3.	**genetic engineering and stress resistance** Genetic engineering for improvement of disease resistance, Genetic manipulation of Crops for insect resistance, herbicide resistance, abiotic stress resistance	**9**
4.	**Chemical and Biological control-**concepts and techniques, Bio-organism for pest Management, Bt based pesticides, Baculovirus pesticides, Mycopesticides, production and formulation technologies	**9**
5.	**Integrated pest management:** Principles of integrated Pest Management (IPM), IPM practices for important crops	**8**
	Total	**42**

Books: -

S.No.	Name of Books/ Author/Publisher
1	Brock T.D. and Modigaa M.T. (Latest edition) Biology of Microorganisms, Prentice Hall, New Jersey Pelczar M.J; Chan E.C.S. and Kreig N.R. 1993.
2	Microbiology, Tata Mc-Graw HTK Publishing Co., New Delhi. Stainer, R.Y; Ingram J; Wheelis, M.G. and Paintor, P.R. 1986
3	The Microbial World-Prentice Hall-New Jersey Alexander M. 1985;.
4	Introduction to soil Microbiology John Wileys & Sons, New York Rangaswamy. G and Bagyaraj, D.I. (1992)
5	Agricultural Microbiology, Asia Publishing House, New York. Subba Rao N.S. 1987Advance in Agricultural Microbiology, Oxford & IBH.

BIOSENSOR

Details of course: -

Course Title	Course Structure			Pre-Requisite
	L	T	P	
Biosensor (BT421)	03	01	00	Nil

Course Objective:
This course will present an overview of the fundamental principles, technologies, methods and applications of biosensors. The objective of this course is to link engineering principles to understanding biosystems in sensors and bioelectronic. Furthermore, the application of fundamentals of measurement science to optical, electrochemical, mass and pressure signal transduction

Course Outcome (CO):

1. Define biosensors and understand its history, properties, design features and the biological component.
2. Distinguish between different type of biosensors like amperometric and potentiometric biosensor and detecting of various cations using calorimetric biosensor.
3. Show overview of sensors and transducers measurement systems their Classification and Important design considerations.
4. List examples of biosensors with the relatable opportunities and obstacles. And learning about miniaturized devices in nanobiotechnology.
5. Discuss the Future of Biosensors and Transducers and the importance of computers in sensor and transducer technology.

S.No.	Content	Contact Hours
1.	**Introduction**: Biosensors: Definition, History, Properties of biosensors, Design features of biosensors, The biological component.	**6**
2.	**Signal Transduction**: Amperometric Biosensors, Potentiometric biosensors,Detection of H+ cation, Detection of NH4+ cation, Detection of CN- anion; Calorimetric biosensors, Optical biosensors, Measuring the change in light reflectance, Measuring luminescence, Piezo-electric biosensors, Immunosensors.	**12**
3.	**Biomedical Sensors:** Sensors and transducers: an overview, measurement systems, Classification of biomedical sensors and transducers, Why do we need Biomedical sensors and transducers? Important design considerations and system calibration.	**10**
4.	**Commercial Examples of Biosensors**: Biosensors markets: Opportunities and obstacles. **Miniaturized devices in nanobiotechnology -** types and applications, MEMS, Lab on a chip concept	**6**
5.	**The Future of Biosensors and Transducers**: Sensing Layer: The importance of computers in sensor and transducer technology, Recent engineering solutions to health care using biosensors and transducers, Modern health care solutions.	**8**
	TOTAL	42

Books:-

S.No.	Name of Books/ Author/Publisher