

Name of Programme: M.Sc. (Ag.) Soil Science and Agriculture Chemistry

Academic eligibility for admission: - B.Sc. (Ag.)

Curriculum and Syllabus

| Semester | Course Code & No. | Course Title | Credit Hrs. | Mid Exam. | Final Exam | | Total | |
|-----------------------|-----------------------------|--|-------------|------------------------------|------------|-----------|-------|-----|
| | | | | | Theory | Practical | | |
| I st Sem. | SAC-501 | PHYSICAL INORGANIC AND ANALYTICAL CHEMISTRY | 3 (2+1) | 20 | 40 | 40 | 100 | |
| | SAC-502 | SOIL, WATER AND PLANT RELATIONSHIP | 3 (2+1) | 20 | 40 | 40 | 100 | |
| | SAC-503 | SOIL MINEROLOGY GENESIS AND CLASSIFICATION | 3 (2+1) | 20 | 40 | 40 | 100 | |
| | AST-501 | Statistical Methods | 3 (2+1) | 20 | 40 | 40 | 100 | |
| | Total | | | 12 | | | | |
| II nd Sem | SAC-504 | SOIL CHEMISTRY | 3 (2+1) | 20 | 40 | 40 | 100 | |
| | SAC-505 | SOIL PHYSICS | 3(2+1) | 20 | 40 | 40 | 100 | |
| | SAC-506 | SOIL BIOLOGY AND BIO CHEMISTRY | 3 (2+1) | 20 | 40 | 40 | 100 | |
| | AST-502 | Design of Experiments | 3(2+1) | 20 | 40 | 40 | 100 | |
| | Total | | | 12 | | | | |
| III rd Sem | SAC-507 | INSTRUMENTAL TECHNIQUES IN SOIL AND PLANT ANALYSIS | 3(2+1) | 20 | 40 | 40 | 100 | |
| | SAC-508 | SOIL FERTILITY AND PLANT NUTRITION | 3(2+1) | 20 | 40 | 40 | 100 | |
| | SAC-509 | MANURES AND FERTILIZERS | 3(2+1) | 20 | 40 | 40 | 100 | |
| | SAC-510 | AGRICULTURAL CHEMICALS | 3(2+1) | 20 | 40 | 40 | 100 | |
| | | | | 12 | | | | |
| IV th Sem | SAC-511 | SOIL POLLUTION | 3(2+1) | 20 | 40 | 40 | 100 | |
| | SAC-512 | SOIL TECHNOLOGY | 3(2+1) | 20 | 40 | 40 | 100 | |
| | SAC-599 | Seminar | 1 | Satisfactory/Unsatisfactory | | | | |
| | Optional (any one from two) | | | | | | | |
| | SAC-513 | ADVANCED ORGANIC CHEMISTRY AND PLANT BIO-CHEMISTRY | 12(9+3) | 20 | 40 | 40 | 100 | |
| | or | | | | | | | |
| | SAC-598 | Thesis Research | 12 | 40 % Internal +60% External) | | | | 100 |
| | Total | | | 19 | | | | |
| Grand Total | | | 55 | | | | | |

Soil Science & Agril. Chemistry

Ist Semester

SAC 6461: PHYSICAL INORGANIC AND ANALYTICAL CHEMISTRY

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE -to + PRA. 40 = 100)

Structure of a to 111, electronic theory of valancy, radio activity, radio isotopes concepts of specific activity, principles of tracer techniques. Method of labellingrn, Isotopic dilution, dipole movement, reaction kinetics, and catalysis, elementary Idea of thermodynamics free energy concept activity and coefficient, colloidal state of matter, properties, classification & stability, emulsions adsorption types isolation, asrnotic pressure and its measurement. Ionic theory of ostualds dilution law, application of ionic theory of analytical chemistry. Arrahenious theory of solution pressure, pH and its methods of determination. Chemical equilibria and its application of homologous gases & liquids.

Practical: Related with the Course.

SAC 6462: SOIL, WATER AND PLANT RELATIONSHIP

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRk 40 = 100)

Importance of soil water the water cycle precipitation, infiltration. Permeability, percolation surface runoff. Condensation, tension of soil moisture, forces of water retension. Soil water energy concept. Total soil moisture potential gravitational potential metric & osmotic potential, suction & tensions methods of expressing energy levels. Tension v/s film thickness energy central moisture content correlation. Physical classification of soil water, Hygroscopic, capillary and gravitational water. Hygroscopic coefficient. Soil water constant. Biological classification of soil water as super fluous available and unavailable water. Now plants are supplied with water movement of soil water. Losses of soil moisture, effect of soil moisture stress and water logging on plant growth measurement of soil moisture. Water requirements of crops.

Practical: Related with the Course.

SAC 6463: SOIL MINEROLOGY GENESIS AND CLASSIFICATION

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Structural chemistry Ionic radii, coordination theory, pouting's rules, isomorphism solid solution and polymorphism, classification structure, characteristics, distribution, origin, rocks and minerals, genesis and transformation of clay minerals, non crystalline

compounds of soil, history and system of soil classification, diagnostic horizons of soils of different orders, taxonomy of soils of India, soil micro morphology.

Practical: Related with the Course.

IInd Semester

SAC 6465: SOIL CHEMISTRY

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Concepts of chemical equilibrium soil, soil colloids solubility relationship of important nutrients and alumion silicates in soils, salt dissolution and precipitation thermodynamics and chemical kinetics of chemical reaction; organic mater- and characterization clay organic matter interaction. Ion retention mechanism and chemical and emperical relationship, surface chemistry and nutrient dynamics; chemical and electro chemical properties of submerged soils; chemistry of acid and salt affected soils and their recommendations.

Practical: Related with the Course.

SAC 6466: SOIL PHYSICS

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Soil water behaviour infiltration, distribution, relretention and movement, soil water potential , soil water valance, soil water management practices; special variability in soils. Soil physical environment and soil fertility relationship; consistence swelling, shrinkage disperssion and workability of soils soil compaction process, factors, isograns, soil texture, soil structure genesis, evaluation and management. puddling and its effects soil physical behaviour. Soil temperature thermal properties, variations modifications; soil air

SAC 6467: SOIL BIOLOGY AND BIO CHEMISTRY

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Soil biota microbial ecology types of organisms in different soils. Soil microbial biomass, microbial interactions; microbiology and bio chemistry of root soil interface; phyllosphere, bio-fertilizers, soil enzymes activities and importance: phosphorus, sulphur/iron and manganese in the soil. Bio chemical composition and biodegradation of soil organic matter and crop residues; organic wastes and their use of production of biogas and manures, biotic factors in soil development.

Practical: Related with the Course.

IIIrd Semester

SAC 7461: INSTRUMENTAL TECHNIQUES IN SOIL AND PLANT ANALYSIS

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Principles of visible ultraviolet and infrared spectro-photometry. atomic absorption chromatographic techniques. potentiometry emission and mass spectrometry, Ion selective electrodes. Tracer techniques in soil and plant research. Chromatographic analysis; use of radio isotopes in soil and plant analysis.

Practical: Related with the Course.

SAC 7462: SOIL FERTILITY AND PLANT NUTRITION

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Forms availability, mobility and losses of macro and micro nutrients in soil. Nutrients deficiencies and toxicities recent diagnostic techniques and ameliorative measures; nutrients and nutrient water interactions; balance use of nutrients. integrated plant nutrient supply and management: nutrient uptake mechanism: nutrient release and carryover effects; quantity intensity relationships; soil fertility evaluation; soil test crop response correlations and response functions.

Practical: Related with the Course.

SAC 7463: MANURES AND FERTILIZERS

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Role of manures in sustainable agriculture; rural urban enriched composts: preparation preservation and mechanisms of their decomposition under different moisture regimes. Fertilizer production future projections and consumption in India production, characteristics and use of different fertilizers. Fertilizer interaction in soils. Use of low grade phosphate rocks on different types of soils. Recent developments in secondary and micronutrient fertilizations; factors affecting fertilizer use efficiency integrated nutrient management of sustainable agriculture. Long term effect of manures fertilizers on soil productivity; quality control of fertilizers and control order.

Practical: Related with the Course.

SAC 7464: AGRICULTURAL CHEMICALS

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Chemicals manufacture and formulations of important pesticides (DDT Aldrin, BHC Endosulfan Phosphamidon, dichlorvos phorate, Malathion, Methylparation, chemistry of plant origin insecticides. Elementry idea of attractants, repellents, chernosterilants growth regulators. Synergists. Biodegradation and made of action of DDT BHC, organoplasphate and atrazine.

Practical: Related with the Course.

IV th Semester

SAC 7465: SOIL POLLUTION

(Credit Hours: 2+1 = 3)

(MARKS: M, ID 20 + THE 40 + PRA. 40 = 100)

Pollution problems and hazards. Nature and sources of pollutants industrial, agricultural and municipal wastes. Fertilizers, pesticides, radio nucleotides fossil fuels acid rains oil spills etc. Soil sickness due to biological agents and toxins etc. Heavy metals toxicity, effect on nutrients, availability of plant growth, characterization and monitoring of pollutants. Air and water pollution; as related to soil nature of pollutants, sources and effect on plant growth. Pollution control; soil is a sink for waste disposal. Remediation of contaminated soil and water.

Practical: Related with the Course.

SAC 7466: SOIL TECHNOLOGY

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Scope and introduction extent distribution and chemistry of problem soils management of acid and acid sulphate, saline, sodic and calcareous, management and principles of sandy clay, red and lateritic and dry land soils, soil plant adjustment principles. Quality of irrigation water and management of saline water for irrigation.

Practical: Related with the Course.

SAC 7467: ADVANCED ORGANIC CHEMISTRY AND PLANT BIOCHEMISTRY

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Characteristics of chemical bonds and covalency. Classification of organic compounds. Nomenclature and their general properties. Chemistry of functional groups, general chemistry of carbohydrates and photosynthesis of carbohydrates. General chemistry of lipids plant pigments, Alkaloids, plant hormones their chemistry & uses. Vitamins, classification and occurrence, chemistry and deficiency symptoms. General chemistry of proteins & their biosynthesis enzymes, their classification, mechanism of their activity.

Practical: Related with the Course.

AST 6364: STATISTICAL METHODS

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Frequency distribution, classification and tabulation of data, graphical and diagrammatic representation of data, measures of central tendency, measures of dispersion, coefficient of variance, standard error, skewness & kurtosis.

Consus &-sample survey, population and sample, probability concept of random sampling, simple random sample, stratified sampling systematic & cluster sampling parameter & sample value. Testing of hypothesis. test of signification based on Z t and F test X² - test for goodness of fit and independence of attributes.

Scattered diagram. Linear regression & correlation, regression and correlation coefficient.

Practical: Related to the Course

AST 6368: DESIGN OF EXPERIMENTS

(Credit Hours: 2+1 = 3)

(MARKS: MID 20 + THE 40 + PRA. 40 = 100)

Analysis of variance. Basic principal of experimental design, CRD, RBD, LSD with their analysis mission plot techniques in R.B.D. and L.S.D.

Factorial experiments its concepts and analysis of 2³, factorial.

Confounding in symmetrical factorial (in 2³ experiments), split plot design, strip plot design, uniformity trials. Progeny row trials. Cornplect family black design, with over trials & simple rotational experiments. Statistical organization, statistics of livestock & fistrics, source of livestock and agriculture in general. Source of official statistician. Crop cutting experiments.