

# Revised Syllabus

## DEPARTMENT OF MICROBIOLOGY COURSE CURRICULUM & MARKING SCHEME

### B.Sc. I & II Semester MICROBIOLOGY

(Based on Choice Based Credit System)

SESSION : 2022-23



ESTD : 1958

**GOVT. V.Y.T. PG AUTONOMOUS COLLEGE,  
DURG, 491001 (C.G.)**

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A<sup>+</sup>, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

Website - [www.govtsciencecollegedurg.ac.in](http://www.govtsciencecollegedurg.ac.in), Email – [autonomousdurg2013@gmail.com](mailto:autonomousdurg2013@gmail.com)

## Department of Microbiology

### Govt. V.Y.T. PG Autonomous College, Durg (C.G.)

**Subject: Syllabus Approval for Semester and CBCS curriculum for B.Sc. with Microbiology  
(as NEP 2022 Multi-Disciplinary Course System) by the members of Board of Studies  
for Session 2022-23**

**Session 2022-23**

Semester I	No. of Credits	Semester II	No. of Credits
DSC: BMB 101 Microbial World and Principles of Microbiology	3	DSC: BMB 201 Basic Biochemistry and Physiology	3
DSC: BMBL 101 Lab Course	1	DSC: BMBL 201 Lab Course	1
*SEC: BMBSE 01 Microbiological Analysis of Air, Water & Soil to Pollution Control	2	*SEC: BMBSE 02 Microbial Products – Bio-fertilizer & Bio-pesticides	2

**\*Students may opt for any one SEC in any of the semesters till Semester VI. Successful completion of at least one SEC of the Discipline is mandatory for award of Degree.**

Semester III	No. of Credits	Semester IV	No. of Credits
DSC: BMB 301 Microbial Techniques and Instrumentation	3	DSC: BMB 401 Environmental Microbiology and Microbial Ecology	3
DSC: BMBL 301 Lab Course	1	DSC: BMBL 401 Lab Course	1
*SEC: BMBSE 03 Microbial Diagnostics and Public Health	2	*SEC: BMBSE 02 Microbial Products – Bio-fertilizer & Bio-pesticides	2
Semester V	No. of Credits	Semester VI	No. of Credits
DSC: BMB 501 Agriculture, Food and Dairy Microbiology	3	DSC: BMB 601 Medical and Veterinary Microbiology and Immunology	3
DSC: BMBL 501 Lab Course	1	DSC: BMB L601 Lab Course	1

*SEC: BMBSE 01 Microbiological Analysis of Air, Water & Soil to Pollution Control	2	*SEC: BMBSE 02 Microbial Diagnostics and Public Health	2
<b>Semester VII</b>	<b>No. of Credits</b>	<b>Semester VIII</b>	<b>No. of Credits</b>
DSC: BMB 701 Industrial Microbiology	4	DSC: BMB 801 Microbial Biotechnology	4
Choose any 2 From Pool of Courses DSE1: BMB 702 Microbial genetics (3Th+1T)	4	Choose any 2 From Pool of Courses DSE: BMB 802 Microbial Enzyme Technology (3) + BMB 802 Lab Course (1)	4
DSE: BMB 703 Food fermentation and Domestic Applications (3Th+1T)	4	DSE: BMB 803 Advanced Microbiology (3Th +1T)	4
DSE: BMB 704 Basic Computer, Biostatistics and Bioinformatics (3) + BMBL 704 Lab Course (1)	4	DSE5: BMB 804: Biosafety and Intellectual Property Rights (3Th +1T)	4

## Marking Scheme

### 4Yr UG Program B.Sc. (Multidisciplinary) with Microbiology

#### CBCS Pattern

Session 2022-23

#### B.Sc. Microbiology Semester I & II

Course. Type	Course Code	Marks	
		Max	Min
DSC	BMB 101	75	30
DSC	BMBL 101	25	10
DSC	BMB 201	75	30
DSC	BMBL 201	25	10
SEC	BMBSE 01	75	30
SEC	BMBSE 02	25	10

**Absolute Grading System (for conversion of marks into grade points)**

Letter Grade	Grade point	MB TH%	MB Lab %	SEC %
O (Outstanding) 10	10	90-100	95-100	95-100
A+(Excellent) 9	9	80-90	90-95	80-95
A (Very Good) 8	8	70-80	80-90	70-80
B+(Good) 7	7	60-70	70-80	60-70
B (Above Average) 6	6	50-60	60-70	50-60
C(Average) 5	5	40-50	50-60	40-50
P (Pass) 4	4	35-40	40-50	35-40
F(Fail) 0	0	0	0	0
Ab (Absent) 0	0	0	0	0


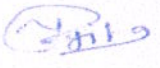


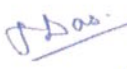



**Sample Grade Sheet**

Courses	Credit Ci	Marks ESE	Marks obtained	Internal	% Marks Obtained =80%ESE +Int	Grade Point Gi	CiGi	SGPA
Chemistry	3	75	70	20	76/80 = 96%	10	30	8.09
Botany	3	75	50	20	60/80 =75%	8	24	
Microbiology	3	75	60	20	80	7	28	
Chem Lab	1	25	20	-	80	8	8	
Bot Lab	1	25	23	-	92	10	10	
Micro Lab	1	25	23	-	92	10		
GEC 1 (Biotech eg)	4	100	70	15	71	8	32	
AEC (Hindi)	2	50	30	10	34/50=68%	7	14	
VAC (yoga/sports)	2	50	30	10	68%	7	14	
SEC 01	2	50	40	10	84%	9	18	
<b>Total</b>	<b>22</b>	<b>450</b>	<b>280</b>		<b>560</b>	<b>62</b>	<b>178</b>	

CGPA of an Academic Yr =  $\frac{SGPA1 + AGPA2}{2}$  or  $\frac{(SGPA1 + SGPA2 + \dots + SGPA_n)}{n}$ ,

\*n is total number of semesters

**Name and Signatures**

Chairperson/ HOD- Dr. Pragya Kulkarni 	Student Nominee – Ms. Yogita Lokhande 
Subject Expert - Dr. Anita Mahiswar 	Departmental members
Subject Expert - Dr. Sonal Mishra 	1. Mrs. Rekha Gupta
VC Nominee – Dr. Prakash Saluja	2. Mrs. Neetu Das 
Industrial Representative- Shri Amitesh Mishra 	3. Ms. Anamika Sharma 
Member of Other Department- Dr. Ranjana Shrivastava	4. Ms. Priya Ssao 

Session 2022-23

**B.Sc. Microbiology**

**Semester I**

**BMB 101 Microbial world and Principles of Microbiology**

**Credits: 3; Lectures: 45**

**Upon successful completion of the course students will be able –**

- CO1** To developed a good knowledge of the development of Microbiology and the contributions made by prominent scientists in this field
- CO2** To understand the characteristics of different types of microorganisms, methods to organize/classify these into and basic tools to study these in the laboratory
- CO3** To be able to explain the useful and harmful activities of the microorganisms
- CO4** To perform basic experiments to grow and study microorganisms in the laboratory

**Unit 1-** History of microbiology and introduction to the microbial world. Germ theory of disease, Development of various microbiological techniques and golden era of microbiology. Contributions of Antony von Leeuwenhoek, Louis Pasteur, Robert Koch, Alexander Fleming, and Edward Jenner. Baltimore classification of virus, the three-domain system of Carl Woese, Five kingdom classification of Whittaker and their utility. **(08 Lectures)**

**Unit 2-** Physiochemical and biological characteristics of microorganisms (including viruses); General characteristics of Cellular microorganisms- Virus, Bacteria, wall-less forms - MLO (mycoplasma and spheroplasts) with emphasis on distribution and occurrence, morphology, mode of reproduction and economic importance. **(09 Lectures)**

**Unit 3-** General characteristics, structure, mode of reproduction and economic importance of actinomycetes with special reference to its application in medicine and industry. General characteristics, occurrence, structure, reproduction and importance of Fungi, Cyanobacteria and Protozoa. **(08 Lectures)**

**Unit 4-** Methods of studying microorganism; Staining techniques: simple staining, Gram staining, negative staining and acid-fast staining. Sterilization techniques (physical & chemical sterilization). Culture media & conditions for microbial growth. Pure culture isolation: Streaking, serial dilution and plating methods; cultivation, maintenance and preservation of pure cultures. **(08 Lectures)**

**Unit 5-** Beneficial and harmful microbes and their role in daily life. Gram positive and gram-negative bacteria General characteristic features and importance of following microorganisms- Influenza virus, Lactobacillus, Clostridium, Staphylococcus, E. coli, Mycobacterium, Pseudomonas, Aspergillus, Penicillium, Trichophyton, Microsporum. **(12 Lectures)**

**Name and Signatures:**

**Chairperson/ HOD**

**Subject Expert**

**Subject Expert**

**VC Nominee**

**Industrial Representative**

**Member of Other Department**

**Student Nominee**

**Departmental members:**

### Recommended Books:

1. Prescott, M.J., Harley, J.P. and Klein, D.A. Microbiology. 5th Edition WCB Mc Graw Hill, New York, (2002).
2. Tortora, G.J., Funke, B.R. and Case, C.L. Microbiology: An Introduction. Pearson Education, Singapore, (2004).
3. Alcom, I.E. Fundamentals of Microbiology. VI Edition, Jones and Bartlett Publishers. Sudbury. Massachusetts, (2001).
4. Black J.G. Microbiology-Principles and Explorations. John Wiley & Sons Inc. New York, (2002).
5. Pelczar, M.J., Chan ECS and Krieg NR, Microbiology McGraw-Hill.
6. Willey, Sherwood, Woolverton. Prescott, Harley, and Klein's Microbiology McGraw-Hill publication
7. Tortora, Funke, Case. Microbiology. Pearson Benjamin Cummings.
8. Jacquelyn G. Black. Microbiology Principles and explorations. John Wiley & Sons, Inc.
9. Madigan, Martinko, Bender, Buckley, Stahl. Brock Biology of Microorganisms. Pearson
10. Tom Besty, D.C. Jim Koegh. Microbiology Demystified McGraw-Hill.

**Session 2022-23**  
**B.Sc. Microbiology**  
**Semester I**  
**BMBL 01 Lab Course**

**Credit: 1; Lab Periods: 30**

**List of Practical Exercises**

**Upon successful completion of the Lab course students will be able-**

- CO 1 To be familiar with common laboratory instruments/ equipment of microbiology
- CO 2 To understand the methods of obtaining microorganisms under lab conditions for study
- CO 3 To differentiate microorganisms on the basis of microscopic features
- CO 4 To Study common microscopic organisms

**List of exercises**

1. Microbiology Good Laboratory Practices and Bio-safety.
2. To study the principle and applications of important instruments (biological safety cabinets, autoclave, incubator, BOD incubator, hot air oven, light microscope, pH meter) used in the microbiology laboratory.
3. Preparation of culture media (liquid & solid) for bacterial cultivation.
4. Handling and care of laboratory equipment - autoclave, hot air oven, incubator, and laminar airflow.
5. Sterilization of media using autoclave and assessment of sterility.
6. Sterilization of glassware using hot air oven.
7. Pouring, Plating and Streaking of Pure culture technique
8. Demonstration of the presence of microflora in the environment by exposing nutrient agar plates to air.
9. Gram staining of bacteria
10. Observation of microorganisms - bacteria, cyanobacteria protozoa, fungi, yeasts, and algae from natural habitats.
11. Study of common fungi and protozoan using temporary / permanent mounts.

**Name and Signatures:**

  
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**Subject Expert**

  
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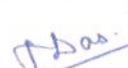
  
**VC Nominee**

  
**Industrial Representative**

  
**Member of Other Department**

  
**Student Nominee**

**Departmental members:**









Session 2022-23

**B.Sc. Microbiology**  
**Semester II**

**BMB 201 Basic Biochemistry and Physiology**

**Credits: 3; Lectures: 45**

**Upon successful completion of the course students will be able to–**

- CO1** Developed a very good understanding of various biomolecules which are required for development and functioning of a bacterial cell.
- CO2** Have developed how the carbohydrates make the structural and functional components such as energy generation and as storage food molecules for the bacterial cells
- CO3** Well conversant about multifarious function of proteins; are able to calculate enzyme activity and other quantitative and qualitative parameters of enzyme kinetics; also knowledge about lipids and nucleic acids.
- CO4** Student are able to make buffers, study enzyme kinetics and calculate  $V_{max}$ ,  $K_m$ ,  $K_{cat}$  values.

**Unit 1- Concept of bio-molecules-Building blocks of life:** Macromolecules, Concept of Bioenergetics- First and second laws of Thermodynamics, Energy rich compounds: ATP, amino acids the building blocks of proteins. Classification biochemical structure and notation of standard protein amino acids, Ninhydrin reaction, General formula of amino acid and concept of zwitterion, Non-protein amino acids: Gramicidin, beta-alanine, D alanine and D-glutamic acid.

**(08 Lectures)**

**Unit 2- Carbohydrate:** Monosaccharides – aldoses and ketoses, trioses, tetroses, pentoses, and hexoses. Stereo isomerism of monosaccharides, epimers, mutarotation and anomers of glucose. Furanose and pyranose forms of glucose and fructose, chair and boat forms of glucose. Disaccharides - concept of reducing and non-reducing sugars, occurrence of maltose, lactose, and sucrose, polysaccharides - storage polysaccharides, starch and glycogen. Structural polysaccharides, cellulose, peptidoglycan and chitin

**Protein:** Primary, secondary, tertiary and quaternary structures. Enzymes: Structure of enzyme, Apoenzyme and cofactors, prosthetic group, Classification of enzymes, Mechanism of action of enzymes: active site, Lock and key hypothesis, and Induced Fit hypothesis.  $K_m$ , and allosteric mechanism. Definitions of terms – enzyme unit, Effect of pH and temperature on enzyme activity. Enzyme inhibition: competitive- sulfa drugs; non-competitive-heavy metal salts.

**(12 Lectures)**

**Unit 3- Lipids:** Definition and major classes of storage and structural lipids. Fatty acids, structure and functions. Essential fatty acids. Triacylglycerols structure, functions and properties. Saponification Structural lipids. Phosphoglycerides: Building blocks, general structure, functions and properties. Structure of Sphingolipids: building blocks, structure of sphingosine, Lipid functions: cell signals, cofactors, Introduction to lipid micelles, monolayers, bilayers.

**Nucleic acids and vitamins:** Base composition. A+T and G+C rich genomes. Structure and functions of DNA and RNA. Concept and types of vitamins and their role in metabolism.

**(12 Lectures)**

**Unit 4-** Definitions of growth, measurement of microbial growth, Batch culture, Continuous culture, generation time and specific growth rate, synchronous growth, diauxic growth curve. Microbial growth in response to environment -Temperature (psychrophiles, mesophiles,


thermophiles, extremophile), pH (acidophiles, alkaliphiles), solute and water activity (halophiles, xerophiles, osmophilic), Oxygen (aerobic, anaerobic).


(06 Lectures)

**Unit 5-** Microbial growth in response to nutrition and energy – Autotroph/Phototroph, heterotrophy, Chemo-lithoautotroph, Chemo-lithoheterotroph, Chemoheterotroph, Chemolithotroph, photolithoautotroph, Photo-organoheterotroph. Passive and facilitated diffusion. Primary and secondary activetransport, concept of uniport, symport and antiport.


(07 Lectures)

**Name and Signatures:**

  
Chairperson/ HOD


  
Subject Expert

  
Subject Expert

  
VC Nominee

  
Industrial Representative

  
Member of Other Department

  
Student Nominee

**Departmental members:**







Dpt. of Microbiology, Govt. VYTPG Auto. College, Durg

### Recommended Books:

1. Tortora, G.J., Funke, B.R and Case, C.L. Microbiology: An Introduction. Pearson Education, Singapore, (2004).
2. Stanbury, Biochemistry
3. Voet.Fundamentals of biochemistry Wiley
4. M.M. Cox, D. L. Nelson.Lehninger's principles of biochemistry.
5. W H Freeman Stryer. Biochemistry W H Freeman
6. Stanier, Ingraham, Wheelis and Painter. The Microbial world. Mc Millan Educational Ltd., London.
7. Moat and Foster, Microbial Physiology. Wiley.
8. Umbreit. Essentials of Bacterial Physiology.
9. Skokatch. Bacterial Physiology and Metabolism.
10. Kushner, D.J. Microbial life in Extreme Environments. Academic Press.
11. Pawar. C.B. Cell Biology.
12. Sturart. Harris and Harris. The control of Antibiotic Resistance in Bacteria.
13. Franklin and Snow, Biochemistry of Antimicrobial Action. Chapman and Hall, New York.
14. Philipp. G. Mannual of Methods for General Bacteriology.
15. David T. Plummer. An Introduction to Practical Biochemistry.
16. Subba Rao, N.S. Soil Microorganisms and Plant Growth.

**Session 2022-23**  
**B.Sc. Microbiology**  
**Semester II**  
**BMBL 02 Lab Course**

**Credits: 1; Lab Periods: 30**

**List of Practical Exercises**

Upon successful completion of the Lab course students will be able-

CO 1 To be familiar with pH scale and buffers

CO 2 To understand the qualitative and quantitative tests for carbohydrates and proteins


CO 3 To study enzyme kinetics and factors affecting

CO 4 To analyse the growth properties of E.coli

1. Properties of water, concept of pH and buffers, preparation of buffers and Numerical problems to explain the concepts.
2. Qualitative/Quantitative tests for carbohydrates, reducing sugars, non-reducing sugars.
3. Qualitative/Quantitative tests for lipids and proteins.
4. Study of protein secondary and tertiary structures with the help of models.
5. Study of enzyme kinetics – calculation of  $V_{max}$ ,  $K_m$ ,  $K_{cat}$  values.
6. Study effect of temperature, pH and heavy metals on enzyme activity.
7. Study and plot the growth curve of E.coli by turbidometric and standard plate count methods.
8. Calculations of generation time and specific growth rate of bacteria from the graph plotted with the given data.
9. Effect of temperature, pH, carbon and nitrogen sources on and salt growth of E.coli.
10. Demonstration of the thermal death time and decimal reduction time of E.coli.

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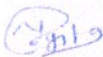
  
**Subject Expert**

  
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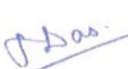
  
**VC Nominee**

  
**Industrial Representative**

**Member of Other Department**

  
**Student Nominee**

**Departmental members:**







Session 2022-23

B.Sc. – Microbiology

Skill Based Enhancement Course

BMBSE 01 Microbiological Analysis of Air, Water & Soil to Pollution

Control

Credits: ~~02 (1Th + 1Lab)~~

Total: ~~15 Lectures + 30 lab~~

25

Upon successful completion of the course students will be able to–

CO1 Established a very good understanding of air, water and soil inhabiting microorganisms

CO2 Recognized the methods of analysis of air, water and soil and contribute to control of environmental pollution

**Aero-microbiology:** Bioaerosols, Air borne microorganisms, allergens (bacteria, Viruses, fungi) and their impact on human health and environment, significance in food and pharma industries and operation theatres.

**Water- microbiology:** Water borne pathogens; water borne diseases.

**Soil- microbiology:** Soil borne pathogens; soil borne diseases.


**Sampling of Bioaerosol:** air samplers, methods of analysis, CFU, culture media for bacteria and fungi, Identification characteristics.

**Sampling of Water:** methods to detect potability of water samples: (a) standard qualitative procedure; presumptive/MPN tests, confirmed and completed tests for faecal coliforms (b) Membrane filter technique and (c) Presence/absence tests

**Sampling of soil:** sample collection and analysis. Isolation and identification of pathogens. Soil testing methods.

**Control Measures:** Fate of bioaerosols, inactivation mechanisms – UV light, HEPA filters, desiccation, Incineration. Precipitation, chemical disinfection, filtration, high temperature, UV light. Soil treatment.

Name and Signatures:

  
Chairperson/ HOD


  
Subject Expert

  
Subject Expert

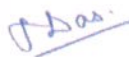
  
VC Nominee

  
Industrial Representative

  
Member of Other Department

  
Student Nominee

Departmental members:







## Reference Books-

1. Medigan, M.T., Martinko, J. M. and Parker, J. Brock Biology of Microorganisms. Pearson Education Inc. New York
2. Alexander, M John. Microbial ecology. Wiley & Sons, Inc., New York.
3. Alexander, M John. Introduction to soil microbiology. Wiley & Sons Inc., New York.
4. Barker, KH, and Herson, D.S. Bioremediation. Mc Craw Hill Inc., New York.
5. Chapelle, F.H. Ground Water Microbiology and Geochemistry. New York: John Wiley & Sons, 2000.
6. Droste, R. L. Theory and Practice of Water and Wastewater Treatment. New York: John Wiley & Sons, 1996.
7. K.R. Aneja. Laboratory Manual of Microbiology and Biotechnology New Age Publications. 2014

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Session 2022-23

B.Sc. – Microbiology

Skill Based Enhancement Course

**BMBSE 02 Microbial Products – Bio-fertilizer & Bio-pesticides**

Credits: 02 (1Th +1Lab)

Total : 15 Lectures + 30 lab

Upon successful completion of the course students will be able to–

- CO1** Developed a very good understanding of microorganisms used as biofertilizers/ Biopesticides
- CO2** Get acquainted with the methods of the production of Biofertilizers/ bio pesticides/bioinsecticides

**Bio fertilizers:** General account of the microbes used as bio fertilizers for various crop plants and their advantages over chemical fertilizers.

**Symbiotic N2 fixers:** *Rhizobium* - Isolation, characteristics, types, inoculum production and field application, *Frankia* - Isolation, characteristics, Cyanobacteria as bio-fertilizers- Isolation, characterization, mass multiplication, field application.

**Non - Symbiotic Nitrogen Fixers:** Free living *Azospirillum*, *Azotobacter*- free isolation, characteristics, mass inoculum production and field application


**Phosphate Solubilizers:** Phosphate solubilizing microbes - Isolation, characterization, mass Inoculum production, field application. PGPR – Isolation and Characterization; mass production and application

**Mycorrhizal Bio-fertilizers:** Importance of mycorrhizal inoculum, types of mycorrhizae and associated plants, Mass inoculum production of VAM, field applications of VAM

**Bioinsecticides:** General account of microbes used as bioinsecticides and their advantages over synthetic pesticides, production, Field applications

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Subject Expert

  
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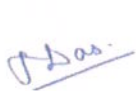
  
VC Nominee

  
Industrial Representative

  
Member of Other Department

  
Student Nominee

Departmental members:







## Reference Books

1. Eldor A .Paul. Soil Microbiology.
2. Ecology and Biochemistry. VI Edition: Academic Press, (2007).
3. Eugene L. Madsen. Environmental Microbiology: From Genomes to Biogeochemistry. I Edition, Wiley-Blackwell Publishing. (2008).
4. Agrios, G.N. Plant pathology. Harcourt Asia Pvt. Ltd. (2000).
5. Buchanan, B.B., Gruissem, W and Jones, R.L Biochemistry and Molecular Biology of Plants. I.K. International Pvt. Ltd. (2000).
6. Mehrotra R S and Ashok Agrawal. Plant Pathology. Tata Mc Graw Hill ,6<sup>th</sup> reprint (2006).
7. K. S. Bilgrami, H. C. Dube. A textbook of modern pathology. 6<sup>th</sup> Edition, Vani Educational Books, a division of Vikas, (1984).
8. Shalini Suri. Biofertilizer and Biopesticide Aph Publishing Corporation (2011)

Dpt. of Microbiology, Govt. VIT PG Auto. College, Durg



Session 2022-23

B.Sc. – Microbiology

Skill Based Enhancement Course

BMBS 03 Microbial Diagnostics and Public Health

Credits: 02 (1Th +1Lab)

Total: 15 Lectures + 30 lab

Upon successful completion of the course students will be able to–

**CO1** Developed understanding of collection of different clinical samples, their transport, culture and examination by staining, and molecular and immunological diagnostic methods for diagnosis of microbial diseases.

**CO2** Established understanding of antibiotic sensitivity testing, water and food testing skills use of testing kits available in the market.

**Diseases of human body systems:** Various Bacterial, Viral, Fungal and Protozoan.

**Collection of Clinical Samples:** Oral cavity, throat, skin, Blood, CSF, urine and faeces and precautions required. Method of transport of clinical samples to laboratory and storage.

**Direct Microscopic Examination and Culture:** Examination of sample by staining - Gram stain, Ziehl-Neelson staining for tuberculosis, Giemsa-stained thin blood film for malaria.

**Preparation and use of culture media:** Blood agar, Chocolate agar, Lowenstein-Jensen medium, Mac Conkey agar, Distinct colony properties of various bacterial pathogens.

**Serological Methods:** Agglutination, ELISA, Kits for Rapid Detection of Pathogens: Typhoid, Dengue and HIV, Swine flu.

**Testing for Antibiotic Sensitivity in Bacteria:** Importance, Determination of resistance/sensitivity of bacteria using disc diffusion method, Determination of minimal inhibitory concentration (MIC) of an antibiotic by serial double dilution method.

#### Reference Books

1. Ananthanarayan R and Paniker CKJ. Textbook of Microbiology. 7<sup>th</sup> Edition. University Press Publication. (2005).

#### Name and Signatures:

  
Chairperson/ HOD  
Nominee

  
Subject Expert

  
Subject Expert

VC

  
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Departmental members:

