

**SCHEME OF STUDIES OF B. Sc FARM MANAGEMENT (2 YEARS
ASSOCIATE DEGREE PROGRAM)**

Course Code	Course Title	Credit Hours
First Semester		
CSC-101	Introduction to information and communication technologies	2 (1-1)
ENG-101	Functional English	2 (2-0)
ISL-101	Islamic Studies	2 (2-0)
AGR-101	Basic Agriculture	3 (2-1)
FM-101	Introduction to Economics & Agricultural Economics	3(3-0)
AGR-103	Land Resource Management	3 (2-1)
AEE-101	Introduction to Agri. Extension Education	3 (2-1)
	Total Credit Hours	18
Second Semester		
SES-101	Soil Science-I	3(2-1)
PKS-102	Pakistan Studies	2 (2-0)
FM-102	Fish Farming and Rural Development	3 (2-1)
AGR-102	Field Crop Production-I	3 (2-1)
AGR-104	General Crop Protection	3 (2-1)
FM-104	Social Psychology and Self Development	3 (3-0)
STAT-102	Statistics-1	3 (3-0)
	Total Credit Hours	20
Third Semester		
FM-201	Principles of Agricultural Marketing	3 (3-0)
FM-203	Orchard Planning and Management	3 (2-1)
FM-205	Fundamentals of Crop Breeding	3 (2-1)
ENT-201	Introductory Entomology	3 (2-1)
PLP-201	Introduction to Plant Pathogens	3(2-1)
AGR-201	Field Crop Production-II	3 (2-1)
AGR-203	Farm Management	3 (2-1)
	Total Credit Hours	18

Fourth Semester		
AGR-202	Agriculture Water Management	3 (2-1)
FM-202	Business Management in Horticulture	3 (3-0)
FM-204	Agribusiness Management, Marketing & WTO	3(3-0)
AGR-206	Farming Systems and Farm Records	3 (2-1)
FRW-201	Introduction to Forestry and Watershed Management	3(2-1)
FST-102	Food Technology	3(2-1)
	Total Credit Hours	18
5th Semester		
FMP-102	Farm Mechanization	3 (2-1)
6th Semester		
I&D- 312	Irrigation Practices	2(1-1)
7th Semester		
8th Semester		
AGR-204	Forage and Fodder Production	3 (2-1)

For Session 2019-2023

5th Semester

SES-101	Soil Science-I	3(2-1)
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8th Semester

FST-102	Food Technology	3(2-1)
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For Session 2021-2025

5th Semester

SES-101	Soil Science-I	3(2-1)
FRW-201	Introduction to Forestry and Watershed Management OR	3(2-1)
AGR-204	Forage and Fodder Production	3 (2-1)

1st or 7th Semester

FST-102	Food Technology	3(2-1)
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DETAIL OF COURSE FOR B. Sc FARM MANAGEMENT (2 YEARS ASSOCIATE DEGREE PROGRAM)

1ST SEMESTER

CSC-101 Introduction to Information and Communication Technologies 2(1-1)

Objective

This is an introductory course on Information and Communication Technologies. Topics include ICT terminologies, hardware and software components, internet, world wide web and ICT based applications.

After completing this course, a student will be able to:

- Understand different terms associated with ICT
- Identify various components of a computer system
- Identify the various categories of software and their usage
- Define the basic terms associated with communications and networking
- Understand different terms associated with the Internet and World Wide Web.
- Use various web tools including Web Browsers, E-mail clients and search utilities.
- Use text processing, spreadsheets and presentation tools
- Understand the enabling/pervasive features of ICT

Course Contents

Basic Definitions & Concepts, Hardware (Computer Systems & Components), Storage Devices, Number Systems, Software (Operating Systems), Programming and Application Software, Introduction to Programming, Databases and Information Systems, Networks, Data Communication, The Internet, Browsers and Search Engines, The Internet, Email, Collaborative Computing and Social Networking, The Internet: E-Commerce, IT Security and other issues, Project Week, Review Week.

Text Books/Reference Books

Introduction to Computers by Peter Norton, 6th International Edition (McGraw HILL) Using Information Technology: A Practical Introduction to Computer & Communications by Williams Sawyer, 6th Edition (McGraw HILL) Computers, Communications & information: A user's introduction by Sarah E. Hutchinson, Stacey C. Swayer Fundamentals of Information Technology by Alexis Leon, Mathewsleon Leon Press.

ENG-101

Functional English

2(2-0)

Objective

To enhance language skills and develop critical thinking.

Course Contents

Basics of Grammar, Parts of speech and use of articles, Sentence structure, active and passive voice, Practice in unified sentence, Analysis of phrase, clause and sentence structure, Transitive and intransitive verbs, Punctuation and spelling, Comprehension(Answers to questions on a given text), Discussion(General topics and every-day conversation, topics for discussion to be at the discretion of the teacher keeping in view the level of students), Listening (To be improved by showing documentaries/films carefully selected by subject teachers), Translation skills (Urdu to English), Paragraph writing (Topics to be chosen at the discretion of the teacher), Presentation skills

Recommended books

1. Functional English

a) Grammar

1. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 1.Third edition.Oxford University Press. 1997. ISBN 0194313492
2. Practical English Grammar by A.J. Thomson and A.V. Martinet. Exercises 2.Third edition.Oxford University Press. 1997. ISBN 0194313506 40

b) Writing

1. Writing. Intermediate by Marie-Christine Boutin, Suzanne Brinand and Françoise Grellet.Oxford Supplementary Skills.Fourth Impression 1993. ISBN 0 19 435405 7 Pages 20-27 and 35-41.

c) Reading/Comprehension

1. Reading. Upper Intermediate.Brain Tomlinson and Rod Ellis.Oxford Supplementary Skills.Third Impression 1992.ISBN 0 19 453402 2.

d) Speaking

Objective

This course is aimed at:

1. Providing basic information about Islamic Studies.
2. Enhancing understanding of the students regarding Islamic Civilization.
3. Improving Students' skill to perform prayers and other worships.
4. Enhancing the skill of the students to understand the issues related to faith and religious life.

Course Contents**Introduction to Quranic Studies**

- 1) Basic Concepts of Quran
- 2) History of Quran
- 3) Uloom-ul -Quran

Study of Selected Text of Holly Quran I

- 1) Verses of Surah Al-Baqra Related to Faith (Verse No-284-286)
- 2) Verses of Surah Al-Hujrat Related to Adab Al-Nabi (Verse No-1-18)
- 3) Verses of Surah Al-Mumanoon Related to Characteristics of faithful (Verse No-1-11)
- 4) Verses of Surah al-Furqan Related to Social Ethics (Verse No.63-77)
- 5) Verses of Surah Al-Inam Related to Ihkam (Verse No-152-154)

Study of Selected Text of Holly Quran II

- 1) Verses of Surah Al-Ihزاب Related to Adab al-Nabi (Verse No.6,21,40,56,57,58.)
- 2) Verses of Surah Al-Hashar (18,19,20) Related to thinking, Day of Judgment
- 3) Verses of Surah Al-Saf Related to Tafakar, Tadabar (Verse No-1,14)

Seerat of Holy Prophet (S.A.W) I

- 1) Life of Muhammad Bin Abdullah (Before Prophet Hood)
- 2) Life of Holy Prophet (S.A.W) in Makkah
- 3) Important Lessons Derived from the life of Holy Prophet in Makkah

Seerat of Holy Prophet (S.A.W) II

- 1) Life of Holy Prophet (S.A.W) in Madina
- 2) Important Events of Life Holy Prophet in Madina
- 3) Important Lessons Derived from the life of Holy Prophet in Madina

Introduction to Sunnah

- 1) Basic Concepts of Hadith
- 2) History of Hadith

- 3) Kinds of Hadith
- 4) Uloom –ul-Hadith
- 5) Sunnah& Hadith
- 6) Legal Position of Sunnah

Selected Study from Text of Hadith

Introduction to Islamic Law & Jurisprudence

- 1) Basic Concepts of Islamic Law & Jurisprudence
- 2) History & Importance of Islamic Law & Jurisprudence
- 3) Sources of Islamic Law & Jurisprudence
- 4) Nature of Differences in Islamic Law
- 5) Islam and Sectarianism

Islamic Culture & Civilization

- 1) Basic Concepts of Islamic Culture & Civilization
- 2) Historical Development of Islamic Culture & Civilization
- 3) Characteristics of Islamic Culture & Civilization
- 4) Islamic Culture & Civilization and Contemporary Issues

Islam & Science

- 1) Basic Concepts of Islam & Science
- 2) Contributions of Muslims in the Development of Science
- 3) Quranic& Science

Islamic Economic System

- 1) Basic Concepts of Islamic Economic System
- 2) Means of Distribution of wealth in Islamic Economics
- 3) Islamic Concept of Riba
- 4) Islamic Ways of Trade & Commerce

Political System of Islam

- 1) Basic Concepts of Islamic Political System
- 2) Islamic Concept of Sovereignty
- 3) Basic Institutions of Govt. in Islam

Islamic History

- 1) Period of Khlaft-E-Rashida
- 2) Period of Ummayyads
- 3) Period of Abbasids

Social System of Islam

- 1) Basic Concepts of Social System of Islam
- 2) Elements of Family
- 3) Ethical Values of Islam

Reference Books:

- 1) Hameedullah Muhammad, —Emergence of Islam, IRI, Islamabad
- 2) Hameedullah Muhammad, —Muslim Conduct of State
- 3) Hameedullah Muhammad, —Introduction to Islam
- 4) Mulana Muhammad Yousaf Islahi,
- 5) Hussain Hamid Hassan, —An Introduction to the Study of Islamic Law, leaf Publication Islamabad, Pakistan.
- 6) Ahmad Hasan, —Principles of Islamic Jurisprudence, Islamic Research Institute, International Islamic University, Islamabad (1993)
- 7) Mir Waliullah, —Muslim Jurisprudence and the Quranic Law of Crimes, Islamic Book Service (1982)
- 8) H.S. Bhatia, —Studies in Islamic Law, Religion and Society, Deep & Deep Publications New Delhi (1989)
- 9) Dr. Muhammad Zia-ul-Haq, —Introduction to Al Sharia Al Islamia, Allama Iqbal Open University, Islamabad (2001) 45

Objective

To provide the basic knowledge about Pakistan's Agriculture.

Course Contents**Theory**

Agriculture, history, importance, branches and allied sciences. Salient features of Pakistan's agriculture. Climate, land and water resources. Agro ecological zones of Pakistan. Farming systems. Tillage: objectives and types. Seed: types and quality. Crop nutrients, manures and fertilizers, sources and methods of application. Irrigation: systems, types and management. Crop protection measures. Crop rotation. Harvesting, processing, storage and marketing of farm produce. Agro-based industries. Environmental pollution and health hazards.

Practical

Land measuring units. Demonstration of hand tools and tillage implements. Identification of meteorological instruments. Identification of crop plants, weeds and seeds. Identification of organic and inorganic fertilizers. Calculation of nutrient-cum-fertilizer unit value. Demonstration of various irrigation methods. Field visits.

Books recommended

1. Abbas, M. A. 2006. General Agriculture. Emporium Urdu Bazar, Lahore
2. Balasubramaniyan. 2004. Principles and Practices of Agronomy. Agrobios, Jodhpur, India.
3. Bashir, E. and R. Bantel. 1996. Soil Science. National Book Foundation, Islamabad.
4. Cheema, Z.A. and M. Farooq. 2007. Agriculture in Pakistan. Allied Book Centre, Urdu Bazar, Lahore.
5. Khalil, I.A and A. Jan. 2002. Cropping Technology. National Book Foundation, Islamabad.
6. Khan S.R.A. 2001. Crop Management in Pakistan with Focus on Soil and Water. Directorate of Agricultural Information, Punjab, Lahore.
7. Nazir, M.S. 1994. Crop Production. National Book Foundation, Islamabad.
8. Qureshi, M.A. M.A. Zia and M.S. Qureshi. 2006. Pakistan Agriculture Management and Development. A-One Publisher, Urdu Bazar, Lahore.

FM-101 Introduction to Economics & Agricultural Economics**3(3-0)****Objective**

After completing the course, students will have understanding of the basic concepts of economics and their application in agriculture.

Course Contents

Definitions and overview of economics and related terms; Subject Matter & Scope; Theory of consumer behavior; Scale of preferences; Utility, Indifference Curve & related concepts; Demand & Supply analysis; Elasticity of Demand and Supply; Market Equilibrium, Market Structures. Definition, nature and scope of agricultural economics; Agriculture as an industry, its peculiarities & role in national economy; Organization and structure of the agricultural Sector; Factors of production and their rewards; Theory of Production; Laws of return, and its significance in agriculture; Land utilization and land use policy; Land tenure systems and land reforms. Important indicators and issues of agriculture sector in Pakistan.

Text Books

1. Penson, J. B., Capps, O. Rossen C. P. & Woodward, R. 2009. Introduction to Agricultural Economics. Fifth Edition. Prentice Hall, New Jersey.
2. Samuelson, P. A. and Nordhaus, W. D. 2004. Economics (Eighteenth Edition). McGraw Hills, Inc.

Books Recommended

1. Mankiw, N. Gregory. 2003. Principles of Economics (Third Edition). South-Western College Publisher.
2. Khuwaja, A. H. 2004. Fundamentals of Economics. Ilmee Kitab Khana Lahore.
3. Cramer, G., Jensen C. W. and Southgate, D. D. 2000. Agricultural Economics and Agribusiness. Eighth Edition. Wiley Publisher.
4. Pakistan, Government of. Economic Survey of Pakistan (Various Issues), Economics Advisor Wing, Ministry of Finance, Government of Pakistan.

Objective

After completing the course, students will have basic understanding about the soil, its physical and chemical properties with respect to plant growth.

Course Contents**Theory**

Introduction to soil science. Lithosphere, hydrosphere, atmosphere and biosphere. Soil forming rocks and minerals: Types and their formation. Weathering: Definition, agents and classification. Parent materials: Definition and types. Soil physical properties and their environmental significance: Texture, structure, density, porosity, aeration, water, temperature and consistency. Soil colloids and clays: Description and environmental significance. Sources of charges on soil colloids. Cation and anion exchange properties of soil and their significance. Soil pH and its importance. Buffering of soil. Organic matter: Sources and agricultural significance. Elements essential for plant growth: Macro and micronutrients. Salt-affected and waterlogged soils.

Practical

Fertilizer identification, nutrient percentage, conversion factor and current prices, Fertilizer analysis for N, P and K. Soil analysis: EC, pH and organic matter

Books recommended

1. Bashir, E. and R. Bantel. 2001. Soil Science. National Book Foundation, Islamabad.
2. Brady, N.C. and R.R. Weil. 2007. The Nature and Properties of Soils. 14th Ed. Pearson Education, Upper Saddle River, NJ, USA.
3. Singer, M.J. and D.N. Munns. 2002. Soils- An Introduction. 5th ed. Prentice-Hall, Inc., Upper Saddle River, NJ, USA.
4. Hillel, D. 2008. Soil in the Environment: Crucible of Terrestrial Life. Elsevier Inc., Burlington, MA, USA.

Objective

At the completion of this course, the students will be able to:

- Comprehend the concept and principles of effective extension
- Identify the organizational set-up of agricultural extension
- Understand the concept of adoption/diffusion of innovations, motivation, planning and evaluation

Course contents**Theory**

Agricultural Extension- its definition, importance and role in increasing agricultural productivity; its history, philosophy, objectives, and organizational set up in Pakistan. Roles and duties of extension workers at various organizational levels. Principles of effective extension work. Program planning- importance, principles and procedures. The adoption and diffusion of agricultural innovations, role of extension worker in adoption process, classification and characteristics of adopters, factors affecting the adoption of agricultural innovations. The process, domains and laws of adult learning. Creating learning environment for farmers. Methods and steps in evaluating agricultural extension program and activities. Extension teaching methods; individual, group and mass contact methods.

Practical

Identification of farming problems, their prioritization and possible solutions thereof. Preparation of audio-visual material. Microteaching: each and every student will practice extension teaching methods in a simulated situation in the class.

Books recommended

1. Adams, M.E. 1988. Agricultural Extension in Developing Countries. Longman, Burnt Mill, Harlow, Essex, UK.
2. Blackburn, D.J. 1989. Foundations and Changing Practices in Extension. University of Guelph, Guelph, Ontario, Canada.
3. Memon, R.A. and E. Bashir, (eds.). 1993. Extension Methods. National Book Foundation, Islamabad.
4. Van den Ban, A.W. and H.S. Hawkins, 1988. Agricultural Extension. Longman Scientific & Technical, Co published in United States with John Wiley & Sons, Inc. New York.

2ND SEMESTER

FMP-102

Farm Mechanization

3(2-1)

Objective

At the completion of this course, the students will be able to:

- Understand farm implements required for soil management and crop husbandry.
- Understand the working of internal combustion engine, tractor components and its mechanics.

Course contents

Theory

Definition, objective of farm mechanization, scope of farm mechanization in Pakistan. Tractor: Engine components and terminologies, Principle of operation of spark ignition and compression ignition engines and their comparison, Principle of operations of 4-stroke and 2-stroke cycle engines and their comparison, Firing order of multi-cylinder engines, Tractor systems, Types of tractors Maintenance routine and its importance, Tractor log book. Farm Machinery: Tillage, objectives, of using farm machines, types of tillage machinery, planting equipments, fertilizer application machines, plant protection equipments harvesting and threshing equipment; cost analysis of agricultural machinery.

Practical

Study of different parts of tractor, study the working principles of petrol and diesel engine, practical demonstration of tractor maintenance program, practical demonstration of primary and secondary tillage implements, calibration and operation of sowing and fertilizing machinery, study of plant protection equipment, study of hitching different implements, study of combine harvester operation in field.

Books recommended:

1. Tahir, A. R., M.S. Sabir and F.H. Kahan. 2003. Fundamentals of Tractor & Agricultural Machinery, Faculty of Agri. Engg. & Technology, UAF.
2. Clinton, O, Jacobs and William R. Harrel 1995. Agricultural Power and Machinery Gregg Division, McGraw Hill Book Co., USA.
3. Jain, S.C. and G. Philip 2003. Farm Machinery-An Approach. 1705-B Post Box No. 1066 Delhi-110006.
4. Kaul, R.N. and C.O. Egbo. 1985. Introduction to Agricultural Mechanization, Published by Macmillan Publishers Ltd., London.

Objective

To develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.

To Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course contents**1. Historical Perspective**

a. Ideological rationale with special reference to Sir Syed Ahmed Khan, Allama Muhammad Iqbal and Quaid-i-Azam Muhammad Ali Jinnah.

b. Factors leading to Muslim separatism

c. People and Land

i. Indus Civilization

ii. Muslim advent

iii. Location and geo-physical features.

2. Government and Politics in Pakistan

Political and constitutional phases:

a. 1947-58

b. 1958-71

c. 1971-77

d. 1977-88

e. 1988-99

f. 1999 onward

3. Contemporary Pakistan

a. Economic institutions and issues

b. Society and social structure

c. Ethnicity

d. Foreign policy of Pakistan and challenges

e. Futuristic outlook of Pakistan

Books Recommended

1. Burki, ShahidJaved. *State & Society in Pakistan*, The Macmillan Press Ltd 1980.

2. Akbar, S. Zaidi. *Issue in Pakistan's Economy*.Karachi: Oxford University Press, 2000.

3. S.M. Burke and Lawrence Ziring. *Pakistan's Foreign policy: An Historical analysis*. Karachi: Oxford University Press, 1993.
4. Mehmood, Safdar. *Pakistan Political Roots & Development*. Lahore, 1994.
5. Wilcox, Wayne. *The Emergence of Bangladesh*, Washington: American Enterprise, Institute of Public Policy Research, 1972.
6. Mehmood, Safdar. *Pakistan Kayyun Toota*, Lahore: Idara-e-Saqafat-e-Islamia, Club Road, nd.
7. Amin, Tahir. *Ethno - National Movement in Pakistan*, Islamabad: Institute of Policy Studies, Islamabad.
8. Ziring, Lawrence. *Enigma of Political Development*. Kent England: Wm Dawson & sons Ltd, 1980.
9. Zahid, Ansar. *History & Culture of Sindh*. Karachi: Royal Book Company, 1980.
10. Afzal, M. Rafique. *Political Parties in Pakistan*, Vol.I, II & III. Islamabad: National Institute of Historical and cultural Research, 1998.
11. Sayeed, Khalid Bin. *The Political System of Pakistan*. Boston: Houghton Mifflin, 1967.
12. Aziz, K.K. *Party, Politics in Pakistan*, Islamabad: National Commission on Historical and Cultural Research, 1976.
13. Muhammad Waseem, *Pakistan Under Martial Law*, Lahore: Vanguard, 1987.
14. Haq, Noor ul. *Making of Pakistan: The Military Perspective*. Islamabad: National Commission on Historical and Cultural Research, 1993.

Objective

To understand the basic concept of fish farming and its role in rural development

Course Contents**Theory**

Fish farming: Introduction and concept, fish farming in fresh and brackish waters. General characteristics of fish: size, shape and external features. Freshwater fishes of Pakistan. Food and feeding habits of fish: feeding types. Pond fish culture: types of fish ponds, planning and construct. Development, Rural development, role of fish farming in rural development (Introduction, food security, poverty alleviation, Aquaculture Intensification and Expansion, Strategies for an Increased Contribution by Aquaculture to Rural Development).

Practical

Morphological characters of typical fish, Species identification, fin formula, etc., key to identification of commercial fishes, Aquarium management Visit wetland/lake/river/coastal areas to study fish diversity and distribution, Introduction to artificial feed ingredients, Visit to fish farm.

Text Books

1. Singh, K. 2009. Rural Development: Principles, Policies and Management, third Edition, SAGE Publication (Pvt) Ltd.
2. Khan, M. H. 2009. Participatory Rural Development in Pakistan: Oxford University Press, USA.

Recommended Books 1. Mosley, M. 2003. Rural Development, Principles and Practice. SAGE Publication (Pvt) Ltd.

2. Tripathy, S.N. 2000. Rural Development, Discovery Publishing House India.
3. Ali, K. 1988. The Political Economy of Rural Development. Vanguard Publications Limited, Lahore.
- 3.4. Khan, S. S. 1980. Rural Development in Pakistan. Waqas Publishing House, Pakistan.

Objective

To understand the production technology of cereals, fibre, sugar and green manure crops.

Course contents**Theory**

Concept and Classification of field crops. Cropping intensity, cropping schemes and cropping patterns. Cropping patterns in different ecological zones. Factors affecting cropping pattern. Mono versus multiple cropping. Production technology of cereals-crops (Wheat, Barley, Oats, Rice, Maize, Sorghum and Millets), Fibre Crops (Cotton, Jute, Sunhemp, Deccan-hemp, Sugar crops (Sugarcane and Sugarbeet), Green manure crops (Guara, Dhancha, Pigeon pea, Senji etc.).

Practical

Identification and plant characteristic of crops, cultivars, and seeds. Demonstration of improved sowing methods. Raising of crop nurseries, their transplanting and inter-cultural practices. Burying of green manure crops. Visit to University/College research areas.

Books recommended

1. Bhatti, I.M. and A.H. Soomro. 1996. Agricultural inputs and Field Crop Production in Sindh, Directorate General, Agri., Res. Institute, Sindh, Hyderabad.
2. Byerlee, D. and T. Hussain, 1992. Farming Systems of Pakistan. Vanguard Books, Lahore.
3. Martin, J.H., R.P. Waldren and D.L. Stamp. 2006. Principles of Field Crop Production 4th Ed. The McMillan Co., New York.
4. Nazir, M.S. 1994. Crop Production. National Book Foundation, Islamabad.
5. Reddy, S.R. 2004 Principles of Crop Production. 2nd Ed. Kalyani publishers New Delhi.
6. Shrestha, A. 2003 Cropping System. Food Products Press. Haworth Press, Inc. Binghamton, NY
7. Wolfe, T.K. and M.S. Kipps. 2004. Production of Field Crops: A Textbook of Agronomy. McGraw Hill Book Co. New York.

Objective

To understand the basic principles and practices of insect pest and weed control

Course contents**Theory**

Economic threshold and injury levels; Principles of insect pest control; Control methods (natural/applied control, cultural, mechanical, physical, biological, legislative, reproductive and chemical); integrated pests management. Weeds, Classification of weeds, Weed control methods. Allelopathy and its uses in crop production. Weed types and their control in major cash crops. Importance of herbicides in crop production; Nomenclature, classification, formulations of herbicides; Herbicides for different crops and application equipment; Hazards, toxicity, storage, transportation, and disposal; Legislation and registration (Pesticide Control Act); Pesticide companies in Pakistan.

Practical

Identification of economically important weeds, demonstration of control measures. Identification of economically important weeds, demonstration of herbicide application and evaluation of herbicides in the field.

Suggested Readings

- Ross, M.A and C.A. Lembi. 2009. Applied Weed Science. 2nd Ed. Academic Press, London, UK.
- Khan, M.A. 2010. Laboratory Manual for Chemotherapy of Plant Diseases. Dept. of Plant Pathology, University of Agriculture, Faisalabad, Pakistan.

FM-104

Social Psychology and Self Development

3(3-0)

Objective

After the completing the course, students will be able to:

Understand socio-psychological skills in interpersonal relationship management.

Organize personal lives better and reduce physical and mental stress in a corporate setting.

Explicit concepts in speed reading, time management, positive thinking, transactional analysis, personal conduct and behavior are covered in the course contents.

Course Contents

Introduction to social psychology, social cognition: thinking about the social world, perceiving & understanding others, the self in a social world, Attitudes, social influence: changing other's behavior, helping & hurting others and prejudice: disliking others

Suggested Readings

Baron, R. A. and D. Byrne, 2012 Social Psychology, Twelfth Edition, Prentice Hall.

Objective

To familiarize the students with basic concept of application of statistics and data analysis.

Course contents

Definition and importance of Statistics in Agriculture, Data Different types of data and variables Classification and Tabulation of data, Frequency distribution, stem-and-Leaf diagram, Graphical representation of data Histogram, frequency polygon, frequency curve. Measure of Central tendency, Definition and calculation of Arithmetic mean, Geometric mean, Harmonic mean, Median quintiles and Mode in grouped and ungrouped data. Measure of Dispersion, Definition and Calculation of Range, quartile deviation, Mean deviation, Standard deviation and variance, coefficient of variation.

Books Recommended

1. Introduction to Statistical Theory Part- I by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad
3. A. Concise Course in A. Level Statistic with world examples by J. Crawshaw and J. Chambers (1994)
4. Basic Statistics an Inferential Approach 2nd Ed. (1986) Fran II. Dietrich-II and Thomes J. Keans.

3RD SEMESTER

FM-201

Principles of Agricultural Marketing

3(3-0)

Objective

After completing the course, students will have the fundamental knowledge of different issues related to agricultural markets and marketing.

Course contents

Basic concepts and principles of Agricultural Marketing and its role in Agricultural development; Marketing Infrastructure, Marketing Approaches and problems; Marketing functions; standardization, grading, Packing coding, packaging, storage, transportation, information, legislation and management. Marketing margins and profitability; market functionaries, marketing channels, price variation and stabilization; Review of agricultural marketing systems in Pakistan.

Text Books

1. Kohls, R.L. and Uhl, J. N. 2002. Marketing of Agricultural Products. Seventh Edition. New York Max Well. MacMillan. 2. Kotler, P. and Armstrong, G. 2008. Principal of Marketing. 12th Edition Prentice-Hall International, Inc. **Books Recommended** 1. Clarkson, K.W. 1997. Industrial Organization, Theory, Evidence and Public Policy, New York John Willey & sons. 2. Scarborough, V. and Kydd, J. 1992. Economic Analysis of Agricultural Markets: A Manual, Chatham, UK. Natural Resources Institute.
2. Shepherd, G. F. 2004. Marketing Farm Products- Economic Analysis, Fourth Edition, National Book Foundation, Islamabad.

FM-203 Orchard Planning and Management 3(2-1)

Objective

After studying this course the students would be able to:

- Realize the importance and classification of fruits.
- Understand commercial fruit crop production.
- Know the pre- and post-harvest management practices for various fruit crops.

Course contents

Theory

Introduction; Classification of fruits; Propagation of fruit crops; Establishment of orchards: Layout methods; Selection of new plant in the nursery; Planting and post-planting care; Concept of pruning and training; Cultivation of individual fruits with reference to Botany, climate, soil, nutrition, irrigation, harvest maturity, ripening: Postharvest handling, marketing and supply chain; Management of important commercial fruits of Pakistan.

Practical:

Identification of fruit trees; orchard tools and their uses; Nursery production techniques. Practice in layout methods; Selection of plants from nursery; Planting and after care; Pruning and irrigation systems; Spray and fertilizer calibration; Field visits. Economics of fruit production-case study.

Suggested Readings

- Durner, E.F. 2013. Principles of Horticultural Physiology. CAB International, Wallingford, UK.
- Hartmann H.T., D.E. Kester, F.T. Davies and R. Geneve. 2010. Hartman and Kester's Plant Propagation: Principles and Practices. Pearson Higher Ed, USA.
- Jackson, D., N.E. looney and M. Morley-Bunker. 2010. Temperate and Subtropical Fruit Production. 3rd Ed. CAB International, Wallingford, UK.
- Khan, I.A. (Ed.). 2007. Citrus Genetics, Breeding and Biotechnology. CAB International, Wallingford, UK.
- Paull, R.E. and O. Duarte. 2012. Tropical Fruits Vo. II. (2nd Ed). CAB International, Wallingford, UK.

Theory**Objective**

After the completion of this course the students will be able to understand:

- The role of breeding in crop improvement
- Reproductive systems of major crop plants
- Breeding self pollinated and cross pollinated crops

Course Contents

Introduction to plant breeding and its role in crop improvement, Reproductive systems in major crop plants. Definition of genetics, concepts of heredity and variation, cell and cell division. Chromosome theory of heredity; Mendelian Genetics, Monohybrid and dihybrid: phenotypic and genotypic ratios. Genetic diversity and its exploitation, artificial creation of variation through genetic recombination, mutation and heteroploidy. Breeding self-pollinated crops: introduction, mass selection, pure line selection; hybridization, pedigree method, bulk method, backcross technique and single seed descent method. Breeding cross-pollinated crops: introduction, mass selection, recurrent selection, development and evaluation of inbred lines, hybrids, synthetic and composite populations.

Practical

Cell cycle and gametogenesis. Descriptive study of floral biology, scientific names and chromosome number of important field crops. Selfing and crossing techniques in self and cross-pollinated crops. Selection techniques and handling of segregating generations.

Books Recommended

1. Gardner, E. J., M. J. Simmons and D. P. Snustad. 1991. Principles of Genetics. (8th ed.) John Wiley and Sons Inc., New York, USA
2. Griffiths, A. J. F., J. H. Miller, D. T. Suzuki, R. C. Lewontin and W. M. Gelbart. 2005. An Introduction to Genetic Analysis. W.H. Freeman and Company, New York, USA.
3. Klug, W. S. and M. R. Cummings. 2003. Concepts of Genetics (7th Ed.), Pearson Education, Singapore.
4. Singh, P. 2003. Elements of Genetics. (2nd Ed.) Kalyani Publishers, Delhi, India.
5. Khan, M. A (Editor). 1994. Plant Breeding. National Book Foundation, Islamabad.
6. Poehlman, J. H. and D. A. Sleper. 2006. Breeding Field Crops. 5th ed. Iowa State University Press/Ames, USA. Singh, B. D. 2003. Plant Breeding: Principles and Methods. Kalyani.

Objective**Objective**

After the completion of this course the students will be able to understand:

- The classification of insects
- Principles and methods of insect control
- Classification and application of insecticides

Course contents**Theory**

Insect classification, salient characters of insect orders; families of economic importance with examples of each family. Introduction; causes of success and economic importance of insects; principles and methods of insect control i.e. cultural, biological, physical, mechanical, reproductive, legislative, chemical and bio-technological control; introduction to IPM; insecticides, their classification, formulations and application equipments; identification, life histories, mode of damage and control of important insect pests of various crops, fruits, vegetables, stored grains, household, termites and locust; entomological industries: apiculture, sericulture and lac-culture.

Practical

Collection, identification and mode of damage of insect pests of various crops, fruits, vegetables, stored grains and household; insecticide formulations, their dilutions and safe handling; use of application equipments, practical instructions in apiculture, sericulture and lac-culture.

Books Recommended

1. Ahmad, I. 2010. Hashriat —Insects. National Book Foundation, Lahore
2. Awastheir, V.B. 2009. Introduction to General and Applied Entomology. Scientific Publisher, Jodhpur, India.
3. Dhaliwal, G.S. 2007. An Outline of Entomology. Kalyani Publishers, Ludhiana.
4. Elzinga, R.J. 2003. Fundamentals of Entomology. Prentice Hall.
5. Lohar, M.K. 2001. Introductory Entomology. Department of Entomology, Sindh Agriculture University Tandojam Sindh, Pakistan.
6. Richards, O.W. and Davies, R. G. 2004. Imm's General Text-book of Entomology, Vol. I. and II, 10th Ed. Chapman & Hall, London, N.Y.
7. Triplehorn, C.A. and Jhonson, N.F. 2005. Borror and DeLong's Introduction to the study of Insects. Brooks Cole. 7th Ed.

8. Trigunayat, M.M. 2009. A Manual of Practical Entomology. 2nd Edition Scientific Publisher (India) Judhupur.
9. Yousuf, M. Tayyab, M. and Shazia, Y. 2007. Manual of Introductory Entomology, University of Agriculture, Faisalabad.

Objective

To familiarize the students with production technology of oil seed, grain legume, forage and miscellaneous crops.

Course contents**Theory**

Production technology of oilseed-crops (Toria, Raya, Sarsoon, Canola, Taramira, Castor bean, Sunflower, Safflower, Sesame, Linseed, Groundnut, Soybean), grain legume crops (Chickpea, Lentil, Mungbean, Mashbean, Cowpea, Pigeonpea), forage crops (Berseem, Shaftal, Lucerne, Oats, Maize, Sorghum, Millets, Mottgrass), and miscellaneous crops (Potato, Sweet Potato, Tobacco, Tea, Medicinal crops). Techniques and practices for enhancing crop productivity.

Practical

Identification and plant characteristic of crops, cultivars, and seeds of the crops and their seeds. Demonstration of improved sowing methods. Inoculation of legume seeds. Interculture practices. Weed control practices. Demonstration of harvesting and threshing operations. Visits to University/College research areas.

Books recommended

1. Baldev, B., S. Ramamjan and H.K. Jain. 1988. Pulse Crops. Oxford and IBH Pub. Co., New Delhi.
2. Martin, J.H. R.P. Waldren and D.L. Stamp. 2006. Principles of Field Crop Production 4th Ed. The McMillan Co., New York.
3. Nazir, M.S. 1994. Crop Production. National Book Foundation, Islamabad.
4. Rahman, A. and M. Munir. 1984. Rapeseed, Mustard Production in Pakistan, PARC, Islamabad.
5. Reddy, S.R. 2004 Principles of Crop Production. 2nd Ed. Kalyani Publishers New Delhi.
6. Wolfe, T.K. and M.S. Kipps. 2004. Production of Field Crop: A Textbook of Agronomy. McGraw Hill Book Co. New York.

Objective

To impart awareness regarding principles of farm management and maintenance of farm records

Course contents**Theory**

Principles of farm layout and design. Concept of farm management and maintenance of farm records. Objectives and advantages of keeping farm records. Different systems of book keeping. Profit and loss account/income statement. Bank accounts, bank cheques, discount, interest, bad debts. Appreciation and depreciation of live and dead stocks, land and buildings, plant and machinery. Preparation of trading, profit and loss account and balance sheet.

Practical

Layout of farm, training in maintenance of crop, livestock and dead stock registers. Preparation of a balance sheet and different types of accounts. Calculation of appreciation and depreciation of different farm articles, crop yield estimation. Working out cost of production of major crops grown in irrigated and rainfed areas.

Books recommended

1. Byerlee, D. and T. Hussain, 1992. Farming Systems of Pakistan. Vanguard Books, Lahore.
2. Ghani M.A. 1992. Principles of Counting. Pak Imperial Book Depot Chowk Urdu Bazar, Lahore.
3. Shresther, A. 2003. Cropping System. Food Products Press. An imprint of the Haworth Press, Inc.
4. Vendermeer, J. 1989. The Ecology of Intercropping. Cambridge University Press.

4TH SEMESTER

AGR-202

Agriculture Water Management

3(2-1)

Objective

To provide knowledge about irrigation principles and management.

Course contents

Theory

Concept of irrigation agronomy and water management. Sources of irrigation water. Introduction to different irrigation methods, their feasibility in various regions. Water requirement of different crops. Irrigation scheduling and water use efficiency in field crops. Current agro-technology for efficient use of irrigation water in crops. Irrigation water pollution and measures to minimize it.

Practical

Estimation of potential evapotranspiration by different methods. Calculation of water use efficiency in field crops. Calculation of water productivity. Potential soil moisture deficit and its calculation.

Books recommended

1. Ahmad, N. and G.R. Chaudhry. 1988. Irrigated Agriculture of Pakistan. Publisher, Shahzad Nazir, Lahore.
2. Allen R.G. L.S. Pereira, D. Raes, and M. Smith. 1998. Crop evapotranspiration: Guidelines for computing crop water requirements. FAO. Irrigation and Drainage paper No. 56. Rome.
3. Choudhary, M, R. 2009. A Text Book of Irrigation and Drainage Practices for Agriculture. University of Agric. Faisalabad, Pakistan.
4. Kirkham, M.B. 2004. Water use in crop production. Internal Book Distributing Co. (Publishing Division).
5. Micheal, M. A. 2003. Irrigation Theory and Practices. Vikas Pub. House, New Delhi, India
6. Sankara, R. G. H. and T. Y. Reddy. 2002. Efficient Use of Irrigation Water. Kalyani Publishers New Delhi, India.

Objective

To promote entrepreneurship and business management capabilities of horticultural graduates

Course contents

Introduction and importance of horticultural enterprise, classifies business management for fruits, vegetables and ornamental crops, national and international marketing channels, market demand and quality control, export prospects, procedure/documentation for import and export, international standards and product handling for export, processing industry and marketing of value added commodities, pricing, policy and market regulations, global trade and Pakistan, W.T.O., Opportunities and challenges.

Book Recommended

Meena, R.K. and J. Yadav. 2001. Horticulture Marketing and Post-harvest Management. Pointer Publisher, Jaipur, Rajasthan.

Raju, M.S.S. 2002. Fruit marketing in India. Daya Publishing House, Delhi, India.

Sharma, K. and S. Jagmohn. 1991. Marketing management of Horticultural Produce. Deep and Deep Publications, New Delhi, India.

Labast, P. 2005. The European Horticulture Market; Opportunities for the Sub-Saharan African Exports. The International Bank for Reconstruction and Development/ The World Bank, Washington D.C.

Objective

To enhance skill of students for fodder production and its preservation.

Course contents**Theory**

Importance and characteristics of forages and fodders. Critical period of fodder scarcity. Factors influencing productivity and quality. Methods of increasing biomass production. Factors affecting chemical composition and nutritive value of forages. Preservation of fodders and forages (silage and hay making). Toxicity due to chemicals and poisonous plants. Establishment of grasses and legumes in range lands. Constraints in fodder production and remedies.

Practical

Identification of forage, fodder crops and poisonous plants. Estimation of sprout density and carrying capacity. Preparation of fodder calendar. Measurement of cover frequency. Preparation of silage and hay.

Books Recommended

1. Balasubramanian, P.O. and S.P. Polanippan. 2001. Principles and Practices of Agronomy. Agrobios, India,
2. Anonymous. 1996. Fodder Production in Pakistan. Proc. National Conf. Improvement, Production and Utilization of Fodder Crops in Pakistan, NARC. March 25-27, 1996, Islamabad.
3. Khalil, I.A. and A. Jan. 2006. Cropping Technology. National Book Foundation, Islamabad.
4. Reddy, D.V. 2006. Fodder Production and Grassland Management for Veterinarians. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.
5. Singh, S.S. 2004. Crop Management. Kalyani Publishers, New Delhi.
6. Stuart, P. 2002. The Forage Book. 2nd Ed. Pacific Seeds Pty Ltd., Toowoomba, Australia.

FM-204 Agribusiness Management, Marketing and WTO 3(3-0)

Objective

After completing the course, students will be well equipped with the basic concepts of Agribusiness Management and WTO.

Course contents

Definition, concepts, Important features and scope of Agribusiness Management, Elements and Functions of management; Forms of business organizations; Agribusiness financial management; Agri Marketing; Marketing channels, functionaries and margins. Role of agri. marketing in economic development; Agricultural marketing problems. WTO, history, objectives and functions; Structure, organization and dispute settlement mechanism; Agreements under WTO; Introduction to general Agreement on Tariffs and Trade (GATT); Agreement on Agriculture (AoA); Market Access, Domestic Support, Export competition; Sanitary and Phyto-sanitary measures (SPS); Trade Related Intellectual Property Rights (TRIPs); Trade Related Investment Measures (TRIMs).

Text Book

1. Downey, W.D. & S. P. Erickson. Agri. Business Management. McGraw Hill. Singapore. 2002.
2. Kohls, R.L.; J.N. Uhl and C. Hurt. Marketing of Agricultural Products. Tenth Edition. Prentice Hall, New Jersey, 2007.
3. NUST. WTO and its Impacts on Pakistan's Agriculture & Trade, Institute of Management Sciences, NUST, Rawalpindi. 2001.

Books Recommended

1. Hoekman, B., A. Mattoo, P. English. Development, Trade and the WTO-A Hand Book, The World Bank Washington, D.C. 2002.
2. Pakistan, Government of, Economic Survey of Pakistan (Various Issues), Economics Advisor Wing, Ministry of Finance, Government of Pakistan.
3. Web page: www.wto.org

Objective

To impart awareness regarding farming system and maintenance of farm records.

Course contents**Theory**

Introduction of farming system, classification of farming system, Basis for the classification of farming system: Available natural resources (land, water resources, climate, grazing areas) and dominant pattern of farm and household activities (such as crops, aquaculture, livestock, forestry, processing and off-farm activities). Factors Influencing the Choice of Farming Systems in Pakistan (Soil, climate, resources, Capabilities of plants and animals, ecology, social, political and economic factors). Types of farming system (Arable farming, livestock farming, poultry farming, diversified farming, subsistence farming, commercial farming, truck farming, dry / rainfed farming). Management and maintenance of farm records; Objective and advantages of keeping farm records; Different systems of book keeping; Principles of double entry system and their application; Objective of journal and ledger; Classification of accounts; Drawing ledger, opening, posting and closing of ledger accounts, cash book, drawing up a trial balance; Profit and loss account/income statement; Bank accounts, bank cheques, discount, interest, bad debts; Appreciation and depreciation of live and dead stock, land and buildings, plant and machinery; Preparation of trading, profit and loss account and balance sheet.

Practical

Training in maintenance of crop, livestock and dead stock registers; Preparation of a balance sheet and different types of accounts; Calculation of appreciation and depreciation of different farm articles; Working out cost of production of major crops grown in irrigated and non-irrigated areas; Layout of farms and demonstration plots.

Recommended Books

1. Ghani, M. A. and E. Ahmad. 2000. Principles of Accounting. Pak. Imperial Book Depot, Chowk Urdu Bazar, Lahore.
2. Moses, B. and Carson. 2009. Book Keeping and Accounts for Beginners. Custom Books, India.
3. Shresther, A. 2003. Cropping System. Food products Press. An imprint of the Haworth Press Inc., USA.
4. Wood, F. and Sheila Robinson 2009. Book Keeping and Accounts. 7th Ed. Trans-Atlantic Publicatio