

B.Sc. in Soil & Irrigation Study Plan

University Compulsory Courses 16 C.H

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University Elective Courses 9 C.H

Pages (64 & 65)

Faculty Compulsory Courses 21 C.H

| Line No. | Code | Course | |
|----------|----------|--|---|
| 622040 | PP204 | PRINCIPLES OF AGRICULTURAL ECONOMICS | 3 |
| 622621 | PP262A | EXTENSION AND TRANSFER OF AGRICULTURAL TECHNOLOGY | 3 |
| 901021 | MATH102A | CALCULUS(FOR BIO.SCI.STUDENTS) | 3 |
| 911031 | CHEM103A | GENERAL CHEMISTRY | 3 |
| 921031 | PHY103A | GENERAL PHYSICS | 3 |
| 931030 | BIO103 | GENERAL BIOLOGY | 3 |
| 1731160 | CS116 | SELECTED PROGRAMMING LANGUAGES (FOR NON COMPUTER SCIENCE INFORMATION STUDENTS) | 3 |

Department Compulsory Courses 77 C.H

| Line No. | Code | Course | |
|----------|--------|---|---|
| 622050 | PP205 | PRINCIPLES OF PLANT SCIENCE | 3 |
| 622051 | PP205A | PRINCIPLES OF PLANT SCIENCE (LABORATORY) | 0 |
| 622130 | PP213 | INTRODUCTION TO BIOSTATISTICS | 3 |
| 642020 | NR202 | PRINCIPLES OF SOIL SCIENCE | 3 |
| 642410 | NR241 | PRINCIPLES OF IRRIGATION AND DRAINAGE | 3 |
| 642411 | NR241 | PRINCIPLES OF IRRIGATION AND DRAINAGE (LAB) | 0 |
| 643010 | NR301 | SOIL PHYSICS | 3 |
| 643011 | NR301 | SOIL PHYSICS(LAB) | 0 |
| 643060 | NR306 | SOIL PLANT WATER RELATIONS | 3 |
| 643120 | NR312 | ENVIRONMENTAL SOIL CHEMISTRY | 3 |
| 643310 | NR331 | RANGE MANAGEMENT | 3 |
| 643330 | NR333 | SOIL CONSERVATION AND LAND MANAGEMENT | 3 |
| 643401 | NR340A | PRINCIPLES OF HYDRAULICS | 3 |
| 643420 | NR342 | HYDROIOGY | 3 |
| 643630 | NR363 | GEOGRAPHICAL INFORMATION SYSTEMS (GIS) AND REMOTE SENSING | 3 |
| 643631 | NR363 | GEOGRAPHICAL INFORMATION SYSTEMS(GIS) AND REMOTE SENSING(LAB) | 0 |
| 644010 | NR401 | SUMMER TRAINING | 6 |
| 644120 | NR412 | SOIL FERTILLITY AND FERTIZERS | 3 |
| 644132 | NR413B | SOIL CHEMISTRY AND FERTILITY LABORATORY | 2 |
| 644133 | NR413 | SOIL CHEMISTRY AND FERTILITY LABORATORY(LAB) | 0 |
| 644140 | NR414 | SOIL RECLAMATION | 3 |
| 644210 | NR421 | ENVIRONMENTAL MICROBIOLOGY | 3 |
| 644320 | NR432 | SOIL GENESIS AND CLASSIFICATION | 3 |

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|--------|----------|-----------------------------------|---|
| 644441 | NR444A | AGRICULTURAL DRAINAGE | 2 |
| 644461 | NR446A | WATER RESOURCES | 2 |
| 644470 | NR447 | IRRIGATION SYSTEMS DESIGN | 3 |
| 644910 | NR491 | SEMINAR | 1 |
| 911072 | CHEM107B | GENERAL CHEMISTRY LAB | 1 |
| 912170 | CHEM217 | ORGANIC CHEMISTRY | 3 |
| 912330 | CHEM233 | ANALYTICAL CHEMISTRY | 3 |
| 912340 | CHEM234 | ANALYTICAL CHEMISTRY LAB. | 1 |
| 931070 | BIO107 | GENERAL BIOLOGY (PRACTICAL) | 1 |
| 933311 | BIO331A | GENERAL MICROBIOLOGY | 3 |
| 933322 | BIO332B | GENERAL MICROBIOLOGY (LABORATORY) | 1 |

Department Elective Courses 9 C.H

| Line No. | Code | Course | |
|----------|--------|---|---|
| 623210 | PP321 | VEGETABLE PRODUCTION | 3 |
| 623211 | PP321A | VEGETABLE PRODUCTION(LABORATORY) | 0 |
| 623220 | PP322 | DECIDUOUS FRUIT TREES | 3 |
| 623222 | PP322 | DECIDUOUS FRUIT TREES | 0 |
| 624241 | PP424A | LANDSCAPE HORTICULTURE(LABORATORY) | 0 |
| 624242 | PP424B | LANDSCAPE HORTICULTURE | 3 |
| 642100 | NR210 | INTRODUCTION TO NATURAL RESOURCES MANAGEMENT | 3 |
| 642200 | NR220 | FOREST SCIENCE | 3 |
| 642210 | NR221 | DRAWING ENGINEERING | 3 |
| 644340 | NR434 | SOIL SURVEY AND LAND USE | 3 |
| 644520 | NR452 | ENVIRONMENTAL AGRICULTURAL MANAGMENT | 3 |
| 644530 | NR453 | IRRIGATION MANAGEMENT | 3 |
| 644710 | NR471 | RANGE DEVELOPMENT AND PROTECTION | 3 |
| 644800 | NR480 | INSTRUMENTAL ANALYSIS IN SOIL SCIENCE | 3 |
| 644923 | NR492C | SELECTED TOPICS IN SOIL,WATER AND ENVIRONMENT | 1 |
| 644924 | NR492D | SELECTED TOPICS IN SOIL,WATER AND ENVIRONMENT | 2 |
| 644925 | NR492E | SELECTED TOPICS (A) | 3 |

TOTAL 132 C.H

*** For prerequisite & equivalent courses see the Courses' Description.**

B.Sc. in Soil and Irrigation

Courses' Description

NR 202 Principles of Soil Science (3C, 3H)

Fundamentals of chemical, physical, and biological properties of soil as they relate to plant growth. The role of soil in the environment as a recipient of wastes. Proper use and conservation of soil. (Prerequisite: CHEM 103)

NR 221 Engineering Drawing (3C, 6L)

Drawing instruments and their use, lettering. Orthographics, isometric projections and sectional views using drawing instruments. Orthographics, isometric projections and sectional views using computer instruments.

NR 241 Principles of Irrigation and Drainage (3C, 2H, 3L)

Importance of Irrigation, Irrigation Resources. Hydraulics flow, Soil moisture measurements, Consumptive use, Irrigation efficiency, Irrigation methods, Water movement, Water quality, Agricultural drainage. (Prerequisite: NR 202)

NR 301 Soil Physics (3C, 2H, 3L)

Introductory to soil physics. Soil texture. Surface area of soil particles. Particle size analysis. Stoke's law. Soil structure. Types of soil structure. Evaluation of soil structure. Porosity, bulk density. Soil water retention. Concepts of water potential, components of potential, potential for equilibrium and non-equilibrium conditions, measurements of potential. Movement of soil water. Darcy's law. Hydraulic conductivity measurements. Soil aeration. Diffusion. Soil temperature, thermal properties of soil, modifying thermal regime. (Prerequisite: NR 202)

NR 306 Soil-Plant-Water Relations (3C, 3H)

Soil and water properties and functions. Water retention and transport in soil. Soil-plant-atmosphere continuum. Physical, biochemical, and environmental processes in soil-plant-water relations. Plant roots and water flux in the soil-root continuum, Evapotranspiration, Water use efficiency. Response of plants to environmental stresses. (Prerequisite: NR 301)

NR 312 Environmental Soil Chemistry (3C, 3H)

Revision for basic chemical concepts. Soil Minerals and their reactions. Soil organic matter as related to agriculture and environment. Cation exchange and adsorption, anion retention. Chemistry of soil solution. Salt-affected soils. (Prerequisite: NR 202, CHEM 233)

NR 333 Soil Conservation and Land Management (3C, 3H)

Basic concepts in soil conservation and land management. Causes of soil erosion and methods of minimizing soil erosion. Soil fertility and its improvement. Revegetation. (Prerequisite: NR 202)

NR 340 Principles of Hydraulics (3C, 3H)

This course will concentrate on open-channel flow and its classification; uniform and non-uniform flow in artificial and natural channels; properties of fluids; steady and unsteady flow; continuity equation, Bernoulli equation, water flow in pipes; friction in pipes; hydraulic jump; pressure measurements; and flow measuring devices (weirs and flumes). (Prerequisite: NR 241)

NR 342 Hydrology (3C, 3H)

Introduction to hydrology as a description of the hydrologic cycle and the role of water and chemicals in

the natural environment. Precipitation, infiltration, and evapotranspiration. Groundwater, surface runoff, river meandering, floods and droughts. (Prerequisite: NR 241)

NR 346 Irrigation Systems (3C, 3H)

Hydraulic flow in pipes open and open channels, Energy losses in pipes, Irrigation scheduling, Border irrigation, Furrow irrigation, Drip, Sprinkler, Surface irrigation systems, Soil-Water-Plant relations. (Prerequisite: NR 241, NR 306 or corequisite)

NR 401 Summer Training (6C, 18L)

Student should be trained for eight weeks during the summer that follows the third year at any public or private institutes that are interested in Soil, Water and Environment. Evaluation will be only as Successful or Unsuccessful. No simultaneous courses could be registered with these courses. (Prerequisite: Completion of 90 C.H)

NR 412 Soil Fertility and Fertilizers (3C, 3H)

Soil chemical and physical properties as related to soil fertility. Plant nutrients and their classification, functions, soil and plant contents, reactions and availability in the soil. Movement and absorption of plant nutrients. Fertilizers classification, types and application methods. Soil fertility evaluation and fertilizer recommendations. Fertigation and advanced techniques in fertilizer applications. (Prerequisite: NR 202, PP 205)

NR 413 Soil Chemistry and Fertility Lab. (2C, 1H, 3L)

Principles, methods, and techniques of quantitative determination of chemical and fertility parameters of soils and plants. Procedures of collecting soil and plant samples are covered as well as interpretation of results. (Prerequisite: NR 312)

NR 41 Soil Reclamation (3C, 2H, 3L)

Principles of soil, water, and crop management under arid and semiarid conditions. The use of diagnostic procedures for evaluation of soils and waters. Reclamation of salt-affected soils. (Prerequisite: NR 312)

NR 421 Environmental Microbiology (3C, 2H, 3L)

Nature and physiology of soil and water microorganisms. Current concepts in microbial biogeochemistry with emphasis on microbial dynamics in the environment. The course includes documentation, reports, seminars and group discussions. Basic techniques for isolation and characterization of environmental organisms from soil and water. Methods of enumeration and measurement of microbial physiological activity. (Prerequisite: BIO 332)

NR 432 Soil Genesis and Classification (3C, 2H, 3L)

Weathering, reactions and processes of soil genesis. Soil classification and the rationale and utilization of soil taxonomy. Field identification of soil properties, profiles and landscapes. (Prerequisite: NR 202)

NR 434 Soil Survey and Land Use (3C, 3H)

Evaluating the soil capabilities through the use of soil survey. Development of plans and practices for management of agricultural, recreational and urban land use. (Prerequisite: NR 432)

NR 444 Agricultural Drainage (2C, 2H)

Concepts of agricultural drainage, importance of drainage. Drainage systems and construction methods. Subsurface drainage, surface drainage. (Prerequisite: NR 241)

NR 446 Water Resources (2C, 2H)

Introduction. Precipitation. Weather maps. Measurement of precipitation. Vegetated waterway, design, channel capacity. Terracing, design and alignment of terraces. Earth embankments. Reservoirs. Conservation structures. Drop spillways. Pipe spillways. Underground water. Confined aquifers. Unconfined aquifers. Wells. Quality of groundwater. (*Prerequisite: NR 342*)

NR 447 Irrigation Systems Design (3C, 2H, 3L)

Design of irrigation systems, Irrigation systems layout, Components of irrigation systems (Drip, Sprinkler), Selecting of irrigation systems, Evaluation of irrigation systems, Practices of irrigation systems, Theoretical and practical applications of irrigation systems. (*Prerequisite: NR 340*)

NR 452 Environmental Agricultural Management (3C, 3H)

Tools used by scientists to understand the environment will be used to focus on water and soil quality. Exploration of science and technology solutions to soil and water pollution and their limits. (*Prerequisite: Completion of 90 C.H*)

NR 453 Irrigation Management (3C, 3H)

Devices and instruments to evaluate irrigation systems, Pumps, Irrigation water strategies to increase water use efficiency, Selecting of irrigation systems, Using traditional and untraditional water for irrigation purposes, Treated wastewater, Soil salinity and irrigation water, Management of irrigation system in the field, Operating and maintaining irrigation systems, Estimating irrigation costs. (*Prerequisite: NR 447 or corequisite*)

NR 480 Instrumental Analysis in Soil Science**(3C, 2H, 3L)**

This course covers the basic analytical methods used in soil analysis. Examples: Molecular Absorption Spectrometry, Atomic Absorption Spectrometry, Atomic Emission Spectrometry, X-Ray Spectrometry, Chromatography Separations. (*Prerequisite: NR 312*)

NR 491 Seminar (1C, 1H)

Presentation of current topics in soil, water, and environment (*Prerequisite: Completion of 90 CH*)

NR 492 Selected Topics (3C, 3H or 2C, 2 H or 1 C, 1H)

This course covers topics related to soil, water, and environment which are not covered in other courses. A student can take this course one time only. (*Prerequisite: Completion of 90 CH*)