HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)

(Affiliated to Osmania University)

Nallakunta, Hyderabad

B.Sc. III YEAR SEMESTER V&VI

DEPARTMENT OF MICROBIOLOGY

(2022-2023)

HINDI MAHAVIDYALAYA

(AUTONOMOUS & NAAC RE-ACCREDITED)
BOARD OF STUDIES
DEPARTMENT OF MICROBIOLOGY

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Hindi Mahavidyalaya
Nallakunta, Hyderabad.

J. Pallavi
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Nallakunta, Hyderabad-44.

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Dr. B. BHIMA, M.Sc.,Ph.D.
Professor
Department of Microbiology, U.C.S,
Osmania University, Hyd-07.

Members of BOS
1. Dr.K.Anuradha
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Hyderabad

Head of the Department
Department of Microbiology
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Sainikpuri, Secunderabad - 500 094.

2. Dr.S. Sreedevi
Head of the department
Department of Microbiology
St.Pious Degree and PG College
Hyderabad.

Head of the Department
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Chairperson — University Nominee — Members — Principal

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PRINCIPAL
HINDI MAHA VIDYALAYA
Arts,Commerce & Science
Nallakunta, Hyderabad-44. T.S.

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)

COMPOSITION OF THE BOARD OF STUDIES IN AN AUTONOMOUS COLLEGE

I. Composition: Department of Microbiology

1. Head of the Department concerned (Chairman)
   Ms.Pallavi Jutika, Head-Department of Microbiology
2. The entire faculty of each specialization
   1. Ms.Pallavi Jutika
3. One expert to be nominated by the Vice Chancellor from a panel of six recommended by the College Principal
   1. Prof. Bhukya Bhima,University Nominee,Head and Chairperson BOS,Principal, Nizam college, Hyderabad.
4. Two experts on the subject from outside the college to be nominated by the Academic Council.
   1. Dr.S.Sreedevi, Head of Microbiology Department, St. Pious X Degree & PG College for women, Snehapuri Colony, Opp. HMT Bus stop, Near Habsiguda, Nacharam Road, Hyderabad.
   2. Dr.K.Anuradha, Head of Microbiology Department, Bharathiya Vidya Bhavan's Vivekananda College of Science, Humanities & Commerce Sainikpuri, Hyderabad.
5. One postgraduate meritorious alumnus to be nominated by the Principal. The Chairman,Board of Studies, may with the approval of the Principal of the College.
   1. Dr.G.Madhusudhan Reddy
   2. Smt.Vemula Sreelatha

(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.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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DEPARTMENT OF Microbiology
AGENDA OF THE MEETING

4.1 Welcome address by the chair.

4.2 Previous Meeting Details.

4.3 Details of choice based credit system.

4.4 Discussion and Distribution of Common Core Syllabus for all the Semesters (V and VI)

4.5 Marks allotted for internal and end semester exams.

4.6 Discussion on Pattern and model paper of Semester Exam and internal exam for all the Semesters (V and VI)

4.7 Discussion on Practical exam model paper for all the Semesters (V and VI)

4.8 Panel of Examiners

4.9 Any other matter

4.10 Vote of thanks

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DEPARTMENT OF MICROBIOLOGY
BOARD OF STUDIES
Academic Year – 2022-2023
Minutes of BOS Meeting

BOS meeting of the Department of Microbiology was held on 01-12-2022. The following members were present

Prof. Bhukya Bhima	-	University Nominee
Ms.J.Pallavi	-	Chair person
Dr. S Sreedevi	-	Member of BOS
Dr.K. Anuradha	-	Member of BOS

1.1 Welcome address by the chair

The chair welcomed the University Nominee, Chairperson BOS, Members of B.O.S.

1.2 Previous Meeting details

The CBCS system has been introduced by Osmania University from 2016-17. The theory and practical syllabus of I, II & III years of B.Sc., question paper pattern for theory and practical, internal assessment pattern, practical examination scheme and panel of examiners were discussed and approved by all the BOS Members in previous BOS meeting.

1.3 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.

1.4 Discussion and Distribution of Common Core Syllabus for semesters V and VI.

i. Members were informed by the chair that Department of Microbiology, Hindi Mahavidyalaya is following common core syllabus prescribed by Osmania University with few changes for B.Sc. III YEAR in V and VI semesters.

ii. The syllabus comprise of 4 units.

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The following are the changes in the syllabus semester

UNIT - 1 -MICROBIAL GENETICS:

1.1. Fundamentals of Genetics - Monohybrid, Dihybrid cross.

UNIT - 2 - MUTATIONS AND GENETIC RECOMBINATIONS

2.1. Mutations-substitution.

2.2. Biological mutagens.

UNIT - 4 - RECOMBINATION DNA TECHNOLOGY

4.2. Enzymes used in genetic engineering-Kinases.

GENERAL ELECTIVE -MICROBIOLOGY AND HUMAN HEALTH

Unit-1 : 1.1 Contributions of Alexander Flemming.

Unit-III: 1.4 Types of vaccines and their importance.

iii. Syllabus copy for both the semesters is enclosed.

iv. Syllabus was approved by the Members of BOS.

1.5 Marks allotted for Internal and end Semester exams.

1. Internal assessment for theory and GE is of 30 marks in which 20 marks are for offline test, where students have to answer 20 MCQs in 30 minutes. Each question carries 1 mark. In each Semester two offline tests of 20 Marks will be conducted and an average of both the tests will be added in the marks of theory exam.
2. Theory Question paper is of 70 marks.
3. Total allotted marks are 70 for each theory paper (V&VI).
4. Theory Question paper for GE is of 70 marks.
5. Total allotted marks are 100 for GE including internals.

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

1.6 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 Online tests will be conducted for DSC of 20 marks. The continuous internal assessment will have three sections.

Section – A 20 multiple choice questions each carries 1 mark (20 x 1 =20M),
Section – B Assignment – 5 Marks
Section – C Seminar – 5 Marks

Average of marks of these two online tests 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 30 Min and Semester exam duration will be of 2 1/2 hrs.

3. Model Question paper for Semester V and Semester VI was discussed. Theory and GE paper for each Semester will have 2 sections.

i) Section A contains 8 short Questions. The student has to answer six questions. Each Question carries 3 Marks (6X3=18 Marks)

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Commerce & Science

HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. III Year Semester – V
Microbiology Paper V – Molecular Biology and Microbial Genetics

Code: BS	**DSC-2E**
Instruction	
Theory Classes	**4 Hrs/Week**
Credit for Theory	**4**
Credit for Practical	**1**
Duration of semester examination	**2 1/2 hrs**
Duration of internal examination	**30 mins**
Semester examiuation marks	**70 marks**
Internal marks	**30 marks**

Learning Outcome: Students will understand concept of classical mendelian genetics, Structure of DNA, Replication of DNA, Mutagenesis, Gene expression, operon concepts and genetic engineering techniques.

UNIT - 1 -MICROBIAL GENETICS

1.2. Fundamentals of Genetics - Mendelian laws.Monohybrid, Dihybrid cross, Alleles, Crossing over and linkage.

1.3. DNA and RNA as genetic material-Griffiths transformation experiment ,Avery Macleod McCartey's Experiment, Hershey and Chase phage-labelling experiments, Tobacco mosaic virus.

1.4. Structure of DNA- Watson and Crick model.

1.5. Extra chromosomal genetic elements - Plasmids and Transposons.

1.6. Replication of DNA - Semi conservative mechanisms.

UNIT - 2 - MUTATIONS AND GENETIC RECOMBINATIONS

2.3. Mutations- Types of mutation-Spontaneous and induced, Base pair changes, substitution. Frameshift, Deletion, Inversion, Tandem duplication, Insertion.

2.4. Various physical and chemical and biological mutagens.

2.5. Outline of DNA damage and repair mechanism.

2.6. Brief account on gene transfer among bacteria- Transformation, Transduction and Conjugation.

UNIT - 3 - GENE EXPRESSION

3.1 Concept of gene- Muton, Recon and Cistron.

3.2. One gene- One enzyme, one gene -one polypeptide, one gene-one product hypothesis.

3.3.Types of RNA and their functions.

3.4. Outline of RNA transcription in prokaryotes- initiation, elongation, termination

3.5. Genetic code, Structure of Ribosomes and brief account on protein synthesis.

3.6.Types of genes- Structural, Constitutive, Regulatory

3.7.Operon concept, Regulation of gene expression in bacteria- Lac Operon.

UNIT - 4 - RECOMBINATION DNA TECHNOLOGY

4.1.Basic principles of genetic engineering - Restriction endonucleases.

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4.2. Enzymes used in genetic engineering-DNA polymerases and Ligases, Kinases, polymerases
4.3 outline of vectors-plasmid vector, Lambda phage vector
4.4. Outline of gene cloning methods.
4.5 .Genome and cDNA libraries
4.6 .General account on application of genetic engineering in industry, agriculture and medicine.

REFERENCE BOOKS

1. Freifelder, D.(1997). Essentials of Molecular Biology. Narosa Publishing House, New Delhi.
2. Crueger, W. and Cruesger, A.(2000). Biotechnology: A Text Book of Industrial Microbiology, Prentice- Hall of India Pvt. Ltd.,New Delhi.
3. Glick, B.P. and Pasternack, J.(1998). Molecular Biotechnology, ASM Press, Washington D.C.,USA.
4. Freifelder, D.(1990).Microbial Genetics. Narosa Publishing House, New Delhi.
5. Strickberger, M.W.(1967).Genetics. Oxford & IBH, New Delhi
6. Sinnot E.W., L.C.Dunn and T.Dobzhansky. (1958). Principles of Genetics. 5th Edition. McGraw Hill, New York.
7. Glazer, A.N. and Nikaido, H.(1995).Microbial Biotechnology- Fundamentals of Applied Microbiology, W.H.Freeman and company, New York.
8. Old,R.W. and Primrose, S.B.(1994) Principles of Gene Manipulation, Blackwell Science Publication, New york.
9. Verma, P.S. nad Agarwal, V.K.(2004).Cell Biology, Genetics, Molecular Biology, Evolution and Ecology.S.Chand & Co.Ltd., New Delhi.

Chairperson

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. III Year Semester – V
Microbiology Paper V

Practical Classes 3 Hrs/Week
Credit for Practical 1

CORE-V : Practicals: Molecular Biology and Microbial Genetics

1. Colorimetric estimation of proteins by Biuret method.
2. Colorimetric estimation of DNA by Diphenyl amine method.
3. Colorimetric estimation of RNA by Orcinol method.
4. Extraction of genomic DNA.
5. Extraction of plasmid DNA.
6. Separation and observation of genomic DNA by Agarose gel Electrophoresis.
7. Separation and observation of plasmid DNA by Agarose gel Electrophoresis.

Reference Books:

1. Experiments in Microbiology by K.R.Aneja.
2. GopalReddy.M.,Reddy. M.N., Sai Gopal, DVR and Mallaiah K.V.Laboratory Experiments in Microbiology.
3. Dubey, R..C and Maheshwari, D.K.Practical Microbiology, S.Channd and Co New Delhi.
4. Alcamo, I.E.Laboratory Fundamentals of Microbiology. Jones and Barlett Publishers, USA.
5. Mahy,, B.W.J. and Kangro, H.O. Virology- Methods Manual Academic Press,USA.
6. Burleson et al Virology- A Laboratory Manual. Academic Press, USA.

Chairperson

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B.Sc. III Year Semester – V
GENERAL ELECTIVE (GE)
TITLE - MICROBIOLOGY AND HUMAN HEALTH

Code: BS, GE	
Instruction	
Theroy Classes	**4 Hrs/Week**
Credit for Theory	**4**
Duration of semester examination	**2 1/2 hrs**
Duration of internal examination	**30 mins**
Semester examination marks	**70 marks**
Internal marks	**30 marks**

UNIT -1 - INTRODUCTION

1.1. Historic developments of Microbiology.
1.2. Contributions of Van Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Alexander Flemming
1.3. Types of Microorganisms, Morphological characteristics of bacteria
1.4. Culture media used for growth of microorganisms, Cultivation methods of bacteria, Staining methods.

UNIT - 2 - MICROORGANISMS: GOOD AND BAD

2.1. Microorganisms related to human health. Normal microbial flora, Human microbiome concept.
2.2. Bacterial disease: Typhoid, Tuberculosis, Syphilis.
2.3 Viral diseases: Flu, SARS, MERS, SARS-CoV-2, HIV
2.4. Insect borne: Malaria and Dengue.

UNIT - 3 - IMMUNITY AND HEALTH

1.1 Introduction to immune system.
1.2 Understanding the terms : Disease, Infection, Pathogenicity, Prophylaxis, Host resistance, Innate immunity and acquired immunity, Epidemics, Endemics and Pandemics.
1.3 Importance of probiotics for human health.
1.4 Types of vaccines and their importance.

UNIT - 4 - WASTE MANAGEMENT AND HEALTH HAZARDS

1.1 Health hazards associated with dumpage of Industrial and Biomedical waste.
1.2 National and international guidelines for the disposal of waste.
1.3 Guidelines of Central Pollution Control Board (CPCB).
1.4 Safe disposal and pretreatment of wastes.

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1.5 Mechanical and chemical treatment of the waste.
1.6 Autoclaving, incineration.

REFERENCES:

1. Michael J. Pelczar, Jr.E.C.S. Chan, Noel R. Krieg Microbiology Tata McGraw- Hill Publisher.
2. Prescott, M.J.,Harly, J.P and Klein Microbiology 5th Edition, WBC McGraw Hill, New York.
3. Madigan, M.T., Martinkl, J.M and Parker.j.Broch of Microorganisms, 9th Edition, MacMillan Press, England.
4. Dube, R.C. and Maheshwari, D.K.General Microbiology S Chand, New Delhi.
5. Ananthanarayan and Paniker. Textbook of Microbiology. Universities Press.

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CBCS STRUCTURE FOR 2020-2021 BATCH

B.Sc-BIOTECHNOLOGY/BIOCHEMISTRY, MICROBIOLOGY, CHEMISTRY

ACADEMIC YEAR 2020-2021

FINAL YEAR SEMESTER - V					Semester End Exam		Continuous Internal Evaluation		Total	Practical 3 hours
Code	Course Title	Course Type	HPW	Credits	Duration in Hours	Marks	Exam Duration	Marks		
BS501	**Microbiology and human health**	**GE**	**4**	**4**	**2 1/2**	**70**	**30 min.**	**30**	**100**	
BS502	English-v	CC-1E	3	3	2 1/2	70	30 min.	30	100	
BS503	Second Language-V	CC-2E	3	3	2 1/2	70	30 min.	30	100	
BS504	Biotechnology/Biochemistry-V	DSE-1E	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
BS505	**Molecular Biology & Microbial Genetics-V**	**DSE-2E**	**4T+3P =7**	**4+1=5**	**2 1/2**	**70**	**30 min**	**30**	**100**	**25**
BS506	Chemistry-V	DSC-3E	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
			31	25		420		180	600	

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CBCS STRUCTURE FOR 2020-2021 BATCH

B.Sc-BIOTECHNOLOGY/BIOCHEMISTRY, MICROBIOLOGY, CHEMISTRY

ACADEMIC YEAR 2020-2021

FINAL YEAR SEMESTER - VI					Semester End Exam		Continuous Internal Evaluation		Total	Practi 3 hour
Code	Course Title	Course Type	HPW	Credis	Duration in Hours	Marks	Exam Duration	Marks		
3S601	**Applied Microbiology/Project work**		**3T+ 3P**	**4**	**2 1/2**	**70**	**30 min.**	**30**	**100**	
3S602	English-vI	CC-1F	3	3	2 1/2	70	30 min.	30	100	
3S603	Second Language-VI	CC-2F	3	3	2 1/2	70	30 min.	30	100	
3S604	Biotechnology/Biochemistry-VI	DSE-1F	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
3S605	**Industrial Microbiology**	**DSE-2F**	**4T+3P =7**	**4+1=5**	**2 1/2**	**70**	**30 min**	**30**	**100**	**25**
3S606	Chemistry-V	DSC-3F	4T+3P =7	4+1=5	2 1/2	70	30 min	30	100	25
			31	25		420		180	600	

Chairperson University Nominee

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B.Sc. III Year, Semester – V

Microbiology Paper V -Microbial Omics

Code: BS	
Instruction	DSC -2E
Theory Classes	4 Hrs/Week
Practical Classes	3 Hrs/Week
Credit for Theory	4
Credit for Practical 1	
Duration of semester examination	2 1/2 hrs
Duration of internal examination	30 mins
Semester examination marks	70 marks
Internal marks	30 marks

Learning Outcome: Students will gain knowledge on molecular biology basics, Indetails about omics which include protein structures, and gains knowledge on molecular databases.

UNIT - 1 - INTRODUCTION TO OMICS

1.1. Introducton to molecular biology.
1.2. Structure of DNA,RNA.
1.3. Multi omics approach for analysis of Microbial biology: Genomics, Transcriptomics (RNA-Seq), Proteomics, Metabolomics, Metagenomics and their applications.
1.4. Basic Concepts in high throughput sequencing or Next- Generation Sequencing methods for use in food-microbiology, diagnostics and Human health.

UNIT - 2 - PROTEOMICS

2.1.Protein structure- Different levels of protein structure, Protein Folding and unfolding.
2.2.Protein secondary and 3D structure prediction methods.
2.3. X-ray crystallography, NMR and homology modeling.
2.4. Protein micro arrays- Protein Markers, Clinical Protemics, Protein engineering, Proteomic strategies in Cancer, Prions.

UNIT - 3 - GENOMICS

3.1. An introduction of functional genomics.
3.2 .Site-directed mutagenesis, Transposon mutagenesis, DNA microarray, RNA interference, and Chromatin immune precipitation.
3.3. Genome annotation, Applications of functional genomics in vaccine and drug designing. Genome editing tools such as CRISPR/Cas9.
3.4. Databases of Microbial Genomics; Microbial genome projects.

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UNIT - 4 -BIOINFORMATICS

4.1. Introduction to Bioinformatics and Molecular Databases,
4.2. Primary Databanks- NCBI, EMBL, DDBJ; Secondary Databases- UNIPORT; Structural Database- PDB.
4.3. Database similarity search(FASTA, BLAST)
4.4. Alignment: Pa.rwise and Multiple sequence alignment.
4.5. Whole genome sequence.
4.6. Genome Annotation and Gene Prediction.
4.7. Primer Designing ; Phylogenetic analysis and Tree construction.

REFERENCE BOOKS

1. Principles of Protein structure, Schultz, G.E., and Schirmer, R.H.Dr.ShakthiSahi.
2. Proteomics, Daniel C.Leibler.
3. Microbial Proteomic, MarjoPoutanen.
4. Proteins: Structures and Molecular Principles (2d ed.), TE Creighton
5. Organic spectroscopy, William kemp
6. Proteome Research: Two-Dimentional Gel Electrophoresis and Detection methods (Principles and Practice), T.Rabilloud (Editor), 2000, Springer Verlag
7. Introduction to Protein Architecture: The Structural Biology of Proteins, M.Lesk, 2001, Oxoford University Press.
8. Molecuar Biotechnology by Bernard R.Glick and Jack J Pasternak
9. DNA Microarrays Ed.M.Schena.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. III Year Semester – V
Microbiology Paper V

Practical Classes	**3 Hrs/Week**
Credit for Practical	**1**

PRACTICALS: MICROBIAL OMICS

1. Protein isolation from E.coli.
2. Sequence analysis of proteins (by BLAST, ClustalW and Phylip)
3. Protein structure predicition by Homology modeling.
4. Isolation of Genomic DNA from E.coli and its demonstration by OD and agarose electrophoresis.
5. Isolation of plasmid DNA from E.coli and its demonstration by OD and agarose electrophoresis.
6. DNA molecular size determination.
7. Primer designing using onine software.
8. PCR amplification of genes and detection of amplicon by agarose gel electrophoresis.

REFERENCE BOOKS

1. Molecular biotechnology by Chanarayppa
2. Methods in Molecular Cloning by Sambrook.
3. Gopal Reddy, M.,Reddy, M.N., Saigopal, DVR and Mallaiah, K.V.(2007). Laboratory, Experiments in Microbiolgy, 2nd edition, Himalaya Publishing House, Mumbai.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. III Year Semester – VI
TITLE -INDUSTRIAL MICROBIOLOGY

Code: DSE-2F	
Instruction	
Theroy Classes	**4 Hrs/Week**
Credit for Theory	**4**
Duration of semester examination	**2 1/2 hrs**
Duration of internal examination	**25 mins**
Semester examination marks	**70 marks**
Internal marks	**30 marks**

UNIT -1: MICROORGANISMS AND SELECTION

1.1. Introduction to Industrial Microbiology.
1.2. Microorganisms of industrial importance - Yeast, Molds, Bacteria, Actinomycetes.
1.3. Screening and Selection of industrially useful microbes.
1.4. Steps to maintain seed cuture and inoculation strategies for enchanced product yield.
1.5. Strain improvement strategies.
1.6. Immobilizationmethods- adsorption and entrapment.

UNIT - 2: FERMENTATION

2.1. Design of bioreactor,Physico-chemical strandards used in bioreactors.
2.2. Limitations of bioreactor, Fermentation equipment and its use.
2.3. Design of fermentor, types of fermenter, agitation, aeration, antifoam, pH and temperature control.
2.4. Stages of fermentation process.
2.5 Inoculation media and fermentation media
2.6 Raw materials used in fermentation industry and their processing, Down stream processing.

UNIT - 3: TYPES OF FERMENTATION

3.1. Types of fermentations: Batch, Fed batch, continuous types abd kinetics.
3.2. Submerged, Surface, Solid state, dual and multiple fermenations.
3.3. Advantages and disadvantages of solid substrate and liquid fermentations.
3.4. Fermentation, common microbial fermentation, alcohol and lactic acid fermentation.

UNIT-4 : MICROBIAL PRODUCTS

4.1. Industrial products derived from microbes: vitamins: B12; Vaccines: recombinant vaccines.
4.2. Production of beverages (beer and wine), biofuels (biogas and methane), enzymes (amylase), antibiotics (penicillin), aminoacids (glutamic acid), organic acid (citric acid).
4.3. Disposal of industrial waste.

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REFERENCES
1. Patel, A.H. (1984). Industrial Microbiology, Mac Milan India Ltd., Hyderabad.
2. Cassida,L.E.(1968). Industrial Microbiology, Wiley Eastern Ltd. & New Age International Ltd.,New Delhi.
3. Crueger,W. and Crueger, A.(2000).Biotechnology- A Text Book of Industrial Microbiology. Panima Publishing Corporation, New Delhi.
4. Reedy,G.(Ed) (1987), Prescott & Dunn's Industrial Microbiology, 4th edition, CBS Publishers & Distributors, New Delhi.
5. Reedy, S.R and SingaraCharya, M.A.(2007).A Text Book of Microbiology- Applied Microbiology, Himalaya Publishing House, Mumbai.
6. Singh,R.P.(2007). Applied Micccrobiology. Kalyani Punblishers, New Delhi.
7. Demain,A.L. ans Dvies,J.E.(1999). Manual of Industrial Microbiology and Biotechnology, ASM Preess, Washington,D.C.,USA

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. III Year Semester – VI
Microbiology Paper VI

Practical Classes 3 Hrs/Week
Credit for Practical 1

PRACTICALS:INDUSTRIAL MICROBIOLOGY

1. Screening for amylase producing microorganisms.
2. Screening for organic acid producing microorganisms.
3. Estimation of Ethanol by potassium dichromate method.
4. Production ofcitric acid by submerged fermentation.
5. Estimation of citric acid by titrimetry method.
6. Estimation of penicillin.
7. Bacterial slides- Bacillus, Lactobacillus, Yeast, Aspergillus, Pencillium.

REFERENCE BOOKS

8. Patel, A.H. (1984). Industrial Microbiology, Mac Milan India Ltd., Hyderabad.
9. Cassida,L.E.(1968). Industrial Microbiology, Wiley Eastern Ltd. & New Age International Ltd.,New Delhi.
10. Crueger,W. and Crueger, A.(2000).Biotechnology- A Text Book of Industrial Microbiology, Panima Publishing Corporation, New Delhi.
11. Reedy,G.(Ed) (1987), Prescott & Dunn's Industrial Microbiology, 4th edition, CBS Publishers & Distributors, New Delhi.
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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. III Year Semester – VI
TITLE -PHARMACEUTICAL MICROBIOLOGY

Code: DSE-2F	
Instruction	**4 Hrs/Week**
Theroy Classes	**4**
Credit for Theory	**2 1/2 hrs**
Duration of semester examination	**25 mins**
Duration of internal examination	**70 marks**
Semester examination marks	**30 marks**
Internal marks	

UNIT -1: INTRODUCTION TO CHEMOTHERAPY

1.1. History of chemotherapy- plants and arsenicals as therapeutics, Paul Ehrlich and his contributions, selective toxicity and target sites of drug action in microbes.

1.2. Development of synthetic drugs- Sulphanamides, antitubercular compounds, nitrofururons, nalidixic acid, metronidazole group of drugs..

UNIT - 2: ANTIBIOTICS

2.1. The origin, develpoment and definition of antibiotics as drugs, types of antibiotics and their classification.

2.2. Non-medical uses of antibiotics.

2.3. Principles of chemotherapy-Clinical and lab diagnosis, sensitivity testing, choice of drug, dosage, route of administration, combined / mixed multi drug therapy, control of antibiotic/ drug usage.

UNIT - 3: DRUG RESISTANCE

3.1. The phenomenon of drug resistance, clinical basis of drug resistance, biochemistry of drug resistance, genetics of drug resistance in bacteria.

3.2. Mode of action of important drugs- Cell wall inhibitors(Betalactam -e.g.Penicillin), membrane inhibitors (polymyxins), macromolecular synthesis inhibitors (streptomycin), antifungal antibiotics (nystatin)

UNIT-4 : MICROBIOLOGICAL ASSAYS

4.1.Assays for growth promoting substances, nutritional mutants and their importance.

4.2. Drug sensitivity testing methods and their importance.

4.3. Assay for antibiotics- Determination of MIC, the liquid tube assay, solid agar tube assay, agar plate assay (disc diffusion, agar well and cylinders cup method).

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1. Ananthanarayana, R.and Panicker, C.K.S.(2000).Text Book of Microbiology, 6th Edition, Oriental Longman Publications,USA.
2. Gupte,s.(1995).Short Text Book of Medical Microbiology, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd,New Delhi.
3. Biochemistry of antimicrobial action. Franklin, DJ. And Snow, GA.Pub: Chapman & Hall.
   Antibiotics and Chemotherapy. Garrod,L.P.,Lambert, HP. And C'Grady, F.(eds).
   Publ; Churchill Livingstone.
4. Antiibiotics. Lancini, G. and Parenti, F.publ;Springer- Verlag.
   The Molecular Basis of antibiotic action. Ga.e,EF.Et al.Publ: Wiley, New York.
   Antimicrobial Drug action.Williams, RAD., Lambart, PA. & Singleton, P.Pub: Bios Sci.
   Microbiological Assays.Hewitt.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. III Year Semester – VI
Microbiology Paper VI

Practical Classes	**3 Hrs/Week**
Credit for Practical	**1**

PRACTICALS: PHARMACEUTICAL MICROBIOLOGY

1. Tests for disinfectants (Phenol coefficient/ RWC)
2. Determination of antibacterial spectrum of drugs/antibiotics
3. Chemical asaays for antimicrobial drugs.
4. Testing for antibiotic/ drug sensitivity/ resistance.
5. Detremination of MIC for antimicrobial compouns.
6. Microbiological assays for antibiotics(Liquid tube assay, agar tube assay, agar plate assays)

REFERENCE BOOKS

1. Disinfection, sterilization and preservation. Block, s.s.(ed). Lea and Febigor, Baltimore
2. Pharmaceutical Microbiology. Huge, W.B. and Russel, AD.Blackwell Scientific, Oxford
3. Inhibition and destruction of microbial cell by Hugo, WB.(ed). Pub: Academic Press, NY
4. Manual of Clinical Microbiolog. Lennette, EH.(ed). Pub: American Society for Microbiology, Washington.
5. Principles and Practices of disinfection. Russell, AP., Hugo, WB., and Ayliffe, GAJ.(eds). Publ. Blackwell Sci.
6. Biochemistry of antimicrobial action. Franklin, DJ. And Snow, GA.Pub: Champman & Hall.
7. Antibiotics and Chemotherapy. Garrod, L.P., HP. AndGrady, F.(eds). Publ: Churchill Livingstone.
8. The Molecular Basis of antibiotic action. Ga.e, EF.Et al. Publ: Wiley, New York.
9. Antimicrobial Drug action. Williams, RAD.,Lambart, PA. & Singleton, P.Pub: Bios Sci.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. III Year Semester – VI
TITLE -APPLIED MICROBIOLOGY
ELECTIVE AGAINST PROJECT

Code: BS	
Instruction	
Theroy Classes	**3 Hrs/Week**
Credit for Theory	**3**
Duration of semester examination	**2 1/2 hrs**
Duration of internal examination	**25 mins**
Semester examination marks	**70 marks**
Internal marks	**30 marks**

UNIT -1: MICROBIAL PRODUCTS FOR SMALL SCALE ENTREPRENEURS

1.1.Maintenance of type strains of microorganisms: culture collectioncentres (MTCC, ATCC).
1.2.Patenting process and IPR.
1.3.Microorganisms in agriculture.
1.4.Nitrogen and phosphate solubilization.
1.5.Biofertilizers- Producction of azolla, rhizobium and mycorrhizae.
1.6.Biofungicides- Mass production of Trichoderma and Pseudomonas.
1.7.Biopesticides- Bacterial, fungal and viral.

UNIT-2: METABOLIC ENGINEERING FORMICROBIALL PRODUCTS

2.1. Production of microbial pigments (prodigiosin, violacein, monascin).
2.2. Bacterial and algal carotenoids.
2.3.Microorganisms for flavor and aroma production.
2.4.Biotransformation and metabolic engineering of microorganisms to produce compounds such as esters, terpenes, aldehydes, lactones,geosmin, vanillin and coumarin.

UNIT - 3: MICROBIAL DIAGNOSTICS AND HEALTH

3.1. Diagnostic microbiology- collection, transport and culturing of clinical samples.
3.2.Preparation and use of culture media for detection of microbial pathogens.
3.3.Examination of samples by staining- Gram stain, Ziehl- Neelsoen staining for tuberculosis,
3.4.Blood smear for malarial parasite.
3.5.Serological methods for rapid detection of bacterial, fungal and viral pathogens.
3.6.Techniques used for the diagnosis of hospital acquired infections and multi drug resistant microorganisms.
3.7.Monitoring of sanitation in community- Biohazard disposal.

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REFERENCES:

1. Stanbury, P.F., Whitaker, A. and Hall, S.J.(1997). Principles of Fermentation Technology, Aditya Books (P) Ltd. New Delhi.
2. Rangaswami, G. and Bhagyaraj, J.(2001). Agriculture Microbiology, 2nd Edition, Prentice Hall of India, New Delhi.
3. Atlas, r.m. NAD Bartha, R.(1998). Microbial Ecology- Fundamentals and Applications, Addison Wesley Longman, Inc., USA.
4. Ananthanarayana R nad Paniker CKJ (2009). Textbook of Microbiology, 8th edition, Universities Press PRIVATE Ltd.
5. Brooks G.F., Carroll K.C., Butel J.S., Morse S.A and Mietzner, T.A.(2013) Jawetz, Melnick and Adelberg's Medical Microbiology. 26th edition.McGraw Hill Publlication.
6. Randhawa,VS, Mehta G and Sharma KB (2009) Practicals andViva in Medical Microbiology 2nd Edition, eLSEVIER India Pvt Ltd.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc. III Year Semester – VI
Microbiology Paper VI

	3 Hrs/Week
Practical Classes	1
Credit for Practical	

PRACTICALS: APPLIED MICROBIOLOGY

1. Isolation and enumeration of Rhizosphere microorganisms.
2. Isolation of Rhizobium from leguminous root nodules.
3. Staining and obseravtion of mycorrhizal fungi.
4. Mass production of Rhizobium, Mycorrhizae, Trichoderma and Pseudomonas using different carriers/ substrates and methods to assay quality control of bioproducts.
5. Grams staining
6. Ziehl-Nielsen staining
7. Blood smear.

REFERENCE BOOKS

1. Aneja, K.R.(2001). Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Production Technology, 3rd Edition, New Age International (P) Ltd.,New Delhi.
2. Dubey, R.C. and Maheswari, D.K.(2002). Practical Microbiology, S.Chand & Co., New Delhi.
3. Atlas, R.M. and Bartha, R. (1998). Microbial Ecology- Fundamentals and Applications, Addison Wesley Longman, Inc., USA.

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
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B.Sc. III Year Semester – VI

TITLE: PROJECT

Code: BS **5 HPW- Credits- 4**

1. Number of students who will be offered project work will vary batch to batch depending upon the infrastructural facilities and may vary each year (Not exceeding 5 students per group)
2. Project work will involve experimental work and the student will have to complete this in stipulated time
3. The final evaluation of the project work will be through a panel involving internal and eexternal examiners.
4. Students will be asked their choice for project work at the beginning of VI Semester and all formalities of the topic and mentorselection wil be completed.

Project work will be offered in lieu of expertise and infrastructural facilities of the department and will be evaluated for 4 credits.

5. The distribution of marks for project work will be:

Project work: 100 Marks (50 marks for dissertation + 25 marks for reserch skills + 25 marks for research work presentation.

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(AUTONOMOUS)

B.Sc Microbiology- IIIrd Year

Semesters – V - Paper – V

Theory Model Question Paper

Time: 2 1/2 hrs **Max. Marks: 70**

SECTION A

I Write short notes on any Six of the following: **6X3 =18 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 Answer all the Questions. **4 X 13= 52 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

12 (a)A question from Unit IV

(OR)

(b) A question from Unit IV

Chairperson **University Nominee**

Dr. B. BHIMA, M.Sc.,Ph.D.
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Members **Principal**

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc Microbiology- 3rd Year
Semester – V - Paper – V
Practical Model Question Paper

Time: 3 hrs **Max. Marks: 25**

I.	Major experiment	(10 Marks)
II.	Minor experiment	(5 Marks)
III.	Spotting 1) 2) 3) 4) 5)	(5 Marks)
IV.	Viva & Record	(5 Marks)

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

J. Pallavi

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B.Sc Microbiology- 3rdYear
Semesters – VI- Paper – VI
Theory Model Question Paper

Time: 2 1/2 hrs **Max. Marks: 70**

SECTION A

I Write short notes on any Six of the following: **6X3 =18Marks**

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 Answer all the Questions. **4 X 13= 52 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.

12 (a)A question from Unit IV
(OR)
(b) A question from Unit IV

Chairperson

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD

(AUTONOMOUS)

B.Sc Microbiology- III Year

Semester – VI- Paper – VI

Practical Model Question Paper

Max. Marks: 25

Time: 3 hrs

I. Major experiment	**(10Marks)**
II.Minor experiment	**(5 Marks)**
III.Spotting	**(5 Marks)**
1) 2) 3) 4) 5)	
IV.Viva & Record	**(5 Marks)**

Chairperson

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HINDI MAHAVIDYALAYA, NALLAKUNTA, HYDERABAD
(AUTONOMOUS)
B.Sc Microbiology- 3rdYear
Semesters – VI- Paper – VI
GE Model Question Paper

Time: 2 1/2 hrs **Max. Marks: 70**

SECTION A

I Write short notes on any Six of the following: **6X3 =18Marks**

9. A question from Unit I
10. A question from Unit I
11. A question from Unit II
12. A question from Unit II
13. A question from Unit III
14. A question from Unit III
15. A question from Unit IV
16. A question from Unit IV

SECTION B

4 X 13= 52 Marks

II Answer all the Questions.

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

12 (a)A question from Unit IV
(OR)
(b) A question from Unit IV

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(AUTONOMOUS)

B.Sc Microbiology-IIIrd Year

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