HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
BOARD OF STUDIES
DEPARTMENT OF BIOTECHNOLOGY

Chairperson
Mrs. Nita Kulkarni
Head – Department of Biotechnology
Hindi Mahavidyalaya
Nallakunta, Hyderabad.

University Nominee
Dr. Surekha Rani
Chairperson – BOS
Department of Biotechnology
Osmania University, Hyderabad.

Dr. H. SUREKHA RANI
Assistant Professor
Chairperson BOS Biotechnology
Department of Genetics & Biotechnology
Osmania University, Hyderabad-07.

Members of BOS

1 Dr. Chaithri
Asst. Prof. Department of Biotechnology
Osmania University, Hyderabad

2. Ms. Sandhya Rani
Department of Biotechnology
Andhra Mahila Sabha Arts & Science College (Autonomous)
Osmania University Campus, Hyderabad

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)

COMPOSITION OF THE BOARD OF STUDIES IN AN AUTONOMOUS COLLEGE

I. **Composition: Department of Biotechnology**

1. Head of the department concerned (Chairman)

II. Mrs. Nita Kulkarni – Department of Biotechnology

2. The entire faculty of each specialization.

Mrs. Nita Kulkarni

3 One expert to be nominated by the vice-chancellor from a panel if six recommended by the College Principal.

III. Dr. Surekha Rani, Chairman, BOS, Dept. of Biotechnology

4. Two experts in the subject from outside the college to be nominated by the Academic Council.

1. Dr. Chaithri, Asst. Prof, Department of Biotechnology, Osmania University, Hyd.
2. Ms. Sandhya Rani, Department of Biotechnology, Andhra Mahila Sabha Arts & Science College, Hyd.

(a) Experts from outside the College whenever special courses of studies are to be formulated-To be nominated.

(b) Other members of staff of the same faculty.

Dr. H. SUREKHA RANI
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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF BIOTECHNOLOGY
BOARD OF STUDIES
Academic Year – 2016-17

Minutes of BOS Meeting

BOS meeting of the Department of Biotechnology was held on Saturday, 06-08-2016 at 11:30AM

The following members were present

Dr. Surekha Rani	-	University Nominee
Mrs. Nita Kulkarni	-	Chairperson
Dr. Chaithri	-	Member
Ms. Sandhya Rani	-	Member

2.1 Welcome address by the chair

The chair welcomed the University Nominee, Chairperson BOS, O.U Department of Biotechnology and Members of B.O.S.

2.2 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. 4 Credits are given for theory paper and 1 credit is given for practical in each semester.

2.3 Discussion and Distribution of Common Core Syllabus.

i. Members were informed by the chair that Department of Biotechnology Hindi Mahavidyalaya is following common core syllabus prescribed by Osmania University.

ii. We are following Osmania University same syllabus of each Semester as it is without any changes

Syllabus copy for both the semesters is enclosed.
Syllabus was approved by the Members of BOS.

Dr. H. SUREKHA RANI
Assistant Professor
Chairperson BOS Biotechnology

2.4 Marks allotted for Internal and end Semester exams.

1. Internal assessment is of 20 marks. (15M for Internal + 5 M for assignment).In each Semester two internal assessment of 15 Marks will be conducted and an average of both the internal assessments will be added in the marks of Theory exam.
2. Theory Question paper is of 80 marks.
3. Total allotted marks are 100.

The distribution of marks was approved by the Member of BOS.

2.5 Discussion on Pattern and Model Paper of Semester exam and Model Paper of Internal Exam

1. It was informed by the department that in each Semester Two Internal exams will be conducted for 15 marks and 5 marks will be allotted for assignment. Average of marks of these two internal exams will be taken.

2. Semester exam will be conducted as per the Almanac which will be provided by the exam branch. Internal exam duration will be 30Mts and Semester exam duration will be of 3 hrs.

3. Model Question paper for Semester I and Semester II was discussed. Theory paper for each Semester will have 2 sections.

i) Section A contains 8 short Questions. The student has to answer four questions. Each Question carries 5 Marks (4X5=20 Marks)

ii) Section B contains 4 Essay type Questions with internal choice. Each Question carries 15 Marks (4X15=60 Marks)

Pattern of Model Question Papers for Paper I and Paper II are enclosed.
Pattern of Model Question Paper was approved by Member of BOS.

2.6 Discussion on Practical Exam Model paper.

It was decided in BOS meeting that 50 Marks Practical Exam of 3 hrs will be held in each Semester and 1 credit will be given for Practical in each Semester.

The Practical model paper was approved by the Member of BOS.

2.7 Panel of Examiners

The panel of examiners was approved by the members.
List is enclosed

2.8 Any other matter.

1. It is resolved to establish a lab for B.Sc. Biotechnology practicals.
2. Question paper pattern is subjected to change as prescribed by Osmania University in the later stages.

2.9 Vote of Thanks

Meeting concluded with the Vote of Thanks by Mrs. Nita Kulkarni

Chairperson

University Nominee

Dr. H. SUREKHA RANI
Assistant Professor
Chairperson BOS Biotechnology
Department of Genetics & Biotechnology
Osmania University, Hyderabad-07.

Members

1.

2.

Principal

DEPARTMENT OF BIOTECHNOLOGY
AGENDA OF THE MEETING
(Saturday – 6-8-2016)

2.1 Welcome address by the chair.

2.2 Details of choice based credit system.

2.3 Discussion on Common Core Syllabus.

2.4 Marks allotted for Internal and end Semester exams.

2.5 Discussion on Semester Exam Model Paper & Internal Exam Model Paper

2.6 Discussion on Practical Exam Model Paper

2.7 Panel of Examiners

2.8 Any other matter

2.9 Vote of Thanks

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HINDI MAHAVIDYALAYA,NALLAKUNTA,HYDERABAD
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B.Sc –I year

Scheme of Instruction & Evaluation

Group: (Bio-tec, Mic, Chem.) I semester

Sub Code	Sub Name	Course Type	Hours/ Week		Credit		Exam Duration	Marks			
			Th	Pr	Th	Pr	Th/Pr	Sem	Internal 30 min	Total	Practical
	Environmental studies	AECC-I	2	-	2	-	1 ½ Hrs	15	-	15	-
	English	CC-IA	5	-	5	-	2 Hrs	40	10	50	-
	Second language	CC-2A	5	-	5	-	2 Hrs	40	10	50	-
	Bio-technology	DSC-IA	4	2	4	1	2 Hrs	40	10	50	25
	Microbiology	DSC-2A	4	2	4	1	2 Hrs	40	10	50	25
	Chemistry	DSC-3A	4	2	4	1	2 Hrs	40	10	50	25
	TOTAL		24	6	27			215	50	265	75

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. 1st Year Biotechnology
Semester – 1
CORE THEORY-I
CELL BIOLOGY AND GENETICS
Paper I

Code:	
Instruction	
Theory Classes	**4 Hrs/Week**
Practical Classes	**2 Hrs/Week**
Credit for Theory	**4**
Credit for Practical	**1**
Duration of Semester Examination	**2 Hrs**
Duration of Internal Examination	**30 Min**
Semester Examination Marks	**40 Marks**
Internal Examination Marks	**10 Marks**

Unit 1: Cell structure and Functions

1.1. Cell as basic unit of living organisms-bacterial, fungal, plant and animal cells
1.2. Ultrastructure of prokaryotic cell (cell membrane and plasmids, Nucleoid)
1.3. Ultrastructure of eukaryotic cell (cell wall, cell membrane, nucleus, mitochondria, chloroplast, endoplasmic reticulum, Golgi apparatus, vacuoles)
1.4. Fluid mosaic model, Sandwich model, Cell membrane permeability
1.5. Structure of chromosome-morphology, components of chromosomes (histones and non-histones), specialized chromosomes (Polytene, Lampbrush)
1.6. Chromosomal aberrations- structural and numerical

Unit 2: Cell cycle

2.1 Bacterial cell division
2.2 Eukaryotic cell cycle –phases
2.3 Mitosis - Stages (spindle assembly)-significance
2.4 Meiosis- Stages (synaptonemal complex)-significance
2.5 Senescence and necrosis
2.6 Apoptosis

Unit 3: Principles and mechanism of inheritance

3.1 Mendel's experiments- factors contributing to success of Mendel's experiments
3.2 Law of segregation- Monohybrid Ratio; Law of independent assortment- Dihybrid Ratio,Trihybrid Ratio

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3.3 Deviation from Mendel's laws- partial or incomplete dominance (eg: Flower Color in Mirabilis jalapa), Co-dominance (eg: MN Blood groups), Non allelic interactions-types of epistasis, modification of dihybrid ratios

3.4 Penetrance and Expressivity (eg: Polydactyly, Waardenburg syndrome), pleiotropism, phenocopy- microcephaly, cleft lip

3.5 Multiple alleleism (eg: Coat color in Rabbits, eye color in Drosophila and ABO Blood groups)

3.6 X-Y chromosomes - Sex determination in Drosophila, Birds, Man, Bonellia; X-linked inheritance– Hemophilia and Color blindness; X-inactivation; Y-linked inheritance- Holandric genes

Unit 4: Linkage, Recombination and Extension to Mendel's Laws

4.1 Linkage and recombination- Cytological proof of crossing over, phases of linkage, recombination frequency, gene mapping and map distance

4.2 Non-Mendelian Inheritance – Maternal effect (Shell coilng in snail), variegation in leaves of Mirabilis jalapa

4.3 Cytoplasmic male sterility in Maize and Paramecium,

4.4 Mitochondrial inheritance in human and poky in Neurospora crassa

4.5 Chloroplast inheritance in Chlamydomonas

4.6 Hardy-Weinberg Equilibrium, allelic and genotypic distribution

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REFERENCE BOOKS

1. Cell & Molecular Biology. E.D.D De Robertis & E.M.F De Robertis, Waverly publication
2. An introduction to Genetic Analysis by Anthony, J.F. J.A. Miller, D.T. Suzuki, R.C. Richard Lewontin, W.M-Gilbert, W.H. Freeman publication
3. Principles of Genetics by E.J.Gardner and D.P. Snusted. John Wiley & Sons, New York
4. The science of Genetics, by A.G. Atherly J.R. Girton, J.F. Mcdonald, Saundern College publication
5. Principles of Genetics by R.H. Tamarin McGrawhill
6. Theory & problems in Genetics by Stansfield, Schaum out line series McGrawhill
7. Molecular Cell Biology Lodish, H., Baltimore, D; fesk, A., Zipursky S.L., Matsudaride, P. and Darnel. American Scientific Books. W.H. Freeman, New York
8. The cell: A molecular approach. Geoffrey M Cooper, Robert E Hausman, ASM press
9. Cell and Molecular Biology, Concepts and Experiments – Gerald Karp, John Wiley & Sons, Inc

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)

B.Sc. 1st Year Biotechnology

Semester – I

Practical Paper - I

Code:	
Instruction	2 Hrs / Week
Duration of Exam	2 Hrs
Marks for Exam	25 Marks
Laboratory Course	30 Hrs

CORE-I: PRACTICALS

1. Microscopic observation of cells: bacteria, fungi, plant and animal
2. Preparation of different stages of Mitosis (onion root tips)
3. Preparation of different stages of Meiosis (grasshopper testis)
4. Preparation of Polytene chromosome from Drosophila salivary gland
5. Identification, maintenance and culturing of Drosophila stock
6. Monohybrid and dihybrid ratio in Drosophila
7. Monohybrid and dihybrid ratio in Maize
8. Problems on co-dominance, epistasis, two point and three point test cross, gene mapping, Tetrad analysis
9. Statistical applications of t-test
10. Statistical applications chi square test
11. Statistical applications of Hardy-Weinberg Equilibrium

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HINDI MAHAVIDYALAYA,NALLAKUNTA,HYDERABAD
(AUTONOMOUS)

B.Sc –I year

Scheme of Instruction & Evaluation

Group: (Bio-tec, Mic, Chem.) II semester

Sub Code	Sub Name	Course Type	Hours/ Week		Credit		Exam Duration	Marks			
			Th	Pr	Th	Pr	Th/Pr	Sem	Internal 30 min	Total	Practical
	Gender Sensitization	AECC-2	2	-	2	-	-	-	-	-	-
	English	CC-IB	5	-	5	-	2 Hrs	40	10	50	-
	Second language	CC-2B	5	-	5	-	2 Hrs	40	10	50	-
	Bio-technology	DSC-IB	4	2	4	1	2 Hrs	40	10	50	25
	Microbiology	DSC-2B	4	2	4	1	2 Hrs	40	10	50	25
	Chemistry	DSC-3B	4	2	4	1	2 Hrs	40	10	50	25
	TOTAL		24	6	27						75

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. 1st Year Biotechnology
Semester – II
CORE THEORY II
NUCLEIC ACIDS & BIOINFORMATICS
Paper-II

Code:	
Instruction	**4 Hrs/Week**
Theory Classes	**2 Hrs/Week**
Practical Classes	**4**
Credit for Theory	**1**
Credit for Practical	**2 Hrs**
Duration of Semester Examination	**30 Min**
Duration of Internal Examination	**40 Marks**
Semester Examination Marks	**10 Marks**
Internal Examination Marks	

Unit 1: Nucleic Acids and Genome organization

1.1 DNA as the genetic material- Griffith's experiments on transformation in Streptococcus pneumoniae, Hershey-Chase experiments with radio labeled T2 bacteriophage, Avery, MacLeod and McCarty's experiments 280 p.no. Len
1.2 RNA as genetic material- Tobacco Mosaic Virus
1.3 Structure and forms of DNA (A, B and Z)
1.4 Genome organization in prokaryotes
1.5 Genome organization in eukaryotes, C-value and C-value paradox, Reassociation kinetics-cot curve, Denaturation, Renaturation, Tm curve
1.6 Kinetic classes of DNA- unique sequences, moderately repeated and highly repeated sequences; tandem repeats (satellite, minisatellite and micro satellites), interspersed repeats (SINES-eg: Alu repeats, LINES); palindromic sequences and transposable genetic elements

Unit 2: DNA Replication, Recombination and Repair

2.1 DNA replication- enzymes; semi conservative DNA replication-Messelson and Stahl experiment; Linear, Circular, Rolling circle, Theta, D loop models
2.2 Mutation- spontaneous, induced (frame shift, transition, transversion)
2.3 Physical and chemical mutagens

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2.4 DNA damage- intrinsic and extrinsic factors
2.5 DNA repair-Direct, Excision and methyl mediated mismatch, recombinational and SOS repair
2.6 DNA recombination-homologous, site specific recombination and NHEJ (Non-Homologous End Joining)

Unit 3: Concepts of Bioinformatics

3.1 Bioinformatics – a historical perspective
3.2 Internet and its role in bioinformatics
3.3 Bioinformatics Data: Genomes, nucleic acids, proteins, protein structures
3.4 Storage of databases in DNA (GenBank, EMBL, DDBJ)
3.5 Protein data banks (PDB, SWISS-PROT, UNIPROT, PIR) and their utilization
3.6 Data retrieval tools-BLAST, ENTREZ

Unit 4: Applications of Bioinformatics

4.1 Genome annotation: Gene identification tools
4.2 Basics of sequence alignment, Pairwise alignment (global and local)
4.3 Multiple sequence alignment and phylogenetic analysis
4.4 Structural classification of proteins and homology model building
4.5 Applications of Bioinformatics- drug targets, overview of drug designing
4.6 Concepts of Phramacogenomics

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REFERENCE BOOKS

1. Genes VII. Benjamin Lewin, Oxford Univ. Press, Oxford
2. Molecular Biology by D, Freifelder Narosa Publishing house New York, Delhi
3. Molecular Cell Biology Lodish, H., Baltimore, D; fesk, A., Zipursky S.L., Matsudaride, P. and Darnel. American Scientific Books. W.H. Freeman, NewYork
4. Molecular Biology by Brown
5. Essentials of Molecular Biology. D. Freifelder, Panima Publishing Corporation.
6. Bioinformatics: Sequence and Genome Analysis by David W. Mount, Cold Spring Harbor Laboratory Press
7. Biological Sequence Analysis: Probabilistic Models of Proteins and Nucleic Acids by Richard Durbin, Sean R. Eddy, Anders Krogh, Graeme Mitchison, Cambridge University Press
8. Bioinformatics: A Practical Guide to the Analysis of Genes and Proteins, Andreas D. Baxevanis, B. F. Francis Ouellette, Wiley-Interscience
9. Bioinformatics tools and Resources – free online tools, downloadable free tools, software packages, internet, Bioinformatics books and Journals, Bioinformatics web-portals

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. 1st Year Biotechnology
Semester – II
Practical Paper- II

Code:	
Instruction	**2 Hrs / Week**
Duration of Exam	**2 Hrs**
Marks for Exam	**25 Marks**
Laboratory Course	**30 Hrs**

CORE-II: PRACTICALS

1. Isolation of DNA from Plant cells
2. Isolation of DNA from Animal cells
3. Estimation of DNA by Diphenylamine method
4. Estimation of RNA by Orcinol method
5. Exploring data bases: Genbank and Uniprot
6. Exploring the structural data bases: PDB, MMDB
7. Visualization of Protein structures-RASMOL
8. Database searching and downloading bioinformatics data- DNA (Gen bank, DDBJ, ENA) Protein (Uniprot)
9. Pairwise sequence alignment (global and local) of DNA and proteins
10. Multiple sequence alignment of DNA & protein sequences using ClustalW
11. Database searching with heuristic algorithms: BLAST

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)

B.Sc Ist Year Biotechology

Semester – I & II

Theory Question Paper Pattern

Time: 3 hrs **Max. Marks: 80**

SECTION A

I Attempt any Four of the following (Short Answer Questions) **5 X 4 = 20 Marks**

1. A Question from Unit I
2. A Question from Unit I
3. A Question from Unit II
4. A Question from Unit II
5. A Question from Unit III
6. A Question from Unit III
7. A Question from Unit IV
8. A Question from Unit IV

SECTION B

II Attempt all the Questions (Long Answer Questions) **4 X 15= 60 Marks**

9 (a) Unit I

(OR)

(b) Unit I

10 (a) Unit II

(OR)

(b) Unit II

11 (a) Unit III

(OR)

(b) Unit III

12 (a) Unit IV

(OR)

(b) Unit IV

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

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc Biotechnology I[st] Year
Semester - I
Paper - I
Practical Model Question Paper

Time – 3 Hrs **Total Marks: 50 Marks.**

I Observe and Identify the given bacterial cells by simple staining technique. 10 Marks

OR

II Prepare different stages of Mitosis in Onion root tip. 24 Marks

Problem — 10 M

III Spotting

A Plant cell B C 6 Marks

IV Record and Viva voce 10 Marks

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc Biotechnology Ist Year
Semester - II
Paper - II
Practical Model Question Paper

Time - 3 Hrs **Total Marks: 50 Marks.**

1 Isolate the DNA from plant cell. 10 Marks

2 To estimate the DNA by Diphenylamine method. 24 Marks

3 Spotting 6 Marks

A) B) c)

IV Record & Viva voce 10 Marks

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S.No.	Name and [illegible]	
1	Ms. Sandhya Rani Andhra Mahila Sabha Arts & Science College (Autonomous) Hyderabad	
2	Smt. G. Y. Kavitha A. V Degree College Domalguda, Hyderabad	9395321541
3	Ms. Jayasree Govt Women's Degree College Begumpet, Hyderabad	9959652621
4	Smt. C. H Pradyutha Reddy Women's College Mehdipatnam, Hyderabad	9705335025
5	Dr. Chaithri Osmania University, Hyderabad	9550008070
6	Dr. Surekha Rani Department of Biotechnology Osmania University, Hyderabad	9866620067

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Hindi Mahavidyalaya

(Autonomous)

Biotechnology Department

Panel of Examiners

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1	Ms. Sandhya Rani Andhra Mahila Sabha Arts & Science College (Autonomous) Hyderabad	9390405439
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3	Ms. Jayasree Govt Women's Degree College Begumpet, Hyderabad	9959652621
4	Smt. C. H Pradyutha Reddy Women's College Mehdipatnam, Hyderabad	9705335025
5	Dr. Chaithri Osmania University, Hyderabad	9550008070
6	Dr. Surekha Rani Department of Biotechnology Osmania University, Hyderabad	9866620067

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