

M.Sc. (Ag) AGRONOMY

| I Semester | | | | |
|---------------------|---|----------|----------|---------------|
| Subject code | Subject Title | L | P | Credit |
| 01MSC18101 | PRINCIPLES AND PRACTICES OF WEED MANAGEMENT | 2 | 1 | 3(2 +1) |
| 01MSC18102 | PRINCIPLES AND PRACTICES OF WATER MANAGEMENT | 2 | 1 | 3(2+1) |
| 01MSC18103 | PRINCIPLE AND PRACTICES OF SOIL FERTILITY AND NUTRIENT MANAGEMENT | 2 | 1 | 3(2+1) |
| 01MSC18104 | STAISTICAL METHODS | 2 | 1 | 3(2+1) |
| 01MSC18301 | DACA | 0 | 1 | 1(0+1) |
| | Total | 8 | 5 | 13(8+5) |

01MSC18101 PRINCIPLES AND PRACTICES OF WEED MANAGEMENT 3(2+1)

Objective

To familiarize the students about the weeds, herbicides and methods of weed control.

Theory

UNIT I

Weed biology and ecology, crop-weed competition including allelopathy; principles and methods of weed control and classification; weed indices.

UNIT II

Herbicides introduction and history of their development; classification based on chemical, physiological application and selectivity; mode and mechanism of action of herbicides.

UNIT III

Herbicide structure - activity relationship; factors affecting the efficiency of herbicides; herbicide formulations, herbicide mixtures; herbicide resistance and management; weed control through bio-herbicides, myco-herbicides and allelochemicals; Degradation of herbicides in soil and plants; herbicide resistance in weeds and crops; herbicide rotation.

UNIT IV

Weed management in major crops and cropping systems; parasitic weeds; weed shifts in cropping systems; aquatic and perennial weed control.

UNIT V

Integrated weed management; cost: benefit analysis of weed management.

Practical

- Identification of important weeds of different crops
- Preparation of a weed herbarium
- Weed survey in crops and cropping systems
- Crop-weed competition studies
- Preparation of spray solutions of herbicides for high and low-volume sprayers
- Use of various types of spray pumps and nozzles and calculation of swath width
- Economics of weed control
- Herbicide resistance analysis in plant and soil
- Bioassay of herbicide resistance
- Calculation of herbicide requirement

Suggested Readings

1. Aldrich RJ & Kramer RJ. 1997. *Principles in Weed Management*. Panima Publ.
2. Ashton FM & Crafts AS. 1981. *Mode of Action of Herbicides*. 2nd Ed. Wiley Inter-Science.
3. Gupta OP. 2010. *Modern Weed Management*. Agrobios.
4. Naylor REL. 2002. *Weed Management Hand Book*. Blackwell Publishing.
5. Rao VS. 2000. *Principles of Weed Science*. Oxford & IBH.
6. Sarswat VN, Bhan VM & Yaduraju NT. 2003. *Weed Management*. ICAR
7. Singh HP, Batish DR & Kohli RK. 2006. *Sustainable Weed Management*. Food Products Press – An imprint of The Haworth Press Inc.
8. Streibig JC & Kudsk P. 1993. *Herbicide Bioassay*. CRC Press Inc.
9. Zimdahl RL. 2007. *Fundamentals of Weed Science*. III Ed. Academic Press.

01MSC18102

PRINCIPLES AND PRACTICES OF WATER MANAGEMENT

3(2+1)

Objective

To teach the principles of water management and practices to enhance the water productivity.

Theory

UNIT I

Water and its role in plants; water resources of India, major irrigation projects in India and different states.

UNIT II

Soil water movement in soil and plants; transpiration; Soil moisture constants; soil-water-plant relationships; water absorption by plants; plant response to water stress, crop plant adaptation to moisture stress condition.

UNIT III

Soil, plant and meteorological factors determining water needs of crops; scheduling, depth and methods of irrigation; microirrigation system; fertigation; management of water in controlled environments and polyhouses.

UNIT IV

Water management of the crops; quality of irrigation water and management of saline water for irrigation; criteria for water allocation.

UNIT V

Excess of soil water and plant growth; water management in problem soils; drainage requirement of crops and methods of field drainage, their layout and spacing.

Practical

- Determination of Bulk density and pH of irrigation water.
- Measurement of soil moisture by using tensiometer, and pressure plate
 - Soil-moisture characteristics curves
- Water flow measurements using different devices
- Determination of irrigation water with deferent methods.
- Determination of irrigation requirements
- Calculation of irrigation efficiency
- Determination of infiltration rate
- Determination of saturated/unsaturated hydraulic conductivity
- Determination of moisture content by neutron moisture meter.

Suggested Readings

1. Lenka, D. 1999 *Irrigation and Drainage*. Kalyani Publishers. L.D.H., New Delhi.
2. Michael, A.M. 1987. *Irrigation: Theory and Practice*. Vikas Publishing House, New Delhi.
3. Mishra, R.D. and Ahmed, M. 1987 *Manual on Irrigation Agronomy*. Oxford & IBH Publishing Co. Pvt.

Ltd., New Delhi.

4. Parihar, S.S. and Sandhu, B.S. 1987 *Irrigation of Field Crops – Principles and Practices*. ICAR, New Delhi.
5. Reddy, S.R. 2007. *Irrigation Agronomy*. Kalyani Pub. , New Delhi.
6. Reddy, G. H. S. & Reddy, T. Y. 2003 *Efficient use of irrigation water*. Kalyani Pub. , New Delhi.
7. Paliwal, K. V. 1972. *Irrigation with Saline Water*. IARI Monograph, New Delhi.
8. Panda, S. C. 2003. *Principles and Practices of Water Management*. Agrobios.
9. Tiwari, R. C; Sumeriya, H. K. & Dhaker, R. C. 2012, *Practical Manual: irrigation water management*. Department of Agronomy, Rajasthan College of Agriculture, MPUAT, Udaipur.

01MSC18103 PRINCIPLES AND PRACTICES OF SOIL FERTILITY 3(2+1)
AND NUTRIENT MANAGEMENT

Objective

To impart knowledge of fertilizers and manures as sources of plant nutrients and apprise about the integrated approach of plant nutrition and sustainability of soil fertility.

Theory

UNIT I

Soil fertility and productivity - factors affecting; features of good soil management; problems of supply and availability of nutrients; relation between nutrient supply and crop growth; organic farming - basic concepts and definitions.

UNIT II

Criteria of essentiality of nutrients; Essential plant nutrients – their functions, nutrient deficiency symptoms; transformation and dynamics of major plant nutrients.

UNIT III

Preparation and use of farmyard manure, compost, green manures, vermicompost, biofertilizers and other organic concentrates their composition, availability and crop responses; recycling of organic wastes and residue management.

UNIT IV

Commercial fertilizers; composition, relative fertilizer value and cost; crop response to different nutrients, residual effects and fertilizer use efficiency, fertilizer mixtures and grades; agronomic, chemical and physiological methods of increasing fertilizer use efficiency; nutrient interactions.

UNIT V

Time and methods of manures and fertilizers application; foliar application and its concept; relative performance of organic and inorganic manures; economics of fertilizer use; integrated nutrient management; use of vermicompost and residue wastes in crops.

Practical

- Determination of soil pH, E_{ce}, organic C, total N, available N, P, K and S in soils
- Determination of total N, P, K and S in plants
- Interpretation of interaction effects and computation of economic and yield optima

Suggested Readings

1. Brady NC & Weil R.R 2002. *The Nature and Properties of Soils*. 13th Ed. Pearson Edu.
2. Fageria NK, Baligar VC & Jones CA. 1991. *Growth and Mineral Nutrition of Field Crops*. Marcel Dekker.
3. Gupta PK. 2007. *A Hand Book of Soil, Fertilizer and Manures*. Agribios
4. Havlin JL, Beaton JD, Tisdale SL & Nelson WL. 2006. *Soil Fertility and Fertilizers*. 7th Ed. Prentice Hall.
5. Prasad R & Power JF. 1997. *Soil Fertility Management for Sustainable Agriculture*. CRC Press.
6. Somani LL. 1996. *Efficient Use of Fertilizers*. Agrotech Publishing Academy.

7. Yawalkar KS, Agrawal JP & Bokde S. 2000. *Manures and Fertilizers*. Agri-Horti Publ.
8. Das, P. C. 2005 *Manures and Fertilizers*. Kalyani Publishers.

01MSC18104

STATISTICAL METHODS

3(2+1)

1. **Probability:** Definition of Probability, addition and Multiplicative laws of probability. Fitting of Binomial, Poisson and normal distribution.
2. **Correlation and Regression:** Karl-Pearson correlation coefficient, Spearman rank Correlation, Partial Correlation, multiple correlation coefficients. Linear Regression, Multiple linear regression upto two independent variables.
3. **Tests of Hypothesis:** Introduction and concept of tests of hypothesis, t-test of significance of single mean, two means, paired t-test, test of significance of correlation coefficient and partial correlation coefficient. F-test test of significance of two variance, test of significance of multiple correlation coefficient. χ^2 test of significance of variance, goodness of fit and independence of attributes. Parametric versus non-parametric test, binomial test, sign test, Wilcoxon test
4. **Analysis of Variance ;** Analysis of variance for one way, two-way classification with equal cell frequencies per cell, transformation of data, concept of critical difference and Duncan's multiple range test.
5. **Design of Experiment:** Principles of design, selection of experimental material, uniformity trial, determination of size and shape of plots. Experiments in farmer's field. Layout and Analysis of RBD and LSD including one missing value, combined experiments in RBD.
6. **Factorial experiments:** Concept of main affect and interaction in 2^2 , 2^3 experiment, partial confounding and complete confounding in 2^3 experiment.
7. **Other Design:** Layout and analysis of split plot design, split-split plot design, strip plot design, cross over design and balanced incomplete block design.
8. **Response surfaces:** Fitting of quadratic response curve, determination of optimum level of a factor by quadratic equation, Mitscherlich equation.

Books Recommended

1. Statistical Procedure for Agricultural Research. By: Kwanchai-a Gomes Arturo a.Gomez, John Wiley and Sons. M.Sc. Agriculture (Hons) Parts I & II 18
2. A text book of Agricultural Statistics.By:R.Rangaswamy, New Age International Pvt. Ltd.
3. Statistics for Agricultural Sciences.By: G. Nageswar Rao,Oxford and IBH Publishing Co.
4. Statistical Analysis of Non normal data, By: J.V. Deshpande, A.P.Gore, A. Shanubhogue, New age International Publishers Ltd.
5. Statistical methods in Animal Sciences, By: V.N. Amble, Indian Society Agricultural Statistics (New Delhi)

| II Semester | | | | |
|---------------------|---|----------|----------|---------------|
| Subject code | Subject Title | L | P | Credit |
| 02MSC18101 | AGROMETEREOLOGY AND CROP WEATHER MANAGMENT | 2 | 1 | 3(2+1) |
| 02MSC18102 | DRYLAND FARMING | 2 | 1 | 3(2+1) |
| 02MSC18103 | AGRONOMY MAJOR CEREALS AND PULSES | 2 | 1 | 3(2+1) |
| 02MSC18104 | PRINCILPE OF PLANT PHYSIOLOGY | 2 | 1 | 3(2+1) |
| 02MSC18105 | TECHNICAL WRITING AND COMMUNICATION SKILL | 1 | 0 | 1(1+0) NC |
| 01MSC18301 | DACA | 0 | 1 | 1(0+1) |
| | Total | 9 | 5 | 14(9+5) |

02MSC18101 AGROMETEOROLOGY AND CROP WEATHER FORECASTING 3(2+1)

Objective

To impart knowledge about agro-meteorology and crop weather forecasting to meet the challenges of aberrant weather conditions.

Theory

UNIT I

Agro meteorology - aim, scope and development in relation to crop environment; composition & structure of atmosphere, distribution of atmospheric pressure and wind, facts about the sun and the each.

UNIT II

Characteristics of solar radiation; Transfer of heat, energy balance of atmosphere system; radiation distribution in plant canopies, radiation utilization by field crops; solar radiation use efficiency, radiation laws, Response of plants to radiation; environmental temperature: soil, air and canopy temperature.

UNIT III

Temperature profile in air, soil, crop canopies; soil and air temperature effects on plant processes; environmental moisture and evaporation: measures of atmospheric temperature and relative humidity vapor pressure and their relationships; evapo-transpiration and meteorological factors determining evapotranspiration. UNIT IV

Modification of plant environment: artificial rain making, heat transfer, controlling heat load, heat trapping and shading; protection from cold, sensible and latent heat flux, controlling soil moisture; monsoon and their origin, characteristics of monsoon; onset, progress and withdrawal of monsoon; weather hazards, drought monitoring and planning for mitigation.

UNIT V

Weather forecasting in India – short, medium and long range; benefits of weather services to agriculture, remote sensing; application in agriculture and its present status in India; atmospheric pollution and its effect on climate and crop production; climate change and its impact on agriculture crop simulation modeling.

Practical

- Visit to agro-meteorological observatory and to record sun-shine hours, wind velocity, wind direction, relative humidity, soil and air temperature, evaporation, precipitation and atmospheric pressure
- Measurement of solar radiation outside and within plant canopy

- Measurement/estimation of potential evapo-transpiration by various methods
- Measurement/estimation of soil water balance
- Rainfall variability analysis
- Determination of heat-unit requirement for different crops
- Measurement of crop canopy temperature
- Verification of medium range weather forecast and preparation of agro-advisory service bulletins
- Working principle of automatic weather station
- Introduction of DSSAT model.
- Visit to solar observatory

Suggested Readings

1. Critchfield HJ.1995. *General Climatology*. Prentice Hall of India.
 2. Lal DS.2005. *Climatology*. Sharda Pustak Bhawan.
 3. Lenka D.1998. *Climate, Weather and Crops in India*. Kalyani.
 4. Mavi HS & Tupper GJ. 2004. *Agrometeorology: Principles and Application of Climate Studies in Agriculture*. Haworth Press.
 5. Menon PA.1991. *Our Weather*. National Book Trust Publ.
 6. Sahu DD. *Agrometeorology and Remote Sensing: Principles and Practices*. Agrobios.
 7. Variraju R & Krishnamurty 1995. *Practical Manual on Agricultural Meteorology*. Kalyani.
 8. Varshneya MC & Balakrishana Pillai P. 2003. *Textbook of Agricultural Meteorology*. ICAR.
- Rao, G. S. L. H. V. Prasada, 2008; Agricultural Meteorology

02MSC18102

DRYLAND FARMING

3(2+1)

Objective

To teach the basic concepts and practices of dry land farming and soil moisture conservation.

Theory

UNIT I

Definition, concept and characteristics of dry land farming; dry land versus rainfed farming; significance and dimensions of dry land farming in Indian agriculture.

UNIT II

Soil and climatic parameters with special emphasis on rainfall characteristics; constraints limiting crop production in dry land areas; types of drought, characterization of environment for water availability; crop planning for erratic and aberrant weather conditions.

UNIT III

Stress physiology and resistance to drought, adaptation of crop plants to drought, drought management strategies; preparation of appropriate crop plans for dry land areas; mid contingent plan for aberrant weather conditions.

UNIT IV

Tillage, tith, frequency and depth of cultivation, compaction in soil tillage; concept of conservation tillage; tillage in relation to weed control and moisture conservation; techniques and practices of soil moisture conservation (use of mulches, kinds, effectiveness and economics); antitranspirants; soil and crop management techniques, seeding and efficient fertilizer use.

UNIT V

Concept of watershed resource management, problems, approach and components.

Practical

- Seed treatment, seed germination and crop establishment in relation to soil moisture contents
- Moisture stress effects and recovery behavior of important crops
- Estimation of moisture index and aridity index
- Spray of anti-transpirants and their effect on crops
- Collection and interpretation of data for water balance equations
- Water use efficiency
- Preparation of crop plans for different drought conditions
- Study of field experiments relevant to dryland farming
- Visit to dryland research stations and watershed projects

Suggested Readings

1. Das NR. 2007. *Tillage and Crop Production*. Scientific Publishers.
2. Dhopte AM. 2002. *Agrotechnology for Dryland Farming*. Scientific Publ.
3. Gupta US. (Ed.). 1995. *Production and Improvements of Crops for Drylands*. Oxford & IBH.
4. Katyal JC & Farrington J. 1995. *Research for Rainfed Farming*. CRIDA.
5. Rao SC & Ryan J. 2007. *Challenges and Strategies of Dryland Agriculture*. Scientific Publishers.
6. Singh RP. 1988. *Improved Agronomic Practices for Dryland Crops*. CRIDA.
7. Singh RP. 2005. *Sustainable Development of Dryland Agriculture in India*. Scientific Publ.
8. Singh SD. 1998. *Arid Land Irrigation and Ecological Management*. Scientific Publishers.
9. Venkateshwarlu J. 2004. *Rainfed Agriculture in India. Research and Development Scenario*. ICAR.
10. Mahnot, S. C.; Singh, P. K. and Chaplot, P. C. 2012 Soil and water conservation and watershed Management. Apex Publishing House, Udaipur

02MSC18103 AGRONOMY OF MAJOR CEREALS AND PULSES 3(2+1)

Objective

To teach the crop husbandry of cereals and pulse crops.

Theory

Origin and history, area and production, classification, improved varieties, adaptability, climate, soil, water and cultural requirements, nutrition, quality components, handling and processing of the produce for maximum production of

UNIT I

Rabi cereals: Wheat
& barley

Kharif cereals: Paddy, maize, sorghum & pearl millet

UNIT III

Rabi pulses:
Chick pea

UNIT IV

Kharif pulses: Pigeon pea

Practical

- Phenological studies at different growth stages of crop
- Estimation of crop yield on the basis of yield attributes

- Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities
- Working out growth indices (CER, CGR, RGR, NAR, LAD), aggressiveness, relative crowding coefficient, monetary yield advantage and ATER of prominent intercropping systems of different crops
- Estimation of protein content in pulses
- Planning and layout of field experiments
- Judging of physiological maturity in different crops
- Intercultural operations in different crops
- Determination of cost of cultivation of different crops
- Working out harvest index of various crops
- Study of seed production techniques in various crops
- Visit of field experiments on cultural, fertilizer, weed control and water management aspects
- Visit to nearby villages for identification of constraints in crop production

Suggested Readings

1. Das NR. 2007. *Introduction to Crops of India*. Scientific Publ.
2. Hunsigi G & Krishna KR. 1998. *Science of Field Crop Production*. Oxford & IBH.
3. Jeswani LM & Baldev B. 1997. *Advances in Pulse Production Technology*. ICAR.
4. Khare D & Bhale MS. 2000. *Seed Technology*. Scientific Publ.
5. Kumar Ranjeet & Singh NP. 2003. *Maize Production in India: Golden Grain in Transition*. IARI, New Delhi.
6. Pal M, Deka J & Rai RK. 1996. *Fundamentals of Cereal Crop Production*. Tata McGraw Hill.
7. Prasad, Rajendra. 2002. *Text Book of Field Crop Production*. ICAR.
8. Singh C, Singh P & Singh R. 2003. *Modern Techniques of Raising Field Crops*. Oxford & IBH.
9. Singh, SS. 1998. *Crop Management*. Kalyani.
10. Yadav DS. 1992. *Pulse Crops*. Kalyani.
11. Yadav, R. L., Singh Panjab, Prasad, R. And Ahlawat, IPS. Fifty years of Agronomic Research in India. Indian Society of Agronomy, IARI, New Delhi, 1998
12. Singh, Guriqbal, Kolar, J. S. and Sekhaon, H. S. Recent advances in Agronomy, Indian Society of Agronomy, IARI, New Delhi, 2002.

02MSC1810

PRINCIPLES OF PLANT PHYSIOLOGY

3(2+1)

Theory

Objective

To acquaint the students with the basic concepts of plant physiology and their application in agriculture.

UNIT I

Cell organelles and their physiological functions, structure and physiological functions of cell wall, cell inclusions; cell membrane structure and functions.

UNIT II

Soil and plant water relations, water and its role in plants, properties and functions of water in the

cell water relations-cell water terminology, water potential of plant cells. Mechanism of water uptake by roots-transport in roots, aquaporins, movement of water in plants –Mycorrhizal association on water uptake. Water loss from plants-Energy balance-Solar energy input-energy dissipation at crop canopy level- evapotranspiration, transpiration –Driving force for transpiration, plant factors influencing transpiration rate.

UNIT III

Stomata structure and function – mechanism of stomatal movement, antitranspirants. Physiology of water stress in plants: Influence of water stress at cell, organ, plant and canopy levels. Indices for assessment of drought resistance. The role of mineral nutrients in plant metabolism: Essential elements, classification based on function of elements in plants.

UNIT IV

Uptake of mineral elements in plants –Mechanisms of uptake-translocation of minerals in plants. Physiological and metabolic functions of mineral elements, critical levels, deficiency symptoms, nutrient deficiency and toxicity. Foliar nutrition.

UNIT V

Photosynthesis and its importance in bio productivity. Photochemical process, photochemical reactions, CO₂ reduction in Calvin

Practical: Preparation of solutions; Growth analysis: Calculation of growth parameters; Methods of measuring water status in roots, stems and leaves; Measurement of water potential by Chardakov’s method; Measurement of absorption spectrum of chloroplastic pigments and fluorescence; Measurement of leaf area by various methods; Stomatal frequency and index – Respirometer – Measurement of respirometer; Leaf anatomy of C₃ and C₄ plants; Transpiration of measurement; Imbibition of seed; Optimum conditions for seed germination; Breaking seed dormancy; (a) Chemical method (b) Mechanical method; Yield analysis; Seed viability and vigour tests; Effect of ethylene on regulation of stomata.

| III Semester | | | | |
|---------------------|---|----------|----------|---------------|
| Subject code | Subject Title | L | P | Credit |
| 03MSC18101 | MODERN COCEPT IN CROP PRODUCTION | 2 | 1 | 3(2 +1) |
| 03MSC18102 | AGRONOMY OF OIL SEED ,FIBRE AND SUGAR CROPS | 2 | 1 | 3(2+1) |
| 03MSC18104 | INTELLECTUAL PROPERTY AND ITS MANAGEMENT IN AGRICULTURE | 2 | 1 | 1(1+0)NC |
| 03MSC18105 | M. Sc RESEARCH | 0 | 5 | 5(0+5) |
| 03MSC18301 | DACA | 0 | 1 | 1(0+1) |
| | Total | 6 | 9 | 15(6+9) |

03MSC18101 MODERN CONCEPTS IN CROP PRODUCTION

3(2+1)

Objective

To teach the basic concepts of soil management and crop production.

Theory

UNIT I

Crop growth analysis in relation to environment; agro-ecological zones of India. UNIT II

Quantitative agro-biological principles and inverse yield nitrogen law; Mitscherlich yield equation, its interpretation and applicability; Baule unit.

UNIT III

Effect of lodging in cereals; physiology of grain yield in cereals; optimization of plant population and planting geometry in relation to different resources, concept of ideal plant type and crop modeling for desired crop yield. UNIT IV

Scientific principles of crop production; crop response production functions; concept of soil plant relations; yield and environmental stress.

UNIT V

Integrated farming systems, organic farming, and resource conservation technology including modern concept of tillage; dry farming; determining the nutrient needs for yield potentiality of crop plants, concept of balance nutrition and integrated nutrient management; precision agriculture. Concept of site specific Nutrient Management.

Suggested Readings

1. Balasubramaniyan P & Palaniappan SP. 2001. *Principles and Practices of Agronomy*. Agrobios.
2. Fageria NK. 1992. *Maximizing Crop Yields*. Marcel Dekker.
3. Havlin JL, Beaton JD, Tisdale SL & Nelson WL. 2006. *Soil Fertility and Fertilizers*. 7th Ed. Prentice Hall.
4. Paroda R.S. 2003. *Sustaining our Food Security*. Konark Publ.
5. Reddy SR. 2000. *Principles of Crop Production*. Kalyani Publ.
6. Sankaran S & Mudaliar TV. 1997. *Principles of Agronomy*. The Bangalore Printing & Publ.
7. Singh SS. 2006. *Principles and Practices of Agronomy*. Kalyani.

03MSC18102 AGRONOMY OF OILSEED, FIBRE AND SUGAR CROPS

3(2+1)

Objective

To teach the crop husbandry of oilseed, fiber and sugar crops.

Theory

Origin and history, area and production, classification, improved varieties, adaptability, climate, soil, water and cultural requirements, nutrition quality component, handling and processing of the produce for maximum production of :

UNIT I

Rabi oilseeds – Rapeseed & mustard, linseed. UNIT II

Kharif oilseeds - Groundnut, sesame, soybean etc. UNIT III

Fiber crops - Cotton,
sunhemp. UNIT IV
Sugar crops –Sugarcane.

Practical

- Planning and layout of field experiments
- Cutting of sugarcane setts, its treatment and methods of sowing, tying and propping of sugarcane
- Determination of cane maturity and calculation on purity percentage, recovery percentage and sucrose content in cane juice phenological studies at different growth stages of crop
- Intercultural operations in different crops
- Cotton seed treatment
- Working out growth indices (LER, CGR, RGR, NAR, LAD) aggressivity, relative crowding coefficient, monetary yield advantage and ATER of prominent intercropping systems
- Judging of physiological maturity in different crops and working out harvest index
- Working out cost of cultivation of different crops
- Estimation of crop yield on the basis of yield attributes
- Formulation of cropping schemes for various farm sizes and calculation of cropping and rotational intensities
- Determination of oil content in oilseeds and computation of oil yield
- Estimation of quality of fibre of different fibre crops
- Study of seed production techniques in various crops
- Visit of field experiments on cultural, fertilizer, weed control and water management aspects
- Visit to nearby villages for identification of constraints in crop production

Suggested Readings

1. Das NR. 2007. *Introduction to Crops of India*. Scientific Publ.
2. Das PC. 1997. *Oilseed Crops of India*. Kalyani.
3. Lakshmikantam N. 1983. *Technology in Sugarcane Growing*. 2nd Ed. Oxford & IBH.
4. Prasad, Rajendra. 2002. *Text Book of Field Crop Production*. ICAR.
5. Singh C, Singh P & Singh R. 2003. *Modern Techniques of Raising Field Crops*. Oxford & IBH.
6. Singh SS. 1998. *Crop Management*. Kalyani.
7. Yadav, R. L., Singh Panjab, Prasad, R. And Ahlawat, IPS. Fifty years of Agronomic Research in India. Indian Society of Agronomy, IARI, New Delhi, 1998
8. Singh, Guriqbal, Kolar, J. S. and Sekhaon, H. S. Recent advances in Agronomy, Indian Society of Agronomy, IARI, New Delhi, 2002.

| IV Semester | | | | |
|---------------------|----------------------|----------|-----------|-----------------|
| Subject code | Subject Title | L | P | Credit |
| 04MSC18101 | SEMINAR | 0 | 1 | 1(0+1) |
| 04MSC18105 | M. Sc RESEARCH | 0 | 15 | 15(0+15) |
| 04MSC18301 | DACA | 0 | 1 | 1(0+1) |
| | TOTAL | 0 | 17 | 17(0+17) |