



ಅದಿಕವಿ ಶ್ರೀ ಮಹರ್ಷಿ ವಾಲ್ಮೀಕಿ ವಿಶ್ವವಿದ್ಯಾನಿಲಯ, ರಾಯಚೂರು
ADIKAVI SRI MAHARSHI VALMIKI UNIVERSITY, RAICHUR

Krishna Tunga Campus, Mantralay Road (N.H. 167), Yergera -584133, Raichur, Karnataka

Syllabus for

Master of Science (M. Sc.)
Semester Scheme - CBCS

MICROBIOLOGY

With effect from
2025-26 & onwards

CHAIRMAN
Department of Micro-Biology
Raichur University, Raichur

(Dr. Virupakshiah. B)

I SEMESTER

HCT 1.1 GENERAL MICROBIOLOGY		
Course Code : HCT 1.1	Credit :4	
Total Contact Hours : 60 T	Internal Assessment: 20 M	Examination: 80 M
Course outcome: ➤ At the end of the course the student will have broad and balanced knowledge of Microbiology. The History, general characters and classification of Microorganisms. ➤ Understanding the different branches of microbiology. ➤ Comprehend evolutionary importance of prokaryotic and eukaryotic cells. ➤ Understanding the structural organization of the bacteria and eukaryotic microorganism.		
UNIT-I		
History and Scope of Microbiology Basic microbiology: Landmark achievements in 20 th century: Reputation of a biogenesis: discovery of penicillin, Theory of Spontaneous generation. Major contribution of scientists– Antony Van Leeuwenhoek, Edward Jenner, Alexander Fleming, Joseph Lister, Robert Koch, Louis Pasteur. Introduction to branches of microbiology: Air Microbiology, Water Microbiology, Sewage Microbiology, Soil Microbiology, Dairy Microbiology, Food Microbiology, Medical Microbiology, Industrial Microbiology, Biotechnology, Geo-microbiology, Microbial nanotechnology.	15 hours	
UNIT-II		
Prokaryotic and Eukaryotic cells Introduction and evolution of Prokaryotic and Eukaryotic cells: Structural organization of Prokaryotic and Eukaryotic cells. Major groups of Microorganisms: Bacteria, Fungi, Algae, Protozoa and Virus. Bacteria: Morphology of Bacteria size, shape, arrangements, structure and functions of cell wall, cell membrane, capsule and slime layer, Flagella, Pilli, Nuclear material, Mesosome, Ribosome. General characteristics of bacteria Spirochetes, Rickettsia, Chlamydia, Mycoplasma, Cyanobacteria, Actinomycetes, Archeabacteria. Beneficial and harmful microorganisms, Growth and reproduction of bacteria-effect of nutritional and environmental factors on bacterial growth.	15 hours	
UNIT-III		
Fungi and Algae Fungi: History and scope of Mycology, General Characteristics of Fungi, Classification and Identification of fungi -Basidiomycetes, Ascomycetes, Deuteromycetes, Oomycetes, Hypochytriomycetes and Symbiotic fungi (Lichens), Growth and reproduction of fungi-effect of nutritional and	15 hours	

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environmental factors on fungal growth. Algae: History and development of Algae, General Characteristics of Algae, Classification, Growth and reproduction of Algae, Cultivation of algae, media, photo-bioreactors. Economic importance of Spirulina, chlorella, Nostoc and, Anabaena.	
UNIT-IV	
Protozoa & Viruses Protozoa: History of Protozoa; Classification, Growth and reproduction of Protozoa. General Characteristics of Protozoa: Paramecium, Amoeba, Euglena, Trypanosoma and plasmodium. Viruses: Types and classification of viruses, Structural organization of viruses with examples: Capsids and Nucleic acids, Envelope and Structure of T4 bacteriophage, TMV, HIV. Brief introduction about Viroids, Virions and Prions.	15 hours

REFERENCES

1. Alexopoulos, C.J., Mims, C.W. and Blackwell, M. (1996). Introductory Mycology, Fourth Edition, Wiley Publishers, New York.
2. Atlas, R.A. and Bartha, R. (2000). Microbial Ecology – Fundamentals and Application, Fourth Edition, Benjamin Cummings, New York.
3. Black, J.G. (2005). Microbiology: Principles and Explorations, Sixth Edition, John Wiley, USA.
4. Dube, R.C. and Maheswari, D.K. (2000) General Microbiology. S Chand, New Delhi.
5. Madigan, M.T., Martinkl, J.M. and Parker, J. (2000). Brock Biology of Microorganisms, Ninth Edition, MacMillan Press, England.
6. Pelczar, M.J., Chan, E.C.S. and Kreig, N.R. (1993). Microbiology. Fifth Edition, Tata Mc Graw Hill Publishing Co., Ltd., New Delhi.
7. Prescott, M.J., Harley, J.P. and Klein, D.A. (2002). Microbiology. Fifth Edition, WCB McGraw Hill, New York.
8. Singh, R.P. (2007). General Microbiology. 2021 Edition, Kalyani Publishers, New Delhi.
9. Sullia, S.B. and Shantaram, S. (1998). General Microbiology, Second Edition, Oxford & IBH Publishing Pvt. Ltd., New Delhi.



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HCT 1.2 CELL BIOLOGY AND BIOCHEMISTRY		
Course Code : HCT 1.2	Credit :4	
Total Contact Hours : 60 T	Internal Assessment: 20 M	Examination: 80 M
Course outcome: After completion of course (Theory), students will be able to: ➤ Overview of major biomolecules, and their classification, structure, and function. ➤ Describe the concepts of electrolytes and electrolytic dissociation, pH and its biological significance, buffers, biological buffer systems and their importance. ➤ Understanding the laws of thermodynamics, concepts of entropy, enthalpy and free energy changes and their application to biological systems and various biochemical studies and reactions. ➤ Conceptual knowledge of aerobic and anaerobic respiration and various intermediary mechanisms involved, oxidative phosphorylation properties, structure, function of enzymes, Application of enzymes.		
UNIT-I		
Evolution of cell: Cell as a unit of living organism, Cell organelles, structure of prokaryotic cell \ Cell cycle in bacteria, fungi and eukaryotes, endosymbiotic theory. Plasma membrane: structure and organization of plasma membrane, models if plasma membrane, membrane structure and transport mechanisms; membrane channels and pumps. cell signaling and signal transduction pathways; Molecular motors. Bio-molecules: Chemical and physical foundations of biomolecules, water, water as solvent, theories of acids, bases and buffers, Stanley Miller experiment Amino acids: Classification, chemical reactions and physical properties; biosynthesis and catabolism; principles of thermodynamics; Bioenergetics and energy metabolism in cells.		15 hours
UNIT-II		
Carbohydrates Nucleotides, Proteins and lipids: Chemistry of carbohydrates: Definition, Classification, Structure and general properties, inter conversion of monosaccharides. Importance and properties of glucose; Disaccharides fructose, sucrose, lactose, maltose; Polysaccharides starch, cellulose, dextrin's, hemicellulose, gellans, pullulans, lignin's, agar and bacterial cell wall polysaccharides. Nucleotides; biosynthesis and catabolism Classification, structure and function; synthesis and oxidation of fatty acids Vitamins; structure and functions. Protein: Proteins Qualitative detection methods of protein structure of protein chemical reaction, classification. Lipids: Properties classification, chemical reaction detection methods		15 hours

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UNIT-III	
Enzymes: Classification, nomenclature, general properties principles of catalytic power and specificity of enzymes, kinetics, coenzymes, activator inhibitors, isoenzymes, multi- enzyme complex, allosteric enzymes, mechanism of enzyme action. Analytical techniques Centrifugation techniques: Basic principles of sedimentation. Methods and applications of density-gradient centrifugation, preparative centrifugation, ultracentrifugation. Electrophoretic techniques: General principles and applications of electrophoresis and isoelectric focusing.	15 hours
UNIT-IV	
Biochemical Techniques: Chromatographic techniques: General principles and techniques. Methods and applications of paper chromatography, thin-layer chromatography, exclusion chromatography affinity chromatography, ion-exchange chromatography, HPLC, Gas- liquid chromatography. MALDI-TOF, LC-MS/MS. Spectroscopic techniques: General and laws of radiation, colorimetry, ultraviolet-visible spectrophotometry. Radio isotopic techniques: General principles, nature of radio activity, detection and measurement of radioactivity, applications of radioisotopes in biological investigation. Spectrophotometers (types), GC-MS, SDS-PAGE.	15 hours

REFERENCES

1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., and Walter, P. (2007). *Molecular Biology of the Cell* (5th ed.). W.W. Norton and Company. 1446 pp.
2. De Robertis, E. D. P., and De Robertis, E. M. F. (1987). *Cell and Molecular Biology* (8th ed.). Lea and Febiger. 576 pp.
3. Gottschalk, G. (1985). *Bacterial metabolism*. 2nd Ed. Springer, New York, United States of America. 376 pp.
4. Karp, G. (2020). *Cell and Molecular Biology: Concepts and Experiments* (8th ed.). John Wiley and Sons. 944 pp.
5. Lodish, H., Berk, A., Kaiser, C. A., Krieger, M., Bretscher, A., Ploegh, H., Amon, A., and Scott, M. P. (2020). *Molecular Cell Biology* (9th ed.). W.H. Freeman. 1184 pp.
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7. Moat, A. G., Foster, J. W., and Spector, M. P. (2002). *Microbial Physiology* (4th ed.). Wiley- Liss. 736 pp.
8. Nelson, D. L., and Cox, M. M. (2024). *Lehninger Principles of Biochemistry* (8th ed.). W.H. Freeman 1096 pp.
9. Stryer, L. (2022). *Biochemistry* (9th ed.). Macmillan Higher Education. 560 pp.
10. Voet, D., Voet, J. G. and Pratt, C. W. (2016). *Fundamentals of biochemistry*. 5 th Ed. ISBN: 978- 1-118- 91840-1. John Wiley and Sons, Germany. 1264 pp

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HCT 1.3 MICROBIOLOGICAL METHODS		
Course Code : HCT 1.2	Credit :4	
Total Contact Hours : 60 T	Internal Assessment: 20 M	Examination: 80 M
Course outcome: After completion of course (Theory), students will be able to: ➤ Understand various Culture media and various physical and chemical means of sterilization ➤ Demonstrate theory and practical skills in microscopy and their handling techniques and staining procedures ➤ Maintenance of microbial culture and instant cultivation methods skill enable the pupil to develop pure microbial culture collection ➤ Students are skilled and trained in understanding the instruments used for microbial handling and sample analysis		
UNIT-I		
Basics of Microbiological methods: Safety, sterilization and control measures: Concept, handling of microbiological specimen and microorganisms. Sterilization techniques: Principles, types of Sterilization and their mode of action. Physical methods: Heat-dry heat, Incineration, Moist heat (Autoclave and other methods), Mechanical methods: Filtration-Types of filters, Radiation methods (UV radiation, Gamma rays, fumigation and other methods) Standardization of disinfectants (phenol co-efficient). Biosafety cabinets – Level I to IV, Lab Containment. Control of Microorganisms: Chemical methods Disinfectants, Antiseptics, Sanitizers, Microbistatic, Microbicides.		15 hours
UNIT-II		
Microbial nutrition and growth: Nutritional requirements, micro and macro nutrients, nutritional types of microorganisms, growth factors/trace elements. Microbial culture media: Culture media, media components, formulation, types of bacteriological, fungal and algal media. Microbial growth: Concept, growth type, Measurement of microbial growth-cell number, turbidity and biomass, determination of microbial growth curve, Continuous and synchronous culture, balanced and unbalanced growth, influence of environmental factors on growth, dioxy- growth curve and growth measurement.		15 hours
UNIT-III		
Microbial Isolation, staining and identification: Isolation techniques: Types of inoculation techniques- dilution, spread, streak, pour plate, bait, Identification of bacteria and fungi - morphological, biochemical and molecular methods. Automated microbial identification system with examples. BIOTYPER, SARAMIS, VITEK, Enterotube. Cultivation of human virus: Egg, animal and cell culture methods. Cultivation of Anaerobic microorganisms: principles, types and methods. Microbiological		15 hours

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stains and staining techniques: Composition, Types of stains and principles of staining- simple staining, Differential staining, Structural staining (nuclear and cytoplasmic inclusions) flagellar staining (types) and special staining protocols and applications. Maintenance and preservation of pure cultures (methods and types), National and International culture collection centers. Method of procurement of cultures.	
UNIT-IV	
Instrumentation and Microscopy Instrumentation: Autoclave: principle and types. Hot air oven: pH meter, nephelometer. Biosafety cabinets: types and applications. Colony counters: Micrometers, Incubators: types, CO ₂ incubator. Microscopy: Working principle, magnification (Aperture angle and numerical aperture) and resolving power of simple and compound microscopes (Bright field, Dark field, phase contrast, and Fluorescence microscopy) and stereomicroscopy. Electron microscopy: Principles, construction and mode of operation of scanning and Transmission electron microscopy (TEM and SEM), limitations; Atomic force microscope and confocal microscopy; Use and care of microscopes. Sample preparation, staining and image processing techniques (Bright field and Electron microscopy)	15 hours

1. Atlas, R. M. (1998). Microbiology, Fundamentals and Applications (II ed) Macmillan Publishing Company.
2. Kango, N. (2009). Textbook of Microbiology. I.K. International Publishing House Ltd. New Delhi.
3. Black, J. G., Larry M. Lewis. (2005). Microbiology: Principles & Explorations. Edition 6. Wiley, John & Sons.
4. Edward, K. Wanger & Martinez, J. Heweltt (2004). Basic virology. Blackwell publishing.
5. Tortora, G.J., BR Funke and Christine L Case (2009) Microbiology – an introduction, 9th Edition, Pearson publisher, p 957
6. Nester, E.W., Roberts, C.E., Pearsall, N.N., Anderson, D.G., Nester, M.T. (1998). Microbiology- A Human Perspective. 2nd Edition. Mc Graw Hill.
7. Becker, W. M., Kleinsmith, L.J. and Hardin, J. (2000). The world of the Cell. 1 st ed. Benjamin/Cummings.
8. Madigan M.T., Martinko M. J. and Parker, J. (2003). Brock Biology of microorganisms. 3. Pearson education., New Jercey
9. Hawkes, P.W., and John C H Spence (2019) Springer Handbook on Microscopy, Edition 1, Springer Nature



SCT 1.1. BIODIVERSITY & MICROBIAL TAXONOMY		
Course Code : SCT 1.1.	Credit :4	
Total Contact Hours : 60 T	Internal Assessment: 20 M	Examination: 80 M
Course outcome: After completion of course (Theory), students will be able to: ➤ Acquaint the knowledge of biodiversity and its significance. ➤ Explore taxonomic strategies and approaches used to name microorganisms, and the criteria used to define genus and species ➤ Unravel the structure and replication of viruses and bacteria. ➤ Understanding the eukaryotic microbial diversity.		
UNIT-I		
Biodiversity and Fundamentals of Microbiology: Biodiversity: concept and elements; significance of biodiversity; species diversity and richness, documentation, conservation and maintenance of biodiversity. Historical perspectives and developmental milestones of microbiology; biogenesis theory, germ theory of diseases: branches of microbiology based on organisms and fields. Scope of microbiology in the present scenario. Role of microbiologists in society.		15 hours
UNIT-II		
Microbial Taxonomy: Classification concepts: Linnaeus concepts of taxonomy, Binomial nomenclature, Hierarchical organization. Five-kingdom classification system; Three-domain classification system; Evolutionary relationships, Universal phylogenetic tree. Microbial Classification: Criteria- Morphological, physiological, ecological, genetic analysis, molecular characteristics, phage typing, serotyping, G+C ratio, comparison of proteins, nucleic acid hybridization, nucleic acid sequence comparison, DNA and RNA homology, significance of rRNA in microbial taxonomy, Chemotaxonomy and Numerical Taxonomy. Metagenomics.		15 hours
UNIT-III		
Virology and Bacteriology: Virology: Characteristics of viruses, components of viruses, genetic material, capsid morphology, size and shapes, viral envelop, viral enzymes. Viral classification, viral replication; Brief account of animal, plant and bacterial viruses with suitable examples. Baltimore system of viral classification; Viroids and Prions: Properties, study of significant diseases caused. Bacteriology: Prokaryotic cell structure, size, shape and arrangement, Cell wall, Cell membranes, Cytoplasm, nucleoid, plasmids, Outer membrane, flagella, fimbriae, endospores. Methods of reproduction. Criteria for bacterial classification. Brief account of Bergey's manual of systematic bacteriology.		15 hours

UNIT-IV	
Eukaryotes: Mycology: Structural details of unicellular and multicellular fungi; cell wall composition and mycelial organization; Homothallism, parasexuality and Heterothallism; Methods of reproduction in fungi and types of spores. Classification fungi to the level of classes; Phycology: Morphological features of prokaryotic algae; structure of unicellular and colonial forms; cell wall, pili, sheaths, pigments, akinetes, heterocyst's. Classification of micro-algae to the level of divisions; Methods of reproduction. Lichenology: Types and structural organization; Classification of lichens; Methods of reproduction. Protozoology and Parasitology: Protozoa - Morphology; encystment, excystment, locomotory organelles; Classification of protozoa to the level of phyla; Methods of reproduction. Helminths - Characteristics, structural features and life cycle of parasitic forms – Flukes, Round worm, Tapeworm.	15 hours

REFERENCES:

1. Alexopoulos, C.J., Mims, C.W., and Blackwell, M. 2002. Introductory Mycology. John Wiley and Sons (Asia) Pvt. Ltd. Singapore. 869 pp.
2. Atlas, R.M. 1984. Basic and practical microbiology. Mac Millan Publishers, USA. 987pp
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4. Chapman, J.L., and Reiss, M.J. 2006. Ecology: principles and applications. 2ndedn. Cambridge University Press, Cambridge. 330 pp.
5. Dimmock, N.J., Easton, A.J. and Leppard, K.N. 2001. Introduction to Modern Virology. Blackwell Publishing, Oxford. 449 pp.
6. Krasner, R.I. 2010. The Microbial Challenge. 2ndedn. Jones and Bartlett Publishers, Sudbury. 476 pp.
7. Pommerville, J.C. Alcamo's Fundamentals of Microbiology. Jones and Bartlett Pub..Sudbury, 835 pp.
8. Schlegel, H.G. 1995. General Microbiology. Cambridge University Press, Cambridge, 655 pp.
9. Torator, G.J., Funke, B.R. and Case, C.L. 2007. Microbiology 9th ed. Pearson Education Pte. Ltd., San Francisco. 958pp.
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SCT 1.2. MYCOLOGY		
Course Code : SCT 1.2.	Credit :4	
Total Contact Hours : 60 T	Internal Assessment: 20 M	Examination: 80 M
Course outcome: After completion of course (Theory), students will be able to: ➤ Study the range of thallus structure, various types of fungal tissues and specialized vegetative and reproductive structures. ➤ Get familiarized with the general characters on with the classification is based. ➤ To study the fungi —as friends as well as foesl.		
UNIT-I		
Ecology of fungi and mycological methods: Development of Mycology, Significance of fungi to human. Distribution of fungi in nature, factors in influencing fungal distribution, Characteristics of fungi - Morphological structural and ultrastructural details of fungi. Chemistry of the fungal cell and molecular architecture. Classification of fungi. Fungal diversity.		15 hours
UNIT-II		
Mycological methods: Isolation, culturing and maintenance of fungi mycological media and methods culture collections. Isolation of fungi from soil, air, water, plant and animal samples. Methods of identification and modern approaches in detection and differentiation of fungi. Fungal biodiversity: Diversity of fungi, systematic position of fungi, parameters for fungal systematic classification of fungi. Biochemical and molecular markers in fungal diversity assessment.		15 hours
UNIT-III		
Fungal Reproduction: Asexual and sexual reproduction. Reproductive structures in different fungi, heterokaryosis, parasexuality and heterothallism. Fungal physiology: Fungal growth, nutritional requirements, assessment of fungal growth, effect of environmental factors on growth. Primary metabolism; Secondary metabolism in fungi-synthesis and activities of fungal antibiotics, mycotoxins, phytotoxins and other metabolites.		15 hours
UNIT-IV		
molecular mycology: Fungal enzymes: Nature of fungal enzymes, quantitative and qualitative assessment of fungal enzymes. Screening and selection of fungi for useful enzymes. Isozyme polymorphism in fungi; applications of fungal enzymes. Fungal Proteomics and Genomics: Identification of fungal proteins; techniques of studying fungal proteins; cellular and extracellular proteins of fungi; fungal protein antigens and their detection. Molecular biology of fungi; genome analysis; fungal genes and molecular methods for study of fungi. Usefulness of fungi in biotechnology. Fungal products of commercial importance; fungi for the production of recombinant proteins		15 hours

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REFERENCES:

1. Ainsworth & Bisby's Dictionary of the Fungi (10th Ed), 2008 CAB International, Wallingford, UK.
2. Benjamin DR 1995 Mushrooms, Poisons and Panaceas, WH Freeman and Co, New York.
3. Carlile MJ & Watkinson SC 2000, The Fungi, Academic Press, London.
4. Dighton J, White JF & Oudemans P (eds) 2005 The Fungal Community 3rd edition, Taylot & Francis.
5. Dix NJ & Webster J 1995 Fungal Ecology, Chapman & Hall, London.
6. Gow NAR & Gadd GM (eds) 1995 The Growing Fungus, Chapman & Hall, London.
7. Redlin SC & Carris LM (eds) 1996 Endophytic Fungi in Grasses and Woody Plants, APS Press, St Paul, Minnesota, USA.
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HCP 1.1 GENERAL MICROBIOLOGY

Course Code : HCP 1.1

Credit :2

Internal Assessment: 10 M

Examination: 40 M

Practicals:

1. Safety Measures in Microbiology laboratory
2. Microscopy – Compound, Dark field, Phase contrast, Fluorescent, Electron, (SEM and TEM).
3. Sterilization technique – physical methods and chemical methods.
4. Preparation of media and stains for microbial work.
5. Preparation of culture media – broth, semisolid, and solid media.
6. Study of Instruments – Autoclave, Hot air Oven, Incubator, Laminar airflow, Centrifuge, pH meter, Colorimeter, Spectrophotometer.
7. Isolation of different groups of microorganisms by various methods
 - a. Isolation of pure culture microorganism and cultivation
 - b. Isolation and enumeration of microorganisms by serial; dilution methods.
8. Calibration of Microscope and Micrometry
9. Staining of different groups of microorganisms-
 - a. Simple and Negative Staining
 - b. Differential staining – Gram staining. Acid fast staining,
 - c. Structural Staining - flagellar staining, Endospore staining, capsule staining and cell wall staining
10. Camera Lucida
11. Study of motility of cells by hanging drop technique
12. Effect Temperature and pH on growth curve of bacteria (*E.coli*)

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HCP 1.2 CELL BIOLOGY AND BIOCHEMISTRY		
Course Code	: HCP 1.2	Credit :2
Internal Assessment:	10 M	Examination: 40 M
Practicals: 1. Introduction to basic laboratory instruments like – pH meter, colorimeter, single pan balance -calibration etc. 2. pH and buffers, preparation of buffers and Numerical problems to explain the concepts. 3. Qualitative/Quantitative tests for carbohydrates, reducing sugars, non- reducing sugar 4. Qualitative/Quantitative tests for amino acids/proteins 5. Qualitative/Quantitative tests for lipids 6. Determination of total amino acid concentration by ninhydrin method. 7. Estimation of protein concentration by i) Biuret method ii) Lowry method 8. Estimation of reducing sugar concentration by DNS method 9. Estimation total sugar concentration by i) Phenol-H₂SO₄ ii) Anthrone method 10. Estimation of Inorganic phosphate by Fiske &Subbarow Method 11. Performance of TLC		

HCT 1.3 MICROBIOLOGICAL METHODS		
Course Code	: HCT 1.3	Credit :2
Internal Assessment:	10 M	Examination: 40 M
Practicals: 1. Streak / Pour / Spread plate methods 2. Inoculation and aseptic transfer techniques 3. Point/Streak/stab inoculation 4. Isolation of microorganism from natural sources- Direct/Dilution plating 5. Bacterial motility- Hanging drop technique 6. Enumeration of microbial cell / spore number using hemocytometer 7. Measurement of microorganisms by micrometry 8. Slide culture for fungi 9. Anaerobic culture system 10. Microbial culture preservation methods 11. Microbial growth assessment – viable count and turbidity 12. Evaluation of antiseptics: the filter paper disc method 13. Effectiveness of hand scrubbing on microbial load 14. Instruments in Microbiology		



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SCP 1.1. BIODIVERSITY & MICROBIAL TAXONOMY

Course Code : SCP 1.1.

Credit :2

Internal Assessment: 10 M

Examination: 40 M

Practicals:

1. Isolation of bacteria from natural sources
2. Morphological diversity in bacteria.
 - a) Microscopic features of bacteria.
 - b) Colony morphology of bacteria.
3. Detection of bacterial endospores.
4. Isolation of fungi from natural sources
5. Morphological features of fungi a) Tease mount. b) Scotch tape preparation. c) Slide culture.
6. Types of spores in fungi
7. Spore germination in fungi.
8. Study of yeasts from different sources.
9. Study of algae- Morphological features of algae.
10. Microscopic examination of pond water for algal diversity.
11. Study of lichens
12. Study of protozoa.

SCP 1.2 MYCOLOGY

Course Code : SCP 1.2

Credit :2

Internal Assessment: 10 M

Examination: 40 M

Practicals:

1. Isolation of fungi from different soil samples.
2. Isolation and identification of fungi from water and air
3. Identification of Mycorrhizal colonization in plants roots
4. Morphological identification of fungi by scotch tape method
5. Morphological identification of fungi tease mount method
6. Isolation of endophytic fungi from medicinal plants
7. Isolation of endophytic fungi (Endolichenic) from lichen
8. Isolation of Trichoderma from paddy waste
9. Determination of *Trichoderma* as a biocontrol agent by dual culture method
10. Determination of *Trichoderma* as a biocontrol agent by seed blotter method
11. Estimation of citric acid production by *Aspergillus niger*
12. Determination of spore size and shape by Micrometric Method