NAGARJUNA GOVERNMENT COLLEGE

(AUTONOMOUS)

NALGONDA

(Re-Accredited with NAAC "A"GRADE)

SYLLABUS

CHOICE BASED CREDIT SYSTEM

SEMESTER PATTERN

B.Sc. Microbiology

(Students admitted from 2019- 20 onwards)

NG. 70+30+50

NAGARJUNA GOVERNEMENT COLLEGE NALGONDA
(AUTONOMOUS)
(Re-Accredited with NAAC "A"GRADE)

Date .10. 2019

To
The Principal
N.G.College
Nalgonda.

Sir ,

Sub:-Grant of Autonomous Status – Constitution of **Board of Studies** in Microbiology Department- Request for Approval-Reg.

Ref:-

1.) No.F.22-1/2007(AC)Dt:3rd April 2007
2.) OU Lr.mr.69/H/2007/Acad.Dt.12-06-2007
3.) GO RT.No.467 HE.(CE-1)Dept.Dt.29-06-2007.
4.) MGU Lr.69 /MGU/NLG/2017-18,Dt.13-08-2019.

***

With Reference to the Subject cited above ,I am submitted the list of members of Board of Studies for Academic Years 2018-19 for your Approval.

S.NO	NAME	DESIGNATION
1.	**Sri, B.Nagaraju** **Asst.Prof of microbiology** IDept of Microbiology N.G. College, Nalgonda.	**CHAIRPERSON**
2.	Dr.T. Thirumala Asst. Prof of Biochemistry, MGU, Nalgonda.	**UNIVERSITY NOMINEE**
3.	Smt . Deva Vani Asst. Prof. of Microbiology, GDC(W),Nalgonda	**SUBJECT EXPERT**
4.	Dr.Ramachander Subject Expert Asst.Prof. of biochemistry, MGU, Nalgonda.	**SUBJECT EXPERT**
5.	**B.Rupa,** Lecturer in Microbiology	**FACULTY MEMBER**

Submitted by

Chairman BOS
Dept.of Microbiology

CHAIRMAN
Board of Studies
Dept. of Microbiology
Nagarjuna Government College (A)
Nalgonda (TS)- 508 001

Proposal Approved

Principal/Chair Person Acad.Council

NAGARJUNA GOVERNEMENT COLLEGE NALGONDA
(AUTONOMOUS)
(Re-Accredited with NAAC "A"GRADE)
B.Sc. Microbiology
(Applicable to the students admitted in 2019-20& AFTER)

Summary of Credits

S.No	Course Category	No.Of Courses	Credits Per Course	Credits
01	**AECC**	2	2	4
02	**SEC**	04	2	8
03	**CC**	08	5	40
04	**DSC**	12	5	60
05	**DSC**	06	4	24
06	**DSE**	06	4	24
07	**GE**	2	2	4
08	**TOTAL**	40		164
09	**OPTIONALS**	24		108

AECC- Ability Enhancement Compulsory Course
SEC – Skill Enhancement Course
DSC – Discipline Specific Course
DSE – Discipline Specific Elective
GE – Generic Elective

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B.Sc. Microbiology
(Applicable to the students admitted in 2019-20& AFTER)

S.No	Course Title	Course Type	Credits
	SEMESTER-1		
01	Communication	AECC-1	
02	English		
03	Second Language		
04	General Microbiology	DSC-1	5
05	Optional-II		
06	Optional-III		
	SEMESTER-2		
07	Environmental studies	AECC-II	
08	English		
09	Second Language		
10	General Microbiology-II	DSC-1B	5
11	Optional-II		
12	Optional-III		
	SEMESTER-3		
13	SEC	SEC-I	2
14	English		
15	Second Language		
16	Microbial Physiology And Enzymology	DSC-IC	5
17	Optional-II		
18	Optional-III		
	SEMESTER-4		
19	SEC	SEC-II	2
20	English		
21	Second Language		
22	Microbial Genetics And Molecular Biology	DSC-1D	5
23	Optional-II		
24	Optional-III		
	SEMESTER-5		
25	SEC	SEC-III	2
26	Generic Elective	GE-1	2
27	Applied Microbiology	DSC-1E	4
27	Optional-II		
28	Optional-III		
29	A-Immunology	DSE-1E	4
30	B-Pharmaceutical Microbiology		
31	Optional-II-A/B/C		
32	Optional-III-A/B/C		

	SEMESTER-6		
33	SEC	SEC-IV	2
34	Generic Elective	GE-2	2
35	Medical Microbiology	DSC-1F	4
36	Optional-II		
37	Optional-III		
38	A-Food Microbiology B-Industrial Microbiology	DSE-1F	4
39	Optional-II-A/B/C		
40	Optional-III-A/B/C		
41			**164**

Proposal Approved

Chairman, BOS
Dept.of Microbioogy

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Principal/Chair Person
Academic Council

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NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA

(Autonomous),

Reaccredited by NAAC with "A" GRADE

DEPARTMENT OF MICROBIOLOGY

BOARD OF STUDIES MEETING -2019-20

The Board of Studies in the Department of Microbiology has been constituted with the following members for the Academic year **2019-2020**

S.No.	Composition of B.O.S	Name and Designation
1.	Chairman ,Board of studies	**Sri.B. Nagaraju** Head&Asst. Prof. Dept.of microbiology Nagarjuna Government College Nalgonda.
2.	University Nominee,Nominated By Vice-Chanceller	**Dr.T. Thirumala** University Nominee Asst. Prof of Biochemistry, MGU, Nalgonda.
3.	Subject Experts- from outside the College nominated by Principal	1.**Smt. Deva Vani** Subject Expert Asst. Prof. of Microbiology, GDC(W),Nalgonda. 2. **Dr.Ramachander** Subject Expert Asst.Prof. of biochemistry, MGU, Nalgonda.
4.	Members: All the faculty members of the Department	Kum.B.Rupa, Guest faculty in Microbiology N.G.College,Nalgonda.

PRINCIPAL

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA

(Autonomous),
Reaccredited by NAAC with "A" GRADE
DEPARTMENT OF MICROBIOLOGY
BOARD OF STUDIES MEETING -2019

The Board of Studies Meeting of Microbiology department is being held Today i.e On_____ in the Department of Microbiology under the Chairmanship of Sri . B . Nagaraju, Head ,Department Of Microbiology to discuss the following Agenda and to formulate certain Resolutions.

Agenda:

1. To continue **CBCS**(Choice based credit system),introduced during the academic year 2014 -15.

2. To approve the syllabus of B.Sc. II,and III year(all papers) & new syllabus for B.Sc I year from 2019-20 academic year onwards .

3. To approve to conduct two (2) internal assessments for 30 marks, twice in a semester,each in the form of (20 marks for written examination,5 marks for assignment and 5 marks for student seminar)for the students admitted during 2019-20 & after.

4. To continue the **Pass Percentage as (40%)** for **CBCS** students.

5. To approve the **Model Question Papers** for **BSc microbiology** I, II, III, IV,V and VI Semesters .

6. To approve the Semester End Examinations - **70 marks for I,II,III Year students (CBCS)** and to conduct **Practical examinations for 50 marks at the semester end**(I,II,III ,VI,V&VI)

7. To approve to continue, **Certificate Course Diagnostic Microbiology** -4 months duration)

8. To approve the Panel of **Paper Setters and Examiners** for evaluation of papers.

9. To approve the skill enhancement course(SEC- I) for III Semester & **SEC II** for IV &VI Semesters.

10.To approve the examination pattern for SEC –I&SEC-II& SEC -III.

Members :

1. **Sri B. Nagaraju,**
   Chairman , Board of Studies,
   Asst.prof of microbiology
   Department Of Microbiology,
   N.G College , Nalgonda.

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Nalgonda (TS) - 508 001

2. Dr.T. Thirumala
   University Nominee
   Asst. Prof of Biochemistry,
   MGU, Nalgonda.

4 .Smt . Deva Vani
Subject Expert
Asst. Prof. of Microbiology,
GDC(W),Nalgonda.

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5. 2. Dr.Ramachander
   Subject Expert
   Asst.Prof. of biochemistry,
   MGU, Nalgonda.

6. kum.B.Rupa, Guest Faculty, N.g college , Nalgonda.

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA
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DEPARTMENT OF MICROBIOLOGY

BOARD OF STUDIES MEETING -2019

Resolutions:

1. Approved to continue **CBCS(Choice based credit system)**,introduced during the academic year 2014 -15 for the academic year 2019-20.

2. Approved the **syllabus of B.Sc. II,and III year(All papers) and new syllabus for** B.Sc I year (sem-i&sem-ii) .

3. Approved to conduct two (2)**internal assessments for 30 marks** twice in a semester,each in the form of (20 marks for written examination,5 marks for assignment and 5 marks for student seminar)for the students admitted during 2019-20& after.

4. Approved the **Pass Percentage** for **CBCS** (**40%**)

5. Approved the **Model Question Papers** for **CBCS** I, II, III, IV, V and VI Semesters ,

6. Approved the Semester-End Examinations -CBCS Pattern – theory exam for **70 marks ,** and **practical examinations for 50 marks at the semester end** (forI,II,IIIYr)

7. Approved to continue **Diagnostic microbiology, Certificate Course** of 4 months Duration

8. Approved the panel of **Paper Setters and Examiners** for evaluation of papers.

9. Approved the skill enhancement course(SEC- I) Medical Diagnostics for III Semester & **(SEC II) Food Adulteration /or Apiculture** for IV Semester ,**SEC-III**- Biofertilizers Or Nursery And Gardening in vi semester .

10. Approved the Scheme of examination for SEC-I,II&III i.e. for III ,VI&VI semester Students As follows:**10 Marks Internal Exam** And **Written Examination for 40 Marks.**

Members :

1. **Sri B. Nagaraju,**
   Chairman , Board of Studies,
   Asst.prof of microbiology
   Department Of Microbiology,
   N.G College , Nalgonda.

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   University Nominee
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   MGU, Nalgonda.

4 .Smt . Deva Vani
Subject Expert
Asst. Prof. of Microbiology,
GDC(W),Nalgonda.

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5. 2. Dr.Ramachander
   Subject Expert
   Asst.Prof. of biochemistry,
   MGU, Nalgonda.

6. kum.B.Rupa, Guest Faculty, N.g college , Nalgonda.

B.Sc. Microbiology I Year Syllabus

(Applicable to the students admitted in 2019-20&After)
I Year B.Sc. (Microbiology)CBCS
SEMESTER-I
Paper I: INTRODUCTORY MICROBIOLOGY-I

Paper Title: Introductory Microbiology 4HPW-credits: 4

1st Credit: Introduction

Microbiology: Definition and scope. History of microbiology: Contribution of Antony Van Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Iwanoswky, Beijernik, Winogradsky and Alexander Fleming.

Microbiological Techniques: Sterilization and Disinfection - Physical methods (dry and moist heat), filtration, radiation. Chemical methods (alcohols, phenols, aldehydes, fumigants)

2nd Credit: Microscopy and Staining methods

Principles and applications of Microscopy-Bright field, Dark field, Phase-contrast, Fluorescent and Electron microscopy (SEM and TEM). Ocular and stage micrometry.

Principles and types of stains-Simple stain, Differential stain, Negative stain.

Structural stain: spore, capsule, flagella

3rd Credit: Classification, Isolation and Identification of Microorganisms

Classification of living organisms; Haeckel, Whittaker and Carl Woese systems.

Differentiation of prokaryotes and eukaryotes. Classification and identification of bacteria as per the second edition of Bergey's manual of systematic bacteriology. Classification of protozoa, microalgae and fungi.

Growth media – synthetic, semi- synthetic, selective, enrichment and differential media.

Isolation of Pure culture techniques - Enrichment culturing, Dilution plating, streak plate, spread plate, Micromanipulator. Preservation of Microbial cultures – Sub culturing, overlaying cultures with minerals oils, sand cultures, lyophilization, storage at low temperature.

4th Credit: Structure and General Characteristics of Microorganisms

General characteristics of prokaryotes: Bacteria, Archaea bacteria. Rickettsia, Mycoplasma, Cyanobacteria and Actinomycetes. Ultra structure of bacterial cell: cell wall, cell membrane, ribosomes, nucleoid, capsule, flagella, fimbriae, endospores & storage granules.

General characteristics of eukaryotes: protozoa, microalgae and fungi.

General characteristics and classification of virus. Morphology and structure of lambda bacteriophage (lytic and lysogeny), TMV and HIV. 2

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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, WCB Mc GrawHill, New York.

3. Madigan, M.T., Martinkl, J.M and Parker,j. Broch Biology of Microorganism, 9th Edition, MacMillan Press, England.

4. Dube, R.C. and Maheshwari, D.K. General Microbiology S Chand, New Delhi.

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I-Semester Practical Paper-I

Introductory Microbiology **2HPW-Credits-1**

5th Credit: Practicals

1. Compound microscope and its handling.
2. Sterilization techniques: Autoclave, Hot air oven and filtration
3. Calibration of microscope by ocular , stage micrometer and measurement of bacterial and fungal spores.
4. Simple and differential staining (Gram staining), Spore staining, capsule staining and flagellar staining.
5. Microscopic observation of bacteria (Gram positive bacilli and cocci, Gram negative bacilli), cyanobacteria (Nostoc, Spirulina), fungi (Saccharomyces, Rhizopus, Aspergillus, Penicillium)
6. Bacterial motility: hanging drop method
7. Preparation of culture media: Solid/Liquid.
8. Isolation of bacteria by serial dilution and pure cultures methods (streak, spread and pour plate techniques)
9. Preservation of microbial cultures- Slant, Stab, mineral oil overlay and glycerol stocks
10. Bacterial biochemical identification-IMViC test, carbohydrate fermentation test

References:

1. Experiments in Microbiology by K.R. Aneja.
2. Gopal Reddy.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. Chand and Co New Delhi.
4. Alcamo, I.E. Laboratory Fundamentals of Microbiology. Jones and Bartlett Publishers, USA.

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B.Sc. Microbiology I Year Syllabus

(Applicable to the students admitted in 2019-20)

I Year B.Sc. (Microbiology)

SEMISTER-II

Paper II: INTRODUCTORY MICROBIOLOGY-II

B.Sc I year: II Semester Paper-II Theory

Title: Microbial Physiology and Biochemistry **4HPW-credits-4**

1st Credit: Microbial nutrition and growth

Microbial Nutrition, Uptake of nutrients by cell. Nutritional groups of microorganisms – Autotrophs, Heterotrophs, Mixotrophs, Methylotrophs. Photosynthetic apparatus in prokaryotes.

Bacterial growth – Different phases of growth, factors influencing bacterial growth. Synchronous, Continuous, Biphasic Growth. Methods for measuring microbial growth – Direct Microscopic, Viable count, Turbidometry.

2nd Credit: Microbial metabolism

Bacterial photosynthesis: Outline of oxygenic and anoxygenic photosynthesis in bacteria.

Microbial respiration – Aerobic: Glycolysis, HMP Pathway, ED Pathway , TCA Cycle and Anaplerotic reactions, Electron transport, Oxidative and Substrate level phosphorylation. Glyoxylate cycle, Anaerobic respiration (Nitrate and Sulphate).

3rd Credit: Biomolecules

Classification and characteristics of carbohydrates (Monosaccharides, disaccharides and polysaccharides). General characteristics of amino acids and proteins, fatty acids (saturated and unsaturated) and lipids (sphingo lipids, sterols and phospholipids). Structure of nitrogenous bases, nucleotides and nucleic acids.

Properties and Classification of enzymes. Biocatalysis – Induced fit and Lock & Key Model, Coenzymes, Co-factors. Factors effecting enzyme activity.

4th Credit: Biochemical techniques

Hydrogen ion concentration in biological fluids. pH measurement. Types of buffers and their uses in biological reactions. Principles and application of colorimetry and chromatography (paper and thin layer). Principles and applications of Electrophoretic techniques- Agarose gel electrophoresis and SDS PAGE

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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, WCB Mc GrawHill, New York.

3. Madigan, M.T., Martinkl, J.M and Parker,j. Broch Biology of Microorganism, 9th Edition, MacMillan Press, England.

4. Dube, R.C. and Maheshwari, D.K. General Microbiology S Chand, New Delhi.

5. Voet, D Biochemistry WCB. Mc GrawHill, Iowa

6. N.J. Dimmock, A.J Easton, and K.N. Leppard. Introduction to Modern Virology. Blackwell Publishing.

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II-Semester Practical Paper – II

Microbial Physiology and Biochemistry **2 HPW- CREDITS-1**

5th Credit: Practicals

1. Setting up of Winogradsky's column
2. Cultivation of photosynthetic bacteria
3. Determination of viable count of bacteria
4. Turbidometric measurement of bacterial growth curve
5. Factors affecting bacterial growth – pH, temperature, salts
6. Qualitative tests for carbohydrates and amino acids
7. Determination of pH
8. Preparation of Buffers
9. Colorimetry - Principles, laws, determination of absorption maxima
10. Paper chromatography-separation of sugars/amino acids

References:

1. Experiments in Microbiology by K.R. Aneja.

2. Gopal Reddy.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. Chand and Co New Delhi.

4. Alcamo, I.E. Laboratory Fundamentals of Microbiology. Jones and Bartlett 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.

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B.Sc. Microbiology II Year Syllabus

(Applicable to the students admitted in 2018-19)

SEMISTER-III

Paper III: MICROBIAL PHYSIOLOGY (Theory)

UNIT – I MICROBIAL NUTRITION

Microbial nutrition - nutritional requirements and uptake of nutrients by cells. Nutritional groups of microorganisms - autotrophs, heterotrophs, mixotrophs, methylotrophs. 5 Hrs

Growth media - synthetic, nonsynthetic, selective, enrichment and differential media.

UNIT-II MICROBIAL GROWTH

Microbial growth - different phases of growth in batch cultures. 6 Hrs

Factors influencing microbial growth. 2 Hrs

Synchronous, continuous, biphasic growth. 3 Hrs

Methods for measuring microbial growth – Direct microscopy, viable count estimates, turbiodometry, biomass. 4 Hrs

UNIT-III - & -ENZYMES

Enzymes - properties and classification, enzyme unit. 3 Hrs

Biocatalysis - induced fit, and lock and key model, coenzymes, cofactors, factors affecting catalytic activity of enzymes. 4 Hrs

Inhibition of enzyme activity - competitive, noncompetitive, uncompetitive and allosteric. 3 Hrs

UNIT – IV MICROBIAL METBOLISM AND PHOTOSYNTHESIS

Aerobic respiration - Glycolysis, HMP pathway, ED pathway, TCA cycle, electron transport, oxidative and substrate-level phosphorylation. Anaplerotic reactions. β-Oxidation of fatty acids. Glyoxylate cycle. 13 Hrs

Anaerobic respiration (nitrate, sulphate respiration). 7 Hrs

Fermentation - Common microbial fermentations with special reference to alcohol and lactic acid fermentations. 5 Hrs

Photosynthetic apparatus in prokaryotes. Outlines of oxygenic and anoxygenic photosynthesis in bacteria. 5 Hrs

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References:

1. Gottschalk, G. (1986). Bacterial Metabolism, Springer-Verlag, New-York.
2. Caldwell, D.R. (1995). Microbial Physiology and Metabolism, W.C. Brown Publications, Iowa, USA.
3. Moat, A.G. and Foster, J.W. (1995). Microbial Physiology, John-Wiley, New York.
4. White, D. (1995). The Physiology and Biochemistry of Prokaryotes, Oxford University Press, New York.
5. Reddy, S.R. and Reddy, S.M. (2004). Microbial Physiology, Scientific Publishers, Jodhpur, India.
6. Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). Principles of Biochemistry, 2nd Edition, CBS Publishers and Distributors, New Delhi.
7. Elliot, W.H. and Elliot, D.C. (2001). Biochemistry and Molecular Biology, 2nd Edition, Oxford University Press, U.S.A.

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LAB – III: MICROBIAL PHYSIOLOGY (Practicals) 45 Hrs

1. Preparation of media for culturing autotrophic and heterotrophic microorganisms - Algal medium, mineral salts medium, nutrient agar medium, McConkey agar, and blood agar.
2. Enrichment culturing and isolation of phototrophs and chemoautotrophs.
3. Setting and observation of Winogradsky column.
4. Determination of viable count of bacteria.
5. Turbidometric measurement of bacterial growth.
6. Bacterial growth curve.
7. Factors affecting bacterial growth – pH, temperature, salts.

References:

1. Wilson, K. and Walker, J. (1994). Practical Biochemistry. 4th Edition, Cambridge University PressEngland.
2. Sawhney, S.K. and Singh, R. (2000). Introductory Practical Biochemistry, Narosa Publishing House, New Delhi.
3. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology. S. Chand & Co. Ltd., New Delhi.
4. Plummer, D.T. (1988). An Introduction to Practical Biochemistry. 3rd Edition, Tata Mc GrawHill New Delhi.
3. Reddy, S.M. and Reddy, S.R. (1998). Microbiology – Practical Manual, 3rd Edition, Sri Padmavathi Publications, Hyderabad.
4. Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.
7. Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion
I.K. International Pvt. Ltd
8. Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). Laboratory Experiments
in Microbiology, . Himalaya Publishing House, Mumbai.

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B.Sc. Microbiology II Year Syllabus

(Applicable to the students admitted in 2019-20)

II Year B.Sc. (Microbiology)

III Semester Skill Enhancement Course

Medical Diagnostics

2Credits

Unit I: Introduction to medical diagnostics, Diagnostic methods for analysis of blood and urine

1.1 Introduction to medical diagnostics and its importance

1.2 Blood composition, Leishman's staining, Platelet count using haemocytometer, Erythrocyte sedimentary Rate (ESR) ,packed cell volume(P.C.V)

1.3 Urine analysis Physical characteristics, abnormal constituents.

Unit II: Non-infection , Infection diseases & Tumours

1.1 Non-infection diseases –causes, types, symptoms, complications,

1.2 diagnosis and

prevention of diabetes (type-I&II), Hypertension (Primary &secondary), testing of blood glucose using glucometer/ kit.

1.2 Infectious diseases- causes, types, symptoms complication, diagnosis and prevention of tuberculosis and hepatitis.

1.3 Tumours – Types (Benign) Malignant) , detection & metastasis.

Suggested Readings:

1. Prakash, G.(2012). Lab Manual on Blood analysis and Medical Diagnostics. S. Chand and Co. Ltd., New Delhi.

Suggested Readings:

1. Prakash, G.(2012). Lab Manual on Blood analysis and Medical Diagnostics. S. Chand and Co. Ltd., New Delhi.

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B.Sc. Microbiology II Year Syllabus

(Applicable to the students admitted in 2018-19)

II Year B.Sc. (Microbiology)

SEMISTER-IV

Paper IV : MICROBIAL GENETICS

UNIT – I

DNA and RNA as genetic materials. 8 Hrs
Structure of DNA – Watson and Crick model. 2 Hrs
Extrachromosomal genetic elements – Plasmids and transposons. 2 Hrs
Replication of DNA – Semiconservative mechanism. 3 Hrs
Outlines of DNA damage and repair mechanisms. 4 Hrs

UNIT-II

Mutations – spontaneous and induced, base pair changes, frame shifts, deletions, inversions, tandem duplications, insertions. 4 Hrs
Various physical and chemical mutagens. 2 Hrs
Brief account on horizontal gene transfer among bacteria – transformation, transduction and conjugation. 5 Hrs

UNIT – III

Concept of gene – Muton, recon and cistron. One gene-one enzyme, one gene-one polypeptide, one gene-one product hypotheses. 4 Hrs
Types of RNA and their functions. 2 Hrs
Outlines of RNA biosynthesis in prokaryotes. 3 Hrs
Genetic code. Structure of ribosomes and a brief account of protein synthesis. 4 Hrs
Types of genes – structural, constitutive, regulatory. 2 Hrs
Operon concept. Regulation of gene expression in bacteria – *lac* operon. 3 Hrs

UNIT-IV

Basic principles of genetic engineering - restriction endonucleases, DNA polymerases and ligases, vectors. 3 Hrs
Outlines of gene cloning methods. 2 Hrs
Genomic and cDNA libraries. 3 Hrs
General account on application of genetic engineering in industry, agriculture and medicine. 4 Hrs

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References:

1. Freifelder, D. (1997). Essentials of Molecular Biology. Narosa Publishing House, New Delhi.
2. Crueger, W. and Crueger, 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. and Agarwal, V.K. (2004). Cell Biology, Genetics, Molecular Biology, Evolution and Ecology. S. Chand & Co. Ltd., New Delhi.

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LAB – IV: MICROBIAL GENETICS (Practicals) 45 Hrs

1.Colorimetric estimation of proteins by Biuret / Lowery method.
2.Colorimetric estimation of DNA by Diphenyl amine method.
3. Colorimetric estimation of RNA by Orcinol method
4. Extraction of genomic DNA
5. Agarose gel Electrophoresis
6. Problems related to DNA and RNA characteristics, Transcription and Translation

References:

1. Wilson, K. and Walker, J. (1994). Practical Biochemistry. 4th Edition, Cambridge University Press, England.

2. Sawhney, S.K. and Singh, R. (2000). Introductory Practical Biochemistry, Narosa Publishing House, New Delhi.

3. Dubey, R.C. and Maheswari, D.K. (2002). Practical Microbiology. S. Chand & Co. Ltd., New Delhi.

4. Plummer, D.T. (1988). An Introduction to Practical Biochemistry. 3rd Edition, Tata Mc GrawHill, New Delhi.

5. Reddy, S.M. and Reddy, S.R. (1998). Microbiology – Practical Manual, 3rd Edition, Sri Padmavathi Publications, Hyderabad.

6. Jaya Babu (2006). Practical Manual on Microbial Metabolisms and General Microbiology. Kalyani Publishers, New Delhi.

7. Sashidhara Rao, B. and Deshpande, V. (2007). Experimental Biochemistry: A student Companion. I.K. International Pvt. Ltd.

8. Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). Laboratory Experiments in Microbiology, . Himalaya Publishing House, Mumbai.

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B.Sc. Microbiology II Year Syllabus

(Applicable to the students admitted in 2019-20)

II Year B.Sc. (Microbiology)

IV Semester Skill Enhancement Course

Food Adulteration

2 Credits

Unit-I

Definition and introduction to food adulteration

Types of food adulteration

Common food adulterants

Causes of food adulteration

Analysis of food

Unit-II

Effects of food adulteration

Prevention of food adulteration

Detection of common food adulterants

Food Adulteration Act-1954

Suggested Readings:

1. Jesse Park Battershall. Food adulteration and its detection. Published by book on demand, Miami, 2015.
2. R.B.Sethi's Prevention of food adulteration Act.
3. Dr. Sheela.S. prevention of Food adulteration.

B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2017-18)

III Year B.Sc. (Microbiology)

SEMISTER-V

Paper V: IMMUNOLOGY

UNIT – I HISTORY OF IMMUNOLOGY AND IMMUNITY

Development of immunology. 2 Hrs

Types of immunity – innate and acquired; active and passive; humoral and cell-mediated immunity. 6 Hrs

Primary and secondary organs of immune system – thymus, bursa fabricus, bone marrow, spleen and lymph nodes. 6 Hrs

Cells of immune system- B and T lymphocytes, null cells, monocytes, macrophages, neutrophils, basophils and eosinophils. 6 Hrs

UNIT – II **22 Hrs**

Antigens – types, chemical nature, antigenic determinants, haptens. 2 Hrs

Factors affecting antigenicity. 1 Hr

Antibodies – basic structure, types, properties and functions of immunoglobulins. 2 Hrs

Components of complement and activation of complement. 2 Hrs

UNIT-III ANTIGENS AND ANTIBODY REACTION

Types of antigen-antibody reactions – agglutination, blood groups, precipitation, neutralization, complement fixation. 4 Hrs

Labeled antibody based techniques – ELISA, RIA and Immunofluroscence. 3 Hrs

UNIT-IV IMMUNOLOGICAL PROCESSES AND APPLICATIONS

Polyclonal and monoclonal antibodies – production and applications. 3 Hrs

Autoimmunity and its significance. 2 Hrs

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1. Sudha Gangal. Shubhangi Sontakke. Text book of Basic and Clinical Immunology, Universitie Press.
2. Tizard, I.R. (1995). Immunology : An Introduction, WB Saunders, Philadelphia, USA.
3. Riott, I.M. (1998). Essentials of Immunology, ELBS and Black Well Scientific Publishers, England.
4. Goldsby, Kindt, T.J. and Osborne, B.A. (2004). Kuby Immunology, 6th Edition, W.H.Freeman and Company, New York.
5. Lydyard, P.M., Whelan, A. and Fanger, M.W. (2000). Instant Notes in Immunology, Viva Books Pvt. Ltd., New Delhi.
6. Chakraborty, B. (1998). A Text Book of Microbiology, New Central Book Agency (P) Ltd, Calcutta, India. 12
7. Ananthanarayana, R. and Panicker, C.K.S. (2000). Text Book of Microbiology, 6th Edition, Oriental Longman Publications, USA.
8. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
9. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
10. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi.
11. Singh, R.P. (2007). Immunology and Medical Microbiology. Kalyani Publishers, New Delhi.
12. Reddy, S.R. and Reddy, K.R. (2006). A Text Book of Microbiology - Immunology and Medical Microbiology, Himalaya Publishing House, Mumbai.
13. Gupte, S. (1995). Short Text Book of Medical Microbiology, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi

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LAB–V:IMMUNOLOGY (Practicals) 45 Hrs

1.Blood tests – i.Total Count,
ii.Differential Count.
2. Estimation of blood haemoglobin.
3. Determination of blood groups and Rh typing.
4. Antigen-antibody interactions in Widal test, VDRL test, and Precipitation – Ouchterlony double diffusion test.
5. Parasites – Malarial parasite, *Entamoeba* (study of permanent slides)

REFERENCE BOOKS FOR LAB:

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. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
4. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
5. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi

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B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2017-18)

III Year B.Sc. (Microbiology)

SEMISTER-V

Paper VI: AGRICULTURE AND ENVIRONMENTAL MICROBIOLOGY

UNIT - I Microbes in Agriculture

Physical and chemical characteristics of soil. 2 Hrs
Rhizosphere and phyllosphere. 1 Hr
Plant growth-promoting microorganisms -mycorrhizae, rhizobia, *Azospirillum*, *Azotobacter*, cyanobacteria, *Frankia* and phosphate-solubilizing microorganisms.
Outlines of biological nitrogen fixation (symbiotic, non-symbiotic). 8 Hrs
Biofertilizers - *Rhizobium*. 1 Hr

UNIT:II Plant Diseases & Biocontrol

Concept of disease in plants. 1 Hr
Symptoms of plant diseases caused by fungi, bacteria, and viruses. 3 Hrs
Plant diseases caused by fungi (groundnut rust), bacteria (angular leaf spot of cotton) and viruses (tomato leaf curl). 3 Hrs
Principles of plant disease control. 2 Hrs
Biological control of plant diseases. Biopesticides – *Bacillus thuringiensis*, Nuclear polyhedrosis virus (NPV), *Trichoderma*. 2 Hrs

UNIT : III Microbial ecology

Microorganisms of environment (soil, water and air). 2 Hrs
Role of microorganisms in nutrient cycling (carbon, nitrogen, sulphur). 4 Hrs
Microbial interactions – mutualism, commensalism, antagonism, competition, parasitism, predation. 4 Hrs

UNIT-IV Role of microbes in environmental Pollution

Microbiology of potable and polluted waters. *E. coli* and *Streptococcus faecalis* as indicators of water pollution. Sanitation of potable water. 5 Hrs
Sewage treatment (primary, secondary and tertiary). 2 Hrs
Outlines of biodegradation of environmental pollutants – pesticides. 2 Hrs
Solid waste disposal – sanitary land fills, composting. 2 Hrs

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1. Alexander, M. (1985). Introduction to Soil Microbiology, 3rd Edition. Wiley Eastern Ltd., New Delhi.

2. Paul, E.A. and Clark, F.E. (1989). Soil Microbiology and Biochemistry, Academic Press, USA.

3. Subba Rao, N.S. (1993). Biofertilizers in Agriculture and Forestry, 3rd Edition Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi. BSc CBCS syllabus 2016-17

4. Rangaswami, G. and Bhagyaraj, D.J. (2001). Agricultural Microbiology, 2nd Edition, Prentice Hall of India, New Delhi.

5. Atlas, R.M. and Bartha, R. (1998). Microbial Ecology - Fundamentals and Applications, Addison Wesley Longman, Inc., USA

6. Lynch, J.M. and Poole, N.J. (1979). Microbial Ecology – A Conceptual Approach, Blackwell Scientific Publications, USA

7. Subba Rao, N.S. (1999). Soil Microorganisms and Plant Growth. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

8. Reddy, S.R. and Singara Charya, M.A. (2007). A Text Book of Microbiology - Applied Microbiology. Himalaya Publishing House, Mumbai.

9. Singh, R.P. (2007). Applied Microbiology. Kalyani Publishers, New Delhi.

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LAB - VI: APPLIED MICROBIOLOGY (Practicals) 45 Hrs

1. Isolation and enumeration of major groups of microorganisms from rhizosphere soil.
2. Study of root nodules and isolation of *Rhizobium* from legume root nodules.
3. Isolation of *Azospirillum / Azotobacter.*
4. Staining and observation of vesicular-arbuscular mycorrhizal (VAM) fungi.
5. Observation of plant diseases of local importance-Rusts,smuts, powdery mildews, tikka disease of groundnut, citrus canker, bhendi yellow vein mosaic, tomato leaf curl, little leaf of brinjal.
6. Isolation of antagonistic microorganisms by crowded plate technique.
7. Isolation of microorganisms of air by Petri plate exposure method.
8. Determination of biological oxygen demand (BOD) of polluted water.
9. Microbial testing of water by coliform test (multiple tube fermentation method).

References:

1. Stanbury, P.F., Whitaker, A. and Hall, S.J. (1997). Principles of Fermentation Technology, Aditya Books (P) Ltd. New Delhi.

2. Doyle, M.P., Beuchat, L.R. and Montville, T.J. (1997). Food Microbiology: Fundamentals and Frontiers. ASM Press, Washington D.C., USA.

3. Frazier, W.C. and Westhoff, D.C. (1988). Food Microbiology, Mc Graw-Hill, New York.

4. Jay, J.M. (1996). Modern Food Microbiology, Chapman and Hall, New York. 15

5. Ray, B. (1996). Fundamentals of Food Microbiology, CRC Press, USA.

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B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2017-18)

III Year B.Sc. (Microbiology)

SEMISTER-VI

Paper VII: CLINICAL MICROBIOOGY

UNIT – I Clinical Microbiology 23 Hrs

History of medial microbiology. 1 Hr
Normal flora of human body. 2 Hrs
Definition of infection and types of infections,
antagonism of indigenous flora. 3 Hrs
Anti-bacterial substances – lysozyme, complement, antiviral substances,
phagocytosis. 2 Hrs

UNIT-II

General principles of diagnostic microbiology. 1 Hr
Collection, transport and processing of clinical samples. 3 Hrs
General methods of laboratory diagnosis – cultural, biochemical, serological and molecular methods. 5 Hrs
Tests for antimicrobial susceptibility. 2 Hrs
Antiviral agents – interferon and base analogues. 2 Hrs
Host-pathogen interactions. Bacterial toxins, virulence and attenuation. 2 Hrs

UNIT – III

Elements of chemotherapy – therapeutic drugs.. 2 Hrs
Mode of action of penicillin and sulpha drugs, and their clinical use.
Drug resistance 3 Hrs
Preventive control of diseases – active and passive immunization. 3 Hrs
Vaccines – natural and recombinant. 2 Hrs

UNIT-IV:

General account of the following diseases – causal organisms, pathogenesis, epidemiology, diagnosis, prevention and control of:
Air-borne diseases - Tuberculosis, Influenza
Food and water-borne diseases - Cholera, Typhoid, Hepatitis- A
Poliomyelitis, Amoebiasis
Insect-borne diseases - Malaria, Filariasis, Dengue fever
Contact diseases - Syphilis, Gonorrhoea
Zoonotic diseases - Rabies, Anthrax
Blood-borne diseases - Serum hepatitis, AIDS 12 Hrs
General account of nosocomial infections. 1 Hr

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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. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.

4. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.

5. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi.

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LAB–VII: CLINICAL MICROBIOLOGY (Practicals) 90 Hrs

1. Acid-fast staining of mycobacteria (stained/permanent slides).
2. Isolation and identification of medically important bacteria (*E. coli, Klebsiella, Pseudomonas, Staphylococcus* and *Streptococcus*) by cultural, microscopic and biochemical tests.
3. Antibiotic sensitivity testing – disc diffusion method.
4. Observation of fungal pathogen *(Candida)*.
5. Tests for disinfectant (Phenol coefficient).

REFERENCE BOOKS FOR LAB:

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. Annadurai, B. (2008). A Textbook of Immunology and Immunotechnology. S. Chand & Co. Ltd., New Delhi.
4. Dey, N., T.K. and Sinha, D. (1999). Medical Bacteriology Including Medical Mycology and AIDS. New Central Book Agency (P) Ltd. Calcutta, India.
5. Shetty, N. (1994). Imuunology – Introductory Textbook. New Age International Pvt. Ltd., New Delhi

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B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2017-18)

III Year B.Sc. (Microbiology)

SEMISTER-VI

Paper VIII: FOOD AND INDUSTRIAL MICROBIOLOGY

UNIT – I Food Microbiology 22 Hrs

Microorganisms of food spoilage and their sources. 3 Hrs
Spoilage of different food materials - fruits, vegetables, meat, fish. 3 Hrs
Canned foods. Food intoxication (botulism and staph poisioning), foodborne diseases (salmonellosis and shigellosis) and their detection. 5 Hrs
General account of food preservation. 2 Hrs

UNIT-II

Microbiological production of fermented foods – bread, cheese, yogurt. 3 Hrs
Biochemical activities of microbes in milk. 2 Hrs
Microorganisms as food – SCP, edible mushrooms (white button, oyster and paddy straw). 2 Hrs
Concept of probiotics. 2 Hrs

UNIT – III Industrial Microbiology 22 Hrs

Microorganisms of industrial importance -yeasts, moulds, bacteria,actinomycetes.2 Hrs
Screening and isolation of industrially-important microorganisms. 3 Hrs
Outlines of strain improvement. 2 Hrs
Types of fermentation – aerobic, anaerobic, batch, continuous, submerged, surface, solid state. 4 Hrs
Design of a stirred tank reactor fermentor. Fermentation media. 3 Hrs

UNIT-IV

Industrial production of alcohols (ethyl alcohol), beverages (beer), enzymes (amylases), antibiotics (penicillin), amino acids (glutamic acid), organic acids (citric acid), vitamins (B12), biofuels (biogas - methane). 8 Hrs

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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. Doyle, M.P., Beuchat, L.R. and Montville, T.J. (1997). Food Microbiology: Fundamentals and Frontiers. ASM Press, Washington D.C., USA
3. Frazier, W.C. and Westhoff, D.C. (1988). Food Microbiology, Mc Graw-Hill, New York.
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5. Ray, B. (1996). Fundamentals of Food Microbiology, CRC Press, USA.
6. Rangaswami, G. and Bhagyaraj, D.J. (2001). Agricultural Microbiology, 2nd Edition, Prentice Hall of India, New Delhi.
7. Atlas, R.M. and Bartha, R. (1998). Microbial Ecology - Fundamentals and Applications, Addison Wesley Longman, Inc., USA
8. Paul, E.A. and Clark, F.E. (1989). Soil Microbiology and Biochemistry, Academic Press, USA.

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LAB - VIII: APPLIED MICROBIOLOGY (Practicals) **45 Hr**

10. Determination of microbiological quality of milk – MBRT.
11. Observation of different spoiled foods.
12. Isolation of fungi and bacteria from spoiled fruits and vegetables.
13. Alcohol production and estimation; Calculation of fermentation efficiency.
14. Isolation of amylase-producing organisms.
15. Citric acid production and estimation.
16. Estimation of ascorbic acid from fruit juices.

References:

1. Stanbury, P.F., Whitaker, A. and Hall, S.J. (1997). Principles of Fermentation Technology, Aditya Books (P) Ltd. New Delhi.
2. Doyle, M.P., Beuchat, L.R. and Montville, T.J. (1997). Food Microbiology: Fundamentals and Frontiers. ASM Press, Washington D.C., USA.
3. Frazier, W.C. and Westhoff, D.C. (1988). Food Microbiology, Mc Graw-Hill, New York.
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B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2017-18)

III Year B.Sc. (Microbiology)

VI Semester Skill Enhancement Course

Bio-fertilizers

2 Credits

Unit-I

1. General account about the microbes used as biofertilizers, Rhizobium, Azotabacter importance in cultivation.

2. Cyanobacteria as biofertilizer, Nitrogen fixation BGA and Azolla in rice cultivation

Unit-II

1. Mycorrhizal association and types of mycorrhizal association; Isolation and inoculums production of VAM and its influence on crop plants.

2. Organic farming- Green manuring and organic fertilizers, recycling of biodegradable municipal , agricultural and industrial wastes.

Suggested Readings:

1.Vayas, S.C, Vayas , S. and Modi, H.A 1998 Bio-fertilizers and organic farming, Akta Prakasham, Nadiad

2. Subha Rao, N.S.2000, Soil microbiology, Oxford & IBH publishers, New Delhi

3. Sathe, T.V. 2004 vermiculture and organic farming. Daya publishers

4. Dubey, R.C., 2005 A text book of biotechnology S.Chand & Co., New Delhi

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DEPARTMENT OF MICROBIOLOGY
MODEL PRACTICAL QUASTION PAPER FOR B.Sc.I,II AND III YEAR **CBCS**

50MARKS 2HRS

SECTION-I 1X20=20

1.MAJOR QUESTION

SECTION-II 1X10=10

2.MINOR QUESTION

SECTIONIII 5X2=10
(SPOTTINGS)

3.

4.

5.

6.

7.

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DEPARTMENT OF MICROBIOLOGY
Model question paper B.Sc.I YEAR **CBCS**
SEMESTER-I

INTRODUCTORY MICROBIOLOGY-I 70MARKS 2 ½ **HRS**

SECTION-I (5X2=10Marks)

ANSWER **ALL** OF THE FOLLOWING

1. Robert Koch .
2. Simple staining.
3. Lyophilization.
4. Mycoplasma.
5. TMV

SECTION II (4X5=20Marks)

ANSWER **ALL** OF THE FOLLOWING

6. Edward jenner
7. Dark field Microscopy
8. Selective Media
9. Storage Granules.
10. Streak Plate Method
11. Bacterial Cell Wall

SECTION III (4X10=40Marks)

ANSWER **ALL** OF THE FOLLOWING

12. (a) write the contributions of the following scientists - **Antony von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Iwanowsky, Beijerinck, Winogradsky** and **Alexander Fleming.**

OR

(b)Define Sterilization and write about the Physical Sterilization methods.

13.(a)write a brief note on staining techniques.

OR

(b)write a Essay on Electron Microscopy.

14.(a) Write a note on the differentiation of prokaryotes and eukaryotes.

OR

(b) define media and write about the types of media.

15.(a)ultra structure of Bacterial cell.

OR

(b) general characteristics and Classification of viruses.

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Model question paper B.Sc.I YEAR **CBCS**
SEMESTER-II

INTRODUCTORY MICROBIOLOGY-II 70MARKS 2 ½ **HRS**

SECTION-I 5X2=10M
VERYSHORT ANSWER TYPE QUESTIONS
ANSWER **ANY FIVE** OF THE FOLLOWING

1.Heterotrophs.

2.Substrate Level Phosphorylation.

3. Sterols.

4.Chromatography.

5. Co- factors.

SECTION-II 4X5=20
SHORT ANSWER TYPE QUESTIONS
ANSWER **ANY FOUR OF** THE FOLLOWING

6.Biphasic Growth.
7. Anapleurotic reactions.
8. Nucleotides & Nucleic aids.
9. Principles and applications of colorimetry.
10. Electrophoresis.
11.Glyoxylate cycle.

SECTION-III 4X10=40
(ESAY TYPE QUESTIONS)
ANSWER **ANY FOUR** OF THE FOLLOWING

12.(a) Uptake of Nutrients by cell.

OR

(b) Photosynthetic apparatus in prokaryotes.

13.(a)Glycolysis.

OR

(b)TCA Cycle.

14.a) Classification and characteristics of carbohydrates.

OR

(b) Properties and classification of enjymes.

15.(a)Types of Buffersand their uses in biological reactions.

OR

(b)Principles and applications of electrophoretic techniques.

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Model question paper B.Sc.II YEAR **CBCS**
SEMESTER-III

MICROBIAL PHYSIOLOGY-III 70MARKS 2 ½ HRS

SECTION-III 5X2=10M
VERYSHORT ANSWER TYPE QUESTIONS
ANSWER **ALL** OF THE FOLLOWING

1.Autotrouphs

2.Enriched media.

3.Effect of temperature on Enzyme activity.

4.Glyoxalate Cycle.

5.Anaerobic Respiration.

SECTION-II 4X5=20
SHORT ANSWER TYPE QUESTIONS
ANSWER **ANY FOUR OF** THE FOLLOWING

6. Active transport
7. Effect of temperature on microbes
8. Lock and key model
9. Cofactors.
10. Alcohol fermentation.
11.β-Oxidation of fatty acids.

SECTION-I 4X10=40
(ESAY TYPE QUESTIONS)
ANSWER **ANY FOUR** OF THE FOLLOWING

1.(a) Write about the Nutritional Groups of Microorganisms.

OR

(b) Define media and write about the types of Media.

2.(a)what are Biocatalysts and write about the properties and classification of them .

OR

(b)Define Enzyme Inhibition and write about the types of Enzyme Inhibition .

3.(a) Write about the GLYCOLYSIS.

OR

(b) What is Oxidative phosphorylation and write about ETS(ElectronTransport System).

4.(a)write about Fermentation.

OR

(b)write a General account on Oxygenic and Non-Oxygenic Photosynthesis in Bacteria.

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Model question paper B.Sc.II YEAR **CBCS**
SEMESTER-IV

MICROBIAL GENETICS-IV 70MARKS 2 ½HRS

SECTION-I 5X2=10M
VERYSHORT ANSWER TYPE QUESTIONS
ANSWER **ALL** OF THE FOLLOWING

1.Conjugation
2. Semi-conservative Replication
3.Muton
4.Structural Genes
5.Ligases

SECTION-II 4X5=20
SHORT ANSWER TYPE QUESTIONS
ANSWER **ANY FOUR OF** THE FOLLOWING

6. chemical mutagens
7. t-RNA
8. Ribosomes
9. lac-Operon
10. Restriction enzymes
11. c-DNA Libraries.

SECTION-III 4X10=40
(ESAY TYPE QUESTIONS)
ANSWER **ANY FOUR** OF THE FOLLOWING

1.(a) Write about the Structure of DNA.
OR
(b) Define plasmid and write about the types of Plasmids.
2.(a)what are Mutagens and write about the physical and chemical mutagens .
OR
(b)write a brief note on Induced Mutations.
3.(a) Write about the RNA Biosynthesis(Transcription)in prokaryotes.
OR
(b) write a brief note on Genetic Code.
4.(a) Discuss the Enzymes involved in Genetic Engineering.
OR
(b)write a general account on Cloning methods.

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Model question paper B.Sc.III YEAR **CBCS**

SEMESTER-V

IMMUNOLOGY-V 70MARKS 2 ½HRS

SECTION-I 5X2=10M

VERYSHORT ANSWER TYPE QUESTIONS

ANSWER **ALL FIVE** OF THE FOLLOWING

1.Macrophages
2.Antibodies
3.Agglutination
4.Blood Groups
5.HAT Medium

SECTION-II 4X5= 20

SHORT ANSWER TYPE QUESTIONS

ANSWER **ANY FOUR OF** THE FOLLOWING

6. Louis Pasteur
7. Humoral immunity
8. Ig E
9. Poly clonal Antibodies
10. Autoimmunity.
1I.ELISA

SECTION-I 4X10=40

(ESAY TYPE QUESTIONS)

ANSWER **ANY FOUR** OF THE FOLLOWING

12.(a) Write about the History of Immunology.

OR

(b) Define Immunity and write about the types of Immunity.

13.(a). what are Antigens and Write about the types of Antigens

OR

(b) write a brief note on Basic Structure of Immunoglobullins

14.(a) Discuss about RIA (Radio Immuno Assay).

OR

(b) Write about ELISA.

15.(a) Discuss about Autoimmunity.

OR

(b)write a general account on Hybridoma Technology

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SEMESTER-V;Agri&Envronmental Microbiology -VI 70MARKS 2 ½ HRS

SECTION-I 5X2=10M

(SHORT ANSWER TYPE QUESTIONS)

ANSWER **All** OF THE FOLLOWING

1.Cyanobacteria.
2.Nuclear Poly Hedrosis Virus.
3.Sulphur Cycle.
4.Trickling filters.
5.Commensalism.

SECTION-II 4X5=20

SHORT ANSWER TYPE QUESTIONS

ANSWER **ANY FOUR OF** THE FOLLOWING

6.Write a note on PGPR.
7.Discuss Nitrogen cycle.
8.Explain about Mycorrhizae.
9.Mutualism.
10.Write about Bacillus Thuringensis.
11.Degradation of pesticides.

SECTION-III 4X10=40

(ESAY TYPE QUESTIONS)

ANSWER **ANY FOUR** OF THE FOLLOWING

1. (a) Write about the Biological Nitrogen fixation.

OR

(b) Discuss about Biofertilizers.

2. (a) write about the Biological Control of Diseases .

OR

(b)write a brief note on Biopesticides.

3. (a) what are Bio-Geo-Chemical Cycles and write about N_2 Cycle.

OR

(b) write a brief note on Microbial Interactions.

4 .(a) Discuss about the sewage treatment methods.

OR

(b)write a general account on Biodegradation of Environmental Pollutants.

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Model question paper B.Sc.III YEAR **CBCS**
SEMESTER-VI

Medical microbiology-VII 70MARKS 2 ½HRS

SECTION-I 5X2=10
(VERY SHORT ANSWER TYPE QUESTIONS)
ANSWER **ALL**OF THE FOLLOWING

1.Infection
2.ELISA
3.Antibiotics
4.AIDS
5.Paul Ehrlisch

SECTION-II 4X5=20
SHORT ANSWER TYPE QUESTIONS
ANSWER **ANY FOUR OF** THE FOLLOWING

5. Phagosytosis
6. Lysozyme
7. ELISA
8. Drug resistance
9. Vaccines
10. Bacterial toxins.
11.Nosacomial infections

SECTION-III 4X10=40
(ESAY TYPE QUESTIONS)
ANSWER **ANY FOUR** OF THE FOLLOWING

1.(a) Write about the History of Medical microbiology.

OR

(b) write about the Normal flora of Human body.

2.(a) write about the Different types of Labaratory diagnosis methods .

OR

(b)write a brief note on Sample collection,transport and processing of clinical samples.

3 .(a) what are Antibiotics and Write about the mode of acion and clinical uses of Penicillins.

OR

(b) write a brief note on sulfa Drugs.

4.(a) Discuss the Pathogenicity and treatment for Tuberculosis.

OR

(b)write a general account on Zoonotic infections.

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Model question paper B.Sc.III YEAR **CBCS**

SEMESTER-VI

FOOD&INDUSTRIAL MICROBIOLOGY-VIII 70MARKS 2 ½HRS

SECTION-I 5X2=10

(VERY SHORT ANSWER TYPE QUESTIONS)

ANSWER **ALL**OF THE FOLLOWING

1.Food Spoillage
2.SCP
3.Submerged Fermentation
4.Citric Acid Uses
5.Fermentor

SECTION-II 4X5=20

SHORT ANSWER TYPE QUESTIONS

ANSWER **ANY FOUR OF** THE FOLLOWING

5. Botulism
6. Appertization(canning)
7. Edible mushrooms
8. Bioreactor
9. Fermentation media
10. Amylases
11. Citric acid production.

SECTION-III 4X10=40

(ESAY TYPE QUESTIONS)

ANSWER **ANY FOUR** OF THE FOLLOWING

1.(a) Write about the Food Spoillage.

OR

(b) Discuss about the Food intoxication.

2.(a) write about the Food Preservation methods .

OR

(b)write a brief note on Single Cell Proteins.(SCP)

3.(a) Write about the types of Screening methods for the isolation of industrially important microorganisms.

OR

(b) write a brief note on types of Fermentation.

4.(a) write about the industrial production of Alcohol by fermentation.

OR

(b)write a General account on the industrial production of Penicillin.

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SEMESTER-I,
INTRODUCTORY MICROBIOLOGY-I

S.No.	Name&Address	Contact No.
1.	**Dr.P.Muthenna** **Asst.Prof.&Head** **Department of Microbiology** **SRR GDC,Karimnagar**	9959029563
2.	**Dr. N. Hari Krishna** **Asst.Prof. of Microbiology** **GDC,Gajwel.**	
3.	**Dr. P.Pallavi** **Assistant prof. of microbiology** **Department of microbiology** **GDC(A),Siddipet.**	9912535999
4.	**Dr.A. Jyothi** **Asst.Prof. of Microbiology** **Department of Microbiology** **Tara GDC, Sangareddy**	
5.	**Smt.K.Deva Vani** **Asst.Prof. of Microbiology** **Department of Microbiology** **GDC(W),Nalgonda .**	9052528822

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SEMESTER-II,
INTRODUCTORY MICROBIOLOGY-II

S.No.	Name&Address	Contact No.
1.	**Dr. N. Hari Krishna** **Asst.Prof. of Microbiology** **GDC,Gajwel.**	9966222110
2.	**Dr. P.Muttenna** **Assist. prof.&Head** **Department of microbiology** **SRR,GDC Karimnagar**	9959029563
3.	**Dr. P.Pallavi** **Assistant prof. of microbiology** **Department of microbiology** **GDC(A), Siddipet.**	9912535999
4.	**Sri. T.Srinivas** **Assistant prof. of Microbiology** **Dr.DRR GDC, Jadcharla.**	9985737320

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SEMESTER-III,
MICROBIAL PHYSIOLOGY-III

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2.	**Dr. P.Pallavi** **Asst. prof. of microbiology** **Department of microbiology** **GDC(A),Siddipet.**	9912535999
3.	**Sri.T.Srinivas** **Asst. prof. of microbiology** **Department of microbiology** **GDC Jadcharla**	9985737320
4.	**Smt. K.Sridevi** **Asst.Prof. of Microbiology** **Department of Mcrobiology** **City College,Nayapul,Hyd.**	9848873122

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SEMESTER-IV,
MICROBIOAL GENETICS-IV

S.No.	Name&Address	Contact No.
1.	**Sri .N.Hari Krishna** **Asst. prof. of microbiology** **Department of microbiology** **GDC (M),Gajwel.**	9966222110
2.	**Dr.A.Madhuri** **Assistant prof. of microbiology** **Department of microbiology** **GDC(W) Begumpet ,** **Hyderabad.**	9581208104
3.	**Dr. P.Muttenna** **Assist. prof.&Head** **Department of microbiology** **SRR,GDC Karimnagar**	9959029563
4.	**Sri. T.Ramachander** **Assistant prof. of Microbiology** **GDC ,Kukatpally.**	9989427725
5.	**Dr. P.Siva Ram** **Assistant prof. of Bio-Technology** **Mahatma Ghandi University** **Nalgonda**	9032694559

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SEMESTER-V,
IMMUNOLOGY -V

S.No.	Name&Address	Contact No.
1.	**Dr. P.Muttenna** **Assist. prof.&Head** **Department of microbiology** **SRR,GDC Karimnagar**	9959029563
2.	**Dr .N.Hari Krishna** **Assistant prof. of microbiology** **Department of microbiology** **GDC Gajwel**	9966222110
3.	**Dr. P.Pallavi** **Assistant prof. of microbiology** **Department of microbiology** **GDC(A) ,Siddipet.**	9912535999
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5.	**Sri.T.Ramachander** **Asst.Prof. of Microbiology** **Department of Microbiology** **GDC,Kukatpally**	8897354254

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SEMESTER-V,
AGRICULTURE &ENVIRONMENTAL MICROBIOLOGY-VI

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1.	**Smt.K.Deva Vani** **Asst.Prof. of Microbiology** **Department of Microbiology** **GDC(W),Nalgonda .**	9052528822
2.	**Dr.A. Jyothi** **Asst.Prof. of Microbiology** **Department of Microbiology** **Tara GDC, Sangareddy**	9885824325
3.	**Sri.T.Srinivas** **Assistant prof. of microbiology** **Department of microbiology** **GDC,Jadcharla**	9985737320
4.	**Smt.A.Madhuri** **Assistant prof. of microbiology** **Department of microbiology** **GDC(W) Begumpet,** **Hyderabad**	9581208104
5.	**Dr.M.Renuka** **Asst.Prof. of Microbiology** **Department of Microbiology** **GDC(W) Pinglee,Warangal**	9849263336

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SEMESTER-VI,
MEDICAL MICROBIOLOGY-VII

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1.	**Dr. P.Muttenna** **Asst. prof.&Head** **Department of microbiology** **SRR,GDC Karimnagar**	9959029563
2.	**Dr .N.Hari Krishna** **Assistant prof. of microbiology** **Department of microbiology** **GDC (M)Gajwel**	9966222110
3.	**Dr. P.Pallavi** **Assistant prof. of microbiology** **Department of microbiology** **KDC,Hanmakonda**	9912535999
4.	**Sri.T.Srinivas** **Assistant prof. of microbiology** **Department of microbiology** **GDC Jadcharla**	9985737320
5.	**Smt.K.Deva Vani** **Asst.Prof. of Microbiology** **Department of Microbiology** **GDC(W),Nalgonda .**	9052528822

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SEMESTER-VI,
FOOD & INDUSTRIAL MICROBIOLOGY-VIII

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1.	**Smt.K.Deva Vani** **Asst.Prof. of Microbiology** **Department of Microbiology** **GDC(W),Nalgonda .**	9052528822
2.	**Dr .N.Hari Krishna** **Asst. prof. of microbiology** **Department of microbiology** **GDC (M)Gajwel**	9966222110
3.	**Sri.T.Srinivas** **Asst. prof. of Microbiology** **Department of microbiology** **GDC Jadcharla**	9985737320
4.	**Smt.A.Madhuri** **Asst. prof. of microbiology** **Department of microbiology** **GDC(W) Begumpet ,** **Hyderabad**	9581208104
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