

**REVISED DISCIPLINES AND CODE NO.
OF NET AND ARS EXAMINATION**

Code No.	Discipline Name
01	Agricultural Biotechnology
02	Agricultural Entomology
03	Agricultural Microbiology
04	Economic Botany & Plant Genetic Resources
05	Genetics & Plant Breeding
06	Nematology
07	Plant Biochemistry
08	Plant Pathology
09	Plant Physiology
10	Seed Science & Technology
11	Floriculture & Landscaping
12	Fruit Science
13	Spices, Plantation & Medicinal & Aromatic Plants
14	Vegetable Science
15	Animal Biochemistry
16	Animal Biotechnology
17	Animal Genetics & Breeding
18	Animal Nutrition
19	Animal Physiology
20	Animal Reproduction & Gynaecology
21	Dairy Chemistry
22	Dairy Microbiology
23	Dairy Technology
24	Livestock Product Technology
25	Livestock Production Management
26	Poultry Science
27	Veterinary Medicine

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28	Veterinary Microbiology
29	Veterinary Parasitology
30	Veterinary Pathology
31	Veterinary Pharmacology
32	Veterinary Public Health
33	Veterinary Surgery
34	Aquaculture
35	Fisheries Resource Management
36	Fish Processing Technology
37	Fish Nutrition
38	Fish Health
39	Fish Genetics & Breeding
40	Agricultural Chemicals
41	Agricultural Meteorology
42	Agroforestry
43	Agronomy
44	Environmental Science
45	Soil Sciences
46	Agricultural Business Management
47	Agricultural Economics
48	Agricultural Extension
49	Agricultural Statistics
50	Home Science
51	Farm Machinery & Power
52	Computer Applications & IT
53	Land & Water Management Engineering
54	Bioinformatics
55	Food Technology
56	Agricultural Structure and Process Engineering
57	Veterinary Anatomy (only for NET)

K. S. Jee

J. J. J.

P. S. J.

Depar
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03. AGRICULTURAL MICROBIOLOGY

Unit 1: History of Microbial World

History, development and scope of microbiology, evolution of microbial life. Theory of spontaneous generation. Prokaryotes, archaebacteria and eukaryotes. Techniques used in identification and classification of bacteria. Important groups of prokaryotes – photosynthetic bacteria, blue green algae, chemoautotrophic bacteria, spore forming bacteria, mycoplasma, viruses, bacteriophages and actinomycetes. Heterotrophic bacteria nitrobacteria, nitrogen-fixing bacteria and cyanobacteria, lactic acid bacteria, halophiles, thermophiles acidophiles and methanogens. Structure and classification of viruses, growth of viruses, lytic and lysogenic cycles, plant viruses, viroids.

Unit 2: Microbial Ecology and Physiology

Principles of microbial ecology, Microbiology of ecosystems - soil, rhizosphere, phyllosphere, water - fresh and marine, and air. Microbial interactions - symbiosis, synergism, commensalism, parasitism, amensalism, antagonism and predation, adoption of micro-organisms to various ecosystems. Microbial growth curve. Mathematical expression of growth -continuous and batch cultures. Diauxic and synchronous growth. Microbial nutrition. Bacterial metabolism - aerobic and anaerobic respiration, electron transport chain, microbial photosynthesis, oxidative and substrate level photo-phosphorylation. Biosynthesis of cell wall, protein breakdown by microbes.

Unit 3: Soil Microbiology

Soil microorganisms: major groups, decomposition of organic matter, soil health. Root exudates and rhizosphere effects. Manipulation of rhizosphere microflora in plant productivity. Microbial biomass. Nitrogen cycle: ammonification, nitrification and denitrification. Biological nitrogen fixation-symbiotic and asymbiotic. Biochemistry and genetics of nitrogen fixation. Microbial transformations of phosphorus, sulphur and minor nutrients. Role of bio-fertilizers in agriculture and forestry. Bioremediation of problem soils, plant growth promoting rhizobacteria and their mode of action. Formation and composition of soil organic matter: fulvic acid and humic acid.

Unit 4: Environmental Microbiology and Basic Microbiological Techniques

Isolation and preservation of different types of microorganisms. Methods of sterilization and disinfection. Microscopy: Optical, phase contrast, fluorescent, dark field and electron. Microbial assay of vitamins, enzymes and antibiotics, Pollution of soil, water and air, Role of microorganisms in pollution, sources of pollution and their impact on environment, microbiology of sewage and industrial effluents and their safe disposal, management of solid and liquid organic wastes, composting, biogas, water purification, sewage treatment, water-borne diseases and effluent management.

Unit 5: Microbial Biotechnology

Industrial production of metabolites - organic acids, alcohols, antibiotics. Fermentor designs and types. Control of fermentation process - batch, feed batch and continuous. Downstream processing in fermentation industry. Production of single cell proteins and probiotics, hormones, biofertilizers, biopesticides. Phyto-remediation. Microbiology of raw and processed foods. Fermented food - vinegar, wine sauerkraut, pickles, cheese, yogurt. Food preservation, contamination and spoilage, food-borne illness and intoxication. Food as substrate for micro-organism, microflora of meat, fish, egg, fruits, vegetables, juices, flour, canned foods; bio-degrading microbes, single cell protein for use as food and feed, bioactive food / probiotics

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