CURRICULUM

OF

AGRICULTURAL ECONOMICS

BS/BSc (Hons)
MS/MSc (Hons)

(Revised 2014)

HIGHER EDUCATION COMMISSION
ISLAMABAD
CURRICULUM DIVISION, HEC

Prof. Dr. Mukhtar Ahmed  Chairman, HEC
Mr. Fida Hussain  Director General (Acad)
Mr. Rizwan Shoukat  Deputy Director (Curri)
Mr. Abid Wahab  Assistant Director (Curri)
Mr. Riaz-ul-Haque  Assistant Director (Curri)

Composed by: Mr. Zulfiquar Ali, HEC, Islamabad
## CONTENTS

1. Introduction .................................................. 6

2. Standardized Scheme of Studies for BS/BSc (Hons) ... 9

3. Scheme of Studies for BS Agricultural Economics .... 10

4. Semester-wise (Scheme of Studies) ...................... 11

5. Detail of Courses ........................................... 12

6. Scheme of Studies for MS/MSc (Hons) ................. 30

7. Detail of Courses ........................................... 31

8. Details of Compulsory Courses ......................... 44
   Annexures – A, B, C, D, E

9. Recommendations ........................................... 66
PREFACE

The curriculum, with varying definitions, is said to be a plan of the teaching-learning process that students of an academic programme are required to undergo. It includes objectives & learning outcomes, course contents, scheme of studies, teaching methodologies and methods of assessment of learning. Since knowledge in all disciplines and fields is expanding at a fast pace and new disciplines are also emerging; it is imperative that curricula be developed and revised accordingly.

University Grants Commission (UGC) was designated as the competent authority to develop, review and revise curricula beyond Class-XII vide Section 3, Sub-Section 2 (ii), Act of Parliament No. X of 1976 titled “Supervision of Curricula and Textbooks and Maintenance of Standard of Education”. With the repeal of UGC Act, the same function was assigned to the Higher Education Commission (HEC) under its Ordinance of 2002, Section 10, Sub-Section 1 (v).

In compliance with the above provisions, the Curriculum Division of HEC undertakes the revision of curricula after every three years through respective National Curriculum Revision Committees (NCRCs) which consist of eminent professors and researchers of relevant fields from public and private sector universities, R&D organizations, councils, industry and civil society by seeking nominations from their organizations.

In order to impart quality education which is at par with international standards, HEC NCRCs have developed unified templates as guidelines for the development and revision of curricula in the disciplines of Basic Sciences, Applied Sciences, Social Sciences, Agriculture and Engineering in 2007 and 2009.

It is hoped that this curriculum document, prepared by the respective NCRC’s, would serve the purpose of meeting our national, social and economic needs, and it would also provide the level of competency specified in Pakistan Qualification Framework to make it compatible with international educational standards. The curriculum is also placed on the website of HEC (www.hec.gov.pk).

(Fida Hussain)
Director General (Academics)
CURRICULUM DEVELOPMENT PROCESS

STAGE-I

STAGE-II

STAGE-III

STAGE-IV

CURRI. UNDER

CURRI. IN DRAFT STAGE

FINAL STAGE

FOLLOW UP STUDY

COLLECTION OF REC

APPRAISAL OF 1ST DRAFT BY EXP. OF COL./UNIV

PREP. OF FINAL CURRI.

QUESTIONNAIRE

CONS. OF CRC.

FINALIZATION OF DRAFT BY CRC

INCORPORATION OF REC. OF V.C.C.

COMMENTS

PREP. OF DRAFT BY

APPROVAL OF CURRI.BY

PRINTING OF CURRI.

REVIEW

IMPLE. OF CURRI.

BACK TO STAGE-I

ORIENTATION COURSES

Abbreviations Used:
CRC. Curriculum Revision Committee
VCC. Vice Chancellor’s Committee
EXP. Experts
COL. Colleges
UNI. Universities
PREP. Preparation
INTRODUCTION

In continuation of earlier meeting of National Curriculum Revision Committee (NCRC) in the discipline of Agricultural Economics held on November 6-8, 2013 at HEC Regional Centre, Lahore, final meeting was held on February 10-12, 2014 at Higher Education Commission, Regional Centre, Peshawar. Following attended:

Prof. Dr. Munir Ahmad,
Joint Director,
Pakistan Institute of Development Economics,
Islamabad.

Prof. Dr. Munir Khan
Department of Agricultural & Applied Economics,
University of Agriculture, Peshawar

Dr. Umar Farooq,
Director General/CSO
Pakistan Agriculture Research Council (PARC),
Social Sciences Division, PARC, 20-Attaturk
Avenue, G-5/1, P.O. Box 1031, Islamabad.

Prof. Muhammad Ashfaq,
Professor/Director
Institute of Agricultural & Resource Economics,
University of Agriculture, Faisalabad.

Prof. Dr. Zahoor ul Haq,
Faculty of Social Sciences,
Abdul Wali Khan University, Mardan.

Dr. Gobind M. Herani,
Dean / Professor,
Faculty of Management Sciences,
Khadim Ali Shah Bukhari Institute of Tech,
84-B, SMCHS, Karachi.

Dr. Ikram Ali Malik
Associate Professor,
Department of Agricultural Economics,
PMAS Arid Agriculture University, Rawalpindi

Mr. Nadeem Anwar,
Assistant Professor/Incharge,
Department of Agricultural Economics,
University College of Agriculture,
University of Sargodha, Sargodha.
Dr. Sultan Ali Adil,  
Associate Professor,  
Institute of Agricultural & Resource Economics,  
University of Agriculture, Faisalabad.

Dr. Habibullah Magsi,  
Assistant Professor,  
Department of Agricultural Economics  
Sindh Agriculture University, Tandojam.

Dr. Dilawar Khan,  
Assistant Professor,  
Department of Economics,  
Kohat University of Science & Technology, Kohat 26000,

Dr. M. Niamat Ullah Babar,  
Assistant Professor / Chairman  
Department of Agricultural Economics,  
Gomal University, Dera Ismail Khan, Khyber Paktunkhwa.

Dr. Syed Muhammad Khair,  
Assistant Professor,  
Department of Economics,  
Balochistan University of IT & Management Sciences,  
Airport Road, Baleli, Quetta.

Dr. Muhammad Rafiq,  
Assistant Professor,  
Department of Economics,  
Institute of Management Science,  
1-A, Sector E-5, Phase VII, Hayatabad, Peshawar.

Dr. Dawood Jan,  
Associate Professor / Chairman,  
Department of Agricultural & Applied Economics,  
University of Agriculture, Peshawar.

Meeting started with recitation from the Holy Quran by Mr. Abid Wahab Assistant Director Curriculum. Mr. Zaheer Ahmed Awan, Regional Director HEC Peshawar welcomed the participants and briefed them about the efforts of the Commission in revision and development of curricula. Mr. Abid Wahab, Assistant Director Curriculum, HEC, Islamabad explained the procedure for curriculum revision.
After detailed deliberations, the committee agreed and recommended the followings:

1. Reviewed, revised and added/dropped the courses, their contents and recommended books and suggested changes in their contents, texts as well as reference books accordingly.

2. In addition the committee revised earlier scheme of studies and specifically recommended incorporation of two courses each of Microeconomics, Macroeconomics and Econometrics at BS/BSc (Hons) Agricultural Economics level.

3. The committee developed the courses of “Economics of Climate Change” and “Ecological Economics”, and incorporated these as optional courses at BS/BSc (Hons) Agri. Economics.


5. Similarly the committee reviewed the scheme of studies for MS/MSc (Hons) in Agricultural Economics and slashed the number of core courses from eight to six.

6. The committee developed the courses of “Financial Economics”, “Pakistan Economy”, “Economics of Climate Change” and “Time-series Analysis” at MS/MSc(Hons) level and incorporated these as optional subjects.

7. Similarly the committee recommended the inclusion of “Mathematical Economics” as a core course and “Marketing and International Trade” as optional course.

8. The committee also recommended “Mathematical Programming” as an optional course.

9. Specifically, the committee identified and recommended TEXT BOOKS: and SUGGESTED READINGS: for each and every course accordingly.

The meeting ended with a vote of thanks to and from the convener.
## Standardized Scheme of Study for 4-Year BS/BSc (Hons) Agriculture

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics / Biology</td>
<td>6 (3-0) (2-1)</td>
</tr>
<tr>
<td>Statistics 1 &amp; 2</td>
<td>6 (3-0) (3-0)</td>
</tr>
<tr>
<td>Computers / IT</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Pak Studies</td>
<td>2 (2-0)</td>
</tr>
<tr>
<td>Islamic Studies</td>
<td>2 (2-0)</td>
</tr>
<tr>
<td>Communications Skills</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>English</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Basic Agriculture</td>
<td>3(2-1)</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>

One subject from each of the following disciplines

<table>
<thead>
<tr>
<th>Discipline</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agronomy</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Plant Breeding &amp; Genetics</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Entomology</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Plant Pathology</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Food Technology</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Horticulture</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Soil Sciences</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td>Agricultural Economics</td>
<td>3 (2-1)</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td><strong>24</strong></td>
</tr>
</tbody>
</table>

Supporting Courses (6-8 courses (3 Cr. Hr) amongst below:

- Agriculture Extension
- Forestry & Range Management
- Animal Science
- Agri Business and Trade
- Rural Development
- Human Nutrition
- Agriculture Chemistry
- Agriculture Engineering
- Water Management

| **Sub Total** | **18-24** |

Sub-total during the first four semesters 70 – 76

| Semester 5, 6, 7 & 8 | 56-60 |
| Internship/Project   | 04   |

**Grand Total:** 130 - 140
SCHEME OF STUDIES
FOR BS/BSc (HONS).
AGRICULTURAL ECONOMICS

Vision:
To achieve food security, and competitive and sustainable agricultural development by providing qualified professionals of agricultural economics to contribute in various national as well as international organizations for the purpose.

Program Objectives
The BSc Honors degree (Agricultural Economics) aims at equipping the students with the knowledge and skills required to analyze the agricultural economic issues for efficient use of scarce resources in agriculture sector and its development, consistent with the interest of all stakeholders.

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Agricultural Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agribusiness &amp; Trade</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Microeconomics – I</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Macroeconomics – I</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Mathematics for Economists</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Statistical Methods for Social Sciences</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Food and Agricultural Marketing</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Microeconomics – II</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Macroeconomics – II</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agricultural Finance</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Mathematical Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agribusiness Management</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Econometrics – I</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Natural Resource Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Development Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agricultural Production Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Research Methods in Social Sciences</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Econometrics – II</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Agricultural issues and Policies of Pakistan</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Internship / Project</td>
<td>4(4-0)</td>
</tr>
</tbody>
</table>

Optional Courses*

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Islamic Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Livestock Production</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agriculture &amp; Rural Development</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Agro based Industries</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Rangeland and Pastures</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Climate Change</td>
<td>3(3-0)</td>
</tr>
</tbody>
</table>
*These are a few examples, Universities could develop related course as optional course.

SEMESTER WISE SCHEME OF STUDIES
FOR
BS/BSc (Hons)
Agricultural Economics

General Courses
(1\textsuperscript{st} to 4\textsuperscript{th} Semester)

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction to Agricultural Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agribusiness &amp; Trade</td>
<td>3(3-0)</td>
</tr>
</tbody>
</table>

Major Courses
(Fifth Semester)

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microeconomics – I</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Macroeconomics – I</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Mathematics for Economists</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Statistical Methods for Social Sciences</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Food and Agricultural Marketing</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Optional</td>
<td>3(3-0)</td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td><strong>18(17-1)</strong></td>
</tr>
</tbody>
</table>

(Sixth Semester)

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microeconomics – II</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Macroeconomics – II</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agricultural Finance</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Mathematical Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agribusiness Management</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Optional</td>
<td>3(3-0)</td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td><strong>18(18-0)</strong></td>
</tr>
</tbody>
</table>
### Seventh Semester

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econometrics – I</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Natural Resource Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Development Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agricultural Production Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Research Methods in Social Sciences</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Optional</td>
<td>3(3-0)</td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td><strong>18(16-2)</strong></td>
</tr>
</tbody>
</table>

### Eighth Semester

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econometrics – II</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Agricultural issues and Policies of Pakistan</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Internship / Project</td>
<td>4(0-4)</td>
</tr>
<tr>
<td><strong>Total Credit Hours</strong></td>
<td><strong>10(5-5)</strong></td>
</tr>
</tbody>
</table>

Optional Courses*

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credit Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Islamic Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Livestock Production</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Agriculture &amp; Rural Development</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Agro based Industries</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Rangeland and Pastures</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Climate Change</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Ecological Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Operations Research</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Logic and Critical Thinking</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>International Economics</td>
<td>3(3-0)</td>
</tr>
</tbody>
</table>

**DETAIL OF COURSES FOR BS/BSc (HONS) AGRICULTURAL ECONOMICS**

**INTRODUCTION TO AGRICULTURAL ECONOMICS**  3 (3-0)

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

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. Production, Factors of
Production, laws of return and their significance in agriculture.

Concept of macroeconomics; approaches to national income estimation; Growth, Unemployment & Inflation. Important macroeconomic issues in agriculture sector of Pakistan.

**TEXT BOOKS:**

**SUGGESTED READINGS:**

**AGRIBUSINESS AND TRADE**  

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

Definition, concepts, important features and scope of Agribusiness Management, Elements and Functions of Management; Forms of business organizations; Agribusiness financial management; Agricultural Marketing; Marketing channels, functionaries and margins. Role of agri. marketing in economic development; Agricultural marketing problems.

The changing world and interdependence; Basis of trade; gains from trade; Concept of absolute and comparative advantage; pattern of trade; Brief introduction of major trade agreements.

**TEXT BOOKS:**

**SUGGESTED READINGS:**
After completing the course, students will be able to understand economic issues pertaining to households and firms.

Scope of Economics; Theory of Consumer’s Behaviour – Approaches to Utility analysis. Laws of Demand and Supply; Various dimensions of Elasticity of Demand and Supply; Theory of Production; Cost concepts in the short run and long run; Market equilibrium analysis.

TEXT BOOKS:

SUGGESTED READINGS:

MICROECONOMICS - II

The course intends to provide further insight about price and output determination under various market scenarios.


TEXT BOOKS:

SUGGESTED READINGS:
MACROECONOMICS – I 3(3-0)
After completing the course, students are supposed to have fundamental knowledge of economic issues at aggregate level.


TEXT BOOKS:

SUGGESTED READINGS:

MACROECONOMICS – II 3(3-0)
After completing the course, students will have understandings of major Macroeconomic models.

Aggregate demand and aggregate supply patterns: Changes in AD and AS, equilibrium and dynamics of equilibrium in short run and long run. Money and Banking: functions of money, the components of money supply, money definitions M1, M2, M3, banking system, historical background and functions of different banks, commercial banks, and central bank. The IS-LM Model, equilibrium in the labour market, goods market and money market, Factors affecting IS and LM curves. General equilibrium in the complete model. The phenomenon of Phillips curve, The Okun’s law, introduction to macroeconomic policies, monetary and fiscal policies, labour and wage
policies, international policy; International trade, balance of payments and causes of disequilibrium.

TEXT BOOKS:

SUGGESTED READINGS:

MATHEMATICS FOR ECONOMISTS 3(3-0)

After completing the course, students will have the basic understanding about the use of Mathematics in Economics.

The nature of mathematical economics, mathematical versus non-mathematical economics and econometrics, economic models and equilibrium analysis, matrix algebra, applications of derivatives: comparative static analysis in economics and economic models, derivatives of implicit functions, optimization problems, general constrained optimization, dynamic optimization & integration, convexity and optimization—multivariate optimization, mathematical programming: The concepts of linear and non-linear programming.

TEXT BOOKS:

SUGGESTED READINGS:
After completing the course, students will be able to apply the statistical tools and techniques in the field of Agricultural Economics.

Index numbers, the concept of Index Numbers, different types of indices and their uses; Random variables and their distribution, probability and density function, estimation of parameters, properties of estimators, confidence interval of means and proportions, variance of normal distribution, variance and covariance, hypothesis testing, Chi Square Test, Analysis of Variance (ANOVA), Correlation, Introduction to Regression Analysis; Application of software to various estimation techniques.

TEXT BOOKS:

SUGGESTED READINGS:

FOOD AND AGRICULTURAL MARKETING

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

Basic concepts and principles of food and fiber marketing system and its role in development; marketing structure, 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; Concept of supply chain management. Review of agricultural marketing systems in Pakistan.

TEXT BOOKS:

SUGGESTED READINGS:

**MATHEMATICAL ECONOMICS 3(3-0)**

After completing the course, students will be in a position to apply the knowledge of mathematical tools for formulation of economic model(s) and analyses.


**TEXT BOOKS:**

**SUGGESTED READINGS:**

**AGRICULTURAL FINANCE 3(3-0)**

This course would help the students to develop an understanding of financial issues in agricultural sector.

Nature and scope of agricultural finance; Sources and types of financial instruments and intermediaries in Pakistan’s perspective. Credit assessment and decision criteria; Agricultural credit markets; Agricultural credit policies and their problems; Role of central bank and other financial institutions in agricultural financing; Classification of loans; insurance in agricultural sector, Micro-credit and role of NGO’s in agricultural lending and development. Nature and scope of financial management, time value of money, capital budgeting, capital and its cost, financial analyses, capital structure, liquidity and lender-borrower relationship and credit evaluation, risk management, financial markets.

**TEXT BOOKS:**
SUGGESTED READINGS:

AGRIBUSINESS MANAGEMENT

After completing the course, students will have developed some understanding of concepts, principles and issues in Business Management.

Scope and objectives of Agribusiness Management; Functions of management; Forms of business organizations; Principles and Techniques of farm planning, operation and management. Enterprise budgeting, resource constraints, optimum combinations and alternate business plans. Balance sheet, income statement and their analysis; Benefit cost analysis, uncertainty and risk in farm business; Risk management strategies; Supply chain management and relevant case studies. Role of Government in agribusiness management.

TEXT BOOKS:

RECOMMENDED BOOKS:

ECONOMETRICS –I

After completing the course, students will be in a position to apply the econometric tools and techniques in the field of Agricultural Economics.

Definition, scope and importance of econometrics; Basic concepts, properties of statistical estimators; Inferences, and hypothesis testing; Regression analysis, OLS estimation of simple and multiple regression; Dummy variables;
Specification bias and tests; Concepts of Multicollinearity; Heteroscedasticity and Autocorrelation.

TEXT BOOKS:

SUGGESTED READINGS:

ECONOMETRICS – II 3(2-1)

The course will further enhance the capability of students towards applying econometric tools and techniques in the field of Agricultural Economics.

Overview of issues of Multicollinearity, heteroscedasticity and autocorrelation; Causes, effects, tests and remedial measures. Model specification issues, limited dependent variables (LPM, Tobit, Logit and Probit Models). Auto regressive and distributed lag models. Time series analysis. Simultaneous equation models and their estimation approaches. Panel data analysis

TEXT BOOKS:

SUGGESTED READINGS:
DEVELOPMENT ECONOMICS 3(3-0)

After completing the course, students will have the knowledge about the development issues in general and developing countries in particular.

The concepts of economic development and economic growth; characteristics of developing economies; importance and challenges of the development process. Theories of economic growth and development. Education, technological change and economic development; Growth, poverty and Income distribution. Economics of population and development; Importance of trade for development. Globalization and its implications for development, Debt burden of developing countries. Governance and developmental experiences in Pakistan; NGOs and Development.

TEXT BOOKS:

SUGGESTED READINGS:

AGRICULTURAL PRODUCTION ECONOMICS 3(3-0)

After completing the course, students will be able to understand the theoretical core of Production Economics.

Definition and scope of agricultural production economics; Assumptions of static and dynamic production economics. Production relationships, i.e. factor-product relationships, factor-factor relationship and product-product relationships; Economic decision making under various production relationships; Costs of production, returns to scale, technological change, resource allocation.

TEXT BOOKS:

SUGGESTED READINGS:
This course will enable the students to develop understanding on issues of natural resources and sustainability in agriculture.

Concepts of natural resources; optimal use of renewable and nonrenewable resources; Issues related to natural resources (soil, water, forest, fisheries and environment); Resource scarcity, prices, demand and supply of natural resources; Market equilibrium, economic efficiency; inter-temporal efficiency; Property rights; Environmental Economics; Natural resource exploitation; Economic approaches to conservation of natural resources; Benefit cost analysis.

**TEXT BOOKS:**


**SUGGESTED READINGS:**


**RESEARCH METHODS IN SOCIAL SCIENCES**

After completing the course, students will be in a position to understand the methods of conducting research in the field of Social Sciences

Foundation of Empirical Research, the scientific approach, the Conceptual foundation of Research, Research Ethics, review of literature and plagiarism; Research proposal and its contents, Sampling and Sample Design, survey methods, observation methods; Data Types, questionnaire construction process; Data collection: Data coding, entry and analysis; univariate, bivariate and multivariate analyses; Citation methods, Presentation and dissemination of research results.

**TEXT BOOKS:**

AGRICULTURAL ISSUES & POLICIES OF PAKISTAN 3(3-0)

After completing the course, students will be in a position to understand the economic thought behind agricultural issues & policies in Pakistan’s perspective.

Overview of Pakistan’s economy and role of agriculture, major issues and problems in agriculture development of Pakistan. Agricultural policy, policy goals, policy instruments, policy formulation, tradeoffs between goals, land reforms, land tenure system, agricultural pricing policies, input-output pricing policies, policy of agricultural marketing; agro-based industries; Agri-Taxation and subsidies, agri. Credit and finance policies, trade policies for agricultural commodities, farm mechanization, agri. extension, research and educational policies, Irrigation policies of Pakistan, institutional reforms. Rural development policies; Past policies and their evaluation.

TEXT BOOKS:

SUGGESTED READINGS:
INTERNATIONAL ECONOMICS 3(3-0)

After qualifying the course, the students will be able to understand the theories and dimensions of International Economics.

Concept of International economics and trade. Market integration and challenges; Trade theories, free trade versus protectionism, tariff and non-tariff trade barriers, approaches to the measurement of protection, distortion and comparative advantage, the effects of exchange rates on the agricultural and food sectors, commodity and price instability and terms of trade, international commodity agreements. Balance of payment in Pakistan’s perspective. International migration and remittances.

TEXT BOOKS:

SUGGESTED READINGS:

Optional Courses

ISLAMIC ECONOMICS 3(3-0)

Course Objectives:
The objective is to provide students with knowledge of Islamic Economics in context of Islamic value system and behaviours at micro/macro level as well as policy framework specifically with reference to Pakistan.

Course Contents:
Definition, nature, comparison, basic values of islam, determinants of economic behaviour and policies in Islam, Islamic economic thought, consumer’s behaviour, behaviour of the firm, market structure, basic macroeconomic concepts, monetary & fiscal policies in an Islamic framework, Islamic economic system, Islamization process in Pakistan.

SUGGESTED READINGS:

**ECONOMICS OF LIVESTOCK PRODUCTION** 3(3-0)

Importance of livestock in the economy of Pakistan, comparative economics of livestock and crop enterprises, economics of livestock and poultry, economic analysis of livestock products, cost and profitability estimations procedures, labour-input estimate, capital input estimate, economics of milk, beef and hides and skins, economics of green fodder, dry fodder and concentrates, the livestock industry, structure and problems, economic losses due to various factors, techniques of estimation of losses, economic analysis of budgeting with different techniques, economics of genetic engineering in livestock, measures of economic efficiency, uncertainty and risk, trend and future of livestock and poultry.

**TEXT BOOKS:**

**SUGGESTED READINGS:**

**AGRICULTURE AND RURAL DEVELOPMENT** 3(3-0)

Development, rural development, study and analysis of rural development models, strategies and policies for rural development in Pakistan, delivery and receiving systems for agriculture and rural development, rural infrastructure, rural industrialization and development, role of land tenure and land reform in rural development, technology, output and employment potential in farm and non-farm sectors, role of women in rural development, planning and participation at grass root, local government and rural development.

**TEXT BOOKS:**

**SUGGESTED READINGS:**


**ECONOMICS OF AGRO BASED INDUSTRIES**

Role of industries for economic development, policies and growth of agro-based industries; performance of small & large scale industries, i.e. ginning and textile, sugar, vegetable ghee/edible oil, tobacco, fruits and vegetables processing, beverages, wheat flour and rice mills, feed mills, etc. Efficiency, productivity and capacity utilization; Overview of Pakistan industrial policies, quantitative & qualitative restrictions, tariff, protection; tax concessions and export subsidies, role of public and private sectors in rural industrialization; problems of agro based industries. Green supply chain.

**TEXT BOOKS:/ SUGGESTED READINGS:**

7. Pakistan Economic Survey (Various issues).
8. SMEDA Website: www.smeda.org.pk.

**ECONOMICS OF RANGELANDS AND PASTURES**

The rangelands/pastures of arid and semi-arid areas- an overview, condition and major problems of rangelands/pastures, causes of rangeland degradation: overgrazing and fuel wood harvesting. Pastoral economy, livestock and rangelands/pastures, sustainability of rangelands and pastures; Range and pasture improvement and management intervention, role of local institutions in regulating the use of ranges and pastures, optimal
use of ranges and pastures under arid and semi-arid conditions, economic analysis of rangelands and pastures conservation.

**TEXT BOOKS:/SUGGESTED READINGS:**

**ECONOMICS OF CLIMATE CHANGE** 3(3-0)

After qualifying the course, students will be aware of impacts of climate change on the agricultural sector and overall economic performance.

Climate change—concept, nature and indicators; Weather and climate; Climate change and variability; Climate change—importance, global warming, some observed trends of human vulnerability to climate; Forms of Climate changes: global warming, precipitation and evaporation, sea level rise, surface warming, extreme events (also shall be covered impacts thereof). Mitigation: limiting the climate change, the need of mitigation, mitigation options and obstacles, mitigation strategies in developing world; Adaptation to climate: adaptation concept and strategies, adaptation costs and benefits; Climate and developing world: adaptation capacity and increasing the adaptation capacity; Climate change and Development; Climate change and agriculture; Climate change and food security; Climate change and climate policy; Impact assessment of climate change; political economy of climate change; future perspective (way forward).

**SUGGESTED READINGS:**
3. Erial Dinar and Robert Mendelsohn, Handbook on Climate Change and Agriculture Edward Elgar publishing Limited, (2011), Massachusetts, USA.
5. K. Raja Reddy, H. F. Hodges, Climate Change and Global Crop Productivity New York, USA: CABI publishing.,
This course will further develop the students' knowledge of areas of contemporary Ecological Economics as well as understanding and evaluation of environmental problems and issues.


TEXT BOOKS:/RECOMMENDED TEXT:

OPERATIONS RESEARCH

The objective of this course is to enable the students to use the techniques of operations research in the field of Agricultural Economics.

LOGICAL AND CRITICAL THINKING 3 (3-0)

The objective of this course is to sharpen the intellect of the students, develop their reasoning ability, strengthen their understanding, and promote clear thinking.

Definition of logic, logic as a science and an art, scope of logic. The laws of logic, Induction and essential characteristics of induction, categorical propositions and classes, quality, quantity and distribution. The traditional square of opposition, immediate inferences, conversion, obversion, contraposition, inversion existential import, symbolism and diagram for categorical proposition. Three basic uses of language, discourse serving multiple functions. The form of discourse, emotive words, kinds of agreement and disagreement, emotively neutral language. The purpose of definition, the types of definition, various kinds of meaning, techniques for defining, standard form categorical syllogisms. The formal nature of syllogistic arguments, Venn diagram techniques for testing syllogisms, rules and fallacies, reducing the number of terms in categorical syllogism, translating categorical proposition into standard forms, uniform translation, enthymemes. The dilemma, informal fallacies, fallacies of ambiguity, the avoidance of fallacies.

TEXT BOOKS:
1. Irving M. Copi: Introduction to logic
2. Karamat Hussain: A textbook of Deductive Logic
3. Karamat Hussain: A textbook of Inductive Logic
SCHEME OF STUDIES FOR MS/MSc (Hons.)
AGRICULTURAL ECONOMICS

Program Objectives:

The program of studies is designed to produce economists well versed in economic theory and its applications to the economic issues in general and of agriculture in particular.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Microeconomics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Macroeconomics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Econometrics</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Food &amp; Agricultural Policy</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Production Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Marketing &amp; International Trade</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Seminar</td>
<td>1(1-0)</td>
</tr>
<tr>
<td>Thesis</td>
<td>06</td>
</tr>
</tbody>
</table>

Optional Courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Credit Hrs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research Methods in Social Sciences</td>
<td>3(2-1)</td>
</tr>
<tr>
<td>Agricultural Development</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Environmental &amp; Resource Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Mathematical Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Project Planning &amp; Management</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economic System of Islam</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Monetary &amp; Fiscal Policy</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Financial Economics</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of Land &amp; Water Resources</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Mathematical programming</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Pakistan Economy</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Economics of climate change</td>
<td>3(3-0)</td>
</tr>
<tr>
<td>Time-series analysis</td>
<td>3(2-1)</td>
</tr>
</tbody>
</table>

Note:

All students pursuing M.Sc. (Hons.) in Agricultural Economics are required to qualify all the core courses. In addition, the departmental Board of Studies will decide the optional (within department) and minor courses (from other relevant departments).

The minimum requirement of credit hours for M.Sc. (Hons.) in Agricultural Economics degree is 31, including 25 credit hours of course work and 06 for thesis/dissertation. However, institutions can go beyond this threshold according to the requirement of the students/institutions.
DETAIL OF COURSES MS/MSc (Hons)
AGRICULTURAL ECONOMICS

MICROECONOMICS (3-0)

After qualifying this course, students should have good understanding of micro economic theory and its application.

Economic activity and economic theory; Organization of an economic system; Theory of consumer behavior; Different approaches of consumer choice and demand. The theory of firm, production, cost and profit functions. Optimization. Firm and industry supply analysis; Determination of price and output under different market conditions; Models of perfect and imperfect competition; Introduction to game theory; Demand and supply for factors of production; Pareto optimality and choice under risk; Optimum distribution of resources/outputs; externalities and public goods.

TEXT BOOKS:


SUGGESTED READINGS:


MACROECONOMICS 3(3-0)

The course aims to equip the students with skills and tools to analyze the macro economic issues.

Macro economic foundation; Major macroeconomic puzzles; Aggregate demand and supply analysis (In terms of monetary and real sectors; as well as wages, prices and employment); The interplay of monetary and fiscal policies in stabilizing the economy; IS-LM model of macroeconomic analysis; Consumption, saving, investment and theory of income determination. Level of investment, interest and money. Demand for money. Money and credit, stabilization policy. Macroeconomic dynamics. Inflation, unemployment, budget deficit and public debt. International adjustment and interdependence. Business cycle.

TEXT BOOKS:

SUGGESTED READINGS:

ECONOMETRICS

After completing the course students will be able to apply the econometric techniques for the micro and macro analysis.

The nature of simple and multiple regression analysis; Violation of basic assumptions, single equation regression models and their applications in economics. Problems of estimation and hypotheses testing, regression of dummy variables; limited dependent variables; Multicollinearity, heteroscedasticity, autocorrelation and model specification problems; Distributed and autoregressive lag models, finite and infinite distribution lags. Adaptive expectations, partial adjustment and rational expectations models; Simultaneous equation models; Identification problems; Indirect least squares, 2SLS, 3SLS and seemingly unrelated regression models; Qualitative response models, Panel data, Time series analysis.

TEXT BOOKS:

SUGGESTED READINGS:

FOOD AND AGRICULTURAL POLICY

Dimensions of food security; Trends in global food production; Food and Agricultural policies and their objectives; Impact of Policy; Macroeconomic policies and agriculture; Frameworks for assessing policy distortions and its implications, modeling of agriculture sector: economic models of policy
analysis for the examination of the impact of commodity, farm input, international trade and economic policies on Agriculture and the whole economy. Multi-market models for the analysis of equity, efficiency, self-sufficiency and balance of payment effects of agriculture policy.

Trends towards trade liberalization and programs of policy reforms and their impact of trade performance of the “agriculture sector, household’s welfare and food security. Analysis of agricultural policies and programs under trade liberalization in developing countries. Adjustment of Pakistan’s agriculture sector under trade liberalization scenario.

**TEXT BOOKS:**


**SUGGESTED READINGS:**


**PRODUCTION ECONOMICS**

**The course will help the students in applying the important theories of production at broader level of agricultural economics.**

Overview of the concepts of production economics; Production functions and functional forms; Cost, profit and revenue functions; Inputs demand and supply functions; Statistical measurement: primal functions; Dual functions; and efficiency and productivity—technical and allocative efficiency, productivity growth and technical change.
TEXT BOOKS:

SUGGESTED READINGS:

MARKETING & INTERNATIONAL TRADE

Introduction and overview of agricultural commodities marketing, demand functions and the law of demand, agricultural production and marketing, elasticity of demand and the elasticity of supply, nominal and real prices; The inflation rate and CPI, marketing margins and farm, processing, wholesaling and retailing, marketing as a value-added process. The Role of Futures; The hedger and the speculator; Relationships between cash and futures prices; The basis: perfect and imperfect hedges; Temporal aspects of agricultural markets, spatial dimensions of prices.

The world food system and international agricultural trade, macroeconomic theories of international trade, international agricultural market fundamentals and the partial equilibrium trade model, Government intervention and the partial equilibrium trade model

Multilateral Trade Negotiations: the World Trade Organization, its history, current issues and controversies, preferential trade agreements (PTAs), sanitary and phyto-sanitary measures, GMOs, animal diseases, aid and trade

TEXTBOOKS:

SUGGESTED READINGS:

Seminar 1(1-0)

OPTIONAL COURSES

RESEARCH METHODS IN SOCIAL SCIENCES 3(2-1)

After completing the course, students will be able to utilize the tools and techniques in conducting research.

The research process, identification of research problem, formulation and testing of hypotheses. Statistical methods, sampling techniques; Probabilistic and non-probabilistic, research design process, measurement of variables, questionnaire development, data collection and sources of data, types of surveys, development of research proposal, data processing and analysis, interpretation of results and report writing.

TEXT BOOKS:

SUGGESTED READINGS:

AGRICULTURAL DEVELOPMENT 3(3-0)

The objective of this course is to provide students basic understandings of the role of agriculture in development and the study of alternatives for accelerating agricultural development.

Inter-sectoral linkages of agriculture, agricultural development in historical perspective; Nature of traditional agriculture; Green revolution; Rational peasants; Determinants of urban rural disparity; Models of agricultural growth; Role of technology in agricultural growth; Interdependence between agricultural growth and economic growth; Growth, inequality and poverty; Models for the analysis of food security and sustainable agriculture; Agricultural development issues in Pakistan; Foreign aid and food aid. Value chain for agricultural development.
TEXT BOOKS:

SUGGESTED READINGS:

ENVIRONMENTAL AND RESOURCE ECONOMICS  3(3-0)

This course will enable the students to develop the understanding of environmental issues arising due to natural resources degradation and ways for a sustainable development.

Economics and the environment, a framework for environmental analysis, environmental microeconomics and macroeconomics, a brief history and future of economic growth and the environment, common property, open access, and property rights, the environment as a public good, the global commons, allocation of non-renewable resources, hotelling’s rule and time discounting, greening the national income accounts, environmentally-adjusted net domestic product, agriculture’s impact on the environment, sustainable agriculture for the future, the supply of non-renewable resources, economic theory of non-renewable resource use, principles of renewable resource management, the economics of pollution control, policies for pollution control, the green economy: introduction, the relationship between economy and environment, does protecting the environment harm the economy? creating a green economy, environmental impacts of trade, trade and environment: policy and practice, trade agreements and the environment, strategies for sustainable trade, the concept of sustainable development, the economics of sustainable development

TEXT BOOKS:
SUGGESTED READINGS:

MATHEMATICAL ECONOMICS 3 (3-0)

The objective is to confront the students to advanced mathematical techniques so as to enable them to handle economic models, interpret the results and solve complex problems.

Differential Equations
Linear differential equations: with constant coefficient & constant term, with variable coefficient and variable terms, qualitative approach: concept of phase diagrams, types of time paths and the dynamic stability of equilibrium, exact differential equations: solution and verification, non-linear differential equations of the first order and first degree, Bernoulli equation, separable variables, economic application: dynamics of market models, Solow growth model.

Solution and verification of second order linear differential equations with constant coefficients and constant terms, real and imaginary roots, distinct, repeated roots and complex roots, dynamic stability of equilibrium, economic applications: market models with price expectations, the interaction of inflation and unemployment in continuous time, higher order differential equations, convergence and the Routh theorem, solution of simultaneous difference equations.

Difference Equations
First order linear difference equations: solution and verification of results, conditions for dynamic stability of equilibrium, types of time paths, economic applications: the cobweb model, market model with inventory, model with price ceiling, nonlinear difference equations, the qualitative/graphic approach and phase diagrams.

Solution and verification of second-order linear difference equations with constant coefficients and constant terms, real and imaginary roots, distinct, repeated and complex roots, the convergence and divergence of the time paths. Economic applications: models of business cycles, the Multiplier-Acceleration interaction model, inflation-unemployment model in discrete time, higher order difference equations and their solutions, convergence and the Schurz’s theorem, solution of simultaneous difference equations.
TEXT BOOKS:

SUGGESTED READINGS:

PROJECT PLANNING AND MANAGEMENT 3(3-0)


TEXT BOOKS:

SUGGESTED READINGS:
Principles of Islamic Economy, Social responsibilities, Social equality, economic cooperation. Wide circulation of wealth, Ethical validity of choices, distribution of wealth and income, interest free economy, private ownership and property. Role of State, revenue and expenditure of an Islamic State, Islam, Capitalism and Socialism. Islamic Banking and Finance, instruments, institutions, policies and implications in riba free financing.

TEXT BOOKS:

MONETARY AND FISCAL POLICY

TEXT BOOKS:

SUGGESTED READINGS:
Overview of the Financial Markets/Instruments, Introduction to Statistical tools used for Portfolio Analysis, Basic tools for Portfolio Analysis, Portfolio Diversification reduces the variance Limitations of Diversification, The relationship between Risk and Return.

Efficient Frontier of risky assets and minimum-variance portfolio, The difference between mean-variance analysis and CAPM, Solving the required return of common stock using the CAPM, Interpretation and meaning of Stock’s Beta, Decomposition of variance of an asset’s return, Basic concepts of Arbitrage, Empirical evidence on the CAPM and market efficiency, Time series modeling, Random walk model, Unit root and stationarity concept, Co-integration and error correction models, The application of time series tools in Purchasing Power Parity (PPP).

SUGGESTED READINGS:

ECONOMICS OF LAND AND WATER RESOURCES 3 (3-0)

Introduction to land economics, principles of land utilization, land resources evaluation, man-land relationship, present and future land requirements, present land use and its problems. Institutional arrangements affecting land use and reclamation. Conservation and improvement. Planning, zoning and efficient use of land resources; Land reforms.

Water as a scarce resource, water markets, principles of water pricing, estimation of alternative water use returns, water policy and resources allocation problems; Water resource development, planning and management. Surface and ground water resources in Pakistan; Methods of water application and water use efficiency. Water losses and measures. Investment strategies for irrigation; Water logging and salinity issues; Drainage of irrigated soils; Environmental, social and political dimensions of water use.

TEXT BOOKS:

SUGGESTED READINGS:

MATHEMATICAL PROGRAMMING 3 (2-1)

Introduction to linear programming (LP): formation of LP problem; Assumptions of linear programming, the simplex methods; Dual linear programming; interpretation of linear programming solution. Post-optimality analysis, sensitivity analysis, parametric programming. Transportation problem, diet/feed mix problem, joint products, assembly and disassembly problems, sequencing and storage problems. Integer and Nonlinear Programming: integer programming, duality and integer programming, nonlinear programming, quadratic programming, Introduction to Goal Programming. Application of Tora Software.

TEXT BOOKS:

PAKISTAN ECONOMY 3(3-0)


TEXT BOOKS:
1. Zaidi, S. A. Issues in Pakistan’s Economy, (Latest eds.).
SUGGESTED READINGS:
5. State Bank of Pakistan Annual and Quarterly Reports
7. Troubled Times in the Age of Extremes published by Sustainable Development Policy Institute, Islamabad. 2006
8. 50 Years of Pakistan Economy, State Bank of Pakistan 2006

ECONOMICS OF CLIMATE CHANGE

Concept, nature and indicators of climate change; Sources of climate change (CO2 emissions etc); Climate change and developing countries: the contribution and burden; Climate change and agriculture; The vulnerability of the agriculture to climate: the nature and channels; Climate variability and livestock; Climate change and food security; Climate change impact assessment: models and data issues, production function, ricardian approach- a comparative perspective; Adaptation to climate: meaning, approaches and obstacles; Mitigating climate change impacts: meaning, strategies and alternatives; Mitigation vs. adaptation: a comparison; Developing countries and adaptation to climate: a case study of Pakistan; Agriculture adaptation to climate: the need, the meaning and the role of irrigation; Adaptation through science: the technological innovation; adaptation through conscience: crop mixing, Institutionalizing the adaptability; climate change and the role of institution in fighting climate change; Food security and adaptation to climate change; Climate change, agriculture and the policy response: a case of Pakistan; Economic impact assessment of climate change: an introduction to alternative approaches (brief introduction).

SUGGESTED READINGS:
TIME SERIES ANALYSIS

General linear regression model; Ordinary least square and summary statistics. Generalized least squares and maximum likelihood estimation; Dummy variables and structural shifts; Non-linear models and estimation algorithms, panel data seemingly unrelated equations and simultaneous equations; Estimation with limited dependent variables, data censuring and selectivity bias. Concept of stationary, analysis of stationary and integrated data, generalizing process, ARIMA models, forecasting and time series decomposition; Analysis and decomposition of forecast errors. ARCH and GARCH models and risk return analysis; VAR models. Casualty influence, response analysis and multivariate decomposition and co-integration and error correction analysis. Autoregressive and Distributed Lag (ARDL) Models.

TEXT BOOKS:

SUGGESTED READINGS:
Compulsory courses in English
for undergraduate level

English I (Functional English) Credit Hours: 3

Objectives: 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
Introduction

Note: Extensive reading is required for vocabulary building

Recommended Books:
1. Functional English
   a) Grammar
b) Writing

c) Reading/Comprehension

d) Speaking

**English II (Communication Skills)**

Credit Hours: 3

**Objectives:** Enable the students to meet their real life communication needs.

**Course Contents:**

- **Paragraph writing**
  Practice in writing a good, unified and coherent paragraph

- **Essay writing**
  Introduction

- **CV and job application**
  Translation skills
  Urdu to English

- **Study skills**
  Skimming and scanning, intensive and extensive, and speed reading, summary and précis writing and comprehension

- **Academic skills**
  Letter/memo writing, minutes of meetings, use of library and internet

- **Presentation skills**
  Personality development (emphasis on content, style and pronunciation)

**Note:** documentaries to be shown for discussion and review

**Recommended Books:**

**Communication Skills**

a) Grammar
b) Writing

c) Reading
2. Reading and Study Skills by John Langan

English III (Technical Writing and Presentation Skills)  
Credit Hours: 3

Objectives: Enhance language skills and develop critical thinking

Course Contents:

Presentation skills

Essay writing
Descriptive, narrative, discursive, argumentative

Academic writing
How to write a proposal for research paper/term paper
How to write a research paper/term paper (emphasis on style, content, language, form, clarity, consistency)

Technical Report writing

Progress report writing

Note: Extensive reading is required for vocabulary building

Recommended Books:

Technical Writing and Presentation Skills

a) Essay Writing and Academic Writing
b) Presentation Skills
c) Reading
The Mercury Reader. A Custom Publication. Compiled by Northern Illinois University. General Editors: Janice Neulib; Kathleen Shine Cain; Stephen Ruffus and Maurice Scharton. (A reader which will give students exposure to the best of twentieth century literature, without taxing the taste of engineering students).
ISLAMIC STUDIES
(Compulsory)

Objectives:
This course is aimed at:
1. To provide Basic information about Islamic Studies
2. To enhance understanding of the students regarding Islamic Civilization
3. To improve Students skill to perform prayers and other worships
4. To enhance the skill of the students for understanding of issues related to faith and religious life.

Detail of Courses

Introduction to Quranic Studies
1) Basic Concepts of Quran
2) History of Quran
3) Uloom-ul-Quran

Study of Selected Text of Holy Quran
1) Verses of Surah Al-Baqara 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 Holy Quran
1) Verses of Surah Al-Ihzab 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) Quran & 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) Hameed ullah Muhammad, “Emergence of Islam”, IRI,
Islamabad

2) Hameed ullah Muhammad, “Muslim Conduct of State”

3) Hameed ullah Muhammad, ‘Introduction to Islam

4) Mulana Muhammad Yousaf Islahi,”


6) Ahmad Hasan, “Principles of Islamic Jurisprudence” Islamic Research Institute, International Islamic University, Islamabad (1993)


9) Dr. Muhammad Zia-ul-Haq, “Introduction to Al Sharia Al Islamia” Allama Iqbal Open University, Islamabad (2001)
Pakistan Studies (Compulsory)

Introduction/Objectives

- Develop vision of historical perspective, government, politics, contemporary Pakistan, ideological background of Pakistan.
- Study the process of governance, national development, issues arising in the modern age and posing challenges to Pakistan.

Course Outline

1. Historical Perspective
   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

Recommended Books:

Annexure “D”

COMPULSORY MATHEMATICS COURSES FOR BSc (Hons) Agriculture

1. MATHEMATICS I (ALGEBRA)

Prerequisite(s): Mathematics at secondary level

Credit Hours: 3 + 0

Specific Objectives of the Course: To prepare the students, not majoring in mathematics, with the essential tools of algebra to apply the concepts and the techniques in their respective disciplines.

Course Outline:

Preliminaries: Real-number system, complex numbers, introduction to sets, set operations, functions, types of functions. Matrices: Introduction to matrices, types, matrix inverse, determinants, system of linear equations, Cramer’s rule.

Quadratic Equations: Solution of quadratic equations, qualitative analysis of roots of a quadratic equations, equations reducible to quadratic equations, cube roots of unity, relation between roots and coefficients of quadratic equations.


Recommended Books:

2. MATHEMATICS II (CALCULUS)

Prerequisite(s): Mathematics I (Algebra)

Credit Hours: 3 + 0

Specific Objectives of the Course: To prepare the students, not majoring in mathematics, with the essential tools of calculus to apply the concepts and the techniques in their respective disciplines.

Course Outline:

Preliminaries: Real-number line, functions and their graphs, solution of equations involving absolute values, inequalities. Limits and Continuity: Limit of a function, left-hand and right-hand limits, continuity, continuous functions.

Derivatives and their Applications: Differentiable functions, differentiation of polynomial, rational and transcendental functions, derivatives.

Integration and Definite Integrals: Techniques of evaluating indefinite integrals, integration by substitution, integration by parts, change of variables in indefinite integrals.

Recommended Books:
4. Thomas GB, Finney AR, Calculus (11th edition), 2005, Addison-Wesley, Reading, Ma, USA

3. MATHEMATICS III (GEOMETRY)

Prerequisite(s): Mathematics II (Calculus)

Credit Hours: 3 + 0

Specific Objectives of the Course: To prepare the students, not majoring in mathematics, with the essential tools of geometry to apply the concepts and the techniques in their respective disciplines.

Course Outline:

Geometry in Two Dimensions: Cartesian-coördinate mesh, slope of a line, equation of a line, parallel and perpendicular lines, various forms of equation of a line, intersection of two lines, angle between two lines, distance between two points, distance between a point and a line.

Circle: Equation of a circle, circles determined by various conditions, intersection of lines and circles, locus of a point in various conditions.

Conic Sections: Parabola, ellipse, hyperbola, the general-second-degree equation
Recommended Books:

Note:
1. Two courses will be selected from the following three courses of Mathematics.
2. University may make necessary changes in the courses according to the requirements as decided by the Board of Studies.
Annexure “E”

Statistics-I
Credit 3 (2-1)
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 quantiles and Mode in grouped and un-grouped data.
Measure of Dispersion, Definition and Calculation of Range, quartile deviation, Mean deviation, Standard deviation and variance, coefficient of variation.

Practical:
- Frequency Distribution
- Stem-and-Leaf diagram
- Various types of Graphs
- Mean, Geometric mean, Harmonic Mean,
- Median, Quartiles Deviation, mean Deviation.
- Standard Deviation, Variance, Coefficient of variation,
- Skewness and kenosis

Recommended Books:
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
4. Basic Statistics an Inferential Approach 2nd Ed. (1986) Fran II. Dietrich-II and Thomas J. Kean

Statistics-II
Credit 3 (2-1)
Sampling Probability and non-Probability Sampling, Simple random sampling stratified random sampling Systematic sampling error, Sampling distribution of mean and difference between two means. Interference Theory: Estimation and testing of hypothesis, Type—I and type-II error, Testing of hypothesis about mean and difference between two means using Z-test and t-test, Paired t-test, Test of association of attributes using X2 (chi-square) Testing hypothesis about variance.

Practical:
- Sampling random sampling
- Stratified random sampling.
- Sampling distribution of mean
- Testing of hypotheses regarding population mean
e. Testing of hypotheses about the difference between population means  
f. Chi-square test  
g. Testing of Correlation Coefficient  
h. Fitting of simple linear regression  
i. One-way ANOVA  
j. Two-way ANOVA  

**Recommended Books:**  
1. Introduction to Statistical Theory Part-II by Sher Muhammad and Dr. Shahid Kamal (Latest Edition)  
2. Statistical Methods and Data Analysis by Dr. Faquir Muhammad  
Introduction to Information and Communication Technologies

Course Structure: Lectures: 2 Labs: 1 Credit Hours: 3
Pre-requisite: None Semester: 1

Course Description:
This is an introductory course on Information and Communication Technologies. Topics include ICT terminologies, hardware and software components, the internet and 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:
Functional Biology-I Credit Hours 3+0

Biological Methods
Principles of Cellular Life
Chemical Basis
Structure and Function
Principles of Metabolism
Energy Acquisition
Principles of Inheritance
Mitosis and Meiosis
Chromosomes
Observable Inheritance Patterns
DNA Structure and Function
RNA and Proteins
Genes
Genetic Engineering and Biotechnology
Biodiversity
Fundamental Concept of Biodiversity
One or two examples of each of the following from commonly found organism
Prions
Viruses
Bacteria
Protistans
Algae
Fungi
Plants
Crops
Animals
Invertebrates
Vertebrates

Reading:

Functional Biology-II Credit Hours 3+0

Myths and Realities of Evolution

Microevolution
Speciation
Macroevolution

Level of Organization
Plants
Tissues
Nutrition and Transport
Reproduction
Growth and Development

Animals
Tissue, Organ System and Homeostasis
Information Flow and Neuron
Nervous System
Circulation and Immunity
Nutrition and Respiration
Reproduction and Development

Ecology and Behavior
Ecosystems
Biosphere
Social Interactions
Community Interactions
Human Impact on Biosphere
Environment Conservation

Reading:


Note:
Universities may make necessary changes in the courses according to the requirement as decided by the Board of Studies.
RECOMMENDATIONS

The NCRC 2013 appreciates the efforts of HEC for the uplift of academic standards across the universities in Pakistan. The committee strongly recommends the followings:

1. The committee identified weaknesses in the areas like, environmental economics, climate change economics, public policy/agricultural policy, recommends that at least 10 scholarships be allocated in each of the above mentioned disciplines.

2. Teaching Assistants to be financed by HEC may be provided to facilitate the faculty in their teaching and research activities to improve their performance.

3. It is strongly recommended that the work load of the university teachers may be rationalized as per international standards.

4. The committee recommends to limit the number of research students up to 8 under the supervision of a faculty member at a time, including MS/MSc (Hons)/MPhil and PhD.

5. The committee expressed concern for not taking any concrete steps for provision of facility of computer software packages as recommended by the NCRC 2010. The committee reiterated the provision of computer software such as Arcview, Microfit, E-VIEWS, SPSS, SAS, STATA, LimDep and Tora, to the departments/faculty so as to train the graduate students.

6. The universities may support to establish/strengthen the independent departmental libraries/computer labs.

7. The graduates of agricultural economics may also be considered for appointment at par with that of economics for recruitment in various national departments.

8. Nomenclature of the degrees of BSc (Hons) and MSc (Hons) may be changed to BS and MS as per international standards.