

**B.Sc. Microbiology Honours****6 Semester Course****List of the Courses**

Sl No	Name of the Course	Semester	Course Code	Credit	Marks in the Course	Name of the Programme	Programme Code	Course outcome	Employability/Skill	Introdcuti on year of new course	BoS Date	Percentag e of Revision	BoS Date
1	GENERAL MICROBIOLOGY-I, MICROBIOLOGICAL METHODS, BIOPHYSICS, STEREOCHEMISTRY AND BIOMOLECULES-I, BIOMETRY I	1	MCBA P1 T	10	100	B.Sc. Microbiology Hons	MCBA	To understand some of the basic concepts of different aspects of biometry needed in Microbiology,To understand the basic classification system of different microbes,To understand some of the basic concepts of different aspects of biochemistry needed in Microbiology,To have a basic overview of history and developments of Microbiology	Structure and function of bacterial, algal, fungal and protozoal cells and organelles; Knowledge on microscope, stains, acid, buffer, stereochemistry and biometry			20	20.02.2018

2	<p>Operation of light microscope</p> <p>Preparation of culture media</p> <p>Cultivation of microorganisms</p> <p>Study of microorganisms by staining techniques</p> <p>Study of algae by temporary mounts</p> <p>Isolation of pure culture</p> <p>Micrometry</p>	1	MCBA P1 P	4	50	B.Sc. Microbiology Hons	MCBA	<p>To have a basic overview of good laboratory practices of Microbiology,</p> <p>To understand the basic working principle of different instruments used in Microbiology, To understand the basic techniques used in Microbiology, To identify different microorganisms by their morphology from their slides</p>	<p>Handling of microscopes, preparation of culture media, culturing bacteria, isolation of pure culture from mixed culture, staining and identification of algae, fungi; measurement of cells and spores.</p>				
3	<p>GENERAL MICROBIOLOGY-II</p> <p>BIOPHYSICS AND BIOMOLECULES-II</p> <p>CELL BIOLOGY- I</p> <p>MOLECULAR BIOLOGY-I</p> <p>BIOMETRY-II</p>	2	MCBA P2 T	10	100	B.Sc. Microbiology Hons	MCBA	<p>To have a basic overview microbial growth and nutrition, To understand the different aspects of cell and molecular biology,</p> <p>To understand some of the basic concepts of different aspects of biochemistry needed in Microbiology,</p> <p>To understand some of the basic concepts of different aspects of biophysical chemistry needed in Microbiology</p>	<p>Knowledge on bacterial nutrition, growth and their control; carbohydrates, lipids; principles of radioactivity and spectroscopy; structure and function of eukaryotic cells; genetic material, DNA replication; application of mathematics in biology</p>			20	05.03.2014

4	<p>Qualitative tests for carbohydrates</p> <p>Separation of amino acids</p> <p>Separation of lipids by thin layer chromatography</p> <p>Estimation of amino acid (glycine) by formol titration</p> <p>Staining of capsule</p> <p>Enumeration of microbes (yeast) by haemocytometer</p>	2	MCBA P2 P	4	50	B.Sc. Microbiology Hons	MCBA	<p>To have a basic overview statistical methods used in laboratory, To understand the process of capsule and endospore staining of microbes, To understand the underlying principle of partition coefficient, To understand nature of different biomolecules by various techniques</p>	<p>Identification of carbohydrate; separation of amino acids and lipids; estimation of amino acids; capsule staining; enumeration of cells by haemocytometry; application of mathematics in biology</p>			20	28.02.2015
5	<p>CELL BIOLOGY-II</p> <p>MOLECULAR BIOLOGY- II</p> <p>BIOCHEMISTRY-I</p> <p>MICROBIAL ECOLOGY- I</p>	3	MCBA P3 T	10	100	B.Sc. Microbiology Hons	MCBA	<p>To have a basic overview of different aspects of cell biology of organisms, To understand the different aspects of some aspects of enzyme biochemistry of cell, To understand some of the basic concepts of different aspects of microbial ecology, To understand some of the basic concepts of different aspects of molecular biology needed in Microbiology</p>	<p>Transport and cell signaling; transcription and translation of DNA; enzymology; microbes in natural habitats</p>			40	11.09.2015

6	<p>Isolation of pure culture from natural resources</p> <p>Microbiological examination of water</p> <p>IMViC reactions</p> <p>Microbiological assay of antibiotics</p> <p>Determination of Minimal Inhibitory Concentration (MIC) by serial dilution method for assaying commonly used antibiotics</p> <p>Biochemical activities of microorganisms</p> <p>Measurement of growth by turbidometry</p> <p>Isolation of mutants of bacteria by UV exposure</p>	3	MCBA P3 P	4	50	B.Sc. Microbiology Hons	MCBA	<p>To have a basic understanding of microorganisms in some natural sources, To have a hands on experience of laboratory testing of water, To have a basic understanding of biotyping of bacteria in laboratory, To understand the basic concept of mutation of bacteria due to physical means</p>	<p>Employability in organizations and laboratories dealing with public health.</p> <p>Isolation of microorganisms from natural samples including soil, air, water; microbial analysis of water; generation of antibiogram pattern; biochemical characterization of bacteria; study of bacterial growth.</p>	2016-17	11.09.2015		
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7	CELL BIOLOGY-III METABOLISM AND BIOENERGETICS MICROBIAL ECOLOGY II A-FOOD MICROBIOLOGY MICROBIAL ECOLOGY IIB- SOIL MICROBIOLOGY IMMUNOLOGY – I	4	MCBA P4 T	10	100	B.Sc. Microbiology Hons	MCBA	To some of the basic concepts of different aspects of cell biology needed in Microbiology,To understand the basic aspects of plant pathology,To have a basic idea about different metabolism in cells,To have a basic idea about innate immune systems in organisms	Mating and secretory pathways of yeast; mitosis and meiosis; apoptosis; metabolism of carbohydrates, proteins, lipids and nucleic acids; microbiology of food; interaction of microorganisms in microhabitat; plant diseases; overview of immune system			60	10.02.2016
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8	<p>Microbiological examination of milk Isolation of pure culture from natural resources Isolation, ammonium sulphate precipitation and quantitative estimation of protein by Folin-Lowry method Isolation of Protease, Amylase, Phosphatase producing microorganisms from soil Microbial quality study of fresh salad vegetables using dilution plating technique Observation of the stages of cell division and mitotic chromosomes Stain and identify</p>	4	MCBA P4 P	4	50	B.Sc. Microbiology Hons	MCBA	<p>To experience the laboratory testing of milk quality, To experience isolation of microbes from various food sources, To isolate various attributed microbes from soil, To have a basic idea about various stages of cell division</p>	<p>Employability in companies dealing with food processing, dairy industries. Microbiological analysis of food; study of mitotic and meiotic cells; screening mycorrhiza.</p>	20	01.03.2017
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9	GENETICS , GENOMICS - I AND BIOINFORMATICS INDUSTRIAL MICROBIOLOGY VIROLOGY I IMMUNOLOGY-II MEDICAL MICROBIOLOGY	5	MCBA P5 T	13	100	B.Sc. Microbiology Hons	MCBA	To have a preliminary idea about genetics needed in microbiology,To understand the basic concepts of bioinformatics needed in microbiology,To understand the basic concepts of virology and immunology,To understand the basic concepts of industrial microbiology	Eukaryotic and prokaryotic genome organization; linkage, crossing over, mapping; exchange of genetic material in bacteria; bioinformatics; industrial application of microbes; structure of virus; immunology ; human microbiome and pathogenesis.			30	05.03.2014
10	Molecular Biology Biochemistry Bioinformatics	5	MCBA P6 P	13	100	B.Sc. Microbiology Hons	MCBA	To have a hands on experience on molecular biology, To understand the basic concepts of enzyme biochemistry, To understand the basic concepts of bioinformatics used in laboratory	Emplyability in biotechnological and pharmaceutical industries. Isolation of DNA and RNA; separation of nucleic acid by gel electrophoresis; transformation in bacteria; enzymology; bioinformatics				

11	<p>GENETICS AND GENOMICS-II  IMMUNOLOGY-III  VIROLOGY II  RECOMBINANT DNA TECHNOLOGY  MEDICAL MICROBIOLOGY</p>	6	MCBA P7 T	13	100	B.Sc. Microbiology Hons	MCBA	<p>To understand about genetic exchange and recombination, To understand about gene mutation and its repair, To understand about viral molecular biology, To understand about cancer, population and evolutionary genetics</p>	<p>Recombination of DNA; transposon; mutants and mutation; cancer biology; model organisms; population genetics; hypersensitivity and vaccines; replication of virus; recombinant DNA technology; microbial diseases and their control by chemotherapeutic agents</p>			30	10.02.2016
12	<p>GENETICS AND GENOMICS-II  IMMUNOLOGY-III  VIROLOGY II  RECOMBINANT DNA TECHNOLOGY  MEDICAL MICROBIOLOGY  Antigen-Antibody interaction  Restriction digestion of DNA  Ligation of DNA fragment  SDS-PAGE and Western Blotting  Project/Review  Grand Viva</p>	6	MCBA P8 P	13	100	B.Sc. Microbiology Hons	MCBA	<p>To understand about the concepts of immunology, To experience hands on project, To experience hands on VDRL and Widal test</p>	<p>Empliability in pathological laboratories. Blood typing and other serotyping techniques; restriction digestion; western blotting; SDS_PAGE electrophoresis; scientific writing and oral presentation with power point</p>			20	08.08.2017



13	Basic Microbiology, Microscopy and Staining techniques Bacterial Morphology, Bacterial Growth and Eukaryotic Microbiology	1	MCBG P1T	2	50	B.Sc. Microbiology Hons	MCBA	Understanding Scope of Microbiology, Whittaker's Five kingdom classification General principles of optics in relation to microscopy Definition of Auxochrome, chromophore Different cell morphology Nutritional types of bacteria Eukaryotic microbiology	Microscopy and stains; morphology of bacterial and eukaryotic cells; growth and nutrition of bacteria	2017-18	01.03.2017		
14	Demonstration of Laboratory Instruments Microscopy Micrometry Staining Culture media Preparation Aseptic techniques	1	MCBG P1P	1	25	B.Sc. Microbiology Hons	MCBA	Direct hands-on training on Ethics of Culture room, operation of autoclave, hot air oven, laminar air flow, incubator: Principle and uses Description and operation of compound microscope. Use of oil immersion objective. cell measurement (using ocular micrometer and stage micrometer) Staining Culture transfer from solid to solid, solid to liquid.	working with microscope; observing bacterial cells after staining; preparation of culture media and culturing bacteria in the laboratory; measuring cells	2017-18	01.03.2017		

15	Virology, Biomolecules, Enzymes and Bacterial Metabolism Environmental Microbiology-I (Soil Microbiology and Plant Pathology) and Control of Microbial Growth	2	MCBG P2T	2	50	B.Sc. Microbiology Hons	MCBA	<p>Understanding and learning of Definition, general characteristics of viruses, functions of virion proteins and difference between bacteria and viruses</p> <p>Classification of viruses</p> <p>Viral reproduction</p> <p>Outline structure, function and examples of carbohydrates, amino acids, proteins (primary, secondary, tertiary and quaternary structure brief outlines only), lipids, DNA, RNA.</p> <p>General properties of enzymes</p> <p>Catabolism of glucose</p> <p>Soil Microbiology and Plant Pathology</p>	<p>structure and role of virus; structure and function of biomolecules including enzymes; respiration of bacteria; microbial interactions; biogeochemical cycles; control of bacterial growth</p>	2017-18	01.03.2017		
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16	Qualitative tests for carbohydrates (glucose, fructose, sucrose) and proteins. 2. Culture techniques	2	MCBG P2P	1	25	B.Sc. Microbiology Hons	MCBA	<ul style="list-style-type: none"> <li>a) Isolation of pure culture by Streak plate technique.</li> <li>b) Viable counting of bacteria by serial dilution and pour plating, spread plating.</li> <li>c) Isolation of bacteria from soil by serial dilution and pour-plate/spread plate method.</li> <li>d) Testing milk samples: Methylene Blue reduction test of milk samples.</li> <li>e) Microbiological examination of water: Multiple tube fermentation test method for detection of coliform bacteria-</li> </ul>	Isolation of pure culture from mixed culture; isolation of bacteria from soil; microbiological analysis of water	2017-18	01.03.2017		
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17	Environmental Microbiology-I Molecular Biology-I and Industrial Microbiology	3	MCBG P3T	2	50	B.Sc. Microbiology Hons	MCBA	Attaining fundamental knowledge on Aeromicrobiology Air Sample Collection and Analysis Control Measures Food Microbiology Water Microbiology Structures of DNA and RNA / Genetic Material Replication of DNA Transcription Translation Regulation of gene Expression Industrial Microbiology	Role of microorganisms in air, water and food, transcription, translation and replication of DNA; microbes used in industry	2017-18	01.03.2017		
18	Microbiological assay of antibiotics Determination of Minimal Inhibitory Concentration Biochemical activities of microorganisms	3	MCBG P3P	1	25	B.Sc. Microbiology Hons	MCBA	Getting hands on knowledge Microbiological assay of antibiotics Determination of Minimal Inhibitory Concentration Biochemical activities of microorganisms	Generation of antibiogram; biochemical characterization of bacteria; isolation of industrially important microbes	2017-18	01.03.2017		

19	Molecular Biology-II and Bacterial Genetics and Recombinant DNA Technology Immunology and Medical Microbiology	4	MCBG P4T	2	50	B.Sc. Microbiology Hons	MCBA	<p>Mutations and Repair Bacterial Transformation Attaining the basic knowledge on Basic properties and types of vectors Introduction of DNA into Living cells Overview of the immune system, Concept of immunity, History of immunology Normal microflora of the human body: Importance of normal microflora, normal microflora of skin, throat, gastrointestinal tract, urogenital tract. Host pathogen interaction</p>	<p>Mutagenic substances and mutation process; genetic exchange in bacteria; vector; immunological barriers; human microbiome and chemotherapeutic agents</p>	2017-18	01.03.2017		
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20	<p>1. Study of different stages of mitosis from onion root.</p> <p>2. Demonstration of blood group typing.</p> <p>3. Demonstration of antigen-antibody interaction by Ouchterlony double diffusion assay.</p> <p>4. Demonstration of Radial immunodiffusion.</p> <p>5. VDRL test</p> <p>6. WIDAL test</p> <p>7. Identification of normal microbial flora of the throat or skin.</p> <p>8. Study of survival curve of bacteria after exposure to ultraviolet (UV) light.</p>	4	MCBG P4P	1	25	B.Sc. Microbiology Hons	MCBA	<p>Acquiring the skill in Demonstration of blood group typing, Demonstration of antigen-antibody interaction, Demonstration of Radial immunodiffusion, VDRL test, WIDAL test</p>	<p>Study of mitotic cells; Blood grouping and other serotyping procedures; isolation of bacteria from human body</p>	2017-18	01.03.2017		
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