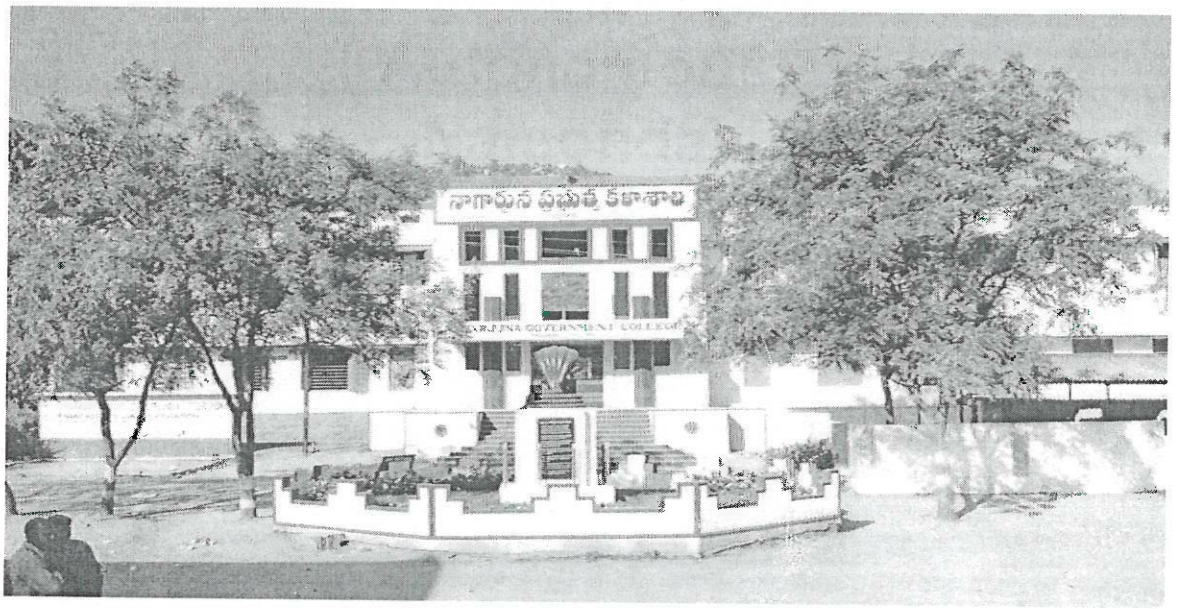
MICROBIOLOGY 2015-16

Nagarjuna Government College,
(Autonomous)
Nalgonda



SYLLABUS
CHOICE BASED CREDIT SYSTEM
SEMESTER PATTERN
B.Sc. Microbiology
(Candidates admitted from 2014-2015 onwards)

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA

(Autonomous),

Reaccredited by NAAC with "A" GRADE

DEPARTMENT OF MICROBIOLOGY

BOARD OF STUDIES MEETING -2015

The Board of Studies Meeting of Microbiology department is being held Today i.e on 05.10.2015 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(Chois based credit system),introduced during the academic year 2014 -15.
2. To Aprove the syllabus of B.Sc. I,II,and III year(all papers) .
3. 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 2014-15 & after.
3.To approve the bsc iii year (non-cbcs)syllabus ,having 4 units in each paper and to conduct two (2) internal assessments twice in a semester for 10 marks.
4. To approve the **pass percentage** for cbcs (**40%**)and **36%** for non-cbcs students.
5. To approve the **Model Question Papers** for cbcs I, II, III, IV, and non –cbcs V, VI Semesters ,
6.To approve the semester end examinations - **70 marks for (CBCS),40marks For non-CBCS** and to conduct **practical examinations at the end of the year for50 marks**(for both CBCS and non-CBCS)
7.To continue **Diagnostic microbiology, certificate course**(4 months duration)
8. To approved the list of **paper setters and examiners** for evaluation of papers

Members Present

1. Sri B. Nagaraju, Chairman , Board of Studies,Department Of Microbiology, N.G College , Nalgonda
2. Prof. P. Acharya Nagarjuna , Chairman , Board of Studies Microbiology, O.U , Hyderabad
3. Dr. B.Bhima Assossiate prof. , H.O.D, Dept. Of Microbiology , O.U , Hyderabad.
4. Smt.I. Vjaya kalyani , Guest Faculty , N.g college , Nalgonda
5. Kum.G.Bhargavi , Guest Faculty N.G college , Nalgonada

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA

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DEPARTMENT OF MICROBIOLOGY
BOARD OF STUDIES MEETING -2015

The Board of Studies in the Department of Microbiology has been constituted with the following members for the Academic year **2015-2016**

S.No.	Catagory	Name and Designation
1.	Chairman ,board of studies	Sri.B. Nagaraju Head,Dept.of microbiology N.G. Government College Nalgonda.
2.	University Nominee	Prof.P. Acharya Nagarjuna Chairman ,board of studies Department of microbiology Osmania university Hyderabad.
3.	Subject Expert- from outside the College	Dr.B.Bhima, Associate Prof.& Head Department of Microbiology Osmania university Hyderabad.
4.	Members: All the faculty members of the Department	1 .Smt.I.Vjayakalyani, Guest faculty in Microbiology N.G.College,Nalgonda. 2. kum.G.Bhargavi, Guest faculty in Microbiology N.G.College,Nalgonda

PRINCIPAL

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA

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DEPARTMENT OF MICROBIOLOGY
BOARD OF STUDIES MEETING -2015

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1.The committee approved to continue **CBCS(Choice based credit system),**introduced during the academic year 2014 -15.
2. Approved the **syllabus of B.Sc. I,II,and III year(all papers)** .
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 2014-15 & after.
3. Approved the **BSc. III year (non-cbcs)syllabus** ,having 4 units in each paper and to conduct two (2) **internal assessments twice in a semester for 10 marks.**
4. Approved the **pass percentage** for cbcs (**40%**)and **36%** for non-cbcs students.
5. Approved the **Model Question Papers** for cbcs I, II, III, IV, and non –cbcs V, VI Semesters ,
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7. Approved to continue **Diagnostic microbiology, certificate course**(4 months duration)
8. Approved the list of **paper setters and examiners** for evaluation of papers

Members Present

1. Sri B. Nagaraju, Chairman , Board of Studies,Department Of Microbiology, N.G College , Nalgonda
2. Prof. P. Acharya Nagarjuna , Chairman , Board of Studies Microbiology, O.U , Hyderabad
3. Dr. B.Bhima Associate prof. , H.O.D, Dept. Of Microbiology , O.U , Hyderabad.
4. Smt.I. Vjaya kalyani , Guest Faculty , N.G. college , Nalgonda
5. Kum.G.Bhargavi , Guest Faculty N.G college , Nalgonada

B.Sc. Microbiology I Year Syllabus

(Applicable to the students admitted in 2014-15&After)

I Year B.Sc. (Microbiology)CBCS

SEMESTER-I

Paper I: INTRODUCTORY MICROBIOLOGY-I

UNIT – I:

Meaning, definition and history of Microbiology. 2 Hrs

Contributions of Antony von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch,Iwanowsky,Beijerinck,Winogradsky and Alexander Fleming.10 Hrs

Importance and applications of Microbiology. 2 Hrs

UNIT –II:

Principles of microscopy – . Principles of Bright field, dark field, phase-contrast, fluorescent and electron microscopy (SEM and TEM). Ocular and stage micrometers. 10 Hrs

Size determination of microorganisms. 2 Hrs

Principles and types of stains - Simple stain, differential stain, negative stain, structural stains - spore, capsule, flagella. Hanging-drop method. 4 Hrs

UNIT – III :

sterilization. 2 Hrs

Physical methods - autoclave, hot-air oven, pressure cooker, laminar air flow, filter sterilization. 5 Hrs

Radiation methods - UV rays, gamma rays, ultrasonic methods. 4 Hrs

Chemical methods - Use of alcohols, aldehydes, fumigants, phenols, halogens and hypochlorites. Phenol coefficient. 5 Hrs

UNIT-IV:

Isolation of pure culture techniques - Enrichment culturing, dilution-plating, streak-plate, spread-plate and micromanipulator. 8 Hrs

Preservation of microbial cultures - subculturing, overlaying cultures with mineral oils, lyophilization, sand cultures, storage at low temperature. 6 Hrs

B.Sc. Microbiology I Year Syllabus

(Applicable to the students admitted in 2015-16)

I Year B.Sc. (Microbiology)

SEMISTER-II

Paper II: INTRODUCTORY MICROBIOLOGY-II

UNIT – I

Outline classification of living organisms: Heckel, Whittaker and Carl Woese systems. 6 Hrs

Place of microorganisms in the living world. 2 Hrs

Differentiation of prokaryotes and eukaryotes.1 Hr

Prokaryotes - General characteristics of bacteria, archaebacteria, rickettsias, mycoplasmas, cyanobacteria and actinomycetes. 6 Hrs

Outline classification for bacteria as per the second edition of Bergey's Manual of Systematic Bacteriology (up to section level). 2 Hrs

UNIT-II

Ultrastructure of a bacterial cell: Invariant components - cell wall, cell membrane, ribosomes, nucleoid. Variant components - Capsule, flagella, fimbriae, endospore and storage granules. 6 Hrs

General characteristics and classification of viruses. Morphology and structure of TMV and HIV. 2 Hrs

Structure and multiplication of lambda bacteriophage. 2 Hrs

Eukaryotes - General characteristics and classification (up to the order level) of eukaryotic microorganisms - Protozoa, microalgae, molds and yeasts. 3 Hrs

UNIT – III

Biomolecules of microorganisms. 1 Hr

Outline classification and general characteristics of carbohydrates(monosaccharides, disaccharides and polysaccharides). 5 Hrs

General characteristics of amino acids and proteins. 5 Hrs

Structure of nitrogenous bases, nucleotides, nucleic acids. 5 Hrs

UNIT IV

Fatty acids (saturated and unsaturated) and lipids (spingolipds, sterols and phospholipids). 5 Hrs

Hydrogen ion concentration in biological fluids, pH measurement. 3 Hrs

Types of buffers and their use in biological reactions. 3 Hrs

Principle and application of colorimerty and chromatography (paper and thin-layer). 3 Hr

TEXT AND REFERENCE BOOKS:

Ram Reddy, S. and Reddy, S.M. (2007). **Essentials of Virology**. Scientific Publishers India, Jodhpur.

Reddy, S.M. (2003). **University Microbiology –I** . Galgotia Publications New Delhi.

Dube, R.C. and Maheswari, D.K. (2000) **General Microbiology**. S Chand ,New Delhi.

Prescott, M.J., Harley, J.P. and Klein, D.A. (2002). **Microbiology.** 5th Edition, WCB Mc GrawHill, New York.

Madigan, M.T., Martinkl, J.M. and Parker, J. (2000). **Brock Biology of Microorganisms**, 9th Edition, MacMillan Press, England.

Stanier, R.Y., Adelberg, E.A. and Ingram, J.L. (1991). **General Microbiology**, 5th Ed., Prentice Hall of India Pvt. Ltd., New Delhi.

Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). **Microbiology**. 5th Edition, Tata Mc Graw Hill Publishing Co., Ltd., New Delhi.

Rao, A.S. (1997). **Introduction to Microbiology**. Prentice-Hall of India Pvt Ltd., Nerw Delhi.

Black, J.G. (2005). **Microbiology: Principles and Explorations**, John Wiley, USA.

Voet, D. and Voet, J.G. (1995) **Biochemistry**, Wiley, New York.

Zubay, G. (1998). **Biochemistry** WCB. Mc GrawHill, Iowa.

Alexopoulos, C.J., Mims, C.W. and Blackwell, M. (1996). **Introductory Mycology**, Wiley, New York.

Moore – Landecker, E. (1996). **Fundamentals of Fungi**, Prentice-Hall, NJ, USA.

Atlas, R.A. and Bartha, R. (2000). **Microbial Ecology – Fundamentals and Application**, Benjamin Cummings, New York.

Frobisher, H., Hinsdil, R.D., Crabtree, K.T. and Goodhert, D.R. (2005). **Fundamentals of Microbiology**, Saunder and Company, London.

Power, C.B. and Daginawala, H.F. (1986). **General Microbiology** Vol I & II (2nd Edition), Himalaya Publishing House, Mumbai.

Sullia, S.B. and Shantaram, S. (1998). **General Microbiology**, Oxford & IBH Publishing Pvt. Ltd., New Delhi.

Dimmock, N.J., Easton, A.J. and Leppard, K.N. (2001). **Introduction to Modern Virology**, Blackwell Science Ltd, U.K.

Webster, J. (1980). **Introduction to Fungi**, Cambridge University Press, Cambridge, England.

Singh, R.P. (2007). **General Microbiology**. Kalyani Publishers, New Delhi.

Talaro, K. and Talaro, A. (1996). **Foundations in Microbiology**. 2nd Edition. UMC Brown Publications.

Tortora, G.J., Funke, B.R. and Case, C.L. (2004). **Microbiology: An Intoduction**. Pearson Education, Singapore.

Niclin, J. et al. (1999). **Instant Notes in Microbiology**. Viva Books Pvt. Ltd., New Delhi.

LAB – I: (B.Sc. I Yr) INTRODUCTORY MICROBIOLOGY (Practicals) **90 Hrs**

1. Precautions to work in Microbiology laboratory.
2. Preparation of culture media: Solid / Liquid.
3. Sterilization techniques: Autoclving, hot-air oven and filtration.
4. Isolation of single colonies on solid media.
5. Enumeration of bacterial numbers by serial dilution and plating.
6. Light compound microscope and its handling.
7. Microscopic observation of bacteria (Gram +ve bacilli and cocci, Gram –ve bacilli), cyanobacteria (*Nostoc, Spirulina*), algae (*Scenedesmus* sp., diatoms), and fungi (*Saccharomyces, Rhizopus, Aspergillus, Penicillium, Fusarium*).
8. Calibrations of microscopic measurements (Ocular, stage micrometers).
9. Measuring dimensions of fungal spores
10. Simple and differential staining (Gram staining).
11. Spore staining, capsule staining and negative staining.
12. Diagramatic or Electron photomicrographic observation of TMV, HIV, T4 phage and adenovirus
13. Qualitative tests for sugars and amino acids.
14. Qualitative test and estimation of glucose.

REFERENCE BOOKS FOR LAB:

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

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

Aneja, K.R. (2001). **Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Production Technology**, 3rd Edition, New Age International (P) Ltd, Publishers, New Delhi.

Dubey, R.C. and Maheswari, D.K. (2006). **Practical Microbiology**, S. Chand & Co., New Delhi.

Cappuccino, J.G. and Sherman, N. (2005). **Microbiology – A Laboratory Manual.** 7th Edition. Pearson Education. Published by Dorling Kindersley (India) Pvt. Ltd.

Mahy, B.W.J. and Kangro, H.O. (1996). **Virology – Methods Manual.** Academic Press, USA.

Burleson *et al.* (1992). **Virology – A Laboratory Manual.** Academic Press, USA

Alcamo, I.E. (2001). **Laboratory Fundamentals of Microbiology**. Jones and Bartlett Publishers, USA.

Benson, J.H. (2005). **Microbiological Applications: Laboratory Manual in General Microbiology**. 7th Edition, McGraw Hill Publications, New York.

B.Sc. Microbiology II Year Syllabus

(Applicable to the students admitted in 2015-16)

SEMISTER-III

Paper III: MICROBIAL PHYSIOLOGY (Theory)

UNIT – I

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 - 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 - 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

SARIN ✓

UNIT – IV

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

Glyoxylate cycle.

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

B.Sc. Microbiology II Year Syllabus

(Applicable to the students admitted in 2015-16)

II Year B.Sc. (Microbiology)

SEMISTER-II

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

TEXT AND REFERENCE BOOKS:

Gottschalk, G. (1986). **Bacterial Metabolism**, Springer-Verlag, New-York.

Caldwell, D.R. (1995). **Microbial Physiology and Metabolism**, W.C. Brown Publications, Iowa, USA.

Moat, A.G. and Foster, J.W. (1995). **Microbial Physiology**, John-Wiley, New York.

White, D. (1995). **The Physiology and Biochemistry of Prokaryotes**, Oxford University Press, New York.

Reddy, S.R. and Reddy, S.M. (2004). **Microbial Physiology**, Scientific Publishers, Jodhpur, India.

Reddy, S.M. and Reddy, S.R. (2005). **A Text Book of Microbiology Vol-II. Microbial Metabolism and Molecular Biology**. Himalaya Publishing House, Mumbai.

Lehninger, A.L., Nelson, D.L. and Cox, M.M. (1993). **Principles of Biochemistry**, 2nd Edition, CBS Publishers and Distributors, New Delhi.

Elliot, W.H. and Elliot, D.C. (2001). **Biochemistry and Molecular Biology**, 2nd Edition, Oxford University Press, U.S.A.

Verma, P.S. and Agarwal, V.K. (2004). **Cell Biology, Genetics, Molecular Biology, Evolution and Ecology.** S. Chand & Co. Ltd., New Delhi.

Freifelder, D. (1997). **Essentials of Molecular Biology**. Narosa Publishing House, New Delhi.

Crueger, W. and Crueger, A. (2000). **Biotechnology: A Text Book of Industrial Microbiology,** Prentice-Hall of India Pvt. Ltd., New Delhi.

Glick, B.P. and Pasternack, J. (1998). **Molecular Biotechnology**, ASM Press, Washington D.C., USA.

Freifelder, D. (1990). **Microbial Genetics**. Narosa Publishing House, New Delhi.

Strickberger, M.W. (1967). **Genetics**. Oxford & IBH, New Delhi.

Sinnot E.W., L.C. Dunn and T. Dobzhansky. (1958). **Principles of Genetics**. 5th Edition. McGraw Hill, New York.

Glazer, A.N. and Nikaido, H. (1995). **Microbial Biotechnology – Fundamentals of Applied Microbiology**, W.H. Freeman and company, New York.

Old, R.W. and Primrose, S.B. (1994) **Principles of Gene Manipulation**, Blackwell Science Publication, New York.

Smith, J.E. (1996). **Biotechnology**, Cambridge University Press.

Snyder, L. and Champness, W. (1997). **Molecular Genetics of Bacteria**. ASM press, Washington, D.C., USA.

Maloy, S.R., Cronan, J.E. and Freifelder, D. (1994). **Microbial Genetics**, Jones and Bartlett Publishers, London.

Lewin, B. (2000). **Genes VIII.** Oxford University Press, England

Turner, P.C., Mclennan, A.G., Bates, A.D. and White, M.R.H. (1998). **Instant Notes in Molecular Biology**, Viva Books Pvt., Ltd., New Delhi.

Twynan, R.M. (2003). **Advanced Molecular Biology**. Viva books Pvt. Ltd. New Delhi.

Kannan, N. (2003). **Hand Book of Laboratory Culture Medias, Reagents, Stains and Buffers**. Panima Publishing Co., New Delhi.

Nicholl, D.S.T. (2004). **An Introduction to Genetic Engineering.** 2nd Edition. Cambridge University Press, London.

LAB – II: MICROBIAL PHYSIOLOGY AND GENETICS (Practicals) **90 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.
8. Colorimetric estimation DNA by diphenylamine method.
9. Colorimetric estimation of proteins by Biuret/Lowry method
10. Paper chromatographic separation of sugars and amino acids
11. Starch hydrolysis, catalase test and sugar fermentation test.
12. Verification of Beer's law.
13. Problems related to DNA and RNA characteristics, Transcription and Translation.

REFERENCE BOOKS FOR LAB:

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

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

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

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

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

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

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

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

B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2013-14)

III Year B.Sc. (Microbiology)

SEMISTER-V

Paper V: IMMUNOLOGY

UNIT – I

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 Basics of Immunology 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

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

Polyclonal and monoclonal antibodies – production and applications. 3 Hrs

Autoimmunity and its significance. 2 Hrs

TEXT AND REFERENCE BOOKS:

Reddy, S.R. and Reddy, K.R. (2006). **A Text Book of Microbiology - Immunology and Medical Microbiology**, Himalaya Publishing House, Mumbai.

Tizard, I.R. (1995). **Immunology : An Introduction**, WB Saunders, Philadelphia, USA.

Riott, I.M. (1998). **Essentials of Immunology**, ELBS and Black Well Scientific Publishers, England.

Goldsby, Kindt, T.J. and Osborne, B.A. (2004). **Kuby Immunology**, 6th Edition, W.H.Freeman and Company, New York.

Lydyard, P.M., Whelan, A. and Fanger, M.W. (2000). **Instant Notes in Immunology**, Viva Books Pvt. Ltd., New Delhi.

Chakraborty, B. (1998). **A Text Book of Microbiology**, New Central Book Agency (P) Ltd, Calcutta, India.

Ananthanarayana, R. and Panicker, C.K.S. (2000). **Text Book of Microbiology**, 6th Edition, Oriental Longman Publications, USA.

Gupte, S. (1995). **Short Text Book of Medical Microbiology**, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

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

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

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

Singh, R.P. (2007). **Immunology and Medical Microbiology**. Kalyani Publishers, New Delhi.

B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2013-14)

III Year B.Sc. (Microbiology)

SEMISTER-V

Paper VI: AGRICULTURE AND ENVIRONMENTAL MICROBIOLOGY

Paper VI: APPLIED MICROBIOLOGY (Theory)

UNIT - I Agricultural Microbiology

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

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 Environmental Microbiology

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

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

TEXT AND REFERENCE BOOKS:

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

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

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

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

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

Subba Rao, N.S. (1993). **Biofertilizers in Agriculture and Forestry**, 3rd Edition Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

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

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

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

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

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

Adams, M.R. and Moss, M.O. (1996). **Food Microbiology**, New Age International (P) Ltd, New Delhi.

Banwart, G.J. (1987). **Basic Food Microbiology**, CBS Publishers and Distributors, New Delhi.

Patel, A.H. (1984). **Industrial Microbiology**, Mac Milan India Ltd., Hyderabad.

Cassida, L.E. (1968). **Industrial Microbilogy**, Wiley Eastern Ltd. & New Age International Ltd., New Delhi.

Crueger, W. and Crueger, A. (2000). **Biotechnology – A Text Book of Industrial Microbiology**, Panima Publishing Corporation, New Delhi

Reed, G. (Ed.) (1987). **Prescott & Dunn's Industrial Microbiology**, 4th Edition, CBS Publishers & Distributors, New Delhi.

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

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

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

Demain, A.L. and Davies, J.E. (1999). **Manual of Industrial Microbiology and Biotechnology**, ASM Press, Washington, D.C., USA.

B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2013-14)

III Year B.Sc. (Microbiology)

SEMISTER-VI

Paper VII: CLINICAL MICROBIOOGY

UNIT – III 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

TEXT AND REFERENCE BOOKS:

Reddy, S.R. and Reddy, K.R. (2006). **A Text Book of Microbiology - Immunology and Medical Microbiology**, Himalaya Publishing House, Mumbai.

Tizard, I.R. (1995). **Immunology : An Introduction**, WB Saunders, Philadelphia, USA.

Riott, I.M. (1998). **Essentials of Immunology**, ELBS and Black Well Scientific Publishers, England.

Goldsby, Kindt, T.J. and Osborne, B.A. (2004). **Kuby Immunology**, 6th Edition, W.H.Freeman and Company, New York.

Lydyard, P.M., Whelan, A. and Fanger, M.W. (2000). **Instant Notes in Immunology**, Viva Books Pvt. Ltd., New Delhi.

Chakraborty, B. (1998). **A Text Book of Microbiology**, New Central Book Agency (P) Ltd, Calcutta, India.

Ananthanarayana, R. and Panicker, C.K.S. (2000). **Text Book of Microbiology**, 6th Edition, Oriental Longman Publications, USA.

Gupte, S. (1995). **Short Text Book of Medical Microbiology**, 8th Edition, Jaypee Brothers Medical Publishers (P) Ltd, New Delhi.

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

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

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

Singh, R.P. (2007). **Immunology and Medical Microbiology**. Kalyani Publishers, New Delhi.

LAB–III:IMMUNOLOGY AND MEDICAL MICROBIOLOGY (Practicals) 90 Hrs

1. Blood tests – TC, DC and ESR.
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. Acid-fast staining of mycobacteria (stained/permanent slides).
6. Isolation and identification of medically important bacteria (*E. coli, Klebsiella, Pseudomonas, Staphylococcus* and *Streptococcus*) by cultural, microscopic and biochemical tests.
7. Antibiotic sensitivity testing – disc diffusion method.
8. Parasites – Malarial parasite, *Entamoeba* (study of permanent slides).
9. Observation of fungal pathogen *(Candida)*.
10. Tests for disinfectant (Phenol coefficient).

REFERENCE BOOKS FOR LAB:

Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). **Laboratory Experiments in Microbiology**, 2nd edition. Himalaya Publishing House, Mumbai.

Talwar, G.P. and Gupta, S.K. (1992). **A Hand Book of Practical and Clinical Immunology**. CBS Publications, New Delhi.

Baren, E.J. (1994). **Bailey and Scott's Diagnostic Microbiology**, 9th Edition, Mosby Publishers.

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

Samuel, K.M. (Ed.) (1989). **Notes on Clinical Lab Techniques**, M.K.G. Iyyer & Son Publishers, Chennai.

Wadher, B.J. and Reddy, G.L.B. (1995). **Manual of Diagnostic Microbiology**, Himalaya Publishing House, Mumbai.

Dey, N.C., Dey, T.K., Dey, M. and Sinha, D. (1998). **Practical Microbiology, Protozoology, and Parasitology.** New Central Book Agency (P) Ltd. Calcutta.

Mukherjee, K.L. (1996). **Medical Laboratory Technology**. Vol II. Tata Mc GrawHill Publishing Co. Ltd., New Delh

B.Sc. Microbiology III Year Syllabus

(Applicable to the students admitted in 2013-14)

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

TEXT AND REFERENCE BOOKS:

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

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

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

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

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

Subba Rao, N.S. (1993). **Biofertilizers in Agriculture and Forestry**, 3rd Edition Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi.

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

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

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

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

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

Adams, M.R. and Moss, M.O. (1996). **Food Microbiology**, New Age International (P) Ltd, New Delhi.

Banwart, G.J. (1987). **Basic Food Microbiology**, CBS Publishers and Distributors, New Delhi.

Patel, A.H. (1984). **Industrial Microbiology**, Mac Milan India Ltd., Hyderabad.

Cassida, L.E. (1968). **Industrial Microbilogy**, Wiley Eastern Ltd. & New Age International Ltd., New Delhi.

Crueger, W. and Crueger, A. (2000). **Biotechnology – A Text Book of Industrial Microbiology**, Panima Publishing Corporation, New Delhi

Reed, G. (Ed.) (1987). **Prescott & Dunn's Industrial Microbiology**, 4th Edition, CBS Publishers & Distributors, New Delhi.

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

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

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

Demain, A.L. and Davies, J.E. (1999). **Manual of Industrial Microbiology and Biotechnology**, ASM Press, Washington, D.C., USA.

LAB - IV: APPLIED MICROBIOLOGY (Practicals) 90 Hrs

1. Isolation and enumeration of major groups of microorganisms from rhizosphere and nonrhizosphere.
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, powderyN 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).
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.

REFERENCE BOOKS FOR LAB:

Gopal Reddy, M., Reddy, M.N., Saigopal, DVR and Mallaiah, K.V. (2007). **Laboratory Experiments in Microbiology**, 2nd edition. Himalaya Publishing House, Mumbai.

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

Aneja, K.R. (2001). **Experiments in Microbiology, Plant pathology, Tissue culture and Mushroom Production Technology**, 3rd Edition, New Age International (P) Ltd., New Delhi.

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

Burns, R.G. and Slater, J.H. (1982). **Experimental Microbiology and Ecology**. Blackwell Scientific Publications, USA.

Peppler, I.L. and Gerba, C.P. (2004). **Environmental Microbiology – A Laboratory Manual**. Academic Press. New York.

Gupte, S. (1995). **Practical Microbiology**. Jaypee Brothers Medical Publishers Pvt. Ltd.

Kannan, N. (2003). **Hand Book of Laboratory Culture Medias, Reagents, Stains and Buffers**. Panima Publishing Co., New Delhi.

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA
(Autonomous),
Reaccredited by NAAC with "A" GRADE
DEPARTMENT OF MICROBIOLOGY
Model question paper B.Sc.I YEAR **CBCS**
SEMESTER-I
INTRODUCTORY MICROBIOLOGY-I 70MARKS 3HRS

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

1.(a) Write about the history of Microbiology.
OR
(b) write the contributions of the following scientists - **Antony von Leeuwenhoek, Edward Jenner, Louis Pasteur, Robert Koch, Iwanowsky, Beijerinck, Winogradsky** and **Alexander Fleming.**

2.(a)write a brief note on staining techniques.
OR
(b)write a Essay on Electron Microscopy.

3.(a) define Sterilization and write about the Physical Sterilization methods.
OR
(b) what are chemosterillants and write about the chemical sterilization agents.

4.(a)define pure culture and write about the pure culture isolation methods.
OR
(b)write a general account on pure culture preservation methods.

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

5. Dark field Microscopy
6. Acid fast staining
7. Edward jenner
8. Tyndelization
9. Streak plate method.
10. Lyophylization.
11. Oligo dynamic action.

SECTION-III 5X2=10M

VERY SHORT ANSWER TYPE QUESTIONS

ANSWER **ANY FIVE** OF THE FOLLOWING

12.Pasteurization

13.Simple staining

14.Robert koch

15.Filter sterilization.

16.Micromanipulator

17.Spontanious generation

18.Koch Postulates

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DEPARTMENT OF MICROBIOLOGY
Model question paper B.Sc.I YEAR **CBCS**
SEMESTER-II
INTRODUCTORY MICROBIOLOGY-II 70MARKS 3HRS

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

1.(a) Write about the Diffentioation of Procaryotes and Eucaryotes .
OR
(b) write the CARL WOOSE System of Classification.

2.(a)write a brief note on Ultra Structure of Bacteria.
OR
(b)write a Essay on General characteristics of Viruses.

3.(a) write about the Classification of carbohydrates.
OR
(b) Give general account of Amino acida and Proteins.

4.(a)discuss about the fatty acids and lipids.
OR
(b)write about the principle and applications of chromatography.

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

5. Place of the Microorganisms in the living world
6. Cyanobacteria.
7. Buffers
8. TMV(Tobacco Mosaic Virus)
9. Nucleotides.
10. Phospholipids.
11. Storage Granules.
12.Archeabacteria

SECTION-III 5X2=10M

VERYSHORT ANSWER TYPE QUESTIONS

ANSWER **ANY FIVE** OF THE FOLLOWING

12.Mycoplasmas

13.Flagella.

14.Actinomycetes

15.poly sacharides.

16.P^H -Significance.

17.Sterols.

18.Thin layer Chromatography.

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DEPARTMENT OF MICROBIOLOGY
Model question paper B.Sc.II YEAR **CBCS**
SEMESTER-III
MICROBIAL PHYSIOLOGY-III 70MARKS 3HRS

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.

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

5. Active transport
6. Effect of temperature on microbes
7. Lock and key model
8. Biphasic Growth
9. ED Path way.
10. Cofactors.
11. Alcohol fermentation.
12. β-Oxidation of fatty acids.

SECTION-III 5X2=10M

VERYSHORT ANSWER TYPE QUESTIONS

ANSWER **ANY FIVE** OF THE FOLLOWING

13.Autotrouphs

14.Enriched media.

15.Effect of temperature on Enzyme activity.

16.Glyoxalate Cycle.

17.Lactic acid fermentation.

18.Anaerobic Respiration.

19.Bacterial growth curve.

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA
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DEPARTMENT OF MICROBIOLOGY
Model question paper B.Sc.II YEAR **CBCS**
SEMESTER-IV
MICROBIAL GENETICS-IV 70MARKS 3HRS

SECTION-I 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.

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

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

SECTION-III 5X2=10M

VERYSHORT ANSWER TYPE QUESTIONS

ANSWER **ANY FIVE** OF THE FOLLOWING

12.Conjugation

13. Semi-conservative Replication

14.Muton

15.m-RNA

16.Structural Genes

17.Ligases

18. Co-translation

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

SEMESTER-V

IMMUNOLOGY-V 40MARKS 3HRS

SECTION-I 4X7=28

(ESAY TYPE QUESTIONS)

ANSWER **ANY FOUR** OF THE FOLLOWING

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

OR

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

2.(a) write about the Organs of Immune System .

OR

(b)write a brief note on Cells of Immune System.

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

OR

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

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

OR

(b)write a general account on Hybridoma technology.

SECTION-II 6X2=12

SHORT ANSWER TYPE QUESTIONS

ANSWER **ANY SIX OF** THE FOLLOWING

5. Antitoxins
6. Louis Pasteur
7. Humoral immunity
8. Thymus
9. Ig E
10. Poly clonal Antibodies
11. Autoimmunity.
12. CFT(Complement fixation Test)
13. ELISA

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DEPARTMENT OF MICROBIOLOGY
Model question paper B.Sc.III YEAR non-**CBCS**
SEMESTER-V

AGRICULTURE & ENVIRONMENTAL MICROBIOLOGY-VI 40MARKS 3HRS

SECTION-I 4X7=28
(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.

SECTION-II 6X2=12
SHORT ANSWER TYPE QUESTIONS
ANSWER **ANY SIX OF** THE FOLLOWING

5. Azatobacter
6. PGPR(Plant Growth Promoting Rhizobacteria
7. Bacillus turingiencis
8. NPV(Nuclear Polyhedrosis Virus
9. Mutualism
10. composting
11. Trickling filters.
12.Sulpher Cycle
13.Cyanobacteria

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DEPARTMENT OF MICROBIOLOGY
Model question paper B.Sc.III YEAR non-**CBCS**
SEMESTER-VI

Medical microbiology-VII 40MARKS 3HRS

SECTION-I 4X7=28
(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.

SECTION-II 6X2=12
SHORT ANSWER TYPE QUESTIONS
ANSWER **ANY SIX OF** THE FOLLOWING

5. Phagosytosis
6. Lysozyme
7. ELISA
8. Drug resistance
9. Vaccines
10. Serum hepatitis(Hep-B)
11. Bacterial toxins.
12.Thyphoid
13.Nosacomial infections

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DEPARTMENT OF MICROBIOLOGY

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

SEMESTER-VI

FOOD&INDUSTRIAL MICROBIOLOGY-VIII 40MARKS 3HRS

SECTION-I 4X7=28

(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.

SECTION-II 6X2=12

SHORT ANSWER TYPE QUESTIONS

ANSWER **ANY SIX OF** THE FOLLOWING

5. Botulism
6. Appertization(canning)
7. Edible mushrooms
8. Bioreactor
9. Fermentation media
10. Amylases
11. Citric acid production.
12. Industrial importance of yeasts
13. Strain improvement

NAGARJUNA GOVERNMENT DEGREE COLLEGE, NALGONDA
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DEPARTMENT OF MICROBIOLOGY

MODEL PRACTICAL QUASTION PAPER FOR B.Sc.I,II AND III YEAR CBCS& non-**CBCS**

50MARKS 3HRS

SECTION-I 1X20=20

1.MAJOR QUESTION

SECTION-II 1X10=10

2.MINOR QUESTION

SECTIONIII 5X2=10
(SPOTTINGS)

3.

4.

5.

6.

7.

Record& viva 10

B.Sc. Microbiology II Year Syllabus

(Applicable to the students admitted in 2015-16)

II Year B.Sc. (Microbiology)

General Elective

SEMISTER-IV

DIAGNOSTIC MICROBIOLOGY(GE)

Syllubus 2Credits

UNIT-1

Introduction to Diagnostic microbiology.

Methods in microbiology: microscopy,sterilization techniques.Staining methods
Microbiological media and cultural methods for cultivation of pathogens
Importance of Diagnostic microbiology.

Principles of Diagnostic microbiology

Specimen and types of specimen,specimen collection ,transport of specimen and processing.
Laboratory Investigation
Specific lab test and non specific lab test diagnosis and report.

UNIT-2

General account of microorganisms and diseases

General account of the following diseases – Casual organisms, pathogenesis,epidomology,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, DengueFever
Contact diseases – syphilis,gonorrhea
Zoonotic diseases – Rabies,Anthrax
Blood borne diseases – serum hepatitis,AIDS

UNIT-3

Immunology

Introduction to immunology , Antigens , antibodies
Immunological Methods – Ag – Ab reactions
Agglutiantion
Blood test,WIDAL test.
Precipitation test
Complement fixation test
Labelled antibody techniques
RIA,ELISA.Immunofluoroscent

UNIT-4

History of Antimicrobial agents and Chemotherapatics.
Antibiotics and types,Clinical use of antibiotics
Phenomenon of Drug resistance and Assy methods of Antimicrobial agents
Phenol coefficient test
Qualitative and Quantitative assay
Drug resistance tests,MIC.Agartube assay.Agar plate assay.

TEXT AND REFERENCES:

Prescott,M.J,Harley,J.P.and Klein,D.A.(2002).**Microbiology**.5th Edition.WCB Mc GrawHill,New York.
Madigan,M.T.,Martinkal,J.M.and Parker,J.(2000).**Brock Biology of Microorganisms**,9Th Edition,MacMillana Press,England.
Pelezar,M.J.Chan.E.C.S.and Kreig,N.R.(1993).**Microbiology**.5th Edition,Tata Mc Graw Hill Publishing Co.,Ltd.,New Delhi.
Black,J.G.(2005).**Microbilogy:Principles and Explorations**, John Wiley,USA.
Voet,D.and Voet,J.G.(1995)**Biochemistry**,Wiley,New York.
FJ Bakers.Bacteriological techniques
Gunasekaran.Introduction to microbial techniques
Baily & Scott"s Diagnostic Microbiology 9th edition
W.H Freeman and Company,New York.

PRACTICALS:

General precautions to work in Microbiology:
1.Light (compound) Microscope and its handling
2.Sterilisations techniques
3.Preparation of culture media for pathogens (solid/liquid)
4.Staining methods
5.Isolation and identification of various bacteria by microscopic biochemical,enzymatic and serologic tests
6.Bacteriological examination of urine.pus throat swap. Etc from patients for diagnosis.
7.Preparation of serum WBC,RBC,Differential blood picture.
8.Aggulutiantion reactions – WIDAL,VDRL,Blood tests(HB estimation,Typing)
9.ELISA (Direct and Indirect)
10.Testing for drug sensitivity tests
11.Determination of phenol co efficient.
12.Microbiological assays of antimicrobiological drugs.

REFERENCES BOOKS FOR LAB:

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