Shiksha Mandal's
Bajaj college of Science, Wardha (Autonomous)

General Elective-I (GE-I) courses Offered by Department of Microbiology

B.Sc. Sem I

Name of the course: Food spoilage and food safety

[2 lectures per week 15 weeks * 2 lectures = 30 L]

[Credits 2]

Course Description:

Food is fundamental to our existence. Therefore it is important to learn the science of food. Food Microbiology is the applied field of Microbiology that aims to study the role of microorganisms in diet and those contaminate/spoil food and food borne diseases.

Course Objectives:

To understand food microbiology with reference to food safety

To recognize the possible role of microorganisms to ensure public safety

Course Learning Outcomes:

Learner will acquire knowledge about food safety: The food Safety rules and regulations, Food safety Management System (FEMS) and Microbiological Risk assessment

Learner will acquire knowledge about food spoilage, Role of different microorganisms in spoiling food, food fermentation and food borne disease.

Unit I: Food safety

Food safety rules and regulations, Food safety Management System (FEMS) and Microbiological Risk assessment. Investigation Procedure for ensuring food safety and Hygiene. food safety law

Unit II: Food Spoilage

Introduction to Food Spoilage of Fruits, Vegetables and their products, Dairy Products. Microbial genera involved in food spoilage

Unit III: Food Poisoning and food born diseases

Introduction to microbial toxins that contaminate or spoil the food. Food born diseases.

References:

Food microbiology: fundamentals and frontiers. 2nd ed. Washington (DC): American Society for Microbiology MP, Beuchat LR, Montville TJ, editors. 2001.

Food Microbiology: Fundamentals and Frontiers, Third Edition, ASM Press Doyle, M. P. and Beuchat, L. R. 2007.

Food Microbiology by Westhoff, Fourth Edition, Tata McGraw-Hill Publishing company Ltd.

The microbiological safety and quality of foods. Volume 1 & 2. Gaithersburg (MD): Aspen Lund BM, Baird-Parker TC, Gould GW, editors. 2000

Food Microbiology R. Rajeshwari Anburaj Edited by Dr. P. F. Steffi ISBN 978-81-947191-6-8.published by Ryan publisher Tamilnadu.

Shiksha Mandal's

Bajaj College of Science, Wardha (Autonomous)

Generic Elective Course II (GE-II) offered by Department of Microbiology

B.Sc. SEM II

Name of the course: Basics of Soil Health

[4 hrs/week 15 weeks* 4 pract = 60 P]

[Credits 2]

Course Description

The course comprises the study of biogeochemical cycles of carbon, nitrogen, Phosphorous etc. It also focuses on nitrogen fixation and biofertilizers.

Learning Objectives

- Impart in-depth information on soil and agriculture
- Make the students understand the role of microbes in agriculture
- Understanding the key concepts in soil and agricultural microbiology
- Make the students understand the role of microbes in agriculture
- Give an overview on plant microbe interaction

Course Learning Outcome

- Make the students to know about various microorganisms involved in biofertilizers production
- To introduce the importance of biofertilizers
- Outline the physico- chemical aspects of the soil and its microbial diversity
- Evaluate the role of microbes in the different biogeochemical cycles and in agriculture
- Discuss biological nitrogen fixation in symbiotic and non symbiotic associations with plan

Syllabus:

Unit 1 Microbial transformations of minerals

Biogeochemical cycles-Carbon, Nitrogen, Phosphorous and Sulphur cycles. Organic matter decomposition, humus formation and C:N ratio.

Unit 2 Biological Nitrogen fixation

Microorganisms in the Rhizosphere, Rhizoplane and Phylloplane-Biological nitrogen fixation, symbiotic and free-living nitrogen fixation, importance of nitrogen fixation

Unit 3 Biofertilizers and its Types

Biofertilizers – Importance and various types of Biofertilizer Rhizobium, Azotobacter, Azospirillum, Cyanobacteria, Phosphate solubilizing microorganism, Mycorrhizal biofertilizers, Concept of PGPR

References

- Subba Rao, N. S., 2019. Biofertilizers in Agriculture and Forestry, 4 Ed., Cbs Publ & Dist Pvt Ltd, New Delhi.
- Subba Rao, N. S. 1995. Soil microorganisms and plant growth. Oxford & IBHPublishing Co.Pvt.Ltd. New Delhi.
- Gupta, S.K., 2014 Approaches and trends in plant disease management. Scientific publishers, Jodhpur, India.
- Jamaluddin et al., 2013 Microbes and sustainable plant productivity. Scintific Publishers Jodhpur, India.
- Gaur, A.C., 1999. Microbial technology for Composting of Agricultural Residues by Improved Methods, 1st print, ICAR, New Delhi.
- Glick, B.R. AND Pasternak, J.J, 1994. Molecular Biotechnology, ASM Press, Washington DC.
- Purohit, S. S., Kothari, P. R. and Mathur, 1993. Basic and Agricultural Biotechnology, Agrobotanical Publishers (India). Bikaner.