Subject Code : ECSCHC

ELECTIVE-COURSE-III

AGRICULTURAL CHEMISTRY

UNIT – I

1.1 Origin of earth – Geological formations of India – Soil forming rocks and minerals –
classification – weathering of rocks and minerals – processes of weathering and factors affecting them. Soil formation – Factors of soil formation – soil forming processes – profile development – defintion of soil – soil composition.

1.2 Soil Physical properties – soil separates and particle size distribution – soil texture and structure -Bulk density, particle density, pore space, soil air, soil temperature, soil water, soil consistence – significance of physical properties to plant growth.

1.3 Soil chemical properties – soil colloids – Inorganic colloids – clay minerals – amorphous – Ion exchange reactions – organic colloids – soil organic matter - Decomposition – Humus formation – significance on soil fertility, soil reaction – Biological properties of soil – nutrient availability.

UNIT – II

2.1 Fertilizer – definition – fertilizer recommendation based on soil testing – fertility index –Nitrogenous fertilizers – Effect of Nitrogen on plant growth and development. Phosphate fertilizers – Effect of Phosphorous on plant growth and development – super phosphate & Bone meal. Potassium fertilizers – function of Potassium on plant growth..

2.2 Secondary and micronutrient fertilizers – complex and mixed fertilizers – sources, manufacture, properties and reactions in soils.

2.3 Biofertilizers – nitrogen fixing biofertilizer- rhizobium, azospirillum-phosphate mobilizing biofertilizer- bacteria-bacillus, pseudomonas, fungi-aspergillus, penicillium

UNIT – III

3.1 Nutrient potential of different organic manures – Agricultural, industrial and urban wastes -preparation of enriched farm yard manures – Zinc enriched organics.

3.2 Green manures – green leaf manure – bulky organic and concentrated organic manures –
compost – enriched farmyard manures, composting of coir pith; sugarcane trash, leaf litters and farm wastes – oil cakes, bone meal, fish meal, guano poultry manures – fertilizer use efficiency – integrated nutrient management.

3.3 Preparation of slow release fertilizer – compatability of fertilizers – fertilizer blending –
preparation of different fertilizer mixtures – fertilizer prescription for different soils and crops.

UNIT – IV

4.1 Pest management and control
Pesticides – formulations – emulsifiable concentrate, water miscible liquids, wettable powders, dusts, granules, classification of pesticides – mode of action – characteristics – uses – fate of pesticides in soil and plants – impact

of pesticids on environment – safety measures in the analysis and handling of pesticides.

4.2 Insecticides – plant products – Nicotine, pyrethrum, rotenone, petroleum oils. Inorganic
Pesticides – Arsenical fluorides, borates. Organic pesticides – organo chlorine compounds – D.D.T, B.H.C, methoxychlor, chloredane, endosulfon. Organophosphorous compounds – Dischlorevas, methyl Carbamic acid derivatives – carbaryl – structure and mode of action. Insecticide Act and the law. Compatility of pesticides with other agrochemicals.

UNIT – V

FUNCIDES AND HERBICIDES

5.1 Fungicides – Inorganic – Sulphur compounds – Copper compounds – Mercuric compounds, Organic – dithiocarbamates – Dithane M.Boredeaux mixture.

5.2 Herbicides : Inorganic herbicides – Arsenical compounds Boron compounds – cyanamide – Cyanides and thiocyanates, chlorates and sulphamates. Organic herbicides & Nitro-compounds –chlorinated compounds – 2 – 4D – Phridine compounds – Triazine compounds – Propionic acid derivatives – urea herbicides, Alachlor.

5.3 Acaricides – Rodenticides – Attractance – Repellants – Fumiganus Defoliants.

REFERENCES :

1. N.C.Brady, the Nature and properties of soils Eurasia publishing house, (P) Ltd. 9th Ed. 1984.
2. Biswas, T.D.and Mukeherjee S.K. 1987 Text book of soil science.
3. A.J.Daji (1970) A Text book of soil science – Asia publishing house, Madras.
4. Donahue, R.L.Miller, R.W.and shickluna, J.C. 1987. soils – An introduction to soils and plant Growth – Prentice Hall of India (P) Ltd., New Delhi.
5. Colling, G.H. 1955, Commercial Fertilizers – McGraw Hill Publishing Co., New York.
6. Tisdale, S.L.Nelson, W.L. and Beaton, J.D. 1990, Soil fertility and fertilizers. Macmillan publishing company, New York.
7. Hesse, P.R.1971. A tex book of soil chemical analysis John Murray, New York.
8. Jackon, M.L. 1958, Soil Chemical Analysis. Prentice Hall of India, New Delhi.
9. Buchel, K.H. 1983. Chemistry of pesticides – John wiley & Sons, New York.
10. Melnikov, N.N.1971. Chemistry of pesticides Vol.36 of Residue Review-springer verlac, New York.
11. Sree Ramula, U.S.1979, Chemistry of Insecticides and Fungicides – Oxford and IBH publishing Co., New Delhi.