Question Paper Pattern:

RANI CHANNAMMA UNIVERSITY

Department of Botany

BSc(botany)

Sub: Code: Maximum Marks: 60

a. Answer any Six Questions from Question 1 b. Answer any Three each Questions from Question 2,3,4 and 5

Q.No.1.	Answer any Six Questions (Atlest Two question from Each Unit) a. b. c. d, e. f. g. h.	2X6=12
Q.No.2.	(Should cover Entire Unit-I) a. b. c. d.	4X3=12
Q.No.3.	(Should cover Entire Unit-II) a. b. c. d.	4X3=12
Q.No.4.	(Should cover Entire Unit-III) a. b. c. d.	4X3=12
Q.No.5.	(Should cover Entire Unit-IV) a. b. c. d.	4X3=12

COURSE-WISE SYLLABUS

Semester I

Year	I	**Course Code:** 21BSC1BOT1L **Course Title:** Microbial diversity and Technology	**Credits**	04
Sem.	1		**Hours**	52
Course Pre-requisites, if any		NA		
Formative Assessment Marks: 40		Summative Assessment Marks: 60	Duration of ESA:.02 hrs.	
Course Outcomes		1. Understand the fascinating diversity, evolution, and significance ofmicroorganisms. 2. Comprehend the systematic position, structure, physiology and life cycles of		

	microbes and their impact on humans andenvironment. 3. Gain laboratory skills such as microscopy, microbial cultures, staining, identification, preservation of microbes for their applications in research andindustry.	
Unit No.	**Course Content**	**Hours**
Unit I	**Chapter No. 1:** Microbial diversity-Introduction to microbial diversity; Hierarchical organization and positions of microbes in the living world. Whittaker's five-kingdom system . Distribution of microbes in soil, air, food and water. Significance of microbial diversity in nature. **5 Hours** **Chapter No. 2** History and developments of microbiology-Microbiologists and their contributions (Leeuwenhoek, Louis Pasteur, Robert Koch, Joseph Lister, Dmitri Iwanowski, SergiusWinogradsky and M W Beijerinck and Paul Ehrlich).**3 Hours** **Chapter No. 3** Microscopy-Working principle and applications of light, dark field, phase contrast and electron microscopes (SEM and TEM). Microbiological stains (acidic, basic and special) and Principles of staining. Simple, Gram's and differential staining. **5 Hours**	13
Unit II	**Chapter No. 4.** Culture media for Microbes-Natural and synthetic media, Routine media -basal media, enriched media, selective media, indicator media, transport media, and storage media. **3 Hours** **Chapter No. 5**. Sterilization methods -Principle of disinfection, antiseptic, tyndallisation and Pasteurization, Sterilization-Sterilization by dry heat, moist heat, UV light, ionization radiation, filtration. Chemical methods of sterilization-phenolic compounds, anionic and cationic detergents. **5 Hours** **Chapter No. 6**. Microbial Growth-Microbial growth and measurement. Nutritional types of Microbes- autotrophs and heterotrophs, phototrophs and chemotrophs; lithotrophs and organotrophs. **5 Hours**	13
Unit III	**Chapter No. 7** Microbial cultures and preservation-Microbial cultures. Pure culture and axenic cultures, subculturing, Preservation methods-overlaying cultures with mineral oils, lyophilisation. Microbial culture	13

	collections and their importance. A brief account on ITCC, MTCC and ATCC. **5 Hours** **Chapter No. 8. Viruses-** General structure and classification of Viruses; ICTV system of classification. Structure and multiplication of TMV, SARS-COV-2, and Bacteriophage (T2). Cultivation of viruses. Vaccines and types. **5 Hours** **Chapter No. 9. Viroids**- general characteristics and structure of Potato Spindle Tuber Viroid (PSTVd); Prions - general characters and Prion diseases**.** Economic importance of viruses. **3 Hours**	
Unit IV	**Chapter No. 10. Bacteria-** General characteristics and classification. Archaebacteria and Eubacteria. Ultrastructure of Bacteria; Bacterial growth and nutrition. Reproduction in bacteria- asexual and sexual methods. Study of *Rhizobium* and its applications. A brief account of Actinomycetes and Cyanobacteria. Mycoplasmas and Phytoplasmas- Generalcharacteristics and diseases. Economic importance of Bacteria. **5 Hours** **Chapter No. 11. Fungi-**General characteristics and classification. Thallus organization and nutrition in fungi. Reproduction in fungi (asexual and sexual). Heterothallism and parasexuality. Type study of *Phytophthora, Rhizopus,,Puccinia, Penicillium***.** **5 Hours** **Chapter No. 12. Lichens –** Structure and reproduction. **VAM Fungi** and their significance. **Fungal diseases**-. Black stem rust of wheat; Downy Mildew of Bajra, Grain smut of Sorghum, Citrus Canker, Economic importance of Fungi. **3 Hours**	13
Recommended Leaning Resources		

Print Resources	**Text Books** 1. Ananthnarayan R and Panikar JCK. 1986. Text book of Microbiology. Orient Longman ltd. New Delhi. 2. Arora DR. 2004. Textbook of Microbiology, CBS, NewDelhi. 3. William CG. 1989. Understanding microbes. A laboratory text book for Microbiology. W.H. Freeman and Company. New York. 4. Dubey RC and Maheshwari DK. 2007. A textbook of Microbiology, S. Chand and Company, NewDelhi. 5. Dubey RC and Maheshwari DK. 2002. A Text book of Microbiology, S.C.Chand and Company, Ltd. Ramnagar, New Delhi. 6. Sharma R. 2006. Text book of Microbiology. Mittal Publications. New Delhi. 305pp. 7. Sharma PD. 1999. Microbiology and Plant Pathology. Rastogi publications. Meerut, India. 8. Vasanthkumari R. 2007. A textbook of Microbiology, BI Publications Pvt. Ltd., New Delhi. **References** 1. Alexepoulos CJ and Mims CW. 1989. Introductory Mycology, Wiley Eastern Ltd., NewDelhi. 2. Allas RM. 1988. Microbiology: Fundamentals and Applications, Macmillan publishing co. NewYork. 3. Brook TD, Smith DW and Madigan MT. 1984. Biology of Microorganisms, 4th ed. Eaglewood Cliffts. N.J.Prentice- Hall. NewDelhi. 4. Burnell JH and Trinci APJ. 1979. Fungal walls and hyphal growth, Cambridge UniversityPress.Cambridge. 5. Michel J, Pelczar Jr.EC and Krieg CR. 2005. Microbiology, Mc.Graw-Hill, New Delhi. 6. Powar CB and Daginawala. 1991. General Microbiology, Vol – I and Vol – II Himalaya publishinghouse,Bombay. 7. Reddy S and Ram. 2007. Microbial Physiology. Scientific Publishers, Jodhpur, 385pp. 8. Sullia SB and Shantharam S. 1998. General Microbiology. Oxford and IBH publishing Co.Pvt.Ltd. NewDelhi

Year	I	**Course Code:** 21BSC1BOT1P **Course Title:**Microbial diversity and Technology	**Credits**	02
Sem.	I		**Hours**	45

Course Pre-requisites, if any:	NA	
Formative Assessment Marks: 25	Summative Assessment Marks: 25	Duration of ESA: 03 hrs.

Practical 1: Safety measures in microbiology laboratory and study of equipment/appliances used for microbiological studies (Microscopes, Hot air oven, Autoclave/Pressure Cooker, Inoculation needles/loop, Petri plates, Incubator, Laminar flow hood, Colony counter, Haemocytomer, Micrometer etc.).

Practical 2: Enumeration of soil/food /seed microorganisms by serial dilution technique.

Practical 3: Preparation of culture media (NA/PDA) sterilization, inoculation, incubation of E coli / B. subtilis/ Fungi and study of cultural characteristics.

Practical 4: Determination of cell count by using Hemocytometer and determination of microbial cell dimension by using Micrometer.

Practical 6: Simple staining of bacteria (Crystal violet /Nigrosine blue) / Gram's staining of bacteria.

Practical 7: Isolation and study of morphology of Rhizobium from root nodules of legumes

Practical 8: Preparation of spawn and cultivation of paddy straw (Oyster) mushroom.

Practical 9: Study of vegetative structures and reproductive structures - Albugo,Phytophthora/Pythium, Rhizopus/Mucor, Saccharomyces, , Puccinia, Agaricus, Lycoperdon, Aspergillus/Penicillium.

Practical 10: Preparation of agar slants, inoculation, incubation, pure culturing and preservation of microbes by oil overlaying.

Practical 11: Downy mildew of Bajra/Maize/Sorghum, Citrus canker, Tobacco mosaic disease.

Practical 12: Study of well-known microbiologists and their contributions through charts and photographs.

Practical-13: Visit to water purification units/Composting/ microbiology labs/dairy and farms to understand role of microbes in day today life.

	(Note: Visit to Composting/ microbiology labs/dairy and farms to understand role of microbes in day today life and submission of study report is compulsory)

Note: Student has to execute a minimum of 10 programs in each part to complete the Lab course

Evaluation Scheme for Lab Examination

Assessment Criteria		Marks
Preparation	Gram staining	05
Enumeration		05
Identification		05
Comment		05
Viva Voice /Tour report		05
Total		**25**

OPEN-ELECTIVE SYLLABUS :

Year	I	**Course Code:** 21BSC1BOT1 **Course Title: PLANTS AND HUMANWELFARE**	**Credits**	03
Sem.	II		**Hours**	40

Course Pre-requisites, if any	NA	
Formative Assessment Marks: 40	Summative Assessment Marks: 60	Duration of ESA:.02 hrs.

Course Outcomes	At the end of the course the student should be able to: 1. To make the students familiar with economic importance of diverse plants that offer resourcesto human life. 2. To make the students known about the plants used as-food, medicinal value and also plantsource of different economic value. 3. To generate interest amongst the students on plants importance in day today life, conservation,ecosystem and sustainability.

Unit No.	**Course Content**	**Hours**
Unit I	Origin of Cultivated Plants. Concept of Centres of Origin, their importance with reference to Vavilov's work. Examples of major plant introductions. Crop domestication and loss of genetic diversity (Only conventional plant breeding methods). Importance of plant bio- diversity and conservation. **Cereals**: Wheat and Rice (origin, evolution, morphology, post-harvest	10

	processing & uses).Green revolution. Brief account of millets and their nutritional importance.	
Unit II	**Legumes:** General account (including chief pulses grown in Karnataka- red gram, green gram, chick pea, soybean). Importance to man and ecosystem. **Cash crops:** Morphology, new varieties and processing of sugarcane, products and by- products of sugarcane industry. Natural Rubber – cultivation, tapping and processing.	10
Unit III	**Spices:** Listing of important spices, their family and parts used, economic importance with special reference to Karnataka. Study of fennel, clove, black pepper and cardamom. **Fruits:** Mango, grapes and Citrus (Origin, morphology, cultivation ,processing and uses)	10
Unit IV	**Oils and fats:** General description, classification, extraction, their uses and health implications; groundnut, coconut, sunflower and mustered (Botanical name, family & uses). Non edible oil yielding trees and importance as biofuel. Neem oil and applications. **Beverages:** Tea, Coffee (morphology, processing&uses)	10
Recommended Leaning Resources		
Print Resources	**Text Books:** 1. Kochhar, S.L. (2012). Economic Botany in Tropics. MacMillan & Co. New Delhi. 2. Wickens, G.E. (2001). Economic Botany: Principles & Practices. The Netherlands:Kluwer Academic Publishers. Netherland. 3. Chrispeels, M.J. and Sadava, D.E. (1994) Plants, Genes and Agriculture. Jones & Bartlett- Publishers. Lincoln, United Kingdom	

Semester: II

	I	**Course Code: 21BSC2BOT2L**	**Credits**
	2	**Course Title:Diversity of non flowering plants**	**Hours**