sashidhar Rao and VijayDeshpande.
2. Laboratory Manual in Biochemistry- Jayaraman, J. Wiley Eastern
3. Biochemical Methods- Sadasivam,S and Manickyam,A. New Age International Publishers

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DEPARTMENT OF BIOCHEMISTRY

B.SC BIOCHEMISTRY III YEAR
SEMESTER – V
PAPER –DSC (V)

THEORY MODEL QUESTION PAPER

Time: 3hrs **Max. Marks: 60**

SECTION A

I Write short notes on any Five of the following: **5X3=15 Marks**

1. A Question from Unit I
2. A Question from Unit II
3. A Question from Unit III
4. A Question from Unit I
5. A Question from Unit II
6. A Question from Unit III
7. A Question from any of I,II,III units
8. A Question from any of I,II,III units

SECTION B

II Essay Questions. Answer all the Questions **3X15=45 Marks**

9. (a) A Question from Unit I
   (OR)
   (b) A Question from Unit I

10.(a). A Question from Unit II
   (OR)
   (b). A Question from Unit II

11.(a) A Question from Unit III
   (OR)
   (b) A Question from Unit III

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DEPARTMENT OF BIOCHEMISTRY

B.SC BIOCHEMISTRY III YEAR
SEMESTER – V
PAPER –DSC (V)

PRACTICAL MODEL QUESTION PAPER

Time – 3 Hrs **Total Marks:50**

I	Principles	10Marks
II	Major Experiment	20Marks
III	Minor Experiment	10Marks
IV	Record and Viva voce	10Marks

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Department of Biochemistry
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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOCHEMISTRY
SEMESTER – V PAPER-VI
DICIPLINE SPECIFIC ELECTIVE THEORY

MOLECULAR BIOLOGY (A)

Code: BS506
HPW: 3T+2P

DSE-1E
Credits:3T+1P

Objective: The course is aimed at exposing the students to some knowledge of Molecular Biology in depth.

UNIT- I : DNA Replication

1. Organization of genome in prokaryotes and eukaryotes.
2. Experimental evidences to prove nucleic acids as genetic material.
3. Nature and structure of the gene.
4. DNA replication- models of replication, Meselson-Stahl's experimental proof for semi-conservative model.
5. DNA polymerases I, II and III of *E.coli*, helicase, topoisomerases, primase, ligase
6. Bidirectional replication model. Okazaki fragments, leading and lagging strands of DNA synthesis.
7. Inhibitors of DNA replication.

UNIT- II : Transcription

1. Transcription - RNA synthesis, RNA polymerases of prokaryotes.
2. Promoters, Initiation- sigma factors and their recognition sites.
3. Elongation- role of core enzyme.
4. Termination- rho dependent and rho independent. RNA polymerase I, II and III of eukaryotes.
5. Transcriptional events in eukaryotic m-RNA synthesis
6. Post-transcriptional modifications of eukaryotic m-RNA
7. Inhibitors of RNA synthesis.

UNIT- III : Translation and Regulation of Gene Expression

1. Introduction to protein synthesis- Genetic code, structure of t-RNA
2. Deciphering of genetic code, Nirenberg's and Khorana's experiments, wobble hypothesis, degeneracy of genetic code.
3. Protein synthesis- activation of amino acids (aminoacyl t-RNA synthetases).
4. Ribosome structure. Initiation, elongation and termination of protein synthesis.
5. Post- translational modifications.
6. Inhibitors of protein synthesis.
7. Regulation of prokaryotic gene expression- induction and repression. Lac operon, catabolite repression. Tryptophan operon and attenuation.

References

1. Molecular Biology of Cell- Alberts, B. Bray, D. Lewis, J. Raff, M. Roberts, K. and Watson, J. D. Garland Publishing.
2. Recombinant DNA and Biotechnology: A Guide for teachers- Helen and Massey.
3. Genes VIII – Lewin. B, Oxford University Press .
4. Molecular Biology- Freifelder. D. Naroasa Pub. House
5. Molecular Biology of the Gene- Watson. J.D., Baker, T.A, Bell, S.P.,Gann.A, Levine, M and Losick.R, Pearson Education.
6. Molecular Biotechnology- Glick, B. R. and Pasternak, J. J. ASM Press
7. Principles of Gene Manipulation: An Introduction to GE- Old, R. V. and Primrose, S. B. Blackwell Sci. Pub.
8. Molecular Cell Biology- Lodish, H., Berk, A., Matsudaira, P., Kaiser, C. A., Krieger, M. Scott M P., Zipursky, S. L. and Darnell, J. Freeman & Co.

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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOCHEMISTRY
SEMESTER – V PAPER-VI
PRACTICALS
DICIPLINE SPECIFIC ELECTIVE
MOLECULAR BIOLOGY (A)

Code: BS503P
HPW: 2

DSE-1E
Credits:1

1. Isolation of DNA from onion/liver/coconut endosperm.
2. Isolation of plasmid DNA
3. Isolation of RNA
4. Determination of purity of nucleic acids by UV-spectrophotometric method.
5. Estimation of DNA by diphenylamine method.
6. Estimation of RNA by orcinol method.
7. Electrophoresis of nucleic acids and visualization by methylene blue staining.
8. Restriction mapping: λ- DNA with any two restriction enzymes.

References

1. Experimental Biochemistry-A student companion-Beedu Sashidhar Rao and VijayDeshpande.

2. Laboratory Manual in Biochemistry- Jayaraman, J. Wiley Eastern

3. Biochemical Methods- Sadasivam,S and Manickyam,A. New Age International Publishers

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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOCHEMISTRY
SEMESTER – V PAPER-VI
DICIPLINE SPECIFIC ELECTIVE THEORY

CELL BIOLOGY AND GENETICS (B)

Code: BS506
HPW: 3T+2P

DSE-1E
Credits:3T+1P

Objective: The course is aimed at exposing the students to some basic knowledge in cell Biology and Genetics

UNIT- I: Cell Biology

1. Cells as basic units of living organisms
2. Composition & functions of cell organelles
3. Cytoskeleton- Microfilaments, Microtubules & Intermediate filaments
4. Ultra-structure of prokaryotic cell and eukaryotic cells
5. Chromosome organization in Prokaryotes and Eukaryotes and structure of chromosomes (Polytene and Lamp Brush)
6. Mitosis and Meiosis and their significance
7. Cell Cycle and cell death; Apoptosis

UNIT- II: Genetics

1. Basic concepts of Mendel's experiments – Law of segregation and Law of Independent assortment
2. Partial or incomplete dominance and Co-dominance
3. Non-Mendelian inheritance: Extra chromosomal inheritance (*Paramoecium* & *Drosophila*).
4. Maternal inheritance (Coiling in snails, Leber's hereditary optic neuropathy (LHON)).
5. Linkage and recombination
6. Polygenic inheritance (Introduction to quantitative traits).
7. Sex linked inheritance. X-linked recessive inheritance (colour blindness & Hemophilia). Concept of Autosomal recessive and dominant inheritance

UNIT- III: Mutations and Mutagens

1. Mutations (spontaneous / induced, somatic / germinal, forward / reverse, transition / transversions)
2. Mutations (Silent, missense, nonsense, and frame shift mutations, conditional, leaky)

3. Detection, selection & isolation of microbial mutants
4. Estimation of mutation rates
5. Reversion and suppression of mutations
6. Mutagens – physical, chemical
7. Transposon mutagenesis, site-directed mutagenesis

References

1. Principles of Genetics by Eldon John Gardner, Michael J. Simmons, D. Peter Snustad; John Wiley
2. Modern Genetic Analysis Anthony JF Griffiths, William M Gilbert, Jeffrey H Miller, and Richard

   C Lewontin. Pub. W. H. Freeman
3. Lewin B. (Ed)(1996) Genes, VII edition, John Wiley and Sons, New York.
4. Cell and Molecular Biology, De Robertis and De Robertis , Lippincott & Wilkins
5. Cell Biology by C. B. Pawar
6. Principles of Genetics by R.H. Tamarin McGrawhill
7. Theory & problems in Genetics by Stansfield, Schaum out line series McGrawhill

Chairperson

artment of BioChemistry
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University Nominee

Members

1. Dr. RAJU PADIYA
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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOCHEMISTRY
SEMESTER – V PAPER-VI
PRACTICALS
DICIPLINE SPECIFIC ELECTIVE
CELL BIOLOGY AND GENETICS (B)

CODE : BS506P
HPW: 2

Credits:1

1. Preparation of different stages of Mitosis
2. Preparation of different stages of Meiosis
3. Types of chromosomes
4. Karyotyping
5. Problems on Monohybrid cross
6. Problems on dihybrid ratio in *Drosophila*/maize
7. Problems on Linkage and Recombination
8. Studies on Sex linked inheritance and X-linked recessive inheritance

References

1. Essential practical handbook of Cell Biology & Genetics, Biometry and Microbiology: A Laboratory Manual by Debarati Das, Academic Publishers

Chairperson | **University Nominee** | **Members** | **Principal**

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DEPARTMENT OF BIOCHEMISTRY

B.SC BIOCHEMISTRY III YEAR
SEMESTER – V
PAPER –DSE (VI) A/B

THEORY MODEL QUESTION PAPER

Time: 3hrs Max. Marks: 60

SECTION A

I Write short notes on any Five of the following: 5X3=15 Marks

1. A Question from Unit I
2. A Question from Unit II
3. A Question from Unit III
4. A Question from Unit I
5. A Question from Unit II
6. A Question from Unit III
7. A Question from any of I,II,III units
8. A Question from any of I,II,III units

SECTION B

II Essay Questions. Answer all the Questions 3X15=45 Marks

9. (a) A Question from Unit I
   (OR)
   (b) A Question from Unit I

10.(a). A Question from Unit II
   (OR)
   (b). A Question from Unit II

11.(a) A Question from Unit III
   (OR)
   (b) A Question from Unit III

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DEPARTMENT OF BIOCHEMISTRY
B.SC BIOCHEMISTRY III YEAR
SEMESTER – V
PAPER - DCE (VI) A/B

PRACTICAL MODEL QUESTION PAPER

Total Marks:50

Time – 3 Hrs

I	Principles	10Marks
II	Major Experiment	20Marks
III	Minor Experiment	10Marks
IV	Record and Viva voce	10Marks

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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOCHEMISTRY
SEMESTER – V PAPER-3

SKILL ENHANCEMENT COURSE
APPLIED BIOCHEMISTRY

Code: BS501
HPW: 2T

SEC-3
Credits:2

Objective: The course is aimed at exposing the students to some basic knowledge in APPLIED BIOCHEMISTRY

UNIT- I: Enzyme and Protein purification methods

1. Homogenization techniques
2. Centrifugation methods
3. Ammonium sulfate precipitation and Dialysis
4. Column chromatography and determination of molecular weight
5. UV Spectra, SDS-PAGE and Native PAGE

UNIT- II: Nucleic acid analysis and Cell Cultures

1 Agarose gel electrophoresis

2. PCR
3. Blotting Techniques
4. Plant cell and Animal cell cultures
5. Microbial cell cultures for production valuable enzymes (Amylase, Protease, Cellulase)

References

1. Applied Biochemistry and Bioengineering by Lemuel Wingard, JR., Ephraim Katchalski-Katzir and Leon Goldstein, Academic Press Inc.

2. Protein purification – Principles and practice by Robert K. Scopes, Springer-verlag

3. Protein purification – Principles High resolution methods and applications by Jan-Christer Janson, Wiley

4. Enzyme purification and related techniques, Vol 22, Nathan Kaplan Nathan Colowick, Elsevier

5. Plant Cell cultures: Essential methods by Michael R. Davrey and Paul Anthony, Wiley-Blackwell

6. Animal Cell cultures: Essential methods by John M. Davis, Wiley-Blackwell

7. Handbook of industrial cell culture – Mammalian, microbial and plant cell cultures by Victor A. Vinci and Sarad R. Parekh, Springer Science+Business Media LLC.

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B.SC. III YEAR SEMESTER – V / VI

SEC-3/4 Credits – 2

SEC - THEORY MODEL PAPER

TIME: 2 HOURS MAX MARKS: 40

SECTION-A

Answer the following Questions in short: 5 x 2 = 10 marks

1. Question from Unit I

2. Question from Unit II

SECTION-B

Answer the following essay type questions: 2 x 15 = 30 marks

3 (a) Question from Unit I

OR

(b) Question from Unit I

4 (a) Question from Unit II

OR

(b) Question from Unit II

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SEMESTER – V PAPER-1

GENERIC ELECTIVE

PHYSIOLOGY AND BIOCHEMISTRY

Code: BS502
HPW: 2

GE-1
Credits: 2

Objective: The course is aimed at exposing the students to some basic knowledge in Physiology and Biochemistry

UNIT- I: Physiology

1. Physiology of digestion
2. Physiology of vision
3. Physiology of muscle and nerve
4. Composition of blood and blood coagulation
5. Hormones secreted by Pituitary
6. Hormones of Thyroid and Clinical Relevance
7. Hormones of Pancreas and Clinical Relevance

UNIT- II: Biomolecules and Metabolism

1. Water properties, pH and Buffers
2. Amino acids – Classification, properties and importance. Structure of proteins. Carbohydrates
   – Classification (mono, di, oligo and poly), properties and importance. Lipids – – Classification, properties and importance. Nucleic acids – Purines, Pyrimidines, Nucleosides, Nucleotides. Structure and types of DNA and RNA and denaturation
3. Enzymes – Classification, Factors affecting enzyme activity, Clinically important enzymes (SGOT, SGPT, LDH and CPK)
4. Amino acid metabolism – General reactions, metabolism of aromatic amino acids
5. Carbohydrate metabolism – Glycolysis, TCA cycle and Gluconeogenesis
6. Lipid metabolism - β-oxidation of fatty acids, de novo synthesis of fatty acids
7. Nucleic acid metabolism – Synthesis and degradation of purines and pyrimidines

References

1. Textbook of Biochemistry and Human Biology – Talwar, G.P. and Srivastava. L.M., Printice Hall of India
2. Human Physiology – Chatterjee.C.C, Medical Allied Agency
3. William's Textbook of Endocrinology – Larsen, R. P. Korenberg, H. N. Melmed, S. and Polensky, K. S. Saunders
4. Lehninger's Principles of Biochemistry – Nelson.D.L. and Cox.M.M., Freeman & Co.
5. Biochemistry – Berg.J.M., Tymoczko.J.L. and Stryer.L., Freeman & Co
6. Fundamentals of Biochemistry –Jain, J.L., Jain, S., Jain, N. S. Chand & Co.

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B.SC. III YEAR SEMESTER – V / VI

GE- 1/2 **Credits – 2**

GE - THEORY MODEL PAPER

TIME: 2 HOURS **MAX MARKS: 40**

SECTION-A

Answer the following Questions in short: **5 x 2 = 10 Marks**

1. A Question from Unit I
2. A Question from Unit II

SECTION-B

Answer the following essay type questions: **2 x 15 = 30 Marks**

3. (a) A Question from Unit I

   OR

   (b) A Question from Unit I

4. (a) A Question from Unit II

   OR

   (b) A Question from Unit II

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B.SC. III YEAR SEMESTER VI

DEPARTMENT OF BIOCHEMISTRY

2018-2019

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ACADEMIC YEAR 2018-19

CBCS STRUCTURE for 2016-17 BATCH

B.SC. BIO-CHEMISTRY, MICROBIOLOGY, CHEMISTRY

THIRD YEAR SEMESTER- VI

Code	Course Title	Course Type	HPW	Credits	Semester End exam		Continuous Internal Evaluation		Total	Practical 3 HRS
					Duration in HRS	Marks	Exam Duration	Marks		
BS601	Mini Project (4WEEKS)	SEC-4	2	2	Dissertation - 25 Marks Project presentation – 15 Marks Response to queries – 10 Marks				50	-
BS602	Nutrition in health and disease	GE-2	2 T	2	2	40	30 min	10	50	-
BS603	Nutrition and immunology	DSC-1F	3 T + 2P = 5	3+1=4	3	60	30 min	15	75	50
BS604	OPTION - II	DSC-2F	3 T + 2P = 5	3+1=4	3	60	30 min	15	75	50
BS605	OPTION - III	DSC-3F	3 T + 2P = 5	3+1=4	3	60	30 min	15	75	50
BS606	BIOCHEMISTRY-VIII A/B A- Microbiology and r-DNA technology B- Biotechnology	DSE- 1F	3 T + 2P = 5	3+1=4	3	60	30 min	15	75	50
BS607	OPTION - II	DSE-2F	3 T + 2P = 5	3+1=4	3	60	30 min	15	75	50
BS608	OPTION - III	DSE-3F	3 T + 2P = 5	3+1=4	3	60	30 min	15	75	50
			34	28		400		100	850	
	TOTAL Credits			164						

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SEMESTER – VI PAPER-VII

DICIPLINE SPECIFIC CORE THEORY

NUTRITION AND IMMUNOLOGY

Code: BS 603
HPW: 3T+2P

DSC-1F
Credits:3T+1P

Objective: The course is aimed to expose the students to the knowledge in Nutrition and Immunology in depth.

UNIT- I: Nutrition

1. Balanced diet. Calorific values of foods and their determination by bomb calorimeter.
2. BMR and factors affecting BMR. Specific dynamic action of foods.
3. Energy requirements and recommended dietary allowance (RDA) for children, adults, pregnant and lactating women.
4. Sources of complete and incomplete proteins. Biological value of proteins. Role of essential fatty acids in human nutrition.
5. Malnutrition- Kwashiorkar, Marasmus and PEM.
6. Vitamins- sources, structure, biochemical roles, deficiency disorders of water and fat soluble vitamins; Bulk and trace elements-Ca, Mg, Fe, I, Cu, Mo, Zn, Se and F.
7. Nutraceuticals, Functional foods, Obesity and starvation.

UNIT- II: Immunology

1. Organization of immune system.
2. Organs and cells of immune system.
3. Innate and acquired immunity.
4. Cell mediated and humoral immunity (T- and B- cells).
5. Classification of immunoglobulins, structure of IgG. Theories of antibody formation- clonal selection theory.
6. Epitopes / antigenic determinants. Concept of haptens. Adjuvants.
7. Monoclonal antibodies and their applications

UNIT- III: Immunotechnology

1. Antigen-antibody reactions- agglutination, immunoprecipitation, immunodiffusion.
2. Blood group antigens.
3. Immunodiagnostics-RIA, ELISA.
4. Vaccines and their classification. Traditional vaccines-live and attenuated, toxoids.
5. Modern vaccines- recombinant and peptide vaccines.
6. Outlines of hypersensitivity reactions.
7. Fundamentals of graft rejection and MHC proteins.

References

1. Essentials of Food and Nutrition –Swaminathan M. Bangalore Press
2. Immunology. Tizard, I. R. Thomson Press.
3. Kuby Immunology – Kindt.T.J., Goldsby.R.A. and Osborne.B.A., Freeman & Co.
4. Roitt's Essential Immunology – Roitt.I.M. and Delves.P.J., Blackwell Science.

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SEMESTER – VI PAPER-VII

PRACTICALS
NUTRITION AND IMMUNOLOGY

CODE : BS603P
HPW: 2 **Credits:1**

1. Estimation of calcium by titrimetry
2. Estimation of iron in apple juice by phenanthroline method.
3. Estimation of vitamin C by 2, 6 -dichlorophenol indophenol method.
4. Isolation of total lipids by gravimetric method.
5. Determination of iodine value of an oil.
6. Determination of acid value of an oil.
7. Determination of Blood Groups.
8. ODD and ELISA – (sandwich ELISA)

References

1. Experimental Biochemistry-A student companion-Beedu Sashidhar Rao and VijayDeshpande.
2. Laboratory Manual in Biochemistry- Jayaraman, J. Wiley Eastern
3. Biochemical Methods- Sadasivam,S and Manickyam,A. New Age International Publishers

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B.SC BIOCHEMISTRY III YEAR
SEMESTER – VI PAPER - VII
DSC
Theory Model Question Paper

Time: 3hrs **Max. Marks: 60**

SECTION A

I Write short notes on any Five of the following: **5X3 = 15 Marks**

1. A Question from Unit I
2. A Question from Unit II
3. A Question from Unit III
4. A Question from Unit I
5. A Question from Unit II
6. A Question from Unit III
7. A Question from any of I,II,III units
8. A Question from any of I,II,III units

SECTION B

II Essay Questions. Answer all the Questions **3X15 = 45 Marks**

9. (a) A Question from Unit I
   (OR)
   (b) A Question from Unit I

10.(a). A Question from Unit II
   (OR)
   (b). A Question from Unit II

11.(a) A Question from Unit III
   (OR)
   (b) A Question from Unit III

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SEMESTER – VI PAPER – VII
DSC
PRACTICAL MODEL QUESTION PAPER

Time – 3 Hrs **Total Marks:50.**

I Principles	10 Marks
II Major Experiment	20 Marks
III Minor Experiment	10 Marks
IV Record and Viva voce	10 Marks

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SEMESTER – VI PAPER-VIII

DICIPLINE SPECIFIC ELECTIVE THEORY

MICROBIOLOGY AND r-DNA TECHNOLOGY (A)

Code: BS606
HPW: 3T+2P

DSE-1F
Credits:3T+1P

Objective: The course is aimed to expose the students to the basic knowledge of Microbiology and r-DNA Technology in depth

UNIT- I : Microbiology

1. Introduction to brief history of microbiology. Classification of microorganisms, Mycoplasma.
2. Isolation and cultivation of bacteria. Selective media and enriched media.
3. Bacterial growth curve and kinetics of growth. Batch, continuous and synchronous cultures.
4. Gram's staining- Gram positive and.Gram negative bacteria, motility and sporulation.
5. Industrial uses of *Aspergillus niger*, yeast and Spirulina.
6. Structure and composition of viruses. (Prokaryotic and Eukaryotic), One-step growth and determination of plaque forming units (PFU).
7. Viral life cycles – T4 (Lytic), λ phage (lytic and lysogenic), TMV, Retro viruses- HIV.

UNIT- II: r-DNA technology I

1. Outlines of cloning strategies.
2. DNA sequencing- Maxam Gilbert and Sanger's methods.
3. Tools of r-DNA technology: Enzymes- Restriction endonucleases and ligases
4. Restriction mapping.
5. Cloning vectors- Plasmids, Cosmids, and λ phages
6. Hosts- *E.coli applications.*
7. Molecular markers–RFLP, AFLP and RAPD.

UNIT- III: r-DNA technology II

1. Construction of c-DNA libraries.
2. Polymerase chain reaction- principle and applications.
3. Outlines of blotting techniques-Southern, Northern and Western.
4. Applications of gene cloning- production of insulin.
5. Production of human growth hormone.
6. Production of Genetically modified pesticide resistant plant (Bt cotton).
7. Edible vaccines.

References

1. Textbook of Microbiology – Ananthanarayan, R and Jayaram Paniker, C.K., Orient Longman.
2. Microbiology – Prescott.L.M.,Harley.J.P. & Klein.D.A, McGraw-Hill.
3. Microbiology – Pelczar Jr,.M.J., Chan.E.C.S. and Krieg.N.R., Tata McGraw-Hill.
4. Textbook of Microbiology- Dubey, R. C. and Maheshwari, D. K. S. Chand & Co.
5. Principles of Gene Manipulation: An introduction to GE – Old, R. and Primrose, S.B. Blackwell Sci. Pub
6. Molecular Biotechnology Glick, BR and Paternak, JJ. Publish ASM Press

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SEMESTER – VI PAPER-VIII
PRACTICALS
MICROBIOLOGY AND r-DNA TECHNOLOGY (A)

Code: BS606P
HPW: 2

DSE-1F
Credits: 1

1. Preparation of culture media and sterilization methods.
2. Isolation of pure cultures: (i) Streak plate method (ii) Serial dilution method.
3. Gram staining.
4. Motility of bacteria by hanging drop method.
5. Bacterial growth curve.
6. Antibiotic sensitivity by paper disc method.
7. Gene cloning (Demonstration only)
8. Preparation and transformation of competent cells

References

1. Molecular Cloning (Lab manual) by Maniatis T, Fritsch EF, Sambrook J, Volume –I, CSH
2. Microbiology – A Laboratory manual by Cappuccino and Sherman, Pearson Publications LPE.
3. Experiments in Microbiology, Plant Pathology and Biotechnology by Aneja A. R., New Age Publications

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SEMESTER – VI PAPER-VIII

DISIPLINE SPECIFIC ELECTIVE THEORY

BIOTECHNOLOGY (B)

Code: BS606
HPW: 3T+2P

DSE-1F
Credits:3T+1P

Objective: The course is aimed to expose the students to the basic knowledge of Biotechnology

UNIT- I: Plant Biotechnology

1. Plant tissue culture and its applications
2. Plants as bioreactors and valuable chemical factories (production of bioactive compounds)
3. Crop improvement, Production of herbicide and insect resistant plants
4. Plant metabolic engineering
5. Genetic engineering for quality improvement of Protein, lipids, carbohydrates, vitamins & mineral nutrients
6. Marker-assisted selection of qualitative and quantitative traits.
7. Genetically modified crops – Arabidopsis, Golden rice, soybeans, Bt cotton, tobacco, potato, papaya, jatropha

UNIT- II: Animal and Microbial Biotechnology

1. Animal cell cultures as bioreactors
2. Usage of animal cell culture for *in vitro* drug testing
3. Molecular pharming; Production of vaccines, pharmaceutical proteins, recombinant hemoglobin and blood substituents
4. Microbes as biocontrol agents
5. Overview of Microbial insecticides (Baculoviruses, *Bacillus thurinigiensis* and *Bacillus sphaericus*)
6. Bioremediation, Biodegradation of cellulose and lignocellulose, biosurfactants and bioemulsifiers
7. Microbial ore leaching and production of microbial fuels (hydrogen, methane)

UNIT- III: Environmental Biotechnology

1. Renewable and Non-renewable energy sources
2. Strategies involved in Municipal solid waste treatment
3. Treatment of industrial and domestic effluent (aerobic and anaerobic)
4. Biomaterials as an alternative to non-degradable materials
5. Microorganisms for Heavy Metal Accumulation
6. Biosorption
7. Heavy metal tolerance (including mechanism) and its impact on environment

References:

1. Introduction to Biotechnology, William J. Thieman, Michael A. Palladino, Benjamin Cummings Publ
2. Biotechnology- Arora, Himalaya pub. House
3. Introduction to Environmental Biotechnology by A. K. Chatterji, PHI Learning Pvt. Ltd.
4. Animal Cells as Bioreactors - By Terence Gartoright, Cambridge Univ Press
5. Text Book of Biotechnology - By H.K. Das (Wiley Publications)
6. Introduction to Plant Tissue Culture- By M.K. Razdan (Oxford and IBH ublishing Company, New Delhi)
7. Industrial Microbiology by L.E. Casida

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SEMESTER – VI PAPER-VIII

PRACTICALS
BIOTECHNOLOGY (B)

Code: BS606P
HPW: 2

DSE-1F
Credits: 1

1. Tissue culture: Preparation of MS medium and initiation of callus
2. Tissue culture: Micropropagation of plants
3. Preparation of animal cell culture media, Cell disaggregation and cell counting
4. Isolation of microbes from environment (soil, water, skin, bread, milk)
5. Microbial degradation of organic matter
6. Efficacy testing for biofertilizers (nodulation test for rhizobia) and biopesticides
7. Municipal solid waste treatment and Waste water treatment
8. Production of hydrogen and methane

References

1. Microbial Biotechnology – A Laboratory Manual for bacterial systems by Das, Surajit, Dash, Hirak Ranjan, Springer-Verlag
2. Plant Tissue Culture by Kalyan Kumar De
3. Biogas Technology by B.T. Nijaguna
4. Biotechnology procedures and experiments handbook by S. Harisha, Infinity Science Press LLC.

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B.SC BIOCHEMISTRY III YEAR
SEMESTER – VI PAPER - VIII
DSE(A / B)
THEORY MODEL QUESTION PAPER

Time: 3hrs Max. Marks: 60

SECTION A

I Write short notes on any Five of the following: 5X3 = 15 Marks

1. A Question from Unit I
2. A Question from Unit II
3. A Question from Unit III
4. A Question from Unit I
5. A Question from Unit II
6. A Question from Unit III
7. A Question from any of I,II,III units
8. A Question from any of I,II,III units

SECTION B

II Essay Questions. Answer all the Questions 3X15 = 45 Marks

9. (a) A Question from Unit I
(OR)
(b) A Question from Unit I

10.(a). A Question from Unit II
(OR)
(b). A Question from Unit II

11.(a) A Question from Unit III
(OR)
(b) A Question from Unit III

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF BIOCHEMISTRY
B.SC BIOCHEMISTRY III YEAR
SEMESTER – VI PAPER – VIII
DSE (A /B)
PRACTICAL MODEL QUESTION PAPER

Time – 3 Hrs **Total Marks:50.**

I	Principles	10 Marks
II	Major Experiment	20 Marks
III	Minor Experiment	10 Marks
IV	Record and Viva voce	10 Marks

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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOCHEMISTRY
SEMESTER – VI PAPER-4
SKILL ENHANCEMENT COURSE

MINI PROJECT

Code: BS601 **SEC-4**
HPW: 2 **Credits:2**

Objective: The course is aimed to make students do live or review based projects to enhance there practical skills.

The mini project can be either live or review based and is of **4 weeks duration**. Suitable project work to be carried out by the student under the mentorship of departmental staff within the department. The assessment would be carried out based the dissertation and project viva-voce.

The distribution of marks for the project is as follows.

Dissertation – 25 Marks

Project presentation – 15 Marks

Response to queries – 10 Marks

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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR BIOTECHNOLOGY
SEMESTER – VI
GENERIC ELECTIVE - 2
NUTRITION IN HEALTH AND DISEASE

Code: BS602 | **GE-2**
HPW: 2 | **Credits:2**

Objective: The course is aimed to expose the students to the basic knowledge in Nutrition in health and disease.

UNIT- I: Nutrition

1. Balanced Diet
2. Calorific value of foods
3. SDA of foods
4. BMR and factors affecting it
5. BMI and its determination
6. Recommended dietary allowance (RDA) for children, adults and lactating women
7. Foods and their Nutrient content – cereals, pulses, nuts and fibre, Fruits and Vegetables.

UNIT- II: Nutritional disorders

1. Malnutrition - Kwashiorkar,
2. Malnutrition - Marasmus
3. Vitamins – Classification, dietary sources, biochemical role, deficiency disorders
4. Trace elements (Ca, Mg, Fe, I and Zn)
5. Obesity and diabetes
6. Probiotics in human health
7. Functional foods

References

1. Essentials of Food and Nutrition –Swaminathan M. Bangalore Press
2. Manual of Nutritional Therapeutics, 2nd edition, Alpers (1991), Little Brown Publications, Washington.

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DEPARTMENT OF BIOCHEMISTRY
B.SC. III YEAR SEMESTER – V / VI

GE- 1/2 | Credits – 2

GE - THEORY MODEL PAPER

TIME: 2 HOURS | MAX MARKS: 40

SECTION-A

Answer the following Questions in short: **5 x 2 = 10 Marks**

1. Question from Unit I
2. Question from Unit II

SECTION-B

Answer the following essay type questions: **2x15=30 Marks**

3 (a) Question from Unit I

OR

(b) Question from Unit I

4 (a) Question from Unit II

OR

(b) Question from Unit II

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B.SC. III YEAR SEMESTER – V / VI

DSC(V, VII) & DSE (VI,VIII) A/B - INTERNAL MODEL PAPER

TIME: ½ HOUR — MAX MARKS: 15

SECTION-A

MULTIPLE CHOICE QUESTIONS — 10 x ½ = 5 Marks

TEN (10) MCQ ½ MARK EACH

SECTION-B

FILL IN THE BLANKS: — 10 x ½ = 5 Marks

TEN (10) FIB ½ MARK EACH

SECTION-C

SHORT NOTE QUESTIONS: — 5 x 1 = 5 Marks

FIVE (5) 1(ONE) MARK EACH

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B.SC. III YEAR SEMESTER – V / VI
SEC 3 & 4 / GE 1&2 - INTERNAL MODEL PAPER

TIME: ½ HOURS

MAX MARKS: 10

SECTION-A

10 x ½ =5 marks

FILL IN THE BLANKS:

TEN (10) FIB ½ MARK EACH

SECTION-B

10 x ½ =5 marks

MULTIPLE CHOICE QUESTIONS

TEN (10) MCQ ½ MARK EACH

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ACADEMIC YEAR 2018-19

CBCS STRUCTURE for 2016-17 BATCH

B.SC. BIO-CHEMISTRY, MICROBIOLOGY, CHEMISTRY

SECOND YEAR SEMESTER-III					Semester End exam		Continuous Internal Evaluation		Total	Practical 2 HRS
Code	Course Title	Course Type	HPW	Credits	Duration in HRS	Marks	Exam Duration	Marks		
BS301	A/B	SEC-1	2	2	2	40	30 min	10	50	-
BS302	English - III	CC-1C	5	5	3	80	30 min	20	100	-
BS303	Second Language - III	CC-2C	5	5	3	80	30 min	20	100	-
BS304	**BIOCHEMISTRY – III Bioenergetics, Biological oxidation and enzymeology**	**DSC-1C**	**4 T + 2P = 6**	**4+1=5**	**3**	**80**	**30 min**	**20**	**100**	25
BS305	OPTION - II	DSC-2C	4 T + 2P = 6	4+1=5	3	80	30 min	20	100	25
BS306	OPTION - III	DSC-3C	4 T + 2P = 6	4+1=5	3	80	30 min	20	100	25
			30	27		440		110	625	-

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DEPARTMENT OF BIOCHEMISTRY
B.SC. BIOCHEMISTRY II YEAR
SEMESTER – III
PAPER – III

PRACTICAL MODEL QUESTION PAPER

Time – 2 Hrs **Total Marks: 25 Marks**

I	Principles	5 Marks
II	Major Experiment	10 Marks
III	Minor Experiment	5 Marks
IV	Record and Viva voce	5 Marks

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ACADEMIC YEAR 2018-1

CBCS STRUCTURE for 2016-17 BATCH

B.SC. BIO-CHEMISTRY, MICROBIOLOGY, CHEMISTRY

SECOND YEAR SEMESTER-IV					Semester End exam		Continuous Internal Evaluation		Total	Practical 2 HRS
Code	Course Title	Course Type	HPW	Credits	Duration in HRS	Marks	Exam Duration	Marks		
BS401	A/B	SEC-2	2	2	2	40	30 min	10	50	-
BS402	English - IV	CC -1D	5	5	3	80	30 min	20	100	-
BS403	Second Language - IV	CC-2D	5	5	3	80	30 min	20	100	-
BS404	**BIOCHEMISTRY – IV Intermediary Metabolism**	**DSC-1D**	**4 T + 2P = 6**	**4+1=5**	**3**	**80**	**30 min**	**20**	**100**	25
BS405	OPTION - II	DSC-2D	4 T + 2P = 6	4+1=5	3	80	30 min	20	100	25
BS406	OPTION - III	DSC-3D	4 T + 2P = 6	4+1=5	3	80	30 min	20	100	25
			30	27		440		110	625	-

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B.SC. BIOCHEMISTRY II YEAR
SEMESTER –IV PAPER –IV

PRACTICAL MODEL QUESTION PAPER

Time – 2 Hrs **Total Marks: 25 Marks**

I	Principles	5 Marks
II	Major Experiment	10 Marks
III	Minor Experiment	5 Marks
IV	Record and Viva voce	5 Marks

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2	**Dr. S. Ravi Kiran** Head – Department of Biochemistry, Aurora Degree & PG College , Chikkadpally, Hyderabad. Email:	9100000562
3	**Ms. G. Bindu** Department of Biochemistry, Aurora Degree & PG College, Chikkadpally, Hyderabad. Email:	9100000504
4	**Ms. C. Vanisree** Head – Department of Biochemistry, St. Pious X Degree & PG College, Nacharam, Hyderabad. Email:	9703599392
5	**Smt. Konda Sumana Yadagiri** Assistant professor, HOD- Department of Biochemistry, Govt. City College ,Nayapool,Hyderabad Email:	9441201640
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