

School of Studies in Microbiology,
Vikram University, Ujjain (M.P.)

Syllabus
M. Sc. Microbiology (For UTD)

Revised Course Structure
Choice Based Credit System (CBCS)
2017-2019

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The School of Studies in Microbiology will have choice based credit system (CBCS) in M.Sc. Microbiology (For UTD). The student will have to earn 112 actual credits (valid credits) and 8 (total 120 credits) virtual credits in total four semesters (two year duration). The course will comprise of Lectures (L), Seminars(S), Practicals (P), Library Assignments (LA), Project work (PW) and Comprehensive viva.

The semester will consist of 16-18 weeks of academic work. One credit is equivalent to one hour (60 minutes) of teaching (lecture) or two hours (120 minutes) of S, P, LA, and PW per week in a semester. The credits for the course have been distributed among the courses under Core, Skill development, Generic Elective and Discipline Specific Elective categories. The credits associated with the courses will be valid credits, while credits associated with Comprehensive viva-voce will be virtual credits.

During the semester, a teacher offering the course will do the continuous evaluation of the student by conducting two written Test / Quiz / Assignment etc. for theoretical courses. In each course, there shall be an End Semester Examination. In each course 20% marks will be for continuous evaluation and 80% marks will be for end term examination. Seminars and Library assignments will be assessed internally. Practical will be assessed continuously and at end of each semester and valuation will be done by two examiners (Internal and External appointed by the University). The project may be undertaken in any of the Recognized Laboratories / Universities / Academic Institutions / Research Institutes/ Companies or Industries. The assessment of the Project work presentation will be internal while the project report assessment and viva-voce will be conducted by one external and one internal examiner appointed by the University. A comprehensive viva-voce of 8 virtual credits will be conducted at the end of fourth semester of the programme by an internal and external examiner. Requirement of attendance will be as per guidelines of the statutory body.

The details of the course are given below:

Course	Course Title	Credit	Semester
Core Theory Course (L)			
MB 101	General Microbiology and Microbial Diversity	6	I
MB 102	Microbial Genetics	6	I
MB 103	Biochemistry and Microbial Physiology	6	I
MB 201	Bacteria and Cyanobacteria	6	II

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MB 202	Medical Microbiology and Virology	6	II
MB 203	Molecular Biology	6	II
MB 301	Food and Industrial Microbiology	6	III
MB 302	Immunology	6	III
MB 303	Yeast and Fungi	6	III
	TOTAL CREDITS	54	
Choice Based Generic Elective Theory Courses (L)			
MB 104	Biological Tools and Techniques.	6	I
MB 105	or Computer in Biology & Biostatistic		
	TOTAL CREDITS	6	
Choice Based Discipline Specific Elective Theory Courses (L)			
MB 204	Microbial Technology	6	II
MB 205	or Advances in Virology		
MB 304◆	Environmental Microbiology	6	III
MB 305	or Plant Pathology		
	TOTAL CREDITS	12	
Skill development Core Courses (P)			
MB 106	Skill development course-I {Laboratory Skill development - Practical I, Soft skill development - Seminar I, Soft skill development - Library Assignment I }	6	I
MB 206	Skill development course-II {Laboratory Skill development - Practical II, Soft skill development - Seminar II, Soft skill development- Library Assignment II }	6	II
MB 306	Skill development course-III {Laboratory Skill development - Practical III,	6	III

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	Soft skill development - Seminar III, Soft skill development - Library Assignment III }		
	TOTAL CREDITS	18	
Project Work (PW)			
MB 401	Project work	22	IV
	TOTAL CREDITS	22	
Comprehensive viva-voce (Virtual credits)			
MB 402	Comprehensive viva-voce	8	IV
	TOTAL CREDITS	8	
	GRAND TOTAL	112 (valid credits) +8 (virtual credits) = 120	

◆ This paper can be opted all the students of the University

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Semester I

S.No.	Course code	Title of course	Course type	Marks			Credits
				Internal Examination Marks	University Examination Marks	Total Marks	
1	MB 101	General Microbiology and Microbial Diversity	Core	10	40	50	6
2	MB 102	Microbial Genetics	Core	10	40	50	6
3	MB 103	Biochemistry and Microbial Physiology	Core	10	40	50	6
4	MB 104	Biological Tools and Techniques.	Generic elective *	10	40	50	6
5	MB 105	Computer in Biology & Biostatistic					
6	MB 106	Skill development course-I {Laboratory Skill development- Practical I, Soft skill development - Seminar I, Soft skill development - Library Assignment - I }	Core	20 { 10+5+5 }	80	100	6
		Total				300	30

*Any 01 out of 02 Generic Elective can be opted by the students.

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Semester II

S.No.	Course code	Title of Course	Course type	Marks			Credits
				Internal Examination Marks	University Examination Marks	Total Marks	
1	MB 201	Bacteria and Cyanobacteria	Core	10	40	50	6
2	MB 202	Medical Microbiology and Virology	Core	10	40	50	6
3	MB 203	Molecular Biology	Core	10	40	50	6
4	MB 204	Microbial Technology	Discipline specific elective*	10	40	50	6
5	MB 205	Advances in Virology					
6	MB 206	Skill development course-II {Laboratory Skill development - Practical II, Soft skill development - Seminar II, Soft skill development - Library Assignment II }	Core	20 { 10+5+5}	80	100	6
		Total				300	30

*Any 01 out of 02 Discipline specific Elective can be opted by the students.

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Semester III

S.No.	Course code	Title of Course	Course type	Marks			Credits
				Internal Examination Marks	University Examination Marks	Total Marks	
1	MB 301	Food and Industrial Microbiology	Core	10	40	50	6
2	MB 302	Immunology	Core	10	40	50	6
3	MB 303	Yeast and Fungi	Core	10	40	50	6
4	MB 304	Environmental Microbiology	Discipline specific elective*	10	40	50	6
5	MB 305	Plant Pathology					
6	MB 306	Skill development course-III {Laboratory Skill development - Practical III, Soft skill development - Seminar III, Soft skill development - Library Assignment III }	Core	20 { 10+5+5}	80	100	6
		Total				300	30

*Any 01 out of 02 Discipline specific Elective can be opted by the students.

◆ This paper can be opted any student of the University

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Semester IV

S.No.	Course code	Title of Course	Course type	Marks			
				Internal Examination Marks	University Examination Marks	Total Marks	Credits
1	MB 401	Project work Project presentation Project report assessment (Viva-voce)	Core	50 -	- 200	250	22
2	MB 402	Comprehensive viva-voce	Core	-	50	50	8 (Virtual credits)
		Total				300	30

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M. Sc. Microbiology (For UTD)

Semester- I CORE THEORY COURSES

MB 101: General Microbiology and Microbial Diversity (core)

Credits: 6

MB 101: General Microbiology and Microbial Diversity (core)

Credits: 6

UNIT 1

- 1.1 Introduction, Discovery of Microorganisms and Scope of Microbiology
- 1.2 Historical background: Anton van Leeuwenhoek and Landmarks in microbiology,
- 1.3 Development of Microbiology (Contribution of pioneers)
- 1.4 Classification of microorganisms: Concept of three domain of life, Whittaker Five Kingdom Concept, Modern Trends in Classification, Bergey's Manual of Systematic Bacteriology.

UNIT 2

- 2.1 Nomenclature and Methods of taxonomy: Phenetic, Numerical and Molecular taxonomy. Major Characteristics used in Taxonomy
- 2.2 Characteristics of Extremophiles: Thermophiles, Acidophiles, Alkalophiles, Halophiles, Barophiles, thermoacidophiles and methanobacteria etc.
- 2.3 Microscopy: Light Microscope, Bright-Field Microscope, Dark-Field Microscope, Phase-Contrast Microscope, , Fluorescence Microscope,
- 2.4 Electron Microscopy, Transmission Electron Microscope, Specimen Preparation, Scanning Electron Microscope

UNIT 3

- 3.1 Preparation and Staining of Specimens, Fixation, Dyes and Simple Staining, Differential Staining (Gram's and Acid fast staining), Staining Specific Structures (Capsule, Flagella, Spore)
- 3.2 Nutrition of Microorganisms: Basic Nutrient Requirements, Nutritional Types of Microorganisms. Requirements for Nitrogen, Phosphorus, and Sulfur , Growth factors.
- 3.3 Culture Media. Synthetic or Defined Media, Complex Media, Types of Media
- 3.4 Cultivation of Microorganisms: Aerobic and anaerobic, Shaker and still culture, Spread Plate, Streak Plate and Pour Plate, Isolation of Pure Cultures, Colony Morphology and Growth Characteristics.

UNIT 4

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- 4.1 Microbial Growth, Growth Curve, Batch, continuous and synchronous culture, Measurements of microbial growth, Influence of environmental factors affecting growth.
- 4.2 Motility test, Biochemical test (IMViC, TSIA, Oxidase, Catalase, Nitrogen reduction, Urease test, Pathogenicity test, Sugar fermentation etc.)
- 4.3 Preservation and maintenance of Microorganisms: Sub-culturing, freeze-drying, In gelatine disc, Storage under mineral oil, Silica gel storage, Lyophilisation, liquid nitrogen storage

UNIT 5

- 5.1 Control of Microorganisms by Physical agent: Heat (Moist and Dry), Filtration and Radiation
- 5.2 Chemical Control of Microorganisms: Halogens, Phenol and other phenolic compounds, Alcohol, Heavy metals, ethylene oxide and aldehyde.
- 5.3 Control of Microorganisms: Microbial death curve, Concept of bio-burden, Thermal death time, reduction time,
- 5.4 Factors effectiveness of antimicrobial agent.

Reference Books

- 1 Text book of Microbiology By Ananthanarayan. R. and C. K. J. Paniker.
- 2 Microbiology by Prescott, Harley and Klein, The Mc Graw Hill companies Inc. , New York
- 3 Brock Biology of Microorganisms. By Medigan, M.T., Martinko, J., M. and Parker, J. Pearson Education Inc., New York
- 4 Bergey's Manual of Determinative Bacteriology (8 Edition) Buchanan, R.E. and Gibbons, N.E., Williams and Wilkinson company, Baltimore
5. The Microbial World By Stainer R.V., Ingraham, J.L., Wheelis, M.L. and Painter P.R. ,Printice-Hall of India (Pvt.) Ltd., New Delhi.
6. Microbiology By Pelczar M., Chan E.C.S. and Krieg, N.R. Tata Mc Graw Hill Publishing Co. Ltd., New Delhi.
- 8 Extermophiles. Springer Verlag. New York By Johri, B.N.
- 9 Microbial Diversity. Academic Press by Colwell, D.
- 10 Microbial life in extreme environment By Kushner D.J.

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Semester – I

MB 102: Microbial Genetics (core)

Credits: 6

UNIT 1

- 1.1 Brief history of Genetics.
- 1.2 Nucleic acids as carriers of genetic information, Experimental evidences.
- 1.3 Components of nucleic acids, Double helix, Alternate forms, Denaturation and melting curves, Superhelicity in DNA.
- 1.4 Plasmids : Types, Transfer and replication in bacteria

UNIT 2

- 2.1 DNA Replication : General principles, Various modes of replication (Theta model and rolling circle model).
- 2.2 Properties of DNA polymerases, Proof reading, Continuous and discontinuous synthesis of DNA.
- 2.3 DNA repair : Various repair systems of DNA and their mechanisms. .

UNIT 3

- 3.1 Absolute and conditional mutants : Types of Mutation and uses of mutation.
- 3.2 Mutagenesis : Physical and Chemical mutagens, Base analogue mutagens, Mutagenesis by intercalating substances, Biochemical basis of mutation.
- 3.3 Isolation of mutants, Replica plating.
- 3.4 Revertant and reversion.: Second site revertants, Reversion as a means of detection of mutagens and carcinogens (Aims test).

UNIT 4

- 4.1 Suppression : Suppressor mutations.
- 4.2 Spontaneous mutation: The random and non adaptive nature of mutations (fluctation test), Origin of spontaneous mutants.

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4.3 Transposable elements: Insertion sequences, Types of bacterial transposons, Excision of transposons, Genetic phenomenon mediated by transposons in bacteria, Transposons and evolution.

4.4 Genetic recombination, Complementation and complementation analysis..

UNIT 5

5.1 Bacterial Conjugation: F insertion in *E.coli* chromosomes, Hfr transfer, Recombination mapping.

5.2 Bacterial Transformation: Its discovery, Mechanism and mapping by transformation,.

5.3 Phage Genetics : Phage mutants, Genetic recombination in phages, Fine structure mapping of T4 rII locus. Deletion mapping,

Reference Books

1. Neidhardt et.al. (1996). Cellular and Molecular Biology, II Ed., ASM press.
2. Lodish, Berk, Zippursky.Matsudaira, Baltimore, Darnell, (2000). Molecular Cell Biology IV Ed., W.H. Freeman.
3. Stryer, L. (2001). Biochemistry, V Ed. W.H. Freeman.
4. Nelson, D.L.,Cox, M.M. (2000). Lehninger- Principles of Biochemistry. III Ed. McMillan.
5. Murray, R.K., Granner, D.K., Maps, P.K. and Rodwell,V.C. (1998). Harper's Biochemistry. XXIV Ed., Prentice Hall International Inc.
6. Lewine, B. (2000). Gene VII, Oxford University Press.
7. Watson, J.M., Hopkins, N.H., Robert , J.W., Stietz,J.A.and Weiner, A.M. (1987). Molecular Biology of Gene. IV Ed. Benjamin and Cumming Pub. Inc. Comp.
8. Freifelder, D. (1995). Molecular Biology. Narosa Publishing House, New Delhi.
9. Fairbanks, D.J. and Andersen, W.R. (1999). Genetics- the Continuity of Life. Brooks/Cole Publishing Company, New York.
10. Brown ,T.A. 1999. Genome. IV.ed. John Wiley and Sons (Asia).
11. Brown, T.A., (2001). Gene Cloning and DNA Analysis. IV Ed. Blackwell Science.
12. Klug, W.S. and Cummings. M.K. (2000) Concept of genetics. VII Ed., Pearson Education, New Delhi.

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Semester – I

MB 103 Biochemistry and Microbial Physiology (core)

Credits: 6

Unit -1

- 1.1 Biomolecules : Introduction
- 1.2 Water, pH and buffers: Water structure and interactions, dissociation of water, and its ionic product, K_w . Water as a solvent. Hydrophobic, hydrophilic and amphiphilic substances. Acid –Base reactions, Bronsted acids, pH, the Handerson Hasselbach equation.
- 1.3 Bioenergetics: Laws of thermodynamics, Gibb's Free energy, Standard free energy and Energy rich compounds.
- 1.4 Amino acids, peptides, ~~the structure and function of proteins~~ degradation of proteins

Unit -2

- 2.1 Proteins: Covalent structure, functions and three dimensional structure of proteins. Protein purification and sequencing techniques
- 2.2 Enzymes: Classification, Specificity, Active site and activity units, Isozymes, Enzymes kinetics, Michaelis- Menton equilibrium for simple enzymes, Enzyme inhibition, Allosteric enzymes.
- 2.3 Lipids : Lipids: Classification. Biosynthesis and degradation of Fats and Fatty acids..

Unit -3

- 3.1 Structural feature of biomembranes and Transport.
- 3.2 Carbohydrates: Classification of carbohydrates, Monosaccharides: configuration and conformation, Fischer and Haworth projection formulae. Disaccharides: lactose, maltose, and sucrose. Polysaccharides: structural and storage.
- 3.3 Respiratory Metabolism: Glycolysis, Pentose phosphate pathway, Entner Doudoroff pathway, Glyoxalate pathway, TCA cycle, Electron transport system, Oxidative and substrate level phosphorylation.

Unit -4

- 4.1 Photosynthesis and Pigments: Chlorophyll, Bacteriochlorophyll, Rhodopsin, Carotenoides, Phycobilins; Photoautotrophy, Oxygenic and Anoxigenic photosynthesis, ATP generation,
- 4.2 CO_2 fixation, C_3 – C_4 pathways and CAM pathways
- 4.3 Vitamins and their role as coenzymes.

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Unit -5

- 5.1 Types of Fermentation: Homolactic and Heterolactic fermentation, etc. Pasteur Effect
- 5.2 Nitrogen fixation and assimilation of Nitrogen. Biosynthesis and degradation of Nucleotides.
- 5.3 Chemoautotrophy: Bacteria oxidizing ammonia, sulphur, iron, hydrogen and CO. Methanogenesis, Luminescent bacteria

Reference Books

1. Burn, Y.V. and Shimket, L.J. (2000) Prokaryote Development, ASM Press.
2. Caldwell, D.R. (1995) Microbial Physiology and Metabolism, Brown Publishers.
3. Gottschalk, G. (1986) Bacterial Metabolism, II Ed. Springer Verlag.
4. Madigan, M.T., Martinko, J.M. and Parker, J. (2000) Brock Biology of Microorganisms, 9th Ed. Prentice Hall International Inc.
5. Moat, A.G. and Foster, J.W. (1999) Microbial Physiology, John Wiley and Sons.
6. Stanier, R.Y. Ingrahm, J.L., Wheelis, M.L. and Painter, P.R. (1986) General Microbiology 5th Ed., McMillan Press Ltd.
7. Stryer, L. (2001) Biochemistry. Freeman.
8. Nelson, D.L. and Coax, M.m. (2000). Lehlingers – Principles of Biochemistry III Ed. MacMillan Worth Publishers.
9. Honlon, H.R., Moran, L.A., Ochs, Raymoas, Rawn, J.D. and Scimgeour K.G. (1996). Principles of Biochemistry II Ed. Prentice Hall, International Inc.
10. Muiray, P.K., Granne, D.K., Mayes, P.A. and Rodwell, V.W. (1996). Harper's Biochemistry XXIV Ed. Prentice Hall, International Inc..

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Semester – I

GENERIC ELECTIVE THEORY COURSES

MB 104: Biological Tools and Techniques. (Generic elective)

Credits: 6

UNIT 1

- 1.1 Spectroscopy: Electromagnetic spectrum, Beer Lambert's Law. UV/VIS Spectrophotometry, Infrared spectroscopy, Atomic absorption spectroscopy, ESR CD, and NMR spectroscopy, Mass spectroscopy, Fluorescent spectroscopy, Applications of different spectroscopic techniques.
- 1.2 Electrophoresis: Paper and gel electrophoresis, Polyacrylamide gel electrophoresis (native and SDS), Agarose gel electrophoresis and Electrofocussing.

UNIT 2

- 2.1 Centrifugation Techniques: Principles, type of centrifuges, density gradient centrifugation, Ultracentrifugation, Preparative and Analytical centrifugation, Applications of Centrifugation techniques .
- 2.2 Separation methods: Principles and applications of gel-filtration, ion-exchange and affinity chromatography, Thin layer and gas Chromatography, High pressure liquid (HPLC) chromatography

UNIT 3

- 3.1 Enzyme purification and assay techniques.
- 3.2 Radioisotopes: Nature of radioactivity, Types of radioactivity, Radioactive decay, Units of radioactivity, Detection and measurement of radioactivity, Geiger counters, Scintillation counters, autoradiography, Biochemical uses of isotopes (tracers, radio immunoassay).

UNIT 4

- 4.1 Biostatistics : Introduction to biostatistics, Measures of central tendencies –Mean, Median and Mode, Measures of Dispersion-Range, Standard Deviation, Standard Error and Variance, Test of significance, t-Test, F-Test, Chi- Square Test, Probability-Definition, types of probability.

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UNIT 5

5.1 Genome Projects, Genomics and Proteomics, Nanotechnology.

5.2 Computer : Introduction, Hardware and Software , Major Components- CPU, Internal Components, Memory, Computer Peripherals, Operating systems: Windows, Application of computer and Internet in Biology.

Reference Books

1. John G. Webster (2004) Bioinstrumentation, Student Edition. John Wiley & Sons Ltd.
2. Keith Wilson & John Walker (2003) Practical Biochemistry Principles and Techniques. 5th Edition, Cambridge University Press.
3. Asokan P (2001) Analytical Biochemistry (Biochemical Techniques). 1st Edition. 2nd Reprint. Published by Chinna Publications. Melvisharam. Vellore, Tamil Nadu.
4. Palanivelu P. (2001). Analytical Biochemistry and Separation Techniques. A Laboratory Manual 2nd Edition. Published by Tulsi Book Centre, Madurai, Tamil Nadu.
5. Wilson K. and Goulding K, A Biologist's Guide to Principles and Techniques of Practical Biochemistry, English Language Book Society.
6. An Introduction to Practical Biochemistry: Plummer D. T.
7. A Biologist Guide to Principle and Techniques: Willson K. and Gounding K.H
8. Microbiology, by Prescott, Hailey and Klein. Wm.C Brown Publishers.
9. Suedecor, GW and Cochram, WG (1968) 'Statistical methods' Oxford & IBH, Delhi.
10. White, R. (2000). How Computer Works. Techmedia.

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Semester I

MB 105: Computer in Biology & Biostatistic (Generic elective)

Credits: 6

UNIT 1

- 1.1 Computer Basics: Operating Systems, Windows and Unix. Hardware, Software, Disc operating system.
- 1.2 Multimedia network concept.

UNIT 2

- 2.1 How the Internet work, Local area network.
- 2.3 Wide area network HTML & XML concepts.

UNIT 3

- 3.1 Nature and Scope of Statistical Methods and Their Limitations, Compilation, Classification, Tabulation and Applications in Life sciences- graphical representation,
- 3.2 Mean, median and mode
 - 4.2 Measures of dispersion: Range, mean deviation, standard deviation, variance mean square deviation , coefficient of variation,

UNIT 4

- 4.1 Introduction to probability theory and distributions (concept without derivations) binomial, Poisson and normal (only definition and problem).
- 4.2 Concepts of sampling and sampling distribution- tests of significance based on t, chi-square and F for means.


UNIT 5

- 5.1 Correlation and regression.
- 5.2 Theory of Attributes and Tests of Independence of Contingency Tables.
- 5.3 Applications of computers in biostatistical problems

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1. Bliss, C.I.K. (1967). Statistics in Biology, Vol.1 Mc Graw Hill, New York.
2. Campbell, R.C. (1974). Statistics for Biologists, Cambridge University Press, Cambridge.
3. Gralla, P. (2000). How Internet Works. Techmedia.
4. Hewitt, W. (1977). Microbiological Assay. Academic Press, New York.
5. White, R. (2000). How Computer Works. Techmedia.

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Semester- II CORE THEORY COURSES

MB 201: Bacteria and Cyanobacteria (core)

Credit: 6

UNIT 1

- 1.1 Microbial Evolution : Early Life Forms, Measure of Evolution, Three Domain of Life Systems.
- 1.2 Bergey's Manual of Systematic Bacteriology : Basic concept.
- 1.3 Cyanobacteria and Prochlorophytes: Classification, Cell structure, Range of thalli, Reproduction, Photosynthesis. Heterocyst and Nitrogen fixation, General account of Prochlorophytes

UNIT 2

- 2.1 Mycoplasma and Planctomyces : Classification, Morphology, Physiology, Reproduction and Pathogenicity, Comparative features between Mycoplasma and Bacteria
- 2.2 Archaea : General characteristics, Classification, Ecology, Morphology and Physiology of genera of respective groups.
- 2.2 Photosynthetic Eubacteria : Classification, Morphology, Physiology of purple bacteria and green bacteria.

UNIT 3

- 3.1 Chemolithotrophs and Methophyles : Ecology, Morphology and Physiology of each type of bacteria.
- 3.2 Gram-negative Aerobic Eubacteria : Classification, Morphology, Physiology and Ecology of representatives of Pseudomonads, Azotobacters, Rhizobia, Prosthecate bacteria, Sheathed bacteria. Spirilla, *Campylobacter*, *Bdellovibrio*, Gliding-Myxobacteria. Cytophaga group.
- 3.3 Enteric Group and Related Eubacteria : Classification, Morphology, Physiology, Ecology. Methods of analysis of Enterobacters, Vibrios, Photobacteria.

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UNIT 4

- 4.1 Gram-negative Anaerobic Eubacteria : Classification, Morphology and Physiology, Ecology of Bacteroides, Sulphur-reducing bacteria.
- 4.2 Spirochetes, Rickettsias and Chlamydias : Classification, Morphology, Physiology, Differentiation.
- 4.3 Gram-positive Endospore Forming Bacteria : Classification, Differentiation and Biochemistry of spores, Ecology of *Bacilli*, *Clostridia*, *Desulfotomaculum*.

UNIT 5

- 5.1 Gram-positive Nonsporulating Eubacteria : Classification, Morphology, Physiology of Staphylococci, Streptococci, Lactobacilli, Micrococci, Deinococci, Thermus, Corynebacteria, Propionibacteria, Arthrobacters, Mycobacteria.
- 5.2 Actinomycetes : Classification, Morphology, Reproduction, Biological importance of actinomyces, Nocardioform, Dermatophilus group, Streptomyces, Actinoplanales.

Reference Books

1. Pelzar, M.J.Jr., Chen E.C.S. and M.R.Kreig (1986). Microbiology V ed. McGraw Tata Hill Book Company, New Delhi.
2. Stanier, R.Y., Ingram, J.L., Wheelis, M.L. and P.R. Painter 1986. General Microbiology V Ed. McMillan Press Ltd., London.
3. Trainor, F.R. (1978). Introductory Phycology, John Wiley and Sons, New York.
4. Fogg, G.E., Stewart, W.D.P., Fay, P. and E.A. Walsly. (1973). The Blue-Green Algae. Audemic Press, London.
5. Madigan, M.T., Martinko, J.M. and Parker, J. (2000). Brock Biology of Microorganisms, IX Ed., Prentice Hall, International Inc.
6. Maniloff, J. (ed.) (1992). Mycoplasmas : Molecular Biology and Pathogenesis. American Soc. Microbiol. Washington D.C.
7. Davis, B.D., Dulbecco, R., Eisen, H.N. and H.S. Ginsberg. (1980). Microbiology IV Ed. Harper and Row Publishers, Singapore.

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Semester II

MB 202: Medical Microbiology and Virology (core)

Credit:6

UNIT-1

- 1.1 Infection: Type of infection, Source of infection , Factors which influence the transmission and spread of infection, Nosocomial infection.
- 1.2 Mechanisms of Pathogenesis, Virulence factors, Normal microflora of human body
- 1.3 Casual organisms, pathogenicity and diagnosis bacterial diseases:–Tuberculosis, Leprosy, Typhoid, Diarrhoea, Cholera, UTI, Dental carries,
- 1.4 Diseases caused by Rickettsia & Chlamydia

UNIT- 2

- 2.1 Casual organisms, Pathogenesis and diagnosis of the fungal diseases: Aspergillosis, Cryptococcosis, Histoplasmosis, Candidiasis
- 2.2 Mycoses, Kerationophilic Fungi, Dermatophytes- *Microsprum*, *Trichophyton* and *Epidermatophyton* , Ring worm disease (Tinea disease).
- 2.3 Casual organisms, pathogenicity and diagnosis of the protozoan disease- Giardiasis, Amebiasis, Malaria.
- 2.4 Diagnosis of microbial infection: collection of clinical samples, cultivation of microorganisms, staining, Motility test, Biochemical test, Pathogenicity test.

UNIT-3

- 3.1 Structure, morphology, Classification and nomenclature of animal viruses, Measurement of viruses.
- 3.2 Replication of Viruses (Lysogenic and Lytic), Morphology, pathogenesis, diagnosis and Prevention of Pox viruses , Herpes Simplex virus, Picorna Viruses
- 3.3 Morphology, pathogenesis and diagnosis of Paramyxo virus, Hepatitis viruses
- 3.4 Morphology, pathogenesis and diagnosis of Arboviruses, Rhabdo viruses (Rabies virus), Polio virus, Oncogenic viruses, HIV viruses

UNIT-4

- 4.1 Pathogenesis and replication, and diagnosis of Oncogenic viruses, HIV viruses
- 4.2 General account of Viral related agents- Viroids, Virusides, and Prions, Control of viral infection.
- 4.3 Serological methods: Agglutination tests, Precipitation tests, Haemagglutinin test,
- 4.4 Compliment Fixation test, Antigen-antibody reactions: ELISA, RIA.

UNIT-5

- 5.1 Cultivation of viruses in animal Inoculation, cell culture and embryonated eggs,
- 5.2 Purification of viruses.
- 5.3 Antibiotics, Antibiotic Sensitivity test, Drug resistance in bacteria
- 5.4 Types of vaccines and their use in diseases control

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