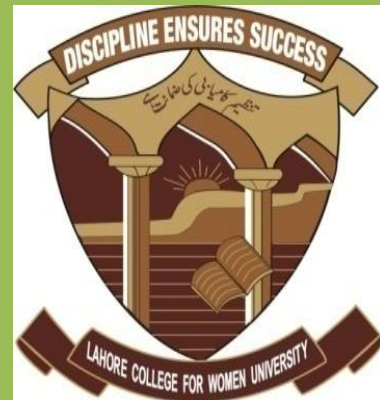


**Scheme of Studies**  
**BS Economics**  
**Session 2021-2025 and Onwards**



**Department of Economics**  
**Lahore College for Women**  
**University, Lahore**

**Lahore College for Women University**



**LAHORE COLLEGE FOR WOMEN UNIVERSITY**  
DEPARTMENT OF ECONOMICS Tel: # 9203801-9 (Ext: 271)

## **Department of Economics**

### **1. Program Description**

An understanding of economics is a vital component of education in social sciences and absolutely necessary for anyone interested in areas as business, environmental policy, welfare reform, international trade and finance, or globalization.

This program is designed to familiarize students with the broad range of issues and situations studied by economists and the tools they use. The curriculum starts at the very basic introductory level. As such no specific high school preparation is required, therefore students with diversified background equally fit in the program. However, an appreciation for mathematics and statistics shall prove to be useful. All economics undergraduate majors study a significant core of economic theory and mathematical and statistical methods, and are then in a position to choose among a wide variety of higher electives.

### **2. Program Objectives**

BS Economics program is designed to equip the graduates with the knowledge of economic theory, so that they could understand that how economic agents interact and economy operates. The graduates of this program are expected not only to identify the economic problems, but also to suggest set of alternative solutions. In specific following are the objectives of this program:

1. The graduates shall be equipped with the comprehensive knowledge and skill set in order to contribute competently as economists and analysts in various capacities.
2. The graduate shall have cross-disciplinary knowledge of the core functions and operations of the economy.
3. The graduate shall be prepared to respect diversity and endeavor to work ethically.



# LAHORE COLLEGE FOR WOMEN UNIVERSITY

DEPARTMENT OF ECONOMICS Tel: # 9203801-9 (Ext: 271)

## Scheme of Studies BS Economics Session: 2021-2025 and onward

### Year-1

Semester-I		
Course Code	Name of Subject	Credits
CC/Eng-108	Literary Reading and Grammar Syntax	3(3-0)
Maj/Eco-101	Principles of Microeconomics	3(3-0)
CC/Isl-101	Islamic Education/	2(2-0)
CC/Phil-101	Ethic (for Non-Muslim)	
CC/Math-101	Compulsory Mathematics	3(3-0)
CS-M-101	Introduction to Computer	3(2-1)
Min/ PSY-101	Elements of Psychology-I	3(3-0)
Min/ Pol. Sc-101	Introduction to Political Science	3(3-0)
Min/ Geog-10	Physical Geography-I	3(3-0)
Min/ S. WorK-101	Introduction and Basic Methods of Social Work	3(3-0)
	<b>(Choose any one)</b>	
<b>Total Credit Hour in Semester-I</b>		<b>17</b>
Semester-II		
CC/Eng-109	Basic Study and Writing Skills	3(3-0)
CC/PS-101	Pakistan Studies	2(2-0)
Maj/Eco-102	Principles of Macro Economics	3(3-0)
Min/Stats-101	Introductory Statistics	3(3-0)
Min/ PSY-102	Elements of Psychology-II	3(3-0)
Min/ Pol.Sc-102	Fundamentals of Political Science	3(3-0)
Min/ Geog-102	Physical Geography- II	3(3-0)
Min/ S. Work-102	Basic Methods of Social Work	3(3-0)
Min/G.Math-102	Complex Numbers and Analytical Geometry	3(3-0)
Min/Isl.St-102	Al. Quran-I	3(3-0)
Min/Hist-102	History of Pakistan Movement (1924-1947)	3(3-0)
	<b>(Choose any two)</b>	
<b>Total Credit Hour in Semester-II</b>		<b>17</b>

## Year-2

Course Code	Name of Subject	Credits
<b>Semester-III</b>		
CC/Eng-204	English Verse and Communication Skills-I	3(3-0)
Maj/Eco-201	Intermediate Microeconomics	3(3-0)
Maj/Eco -203	Mathematical Economics-I	3(3-0)
Maj/Eco -205	Issues in Pakistan Economy	3(3-0)
Min/ Stats-102	Introduction to Probability Distribution	3(3-0)
Min/S. Work- 201	Social Development of Pakistan	3(3-0)
Min/ PSY-201	Psychology of Adjustment	3(3-0)
Min/ Geog-201	Human Geography	3(3-0)
Min/ Pol.Sc-201	The Comparative Constitutions: Developed-I	3(3-0)
Min/Mass.Com-201	Introduction to Communication and Mass Media (Choose any one)	3(3-0)
<b>Total Credit Hour in Semester-III</b>		<b>18</b>
<b>Semester-IV</b>		
CC/Eng-205	Communication Skills II	3(3-0)
Maj/Eco -202	Intermediate Macroeconomics	3(3-0)
Maj/Eco -204	Mathematical Economics-II	3(3-0)
Maj/Eco -206	Islamic Economics	3(3-0)
Maj/Eco -208	World Economic History	3(3-0)
Min/S. Work-202	Secondary methods and fields of social work	3(3-0)
Min/Psy-202	Organizational and Social Psychology	3(3-0)
Min/Geog-202	Geography of Pakistan	3(3-0)
Min/Pol.Sc-202	The Comparative Constitutions: Developed-II (Choose any one)	3(3-0)
<b>Total Credit Hour in Semester-IV</b>		<b>18</b>

### Year-3

Course Code	Name of Subject	Credits
<b>Semester-V</b>		
Maj/Eco -301	Microeconomic Theory	3(3-0)
Maj/Eco -303	Macroeconomic Theory	3(3-0)
Maj/Eco -305	Development Economics	3(3-0)
Maj/Eco -307	Public Finance	3(3-0)
Maj/Eco -309	Statistical inference and Decision Making	3(3-0)
<b>Total Credit Hour in Semester-V</b>		<b>15</b>
<b>Semester-VI</b>		
Maj/Eco -302	Econometrics-I	3(3-0)
Maj/Eco -304	International Trade Theory	3(3-0)
Maj/Eco -306	Environmental and Natural Resource Economics	3(3-0)
Maj/Eco -310	Managerial Economics	3(3-0)
Maj/Eco -312	Research Methodology	3(3-0)
<b>Total Credit Hour in Semester-VI</b>		<b>18</b>

### Year 4

Course Code	Name of Subject	Credits
<b>Semester-VII</b>		
Maj/Eco -401	Econometrics –II	3(3-0)
Maj/Eco -403	International Finance	3(3-0)
Maj/Eco -405	Applied Economics	3(3-0)
Maj/Eco-427 Maj/Eco-428 Maj/Eco -429	Internship/Term Paper/Research Project <b>or</b> <b>Choose any two from Annexure-A<sup>+</sup></b>	6(0-6)
<b>Total Credit Hour in Semester-VII</b>		<b>15</b>
<b>Semester-VIII</b>		
Maj/Eco -402	Monetary Economics*	3(3-0)
Maj/Eco -404	Labor Economics*	3(3-0)
Maj/Eco -406	Agriculture Economics*	3(3-0)
EC/Eco-	<b>Choose any two from Annexure-B<sup>+</sup></b>	3(3-0)
<b>Total Credit Hour in Semester-VIII</b>		<b>15</b>

\*Department has the option to offer any other course(s) in lieu of these, from the list of optional courses.

+The course code will be in accordance to the course chosen from the annexure.

**Total Credit Hours for BS Economics = 17+17+18+18+15+15+15+15=130**

### **Annexure-A**

<b>Course Code</b>	<b>Course Title</b>	<b>Credit Hours</b>
EC/Eco -409	Health Economics	3(3-0)
EC/Eco -411	Comparative Economic System	3(3-0)
EC/Eco -413	Population Economics	3(3-0)
EC/Eco -415	Industrial Economics	3(3-0)
EC/Eco -417	Urban Economics	3(3-0)
EC/Eco -419	Poverty and Income Distribution	3(3-0)
EC/Eco -421	Development Policies	3(3-0)
EC/Eco -423	Project Appraisal with Reference to Pakistan	3(3-0)

### **Annexure-B**

<b>Course Code</b>	<b>Course Title</b>	<b>Credit Hours</b>
EC/Eco -408	Political Economy	3(3-0)
EC/Eco -410	Islamic Finance	3(3-0)
EC/Eco -412	Transport Economics	3(3-0)
EC/Eco -414	Dynamic Macroeconomics	3(3-0)
EC/Eco -416	Game Theory	3(3-0)
EC/Eco -418	Financial Markets	3(3-0)
EC/Eco -420	Rural Development	3(3-0)
EC/Eco -422	History of Economic Thought	3(3-0)
EC/Eco -424	Institutional Economics	3(3-0)
EC/Eco -426	Dynamic Optimization	3(3-0)

Maj /ECO-101	<b>PRINCIPLES OF MICROECONOMICS</b>
Semester-1	Credit Hours: 3(3-0)

### **Course Objectives**

The main objectives of this course are:

- To develop an understanding of introductory microeconomic theory and its relevance to the real word
- To sharpen the problem-solving tactics required to solve basic microeconomic problems
- To give a broader implications of microeconomics principles and their applications
- To train the students to work with others as a part of team to solve problems

### **Course Learning Outcomes**

At the end of this course students would be able to:

- Understand consumer and firm behavior
- Apply graphical analysis for a variety of economic situations
- Calculate and interpret elasticities
- Define and derive short-run and long-run production costs
- Explain various market structures

### **Course Content**

#### **1. Introduction**

The Economic Problem, Economic Decision Makers, The Circular Flow Model, Distinction Between Microeconomics and Macroeconomics, The Market System

#### **2. Demand & Supply**

Demand, Demand Function, Demand Curve, Engel Curve, Changes in Demand, Law of Demand, Shift in Demand, Factors Affecting Demand, Consumer Surplus, Supply, Supply Function, Supply Curve, Changes in Supply, Factors, Affecting Supply, Law of Supply, Producer Surplus, Equilibrium of Demand and Supply, Market Equilibrium, Price Controls, Taxes and Subsidies

#### **3. Elasticity of Demand & Supply**

- Price Elasticity of Demand & Supply
- Point Elasticity of Demand & Supply
- Arc Elasticity of demand & Supply
- Income Elasticity of Demand & Supply
- Cross Elasticity of demand & Supply

#### **4. Consumer Behavior**

- Utility Analysis (Cardinal Approach), Marginal Utility
- Law of Diminishing Marginal Utility and Law of Equi-Marginal Utility, Consumer Equilibrium
- Ordinal Approach of Consumer Behavior, Indifference Curves, Features of Indifference Curves, Budget Line, Consumer Equilibrium, Comparison between two approaches

#### **5. The Theory of production & Theory of Cost**

- Cost of Production, Short Period and Long Period Analysis
- Economies of Scale, Elasticity of Cost, Graphical Representation of Long Run Cost
- Production, Factors of Production, Production Function, Short Period Production Relations, Total, Average and Marginal Product, Elasticity of Production
- Laws of Returns to Scale
- Duality Between Production and Cost of Production

#### **6. Market Structure**

- Basics of Perfect Competition, Monopoly, Monopolistic Competition and Oligopoly
- Different Possibilities of Short Run firm Equilibrium under Perfect Competition
- Profit Maximization in Short-run and long-run under Perfect Competition
- Supply Curve of Perfectly Competitive Firm under Short and Long Run
- Short run and Long run Equilibrium under Monopoly

#### **Recommended Books**

1. Michael J. Swann, William A. McEachern Microeconomics: A Contemporary Introduction, 3<sup>rd</sup> Edition (or latest available)
2. Mankiw N. Gregory, Principles of Microeconomics, 7<sup>th</sup> Edition (or latest available).
3. Campbell R. McConnell, Stanley L. Brue, Principles of Economics, 17th Edition (or latest available).
4. Paul A. Samuelson, William D. Nordhaus, Economics, Latest Edition



Maj/ECO-102	<b>PRINCIPLES OF MACROECONOMICS</b>
Semester-II	Credit Hours: 3(3-0)

### **Course Objectives**

The main objectives of this course are:

- To make students aware of the working of economy on macro level
- To make students familiar with the basic concepts of growth, unemployment and monetary system

### **Learning Outcomes**

- Students become aware of the working of economy at macro level
- They got familiar with the macroeconomic concepts.

### **Course Contents**

#### **1. Introduction**

The economy in aggregate, Scope of macroeconomics, Brief account of classical and the development of macro-economic after the World War-II; Three concerns of macroeconomics, Inflation, GDP growth and unemployment

#### **2. Measuring a Nation's Income**

Income, expenditure and production method of measurement of national income, Difficulties of measurement, Component of GDP, Real vs Nominal GDP, Circular Flow of National Income in two and three sector economy

#### **3. Measuring the cost of living**

Measurement of consumer price index, GDP deflator, correcting economic variables for the effects of inflation

#### **4. Unemployment**

Identifying unemployment, why are there always some people unemployed?

#### **5. Components of Aggregate Demand**

The Concept of Open and closed economy models, Concept of aggregate markets: Product, Money, Labor and Capital markets, Components of aggregate demand: Consumption, Investment and Government spending, Income and expenditure identities.

#### **5. Aggregate Demand and Aggregate Supply (Classical Model)**

What brings the supply and demand for goods and services in equilibrium (Classical Model), Says law of market, Classical QTM, Cambridge Cash Balance Approach, Wage –price flexibility, Automatic Adjustment in Labor, Product and Money market at full employment (Derivation of Aggregate Supply), Criticism?

#### **6. Aggregate Demand and Aggregate Supply (Keynesian Model)**

Three key facts about economic fluctuations, Explaining short run economic fluctuations, the aggregate demand Curve, The aggregate supply Curve, Two causes of economic fluctuations

### **Recommended Books**

1. Abel, Andrew and Bernanke. Macroeconomics. 5<sup>th</sup> Edition (or latest available).
2. Fred R. Glahe. Macro Economics Theory and Policy. Latest Edition.
3. N. Gregory Mankiw, Principles of Economics. 6<sup>th</sup> Edition (or latest available).
4. N. Gregory Mankiw, Macroeconomics. 8<sup>th</sup> Edition (or latest available).
5. Parkin, Michael - Macroeconomics, 7<sup>th</sup> Edition (or latest available).

Maj/ECO-201	<b>INTERMEDIATE MICROECONOMICS</b>
Semester-III	Credit Hours: 3(3-0)

### **Course Objectives**

- The course is aimed to develop the economic way of thinking to tackle the issues like resource allocation of consumers and producers.
- The course is aimed to give an insight into how economic models can help us think about important real world phenomena, like reasons behind the rise and fall of prices and wages, how firms earn profits and why they go out of business.
- The course is aimed to obtain basic knowledge of the issues that may arise when market information is asymmetric.

### **Course Learning Outcomes**

Upon successful completion of the course, the student will be able to:

- Acquire proficiency to employ numerical and graphical techniques as well as verbal presentation of microeconomic concepts.
- Understand the concepts of microeconomic theories and models in terms of their policy implications, advantages and limitations.
- Explains consumers', firms', and market behavior using mathematical tools and diagrams the problems.

### **Course Contents**

#### **1. Theory of Consumer Behavior**

Axioms of Rationality, The utility function and its arguments, Laws of diminishing marginal and equi-marginal utility, Indifference curves and their properties, Concepts of imperfect substitutes and complements, Marginal rate of (commodity) substitution (MRCS), Convexity of indifference curve and diminishing MRS, The budget constraint, Consumer's equilibrium and indifference curve, Income & Substitution effects of a price change: diagrammatic representation, Normal, Inferior and Giffen goods, Gross substitutes and net substitutes, Revealed Preference Theory.

#### **2. Demand & Elasticity**

Derivation of demand functions using indifference curves, Ordinary and Compensated demand functions, Engel's law and classification of goods, Market demand, Elasticity of demand, Importance and types: Own-Price, Cross-Price and Income elasticity, Relationships among different demand elasticities.

#### **3. Theory of Production and Supply**

Definition, classification and problems of firms, Production and value-added functions, Fixed and variable-coefficient functions, Some commonly used production functions: Cobb Douglas and CES etc., Average and marginal products of variable factors and their inter-relationship, Iso-quant maps, Marginal rate of (technical) substitution (MRTS), The cost line and equilibrium of the firm, Output maximization subject to given cost/budget, Demand for variable factors, Elasticity of substitution, Returns to scales and Economies of scales. Measuring Costs, Short Run Costs, Long run Costs, Lower Costs in the long run, Cost of producing multiple goods.

#### **4. Perfectly Competitive Markets**

Assumptions of the model, Pure and Perfect Competition, Short-run and Long-run equilibrium of competitive firms, Supply functions in the short and long-run, Constant-cost and increasing-cost industries

#### **5. Monopoly and Monopsony**

The market power of a firm, Sources of monopoly power: why do monopolies exist, Decreasing-cost industries and natural monopolies, Comparison between monopoly and monopsony, Short-run and Long-run Equilibrium of a firm with monopoly power

#### **6. Factor Markets**

- Competitive factor market
- Non-competitive factor market
- Monopsony

#### **Recommended Books**

1. Pindyck and Rubinfeld with Mehta- Microeconomics- 6<sup>th</sup> Edition (or latest available), Pearson Education, Singapore
2. Walter Nicholson- Intermediate Microeconomics- 6<sup>th</sup> Edition ( or latest available) The Dryden Press: Harcourt Brace College Publishers
3. Koutsoyiannis, A. - Modern Microeconomics- 2<sup>nd</sup> Edition (or latest available) - Macmillan.
4. Varian Hall R. - Intermediate Microeconomics: Modern Approach- 6<sup>th</sup> edition (2002) - W. W. Norton Publishing Company, New York.
5. Perloff, M. Jeffrey. Microeconomics: Theory and Applications with Calculus, 1<sup>st</sup> Edition (or latest available), Pearson Education.
6. Perloff, M. Jeffrey (2016). Microeconomics, 7<sup>th</sup> Edition (or latest available), Pearson Education.

Maj/ECO-202	<b>INTERMEDIATE MACROECONOMICS</b>
Semester-IV	Credit Hours: 3(3-0)

### **Course Objectives**

- Develop a good understanding of functioning of the macro economy.
- To enable the students for the decomposed analysis of major sectors of the economy and facilitate them for further research on macroeconomic problems for the development of the economy.

### **Learning Outcomes**

After completing the course, the students shall be able to

- Analyze the functioning of the macro economy.
- Critically evaluate the macroeconomic policies in major sectors of economy and will be competent for further higher research-oriented studies.

### **Course Contents**

#### **1. Introduction**

The Keynesian revolution and growth of Macroeconomics, Actual vs. Potential Output, Analytical approach to macroeconomics, Oken's Law and unemployment, Price Indices and Inflation, The simple macroeconomic models, Lead and Lagged variables, Exogenous and Endogenous variables and their functional relationships, Introduction to the Classical and Keynesian Schools of Thought.

#### **2. Keynesian Economics**

The expenditure sector: consumption, saving, investment, the multiplier, and equilibrium income, the government sector: government expenditure and taxes multipliers, the monetary sector: the demand for and supply of money, money markets equilibrium and monetary theory of the rate of interest.

#### **3. Synthesis of the Classical and Keynesian Models**

Linear version of the IS-LM curves and their interrelationship with Classical and Keynesian assumption, Equilibrium in the two-sector model with constant price level. The problem of equilibrium with variable price level, derivation of aggregate demand.

#### **4. Consumption**

Absolute income Hypothesis of Consumption, Permanent Income Hypothesis, Relative Income Hypothesis, Life Cycle Hypothesis.

#### **5. Investment**

Marginal Efficiency of Capital, Marginal Efficiency of Investment, Accelerator

#### **6. The Production and Employment Sector**

Supply side equilibrium, The Production Function, The demand for and supply of labour, Equilibrium in labour market, the derivation of the classical and Keynesian aggregate supply curves.

#### **7. Aggregate Demand and Supply Analysis**

The equilibrium level of output and employment in the three-sector model. The Keynesian underemployment equilibrium and real balance effect.

### **Recommended Books**

1. Dornbusch, R. & S Fischer. Macroeconomics. 11<sup>th</sup> Edition (or latest) Mc Graw- Hill.
2. Fred R. Glahe. Macro Economics Theory and Policy- Latest.
3. N. Gregory Mankiw. Macroeconomics. 8<sup>th</sup> Edition (or latest available).

4. Froyen, Richard–Macroeconomics: Theories and Policies–7<sup>th</sup> Edition (or latest available) – Macmillan.

Maj/ECO-203	<b>MATHEMATICAL ECONOMICS-I</b>
Semester-III	Credit Hours: 3(3-0)

### **Course Objectives**

- The course includes the mathematical techniques and economic applications of derivatives, matrix algebra, differentials, multivariable optimization, constrained optimization and integration.
- Emphasis is on the application of optimization, both with and without constraints, and introductory integrals for understanding relationships of various economic variables and concepts, such as the relationship of aggregate, average and marginal functions
- The aim is to give students the mathematical tools they need for further study in economics, therefore, this course is designed to provide strong mathematical foundations.

### **Learning Outcomes**

By the end of the course, successful students will be comfortable with the basic mathematical methods which are indispensable for a proper understanding of economics and will have command on the use of derivatives, matrix algebra and integrals in solving economic problems.

### **Course Outline**

#### **1. The Nature of Mathematical Economics**

The use of mathematical tools in social sciences, particularly in economics, Economic theory (logical argument) as description of some kind of relationship between variables, explaining properties of economic parameters like elasticity, propensity to consume etc.

#### **2. Equilibrium Analysis**

Equation of a straight line: Intercept and Slope parameters and their economic interpretation, Partial and general equilibrium analysis, Single and Simultaneous equation models, Examples from market models: Demand and supply equations, Determination of price and quantity, Calculation of elasticities at equilibrium, the effect of an excise tax on market equilibrium, National Income determination: Closed economy with goods and money markets.

#### **3. Matrix Algebra**

Introduction to Matrices, Matrix Operations: Additions, Subtraction, Scalar Multiplication, Inner Product, Matrix Multiplication, Special types of Matrices: Vectors, Square Matrices, Identity Matrix, Null Matrix, Symmetric Matrix, Idempotent Matrix, Diagonal Matrix, Transpose of a Matrix. Determinants: Determinants of a Square Matrix, Properties of Determinants, Determinants as a test of Invert-ability, Jacobians, Hessians and Bordered Hessian Determinants. The Inverse of a Square Matrix, A System of Equations in Matrix Format, Solution of a system of Linear Equations by: (1) Inverse Matrix Method (2) Cramer's Rule. The Input-Output Model, The uses of Input-Output Analysis, The Input-Output Table, The General Solution to the Input-Output Model.

#### **4. Differential Calculus**

Average and Instantaneous Rate of Change, The Slope of a Secant line and a Tangent Line, Differentiability of a Function

## **5. Economic Applications**

Marginal Analysis in Business and Economics; Optimization of a Function; Revenue, Cost, Utility and Profit Applications; Elasticity of Demand, Curvature and other Applications.

## **6. Total Differentials and Total Derivatives**

Differentials; Total Differentials; Rules of Differentials, Total Derivatives, Implicit Differentiation

## **7. Multivariable Calculus**

Economic Applications: Multivariate Optimization: Maxima, Minima, Point of Inflection; First –Order necessary Condition, Second-Order Sufficient Condition for Maxima and Minima. Constrained Optimization: Maxima, Minima and Saddle Point, Constrained Optimization by the Lagrange Multiplier Method, Utility Maximization, and Profit Maximization, Optimal Input combination for Minimum Cost or Maximum Output. Homogenous Functions and Euler's Theorem; Linear Homogeneity, The Organization of a Production Function, Cobb-Douglas Production Function, Returns to Scale.

## **8. Integral Calculus**

Ant derivatives and Indefinite Integrals, Rules of Integration, Integration by Substitution, Integration by Parts, Definite Integrals, the Concept of Area and the Definite Integrals, Fundamental Theorem of Calculus, Improper Integrals. Economic Applications: Consumer's Surplus, Producer's Surplus, Marginal and Total Relationships; Investment and Capital Formation; Present Value of Cash.

## **Recommended Books**

1. Chiang & W, Kevin Fundamental Methods of Mathematical Economics McGraw-Hill Int.4rth; 2005.
2. Budnick, F. S. Applied Mathematics for Business, Economics and Social Sciences McGraw-Hill Int. Ed.
3. Dowling, E.T. Introduction to Mathematical Economics McGraw-Hill Int. Ed.
4. Nicholson, R.H. Mathematics for Business and Economics, McGraw-Hill Int. Ed. 1986.
5. Weber, Jean Mathematical Analysis, Harper & Row, 1982.

Maj/ECO-204	<b>MATHEMATICAL ECONOMICS-II</b>
Semester-IV	Credit Hours: 3(3-0)

### **Course Objective**

- The principal aim of the course is to introduce students to how mathematics can be used to sharpen and clarify economic analysis. The topics included are Differential equations, Difference equations and Linear Programming.
- The objective is to introduce them to dynamic analysis and its application in economics. Various important economic models in the area of micro, macro and economic growth are included for this purpose.
- The course will focus on presenting common micro, macro and economic development topics in a more rigorous mathematical way than standard core economics courses, and on those techniques, which will be of use to students continuing in economics.

### **Learning Outcomes**

- By the end of the course, successful students will be comfortable with the basic mathematical methods which are indispensable for a proper understanding of economics and will have some facility at tackling economic problems using a mathematical framework.
- This course would provide them with the basic ability to handle economic theory in mathematical language. Such ability is essential for further studies in economics - particularly for post-graduate economic theory courses and for understanding articles in economic journals.

### **Course Contents**

#### **1. Circular Functions**

Complex number system, Complex numbers, Alternative representation of Complex Numbers (i) Cartesian Form (ii) Polar Form (iii) Exponential Form;

- Complex Numbers and Circular Functions, Analysis of Complex Root Case
- Sine and Cosine Functions, Properties and Derivatives of Sine and Cosine Functions; Euler's Relations; De Moivre's Theorem

#### **2. Differential Equations**

- Solution of Linear First-Order Differential Equation with Constant Coefficient and Constant Term
- Nonlinear Differential Equations: Exact Differential Equation, Separable Variable, Bernoulli Equation
- Qualitative Graphic Approach, Phase Line; Types of Time-Path and its Dynamic Stability
- Economic Applications: Dynamics of Market Price, Domar Burden of the Debt Model, Solow's Growth Model
- Solution of Second-Order Linear Differential Equation with Constant Coefficient and Constant Term
- Economic Applications: A Market Model with Price Expectations; The Interaction of Inflation and Unemployment

#### **3. Difference Equations**

- Solution of First-Order Linear Difference Equation with Constant Coefficient and Constant Term, Dynamic Stability of Equilibrium
- Economic Application: Harrod's Growth Model, The Cobweb Model, The Lagged Income Model, A Market Model with Inventory
- Solution of Second-Order Linear Difference Equation, Dynamic Stability of Equilibrium
- Economic Application: Samuelson Multiplier-Accelerator Interaction Model

#### **4. Linear Programming**

- Introduction to formulating the Linear Program, The Linear Programming Model, A Standard Form of the Model
- Solving Linear programming Problems: The Graphical Solution Method, Area of Feasible Solutions, Incorporating the Objective Function; Corner-Point Solution; No Feasible Solution, Unbounded Solutions
- The Simplex Method, Basic Simplex Concepts, Setting Up Simplex Method, The Algebra of Simplex Method, The Interpretation of the Optimal Tableau

#### **5. The Dual Linear Program**

- The Essence of Duality Theory, Economic Interpretation of Duality Theory; Formulation of the Dual, Primal-Dual Relationships, Complementary Slackness
- Solving Primal from the Dual; Solving the Dual Graphically, Solving the Dual Linear Program with Simplex Method
- The Meaning of Dual and Shadow Prices, Interpretation of the Optimal Dual Tableau

#### **Recommended Books**

1. Chiang, A.C., Fundamental Methods of Mathematical Economics, McGraw Hill Int. Edition (or latest available)
2. Baumol, W.J., Economic Dynamics, Macmillan Publishing Co., Latest Edition
3. Dowling, E.T., Introduction to Mathematical Economics, McGraw Hill Int, Latest Edition.
4. Weber, Jean, Mathematical Analysis, Harper & Row (1982)
5. Nicholson, R.H., Mathematics for Business and Economics, McGraw-Hill -Latest Edition
6. Hillier & Liebermann, Introduction to Mathematical Programming-Latest Edition.



Maj/ECO-205	<b>ISSUES IN PAKISTAN ECONOMY</b>
Semester III	Credit Hours: 3(3-0)

### **Course Objectives**

The objective of this course is:

- To give the understanding about Pakistan's development, issues of agriculture and industry in the Pakistan.
- To provide understanding about balance of payment and trade regimes, public finance, monetary policy and monetary management in Pakistan.
- To provide an overview relevant structural adjustment programs in Pakistan and poverty in Pakistan.

### **Learning Outcomes**

- Students will be able to analyze the functioning of the economy of Pakistan and also will have a comprehensive knowledge about the challenges which Pakistan has to face.

### **Course Outline**

#### **1. Assessing Pakistan's development**

- structural change
- five decades and five epochs
- laying the foundation 1947-58
- the decade of development 1958-68
- the bad-luck years 1971-77
- the second military government 1977-88
- the era of structural adjustment 1988 onwards

#### **2. The green revolution and land reforms**

- the green revolution
- the issues of the tube-wells and tractorisation
- regional and income disparities
- elite farmer strategy and capitalist development
- social and political effects
- land reforms
- land reforms of 1959 and 1972
- 

#### **3. Agriculture: Critical Issues**

- an overview and major trends

- agricultural pricing policy
- rural financial markets and agricultural credit
- Informal sources of credit & formal sources of credit
- mechanization
- agricultural income tax
- the water crisis
- land ownership, power and land reforms

#### **4. Key issues in industry in Pakistan**

- numbers and trends in industry
- the small scale manufacturing sector
- the textile industry and its crisis
- Has public sector industry been a failure?
- the privatization process
- the debate over the efficiency in the industrial sector

#### **5. Public finance: resource mobilization and structure of taxation**

- the structure of government and taxation prior to 2001
- the district government system fiscal issues
- public finance: the basic facts
- important issues in public finance and revenue mobilization
- Is local government the answer?
- the nature of public debt and fiscal deficit

#### **6. Balance of payments and trades regimes**

- Pakistan's foreign trade: basic facts
- trade policy and trades regimes 1947-2019
- the debate over efficiency and the trade regime
- the exchange rate
- dealing with globalization and WTO
- some political economy issues
- globalization and WTO impacts on Pakistan

#### **7. Monetary policy, savings and inflation**

- money supply and monetary expansion
- inflation and its causes
- the low saving rate

#### **8. Structural adjustment programmes in Pakistan's history**

- implementation of the structural adjustment programmes in Pakistan: an examination of the 1988 programme
- Was the structural adjustment programme a success? achievements and failures
- The world bank /IMF's overall evaluation of the 1988 structural adjustment programme & the political economy of structural adjustment programmes in Pakistan

## **9. Poverty: trends, causes and solutions**

- What does poverty mean?
- trends in poverty
- Who are the poor and where do they live?
- Why did the poverty return to Pakistan and why does it still persist 1988 to 2019?
- poverty alleviation then and now
- Can poverty be eliminated in Pakistan?

## **10. Institutional issues in the social sector**

- the social action programme (SAP)
- What SAP envisaged?
- What happened to SAP?
- governance, decentralization and local level delivery
- government and development in Pakistan
- NGOs and community participation

## **Recommended Books**

1. S. Akbar Zaidi, "Issues in Pakistan's Economy" (Latest edition)
2. Shahid Javed Burki "The development of Pakistan's agriculture"; an interdisciplinary explanation.
3. Viqar Ahmad and Rashid Amjad "The Management of Pakistan's Economy"
4. Rashid Amjad "Private Industrial Investment in Pakistan"
5. Zafar Iqbal "Institutional Variations in Saving Behavior in Pakistan"
6. Shahruk Rafi Khan "Fifty years of Pakistan's Economy"
7. Economic Survey of Pakistan (various issues) Federal Bureau of Statistics, Government of Pakistan.

Maj/ECO-206	<b>ISLAMIC ECONOMICS</b>
Semester IV	Credit Hours: 3(3-0)

## **Course Objectives**

The course is designed for senior students having gone through some basic courses in economic theory and development economics. The objective is to let them realize that Islam provides full guidance to its followers in all spheres of social life. The students have to understand the Islamic injunctions ordained for economic behaviour, both in the individual as well as collective capacity. They have to compare the prevailing system with that devised by Islam, to capture the socio-economic problems faced by the present day Muslim countries and to find ways and means to reconstruct the system in vogue according to Islamic guidelines so as to achieve greater stability, equity in distribution and reduction in poverty as the primary goals of all developing nations.

## **Course Contents**

### **Introduction**

Islamic Economics: Definition, Nature, and Importance, Islamic Economics Versus Secular Economics, The foundations of Islamic Economics, Brief Introduction of the Basic Values of Islam; Piety (Taqva), The lawful and unlawful (Halal and Haram), Trusteeship, Accountability, Justice, Benevolence, Equality, Brotherhood and Cooperation, Determinants of Economic Behaviour and Policies in Islam.

### **Islamic Economic Thought**

Contribution of prominent scholars towards development of Islamic Economic Thought (Imam Abu Yousuf, Imam Abu Ubaid Al-Qasim, Ibn-e-Khuldoon, Imam Ibn-e-Taimiyah, Shah Waliullah Dehlawi, Maulana Maududi, Baqar-al-Sadar etc).

### **Microeconomics in Islamic Framework**

#### **a. Consumer's Behaviour**

Objectives, Success in this world and the life Hereafter, Moderation in consumption, restricted set of preferences, altruism and charitable donations (Zakah and Sadaqat), Utility function, Consumer's equilibrium in an Islamic framework.

#### **b. Behaviour of the Firm**

Business Ethics in production and marketing, Permissible and prohibited activities, Hoarding and gains, Forms of business organization: Proprietorship, Partnership (Muzara'ah, Mudharabah, Musharakah), Joint Stock Company (Sharikah), Modes of investment and financing.

### **c. Market structure**

The concept of fair trade, Resource allocation under Islamic environment, Emphasis on competition, The case of monopolies and cartels in an Islamic system, Behaviour of the retailers, stock holders and whole-sellers, Types of transactions (Bai Fasid, Bai Salam, Bai Muajjal, Murabaha), Principles of financial contracts, Determination of price and the rate of Normal profit, Meeting of losses, Price mechanism and role of the State in market regulation.

## **Macroeconomics in Islamic Framework**

### **a. Some Basic Macroeconomic Concepts**

Consumption, saving and investment functions, Determinants of consumption and Investment functions in Islamic environment, Concept of helping others, The parameters of Public spending in Islamic framework, International trade relations, Inflation and unemployment, Stabilization policies in Islamic framework.

### **b. Money and Banking**

Commodity money, Paper money and Credit money, The concept of Riba (interest): its interpretation and implications, Justification of interest in the conventional theory, Rationale for prohibition of interest-based transactions and gambling, Models of interest-free Commercial Banking, Modes of financing investment: leasing (Ijarah), partnership in capital (Musharaka), principal-agent Murabaha, Bai-Salam, Bai Muajjal etc., Central Banking and monetary policy in Islamic framework: Combating inflation, Design of capital markets and Insurance.

### **c. Public Finance and Fiscal Policy**

Sources of revenue and heads of expenditure of an Islamic State, the scope for taxation, Objectives of fiscal policy: Social justice, Equity in distribution and elimination of poverty, Beneficiaries of Zakat, Exemption limits and rates of Zakah, Economic impacts of Zakah & Usher: the multiplier effect, Financing economic growth and development in Islamic perspective, The case of domestic and foreign borrowing,

## **Islamic Economic System**

Salient features of an Islamic Economic System: Objectives, Economic Freedom, Equity and Efficiency, Social and distributive justice, The relative importance of Capital and Labour, Private ownership and property rights, Family system and the law of inheritance, The

institution of Zakah and Bait-ul-Mal, Wider circulation of wealth, Fulfillment of basic needs, The institution of Interest and its inconsistency, Rationale for prohibition of interest, Role of the State in an Islamic system, Protection of faith and Islamic values, Economic and social welfare, Alleviation of poverty and reducing of inequalities, Comparison of Islamic economic system with Capitalism and Socialism.

### **Islamization Process in Pakistan**

Islamization of the banking and financial system: Reports of the CII and implementation issues, The role of financial institutions in the private sector, Implementation of Zakah and Usher system: Prospects and Problems, A brief survey of changes that have taken place in economic and financial structure since 1980's, Islamic Banking practice and the role of the State Bank of Pakistan, The process of Islamization in other countries like Iran, Sudan, Malaysia.

### **Recommended Books**

- Prof. Abdul Hameed Dar & Prof. Mian Muhammad Akram "Islamic Economics."
- Ahmed, Khurshid – Studies in Islamic Economics- (1980) King Abdul Aziz University Jeddah and The Islamic Foundation UK
- Ziauddin et al (Ed) – Money and Banking in Islam – (1983)- King Abdul Aziz University Jeddah and Institute of Policy Studies Islamabad.
- Ziauddin et al (Ed) – Fiscal Policy and Revenue Allocation in Islam – (1983) King Abdul Aziz University Jeddah and Institute of Policy Studies Islamabad.
- Siddiqui, M.N.- (1983)- Issues in Islamic Banking - Leicester, The Islamic Foundation, UK.
- Iqbal, Munawar (Ed) – Distributive Justice and Need Fulfillment in an Islamic Economy – (1986) – IIIE, International Islamic University Islamabad.
- Mannan, M.A.- Islamic Economics: Theory and Practice, A Comparative Study - (1986) - Cambridge, Hodder and Stoughton.
- Sayyid Tahir et al (Ed) – (1992) - Readings in Microeconomics: An Islamic Perspective – Longman Malaysia.
- Chapra, M. Umer – Just Monetary System – (1993) – IIIT New York and Islamic Research Institute, IIU Islamabad.
- Taqi Usmani, Justice M – (2000) - Introduction to Islamic Finance -
- Idarat-al- Ma'arif Karachi.
- Siddiqui, M.N. – (2001)- Economics: An Islamic Approach – Institute of Policy Studies Islamabad and The Islamic Foundation, UK.

- Yasin, Hafiz M. – Economic System of Islam – (1993) -Lecture Notes (mimeographed) – IIIE, International Islamic University Islamabad.
- Badawi, Muhammad A. Zaki- Zakat and Social Justice: English transliteration of the Book: Kitab ul Amwal by Imam Abu Abaid Al-Qasim - (1979) - The Islamic Council of Europe, London.
- Chapra M. Umer (1991)- The Economic System of Islam- University of Karachi.
- Khan, M. Fahim – (1983) - Macro Consumption Function in an Islamic Economic Framework - International Centre for Research In Islamic Economics, King Abdul Aziz University, KSA.
- Khan M. Fahim – (1995) - Human Resource Mobilization through the Profit-Loss Sharing – IRTI, Islamic Development Bank Jeddah.
- Khan, Tariqullah, (1996), Practice and Performance of Mudarbah: A case study of Pakistan, IRTI, Islamic Development Bank, Jeddah.
- Mahdi, M. Ahmad, (1995), Islamic Banking Modes for House Building Finance - IRTI, Islamic Development Bank, Jeddah.
- Mannan M.A. - (1996) - Financing Development in Islam - IRTI, Islamic Development Bank, Jeddah.
- Naqvi, Syed Nawab Hyder- (1981)- Ethics and Economics - Leicester, The Islamic Foundation, UK.
- Ghazanfar S.M., (2003), Medieval Islamic Economic Thoughts- Routledge Publishers.
- Nomani, Farhad & Rehnuma., Ali- (1994) - Islamic Economic Systems – Zed Books Ltd., London.
- Nuti, D. Haris, (1995), The Economics of Participation, IRTI, Islamic Development Bank, Jeddah.
- Yusaf, Imam Abu, Kita bur Kharaj, Lahore, Islamic Book Centre, 1979.
- CII Reports – Consolidated Recommendations on the Islamic Economic System (1983, 1994)- the Council of Islamic Ideology, Govt. of Pakistan.
- Siddiqui, M.N.- (1985)- Muslim Economic Thinking - Leicester, The Islamic Foundation, UK.
- Mannan M.A. (1995), Developing a System of Financial Instruments IRTI, Islamic Development Bank, Jeddah.

Maj/ECO-208	<b>WORLD ECONOMIC HISTORY</b>
Semester IV	Credit Hours: 3(3-0)

### **COURSE OBJECTIVES:**

- To give a historical consciousness of economic ideas
- To give an overview of developments in economics

### **COURSE LEARNING OUTCOMES:**

Upon Successful Completion, the Students Should be able to:

- Understand key models and concepts of the world economic history
- Understand scholarly articles concerned the world economic history
- Have a historical consciousness of economic ideas

### **COURSE CONTENTS**

#### **1. Introduction**

Introduction: Importance of Economic History: Approaches to Study the Subject. Overview of Ancient Greek, Roman and Medieval Economic Thought. Overview of Ancient and medieval thoughts, Quensy's influential ideas, Feudalism, Mercantilism, Nature's Circular Flow, Process of modern theories and thoughts. Overview of Islamic thoughts: Ibne-Khuldoon and thereafter. Overview of Silent Features of Muslim School of Thought

#### **2. Mercantilists and the Physiocrats**

The Contributions of Mercantilists and the Physiocrats. A doctrine of economic process, transition to liberalization: Wage theory to natural price, the task of government. Overtime, Changing Role of Government.

#### **3. Classical School**

The Contributions of Classical School, Adam Smith; Malthus and Ricardo etc., The Labor Theory of Value. Bullin Debate. Ricardo's Monetary Thought. Evolutionists, Ricardo and Reformers of 18<sup>th</sup> Century. The Theory of Rent. Profit Concepts of Colonization. Economic

#### **4. Socialism**



Socialism before Marx. English Socialists. Anarchism. Karl Marx's Contributions. The Class Struggle. Criticism on Marx. Challenges to Capitalism. German Historical School, Weber's contributions. The Marginalist School, Neo-Classical Economics. Jons Inference. The concept of Welfare State. Chamberlin and Robinson. Australian School of thought. Veber and Galberith's Contribution.

## **5. Keynesian and Post Keynesian School**

The Keynesian and Post Keynesian School, The Great Depression: Economic Policies and Capitalist Instability Between the World Wars. The 20<sup>th</sup> Century Paradigms. The Growth of International Economy. The Rise and fall of Post-World War II. The American economic history and Lessons.

i) The Emergence of Modern Economic Growth, Building Blocks, Industrial Revolution, Structuralist and Dependency School of thought; Sunkel, Amir Samer, Frank and others' contribution. Technological Change and Impacts.

The Crisis of the 1970's and International Responses. Failure of Trickle down effects. Rational Expectation Revolution. Basic Needs Approach and welfare. Emergence Famine and Poverty.

ii) Modern Economic Thought. Comparison of Post Keynesian and Monetarist Thoughts. Supply side economics. Globalization, Liberalization and New Weave of Economic Growth and Welfare. New Growth Theory. Convergence and Divergence Debate. Future of Economics, Quality and International Trade and emergence of markets, New Regionalism, New directions of research. Environment and sustainable growth.

### **Recommended Books**

- A History of Economic Ideas, (1959), Robert Lekachman, McGraw Hill Company.
- Economic Theory in Retrospect, Blaug, (1978), Cambridge University Press.
- Frank A. G., (1998), Global Economy in the Asian Age, Univ., of California Press.
- Henery John D., The Future of Economics, (1992), Black Wall Publishers.
- Marx k., and Engles F., The Communist Manifesto, Peoples Publishing House, Moscow, latest edition.
- Rima Ingrid, Development of Economic Analysis, Routledge Publishers (Latest ed.).
- Spechler, Martin C., (1990), Perspective in Economic Thought, McGraw Hills.
- The Main Current in Modern Economics (latest edition), The Free Press of Glancer.
- Theories of Value and Distribution (latest Edition), Dobb M., Cambridge Univ. Press, Latest edition.

- Twenty Contemporary Economist ed. (1981). Schach and Locksley, MacMillan Press.

Maj/ECO-301	<b>MICROECONOMIC THEORY</b>
Semester V	Credit Hours: 3(3-0)

## **COURSE OBJECTIVES**

Following are the prime objectives of this course:

- To explain the technical concepts of microeconomics
- To learn the latest developments in microeconomic theory
- To understand the modeling of consumer and production theory

## **COURSE LEARNING OUTCOMES**

After completing this course, students are expected to:

- Recognize and identify the latest development in microeconomic theory
- Understand the modeling of consumer choices and production decisions
- Apply the theoretical knowledge in research

## **COURSE CONTENTS**

### **1. Theory of Consumer Behavior**

Consumer preferences, Consumption bundle, Axiom of consumer preferences, Utility maximization subject to budget constraint, Marshallian demand function (Concept, Derivation and Properties), Hicksian demand function (Concept, Derivation and Properties), Expenditure Function (Concept, Derivation and Properties), Duality between Hicksian and Marshallian demand functions

### **2. Production Analysis**

Production, production process, Types of inputs, concept of net output, Production set; Iso-quants, Technical rate of substitutions, Elasticity of substitution, Returns to scale, Elasticity of scale, Homogeneous and homothetic technologies, Euler's theorem, Production function and Classification of production functions; Linear production function, Cob-Douglas production function, Constant elasticity of substitution production function, Budget Constraint, Cost of Production, Economic Cost, Private Cost, External Cost, Implicit Cost, Explicit Cost, Cost equation and Cost Function.

### **3. Market Structures and Price Determination**

Critical appraisal of the competitive market assumptions, Efficiency of competitive market, Monopoly and its Welfare effects, Taxes and Monopoly, Cost advantages that create monopolies, Government actions that create monopolies, Government actions that reduce market power, Monopoly decisions over time, Why and how firms price discriminate, Perfect price discrimination, Quantity discrimination, Multimarket price discrimination, Two-part tariffs, Tie-In sales, Advertising, Oligopoly and Monopolistic Competition, Market structures, Cartels, Non-cooperative Oligopoly, Cournot Oligopoly model, Stackelberg oligopoly model, Comparison of Collusive, Cournot, Stackelberg, and Competitive equilibria, Bertrand Oligopoly model

### **4. Game Theory**

- An overview of game theory, Static games, Dynamic games, Prisoner's Dilemma

### **5. General Equilibrium and Economic Welfare**

- General Equilibrium
  - Exchange Economy: Trading between two people
  - Competitive Exchange
  - Production and Trading
  - Efficiency and Equity

### **Recommended Books**

1. Perloff, M. Jeffrey (2013). Microeconomics: Theory and Applications with Calculus, First Edition, Pearson Education.
2. Perloff, M. Jeffrey. Microeconomics, Latest Edition, Pearson Education.
3. Katz, L. Michael & Rosen S. Harvey. Microeconomics, Latest Edition, McGraw-Hill.
4. • Nicholson, Walter - Microeconomic Theory: Basic Principles and Extensions- 8<sup>th</sup> Edition or latest -Thomson & Learning Inc.
5. • Henderson & Quandt - Microeconomic Theory: A Mathematical Approach- 3<sup>rd</sup> Edition or latest -McGraw Hill International
6. • Silberberg, E. & Suen, W.- The Structure of Economics: A Mathematical Analysis- 3<sup>rd</sup> Edition (or latest available) – McGraw Hill International
7. Layard & Walters – Microeconomic Theory- Latest edition– McGraw Hill Book Company
8. Pindyck & Rubinfeld – Microeconomics- 6<sup>th</sup> Edition (or latest available) – Pearson Education Asia.

Maj/ECO-303	<b>MACROECONOMIC THEORY</b>
Semester V	Credit Hours: 3(3-0)

### **Course Objectives**

- To provide the students the understanding of main issues of macroeconomics i.e. inflation, unemployment, growth and trade balance.
- To teach the theory of growth.
- To teach the debate of stabilization policies.

### **Learning Outcomes**

- After the completion of course, the students will be able to analyze the issues related to inflation, growth and trade balance
- Students will be able to analyze the issues related to stabilization policies

### **The Economy in the Very Long Run**

#### **Economic Growth I: Capital Accumulation and Population Growth**

The Accumulation of Capital; The Supply and Demand for Goods, Growth in the Capital Stock and the Steady State, Approaching the Steady State: A Numerical Example, How Saving Affects Growth

- The Golden Rule Level of Capital; Comparing Steady States, Finding the Golden Rule Steady State: A Numerical Example, The Transition to the Golden Rule Steady State
- Population Growth; The Steady State with Population Growth, The Effects of Population Growth, Alternative Perspectives on Population Growth.

#### **Economic Growth II: Technology, Empirics, Policy, and Human Capital**

- Technological Progress in the Solow Model; The Efficiency of Labor, The Steady State with Technological Progress, The Effects of Technological Progress
- From Growth Theory to Growth Empirics; Balanced Growth, Convergence, Factor Accumulation Versus Production Efficiency
- Policies to Promote Growth; Evaluating the Rate of Saving, Changing the Rate of Saving, Allocating the Economy's Investment, Establishing the Right Institutions, Encouraging Technological Progress
- Beyond the Solow Model: Endogenous Growth Theory; The Basic Model, A Two-Sector Model, The Microeconomics of Research and Development, The Process of Creative Destruction

## **1. Inflation**

- Introduction of inflation, demand pull inflation, cost push inflation, unemployment and inflation, inflation and interest rate.

## **2. Stabilization Policies**

- Should policy be active or passive? Lags in the implementation and effects of policies, the difficult job of economic forecasting: ignorance.
- Expectations and Lucas Critique; Historical Record; should policy be conducted by Rule or Discretion?
- Distrust of policy makers and the political process, time inconsistency of discretionary policy, rules for monetary policy, rules for fiscal policy

## **3. Government Debt and Budget Deficit**

- Size of the government debt, problems in measurement, traditional view of government debt, Ricardian view of government debt, other perspectives on government debt.

## **4. Advances in the Theory of Economic Fluctuations**

- Theory of real business cycles, interpretation of labor market, importance of technology shocks, neutrality of money, flexibility of wages and prices.
- New Keynesian economics, small menu costs and aggregate demand externalities, recession as coordination failure.
- Rational expectations.

## **5. Aggregate Demand in the open Economy**

- The Mundell-Fleming Model, the small open economy under floating exchange rates, the small open economy under fixed exchange rates, interest rate differentials, should exchange rates be fixed or floating?
- The Mundell-Fleming model with a changing price level.

## **6. Important Lessons of Macroeconomics**

- In the LR, a country's capacity to produce goods and services determines the standard of living of its citizens
- In the short run, aggregate demand influences the amount of goods and services that a country produces
- In the long run, the rate of money growth determines the rate of inflation, but it does not affect the rate of unemployment

- In the short run, policy makers who control monetary and fiscal policy face a tradeoff between inflation and unemployment

### **Recommended Books**

1. Dornbusch, R and Stanley Fischer. Macroeconomics. 11<sup>th</sup> Edition (or latest available)
2. Froyen, Richard T. Macroeconomics. 10th Edition (or latest available).
3. Glahe. R. Fred, Macroeconomics Theory and Policy, 2<sup>nd</sup> Edition (or latest available)..
4. N. Gregory Mankiw . Macroeconomics. 8<sup>th</sup> Edition (or latest available).

Maj/ECO-305	<b>DEVELOPMENT ECONOMICS</b>
Semester V	Credit Hours: 3(3-0)

## **Course Objectives**

The objectives of this course are:

- to provide a comprehensive knowledge of development economics
- to enable the students to understand the historic growth and contemporary development phenomenon
- to equip the students with the theories that provide the path to progress

## **Learning Outcomes**

After the completion of the course:

- The students will be able to understand the basics and diverse structure of development economics.
- The students will be able to understand the socio-economic factors responsible for the underdevelopment of LDC's
- The students will be able to use the theories of development economics for research and economic development of their country.

## **Course Outline**

### **1. Principles and concepts of development**

- Meaning and definition of economic development
- Traditional economic measures
- The economic view of development
- Three core values of development
- Three objectives of development
- A critical analysis of Millennium development goals
- Sustainable Development Goals

### **2. Diverse structure and common characteristics of developing nations**

- Defining the developing world
- Basic Indicators of development
- Holistic measures of living levels and capabilities
- The new human development index

- Structural diversity of developing economies
- Common characteristics of developing nations

### **3. Classic theories of development**

- Development as growth and linear stages theories
- Rostow's stages of growth
- Harrod-Domar growth model
- Lewis Model of Economic Growth
- The Endogenous growth theory
- Theory of Dualism
- Big Push theory
- Balanced and Unbalanced growth theory
- Theory of international dependence

### **4. Agriculture transformation and rural development**

- The imperative of Agricultural progress and rural development
- Agricultural growth: Past progress and current challenges
- The structure of agrarian systems in developing world
- Core requirement of a strategy of agricultural and rural development

### **5. The environment and development**

- Environment and development: the basic issues
- Global warming and climate change: scope, mitigation and adaption
- Policy options in developing and developed countries

### **6. Trade theory and development experience**

- Economic globalization : an introduction
- International trade: some key issues
- The traditional theory of international trade
- The critique of traditional free trade theory in the context of developing country experience

## **Recommended Books**

1. Michael P.Todaro "Economic development".12<sup>th</sup> Edition (or latest available).
2. G.M Meier Leading "Issues in Economic Development". 8<sup>th</sup> Edition (or latest available).
3. A.P.Thirlwall "Growth and Development". 9<sup>th</sup> Edition (or latest available).
4. Subarata Ghattak "Development Economics". 4<sup>th</sup> Edition (or latest available).
5. M.L. Jhingan "Development Economics". Latest Edition.





Maj/ECO-307	<b>PUBLIC FINANCE</b>
Semester V	Credit Hours: 3(3-0)

### **Course Objective:-**

- To enable the student to understand the basic role of government in a modern state.
- To facilitate the students with the use of public policy and its tools for the economic development and welfare maximization of the nation..

### **Outcomes:-**

- Students shall have an ability to apply knowledge of macro economics in public policy making
- Students shall have an ability to identify, formulate and solve public sector problems
- Students shall have the ability to critically evaluate the public policy

### **Publi goods**

Public goods defined, efficient provision of public goods, public versus private provision, public versus private production, public goods and public choice,

### **Externalities**

The nature of externalities, private responses, public response to externalities, taxes and subsidies, emission fees and cap-and-trade program

### **Expenditure Program**

Basic trade of, work incentives, work requirements, time limits, family structure

### **Taxes and income distribution**

Tax incidence, partial equilibrium model:

- Unit taxes on commodities
- Ad volrem taxes
- Taxes on factors
- Commodity taxation without competition

- Profit taxes
- Tax incidence and capitalization

General equilibrium models

- Tax equivalence relations
- The Herberger Model

## **Taxation and efficiency**

Excess burden defined, excess burden measurement with demand curves, differential taxation of inputs, Efficient and equitable Taxation Optimal commodity taxation,

- The Ramsey rule
- Equity consideration Optimal user fees Optimal income taxation
- Edgeworth model Politics and time inconsistency problems Other criteria for tax design
- Horizontal equity
- Cost of running the tax system
- Tax evasion

## **Deficit finance**

Interpreting deficit, surplus and debt numbers, the burden of the debt,

- Lerner's view
- An overlapping generation model
- Neoclassical model
- Richardian model

Should we reduce the deficit, hidden deficit and debt

## **To tax or to borrow**

- Benefit received principle
- Intergenerational equity
- Efficiency considerations
- Macroeconomic considerations
- Moral and political considerations

## **Public finance and ideology**

Organic view of the government, mechanistic view of the government, Government at a glance, the legal framework of the government of Pakistan, Expenditures and revenues in Pakistan,

## **Taxation Structure in Pakistan**

Tax system in Pakistan ,elasticity and buoyancy of taxes in Pakistan ,Federalism,  
National Finance Commission Award

## **Books Recommended**

1. Harvey S. Rosen, Public Finance, 7<sup>th</sup> edition, McGraw hill.
2. Joseph E. Stiglitz, Economics of the Public Sector, 3<sup>rd</sup> edition, Norton
3. Musgrave .A.R & Musgrave .P.B . Public finance in Theory and Practice , 5th edition , Tata McGraw.Hill
4. Jonathan Gruber, “Public Finance and Public Policy”, Ed 2<sup>nd</sup> .worth publishers
5. Viqar Ahmed and Rashid Amjad, the Management of Pakistan’s Economy, Oxford University Press 1984.
6. S. Akbar Zaidi, Issues in Pakistan’s Economy, Oxford University Press 1999.
7. Iftikhar Ahmad,usman Mustafa,Muhammad Khalid “National Finance Commission Award A Historical Perspective”.*pide working papers* 2007:33
8. Fiscal policy [www.sbp.org.pk](http://www.sbp.org.pk)
9. Browning &browning .Public Finance And The Price System, 4th edition, Pearson education

Maj/ECO- 309	<b>Statistical inference and Decision Making</b>
Semester V	Credit Hours: 3(3-0)

### **1. Sampling Method and the central limit theorem**

- Sampling the Population, Advantages of sampling, Probability and Non-Probability Sampling Methods, Sampling error, The Central Limit Theorem, Sampling Distribution of Mean with properties, Sampling Distribution of difference between Means with properties.

### **2. Estimation and the confidence intervals**

- Point estimates and confidence intervals, Confidence interval for a known  $\sigma$  or a large sample, Confidence interval for an unknown  $\sigma$  and a small sample, Finite population correction factor, Choosing an appropriate sample size.

### **3. One sample test of hypothesis**

- What is a hypothesis? What is hypothesis testing? Five step procedure for a testing hypothesis. One tailed and two tailed test of significance. Testing of a population mean with a known population standard deviation, Testing of a population mean large sample with an unknown population standard deviation, Testing of a population mean small sample with an unknown population standard deviation, P Value in Hypothesis testing, Type one and type two errors, The power of a test, The significance level.

### **4. Two sample test of hypothesis**

- Testing hypotheses about difference between two population means.
- Comparing populations with small samples, dependent samples.
- Comparing dependent and independent samples.

### **5. Analysis of variance**

- F-distribution, comparing two population variances, ANOVA assumptions, ANOVA Test, Inference about pairs of treatment means, two-way analysis of variance.

### **6. Linear regression and correlation**

- What is correlation analysis, the coefficient of correlation, the coefficient of determination, testing the significance of correlation coefficients, the regression analysis, The standard error of estimate, difference between confidence intervals and prediction intervals, The relationship between the coefficient of determination and the standard error of estimate.

### **7. Multiple Regression and Correlation Analysis**

- Multiple regression analysis, multiple standard error of estimate, Assumptions, Evaluating the regression equation, Analysis of residuals.

## **8. Non-parametric methods Chi Square Applications**

- Goodness of fit test, Equal expected frequencies, Unequal expected frequencies, Limitations of Chi Square, Using the goodness of fit test to test for normality.

## **Recommended Books**

1. Lind, Marchal Wathen. “Basic Statistics for Business and Economics” McGraw Hill, Latest Edition.
2. Sher Muhammad Chaudhry. “Introduction to Statistical Theory” PART 1 & 2. 7<sup>th</sup> edition (or latest available) Ilmi Kitab Khana.
3. Taro Yamane. “Statistics an Introductory Analysis” 2<sup>nd</sup> Edition (or latest available), Harper and Row, New York, Evanston And London And Jhon Weatherhill, Inc, Tokoyo
4. Walpole, R.E. “ Introduction to Statistics” 3rd Edition 7<sup>th</sup> edition (or latest available).Macmillan publishing Co. Inc., New York
5. Spiegel,M.R. “Theory and Problems of Statistics ” Schaums’ Outline Series 2<sup>nd</sup> Edition (or latest available).

Maj/ECO-302	<b>Econometrics-I</b>
Semester VI	Credit Hours 3(3-0)

## **COURSE OBJECTIVES**

This course is designed to develop basic understanding in students about econometrics and provide working knowledge of its basic tools. After completion of this course, students

1. Can apply econometric tools and modeling, estimation, inference and forecasting in the context of real world economic problems.
2. Be capable to apply appropriate estimation techniques under different types of data/model problems
3. Can evaluate critically the results and conclusions of other researchers.
4. Have a foundation and understanding for advance level course in econometrics.

## **COURSE LEARNING OUTCOMES**

On successful completion of this course, students will be able to:

Apply knowledge of regression technique for analyzing economic data.

Interpret and critical to evaluate the outcomes of empirical analysis

Use elementary procedures for model validation in the single equation context.

## **COURSE CONTENTS**

### **1: An Introduction to Econometrics**

Why Study Econometrics?

Methodology of Econometrics

Types of Econometrics

Data types and its sources

### **2. The Classical Linear Regression Model (CLRM)**

Simple Regression function

Population regression function

Linear regression function

Linearity in variables and linearity in parameters

Simple Regression Analysis

Estimation of regression equation using OLS

Statistical properties of OLS estimators (BLUE)  
Classical Linear Regression Model (CLRM) and its assumptions  
Estimation of the coefficient of determination

**3. The Multiple Linear Regression Model (MLRM)**

Multiple Regression Analysis  
Difference between simple and multiple regression analysis  
OLS estimation of multiple regression equation  
Properties of OLS estimators  
Coefficient of determination ( $R^2$ ) and Adjusted  $R^2$   
Testing the significance of Regression coefficients (t-test)  
Testing the overall significance (F-test) of the model

**4. Matrix Approach of the Classical Linear Regression Model:**

The multiple regression (K-variable) model in matrix format  
The Least-Squares estimation procedure in matrix notation  
Interpretation of the Beta coefficients ( $\beta_1, \beta_2, \beta_k$ )  
Hypothesis testing using matrix approach  
Coefficient of determination  
 $R^2$  in matrix notations

**5. Econometric Modeling: Model Specification:**

Model selection criteria  
Types of specification errors  
Consequences of model specification errors  
Tests of specification errors  
Errors of measurement  
Model selection criteria  
Endogeneity and nature of Endogeneity



OLS estimation in presence of Endogeneity  
Detection of Endogeneity  
BLUE estimators in the presence of Endogeneity  
Consequences of Endogeneity in OLS estimation  
Remedial measures.

**6. Deviation from the Classical Assumptions:**

Assumptions of the classical model and economic reality  
Relaxation of the assumptions and estimation issues  
Brief introduction to the nature of problems and alternatives.

**(i) Multicollinearity**

Nature and severity of the problem  
OLS estimation of regression equation in the presence of perfect multicollinearity  
Causes of multicollinearity  
Distinction between perfect and partial multicollinearity  
Detection and remedial measures.

**(ii) Heteroscedasticity**

The nature of the problem with reference to economic theory  
Cross-section data and the problem of non-constant variances  
Consequences for OLS estimators  
Detection and remedial measures  
Introduction to the Generalized Least-Squares model (GLS).

**(iii) Autocorrelation**

Autocorrelation and its causes  
Time-series data and emergence of the problem with reference to economic theory  
Serial correlation  
Consequences of autocorrelation for OLS estimators  
Detection and remedial measures

## TEXTS AND REFERENCE BOOKS

1. Dougherty, C. *Introduction to Econometrics*, Oxford University Press.
2. Gujarati, D. N. *Basic Econometrics*, McGraw-Hill Company.
3. Hill, R.C., Griffiths, W.E. and C. Lim, G.C. *Principles of Econometrics*, John Wiley, New York.
4. Stock H. J. and M. W. Watson. *Introduction to Econometrics*, Pearson Education.
5. Wooldridge, J. M. *Introductory Econometrics: A Modern Approach*, South-Western College.

Maj/ECO-304	<b>International Trade Theory</b>
Semester-VI	Credit Hours 3(3-0)

### Course Objectives

- To equip students with elementary concept of international trade theories.
- To provide strong foundation in international economics to deal with changing global scenario.

### Learning Outcomes

- After the completion of this course students will be able to identify, formulate and solve practical economics problems relating to international trade.
- Students will be able to recommend policy option in foreign trade with refers to international scenario

### Course Outline

#### 1. International Trade Theories

- Mercantilist view / absolute advantage theory
- Comparative advantage theory
- Opportunity cost theory (Increasing, decreasing and constant case)

#### 2. Determination of relative commodity prices

- Partial equilibrium analysis
- General equilibrium analysis

#### 3. Heckscher – Ohlin model

#### 4. Relaxing Assumption of H.O Model and new Trade Theories

- Demand Reversal
- Factor Intensity reversal
- Specific Factor Model
- Imperfect competition and international Trade
- Technological gap theory / product cycle theory
- Economies of scale and international trade
- Cost of transportation and international trade

#### 5. International trade & economic growth

#### 6. Tariff, Quota and WTO

Tariff and Small Country: Effects of Tariff, Price and Demand for Imports, Welfare impacts. Impacts of Tariff on Government Revenue, T.O.T Production and Welfare. Impact of Tariff

on Domestic and World Welfare. The Optimal Tariff. Tariff and Distribution of Income. Brief Introduction of Tariff and WTO Laws, Tariff and Second Best Choice, Subsidies and Quota, Voluntary Quota, Growth with Protection vs. Free Trade Gains and WTO.

### **Recommended Books**

1. Dominick Salvatore, International Economics, 9<sup>th</sup> edition
2. Apple Yard, Cobb, Field, “International Economics”, 5<sup>th</sup> Edition
3. Jame C. Ingram, International Economics, 2<sup>nd</sup> Edition
4. Robert C. Feenstra, Advanced International Trade

Maj/ECO-306	<b>Environmental and Natural Resource Economics</b>
Semester-VI	Credit Hour 3(3-0)

### **Course Objective:**

The objective of the course is to look at environmental issues from an economic perspective and to provide an overview of the economic tools that are used to address environmental problems.

### **Course Contents**

#### **Introduction**

- What is environmental economics; review of microeconomics and welfare economics

#### **1. Limitation of Market**

- Excludable and rival goods, common pool resources and public goods

#### **2. The Theory of Externalities**

- Pareto optimality and market failure in the presence of externalities; property rights and the Coase theorem

#### **3. Valuing the Environment: Methods**

- Introduction: theoretical aspects, Economic valuation of the environment: methodologies and Applications

#### **4. Benefit–Cost Analysis and Other Decision-Making Metrics**

- Framework of BCA and its applications, Divergence of Social and Private Discount Rates, Cost-Effectiveness Analysis, Impact Analysis

#### **5. The Design and Implementation of Environmental Policy**

- Overview; Pigouvian taxes and effluent fees; tradable permits; choice between taxes and quotas under uncertainty; selection of environmental policy instruments; implementation of environmental policy

#### **6. International Environmental Problems**

- Trans-boundary environmental problems; global pollution; economic significance of biodiversity; economics of climate change; trade and environment

#### **7. Measuring the Benefits of Environmental Improvements**

- Non-Market values and measurement methods; risk assessment and perception

#### **8. Contemporary Issues in Environmental Economics with Reference to Pakistan**

- Energy crisis, Water footprints, Forests, Fisheries, Economics of Pollution

## 9. Sustainable Development

- Concepts; Sustainability of Development, The Growth–Development Relationship measurement (conventional and alternative)

### Recommended Books

- Tom Tietenberg and Lynne Lewis Environmental & Natural Resource Economics Pearson Education, Inc., 9th Edition 2012
- Charles Kolstad, Intermediate Environmental Economics, Oxford University Press, 2nd edition, 2010.
- Robert N. Stavins (ed.), Economics of the Environment: Selected Readings, W.W. Norton, 5th edition, 2005.
- Roger Perman, Yue Ma, James McGilvray and Michael Common, Natural Resource and Environmental Economics, Pearson Education/Addison Wesley, 3rd edition, 2003.
- Ian Wills, Economics and Environment; A signaling and incentive approach, 2nd edition, 2007.
- Freeman, A M, *The measurement of Environment and resource Values; Theory and Methods*, resource for the future, 2nd edition, 2003.
- Thomas Sterner, *Policy Instruments for Environmental and Natural Resource Management*, Resource for the future, 2003.
- Haab, T C and McConnell, K E, “*Valuing Environmental and Natural Resources; The Econometrics of Non-Market Valuation*”, Edward Elgar Publishing Ltd, 2002.

Maj/ECO-310	<b>Managerial Economics</b>
Semester VI	Credit Hours3(3-0)

## **Course Contents**

### **Introduction**

- Definition and scope of Managerial Economics
- Theory of Firm
  - Functions and objectives of Firm and Industry.
  - Critical analysis of Firms, objectives of profit maximization.

### **Managerial theories of Firm**

- Williamson's theory.
- Marris' theory.
- Boumal's sales maximization model.

### **Demand analysis**

- Demand Sensitivity Analysis:
  - Price elasticity, income elasticity, cross elasticity of demand and additional demand elasticity concepts
  - Determinants of Price Elasticity of Demand
  - Implications/Uses of the Elasticity in Business Decisions
- Demand Estimation
  - Survey methods.
  - Market studies and experiments.
  - Regression Analysis
- Demand Forecasting
  - What is economic forecasting?
  - Qualitative Analysis
  - Econometric Methods

### **Production Analysis and Estimation**

- Production functions and related projections.
- Law of Diminishing Returns to a Factor
- Input Combination Choice
- Roles of Revenue and Cost in Production
- Illustration of Optimal Levels of Multiple Inputs
- Returns to Scale

- Production Function Estimation
- Productivity Measurement

### **Cost Analysis and Estimation**

- Types of costs.
- Short Run and Long Run Costs Curves
- Minimum Efficient Scale
- Firm Size and Plant Size
- Learning Curves
- Economies of Scope
- Cost Volume Profit Analysis

### **Pricing Strategies and Practices**

- Full-cost pricing.
- Multiple Product Pricing
- Pricing in Life-Cycle of a Product
- Pricing in Relation to Established Products
- Peak Load Pricing

### **Capital budgeting**

- What is Capital Budgeting?
- Project Classification Types
- Steps in Capital Budgeting
- Capital Budgeting Decisions Rules
- Cost of Capital.
- Optimal Capital Budget

### **Recommended Books**

1. Douglas, E.J., Managerial Economics, Prentice Hall, (Latest Edition).
2. Salvatore, D. Managerial Economics, McGraw Hill, (Latest Edition).
3. Pappas, James, Brigham Eugene F and Hirschey Mark., (Latest Edition), Managerial Economics, Dryden Press, Chicago.
4. Hirschey, M. Managerial Economics, (Latest Edition) U.S.A Thomson South-Western.
5. Baye, Michael R. *Managerial Economics and Business Strategy*. (Latest Edition) McGraw-Hill Irwin.



Maj/ECO-312	<b>Research Methodology</b>
Semester-VII	Credit Hours3(3-0)

### Course Objective

The objective of this course is to:

- Provide the students a good understanding of basic concepts, lines and methods of research.
- Explain the relevance of these basic concepts with the research world.

### Learning Outcomes

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

- Understand the theoretical and methodological backgrounds of research.
- Conduct the higher-level research.
- Practically apply the all theories through the understanding of basics of research and methodologies.

### Course Outline

- Defining research, the research process: characteristics and requirements, types of research from application perspective, objectives perspective and mode of inquiry perspective.
- The research process: Attributes of a good research, Steps involved in scientific research.
- Identification of broad topic area, Turning research idea into research project.
- Literature review, how to conduct a systematic review, searching for literature, Evaluating the literature, Write the literature review, APA citation format, The research proposal
- The research process: theoretical framework and hypothesis development, The need for a theoretical framework and its components, Variables and its types, Hypothesis development: definition, statement of hypothesis, Directional and non-directional hypotheses, Null and alternate hypothesis.
- The elements of research design: The purpose of study: exploratory, descriptive, hypothesis testing, Types of investigation: casual vs. Correlational study settings: contrived and no contrived.
- Unit of analysis: individuals, dyads, groups, organizations, cultures; time horizon of studies.
- Measurement of variables: Operational definition; how variables are measured, Operationalization of variables, operationalization: dimensions and elements using example of achievement motivation.
- Scale of measurement: scales; nominal scale, interval scale, ratio scale.

- Collection of Data: Primary sources of data, Secondary sources of data, Data collection methods. Interviewing, unstructured and structured interviews, training interviews, face-to-face interview, the questioning technique. Questionnaire: personally, administered and mailed, open ended versus closed ended questions, sample design and procedures. Guidelines for questionnaire design, type and form of questions, general appearance or setup of the questionnaire.
- Analysis of data: Developing the field for the data, Coding and data entry, code book construction, data transformation.
- Sampling: population, element, sample, sampling unit, subject; reasons for sampling, the sampling process, probability sampling, non-probability sampling.
- Research report: written report and its purpose, audience of written report, characteristics of report, Contents of the research report, the oral presentation of the report.

### **Recommended Books**

1. Neuman, W.L. "Social research methods", McGraw Hills.
2. Baker, T.L. "Doing Social research", McGraw Hills.
3. Cooper, Donald R. "Business Research Methods", McGraw Hills.
4. Sekaran, Uma. "Research Methods for Business", John Wiley & Sons.
5. Kumar, R. "Research Methodology: a step-by-step guide for beginners", Sage publication
6. Etheridge Don E. *Research Methodology in Applied Economics: Organizing, planning and Conducting Economic Research*, 2<sup>nd</sup> Edition. Blackwell Publishing.

Maj/ECO-401	<b>ECONOMETRICS –II</b>
Semester-VII	Credit Hours3(3-0)

### **Course Objectives**

The main aims of the course are to

- Provide a base of understanding for students when conducting econometric research, as well as understanding applied econometric results.

### **Learning Outcomes**

By the end of this course, it is expected that the student will:

- Understand the problem relating to simultaneous equation models.
- Have basic concept of time series and pooled or panel data related techniques.

### **Course contents**

#### **Regression with Qualitative Explanatory Variables**

- Regression with Single Qualitative Explanatory Variable
- Regression with multiple Qualitative Explanatory Variables
- Regression with both Quantitative and Qualitative Explanatory variables
- Testing for Structural Change

#### **1. Simultaneous equation models**

- Types of simultaneous equation system, the identification problem, simultaneous equation model: ILS, 2SLS, 3SLS.

#### **2. Time-series Econometrics**

- Stationary and non-stationary time series: Introduction, tests of stationarity, graphical analysis, unit root test (Dickey -fuller and augmented Dickey-fuller test)
- The phenomenon of spurious regression
- Transforming non stationary time series to stationary time series.
- Co-integration: co-integrating regression, test for co-integration (Engle-Granger test and co-integration regression Durbin Watson test)

#### **3. Dynamic Econometric Model**

- Autoregressive and Distributive lag Models
- The Granger Causality Test and VAR model

#### **4. Panel data Regression Models**

- Why Panel data
- Estimation of Panel data Regression Models: Fixed effect and Random effect model.

#### **Recommended Books**

1. Gujarati, D.N. (2009), Basic Econometrics, McGraw-Hill.
2. Asteriou, Dimitrios & Hall G. Stephen (2011), Applied Econometrics, Palgrave Macmillan.
3. Gujarati by Example, 1<sup>st</sup> edition..
4. Johnston, J. and DiNardo, J. (1997), Econometric methods, New York: McGraw-Hill.
5. Koutsoyiannis, A. (1997) Theory of Econometrics, Macmillan.
6. Pindyck, R.S., and Rubinfeld, D.L. (1998), Econometric Methods and Economic Forecast, McGraw-Hill.

Maj/ECO-403	<b>INTERNATIONAL FINANCE</b>
Semester-VII	Credit Hours3(3-0)

### **COURSE OBJECTIVES:**

This course examines and analyzes important and related macroeconomics issues in open economies. The objectives of the course are

1. To understand three important and related macroeconomics issues: exchange rates, capital flows and balance of payments
2. To introduce and critically evaluate the main relevant economic theories, models and empirical works in the key areas of International Finance
3. To apply these analytical tools to build an understanding of relevant economic developments and policy issues in the preface of global economy.

### **COURSE CONTENTS:**

1. Introduction to international finance concepts: balance of payments, foreign exchange rate and market, arbitrage, hedging, foreign bonds, Euro-bonds, speculation, etc.
2. Description of balance of payments and its various accounts; current, capital and official reserve accounts
3. Illustration of foreign exchange markets: spot and forward markets, forward premium and discount
4. Interest arbitrage and efficiency of foreign exchange markets: covered & uncovered interest arbitrage, Covered interest arbitrage parity line & margin.
5. Theories of exchange rate/balance of payments determination: modern theories (Purchasing Power Parity, monetary approach to BOP, Portfolio balance model).
6. Traditional theories of BOP: price adjustment mechanism (elasticity approach to BOP) and income adjustment mechanism (Absorption approach to BOP).
7. Adjustment policies in open economy to remove internal & external disequilibrium: Swan model, Mundell-Fleming model (perfect and imperfect capital mobility) and policy and price changes.
8. Prices and output in an open economy: aggregate demand and aggregate supply model under fixed exchange rate and flexible exchange rate systems.
9. Economic Shocks (real & nominal) and aggregate demand in open economy in long run
10. Role of fiscal and monetary policies in aggregate demand in open economy.
11. Role of macroeconomic policies to stimulate growth and adjust to supply shocks in open economy.
12. Introduction to European Monetary System (1979-1998), Exchange rates bands: adjustable pegs, crawling pegs and managed floating

**TEXT AND REFERENCE BOOKS:**

1. Salvatore, D. *International Economics*, Wiley.
2. Suranovic, S. S. *International Finance: Theory and Policy*, Saylor Foundation.
3. Madura, J. *International Financial Management*, Cengage Learning

Maj/ECO-405	<b>Applied Economics</b>
Semester-VII	3(2-1)

## Course Contents

### SPSS:

- **Introduction to SPSS for Windows**
- Using SPSS for windows
- Menus, Toolbars, Status Bar, Dialog Boxes,
- Specifying Data
- Using Point and Click Method, Getting Help
- Data Files: Creating a New Data File, Opening
- and Saving Data, Data Editor
- **Output**
- One-Variable Descriptive Statistics
- Two Variable Descriptive Statistics
- Linear Regression
- Non-Linear Regression
- Correlation
- T-TEST (Independent and Paired)
- ANOVA F-Test
- Chi-square test
- **Working with Output**
- Output files, output navigator, editing Output,
- Using SPSS output in other Applications

### Create and Modify Chart in SPSS

### E-views:

- Introduction to Eviews
- Making work file, copy pasting data
- Generating variables
- Differences, lags and logs
- Descriptive Statistics
- Correlation
- Linear Regression
- Testing for Multicollinearity
- Testing for Heteroscedasticity
- Testing for Autocorrelation
- Dummy Variables
- ARDL

### Books:

1. Kirkpatrick Lee A, Feeney Brooke. "A Simple Guide to SPSS for Windows."

2. Lind, Marchal, Mason “Statistical techniques in Business & Economics” 11<sup>th</sup> edition, McGraw-Hill Irwin.

**Assessment Criteria:** 25% Term Paper+25% Practical + 45% Theory+5% attendance

Maj/ECO-402	<b>Monetary Economics</b>
Semester-VIII	Credit Hours3(3-0)

### **Course Objective:**

The objective of this course is to

1. Provide the students a good understanding of principles of monetary economics.
2. Explain its relevance & importance to the students in real world.

### **Learning Outcomes:**

After completing the course the student shall be able to:-

1. Describe the development of monetary mechanism, functions of money, & the role of banking system in the creation of money.
2. Explain the relationship between the money supply growth & inflation.
3. Understand and interpret the main objective and tools of monetary policy & the rational for the various policies used to achieve these objectives & also to maintain economic stability

### **Module Title:-**

#### **1- Introduction and Development of Monetary Mechanism**

Evolution of Money and payment system, definition of money, function of money & measurement of Money, Demand for Money & Supply of Money, Definitions of Money, M1, M2, M3.

#### **2- Monetary Base and Process of Money supply:**

Economics and Mathematics of Deposit Creation. Multiple expansion and contraction of bank deposits. The Monetary Base and Multiplier Framework. Factors Producing changes in monetary base. Derivation, Application and Determinants of Money Multiples.

#### **3- Demand for Money:-**



Quantity Theory of Money, Transaction Theories of Demand for Money. Portfolio Theories of Demand for Money. Baumel-Tobin Model of Cash Management. Friedman's Restatement of Quantity Theory of Money. Empirical Evidence on the Demand for Money.

**4- Behavior of Interest Rates**

Determination of Interest Rates. Money Demand and Money Supply Interaction. Loan-able Funds Framework. Supply & Demand in Bonds Market. Changes in Interest Rates.

**5- Targets and Instruments of Monetary Policy**

Ultimate Targets of Monetary Policy. Intermediate Targets of Monetary Policy. Selection of Intermediate Targets. Alternative Instruments of Monetary Policy and their Economic Implications. Open Market Operations Discount Window Policy. Reserve Requirement Policy. Rules Vs Discretion.

**6- Different Points of Views on Role of Monetary Policy:**

Transmission Mechanisms and Policy Views in Classical Keynesian and Monetarists' Model, Wealth Effects.

**Recommended Books:**

1. Bennett T. McCallum (1989), Monetary Economics, Theory and Policy.
2. Fredric S. Mishkin (1995). Financial Markets and Money Harper & Row Publishers.
3. Laidler D. "The Demand for Money"
4. Dennis, GEJ, "Monetary Economics"
5. Mishkin, Frederics, "The Economics of Money, Banking and Financial Markets".
6. Patinkin Don, "Money, Interest and Prices" (Latest Edition).

Maj/ECO-404	<b>Labor Economics</b>
Semester-VIII	Credit Hours3(3-0)

## Course Content

- 1. Importance of Labor Economics:**  
Overview of labor economics, Industrialization and emergence of labor economics.
- 2. Tools to Analyze the Labor Market and its Conditions:**  
Overview of labor issues in developing and developed world.
- 3. Theories of Labor Movement:**  
Contribution of Marx, Role of trade unions in Pakistan, Labor legislation and policies in Pakistan, Critical evaluation of child labor in Pakistan.
- 4. Labor Market Analysis - Supply of Labor:**  
Labor force participation, Determinants of labor supply, Backward bending supply curve of labor, Dynamic and Static Analysis, Concept of Human Capital, Human capital investment, wages, training and productivity
- 5. Labor Market Analysis - Demand for Labor:**  
Production function, Determination of wages and marginal productivity, Models of Perfect and Imperfect Competition, Short run and long run demand for labor, Labor Market Equilibrium
- 6. Unemployment and Benefits of Income Support:**  
Defining full employment, Sources of unemployment, Unemployment and social protection, Efficiency wages.
- 7. Labor Mobility and Migration:**  
Reasons and impacts, The Roy Model
- 8. Labor Market Discrimination:**  
Gender, race and ethnicity discrimination in labor market, Gender-wage differentials

## Recommended Readings:

1. G. Borjas, Labor Economics, latest edition, McGraw-Hill.
2. McConnell et al., Contemporary Labor Economics, latest edition, McGraw-

- Hill.
3. Smith, S. Labour Economics, latest edition, Routledge Publishers.
  4. R. Ehrenberg and R. Smith. *Modern Labor Economics*, (latest edition), Addison Wesley.

Maj/ECO-406	<b>Agriculture Economics</b>	Credit Hour 3(3-0)
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## **Course Contents**

### **Introduction and Importance of Agriculture**

Agricultural Revolution, Importance of Agriculture, Food Safety, Agriculture vs. Industrial development Debate. Current State of Agricultural Development. Brief Overview of Sources of Growth. Introduction to issues in Agriculture etc.

- **Structure and Characteristics of Agriculture in LDCs**

Traditional Agriculture and Productivity. Access to non-labor resources. The Framing Environment: Natural Hazards and Economic Uncertainties. The Food problem. Farm Size and Productivity. Farm Size in Pakistan and Productivity Commercial Farms. Impact of Agricultural Reforms on Farm Size.

- **Role of Agriculture in Economic Development**

A framework of Analysis. Product Contribution, Market Contribution, Factor's Contribution. Foreign Exchange Contribution. Agriculture vs. Industry Debate of Development.

- **Theory of Rent and the Concept of 'Surplus'**

Introduction. Economic Rent. The Theory of Rent. Rent and Quasi-Rent

The Ricardian 'Corn Rent. The Rental Market. Agricultural Surplus. Characteristics of Landownership in Underdeveloped Agriculture and Pakistan. The Theory of Share Tenancy. Some Extensions of the Share Tenancy Model.

Tenant's Status in Pakistan. Agricultural productivity in Pakistan and use of inputs.

- **Agriculture in Dualistic Development Models**

Introduction. The Lewis Model. The Ranis-Fei (FR) Model. The Jorgenson Model. Kelley, Williamson, Cheetham Model.

Criticism: Dual Economy Models. Agricultural Adequacy; Mellor's Model.

- **Resource Use Efficiency and Technical Change in Peasant Agriculture.**

Efficiency of Resource Utilization. Technological Change in Agriculture.

Generation of new Agricultural Technology. Factor-biased Technological Change and its Distributional Consequences. Agricultural Technical Change and Agricultural Employment: Empirical Evidences. Agricultural Resources and Technical Change in LDCs: with Special Reference to Pakistan.

- **Supply Response**

Introduction. The Cobweb Model: An Illustration. Price-Supply Response in Backward Agriculture. A simple Supply Response Model.

Supply Response in the Underdeveloped Agricultural labour Market, Specifically in Pakistan. The Concept of 'Marketed Surplus': Some Methods of Estimation.

Some Criticisms of Krishna's Method and the Alternative Approach of Behrman Perennial Crops and Marketed Surplus in Pakistan. Green Revolution in Pakistan and Responses. Present Status of Green Revolution in Pakistan: Empirical Analysis.

- **Population and Food Supplies**

The Classical Model. Contra-Malthusian Model. Ecological Disequilibrium.

Synthesis of Population and Food Supply Theories. Malnutrition in Developing Countries like Pakistan and Remedial Manners.

Choice of Planning Strategy for Agriculture Development, Agricultural Project Planning.

### **Recommended Books**

- Ghatak S., and Ingersent K., Agriculture and Economic Development, (Latest Edition), Harvester Press.
- Johnston, Bruce, F & Fellir Kily. Agricultural and Structural Transformation, Economic Strategies in late Developing Countries.
- Khan Mahmood-ul-Hassan. The Economics of Green Revolution in Pakistan, New York, Published 1975.
- Karamat, A., Political Economy of Rural Development in Pakistan, Lahore Vanguard Book House, 1981.
- Shafi M., (1995), Pricing of Farm Produce in Pakistan, Objectives, Practices, and Experiences. Print Associates International, Islamabad.
- Thorbake Erike. The Role of Agriculture in Economic Development, New York, Columbia University Press (1971).

- Upton Marlin, Agricultural Production and Resource Use.
- Colman D. and Young T., Principals of Agricultural Economics, Markets and Prices in Less Developed Countries, (1989), Cambridge University Press.
- Yujiro Hayami and Vernon W. Ruttan, Agricultural Development, John Hopkin University Press, London. (Latest edition).

### **Optional Courses**

EC/ECO-409	<b>HEALTH ECONOMICS</b>
Semester	Credit Hour 3(3-0)

### **Course Objectives**

This course is an introduction for advanced economics students to Contemporary theoretical analysis of, empirical evidence on and policy debate about: What and who produces health, how it is produced, variations in its production, and consequences of its production or lack of production.

### **Course Contents**

#### **1. Introduction**

The particular problems of health and the economics of health: great uncertainty, great irreversibility, major ethical/equity concerns throughout time, the near-impossibility of separating production from distribution. Are there parallels?

#### **2. Studies of the Production of Health**

What makes individuals and populations healthier or unhealthier? Life expectancy mortality, morbidity and X-Adjusted Life. The distinction between the production of health and the production of health care also a distinction between the production of health and the production of utility

#### **3. The Fundamental Microeconomics of Health Care**

Is health care really different from other commodities? Is this market failure irreparable, and what does it imply for market versus social or state provision of health care? Have we learnt more since Arrow's basic insights? Health care insurance as a special sub-topic of insurance. The health care market: Supply, demand, industrial organization. Health care as a part of public economics. Why health care is almost everywhere a topic for public economics. The alternate private/public mix which has been developed in different countries. What is happening in Russia? What could happen? How should health care systems be compared? Cost-effectiveness and the role of the economist in the health sector: an introduction. (Students interested in further applications can find them in Cost-Benefit Analysis). Measuring Health: Adjusted Life Years: QALYs, DALYS, and life years. How far have we

come? Can we really measure cost-effectiveness? Can we produce a single objective function? The debate over WHO rankings. How health and health care has changed in the last century, the last two decades, the last year: an international overview. Demographers' measures, particularly life expectancy. What has happened to Russian mortality in the last century, the last two decades, the last few years?

Trying to quantify health care: QALYs, DALYs and WHO rankings. How is it done? What should we do now? What is the research agenda? Problems of Health Care Insurance in theory. Alternate forms of health care provision in the world, and recent changes. Trade-offs in "American" versus "European" systems. Is Health care really different from all other commodities? Are there even partial cures for problems such as the agency problem? How much is inherent, how much is inbuilt institutionally?

#### **4. Demand for Health Services**

Theory of Demand for Health Services, Total Utility and Marginal Utility Curves for Health Services, Demand Curves for Health Services, Health Insurance and Demand for Health Services

#### **5. The Pharmaceutical Market**

Structure and Regulation of the Pharmaceutical Industry, Conduct of the Pharmaceutical Industry, Performance of the Pharmaceutical Industry, Research/Development and Innovation

#### **6. The Future of Health Care Reform in Pakistan**

In Pakistan: Paradigm Shift: From Providing Health Care to Producing Health, Regionalization of Health Care Services, greater responsiveness to local meaningful local community, Elimination of Structural Fragmentation, Establishing Functional Specificity, Public-Private Partnership, Healthy Public Policy, Engendering the Health Care System, Good Governance, Freedom and Development

### **Recommended Books**

- The Economics of Health is one of the newest fields to have its own North-Holland 2-Volume Handbook, and remains somewhat unstandardized, with major variations in subject matter between countries and departments.
- Bootman JL, Townsend RJ, McGhan WF. (2005). *Principles Pharmacoeconomics*. Harvey Whitney Books, Cincinnati.
- Drummond MF, O'Brien BJ, Stoddart GL, Torrance GW (1998). *Methods for the Economic Evaluation of Health Care Programmes*. 2<sup>nd</sup> edition, Oxford University Press, Oxford.
- Duckett SJ (2004). *The Australian Health Care System*. Oxford University Press, Oxford.
- Gold MR, Siegel JE, Russell LB, Weinstein MC (1996). *Cost-Effectiveness in Health and Medicine*. Oxford University Press, Oxford.

- Petitti DB (2000). *Meta-Analysis, Decision Analysis, and Cost-Effectiveness Analysis: Methods for Quantitative Synthesis in Medicine*, 2nd edition. Oxford University Press, Oxford.
- Rychlik R (2002). *Strategies in Pharmacoeconomics and Outcomes Research*. The Haworth Press, New York.
- Vogenburg, FR (2001). *Introduction to applied pharmacoeconomics* McGraw Hill, New York.
- Zweifel and Breyer, *Economics of Health*, North Holland

EC/ECO-411	<b>Comparative Economic System</b>
Semester	Credit Hour 3(3-0)

### **Course Objectives**

This course is designed as an introduction and review of the major questions and analytical approaches concerning how market-oriented, mixed, centrally planned and developing economic systems are organized to obtain major economic and social goals such as economic growth, security, price stability, an equitable income distribution and enhanced quality of life. This course will examine the interrelationships between the political system of a country, its economic system, and the historical development of both. This course will include several case studies of selected national economies.

### **Course Contents**

- **Evaluation of Economic Systems**

Classification of Economic Systems, Historical Development Criteria for Evaluation of an Economic System, Basic Differences between Economic Systems.

- **Capitalism**

Definition, Historical Development, Pre-Requisites of Capitalism, Competitive and Monopoly Capitalism, Economic Institutions of Capitalism. Distinction between private and Public Property and Production, Price Systems, Profit Maximization/Cost Minimization and Competition. Economic Decision Making under Capitalism. Evaluation of Capitalism in USA and Europe Capitalism, Market System and Environmental Problems.

- **Communism and Socialism**

Meaning and Nature, Communism and Power to the Centre. Concepts of Ownership and Production. Various types of Communism, Marxism, Socialism, Economic Planning and Decision Making. Achievements and Failures, Communism / Socialism in USSR, China and Other parts of the World. Modern Trend and its failure, Convergence of Capitalism and Socialism. Present Status of Socialism

- **Economic System of Islam**

Distinctive Features, Basic Economic Values of Islam. Economic Institutions and their Role, Property Rights, Production and Distribution System. The Concept of Welfare State. Comparative Analysis: Islamic System, Capitalism and Communism

- **Economics of the Developing World**

**The Americas:** The Western Hemisphere: An Introduction, The United States: The Service Economy Latin America: The Jaguars Awaken.



**Western Europe:** The European Economy: The United Kingdom: Declining Capitalism, Germany: Unifying the Social Market Economy, France: Planning in the Market Economy, Sweden: Whither the Welfare State?

**Central Eurasia:** Central Eurasia and Eastern Europe: History and Overview, The Political Economy of Soviet-Style Central Planning, Central Eurasia: Socialist Economic Reform, Central Eurasia: Making Markets

**Asia and Africa:** Asia and the Pacific Area: An Overview, Japan: Rebuilding after the Bubble, China: The Continuing Revolution, Africa: The Challenge of Development

### **Economic System in Pakistan**

Brief Economic History of Pakistan. The Mixed Economy, Nationalization and its Impacts. Operations under Mixed Economy, Privatization and Liberalization in the 1990's and 2000's. Islamisation in Pakistan: Process and Problem, Achievements and Experience. Islamic Economics as Global System of Equity and Welfare

### **Recommended Books**

- Capitalism, Socialism and Islam by Syed A. AlaMaududi, Islamic Book Publisher, Lahore.
- Comparative Economic System by William, Louks and William G. Whitney (latest edition).
- Comparative Economic System by Stephen Gardener (latest edition).
- Comparative Economic Systems by Martin C. Schnetzraund James W. Hordyke (1997).
- Economic System of Islam by M. Omer Chapra.
- Islam or Socialism by Wilicaynaki.
- Comparative Economic Systems by Gregory, Stuart, Houghton Mifflin Company, Boston (1985)

EC/ECO-413	<b>Population Economics</b>
Semester	Credit Hour 3(3-0)

### **Course Description:**

This course familiarize the students with the basic concepts of demography. The course aims to establish initial understanding of the important demographic issues for instance, demographic processes, demographics theories, population characteristics, methods of demographic analysis, and the demographic transitions. In the latter part of the course the focus will be on the issues such as urbanization, family change, population aging, and health related issues.

### **Course Objectives:**

1. To provide the initial exposure of the important demographic issues.
2. To enable the students to establish the linkages between economic and demographic factors.

### **Course Learning Outcomes:**

Upon Successful Completion, the Students Should be able to:

UNDERSTAND the importance of demography

IDENTIFY the factors related to population policies

Acquire KNOWLEDGE of the population dynamics of Pakistan.

### **Course Contents:**

#### **1. Introduction**

Understanding Demography

Importance of Demography

Sources of Demographic Data

Processes of Demography

#### **2. Theories of Population**

Mercantilist Perspective

Malthusian Theory of Population

The Marxist Perspective

John Stuart Mill

Lujo Brentano's Theory

Emile Durkheim's Perspective  
The Theory of Demographic Transition  
Theory of Relative Income

**3. Fertility**

Understanding the Concept  
Measuring Fertility  
Period Measures of Fertility  
Cohort Measures of Fertility  
Fertility Trends  
Fertility & Population Growth in Pakistan

**4. Mortality**

Components of Mortality  
Measuring Mortality  
Differentials in Mortality  
Estimates of Mortality in Pakistan

**5. Migration**

Definition & Measurement  
Causes of Migration  
Internal Vs International Migration  
Individual & Social Consequences of Migration  
Migration Trends in Pakistan: Causes & Consequences

**6. Population Composition: Age & Sex Composition**

Measuring the Age Composition  
Measuring the Sex Composition  
Impact of Population Processes on the Age Composition  
Impact of Age Composition on Population Processes  
The Dynamics of Age/Sex Compositions; Age-Stratification Theory

**7. Population Growth & Ageing**

Demographic Composition of the Elderly

Dynamic Scenarios, Biological & Social Aspects of Aging

Implications for the Society

**8. Urbanization**

Demographic Components of Urbanization

Internal Rural-to-Urban Migration

Impact of Population Processes and Urbanization in Pakistan

**9. Population Policy**

Need of Population Policy

Influencing Population Processes

Case Studies of Pakistan

**RECOMMENDED BOOKS:**

1. Weeks J. R, Population. An Introduction to Concepts and Issues(latest edition). Wadsworth Publishing Company, USA.
2. Poston D. L.& L. F. Bouvier. Population and Society: An Introduction toDemography, (latest edition), Cambridge University Press, UK.

EC/ECO-415	<b>Industrial Economics</b>
Semester	Credit Hour 3(3-0)

### **Course Objectives**

The course analyzes the problems of the real economy that cannot be described within the framework of a classical economic theory that is taught by traditional micro- and macroeconomics. This course will cover all the three main fields of industrial organization theory: the theory of a firm, the theory of imperfect competition, and the theory of economic regulation. The students are presumed to be familiar with the standard courses in micro- and macroeconomics at the graduate level.

### **Course Contents**

- **Theory of a Firm**

What is the firm and why is it organized? A firm as an alternative to a market. Transaction costs theory explaining appearance of firms. Production scale, specialization level and advantages of firms as a means of production. Hierarchical firm structure and its efficiency. Optimal size of a firm (of a number of hierarchical levels). Hierarchical firm structure under oligopoly.

- **Economic Theory of Bundling**

Bundling as a marketing tactics. Price discrimination and bundling. Heterogeneous consumers. Pure components strategy, pure bundling strategy, and mixed bundling strategy. Superiority of mixed bundling relative to pure bundling. Conditions for mixed bundling strategy to be dominant over pure components strategy. Independent distribution of reservation prices. Homogeneous consumers. Commodity bundling and consumer surplus.

- **Mergers and Acquisitions**

- **Horizontal Mergers and Acquisitions**

Types of mergers and acquisitions: horizontal, vertical, conglomerates. Examples of mergers and acquisitions within the last decade. Mergers of firms with identical production costs. Condition of merger profitability. Mergers of firms with differing production costs. Reaction of a firm to a change in output by all other firms on the same market. Condition of industry output increase, resulting from a merger.

Horizontal mergers and public welfare. Herfindal-Hirshman index as a measure of public welfare. Condition under which horizontal merger results in higher public welfare.

- **Vertical Mergers**

Effect of a vertical merger on output of final and intermediate products. Vertical mergers and market foreclosure. Vertical mergers and profits of integrated and unintegrated firms.

- **Product Differentiation**

- **Location Models**

Linear city, linear transportation costs. Quadratic transportation costs. Stability of equilibrium states. Circular city. Welfare implications.

- **Differentiated Goods, Increasing Returns to Scale, and Monopolistic Competition**

Markets for differentiated goods. The problems solved by consumers and producers. Market equilibrium under free entry conditions. Effects of fixed costs and market size on product diversity and output.

- **Industrial Agglomeration**

Phenomenon of industrial agglomeration. Increasing returns to scale as a driving force of agglomeration. External and internal mechanisms of increasing returns to scale. The role of transportation costs. A simple model of industrial agglomeration: two regions, two production factors (perfectly mobile workers and immobile farmers). Competition and market size – the main factors affecting the process of industrial agglomeration. Effects of transportation costs, fixed costs, a share of immobile factor on industrial agglomeration. Stability of distributed and agglomerated equilibria. Multiple equilibria and hysteresis.

- **Economics of Innovations**

Model of the innovation process. Patent race. Market structure and innovation efforts. Incentives for innovations. Socially optimal and market investments into R&D. Patent life.

- **Theory of Regulation**

Public costs of monopoly. Subadditivity of cost function – a necessary and sufficient condition for a natural monopoly. Economy of scale, concavity of a cost function and subadditivity. Stability of a natural monopoly. History of regulation after World War II. When should natural monopolies be regulated? Demsetz competition for a market. Contestability of a market. Deadweight losses, sunk costs and regulation. Regulation under complete information. Price discrimination and nonlinear tariffs as a means of increasing efficiency of a regulated monopoly. Peak-load pricing. Regulating monopoly under asymmetric information. Exogenous mechanisms of regulation. Averch-Johnson model. Endogenous mechanisms of regulation. The delegation and revelation approaches.

**Recommended Books and Articles:**

- Adams W.J., and J.L. Yellen, 1976, “Commodity Bundling and the Burden of Monopoly”, *Quarterly Journal of Economics*, vol. XC, 475-498.
- Averch H., and L.L. Johnson, 1962, Behavior of the Firm under Regulatory Constraint, *American Economic Review*, vol. 52, 1052-1069.
- Baron D., 1989, *Design of Regulatory Mechanisms and Institutions*, in R. Schmalensee and R.D. Willig eds.: *The Handbook of Industrial Organization*, Elsevier North-Holland.

- Becker G., 1991, A Note on Restaurant Pricing and Other Examples of Social Influences on Price, *Journal of Political Economy*, vol. 99, 1109-1116.
- Braeutigam R., 1989, *Optimal Policies for Natural Monopolies*, in R. Schmalensee and R.D. Willig eds.: The Handbook of Industrial Organization, Elsevier North-Holland.
- Buchanan J.M., 1969, External Diseconomies, Corrective Taxes, and Market Structure, *American Economic Review*, vol. 59, 174-177.
- Coase R.H., 1992, The Institutional Structure of Production, *American Economic Review*, vol. 82, 713-719.
- Diversity, *American Economic Review*, vol. 67, 297-308.
- Dixit A.K., and J. Stiglitz, 1977, Monopolistic Competition and Optimum Product
- Farrel J., and C. Shapiro, 1990, Horizontal Mergers: An Equilibrium Analysis, *American Economic Review*, vol. 80, 107-126.
- Krugman P., 1991, *Geography and Trade*, The MIT Press.
- Krugman P., 1991, Increasing Returns and Economic Geography, *Journal of Political Economy*, vol. 99, 483-499
- Krugman P., 1995, *Development, Geography, and Economic Theory*, The MIT Press.
- Loury G.L., 1979, "Market structure and Innovation", *Quarterly Journal of Economics*, vol. XCIII, No. 3, 395-410.
- Mankiw G., 1985, Small Menu Costs and Large Business Cycles: A Macroeconomic Model of Monopoly, *Quarterly Journal of Economics*, vol. 100, 529-537.
- Martin S., 1993, *Advanced Industrial Economics*, Blackwell.
- McAfee R.P., J. McMillan, M.D. Whinston, 1989, "Multiproduct Monopoly, Commodity Bundling, and Correlation of Values, *Quarterly Journal of Economics*, vol. CIV, 371-383.
- Posner R.A., 1975, The Social Costs of Monopoly and Regulation, *Journal of Political Economy*, vol. 83, 807-827.
- Rotemberg J.J., and G. Saloner, 1987, The Relative Rigidity of Monopoly Pricing, *American Economic Review*, vol. 77, 917-926.
- Salant S.W., S. Switzer, and R.J. Reynolds, 1983, Losses from Horizontal Merger: The Effects of an Exogenous Change in Industry Structure on Cournot-Nash Equilibrium, *Quarterly Journal of Economics*, vol. 98, 185-199.
- Salinger M.A., 1988, Vertical Mergers and Market Foreclosure, *Quarterly Journal of Economics*, vol. 77, 345-356.
- Sharky W., 1982, *The Theory of Natural Monopoly*, Cambridge University Press.
- Shy O., 1995, *Industrial Organization*, The MIT Press.
- Tirole J., 1988, *The Theory of Industrial Organization*, The MIT Press.
- Varian H., 1992, *Microeconomic Analysis*, W.W. Norton & Company.

- Williamson O., 1996, *The Mechanisms of Governance*, Oxford University Press.
- Williamson O.E., 1981, The Modern Corporation: Origins, Evolution, Attributes, *Journal of Economic Literature*, vol. 19, 1537-1568.
- Willig R., 1976, Consumer's Surplus Without Apology, *American Economic Review*, vol. 66, 589-597.



EC/ECO-417	<b>Urban Economics</b>
Semester	Credit Hour 3(3-0)

### **Course Description:**

This course is an introduction to urban economics. The focus will be on the main economic forces that lead to the existence of cities and regional clusters. It covers a variety of topics including urbanization, housing, pollution, urban poverty and crime.

### **Course Objectives:**

The basic objectives of this course are:

1. To analyze the economic forces that lead to the existence of cities and regional clusters,
2. To study the factors of local selection for firms and workers,
3. To study the economics of urban problems such as crime, poverty and insufficient housing,

### **COURSE LEARNING OUTCOMES:**

Upon successful completion, the students should be able to:

UNDERSTAND the mechanism of the emergence of cities and regional clusters

IDENTIFY the root cause of regional disparities

KNOWLEDGE on role of local government in provision of public goods

### **COURSE CONTENTS:**

#### **1. Introduction**

Emergence and existence of cities

Clustering of firms and workers

Expansion and growth of cities

#### **2. Land Rent and Land Use Patterns**

Urban land rent

Land use patterns

Neighbourhood choice

**3. Urban Size and Growth**

Population growth

Life expectancy rate

Mortality rate

**4. Policy Topics**

Education and crime

Transportation

Housing

Local Government

The role of local government

Local government revenue

**RECOMMENDED BOOKS**

1. Aurthor O'Sullivan, *Urban Economics*, (latest edition), McGraw Hill Education.
2. John F. McDonald, *Fundamentals of Urban Economics* (latest edition),  
Prentice Hall

EC/ECO-419	<b>Poverty and Income Distribution</b>
Semester	Credit Hour 3(3-0)

### **Course Description:**

Poverty and income inequality has always been issues of concern for economists. Their empirical analysis is of great significance. This course describes the technical issues related with the empirical analysis of poverty and income inequality.

### **Course Objectives:**

1. To explain the distributional aspects of national income
2. To familiarize students with the effects of poverty and income inequality
3. To understand the technical issues in the measurement of poverty and inequality

### **COURSE LEARNING OUTCOMES:**

Upon Successful Completion, the Students Should be able to:

UNDERSTAND the importance of income distribution in economic growth

ANALYSE and INTERPRET the poverty and inequality estimates

IDENTIFY sources and causes of poverty and inequality

CONDUCT independent research on poverty and inequality

### **Course Contents**

#### **1. Introduction:**

The concept of poverty, inequality & well-being

Correlation between inequality & poverty

Consequences of inequality & poverty

Determinants / sources of poverty and inequality

#### **2. Issues in the Measurement of Poverty & Inequality:**

Unit of well being

Unit of measurement

Sampling procedure

Problems of grouped and survey data

Issue of relative purchasing power

**3. Empirical Analysis of Poverty:**

Defining and estimating poverty Lines

Poverty measures

Desirable qualities of good poverty measure

Rigid and adjustable measures

Sub group poverty analysis

Welfare Interpretation of poverty measures

Multidimensional Poverty (concept and measurement)

**4. Empirical Analysis of Inequality**

Approaches to measure inequality

Desirable qualities of good inequality measure

Classification of inequality measures and details

Decomposition of inequality

**5. Empirical Analysis of Welfare**

Approaches to measure welfare

Desirable qualities of good welfare measure

Classification of welfare measures and details

Decomposition of welfare

**6. Issues in Poverty and Inequality:**

Migration, inequality and poverty

Fiscal measures, inequality and poverty

Economic development, Inequality and poverty

Globalization, inequality and poverty

## **7. Poverty and Inequality in Pakistan:**

Time series Analysis of inequality, welfare and poverty

International comparison

### **Recommended Books:**

1. Cowell F.A. Measurement of Inequality, STICERD, London School of Economics and Political Science, London (2000)
2. Anand S. Inequality and Poverty in Malaysia, Measurement and Decomposition, A World bank Research Publication, Oxford University Press. (1983)
3. Kakwani, N. Income Inequality and Poverty: Methods of Estimation and Policy: Applications, A World bank Research Publication, Oxford University Press. (1980).

EC/ECO-421	<b>Development Policy</b>	Credit Hour 3(3-0)
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## **Course Objectives**

This course helps students understand: (1) why some poor countries have been successful in catching up with the industrialized countries in per capita income, while others are increasingly lagging behind, (2) why half of humanity remains poor, and (3) why environmental degradation and resource exhaustion are commonly associated with income growth, and what are the implications of degradation and exhaustion on growth and poverty. It also helps students understand what can be done to promote development through policies and investment projects, and learn to analyze the economic, social, and environmental impacts of specific initiatives.

## **Course Learning Outcomes**

Upon Successful Completion, the students should be able to:

- UNDERSTAND and critically assess the mainstream economic literature relating economic development
- ASSESS and formulate development policies and develop critical thinking
- DEMONSTRATE the empirical approaches to understand the process of development

## **Course Contents**

Each topic will correspond to a week of the course

1. Policy issues in development
2. Poverty assessment: methods
3. Poverty assessment: policies and programs
4. Inequality and vulnerability assessment
5. Human development and social protection programs
6. Targeting of social programs
7. Microfinance institutions
8. Impact analysis of development projects: methods
9. Impact analysis of development projects: cases
10. Development strategies and macro-policies
11. Agriculture for development
12. Environment and development policy
13. Policy debate on foreign aid
14. Crises and policy responses
15. Review. The development profession

## Recommended Books and Articles

1. Alain de Janvry and Elisabeth Sadoulet. 2010. International Economic Development and Policy. Accessible to students with class password. Overview:
2. World Bank-IMF, Global Monitoring Report 2009. Overview  
<http://web.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTGLOBALMONITOR/EXTGLOMONREP2009/0,,contentMDK:22149019~pagePK:64168445~piPK:64168309~theSitePK:5924405,00.html>
3. 68309~theSitePK:5924405,00.html
4. See in particular progress on the MDG on that page
5. Inspect the World Bank homepage for information [www.worldbank.org](http://www.worldbank.org)
6. Poverty Assessments
7. Poverty and inequality course-WB
8. <http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/EXTPROGRAMS/EXTPOVRES/0,,contentMDK:21612674~pagePK:64168182~piPK:64168060~theSitePK:477894,00.html>
9. Look at the World Bank's Guidance on Poverty Assessments, and in particular the Guidance Note on Poverty Assessment found at:  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPA/0,,contentMDK:20202212~isCURL:Y~menuPK:435735~pagePK:148956~piPK:216618~theSitePK:430367,00.html>
10. Poverty
11. Ravallion, M., and S. Chen. 2007. "China's (uneven) progress against poverty." *Journal of Development Economics* 82(1): 1-42.
12. Inequality and Inequity
13. World Bank, Growth and Inequality  
<http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTPOVERTY/EXTPGI/0,,contentMDK:20263391~menuPK:577810~pagePK:148956~piPK:216618~theSitePK:342771,00.html>
14. Social programs and the art of targeting
15. David Coady, Margaret E. Grosh, John Hoddinott. 2004. Targeting of Transfers in Developing Countries. The World Bank. Read chapter 4  
[http://books.google.com/books?hl=en&id=l3ppSymUipQC&dq=targeting+transfers+developing+countries+coady&printsec=frontcover&source=web&ots=ils6E7d\\_9d&sig=wuRU0ov\\_z2xS3AZM36Q8atKyUlc&sa=X&oi=book\\_result&resnum=1&ct=result#PPA81,M1](http://books.google.com/books?hl=en&id=l3ppSymUipQC&dq=targeting+transfers+developing+countries+coady&printsec=frontcover&source=web&ots=ils6E7d_9d&sig=wuRU0ov_z2xS3AZM36Q8atKyUlc&sa=X&oi=book_result&resnum=1&ct=result#PPA81,M1)
16. Cash transfer policies
17. Ariel Fiszbein and Norbert Schady. 2009. Conditional Cash Transfers: Reducing present and future poverty. The World Bank Read: Overview, pp. 1-27  
[http://books.google.com/books?id=aunlBU\\_2FsYC&pg=PA103&lpg=PA103&dq=conditional+cash+transfer+overview+schady&source=bl&ots=\\_08Hq4HT3K&sig=fO\\_5Pw4w4uigscIReGaekfCZygi&hl=en&ei=NITFS06zIovisQO02K2iBQ&sa=X&oi=book\\_result&resnum=1&ct=result#PPA81,M1](http://books.google.com/books?id=aunlBU_2FsYC&pg=PA103&lpg=PA103&dq=conditional+cash+transfer+overview+schady&source=bl&ots=_08Hq4HT3K&sig=fO_5Pw4w4uigscIReGaekfCZygi&hl=en&ei=NITFS06zIovisQO02K2iBQ&sa=X&oi=book_result&resnum=1&ct=result#PPA81,M1)

- ok\_result&ct=result&resnum=3#v=onepage&q=&f=false -  
Impact analysis of development projects.
18. Ravallion, M. "The mystery of the vanishing benefits: An introduction to impact evaluation." *World Bank Economic Review*, Sep, 2001, V15(N1):115-140.  
<http://wber.oxfordjournals.org/content/vol15/issue1/index.dtl>
  19. Kim, J., H. Alderman, and P. Orazem. 1999." Can Private School Subsidies Increase Enrollment for the Poor? The Quetta Urban Fellowship Program. *The World Bank Economic Review*, Vol. 13, No. 3, pp. 443-65  
<http://wber.oxfordjournals.org/content/vol13/issue3/index.dtl>
  20. Development strategies and macro policies
  21. Chapter 12. International Finance and Development: Exchange Rates and Foreign Capital Flows
  22. *The Economist*, October 22, 2009. Special Report on China: Round and round it goes
  23. Microfinance institutions
  24. Beatriz Armendáriz de Aghion and Jonathan Morduch. 2004. "Microfinance: Where do we stand?"
  25. Look at the home pages of the following three internet microfinance lenders:  
<http://www.kiva.org/> <https://www.myc4.com> <http://www.prosper.com>
  26. How do they each work? What are their relative advantages and inconvenient?
  27. Development and the Environment
  28. A bad climate for development, *The Economist*, Sep 17th 2009
  29. Last gasp for the forest, *The Economist*, Sep 24th 2009
  30. The price of cleanliness, , *The Economist*, Oct 22nd 2009 - Common Property Resources and Cooperation
  31. Chapter 9: Common Property Resources and Cooperation
  32. A rising tide, *The Economist*, Sep 18, 2008
  33. Common Sense, *the Economist*, July 31, 2008.



EC/ECO-423	<b>Cost-Benefit Analysis</b>
Semester-VI	Credit Hours3(3-0)

### **COURSE OBJECTIVES:**

1. To equip students with an understanding of the principles of Cost Benefit Analysis (CBA) and project appraisal, with special emphasis on Economic analysis.
2. To provide introductory material for those seeking to undertake appraisal exercises by their own.

### **COURSE LEARNING OUTCOMES:**

Upon successful completion of the course, the students would be able to:

7. UNDERSTAND the rationale of CBA
8. DIFFERENTIATE between the Financial and Economic Analysis.
9. CONDUCT the cost and benefit analysis of project.

### **COURSE CONTENTS:**

#### **1. Introduction**

Rationale of a project and its Cost Benefit Analysis

#### **2. Project Cycle**

Phases of Project Cycle: Identification, Feasibility Report, Preparation, Appraisal, Implementation and Evaluation

#### **3. Project Identification**

Sources of Project Identification, Steps of Project Identification

#### **4. Feasibility Report & Project Planning**

Dimensions of a Feasibility Study, Problems in Project Preparation, Linking Projects to Resources

#### **5. Project Appraisal**

Purpose of Project Appraisal, Aspects of Project Appraisal: Technical, Managerial, Commercial, Financial and Economic. Economic analysis in detail with pricing of inputs and output, identification and discounting of costs and benefits. Techniques of project appraisal; undiscounted and discounted techniques. Sensitivity analysis

#### **6. Project Approval**

Rules of project approval

## **7. Project Implementation**

Monitoring Indicators, Kinds of monitoring. Monitoring and reviewing techniques

## **8. Project Evaluation**

Significance & Purpose, Types and indicators of evaluation

### **TEXT AND REFERENCE BOOKS:**

Broadman *et al.* *Cost Benefit Analysis: Concepts and Practices*, Prentice Hall

International (latest edition)

*Manual for Development Projects*, Project Wing, Planning & Development

Division, Islamabad. (latest edition)

EC/ECO-408	<b>Political Economy</b>
Semester	Credit Hour 3(3-0)

### **Course Description**

This course is expected to provide an overview of political dimensions of an economy. The course will develop basic understanding of the relationship between politics and economy. This course will help to differentiate between political efficiencies and inefficiencies..

### **Course Objectives**

This course is aimed to meet the following objectives:

1. Definition(s) and basic concepts of political economy
2. To summarise the evolution of political economy
3. Economic and Political Interests in shaping the economic behaviours
4. Explain the political economy from an individual and societal point of view

### **COURSE LEARNING OUTCOMES:**

Upon successful completion of the course, the students will be able to:

- ACQUIRE the fundamental notions of political economy
- SOLVE human responses to incentives based on cost-benefit analysis versus norm-based behaviour imbedded in their respective culture
- EVALUATE politically efficient and inefficient decisions
- DEMONSTRATE the ability to differentiate efficient and inefficient institutions from the perspective of political economy

#### **1. Introduction**

- a. Meaning & definition of political economy
- b. Economics & Political interlink
- c. Importance of political economy in contemporary world.

#### **2. Regionalism & Globalization**

- a. What is regionalism
- b. European union
- c. History of European union
- d. Best examples of regionalism
- e. Different regional organizations

- f. Globalization
- 3. Economic Development and WTO**
  - a. Political Economy of Economic development
  - b. Transfer of technology and dependency of third world on the 1<sup>st</sup> world
  - c. Incidence of poverty
  - d. Phenomenon of inequality
  - e. Intellectual property rights
  - f. Political slogans
- 4. Political economy of Pakistan**
  - a. economic history of Pakistan
  - b. different regimes
  - c. seven pillars of good governance
  - d. effective management
- 5. SAARC**
  - a. Political and economic aspects
  - b. Objectives
  - c. Phenomenon of regionalism in context of SAARC
  - d. Factors that involved in the failure of SAARC to be a successful organization
  - e. How does SAARC achieve its objectives
- 6. Economic Development and Crimes**
  - a. Socio economic problems of Pakistan, crime theories and economic development
  - b. Social structure and juvenile delinquency
- 7. Political Economy & Global order**
  - The changing world order
  - Political voices
  - The group of G8
  - Hot issues in the world economy & politics behind these issues.

### **Books Recommended**

1. Mitchell A. Seligson & John T Passe` Smith "Development & Underdevelopment" the Political Economy of Global Inequality
2. Azhar Hassan Nadeem Pakistan: "The Political Economy of Lawlessness"
3. Ishrat Husain "Pakistan the Economy of an Elitist State"
4. Ishrat Husain "Economic Management in Pakistan 1999 – 2002"
5. Alison M S Watson "An Introduction to International Political Economy"
6. Robert Gilpin "The Political Economy of International Relations"

EC/ECO-410	<b>Islamic Finance</b>
Semester	Credit Hour 3(3-0)

### **Course Description:**

The course covers the topics on Islamic finance. Main focus will be on the features of Islamic financial system, and Shariah compliant financial structures.

### **Course Objectives:**

The prime objectives of this course are;

1. To explain the fundamental principles of Islamic Finance,
2. To know the evolution, growth and development of the Islamic finance in different periods,
3. To know the origin, legitimacy, Shariah principles, structure, mechanism and flows of different types of Islamic finance structures.

### **Course Learning Outcomes:**

After completion of this course students are expected to;

1. UNDERSTAND the salient features of Islamic Financial system,
2. RECOGNISE and IDENTIFY the differences between Islamic and conventional finance,
3. APPLY Islamic Finance structures in the monetary and capital institutions of an Islamic state.

### **Course Contents:**

1. **Definition of Islamic Finance based on Shariah and Fiqh,**
2. **Features of Islamic finance;**
  - Prohibition of Riba,
  - Prohibition of Gharar,
  - Prohibition of Mayser,
  - Prohibition of dealing in unlawful goods and services,
  - Desire for justice and equity based on business Ethics.
3. **History and Development of Islamic Finance;**
  - During 650 AD – 750 AD,

During 750 AD – 1900 AD,  
During 1900 AD – 2000 AD,  
2000 AD till date.

**4. Shariah Compliant Islamic Finance Structures;**

Barter Trading (Bay al-Muqayada),  
General Sale (Bay al-Mutlaq),  
Exchange Sale (Bay al-Sarf) ,  
Markup-Sale (Murabaha),  
Deferred Payment Sale (Bay' Bithaman Ajil),  
Monetization (Tawarruq),  
Ena Contract,  
Salam Sale (Bai Salam),  
Manufacturing Finance (Istisna),  
Partnership (Musharaka),  
Venture Capital (Mudaraba),  
Islamic Lease (Ijara),  
Pledge (Rahn),  
Guarantee (Kafala),  
Wakala,  
Hawala,  
Wadia,  
Muqassa,  
Urboun,  
Waad (Promise),  
Qard.

**5. Difference between Islamic finance and conventional finance.**

**RECOMMENDED BOOKS:**

1. Ahmad, K. *Studies in Islamic Economics*, Leicester, The Islamic Foundation, United Kingdom, 1980.
2. Ayub, M. *Understanding Islamic Finance*, John Wiley and Sons Ltd., The Atrium, Southern Gate, Chichester, West Sussex, England, 2007.
3. Maududi, Sayyid Abul Ala. *First Principles of Islamic Economics*, Islamic Foundation, Markfield, United Kingdom, 2011.
4. Usmani, M. Taqi. *Islamic Finance*, Maktaba Maariful Quran, Pakistan, 2005.

EC/ECO-412	<b>Transport Economics</b>
Semester	Credit Hour 3(3-0)

### **Course Description:**

This module provides a critical awareness of how economics can be used to overcome current problems in the transport sector, such as congestion, inadequate service (in terms of both quantity and quality) and high prices. It will give you a systematic and comprehensive understanding of the key concepts in transport economics and the graphical and numerical analytical techniques used by transport economists.

### **Course Objectives**

This course will provide students with the basic concepts and tools for economic evaluation of transportation projects and related investments. Students should obtain basic skills in the analysis of travel demand and in the valuation and analysis of transportation system benefits. Students should also be able to understand different components of the costs of transportation, basic pricing principles, and how these factors affect the market for transportation infrastructure and services. Finally, students should be able to apply these concepts to analyze transportation investment decisions.

### **COURSE LEARNING OUTCOMES:**

Upon Successful Completion, the Students Should be able to:

EVALUATE the economic impacts of transport schemes using cost benefit analysis and alternative methods

ASSESS issues relating to transport funding, road pricing and the pricing of public transport.

PREPARE and PRESENT a critique of the key economic issues in transport policy.

IDENTIFY the key issues in transport economics and economic appraisal.

### **Course Contents**

- Economic analysis of transportation projects and transportation infrastructure investment, optimal pricing and investment
- Travel demand analysis and the value of travel time saving consumers' surplus and producers' surplus measures
- General equilibrium models for transportation economics, analysis of travel demand, benefits, costs, equilibrium, pricing, and market structure
- Introduction to microeconomic principles in transportation
- Pricing alternatives, road pricing and sustainable transportation, fare increases and the public transport fare adjustment mechanism



- Price discrimination
- Road congestion pricing
- Equity dimensions of transport policy
- Cost function for transport firm
- City formation and transport cost, peak load and cost allocation problem, project appraisal and financing
- Economics of transport logistics
- Efficiency measurement theory and its application to transport
- Theory of external cost, transport and energy, competition, regulation and public service obligations
- Public private partnership in transport, transportation improvements and land values, returns to scale and road durability
- Project evaluation
- Congestion, Air quality, Fuel economy and safety
- Transportation technology
- Transportation and international Trade
- Transportation and Economic Development

### **Recommended Books**

- Palma, Andre De. A Handbook of Transport Economics. Edward Elgar Publishing, 2011
- Émile Quinet, R. Roger William Vickerman, Principles of Transport Economics, Edward Elgar Publisher 2005
- John Robert Meyer, José A. Gómez-Ibáñez, W. William B. Tye, Essays in Transportation Economics and Policy. A Handbook in Honor of John R. Meyer.
- A Handbook of Transport Economics *Elgar Original Reference Series*, Andre De Palma, Edward Elgar Publishing, 2011.

EC/ECO-414	<b>Dynamic Macroeconomics</b>
Semester	Credit Hour 3(3-0)

## **Course Objectives**

This course is designed to develop the theoretical building blocks and tools of dynamic macroeconomics at advanced level. The course methodologically acknowledges the microeconomics foundations of macroeconomics.

## **Course Contents**

### **Dynamic General Equilibrium**

The Basic Dynamic General Equilibrium Closed Economy , Golden Rule Solution ,The Steady State ,The Dynamics of the Golden Rule , Optimal Solution ,Derivation of the Fundamental Euler Equation , The Intertemporal Production Possibility Frontier, Static Equilibrium Solution , Dynamics of the Optimal Solution , Real-Business-Cycle Dynamic, The Business Cycle , Permanent Technology Shocks ,Temporary Technology Shocks

### **Economic Growth**

Modeling Economic Growth ,The Solow–Swan Model of Growth , Growth and Economic Development , Balanced Growth The Theory of Optimal Growth ,Endogenous Growth , The AK Model of Endogenous Growth , Human Capital Models of Endogenous Growth

### **The Decentralized Economy**

Consumption, The Consumption Decision, The Intertemporal Budget Constraint, The Consumption Function, Permanent and Temporary Shocks. Savings , Life-Cycle Theory ,Model of Perpetual Youth ,Nondurable and Durable Consumption ,Labor Supply ,Firms , Labor Demand without Adjustment Costs , Labor Demand with Adjustment Costs ,General Equilibrium in a Decentralized Economy ,Consolidating the Household and Firm Budget Constraint, The Labor Market , The Goods Market , Comparison with the Centralized Model

### **Fiscal Policy**

Time-Consistent and Time-Inconsistent Fiscal Policy , Lump-Sum Taxation Taxes on Labor and Capital, The Overlapping-Generations Model, Short-Run Dynamics and Long-Run Equilibrium, Comparison with the Representative-Agent Model, Fiscal Policy in the OLG Model

### **The Monetary Economy**

Hyperinflation and Cagan's Money-Demand Model, The Optimal Rate of Inflation, The Friedman Rule,The General Equilibrium Solution, The Super-Neutrality of Money

## **Imperfectly Flexible Prices**

Price Setting under Imperfect Competition, Theory of Pricing in Imperfect Competition, Price Determination in the Macroeconomy with Imperfect Competition, Pricing with Intermediate Goods, Pricing in the Open Economy: Local and Producer-Currency Pricing, Price Stickiness Taylor Model of Overlapping Contracts, The Calvo Model of Staggered Price Adjustment Optimal Dynamic Adjustment, Price Level Dynamics, The New Keynesian Phillips Curve, The New Keynesian Phillips Curve in an Open Economy

## **Monetary Policy**

Inflation and the Fisher Equation, The Keynesian Model of Inflation, The New Keynesian Model of Inflation, The Effectiveness of Inflation Targeting in the New Keynesian Model Inflation Targeting with a Flexible Exchange Rate, The Nominal Exchange Rate Under Inflation Targeting, Inflation Targeting and Supply Shocks, Optimal Inflation Targeting, Social Welfare and the Inflation Objective Function, Optimal Inflation Policy under Discretion, Optimal Inflation Policy under Commitment to a Rule, Intertemporal Optimization and Time-Consistent Inflation Targeting, Central Bank Preferences versus Public Preferences, Optimal Monetary Policy Using the New Keynesian Model , Using Discretion, Rules-Based Policy.

## **Real Business Cycles, DSGE Models, and Economic Fluctuations**

The Methodology of RBC Analysis, The Steady-State Solution, Short-Run Dynamics, The Basic RBC Model, Extensions to the Basic RBC Model ,The Open-Economy RBC Model, DSGE Models of the Monetary Economy, The Smets–Wouters Model, Wedges, Frictions, and Economic Fluctuations.

## **Recommended Books**

- Wickens, Michael (2012). *Macroeconomic Theory – A Dynamic General Equilibrium Approach*, Princeton University Press, Princeton
- Blanchard O and S. Fisher, 1998, *Lectures on macroeconomics*, MIT Press, Cambridge, Massachusetts and London, England.
- Chaing A C. (1992): *Elements of Dynamic Optimization*. McGraw-Hill, New York: New York
- Cooley T.F., 1995 *Frontiers of business cycle research*, Princeton University Press.
- Huggett, M., 1996 Wealth distribution in life-cycle economics, *Journal of Monetary Economics* 38, 469-494.
- Obstfeld, M., & Rogoff, K. S. (1996). *Foundations of International Macroeconomics*. Massachusetts Institute of Technology.
- Perkins, D. H., Radelet, S., Snodgrass, D. R., Gillis, M., & Roemer, M. (2001). *Economics of Development*. W.W. Norton & Company.
- Ljungqvist, L. and T. Sargent, 2000, *Recursive macroeconomics theory*, MIT Press, Cambridge, Massachusetts and London, England.
- Marimon, R. and Scott A., 1999, *Computational methods for the study of dynamic economics*, Oxford University Press.

- McCandless G. and N. Wallace, 1991 Introduction to dynamic macroeconomic theory, an overlapping generations approach, Harvard University Press.
- Romer D. (2006) Advanced Macroeconomics. McGraw-Hill, New York: New York
- Ros-Rull J., 1993, working in the market, working at home and the acquisition of skills: a general-equilibrium approach, American Economics Review 8, 893-907.
- Sargent, T. J. (1987): Dynamic Macroeconomic Theory. Harvard University Press, Cambridge: Massachusetts.
- Taylor, J. B., & Woodford, M. (Eds.). (1999). *Handbook of Macroeconomics*. Elsevier.
- Taylor, J and M. Woodford, 1999, Handbook of Macroeconomics, Volume 1C, Elsevier.

EC/ECO-416	<b>Game Theory</b>
Semester	Credit Hour 3(3-0)

### **Course Description:**

How individuals take decisions in a situation where his/her interests depend not only on own actions but also on the actions of other people as well. Game theory provides the analysis of such strategic interactions. This subject is an introduction to the economic study of game theory. A main aim of this subject is to show how tools and techniques from game theory can be applied to interesting and relevant problems in economics and everyday life.

### **Course Objectives:**

To provide the students a glimpse of how the traditional decision making differ from strategic interaction

To introduce the basic concepts and techniques related to the strategic interaction

To show some applications of game theory like Bargaining, Auctions, and Mechanism Design etc.

### **COURSE LEARNING OUTCOMES:**

Upon Successful Completion, the Students Should be able to understand:

HOW to transform a strategic interaction into a Game?

How to FIND Equilibrium Outcomes in Strategic Interactions?

How to APPLY the concepts of game theory into real life strategic interactions?

### **COURSE CONTENTS:**

#### **Principles and Basic Concepts of Game Theory**

- Introduction: Basic Concepts
- Static Games of Complete Information,
  - Strategic Game: Simultaneous games with pure and discrete strategies, Pure strategy Nash Equilibrium, Pure Versus Behavioral Strategies, Common Knowledge of Rationality,
- Dominate and dominated strategy,
- Iterative elimination of dominated strategy
- Correlated Equilibrium
- Multiple Nash Equilibria, Pareto Optimality, Existence of Nash Equilibrium
- Static Games of complete but imperfect information
  - Simultaneous games with continuous and mixed strategies, Non-Existence of a Pure Strategy Equilibrium,
  - Mixed Strategy Nash Equilibrium
- Dynamic games of complete information

- Sequential Games: Extensive form representation of game
- Theory of Backward Induction, Sequential Rationality and
- Backward Induction, Sub Game Perfect Nash Equilibrium
- (SPE), Critique of Backward Induction and Sub game
- Perfection
- Dynamic games of complete but imperfect information
- Sub-games, Sub-game perfect Nash Equilibrium

## 2. Advanced Concepts of Game Theory

Static Games of Incomplete Information,

- Static Bayesian Games and Bayesian Nash Equilibrium, Examples of Bayesian Equilibrium,
  - Dynamic Games of Incomplete information,
  - Perfect Bayesian Equilibrium,
  - Signaling Games
  - Repeated games:
    - Finitely Repeated Games with Several Static Equilibria
    - Infinitely Repeated Games, Infinite Horizon Equilibria,
    - Folk Theorem

### • 3. Applications of Game Theory

- Industrial organization:
  - Cournot Model of Duopoly
  - Cournot Competition Under Asymmetric Information
  - Providing a Public Good under Incomplete Information
  - Bertrand Model of Duopoly, the Problem of Commons
  - Stackelberg Model of Duopoly
  - Bargaining:
    - Rubinstein Model of Bargaining, Uniqueness of Infinite
  - Horizon Equilibria, comparative Statics
- Auctions:
  - Theory of Auctions and Competitive Bidding

## RECOMMENDED BOOKS

1. Mas-Colell, Whinston and Green. *Microeconomic Theory*
2. H. R. Varian , *Microeconomic Analysis*
3. Martin J. Osborne, *An Introduction to Game Theory*
4. Robert Gibbons , *Game Theory for Applied Economists*
5. Osborne and Rubinstein , *A Course in Game Theory*

EC/ECO-418	<b>Financial Market</b>
Semester	Credit Hour 3(3-0)

## Course Objectives

The objectives of this course are:

- Provide the students a good understanding of Financial Markets
- Explain the linkages of financial markets to other markets in the economy.
- Describe the strength and weaknesses of the financial system of Pakistan.

## Course Contents

### • Theory of the Role and Functioning of Financial System

Information asymmetric and the need for the role of financial sector. Some Basic concepts like adverse selection, moral hazard, free rider and principal-agent problems in financial sector to understand puzzles of financial markets. Financial system and its relationship with the rest of the economy. Functions of financial sector: mobilization and allocation of resources; pooling, diversification and trading of risk; advisory role; financing technological innovation and development. Financial Repression vs. Financial Liberalization.

### • Growth and Stability of Financial System

Why there is need to regulate the financial sector? Why financial sector is most regulated one in an economy? State Bank of Pakistan and its main functions: conduct of monetary policy; promotion, establishment, regulation and supervision of depository institutions; exchange rate policy and management of foreign exchange reserves; Payment System (NIFT and its functions. Relating to payments system). Securities and Exchange Commission of Pakistan and its functions: promotion, establishment, regulation and supervision of various components of capital market.

### • Financial Institutions and Current issues

Scheduled Banks and their role in economic development of Pakistan: Introduction to commercial banking; structure of commercial bank in Pakistan; Assets and Liabilities of a commercial bank; performance indicators for commercial banks; recent issues in commercial banking.

Non-bank Financial Institutions: Development Financial Institutions, Investment Banks, Modarbas, Leasing companies, Mutual Funds, Housing Finance Corporations, Discount Houses, Venture Capital Companies. Micro Finance Institutions, SME Banks, Insurance Companies – the rationale and role.





- **Financial Markets and Current Issues**

Functioning of Money Market (Primary and Secondary Dealers), Capital Market (Stock exchanges and Various Components of capital markets – Securities, equities, bonds, debentures), Foreign Exchange Market and its evolution, dollarization of the economy.

- **Financial Infrastructure**

Legal Framework (SBP Act 1956, BCO, 1984, SBP Prudential Regulations), Accounting Standard, Auditing, Corporate governance of banks and other financial institutions. Human Resource, Development| (Skill and Training) – Importance for functioning of financial sector. Electronic Banking and its prospects

### **Recommended Books**

- Fabozzi, F. and Modigliani, F. Capital Markets. 2nd edition. Prentice- Hall London (1996).
- Mishkin (2003), The Economics of Money, Banking, and Financial Markets. 7th edition.
- Ritter, L. S. and Peterson, R.L. Financial Institutions and Financial Markets. 9th edition. NewYork. Basic Books.
- Arby, Muhammad Farooq (2004), “Functions, Evolution and Organization of State Bank of Pakistan” [www.sbp.org.pk](http://www.sbp.org.pk)
- History of State Bank of Pakistan (Volume – 3, chapters 2 to7, 13).
- Zaidi, Akber (2005), “Issues in Pakistan Economy,” Karachi. Chapters12, 13
- SBP Annual and Quarterly Reports
- SBP Financial Sector Assessment: 1990-2002, 2003 and onward

EC/ECO-420	<b>Rural Development</b>
Semester	Credit Hour 3(3-0)

### **Course Description**

This course focuses on the structure of rural economy encompassing socio-economic setup, development status and core economic, social and environmental problems. This course elaborates in detail historical background, evolutionary planning process of rural development. Explore the process of rural development in Pakistan and impact of different rural support programs on rural households.

### **Course Objectives**

- To enable students appreciate the key concepts in rural development
- Students will become familiar with a variety of economic and rural development theories
- Analyze rural development planning process and development of rural sector in Pakistan
- To equip students with knowledge and skills to design appropriate rural development policies and programs that can ably reduce the misery in rural settings

### **Course Contents**

- **Structure of Rural Economy**

Rural development is crucially linked with rural development. This section of course contents through light on Land, people and resources, socio-economic and political organizations, models means and relations of production, potential for development, basic problems including traditions, power, structure, illiteracy, poor health, unemployment, poverty, underdevelopment, infrastructure and environmental degradation.

- **Theories of Rural Development**

In recent decades several theories on rural development has been expounded in an attempt to explain some experiences of regional economic growth or to provide recommendations on rural development. Following theories are included in the course outline to make student better understand the process of rural development.

Basic needs and community development, modernization of agriculture, diversification of rural economy, rural-urban nexus of development and other approaches.

- **Rural Development Planning**

Rural development and planning is growing global issue. It helps to cater the needs of developing economies in formulating policies according to their circumstances.

This section includes rural integrated development program that incorporates location, people, utilities, services and infrastructure; village aid programs, rural development through local government, rural development through NGO's, rural resource allocation.

- **Rural Development in Pakistan**

Being an agrarian economy, the rural sector plays a crucial role in economic development of Pakistan since it provides food and fiber for the whole nation and also accounts for export earnings. This part of course outlines includes historical background, Land reforms, Government plans and policies, people's participation, NGO's and rural support programs, rural development strategy, design and evaluation of rural development projects, rural development programs before and after eighties, rural human resource development, role of local organizations in rural development, role of voluntary agencies in rural development, use of improved technologies, poverty in the non-modern sector, impact of integrated rural development programs, impact of rural support programs on rural households and current rural sector scenario in Pakistan.

### **Recommended Books**

- Malcolm Moseley, Rural Development: principles and practices, sage publications 2003
- Young, F/Clark, J., Interdisciplinary Theories of Rural Development, Jai press 2006
- Hassan, Ibnul, Integrated Rural Development in Pakistan, Sterling Press Limited 1989
- Kator Singh, Rural Development: Principles and Policy, Institute of Rural Management 1999
- Desilva, G. Haque, Towards a Theory of Rural Development, Progressive publishers 1988
- James, Jeffery, Improving Traditional Rural Technologies, Macmillan Press 1989
- Kenneth Lynch, Rural Urban Interaction in the Developing world, Routledge 2005
- Khan, Mahmood Hassan, community Organizations and Rural Development, Vanguard 2001
- Khana, B., Rural Development in South Asia, Deep and Deep publications 1992
- Shoaib Sultan Khan, Rural Development in Pakistan, Vikas Publishers, 1982
- The African Development bank, African Development Report 2002, Oxford 2002
- World Bank, agriculture and Rural Development, Washington D.C. 2005
- Dar, S. U, Impact of integrated rural development program, Anmol, New Delhi 1992

EC/ECO-422	<b>History of Economic Thought</b>
Semester	Credit Hour 3(3-0)

### Course Objectives:

1. To give a historical consciousness of economic ideas
2. To give an overview of developments in economics

### Course Learning Outcomes:

Upon Successful Completion, the Students Should be able to:

Understand key models and concepts of the history of economic thought  
Understand scholarly articles concerned the history of economic thought  
Have a historical consciousness of economic ideas

### Course Contents

#### Economics and its History

Introduction  
Aim, Scope and Method  
Where to Begin?  
General References

#### The Beginnings

The Old Testament  
Greece: Plato and Aristotle  
The Roman Empire and Christianity  
The middle Ages and the Canon Law

#### Pre-Adamite Economics

- **MERCANTILISM:** The Balance of Trade Doctrine. The Specie-Flow Mechanism. The Defense of Mercantilism. Precursors of Keynes? Rational Elements in Mercantilist Theory.
- **THE 18<sup>TH</sup>-CENTURY PREDECESSORS:** The Mercantilist Dilemma and the Quantity Theory of Money. The Theory of Creeping Inflation. Cantillon's Essay. Monetary Analysis. The Real Rate of Interest.

- **PHYSIOCRACY:** The Meaning of Physiocracy. The Tableau Economique. The Single Tax. Say's Law.

Scholastic Influences: An Afterthought.

- **Adam Smith: System Builder**

Introduction

Adam Smith's Economic System

Conclusion

- **Classical Economic Analysis (I): Utility, Population and Money**

Introduction

The Principle of Utility in Classical Economics: Jeremy Bentham

The Principle of Population in Classical Economics: Thomas Malthus

Early Monetary Issues

Conclusion

- **Keynesian Economics**

The IS Curve. The LM Curve. The Hicks-Hansen Diagram. Full Employment Equilibrium. The Liquidity Trap. Interest- Inelastic Investment Demand. Wage Rigidities. Unemployment Equilibrium. The Pigou Effect. Keynesian dynamics. The Counter- Revolution. Rereading Keynes. Keynes versus the Classics. The Traditional Case for Public Works. The Economics of Wage Cutting. What Economists Said About Wage Cutting? Keynes' Contributions to Economics.

- **Socialists and Historicists**

Introduction

Saint-Simon, Sismondi, and list: examples of European evolutionary thought

The utopian socialists: Owen, Fourier and Proudhon

History

The German historical school

Conclusion

- **Karl Marx and "Scientific Socialism".**

Introduction

Marx's life and works

Overview of the Marxian system

Marx's early writings on capitalist production

The nature of capitalism

The legacy of Marx

### **Modern Microeconomics: A Rich and Movable Feast**

Introduction

Consumption technology: modern views new theories of the firm

Other applications and extensions

Conclusion

### **The new Political Economy: Public Choice and Regulation**

Introduction

Public choice: contemporary political economy

The new political economy of regulation

Conclusion

### **Books Recommended:**

1. Maurice Dobb “Theories of Value and Distribution Since Adam Smith  
Ideology and Economic Theory”
2. Eric Roll “A History of Economic Thoughts”
3. J. Wil Czynski “The Economics of Socialism”
4. Robert B. Ekelund, Jr. & Robert F. Hebert “A History of economic Theory and  
Method” (Third Edition)
5. Robert Lekachman “A History of Economic Ideas”
6. William Fellner “Emergence and Content of Modern Economic Analysis”
7. Mark Blaug “Economic Theory in Retrospect” (Third Edition)

EC/ECO-424	<b>Institutional Economics</b>
Semester	Credit Hour 3(3-0)

## Course Objectives

A course in "Institutional economics" accomplishes a series of courses that constitute the basic training for economists. Before studying institutional economics students should master not only the fundamentals of general economic theory but have knowledge of the historical courses and humanities as well.

## Course Content

- **Introduction to Institutional Analysis**

Institutions and organizations, Functions of social institutions, Interaction situations and the types of norms: prisoners' dilemma-type situation; co-ordination situation; inequality situation. Enforcement characteristics, Institutional structure of a society. Formal and informal institutions, Sanctions for disobeying norms. Conditions of norms' effectiveness. Interaction of formal and informal institutions. The limits of imitations of institutions from best-performing countries. The problems of their enforceability. The New Institutional Economics and modern institutionalism. Old institutional economics.

- **Transaction Costs**

Market and intrafirm transactions. Transaction costs as friction in the economy. Transaction costs and transformation costs. Types of market transaction costs and means of transaction costs minimization. Comparative advantages and shortcomings of the legal enforcement mechanism. Reputation as a contract enforcement device. Ideal model of "perfect reputation". Shortcomings of the reputation as a contract enforcement mechanism. Reputation and the "free rider problem". Reputations aided by institutions.

- **Property Rights**

Property rights in different legal traditions. Assigning of property rights: the internalization of externalities. The Coase Theorem. Alternative property rights regimes. Common property (open access) and the tragedy of the commons. Exclusive property rights and the conditions for their emergence. The first economic revolution. Communal property. Optimal group size. Private property. Moral and economic aspects of private property. Public property. The emergence of property rights. The optimistic theory of the emergence of property rights (naive model). The interest-group theory of property rights. The costs of collective action. The theory of rent-seeking.

- **Contracts**

Legal and economic approach to contracts. Freedom of contract. Bounded rationality and contractual incompleteness. Asymmetric information and opportunistic behavior. Adverse selection and the closing of markets. Signaling, screening and self-selection. Asset plasticity and moral hazard. Principal-agent problem and agency cost. Attributes of transactions and the choice of a contract. Asset specificity, types of specific assets. Synergy effects, quasi-rents appropriation and hold-up problem. Classification of

contracts (classical, neoclassical and relational contracting). Discrete alternative governance structures: market, hybrids and hierarchy.

- **The New Institutional Theory of the Firm**

Neoclassical theory of the firm. The market and the firm. Comparative analyses of the alternative coordination forms. Internal market and influence costs. The boundaries of the firm.

- **The New Institutional Theory of the State**

Social mechanisms for constraining open access. Contractual theories of the State, Hobbes predatory theory of the state. North's model of the state. The regulatory role of the state in the Russian economy.

- **The Theory of Institutional Change**

Stability of institutions and institutional change. The concept of institutional equilibrium. The main sources of institutional change. Centralized and spontaneous institutional change. The role of the state in the process of institutional change. The problem of compensation of the disadvantaged groups. Theories of selection of efficient institutions in the process of competition. Institutional change and path dependence. Forms of path-dependence

## **Recommended Books**

- Elinor Ostrom, "Understanding Institutional Diversity" latest Edition, Princeton University Press
- Marc Tool, "Institutional Economics Theory, Method, Policy" Latest Edition
- Akerlof G.A. (1984) The Markets for "Lemons": Quality Uncertainty and the Market Mechanism" 84 Quarterly Journal of Economics, pp. 488-500
- Alchian A., Demsetz H. (1972) Production, Information Costs and Economic 52 The American Economic Review, pp. 777-795
- Coase R. (1937) The Nature of the Firm. 4 Economica, pp. 386-405
- Coase R.H. (1960) The Problem of Social Cost. 3 Journal of Law and Economics 1-44
- Dahlman C. (1979) The Problem of Externality. 22 Journal of Law and Economics, pp. 141-162
- Eggertson Thr. Institutions and Economic Behavior.
- Hart O. (1989) An Economist's Perspective on the Theory of the Firm. 89 Columbia Law Review, p. 1757
- Joskow P. (1987) Contract Duration and Relationship-Specific Investments: Empirical Evidence from Coal Markets. 77 American Economic Review pp. 168-173
- Milgrom P., Roberts J. Economics, Organization and Management.
- Milgrom P., Roberts (1992) J. Economics, Organization and Management. - Prentice-Hall Int.



- North D. (1990) Institutions, Institutional Change and Economic Performance. Cambridge University Press
- Posner R. (1997) Social Norms and the Law: an Economic Approach. 87 American Economic Review, pp. 365-369
- Rose C. Evolution of Property Rights. In: Newman P. The New Palgrave Dictionary of Economics and the Law. Vol. 2.
- Tullock G. Rent-seeking. (1987) In: The New Palgrave: A Dictionary of Economics. - L., Macmillan, 1987,

EC/ECO-426	<b>Dynamic Optimization</b>
Semester-VIII	Credit Hours3(3-0)

### Course Objectives:

Objectives of the course are:

1. To confront the students to advanced mathematical techniques.
2. To formulate, analyze and apply mathematical models.
3. To learn how to frame economic ideas/ theories in mathematical form.
4. To enable the students to handle economic models, interpret the results and solve complex problems.
5. To use basic mathematical tools to analyze economic models, especially optimization models, both univariate and multivariate.

### COURSE LEARNING OUTCOMES:

Upon successful completion of the course, the student will be able to:

- **ACQUIRE** the basic knowledge to solve economic issues with calculus and linear algebra.
- **UNDERSTAND** the general framework of mathematical research; an understanding of the role of axioms, assumptions, theorems and
- **SOLVE** economic problems by using the mathematical methods described in the subject.
- **EVALUATE** the standard economic problems by applying mathematical techniques (the consumption decision, the production decision, cost minimization, simple multi-period decision making).
- **DEMONSTRATE** the basic computational methods in calculus, algebra, and differential equations.

### COURSE OUTLINES:

#### 1. Complex Number and Circular Functions:

Imaginary and Complex Numbers,  
Complex Roots, Circular Functions,

#### 2. Integral Calculus:

Comparative Dynamics and Integration,

The Nature of Indefinite Integrals,

Rules of Integrations and Operation: Substitution Rule, Integration by parts.

Definite integrals and their properties, Definite Integrals and Area under a curve,

Improper integrals, Economic Applications of Integrals: Finding total functions from marginal functions, Investment & capital formation, Present value (PV) of cash flow, P.V. of a Perpetual Flow, The Domar growth model.

### **3. First Order differential equation:**

Meaning and Definition; Homogenous & non-Homogenous cases,

Solution of first order 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, Bernoulli Equation, Separable Variables, Economic Application: Dynamics of market models, Solow growth model.

### **4. Higher Order Differential Equations:**

Solution and Verification of second order linear differential equations with constant coefficients and constant terms,

Dynamic stability of equilibrium, Economic applications: Market models with price expectations,

The Interaction of inflation and unemployment in continuous time,

### **5. First Order Difference Equations:**

Meaning and definition, 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.

## **6. Higher Order Difference Equations:**

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,

Convergence and the Schur's theorem, Solution of simultaneous difference equations.

## **7. Non-Linear Programming:**

The nature of non-linear programming,

Non-linearities in Economics, Kuhn-Tucker conditions and their interpretation.

The Kuhn-Tucker Sufficiency theorem: Concave programming,

The Arrow-Enthoven Sufficiency theorem: Quasi-concave programming  
Economic applications: Utility maximization, Least-cost combination

## **Recommended Books**

1. Chiang, A.C. and Kevin Wainwright. *Fundamental Methods of Mathematical Economics*, 4th Edition, McGraw Hill Publishing Company.
2. Gandolfo, G. *Economic Dynamics: Methods and Models*, Latest Edition, North Holland Publishing Company
3. Weber E. Jean, *Mathematical Analysis, Business and Economic Application*, Latest edition, Harper and Row Publishers, Netherlands.
4. Hoy M., Livermois J, Rees R, Stengos T. *Mathematic for Economics*, Addison & Wesley Publish.