

Minutes of Meeting

Minutes of Meeting of a State Level Committee for Revision of Undergraduates B.Sc & B.Sc (Honors) Semester III & IV CBCS Common Core Syllabus in Biotechnology for all Universities in Telangana and their affiliated institutions for Academic Year 2026-27 held on 10.07.2026 at 2.00 pm in Seminar Hall, Dept. of Genetics & Biotechnology Wing, Osmania University, Hyderabad.

S.NO.	Name	Designation	Signature
1	Prof. H. Surekha Rani Head, Dept. Of Genetics & Biotechnology Wing, OU, Hyderabad	Chairperson	<i>H. Surekha Rani</i> 10/7/2026
2	Dr. S. Prashant Chairperson, BOS Biotechnology, Dept. Of Genetics & Biotechnology Wing, OU	Convenor	<i>S. Prashant</i> 10/7/2026
3	Dr. G. Sumanlatha Chairperson, BOS Genetics, Dept. Of Genetics & Biotechnology Wing, OU	Member	<i>G. Sumanlatha</i> 10/7/2026
4	Dr. Shasthree Taduri Chairman, BOS Biotechnology, Department of Biotechnology, KU	Member	<i>Shasthree Taduri</i>
5	Dr. Aileni Mahender Chairman, BOS Biotechnology, Department of Biotechnology, TU	Member	<i>Aileni Mahender</i> 10/07/2026
6	Dr. K. Madhuri Chairperson, BOS, Biotechnology, Department of Biotechnology, MGU	Member	<i>K. Madhuri</i> 10/7/26
7	Dr. Syeda Amena Kausar Asst. Prof. I/C Head, Genetics & Biotechnology, VCIWU, Hyderabad	Member	<i>Syeda Amena Kausar</i> 10/7/26
8	Dr. Y. Venkateshwarlu Asst. Prof. Biotechnology, Tara GDC, Sangareddy	Member	<i>Y. Venkateshwarlu</i> 10/7/26
9	Dr. D. Annapurna Asst. Prof. Biotechnology, GDC, Khairatabad, Hyderabad	Member	<i>D. Annapurna</i> 10/7/26
10	Smt. P. Pushpalatha Asst. Prof. Biotechnology, GDC for Women, Nalgonda	Member	<i>P. Pushpalatha</i> 10/7/26
11	Smt. V. Rohini Asst. Prof. Biotechnology, GDC (A), Siddipet	Member	<i>V. Rohini</i> 10/7/26
12	Dr. Vikas Sharma Asst. Prof (C), Biotechnology, UCS, Saifabad, OU, Hyderabad	Member	<i>Vikas Sharma</i> 10/7/26
13	Mrs. Deepika Asst. Prof (C), Biotechnology, Nizam College, OU, Hyderabad	Member	<i>Deepika</i> 10/7/26
14	Ms. V. Kanaka Durga Bhavani, Lecturer, Biotechnology, Hindu DC, Hyderabad	Member	<i>V. Kanaka Durga Bhavani</i> 10/07/26

15	Ms. D S N Praveena Lecturer, Biotechnology, HRD Degree & PG College, Hyderabad	Member	<i>Dr. A. 10/7/2026</i>
16	Dr. Nishant Jain Senior Scientist, IICT, Hyderabad	Member	<i>Absent</i>
17	Dr. Ramjee Pallala Former, COO, AIC-CCMB, Hyderabad	Member	<i>Absent</i>
18	Mr. A. Vinod Kumar Team Leader, QA, Dr. Reddy's Biologics, Hyderabad	Member	<i>Absent</i>

AGENDA

1. Revision of Undergraduate B.Sc. (Regular) Semester III and IV Common Core Syllabus in Biotechnology.
2. Revision of Undergraduate B.Sc. (Honors) Semester III and IV Common Core Syllabus in Biotechnology.

RESOLUTIONS

1. The Syllabus for B.Sc Biotechnology (Regular) Semester III and IV has been discussed thoroughly and finalized unanimously for implementation from academic year 2026-27 across all universities in Telangana after thorough discussion with the Committee Members.
2. The Syllabus for B.Sc Biotechnology (Honors) Semester III and IV has been discussed thoroughly and finalized unanimously for implementation from academic year 2026-27 across all universities in Telangana after thorough discussion with the Committee Members.

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K. H. H. H.
10/7/26.

V. K. S.
10/7/26

P. S. S.

K. S. S.

P. S. S.
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S. S. S.
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H. S. S.

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D. S. S.
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P. S. S.
10/07/26

S. S. S.
10/7/26

G. S. S.
10/7/2026

**TELANGANA COUNCIL OF
HIGHER EDUCATION (TGCHÉ)
GOVT. OF TELANGANA
B.Sc – CBCS
Common Syllabus for All Universities
In Telangana
B.Sc BIOTECHNOLOGY
(2025-26 onwards)**

Telangana Council of Higher Education, Govt. of Telangana
B.Sc CBCS Common Core Syllabus for all Universities in Telangana
B.Sc – Biotechnology (w.e.f.2025-26)

FIRST YEAR SEMESTER I				
Code	Course Title	Course Type	HPW	Credits
BS101	Major - I Cell Biology, Genetics & Biostatistics	DSC1A	4T+2P=6	4+1=5
BS102	Major - II	DSC2A	4T+2P=6	4+1=5
BS103	Minor	DSC3A	4T+2P=6	4+1=5
BS104	English	AEC1A	5	5
BS105	Second Language	AEC2A	5	5
	Total		28	25
FIRST YEAR SEMESTER II				
BS201	Major - I Microbiology & Immunology	DSC1B	4T+2P=6	4+1=5
BS202	Major - II	DSC2B	4T+2P=6	4+1=5
BS203	Minor	DSC3B	4T+2P=6	4+1=5
BS204	English	AEC1B	5	5
BS205	Second Language	AEC2B	5	5
	Total		28	25
SECOND YEAR SEMESTER III				
BS301	Major - I Biological Chemistry & Molecular Biology	DSC1C	4T+2P=6	4+1=5
BS302	Major - II	DSC2C	4T+2P=6	4+1=5
BS303	Minor	DSC3C	4T+2P=6	4+1=5
BS304	English	AEC1C	5	5
BS305	Second Language	AEC2C	5	5
	Total		28	25
SECOND YEAR SEMESTER IV				
BS401	Major - I Recombinant DNA Technology & Bioinformatics	DSC1D	4T+2P=6	4+1=5
BS402	Major - II	DSC2D	4T+2P=6	4+1=5
BS403	Minor	DSC3D	4T+2P=6	4+1=5
BS404	English	AEC1D	5	5
BS405	Second Language	AEC2D	5	5
	Total		28	25

THIRD YEAR SEMESTER V				
Code	Course Title	Course Type	HPW	Credits
BS501	Major – I Plant & Animal Biotechnology	DSC1E	4T+2P=6	4+1=5
BS502	Major - II	DSC2E	4T+2P=6	4+1=5
BS503	Basics in Biotechnology	MDC	4	4
BS504	Skill Enhancement Course - I	SEC1	2	2
BS505	Skill Enhancement Course - II	SEC2	2	2
BS506	Value Added Course - I	VAC1	3	3
	Total		23	21
THIRD YEAR SEMESTER VI				
BS601	Elective: Optional - I (A) Industrial & Environmental Biotechnology/ (B) Medical Biotechnology	DSC1F	4+2=6	4+1=5
BS602	Major – II A/B	DSC2F	4+2=6	4+1=5
BS603	Skill Enhancement Course - III	SEC3	2	2
BS604	Skill Enhancement Course – IV Biophysical and Molecular Techniques/ Bioprocess Technology/ Food Biotechnology/ Intellectual Property Rights, Good Laboratory Practices & Good Manufacturing Practices	SEC4	2	2
BS605	Value Added Course - II	VAC2	3	3
BS606	Internship/Project Work		4	4
	Total		23	21
	Grand Total			142

**Credits under Non-CGPA
(Community Engagement & Service)**

1	NSS/NCC/Sports/Extra curricular	Upto 3 Credits (2 in each year)
2	IKS	Upto 4 Credits (2 in each, after I & II years)

Major - I	30
Major - II	30
Minor	20
AEC (Ability Enhancement Course) - English	20
Second Language – Telugu/Hindi/Urdu etc.	20
MDC (Multi Disciplinary Course)	4
SEC (Skill Enhancement Course)	8
VAC (Value Added Course)	6
Internship/ Project Work	4
Total	142

Value Added Courses:

Paper I: Environmental Science (EVS)/Cyber Security & Cyber Laws

Paper II: Cyber Security & Cyber Laws/ Environmental Science(EVS)/ Introduction to Indian Constitution/ Health & Wellness

Skill Enhancement Courses:

Paper I: Communication Skills/ Professional Development Skills/ Entrepreneurship& Startups

Paper II: Professional Development Skills/ Communication Skills/ Entrepreneurship& Startups

Paper III: Fundamentals of AI Tools/ Ability Skills (Competitive Mathematics)

Paper IV: Biophysical and Molecular Techniques/ Bioprocess Technology/ Food Biotechnology/ Intellectual Property Rights, Good Laboratory Practices & Good Manufacturing Practices

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Unit III: Genome Organization, Replication and Mutations

- 3.1 **DNA as the genetic material** – Griffith's Experiment, Avery, MacLeod and McCarty's Experiment and Hershey & Chase Experiment; RNA as genetic material – Fraenkel Conrat Experiment
- 3.2 **Structure of DNA** (Watson & Crick Model), Forms of DNA – A, B & Z; Structure and types of RNA
- 3.3 **Genome Organization** - Organization of Prokaryotic genome (Nucleoid) and Eukaryotic genome (Nucleosome, 30 nm Fiber, Solenoid loops); Euchromatin & Heterochromatin, C-value paradox
- 3.4 **Organellar Genome** - Organization of Organellar genomes – Mitochondria and Chloroplast; features & significance
- 3.5 **DNA Replication** – Semi-conservative mode, Replication Fork, Enzymes involved in replication; **Prokaryotic and Eukaryotic DNA replication**, Inhibitors of DNA Replication
- 3.6 **Mutations** – Types of Mutations (Spontaneous & Induced Mutations); Physical and chemical mutagens

Unit IV: Gene Expression & Gene Regulation

- 4.1 **Gene structure** - Structure of Prokaryotic gene (polycistronic) & Eukaryotic gene (monocistronic); Structure & functions of Prokaryotic and Eukaryotic RNA Polymerases
- 4.2 **Transcription** - Transcription process (initiation, elongation & termination) in Prokaryotes and Eukaryotes, Mechanisms involved
- 4.3 **Genetic Code** – Properties, Degeneracy, Wobble hypothesis
- 4.4 **Translation** - Structure of ribosomes, Translation process (initiation, elongation & termination) in Prokaryotes and Eukaryotes
- 4.5 **Gene regulation** - Prokaryotic transcriptional regulation (Inducible Operon - lac Operon; Repressible Operon – trp Operon); Eukaryotic Post transcriptional modifications – capping, poly-adenylation, RNA Editing and splicing, alternate splicing
- 4.6 **Post-translational modifications in Eukaryotes** – Glycosylation, Acetylation, Ubiquitination; Gal regulation in Yeast – mating type gene switching

Practicals

1. Preparation of Normal, Molar, Molal solutions and buffers
2. Qualitative tests for Sugars
3. Qualitative tests for Amino acids
4. Qualitative tests for Lipids
5. Estimation of Glucose by DNS Method
6. Separation of Amino acids by Paper Chromatography
7. Estimation of Proteins by Biuret Method
8. Isolation of DNA from bacteria/plant material/ animal cells
9. Agarose gel electrophoresis of isolated DNA

H. Madhavi
10/10/24

Smy
G. Arun Kumar

10/10/24

Ime Kusan

10/10/24

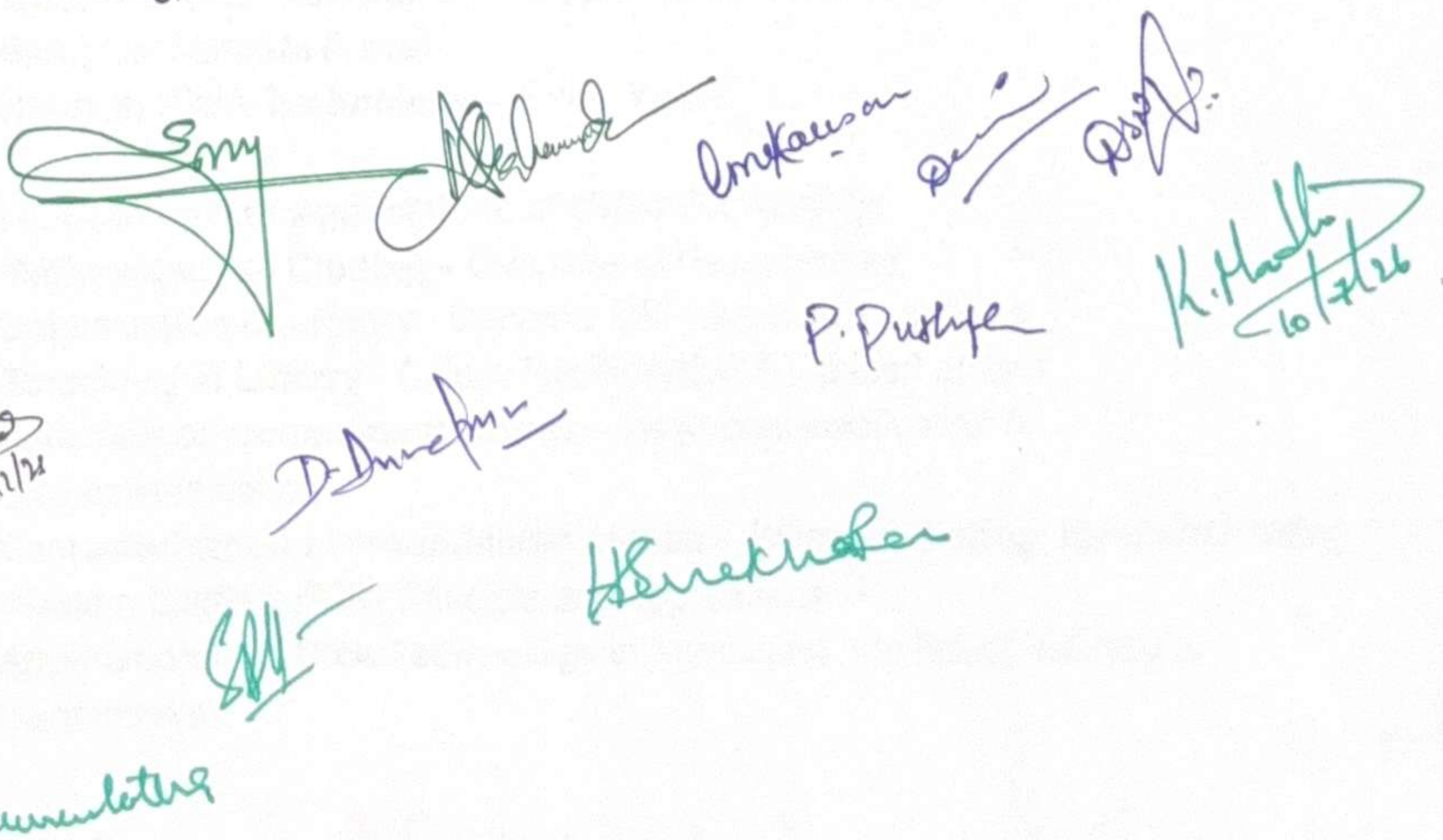
P. Pushpa

D. Anurag

10. Determination of quantity of DNA using UV Spectrophotometer
11. Separation of proteins using SDS - PAGE

Reference Books

1. Lehninger Principles of Biochemistry by David L. Nelson and Cox.
2. Harper's Biochemistry by Robert K. Murray
3. Principles of Biochemistry by Donald J. Voet, Judith G. Voet, Charlotte W. Pratt
4. Analytical Chemistry by Cooper
5. Principles and Techniques in Biochemistry and Molecular Biology
6. Molecular Biology of the Cell, Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter.
7. Molecular Biology of the Gene by J.D. Watson, N.H. Hopkins, J.W. Robertis, A.
8. Steitz & A.M. Weiner, Benjamin Cummings Publ. California
9. Molecular Cell Biology Lodish, H., Baltimore, D; Fesk, A, Zipursky S.L., Matsudaride, P. and Darnel American Scientific Books. W.H. Freeman, New York
10. Genes VII. Benjamin Lewis, Oxford Univ. Press, Oxford.
11. Molecular Biology by D. Freifelder Narosa Publishing house New York, Delhi.
12. Advance Molecular Biology Twyman, R.M., Bios Scientific publishers Oxford
13. Molecular Biology by T.A. Brown
14. Essentials of Molecular Biology. D. Freifelder, Panima publishing co-operation
15. Genes & Genomes – A changing perspective by Singer & Berr, Universal Science Books, California.
16. DNA Damage Repair, Repair Mechanisms and Aging by Allison E. Thomas Nova Science Publisher's, 2010.
17. Chromosomal Translocations and Genome Rearrangements in Cancer by Janet D. Rowley, Michelle M. Le Beau, Terence H. Rabbitts Springer International Publishing, 2015.


 A collection of handwritten signatures in green and blue ink. The signatures are scattered across the lower half of the page. Some are written in green ink, while others are in blue ink. The signatures vary in style, with some being more stylized and others more legible. One signature in green ink on the right side includes the date "10/21/26".

B.Sc BIOTECHNOLOGY II YEAR
SEMESTER - IV
Major- I (DSC – 1D)
BS 401: RECOMBINANT DNA TECHNOLOGY & BIOINFORMATICS

Course Objectives (C. Obj):

- A. To learn the basic components of rDNA Technology
- B. To gain knowledge of techniques involved in Molecular cloning & Genetic Engineering
- C. To understand the basics of Bioinformatics and Biological Databases
- D. To comprehend the fundamentals of Sequence alignment and Phylogeny

Course Outcomes (C.O):

- A. Understanding the fundamentals of components involved in Genetic Engineering
- B. Comprehension of Molecular cloning various rDNA Techniques and their applications
- C. Gain insights of Bioinformatics tools & Biological Databases and applications
- D. Acquiring knowledge of *in silico* tools of Sequence alignment and Phylogeny

Unit I: Fundamentals of rDNA Technology

- 1.1 **Restriction Enzymes** – Classification, Nomenclature and Applications
- 1.2 **DNA Modifying Enzymes** – Nucleases, Methylases, Polymerases, Ligase, Phosphatases and Kinases
- 1.3 **Vectors** – Salient features, Types – Plasmids, Phages, Phagemids, Cosmids, Shuttle vectors
- 1.4 **Cloning Vectors** (pUC19), **Expression vectors** (pET vector) & Vectors for Library Preparation (λ phage, Cosmids, BAC & YAC)
- 1.5 **Gene Transfer Techniques** – Physical (Electroporation), Chemical (PEG), Biological Methods (Virus)
- 1.6 **Hosts in rDNA Technology** – *E.coli*, Yeast

Unit II: Cloning and Applications of rDNA Technology

- 2.1 **Methodology of Cloning** – Overview of Gene cloning
- 2.2 **Construction of Library** - Genomic DNA and cDNA Libraries
- 2.3 **Screening of Library** - Colony Hybridization & Labeled probes
- 2.4 **Selection of recombinant clones** – Insertional inactivation & α -complementation
- 2.5 **Characterization of recombinant clones** – Southern Blotting, Northern Blotting, Western Blotting, PCR- Principle and applications
- 2.6 **Applications of rDNA Technology** in Agriculture, Medicine, Industry & Environment

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G. Suman Kumar

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Anurag Kumar

P. Pushpa

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D. Anurag Kumar

Unit III: Basics of Bioinformatics

3.1 Introduction to Bioinformatics – Definition, Historical perspective, Scope and Applications

3.2 Bioinformatics resources – Web Portals – NCBI, EBI, ExPASy

3.3 Biological Databases – Classification, Primary, Secondary and Composite/ Specialized databases; Significance of Databases

3.4 Nucleotide databases – Genbank, ENA, DDBJ

3.5 Protein databases – Uniprot, PDB (Protein Data Bank), SwissProt, PROSITE

3.6 Bioinformatics Tools – Database search engines, Free Online tools

Unit IV: Sequence Alignment and Applications of Bioinformatics

4.1 Basics of Sequence Alignment – Match, Mismatch, Gaps, Gap penalties, Sequence identity & Similarity, Scoring alignment

4.2 Types of Sequence Alignment – Pairwise and Multiple Sequence Alignment, Local and Global Alignment

4.3 Pairwise Sequence Alignment Search tools – FASTA & BLAST

4.4 Dot-matrix comparison of sequences; scoring matrices – PAM & BLOSUM

4.5 Concept of Phylogeny – Distance matrix based (NJ Method) and Character based (ML Method)

4.6 Applications of Bioinformatics – Genome sequence analysis, Genome Annotation, Drug Discovery

Practicals

1. Isolation of plasmid DNA (Vector)
2. Amplification of a gene using PCR
3. Restriction digestion of plasmid DNA
4. Ligation of digested gene and vector DNA
5. Transformation of *E.coli* and selection of recombinant clones
6. Exploring Web Portals – NCBI, EBI, ExPASy
7. Search and Nucleotide Sequence retrieval from NCBI, ENA
8. Search and Protein Sequence retrieval from Uniprot, Swiss PROT, PDB
9. Pairwise homology search of nucleotide/protein sequences by BLAST & FASTA
10. Construction of a Phylogeny Tree

Reference Books

1. Principles of Gene Manipulation and Genomics by Sandy B. Primrose and Richard Twyman, 7th Edition, Blackwel Publishing
2. An Introduction to Genetic Engineering – Desmond S.T. Nichol, Cambridge University Press
3. Molecular Biotechnology: Principles and Applications of Recombinant DNA – Bernard R. Glick, Jack J. Pasternak, Cheryl L. Patten – ASM Press

4. Gene Cloning and DNA Analysis: An Introduction – T. A. Brown, John Wiley and Sons
5. Introduction to Bioinformatics by Aurthur M lesk
6. Developing bioinformatics computer skills by Cynthia Gibas, Per Jambeck
7. Bioinformatics second edition by David M mount
8. Essential bioinformatics by Jin Xiong
9. Bioinformatics: concepts, skills & applications by R.S. Rastogi
10. Bioinformatics computing by Bryan Bergeron
11. Bioinformatics: methods and applications genomics, proteomics and drug discovery by S.C. Rastogi, Parag Rastogi, Namita Mendiratta

Sam

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K. Hally
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H. S. K. K. K.

G. Anurag