DAV UNIVERSITY JALANDHAR

Course Scheme & Syllabus

For

B.Sc. (Hons.) Economics
(Program ID-183)

Ist TO 6th SEMESTER Examinations

2015–2016 Session Onwards

Syllabi Applicable For Admissions in 2015

Scheme of Courses (Program ID-183)
B.Sc. (Hons.) Economics: B Sc (Hons) In Economics

Category of Course	No of Courses	Credit Per course	Total Credits
Core Discipline	17	4	68
Skill Enhancement Course (SEC)	2	4	14
	1	3	
	1	1	
	1	2	
Ability Enhancement Course (AEC)	2	4	16
	1	3	
	1	1	
	2	2	
Discipline Specific Elective (DSE)	8	4	32
Interdisciplinary General Elective (IGE)	1	4	4
Dissertation/Project	-	-	-
		TOTAL	134

Scheme of B.Sc. (Hons.)
B.Sc. (Hons.) Economics

Semester 1

S. No	Paper Code	Course Title	L	T	P	Cr.	Course Type
1	ECO105	Microeconomics-1	4	0	0	4	Core Discipline
2	ECO106	Macroeconomics-1	4	0	0	4	Core Discipline
3	ECO107	Mathematics for Economists-1	4	0	0	4	Core Discipline
4	EVS100	Environmental Studies	4	0	0	4	Ability Enhancement Course (AEC)
5	ENG151A	Communication Skills	3	0	0	3	Ability Enhancement Course (AEC)
6	ENG152	Communication Skills Lab	0	0	2	1	Ability Enhancement Course (AEC)
7	CSA151	Computer Applications in Business	3	0	0	3	Skill Enhancement Course (SEC)
8	CSA153	Computer Applications in Business	0	0	2	1	Skill Enhancement Course (SEC)
						24	

Semester 2

S.No	Paper Code	Course Title	L	T	P	Cr.	Course Type
1	ECO109	Microeconomics-II	4	0	0	4	Core Discipline
2	ECO110	Macroeconomics-II	4	0	0	4	Core Discipline
3	ECO111	Mathematics for Economists-II	4	0	0	4	Core Discipline
4	CSA105	Principles of Programming and Algorithms using C	4	0	0	4	Skill Enhancement Course (SEC)
5	CSA108	C Programming Laboratory	0	0	4	2	Skill Enhancement Course (SEC)
6	SGS107	Human Values and General Studies	4	0	0	4	Skill Enhancement Course (SEC)
						22	

Semester 3

S.No	Paper Code	Course Title	L	T	P	Cr.	Course Type
1	ECO205	Microeconomics-III	4	0	0	4	Core Discipline
2	ECO206	Macroeconomics-III	4	0	0	4	Core Discipline
3	ECO207	Mathematics For Economists-III	4	0	0	4	Core Discipline
4	ECO210	Statistics-I	4	0	0	4	Core Discipline
5	ECO209	Labour Economics	4	0	0	4	Discipline Specific Elective (DSE)
6	ENG351	Business Communication	4	0	0	4	Ability Enhancement Course (AEC)
						24	

Semester 4

S. No	Paper Code	Course Title	L	T	P	Cr.	Course Type
1	ECO211	Development Economics-I	4	0	0	4	Core Discipline
2	ECO212	Econometrics-I	4	0	0	4	Core Discipline
3	ECO216	Statistics –II	4	0	0	4	Core Discipline
4	ECO214	Money and Banking	4	0	0	4	Discipline Specific Elective (DSE)
5	ECO215	Public Finance	4	0	0	4	Discipline Specific Elective (DSE)
						20	

Semester 5

S. No	Paper Code	Course Title	L	T	P	Cr.	Course Type
1	ECO301	Development Economics-II	4	0	0	4	Core Discipline
2	ECO302	Agricultural Economics	4	0	0	4	Discipline Specific Elective (DSE)
3	ECO300	Statistics-III	4	0	0	4	Core Discipline
4	ECO303	Econometrics-II	4	0	0	4	Discipline Specific Elective (DSE)
5	ECO304	Environmental Economics	4	0	0	4	Discipline Specific Elective (DSE)
6	ECO305	Workshop on SPSS Software	0	0	2	2	Ability Enhancement Course (AEC)
						22	

Semester 6

S. No	Paper Code	Course Title	L	T	P	Cr.	Course Type
1	ECO306	International Economics	4	0	0	4	Core Discipline
2	ECO307	Indian Economy	4	0	0	4	Core Discipline
3	ECO308	Industrial Economics	4	0	0	4	Discipline Specific Elective (DSE)
4	ECO309	Economics of Health & Education	4	0	0	4	Discipline Specific Elective (DSE)
5	ECO310	Operational Research	4	0	0	4	Interdisciplinary General Elective (IGE)
6	ECO311	Seminar on Contemporary issues	0	0	2	2	Ability Enhancement Course (AEC)
						22	

Discipline Specific Elective (DSE)

S. No	Paper Code	Course Title	L	T	P	Cr.	Course Type
1	ECO209	Labour Economics	4	0	0	4	Discipline Specific Elective (DSE)
2	ECO214	Money and Banking	4	0	0	4	Discipline Specific Elective (DSE)
3	ECO215	Public Finance	4	0	0	4	Discipline Specific Elective (DSE)
4	ECO302	Agricultural Economics	4	0	0	4	Discipline Specific Elective (DSE)
5	ECO303	Econometrics-II	4	0	0	4	Discipline Specific Elective (DSE)
6	ECO304	Environmental Economics	4	0	0	4	Discipline Specific Elective (DSE)
7	ECO308	Industrial Economics	4	0	0	4	Discipline Specific Elective (DSE)
8	ECO309	Economics of Health & Education	4	0	0	4	Discipline Specific Elective (DSE)
						22	

L	T	P	Credits
4	0	0	4

Course Title: Microeconomics – I

Course Code: ECO105

Course Objectives:

This course develops the understanding of the students regarding the basic concepts of microeconomics which involves decision making at the individual economic agent level – consumer and producer.

Unit I   **(15 Hours)**

Introduction to Economics: Meaning, Definition, Scope, Importance and Basic problems of an economy. Demand and Supply functions, Market Equilibrium, Shift in market equilibrium due to change in demand and supply.
Elasticity of demand: Methods of calculating price, income and cross elasticities; Degrees and their interpretation, relationship among various types of elasticities.

Unit II   **(15 Hours)**

Consumer Choice: Cardinal theory, derivation of demand in case of one or more goods; Ordinal theory: Budget sets, Indifference curves: the rate and elasticity of substitution. Consumer equilibrium; effects of change in prices and income; Engels curve. Derivation of demand curve. Income and substitution effects: Hicks and Slutsky. Revealed preference theory: strong and weak axioms and the derivation of demand curve.

Unit III   **(16 Hours)**

Theory of production: Production function, isoquants, properties of isoquants, iso-cost lines, optimum input combination, Expansion Path, returns to a factor and returns to scale and their compatibility. Marginal rate of technical substitution, Principle of marginal rate of technical substitution, Law of variable proportion. Elasticity of technical substitution; economies of scale; general concept of Linear homogenous production function and its properties; Cobb-Douglas production function.

Unit IV   **(14 Hours)**

Theory of Cost: concept of economic cost; Short run and long run cost curves; increasing and decreasing cost industries; envelope curve; L-shaped cost curves;
Revenue analysis: concept of total revenue, marginal revenue and average revenue & their relationships,

Suggested Readings:

1. Bernheim, B. D., M. Whinston and A. Sen. *Microeconomics*. Tata McGraw-Hill Education.
2. Koutsoyiannis, A. *Modern Microeconomics*. Palgrave Macmilian, Second Edition, 2003
3. Lipsey*, G.* and K.A. Chrysal. *Economics*. Oxford University Press. 2004.
4. Mankiw, N.Gregory. *Principles of Economics*. Worth Publishers. 2007. Seventh Edition.
5. Salvatore, D. *Microeconomics: Theory and Applications*. Oxford University Press. 2008
6. Samuelson, P.A. and W. D. Nordhaus. *Economics*. Tata McGraw Hill. 2005.

Course Title: Macroeconomics – I

Paper Code: ECO106

L	T	P	Credits
4	0	0	4

Course Objectives:

- To understand the conceptual and practical framework of the economy as a whole.
- To understand the various methods used in national income accounting.

Unit I   **(14 Hours)**

Introduction to Macroeconomics; Meaning, Nature and scope, importance, Micro vs. Macroeconomics and its limitations. Circular flow of income in two, three and four sectors economies; Variables: Real and nominal; Induced and autonomous; Lagged and un-lagged; ex-ante and ex- post; Model and Equations; Equality & identity; stock and flow; Static, Equilibrium and Disequilibrium.

Unit II   **(14 Hours)**

National Income: Definition: Economic and Non- Economic Production: Productive Vs Non-productive, intermediate and final output; Concepts of national income. Measurement of National Income: National income: Concepts, components and methods of measurement; Income, Output and Expenditure methods, Difficulties in national income measurement. Nominal and Real GNP.

Unit III   **(16 Hours)**

National Accounts: Meaning, objectives and importance. Different methods of preparing national income accounts; Social Income Accounts, Fund Flow Accounting, Balance of Payment method and Input Output method.

GNP and Welfare; Inter temporal and international comparisons of National income.

Unit IV   **(16 Hours)**

Determination of Income and Employment: Classical View: Labour Market; Product Market and Money Market.

Say's Law of Markets (Barter and a monetized economy). Classical theory of income, output and income determination.

Suggested Readings:

1. Ackley, G. *Macro Economics: Theory and Policy*. Macmillan publishers. 1978.
2. Branson, William H. *Macro-Economic Theory and Policy*. Indian edition.
3. Dornbush, R., S. Fisher and R. Startz. Macro Economics. Tata Mc. Graw Hill. 2004.
4. Rana, K.C. and K.N. Verma. *Macro-Economic Analysis*. Vishal Publishing Co. 2014.
5. Shapiro, Edward. *Macroeconomic Analysis*. Galgotia Publications. 1999. Indian edition.

L	T	P	Credits
4	0	0	4

Course Title: Mathematics for Economists-I

Course Code: ECO107

Course Objectives:

• To understand the basic and advanced concepts of quantitative techniques.
• To make the students conversant with various quantitative techniques used in Economics for decisions making.
• To understand the concepts and theories underlying some applications of quantitative techniques in research issues.

Unit-I   **(15 Hours)**

The straight line, Mathematical modelling, Applications: Demand, Supply, Cost, and Revenue. Translations of linear Functions, elasticity of demand, Supply and Income, Budget and cost constraints, Excel for linear Functions.

Unit-II   **(15 Hours)**

Simultaneous equations: Solving simultaneous equations, Equilibrium and break even, Consumer and producer surplus, Non-linear functions and applications; Quadratic, Cubic and other polynomial functions. Exponential functions.

Unit-III   **(15 Hours)**

Arithmetic Progression; Definition nth term of an A.P, sum of n terms, Arithmetic mean, A.M. between two numbers, application of A.P. series, Geometric Progression; Definition, nth terms of G.P. series, sum of n terms, Geometric mean between two numbers, Application of G.P. series

Unit –IV   **(15 Hours)**

Financial Mathematics: Simple interest, compound interest and annual percentage rates, depreciation, net present value and internal rate of return, Annuities, debt repayments, Sinking funds, the relationship between interest rate and the prices of bonds.

Suggested Readings:

1. Bradley T. Paul Patton. *Essential Mathematics for Economics and Business*. Wiley Publication. 2014.

2. Chiang, A.C. *Fundamental Methods of Mathematics Economics*. McGraw Hill. 2005.

3. Kandoi, B. *Mathematics for Business and Economics with Applications*.Volume-1. Himalaya Publishing House. New Delhi. 2011.

4. Kandoi, B. *Mathematics for Business and Economics with Applications*.Volume-1I. Himalaya Publishing House. New Delhi. 2011.

5. Yamane, T. *Mathematics for Economist*. Prentice Hall of India. New Delhi. 2001.

Course Title: Environmental Studies
Course Code: EVS100

L	T	P	Credits
4	0	0	4

Course Objective: This course aims at understanding the students in aspects of environmental problems, its potential impacts on global ecosystem and its inhabitants, solutions for these problems as well as environmental ethics which they should adopt to attain sustainable development.

Unit 1

The multidisciplinary nature of environmental studies   **(2 Hours)**

Definition, scope and importance, Need for public awareness

Natural Resources: Renewable and non-renewable resources: **(8 Hours)**

Natural resources and associated problems.

(a) **Forest resources:** Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

(b) **Water resources:** Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

(c) **Mineral resources:** Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

(d) **Food resources:** World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.

(e) **Energy resources:** Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources, case studies.

(f) **Land resources:** Land as a resource, land degradation, man induced landslides, soil erosion and desertification.

- Role of an individual in conservation of natural resources.
- Equitable use of resources for sustainable lifestyles.

Ecosystem: **(4 Hours)**

- Concept of an ecosystem
- Structure and function of an ecosystem
- Producers, consumers and decomposers
- Energy flow in the ecosystem

- Ecological succession
- Food chains, food webs and ecological pyramids
- Introduction, types, characteristic features, structure and function of the following ecosystem:

a. Forest ecosystem

b. Grassland ecosystem

c. Desert ecosystem

d. Aquatic ecosystems (ponds, streams, lakes, rivers, ocean estuaries)

Unit II

Biodiversity and its conservation   **4 Hours**

- Introduction – Definition: Genetic, Species and Ecosystem Diversity
- Bio-geographical classification of India
- Value of biodiversity: Consumptive use, Productive use, Social, Ethical, Aesthetic and Option values
- Biodiversity at global, national and local levels
- India as a mega-diversity nation
- Hot-spots of biodiversity
- Threats to biodiversity: habitat loss, poaching of wildlife, man wildlife conflicts
- Endangered and endemic species of India
- Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity, global and national efforts.

Environmental Pollution   **8 Hours**

- Definition, causes, effects and control measures of:

a. Air pollution

b. Water pollution

c. Soil pollution

d. Marine pollution

e. Noise pollution

f. Thermal pollution

g. Nuclear pollution

- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution
- Pollution case studies
- Disaster management: floods, earthquake, cyclone and landslides

Unit III

Social Issues and the Environment   **7 Hours**

- Population growth, variation among nations, Population explosion – Family Welfare Programmes.
- Environment and human health,
- From unsustainable to sustainable development
- Urban problems and related to energy
- Water conservation, rain water harvesting, watershed management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics: Issues and possible solutions
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation
- Consumerism and waste products
- Environmental Laws: The Environment Protection Act, 1986; The Air (Prevention and Control of Pollution) Act, 1981; The Water (Prevention and control of Pollution) Act 1974; The Wildlife Protection Act, 1972; Forest Conservation Act, 1980.
- Issues involved in enforcement of environmental legislation
- Public Awareness

Unit IV

Human Population and Environment5 Hours

- Population Growth and Variations among Nations
- Population Explosion
- Human Rights
- Value Education
- HIV / AIDS
- Women and Child Welfare
- Role of Information Technology in Environment and Human Health
- Case Studies

Field Work   **5 Hours**

- Visit to a local area to document environmental assets river/ forest/ grassland/hill/mountain
- Visit to a local polluted site – Urban / Rural / Industrial / Agricultural
- Study of common plants, insects, birds
- Study of simple ecosystems-Pond, river, hill slopes, etc (Field work equal to 5 lecture hours)

Suggested Readings:

1. Odum, EP. *Basic Ecology*. Japan: Halt Saundurs. 1983.
2. Botkin, DB and Kodler EA. *Environmental Studies: The Earth as a living planet.* New York: John Wiley and Sons Inc., 2000.
3. De, A. K. *Environmental Chemistry*. New Delhi: Wiley Eastern Ltd. 1990.
4. Sharma, P. D. *Ecology and Environment*. Meerut. Rastogi Publications. 2004
5. Singh, J. S. Singh, S. P. and Gupta S. R. Ecology, *Environment and Resource Conservation.* New Delhi: Anamaya Publishers. 2006.

Course Title: Basic Communication Skills
Course Code: ENG151A

L	T	P	Credits
4	0	0	4

Course Objective:
To enhance students' vocabulary and comprehensive skills through prescribed texts.
- To hone students' writing skills.

Learning Outcomes: Students will be able to improve their writing skills as well as will enrich their word power.

Unit – A Applied Grammar (Socio-Cultural Context)

- Parts of Speech: Noun, Pronoun, Adjective, Verb, Adverb, Preposition, Conjunction, Interjection **4 hours**

- Tenses (Rules and Usages in Socio-cultural contexts) **5 hour**

- Modals: Can, Could, May, Might, Will, Would, Shall, Should, Must, Ought to **4 hours**

- Passives **3 hours**

- Reported/Reporting Speech **3 hour**

Unit – B Reading (Communicative Approach to be Followed)

- J M Synge: Riders to the Sea   (One Act Play) **5 hours**

- Anton Chekhov : Joy   (Short Story) **4 hours**

- Swami Vivekanand : The Secret of Work (Prose) **5 hours**

Unit – C Writing

- Paragraph and Essay Writing *4 Hours*

- Letter Writing: Formal and Informal *4 hours*

- Notice and Email *4 hours*

References:
a. **Books**

1. Kumar, Sanjay and PushpLata. *Communication Skills*. India: OUP, 2012.

2. Vandana, R. Singh. *The Written Word* by. New Delhi: Oxford University Press, 2008.

b. **Websites**
1. www.youtube.com (to download videos for panel discussions)

2. www.letterwritingguide.com

3. www.teach-nology.com

4. www.englishforeveryone.org

5. www.dailywritingtips.com

6. www.englishwsheets.com

7. www.mindtools.com

Course Title: Basic Communication Skills
Course Code: ENG152

L	T	P	Credits
4	0	0	4

Course Objective:

- To improve fluency in speaking English.

- To promote interactive skills through Group Discussions and role plays.

Learning Outcome: Students will get exposure to speaking through the above mentioned interactive exercises. In addition, they will develop a technical understanding of language learning software, which will further improve their communicative skills.

Unit – A Speaking/Listening	
• Movie-Clippings	10 hours
• Role Plays	10 hours
• Group Discussions	10 hours

Instructions:

1. Each student will prepare a scrap file on any of the topics given by class teacher. Student should be able to justify the contents of his/her Scrap file, which carries the weightage of 10 marks. Marks will be given for originality, creativity and presentation of thoughts.
2. In the end of semester, viva exam will be conducted. Viva will be for 10 marks. Spoken English will be the focus of exam. Examiner will ask questions related to scrap file and other general (non-technical) topics.
3. In the End-term exam, lab activity will carry the weightage of 10 marks.
4. Acknowledge all the sources of information in your scrap file.

References:

Books

1. Gangal, J. K. *A Practical Course In Spoken English*. India: PHI Private Limited, 2012.

2. Kumar, Sanjay and Pushp Lata. *Communication Skills*. India: OUP, 2012.

Websites
1. www.youtube.com (to download videos for panel discussions)

2. www.englishforeveryone.org

3. www.talkenglish.com

4. www.mindtools.com

Course Title: Computer Applications in Business
Course Code: CSA151
Course Duration: 45 Hours

L	T	P	Credits
3	0	0	3

Course Objective: To familiarize the students with computers and their use, and make them proficient in the use of computer applications relevant to business contexts.

UNIT – A   **12 Hours**

Introduction
- Block Diagram of Computer: Basic Functions of Each Component
- Classification of Digital Computers Based on Size
- Uses of Computers
- Operating System Basics - Role of Operating System
- Features of Well Known PC Operating Systems
- Networks & Data Communication
- The Uses of a Network
- How Networks Are Structured: Network Topologies
- Media & Hardware
- Internet & Online Resources: How Internet Works
- Features of the Internet
- Accessing the Internet, Working on the Internet

UNIT – B   **10 Hours**

Word Processing
- Editing and Formatting a Document, Text Formatting, Paragraph Formatting, Headers and Footers
- FIND command & REPLACE command, Checking Spelling and Grammar; On-line Spelling and Grammar correction using Auto correct
- Auto Text, Using Thesaurus, Using Clip Gallery. Inserting Graphics From files
- Working with Tables -Creating Table , Entering Text in the Table
- Changing Format of Text of cells, Changing Column width and Row height, Formatting Table Border
- Using Mail Merge - Mail Merge Procedure, Printing a document

UNIT – C   **12 Hours**

Spreadsheets
- Basic Operations - Arithmetic operators, Comparison operators, Text operator & (ampersand) Reference operator
- Modifying the worksheet layout - Changing Width of Column, Changing Height of Row, Deleting Rows/Columns/Cells, Moving and copying contents of cell, Alignment of text in the cell

- Printing the workbook - Setting up Print Area, Setting up Margins, Defining Header and Footer, Controlling Gridlines
- Working with functions - Date and time function, Statistical function, Financial function, Mathematical and Trigonometric functions.
- Introduction to CHARTS - Formatting Charts

11 Hours

UNIT – D

Presentations

- Creating a presentation slide, Design Templates and Blank presentations
- Power Point standard toolbar buttons
- Working with the text in a slide, Arranging Text in Different Levels
- Changing Font, Font Size and Bold; Moving the frame and inserting clip art; Different slide layouts; Formatting the Slide Design; Work with the Slide Master; Saving the presentation
- The Auto Content Wizard; Using Existing Slides; Using the different views of a slide
- Adding Transitions and Animation, Running Slide Show

Reference Books:

1. A. Simpson, C. Robinson, Mastering Access 2000, New Delhi, BPB
2. Anita Goel, Computer Fundamentals, Pearson
3. K. Kumar, and R. Rajkumar, Computer Applications in Business, Tata McGraw Hill
4. Kogent Learning Solutions Inc, Office 2010 in Simple Steps, Dream Tech Press
5. R. K. Taxali, P C Software Made Simple, New Delhi, Tata McGraw-Hill
6. Silberschatz & A. Korth, Database System Concepts, New York, McGraw-Hill

L	T	P	Credits
0	0	2	1

Course Title: Computer Applications in Business Laboratory
Course Code: CSA153

- The laboratory will comprise of using commands and tools available in MS Word, PowerPoint, and Excel.
- Assignments based on the applications of above mentioned software packages.

Course Title: Microeconomics-II

Course Code: ECO109

L	T	P	Credits
4	0	0	4

Course Objectives:
This course aims to acquaint students with the different market forms and introduces them to the concepts of game theory which would enable them to grasp the strategic behaviour of the firms.

Unit-I   **(15 Hours)**

Perfect competition: its features, price determination, equilibrium of firm and industry in market period, short run and long run; Shut down point, short period and long period supply curves.

Monopoly: Meaning, Assumptions, equilibrium of the monopolist in short and long run, monopoly power, supply curve, Price discrimination: meaning, degrees, conditions and equilibrium in discriminating monopoly, monopoly control and regulation.

Unit-II
                                                                                                             (14 Hours)
Monopolistic competition: meaning, assumptions, product differentiation and demand curve, firm and group equilibrium; Selling costs, excess capacity, Dumping.

Price determination under monopsony and bilateral monopoly.

Unit-III   **(15 Hours)**

Oligopoly: meaning, features, causes for the existence of oligopoly, approaches to the determination of price and output under oligopoly; Non-Collusive Oligopoly: Cournot, Bertrand, and Kinked demand curve model. Collusive Oligopoly: Cartels and price leadership models; Baumol's sales maximization model of oligopoly firm.

Unit IV   **(16 Hours)**
Firm's Managerial Theories - Williamson's model, Marris model; Limit pricing theory.
Game Theory: basic concepts; Prisoner's Dilemma; competitive strategy: dominant strategies and Nash equilibrium, repeated games, threats, commitments and credibility.

Suggested Readings:
1. Bernheim, B. D., M. Whinston and A. Sen. *Microeconomics*. Tata McGraw-Hill Education.
2. Koutsoyiannis, A. *Modern Microeconomics*. Palgrave Macmilian, Second Edition, 2003.
3. Lipsey*, G.* and K.A. Chrysal. *Economics*. Oxford University Press. 2004.
4. Mankiw, N.Gregory. *Principles of Economics*. Worth Publishers. 2007. Seventh Edition.
5. Salvatore, D. *Microeconomics: Theory and Applications*. Oxford University Press. 2008.
6. Samuelson, P.A. and W.D. Nordhaus. *Economics*. Tata McGraw Hill. 2005.

L	T	P	Credits
4	0	0	4

Course Title: Macroeconomics – II
Course Code: ECO110

Course Objectives: The course aims to make the students understand, the main problems found in economy in different periods of time and to analyze how government expenditures and taxation can be used to stimulate or slow the market economy and the possible consequences of such acts.

Unit-I   **(12 Hours)**

Basic Concepts: Full employment and various types of unemployment. Aggregate demand and aggregate supply functions. Effective demand: Determinants of effective demand, determination of effective demand, importance of effective demand.

Unit-II
                                                                              (16 Hours)
Keynesian Economics: Keynes consumption function; saving and investment functions. Psychological law of consumption. Determination of income, employment and output in Keynesian frame work in a two sector, three sector and four sector economy. Paradox of thrift.

Unit-III
                                                                              (16 Hours)

Multiplier: Static and Dynamic analysis. Balanced – budget multiplier. Foreign trade multiplier. The principle of acceleration and Super Multiplier.
Theories of Consumption: Absolute Income Hypothesis; Relative Income Hypothesis; Permanent Income Hypothesis and Life Cycle Hypothesis.

Unit-IV   **(16 Hours)**
The Marginal Efficiency of Investment, Relationship between the MEC and MEI, Factor affecting inducement to investment; Classical theory of investment; Keynesian theory of investment; Accelerator theory of investment; Neo-classical theory of investment.

Suggested Readings:

1. Ackley, G. *Macro Economics Theory and Policy*. Macmillan publishers. 1978.
2. Branson, William H. *Macro-Economic Theory and Policy*. Indian edition.
3. Dornbush, R., S. Fisher and R. Startz. *Macro Economics*. Tata McGraw Hill. 2004.
4. Rana, K.C. and K.N. Verma. *Macro-Economic Analysis*. Vishal Publishing Co. 2014.
5. Shapiro, Edward. *Macroeconomic Analysis*. Galgotia Publications. 1999. Indian edition.

Course Title: Mathematics for Economists –II

Course Code: ECO111

L	T	P	Credits
4	0	0	4

Course Objectives: The students are to develop skills in mathematical techniques that are required for a meaningful study of both theoretical and applied economics.

UNIT-I   **(14 Hours)**

Sets and Relations: Functions-types of function and its application in economics, System of equations and Inequalities in Market Equilibrium

Unit II   **(15 Hours)**

Differentiation: Rules of differentiation, Economic Applications; Marginal revenue, average revenue, total revenue, marginal cost, average cost and total cost. Partial differentiation.

Unit III   **(16 Hours)**

Maxima and Minima, profit maximisation. Integration: rules of integration. Consumer and producers surplus.

Unit IV   **(15 Hours)**

Linear Algebra: Matrices, types, products of matrices, inverse of matrix, rank of a matrix, determinants, simultaneous linear equations (Cramer's rule). Rank method

Suggested Readings:

1. Bradley T. Paul Patton. *Essential Mathematics for Economics and Business*. Wiley Publication. 2014
2. Chiang, A.C. *Fundamental Methods of Mathematics Economics*. McGraw Hill. 2005
3. Kandoi, B. *Mathematics for Business and Economics with Applications.* Volume-I, Himalaya Publishing House. New Delhi. 2011.
4. Kandoi, B. *Mathematics for Business and Economics with Applications*. Volume-II, Himalaya Publishing House. New Delhi. 2011.
5. Monga, G.S. *Mathematics and Statistics for Economics*. Vikas Publication. New Delhi. 2005.
6. Yamane, T. *Mathematics for Economist.* Prentice Hall of India. New Delhi. 2001.

Course Title: Principles of Programming and Algorithms using C

Course Code: CSA105

L	T	P	Credits
4	0	0	4

Course Duration: 45-60 Hours

Course Objective: The objective of this course is to help the students in finding solutions to various real life problems and converting the solutions into computer program using C language (structured programming). Students will learn to write algorithm for solutions to various real-life problems. Converting the algorithms into computer programs using C language.

UNIT-A   15 Hours

Logic Development and Program Development Tools

- Data Representation, Flowcharts, Problem Analysis
- Decision Trees/Tables, Pseudo Code and Algorithms,
- Program Debugging, Compilation and Execution.

Fundamentals

- Character Set, Identifiers and Key Words, Data Types
- Constants, Variables, Expressions, Statements, Symbolic Constants.

Operations and Expressions

- Arithmetic Operators, Unary Operators, Relational Operators,
- Logical Operators, Assignment and Conditional Operators, Library functions.

UNIT-B   12 Hours

Data Input and Output

- Single Character Input, Single Character Output, Entering Input Data
- More About Scan Functions, Writing Output Data, More About Print Functions
- Gets and Puts Functions, Interactive Programming.

Control Structures

- Introduction, Decision Making with If – Statement, If Else and Nested If,
- While And Do-While, For Loop.
- Jump Statements: Break, Continue, Goto, Switch Statement.

Functions

- Introduction To Functions, Function Declaration, Function Categories
- Standard Functions, Parameters And Parameter Passing, Pass – By Value/Reference
- Recursion, Global and Local Variables, Storage Classes.

UNIT-C   10 Hours

Arrays

- Introduction to Arrays, Array Declaration, Single and Multidimensional Array, Memory Representation, Matrices, Strings, String Handling Functions.

Structure and Union

- Declaration of Structure, Accessing Structure Members, Structure Initialization, Arrays of Structure, Nested Structures, Unions.

UNIT-D   **8 Hours**

Pointers

- Introduction To Pointers, Address Operator And Pointers, Declaring and Initializing Pointers,
- Assignment through Pointers, Pointers and Arrays.

Files

- Introduction, Creating a Data File, Opening and Closing a Data File, Processing a Data File.

Preprocessor Directives

- Introduction and Use, Macros, Conditional Preprocessors, Header Files

Reference Books

1. Yashvant P Kanetkar, Let us C, BPB Publications, New Delhi, Seventh Edition.
2. Balaguruswamy, Programming in ANSI C.
3. Byron S. Gottfried, Programming in C, McGraw Hills, Second Edition.
4. E. Balagurusami, Programming in ANSI C, Tata McGraw Hill, Fourth Edition.
5. Kernighan & Richie, The C Programming Language, PHI Publication, Second Edition.
6. Schaum Outline Series, Programming in C.

Course Title: C Programming Laboratory
Course Code: CSA108

L	T	P	Credits
0	0	4	2

Implementation of C programming concepts:

- Control Structures, Loops, Arrays, Strings
- Functions, Structures, Union, Files, etc.

Course Title: Human Values and General Studies

Course Code: SGS107

L	T	P	Cr.
4	0	0	4

Course Objectives

a) To sensitize students about the role and importance of human values and ethics in personal, social and professional life.

b) To enable students to understand and appreciate ethical concerns relevant to modern lives.

c) To prepare a foundation for appearing in various competitive examinations

d) To sensitize the students about the current issues and events of national and international importance

e) To provide opportunity to the students to study inter disciplinary subjects like Geography, Science, Economy, Polity, History, International Relations etc.

Part - A

Human Values

1. **Concept of Human Values:** Meaning, Types and Importance of Values. **2 Hrs**
2. **Value Education :** Basic guidelines for value education   **2 Hrs**
3. **Value crisis and its redressal**   **1 Hrs**

Being Good and Responsible

1. Self Exploration and Self Evaluation   **2 Hrs**
2. Acquiring Core Values for Self Development   **2 Hrs**
3. Living in Harmony with Self, Family and Society   **3 Hrs**

| 4. | Values enshrined in the Constitution: Liberty, Equality | **3 Hrs** |
| | Fraternity and Fundamental Duties | |

Part - B

Value – based living

1.	Vedic values of life	**2 Hrs**
2.	*Karma Yoga* and *Jnana Yoga*	**2 Hrs**
3.	*Ashta Marga* and *Tri-Ratna*	**2 Hrs**

Ethical Living:

1.	Personal Ethics	**2 Hrs**
2.	Professional Ethics	**3 Hrs**
3.	Ethics in Education	**2 Hrs**

Part-C

General Geography

World Geography   **3 Hrs**

The Universe, The Solar System, The Earth, Atmosphere, The World we live in, Countries rich in Minerals, Wonders of the World, Biggest and Smallest.

Indian Geography   **3 Hrs**

Location, Area and Dimensions, Physical Presence, Indian States and Union Territories, Important sites and Monuments, Largest-Longest and Highest in India.

General History   **3 Hrs**

Glimpses of India History, Ancient Indian, Medieval India, Modern India, Various Phases of Indian National Movement, Prominent Personalities, Glimpses of Punjab history with special reference to period of Sikh Gurus

Glimpses of World History   **3 Hrs**

Important Events of World History, Revolutions and Wars of Independence, Political Philosophies like Nazism, Fascism, Communism, Capitalism, Liberalism etc.

Indian Polity: Constitution of India   **3 Hrs**

Important Provisions, Basic Structure, Union Government, Union Legislature and Executive, State Government: State Legislature and Executive, Indian Judiciary, The Election Commission, Panachayati Raj System, RTI etc.

General Economy   **3 Hrs**

The process of liberalization, privatization, globalization and Major World Issues, Indian Economy, Indian Financial System, Major Economic Issues, Economic Terminology.

Part-D

General Science   **3 Hrs**

General appreciation and understandings of science including the matters of everyday observation and experience, Inventions and Discoveries

Sports and Recreation   **3 Hrs**

The World of Sports and recreation, Who's Who is sports, Major Events, Awards and Honours. Famous personalities, Festivals, Arts and Artists

Current Affairs   **3 Hrs**

National and International Issues and Events in News, Governments Schemes and Policy Decisions

Miscellaneous Information

Who is who   **2 Hrs**

Books and Authors, Persons in News, Awards and Honours, Abbreviations and Sports

References:

Human Values, A N Tripathi, New Age International Publishers, New Delhi, Third Edition, 2009

1. Professional Ethics, R. Surbiramanian, Oxford University Press, New Delhi, 2013.

2. Human Values and Professional Ethics, Rishabh Anand, Satya Prakashan, New Delhi, 2012

3. Human Values and Professional Ethics, Sanjeev Bhalla, Satya Prakashan, New Delhi, 2012.

4. Human Values and Professional Ethics, Ritu Soryan Dhanpat Rai & Co. Pvt. Ltd., First Edition, 2010.

5. Human Values and Professional Ethics by Suresh Jayshree, Raghavan B S, S Chand & Co. Ltd. , 2007.

6. Human Values and Professional Ethics, Yogendra Singh, Ankur Garg, Aitbs publishers, 2011.

7. Human Values and Professional Ethics, Vrinder Kumar, Kalyani Publishers, Ludhiana, 2013.

8. Human Values and Professional Ethics, R R Gaur, R. Sangal, GP Bagaria, Excel Books, New Delhi 2010.

9. Values and Ethics, Dr. Bramwell Osula, Dr. Saroj Upadhyay, Asian Books Pvt. Ltd., 2011.

10. Indian Philosophy, S. Radhakrishnan, George Allen & Unwin Ltd., New York: Humanities Press INC, 1929.

11. Essentials of Hinduism, Jainism and Buddhism, A N Dwivedi, Books Today, New Delhi – 1979

12. Dayanand : His life and work, Suraj Bhan, DAVCMC, New Delhi – 2001.

13. Esence of Vedas, Kapil Dev Dwivedi, Katyayan Vedic Sahitya Prakashan, Hoshiarpur, 1990.

14. Vedic Concepts, Prof. B B Chaubey, Katyayan Vedic Sahitya Prakashan, Hoshiarpur, 1990.

15. Advance Objective General Knowledge, R. S. Aggarwal, S. Chand Publisher (2013)

16. Concise General Knowledge Manual 2013, S. Sen, Unique Publishers,2013

17. Encyclopedia of General Knowledge and General Awareness by R P Verma, Penguin Books Ltd (2010)

18. General Knowledge Manual 2013-14, Edgar Thorpe and Showick Thorpe, The Pearson, Delhi.

19. General Knowledge Manual 2013-14, Muktikanta Mohanty, Macmillan Publishers India Ltd., Delhi.

20. India 2013, Government of India (Ministry of Information Broadcasting), Publication Division, 2013.

21. Manorama Year Book 2013-14, Mammen Methew, Malayalam Manorama Publishers, Kottayam, 2013.

22. Spectrum's Handbook of General Studies – 2013-14, Spectrum Books (P) Ltd., New Delhi

CURRENT AFFAIRS

Magazines

Economic and Political Weekly, Yojna, the Week, India Today, Frontline, Spectrum.

Competition Success Review, Competition Master, Civil Services Chronicle, Current Affairs, World Atlas Book

Newspapers

The Hindu, Times of India, The Hindustan Times, The Tribune

Course Title: Microeconomics-III
Paper Code: ECO205

L	T	P	Credits
4	0	0	4

Course Objectives:

The course acquaints the students about the price determination of various factors of production so as to decide the price of the product. It also helps the students to use microeconomic techniques to study how allocation of resources affects welfare at the economy-wide level.

Unit-1   **(16 Hours)**

Factor Pricing: Marginal productivity theory of distribution and determination of factor prices under different market forms; Euler's Theorem.

Economic Rent: concepts (such as quasi rent etc.) and theories of rent determination - Ricardian and Modern theory.

Unit-II   **(16 Hours)**

Edgeworth box: 2 good, 2 factor, 2 consumer analysis and Pareto optimality conditions; market trade; Walras Law; Relative prices; Equilibrium and efficiency; Grand Utility possibility frontier. Implication of first and second welfare theorem

Unit-III   **(16 Hours)**

Welfare Economics: Concepts, Compensation Principle (Kaldor-Hicks, Scitovsky criteria), Social Welfare Function, Theory of Second best, Arrow' s Impossibility, First and Second theorem of welfare;

Unit-IV   **(13 Hours)**

Market Failures: concept of externality - production, consumption and pecuniary, public goods.

Suggested Readings:

1. Bernheim, B. D., M. Whinston and A. Sen. *Microeconomics*. Tata McGraw-Hill Education.
2. Koutsoyiannis, A. *Modern Microeconomics*. Palgrave Macmilian, Second Edition, 2003
3. Lipsey*, G*. and K.A. Chrysal. *Economics*. Oxford University Press. 2004.
4. Mankiw, N.Gregory. *Principles of Economics*. Worth Publishers. 2007. Seventh Edition.
5. Salvatore, D. *Microeconomics: Theory and Applications*. Oxford University Press. 2008
6. Samuelson, P.A. and W.D. Nordhaus. *Economics*. Tata McGraw Hill. 2005.

L	T	P	Credits
4	0	0	4

Course Title: Macroeconomics-III
Paper Code: ECO206

Course Objectives:
The aim of the course is to analyse the process of economic growth, reviewing alternative approaches with a view to attaining a greater understanding of the diverse experiences of different economies, and suggesting policy implications. In addition to it, the IS-LM analysis of monetary and fiscal policy will be extended to confront problems of policy design.

Unit 1 (16 Hours)

The IS Curve and Goods Market Equilibrium: Derivation and Interpretation of Slope, the IS Curve and Fiscal Policy, Alternative Formulation of Goods Market Equilibrium, Savings-Investment Equality

The Money Market: The bond price and interest rate - inverse relation, Money Supply Control by RBI (preliminary), The Demand for Money: The Liquidity Preference Theory - Speculative Demand, Determination of Interest Rate, and Transaction Demand for Money, The Liquidity Trap.

Money Market and LM Curve - Derivation and Shifts, IS-LM Model Combined / Interaction, Fiscal Policy in IS-LM Model: Changes in G, Changes in Taxes, the Crowding-out effect, Monetary Policy: Expansionary &Contractionary, Monetary Transmission Mechanism.

Unit-II (16 Hours)

Trade Cycles: Features, Keynes' view on trade cycle, Schumpeter, Kaldor Samuelson, Hicks models, control of trade cycle.

Inflation: Causes, consequences and cures, theories of inflation: Classical, Neo-Classical, Keynesian, Monetarist view, Modern theory of Inflation (demand Pull and Cost push inflation) Inflation – unemployment trade off. Natural rate of unemployment.

Unit-III (14 Hours)
Open Economy: Trade Balance and Exchange Rates: Nominal Exchange Rate and Real Exchange Rate, PPP: Absolute and Relative Purchasing Power Parity; Devaluation and Revaluation; J-Curve ; Exchange Rate Regime: Perfect Capital Mobility under Fixed Exchange Rate; Perfect Capital Mobility under Flexible Exchange Rate; The effectiveness of Fiscal Policy and Monetary Policy in Mundell-Fleming model under different exchange rate regimes; Policy mix as optimal tool for internal and external balance under perfect capital mobility

Unit-IV (14 Hours)
Monetary Policy: Instruments, objectives and effectiveness in recession and boom.
Fiscal Policy: Instruments and full employment; budget surplus; problems of stabilization policy.
Recent Developments in Macro Economics

Suggested Readings:

1. Ackley, G. *Macro Economics Theory and Policy*. Macmillan publishers. 1978.
2. Branson, William H. *Macro-Economic Theory and Policy*. Indian edition.
3. Dornbush, R., S. Fisher and R. Startz. *Macro Economics*. Tata McGraw Hill. 2004.
4. Rana, K.C. and K.N. Verma. *Macro-Economic Analysis*. Vishal Publishing Co. 2014.
5. Shapiro, Edward. *Macroeconomic Analysis*. Galgotia Publications. 1999. Indian edition.

Course Title: Mathematics for Economists -III
Course Code: ECO207

L	T	P	Credits
4	0	0	4

Course Objectives: This course enhance the skills of students by introducing mathematical tools which develop their potential for undertaking economic decisions.

Unit I (13 Hours)

Difference equations and their applications; Linear Homogenous Difference Equation of First order. Non-Linear differential equation of First Order.

Unit II (16 Hours)

Simple Integration and Applications; Rules of Integration, Methods of Integration, Integration by Parts, Economic Applications: Cost, Revenue, Demand Function, Consumer surplus.

Unit III (15 Hours)

Input – Output Analysis: Assumptions; Transaction matrix: Technical coefficients, Hawkin – Simon Conditions, Metzler condition, open and close input-output systems; Dynamic input output analysis (an introduction).

Unit IV (16 Hours)

Linear Programming: Formulation of linear programming problem. Graphical method, Simplex method, Two-phase simplex method, unbounded solution, infeasible solution, degeneracy and cycling problem. Duality theorem, Solution of primal and dual by simplex method. Dual simplex method.

Suggested Readings:

1. Bradley T. Paul Patton. *Essential Mathematics for Economics and Business*. Wiley Publication. 2014.
2. Chiang, A.C. *Fundamental Methods of Mathematics Economics*. McGraw Hill. 2005.
3. Kandoi, B. *Mathematics for Business and Economics with Applications*. Volume-1, Himalaya Publishing House. New Delhi. 2011.
4. Kandoi, B. *Mathematics for Business and Economics with Applications*. Volume-II, Himalaya Publishing House. New Delhi. 2011.
5. Monga, G.S. *Mathematics and Statistics for Economics*. Vikas Publication. New Delhi. 2005.
6. Yamane, T. *Mathematics for Economist*. Prentice Hall of India. New Delhi. 2001.

Course Title: Statistics -1
Course Code: ECO210

L	T	P	Credits
4	0	0	4

Course Objectives:

The main objective of this course is to acquaint students with some basic concepts in Statistics. They will be introduced to some elementary statistical methods of analysis of data.

UNIT-I   **(15 Hours)**

Definition: Scope, Importance and limitation of statistics. Classification and Tabulation of data: discrete and continuous one – way and two – way frequency distribution. Diagrammatic and graphic presentation of Data.

UNIT-II

                                                                                                      (17 Hours)

Measures of Central Tendency; Mean, Median, Mode, GM and HM, properties, merits and demerits. Measure of Dispersion: Absolute and Relative measures of dispersion-Range, Quartile Deviation, Mean Deviation, Standard Deviation and Variance.

UNIT-III

                                                                                                      (12 Hours)

Index Numbers: Meaning scope and limitation of index numbers, problems in construction of index numbers. Tests of Index numbers (time reversal and factor reversal tests), Weighted price and quantity index numbers using aggregate method: Laspeyre's, Paasche's, Fisher's Formulae, cost of living index numbers. Tests for the consistency of index numbers. Use the index numbers to various fields.

UNIT-IV

                                                                                                      (16 Hours)

Correlation: meaning, Types, importance, Methods to measure – Scatter Diagram, Karl Pearson's product moment and spearman's rank correlation.

Regression: Meaning, simple regression, least squares principle, properties of correlation and regression coefficients.

Suggested Readings:

1. Nagar A.L. and R.K. Das. *Basic Statistics*. Oxford University Press. 1976
2. Gupta, S.C. *Fundamentals of Statistics*. Himalaya Publishing House. New Delhi. 2013.
3. Gupta, S.P. *Statistical Methods*. Sultan Chand and Sons. New Delhi. 2012.
4. Gupta C.B. *An Introduction to Statistical Methods*. Vikas Publishing House. New Delhi. 2009.
5. Spiegel, M.R. *Theory &Problems of Statistics*. McGraw Hill. 2009.

Course Title: Labour Economics

Course Code: ECO209

L	T	P	Credits
4	0	0	4

Course Objectives:

This is an applied economics course which aims to develop the understanding of the students regarding the functioning of the labour market and related issues, with special focus on developing economies like India.

Unit I (15 Hours)

Introduction to Labour Economics: Meaning, Scope and Importance,

Labour Demand: Nature, Marginal Productivity Theory and demand for labour under different market forms, Short run and Long run labour demand curve for firm and industry; elasticity of substitution; Marshall's rules of derived demand.

Unit II (16 Hours)

Labour Supply: Neoclassical Model of labour-leisure choice; Effects of changes in non-labour income and wage rate on individual equilibrium; role of income and substitution effect, backward bending supply curve; Individual and market labour supply curve.

Equilibrium in Labour Market: Analysis of equilibrium under the competitive and non-competitive market forms.

Unit III (16 Hours)

Unemployment: History of Economic Thought – classical theory, Keynesian, New Classical, Philips curve, Monetarism; various concepts of unemployment; work participation, labour absorption.

Labour Unions: concepts, models of union behaviour and public policies.

Unit IV (14 Hours)

Rural and Urban Labour Market: Labour Market Reforms in India; Labour Laws in India; Subsistence wage and Minimum Wage Act in India; Contemporary issues (post liberalization era); Welfare programmes, government wage employment and self-employment programmes.

Human Capital; Labour Mobility; Child Labour issues; Issues in developing and transition economies.

Suggested Readings:
1. Borjas, George J. *Labour Economics*. McGraw-Hill Irwin. 2013.
2. Gould, J. P. and P. Edward Lazear. *Microeconomic Theory*. AITBS Publishers and Distributors Delhi. 2001.
3. Government of India. *Indian Labour Yearbooks (various issues),* GOI
4. Kar, Saibal and Debabratta, Datta. *Industrial and Labor Economics: Issues in Developing and Transition Countries*. Springer India. 2015.
5. Smith, Stephen. *Labour Economics*. Routledge. 2003

Course Title: Development Economics-1
Course Code: ECO211

L	T	P	Credits
4	0	0	4

 Course Objectives:
This course acquaints the students with the various theories and models explaining the process of economic growth and development. In addition, the course highlights the contemporary development challenges faced by the developing countries.

Unit 1   **(15 Hours)**

Economic Development: Meaning and its evolution, Amartya Sen's Approach, The Millennium and sustainable development Goals. Growth vs Development - their significance, objectives and core values. Characteristics of Underdevelopment.

Unit II   **(14 Hours)**

Indicators of Development: GDP as a measure of welfare and its criticism. Indicators of Development; Social and Economic Indicators, Physical Quality of Life Index (PQLI), the Human Development Index (HDI). Indicators of Sustainability.

Unit III   **(15 Hours)**

Poverty, Inequality, and Development: Measuring Inequality, Lorenz Curves and Ginni coefficient Kuznets'Inverted - U Hypothesis, Measuring Poverty- Extent and Magnitude, Characteristics of Poverty Groups, The Functional Impact of Poverty.

Unit IV   **(16 Hours)**

Approaches to development (Part 1): Development as growth and the linear stage theories- Rostow's stages of growth, the Harrod – Domar model, criticisms of stages model; Structural Change models- Lewis model of development, Structural changes and pattern of development.

Suggested Readings:

1. Chew, S.C. and R.A. Denmark. *The Underdevelopment of Developmen*t. Sage Publications. New Delhi. 1999.
2. Debraj, Ray. *Development Economics*. Oxford University Press.1998.
3. Meier, G.M. & J.E. Rauch. *Leading Issues in Economic Development*. Oxford University Press. 2000.
4. Taneja, M.L & R.M. Myer. *Economics of Development and Planning*. Vishal Publications. 2014
5. Thirwall. A.P. *Growth and Development*. Palgrave Macmillan Publishers. 7th edition.
6. Todaro, M.P. and Stephen C. Smith. *Economic Development*. Pearson Publications. 2011.

Course Title: Econometrics I

Course Code: ECO212

L	T	P	Credits
4	0	0	4

Course Objective:

The main objective of the course is to introduce students to basic econometrics techniques and develop their potential for application to economic decision making.

Unit-I   **(14 Hours)**

Nature, Meaning and Scope of econometric; Difference between mathematical economics, statistics and econometrics; Methodology of Econometrics .Difference between correlation and regression.

Simple linear regression model (Two variables): Sources of disturbance terms, assumptions, least squares estimators and their properties; Gauss Markov's theorem.

Unit-II   **(13 Hours)**

Multiple regression Model: Definition, assumptions, least–squares estimation. Testing significance of regression coefficients, concepts of R^2 and R^{-2}. Functional forms: Estimation of quadratic, semi–log and double log functions; simple and compound rates of growth (applications).

Unit-III   **(16 Hours)**

Econometric Modeling: Specification of regression model, Model selection criterion and Diagonistic testing. Multicollinearity: Problem consequences, test to detect Multicollinearity, remedies.

Unit-IV   **(17 Hours)**

Autocorrelation and Hetroscedasticity: Nature, Consequences tests and remedies (elementary treatment).

Suggested Readings:

1. Christopher Dougherty. *Introductory Econometrics*. Oxford University Press. 2012.
2. Gujarti, D. N. *Basic Econometrics*. Tata McGraw Hill. 2004.
3. Koutsoyiannis, A. *Theory of Econometrics*. Palgrave Macmillan.2005.

Course Title: Statistics –II

Course Code: ECO216

L	T	P	Credits
4	0	0	4

Course Objectives:

- To enable students to acquire the basic knowledge of statistical tools as required for their understanding of economic issues.
- To enable the students to apply statistical analysis to a range of economic policy problems

Unit-I (13 Hours)

Correlation and Regression Analysis: Partial and multiple correlation coefficients: Derivations, application and properties. Fitting of multiple regression by least squares technique stress on numerical examples.

Unit-II (15 Hours)

Skewness, Moments and Kurtosis: Introduction, Difference between dispersion and Skewness Tests of Skewness, Absolute measure of Skewness, Karl Pearson's coefficient of Skewness, Bowley's coefficient of Skewness Kelly's coefficient of Skewness. Moments about arbitrary origin, Central Moments, Moments about zero. Measures of Kurtosis.

Unit-III (14 Hours)

Time Series Analysis: Meaning, Components: Models, economic significance of time series, methods of estimating trend and seasonal variations. Growth Curves**:** Properties, methods of estimation and applications of parabolic, geometric, exponential, modified exponential, Gompertz and logistic growth curves.

Unit IV

(16 Hours)

Probability: Definition (classical and empirical only), laws of probability, conditional probability and independence of events (applications only) concept of random variables, probability density and mass function, expectation, moments, moment generating function, properties (without proof).

Suggested Readings:
1. Nagar A.L. and R.K. Das. *Basic Statistics*. Oxford University Press. 1976.
2. Gupta, S.C. *Fundamentals of Statistics*, Himalaya Publishing House. New Delhi. 2013.
3. Gupta, S.P. *Statistical Methods*. Sultan Chand and Sons. New Delhi. 2012.
4. Gupta C.B. *An Introduction to Statistical Methods*. Vikas Publishing House. New Delhi. 2009.
5. Spiegel, M.R. *Theory &Problems of Statistics*. McGraw Hill. 2009.

Course Title: Money and Banking
Course Code: ECO214

L	T	P	Credits
4	0	0	4

Course Objectives: This course acquaints the students with the functioning of money market by providing theoretical foundations of money demand and money supply. It also introduces the students to the functioning of banking and financial institutions.

Unit-I (15 Hours)

Money: Introduction, Nature and functions; money and near money;
Demand for money: Fisher, Cambridge, Keynesian and Friedman theories.
Supply of money: mechanics of money supply creation; measures of money supply in India.

Unit-II (14 Hours)

Rate of Interest: Meaning and Classification of Interest, Determination; Factors affecting the level and structure of interest rates.
Theories of interest: Classical theory of interest, Neo classical theory of interest and Keynesian theory of interest.

Unit-III (15 Hours)

Commercial Banking: Meaning, Types, Functions, Theories; credit creation process. Commercial banking in India; Structure; nationalization: objectives, performance and evaluation.
Central Banking: Meaning and functions, techniques of credit control with special reference to India, credit policy in India.

Unit IV
(16 Hours)
Monetary Policy: Targets and indicators; macroeconomic objectives. Monetary policy in less developed countries. Inflation in India.
Indian Monetary and Credit System: System of note-issue; computation of money supply by the RBI. Problems and working of money and capital markets.
International Monetary System: Problem of International liquidity. IMF: Its working and role in international financial system. IBRD: Its Working and role.

Suggested Readings:

1. F. S. Mishkin and S. G. Eakins. *Financial Markets and Institutions*. Pearson Education. 2009.
2. Gupta, S.B. *Monetary Economics-Institutions, Theory and Policy*. S. Chand & Co. Ltd. New Delhi. 1995.
3. L. M. Bhole and J. Mahukud. *Financial Institutions and Markets*. Tata McGraw Hill. 2011.
4. Misra, S. Puri. *Indian Economy*. Himalaya Publishing House. 2015.
5. Pathak, Bharati V. *The Indian Financial System*, *Market, Institutions & Services*. Pearson. 2008.
6. Paul, R.R. *Monetary Economics*. Kalyani Publishers. 2005.
7. Sundram, K.P.M. *Money, Banking, Trade and Finance*. Sultan Chand & Sons. New Delhi. 2014.
8. Vaish, M.C. *Money, Banking and International Trade*. Vikas Publishing House. 2005.

L	T	P	Credits
4	0	0	4

Course Title: Public Finance
Paper Code: ECO215

Course Objectives:

The course aims to equip students with the understanding of public sector with emphasis on the role of government in terms of its key fiscal functions. It provides a comprehensive overview of issues involved in the domain of public finance with the application of basic principles of economics.

Unit 1   **(14 Hours)**

Introduction: Nature and scope of public finance, categories of revenue, fiscal functions (allocation, distribution and stability), meaning of public sector and public expenditure.

Market Performance: meaning of efficiency, externalities, private versus public good – their efficient provision, merit goods.

Unit-II   **(14 Hours)**

Taxation: requirements for a good tax structure; benefit principle, ability to pay principle, equity (horizontal and vertical); tax base (income, consumption and wealth); direct vs. indirect taxes, proportional vs. progressive taxes; tax incidence (Concept and measurement).

Excess Burden: Meaning, its measures, administration and compliance cost, tax distortions (partial and general equilibrium analysis).

Unit-III   **(16 Hours)**

Optimal Taxation: normative versus positive, commodity tax, income tax, analysis of normative and positive optimal tax.

Public Debt: Concept, objectives and significances of public debt, sources of public borrowings; distinction between internal and external debt.

Unit-IV   **(16 Hours)**

Issues in Indian Public Finance: current issues of India's tax system, fiscal federalism in India, state and local finances

International issues: global public goods, taxation of international trade, government revenue and smuggling

Suggested Readings:

1. Musgrave, R. A and P. B Musgrave. *Public Finance in Theory and Practices,* McGraw-Hill International Editions, 1989.
2. Cullis, John and Philip Jones, *Public Finance and Public Choice,* Oxford University Press, Third Edition (Indian), 2010.
3. Rao, M Govind and Mihir, Rakshit. *Public Economics: Theory and Policy Essays in Honor of Amaresh Bagchi*, Sage Publications, 2011.
4. Srivastava, D K and U, Shankar (ed.). *Development and Public Finance: Essays in Honour of Raja J. Chelliah,* Sage Publications, 2012.

Course Title: Development Economics-II
Course Code: ECO301

L	T	P	Credits
4	0	0	4

Course Objectives:
This course acquaints the students with the various theories and models explaining the process of economic growth and development. In addition, the course highlights the contemporary development challenges faced by the developing countries.

Unit 1

Approaches to Development (Part II):   **(15 Hours)**

 The international-Dependence Revolution - The Neo-classical Dependence Model, the False-Paradigm Model, The Dualistic-Development Thesis; Market Fundamentalism – Neo classical Growth Theory.

Unit II   **(15 Hours)**

Balanced and Unbalanced Growth: Meaning, Explanation, Basic Elements, Essential Conditions for Balanced Growth, Advantages and Critical Appraisal.
Unbalanced Growth: Meaning, Explanation, Linkage Effects, Advantages, Critical Appraisal of
Unbalanced Growth, Balanced versus Unbalanced Growth, Reconciliation.
Theory of big push and critical minimum effort thesis.

Unit III   **(16 Hours)**

Models of Growth: Classical model: the Marxian model; Schumpeter's model; Kaldor's growth model; Mrs. Joan Robinson's growth model; Solow Growth Model, Convergence and divergence hypothesis. Endogenous growth model.

Unit IV   **(14 Hours)**
Economic Planning: Meaning, need, Objectives and Process for Planning, Requisites for Successful Planning. Types of Planning - Structural and Functional Planning, Planning by Inducement and Direction, Democratic and Socialist Planning, Indicative and Imperative Planning, Perspective and Short-term Planning, National and Regional (Micro level) Planning, and Centralized and Decentralized Planning. Limitations of Planning.

Suggested Readings:

1. Chew, S.C. and R.A. Denmark. *The Underdevelopment of Development*. Sage Publications. New Delhi. 1999.
2. Debraj, Ray. *Development Economics*. Oxford University Press.1998.
3. Meier, G.M. & J.E. Rauch. *Leading Issues in Economic Development*. Oxford University Press. 2000.
4. Taneja, M.L & R.M. Myer. *Economics of Development and Planning*. Vishal Publications. 2014
5. Thirwall. A.P. *Growth and Development*. Palgrave Macmillan Publishers. 7th edition.
6. Todaro, M.P. and Stephen C. Smith. *Economic Development*. Pearson Publications. 2011.
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Course Title: Agriculture Economics
Course Code: ECO302

L	T	P	Credits
4	0	0	4

Course Objectives:
The objective of this course is to provide students with an understanding of the motivations for agricultural policies and the instruments that governments use to pursue policy goals.

UNIT-I (12 Hours)

Nature, scope and its importance Agriculture Economics in the economy. Role of agriculture in economic development. Reasons for backwardness of Indian agriculture. Transforming traditional agriculture.

Farming Systems: Family farming, co-operative farming, collective farming and state farming. Farm size and productivity.

UNIT-II (16 Hours)

Agricultural credit: Need, role of co-operative and commercial banks.
Institutional changes and agricultural development: Land reforms- consolidation of holdings, abolition of intermediaries, ceiling on land holdings and tenurial reforms - need, nature and evaluation with special reference to India.

UNIT-III (16 Hours)

New agricultural technology – Its impact on production, income distribution and labour absorption. Negative consequences of new agricultural technology in the context of Punjab.
Crop diversification – Need, progress and problems.

UNIT-IV (16 Hours)

Agricultural Marketing in India: Structure, types, defects, marketing functions, marketing margins, marketed surplus and marketable surplus. Factors affecting marketed surplus.

Agricultural Price Policy: Need and objectives. Mobilization of agricultural surpluses, Terms of trade between agriculture and industry, Agricultural taxation in India.

Suggested Readings:

1. *Economic Survey*, Government of India. Various Issues.
2. *Handbook of Agriculture Economics*.
3. H Drummond, John Goodwin. *Agriculture Economics*. Pearson Publication. 2013.
4. Sadhu, A.N. and Amarjit Singh. *Fundamentals of Agricultural Economics*, Himalaya Publishers. New Delhi. 2012.

Course Title: Statistics -III
Course Code: ECO300

L	T	P	Credits
4	0	0	4

Course Objectives:

- To enable students to acquire the basic knowledge of statistical tools as required for their use in economics-based issues
- To enable the students to apply statistical analysis to a range of economic policy problems

UNIT-I (15 Hours)

Theoretical Distribution; binomial, poisson and normal distributions, Derivation with numerical examples based upon these distributions and their fitting.

UNIT-II (15 Hours)

Sampling: Concepts used in sampling: methods of sampling simple random, systematic and stratified. Point estimation: Concept of random sampling, meaning of an estimator; properties of a good estimator; methods of estimation.

UNIT III (15 Hours)

Theories of estimation; Point Estimation, Interval Estimation. Concepts of null and alternative hypothesis; types of errors; some elementary tests based on above sampling distributions.

UNIT IV (15 Hours)

Testing of Hypothesis; Large sample test; Sampling of attributes, Test of significance for difference of proportion, Single mean, Differences of means. t- test, chi square and F-test.

Suggested Readings:

1. Gupta, S.C. and V.K. Kapoor. *Fundamental of Applied Statistics*. Sultan Chand and Sons. New Delhi. 2010
2. Kapur, J.N. and H.C. Saxena. *Mathematical Statistics*. S. Chand and Company. New Delhi. 1995.
3. Mood, A.M. and F.A. Gray Bill. *Introduction to the Theory of Statistics*. McGraw Hill Company, New York. 1963.

Course Title: Econometrics -II

L	T	P	Credits
4	0	0	4

Course Code: ECO303

Course Objectives: Students of Economics must have knowledge in Econometrics, because the theoretical application of economics had undergone changes in giving priority to understand Economics and Econometrics joined together will provide strong mathematical foundation in Economics

Unit I   **(14 hours)**

Dummy Variables; Regression on qualitative and quantitative variables, dummy variable trap, structural stability of regression models, Chow test, piecewise linear regression model

Unit II   **(16 Hours)**

Simultaneous Equation Models; Simultaneous bias, structural versus reduced form, Identification: rank versus order condition, exact and over identifications, triangular model, methods of estimation including indirect least squares, two-stage least squares and three-stage least squares model.

Unit III   **(16 Hours)**

Distributed Lag Models; Formation of expectations, naïve expectation versus adaptive expectations models, partial adjustment models, distributed lag models; Koyck's model, Almon lag, polynomial distributed lag models.

Unit IV   **(14 Hours)**

Basic Characteristics of Time Series Data; Random Walk, Testing for Nonstationarity and Stationarity, Unit Root Tests

Suggested Readings:

1. Gujarati, Damodar N. *Basic Econometrics*. New York: McGraw-Hill. 2007. Print.
2. Wooldridge, Jeffrey M. *Introductory Econometrics: A Modern Approach*. Peking: Cengage Learning. 2009. Print.
3. Brooks, C. *Introductory Econometrics for Finance*.Cambridge University Press. 2003. First edition.

Course Title: Environmental Economics

Course Code: ECO304

L	T	P	Credits
4	0	0	4

Course Objectives:

This is an applied economics course which aims to acquaint the students with the range of environmental issues and develop their skills for addressing such environmental problems with the help of suitable tools and techniques for decision making.

Unit I (15 Hours)

Introduction to Environmental Economics: Meaning, Scope and Importance; Positive and Normative Economics; Welfare and Markets: Pareto Optimality, Efficiency and Competitive Markets, First and Second Theorem of Welfare Economics, Social Welfare Function and Arrow Impossibility Theorem.

Type of Environmental Goods – Use value and Nonuse value (existence, altruistic and bequest value), Public goods, Private goods, Club goods, Open access resources.

Unit II (16 Hours)

Market Failure and Externalities; Theory of Environmental Regulation and Policy: Assignment of Property Rights and Coase Theorem, Government Interventions - Command & Control Measures and Marketable Instruments.

Unit III (16 Hours)

Valuation of Environmental Goods and Services: Indirect method (revealed preference); household production function – travel cost, hedonic pricing, statistical value of life and health; direct/stated preference method – contingent valuation.

Unit IV (14 Hours)

Economic Growth and the Natural Environment: Rise and fall of Environmental Kuznets Curve, Climate Change; Sustainable Development: Meaning of sustainability – weak or strong, goals and indicators.

National Accounting and the Natural Environment: Green National Income Accounting with special reference to India

Suggested Readings:
1. GOI, *Green National Accounts for India – A Framework*. Government of India, 2013.

2. Kolstad, Charles D. *Intermediate Environmental Economics*. Oxford University Press. 2011.
3. Koutsoyiannis, A*., Modern Microeconomics*. Palgrave Macmilian. Second Edition. 2003.
4. Maureen L. Cropper and Wallace E. Oates. *Environmental Economics: A Survey*. Journal of Economic Literature Volume 30, pp. 675-740.1992
5. Partha Dasgupta. *Measuring Sustainable Development: Theory and Application*. Asian Development Review Volume 24(1**)**, pp: 1-10. 2007.
6. Roger Perman, Yue Ma, James McGilvray and Michael Common. *Natural Resource and Environmental Economics*. Pearson Education/Addison Wesley. 3rd edition. 2003.

Course Title: Workshop on SPSS Software

Course Code: ECO305

L	T	P	Credits
0	0	2	2

Course Objectives:
The course is designed to provide students with transferable skill, to understand the uses of SPSS, as a tool to summarize and aid in the interpretation of research findings.

Unit-I   **(8 Hours)**
Introduction to SPSS: Launching SPSS, Entering Data into the data editor, Saving a Data file, creating a bar chart, saving a output chart, Tables and Graphs of One Variables and two variables

Unit II   **(7 Hours)**

One variable descriptive statistics, two variables descriptive statistics. Elementary Probability, Discrete probability distribution.

Unit III   **(7 Hours)**

Sampling distributions: Sampling from normal population, Central limit theorem, Sampling distribution of the proportion. One sample Hypothesis Tests. Two sample Hypothesis tests.

Unit IV   **(8 Hours)**

Linear regression, Multiple regression, Chi Square Test, Z test and small sample test.

Suggested Readings:

1. Carver, Robert. H. and Nash J. Gradwohl. *Doing Data Analysis with SPSS Version 14*. Cengage

Learning. 2006.

2. Darren G. *IBM SPSS Statistics 21 Step by Step: A Simple Guide*. Pearson Publication. 2014.

Course Title: International Economics
Course Code: ECO306

L	T	P	Credits
4	0	0	4

Course Objectives: The objective of the paper is to make the students aware about the important linkages between domestic economy and its external sector and to provide comprehensive, up-to-date, and clear exposition of the theory and principles of international economics and trade.

Unit-I   **(16 Hours)**

Trade Theories and Commercial Policy: Theories of absolute advantage, comparative advantage and opportunity cost; Heckscher-Ohlin theory of trade- its main features, assumptions and limitations: Terms of trade (concepts and secular deterioration in terms of trade); Doctrine of reciprocal demand; Gains from trade-their measurement and distribution.

Unit-II   **(14 Hours)**

Instruments of Trade Policy: Rationale of protection; Tariff and non-tariff barriers to trade (quota, voluntary export restraints, export subsidies, dumping and international cartel); Tariff and quota (partial equilibrium analysis).

Unit-III   **(15 Hours)**

Balance of Payments: Concepts and components of balance of payments; Equilibrium and disequilibrium in balance of payments; various measures to correct deficit in the balance of payment; Foreign trade multiplier.

Unit-IV   **(15 Hours)**

Exchange Rate: Meaning, concept of equilibrium exchange rate and determination; Fixed versus flexible exchange rates: Managed floating exchange rate; Purchasing Power Parity (absolute, relative); Brettonwood systems and its breakdown; Reserve currency standard and the gold standard; Open economy trilemma; the theory of optimum currency areas and economic integration.

Contemporary Issues: Financial Globalisation, Global Financial Crises (2007-2009), Regulating international banking; China's exchange rate policy; International trade and macroeconomic policy coordination.

 Suggested Readings:

1. Krugman, Paul, M. Obstfeld and Marc J. Melitz. *International Economics: Theory and Policy.* Addison Wesley Longman. Ninth Edition, 2012.
2. Salvatore, D.K. *International Economics*. John Wiley and Sons. 2013.
3. Soderston, Bo and G. Reed. *International Economics*. Macmillan Publishing House. 1994.

Course Title: Indian Economy
Course Code: ECO307

L	T	P	Credits
4	0	0	4

Course Objectives:

The course acquaints the students with the features and problems of Indian Economy. Students will understand the national planning system, foreign trade, problems of Indian agriculture and industry in addition to the emerging issues faced by the Indian economy.

Unit 1:

Structure of Indian Economy: National Income and Trends, Sectorial contribution, Inter-state variation of National income in India. Capital Formation and Economic Development in India.

Human resources and economic development in India: Size and growth rate of population in India, Demographic features of India's Population, Population Policy in India, Family Planning and welfare programme in India.

Poverty Line and various measures to control Poverty.

Unit II

Economic Planning in India: Review of first ten Five Year Plans in India, Resources mobilization during different plans. Eleventh five year plan: objectives, target and achievement and its critical analysis. Twelfth five year plan: objectives, target and achievement, issues for approach to the twelfth plan, Financing for various sector under 12th plan.

Unit III

Basic Issues in Agriculture: Role, nature and Emerging trends; Trends in agricultural production and productivity; Factors determining productivity; Remedies measures to raise agriculture productivity in India, Agriculture sustainability and development during plan period.

Issues in Industrial Development: Industrial development during planning period; Review of Industrial poilcy of 1948, 1956, 1977 and new industrial policy 1991; Industrial policy reforms 1992-93 onwards. Small scale and Cottage industries in India and MSME ; Public sector in India-its role, growth, performance, problems; Issue of privatization.

Unit IV

External Sector: India's foreign trade- features, composition and direction; India's balance of payments position in India, Foreign Trade policy in India. Current Global slowdown and financial turmoil and its impact on Indian economy.

Suggested Readings:

1. Kapila, Uma, Indian Economy: Programme and Policies, Academic Foundation, New Delhi, 2015.
2. Dutt, Ruddra and, K.P.M. Sundharam. *Indian Economy*. New Delhi: S. Chand and Company Ltd. 2015.
3. Misra, S.K. & V.K. Puri. Indian Economy. Himalayan Publishing House. 2015.
4. Wadhawa, C.D. *Some Problems of India's Economic Policy*, New Delhi: Tata McGraw Hill Publishing P. Ltd.

Course Title: Industrial Economics
Course Code: ECO308

L	T	P	Credits
4	0	0	4

Course Objectives:
- This course provides an introduction to current theory and empirical work in Industrial economics.
- It aims to develop the understanding of students regarding the internal structure of firms, their strategic interaction and decision making.

Unit-I **(14 Hours)**

Definition: Nature and scope of Industrial Economics. History and development of industrial Economics. Basic Concepts: Firm, industry, Market, Market structure, Market power, passive and active behaviour of the firm.

Unit-II **(15 Hours)**

Conceptual framework for the study of Industrial Economics. Organizational form and alternative motives of the firm. Industrial efficiency and technical efficiency. Optimum size of the firm.

Unit-III **(15 Hours)**

Growth of the firm: Acquisition, diversification, merger constraints on Growth: demand, managerial and financial.

Market Structure: Seller's concentration; product differentiation; entry conditions and economics of scale.

Unit-IV **(16 Hours)**

Theories of Industrial Location: Factors affecting location; contributions of weber and Sargent Florance. Location policy in India since Independence. Industrial concentration and dispersal in India. Industrial growth under planning in India. Industrial policy and licensing policy, MRTP Act and FERA Act in India.

Suggested Readings:
1. Barthwal, R. R. 2007. *Industrial Economics: An Introductory Text Book*. New Age International. New Delhi.
2. Ferguson, P. R.1998. *Industrial Economics: Issues and Prospectus*. New York University Press.
3. Seth, R. 2010, *Industrial Economics*. Ane Book. New Delhi.

Course Title: Economics of Health and Education
Paper Code: ECO309

L	T	P	Credits
4	0	0	4

Course Objectives:

This course deals with the economic issues regarding the provision of, and demand for, health and education services. Moreover, this paper is about the economic analysis of the health and education sectors, with particular emphasis on government policy concerning them.

Unit I

Introduction to Health Economics:

Meaning, Importance and Essential Features of Health Economics.

Concepts: Health, Health Care, Birth rate, Fertility rate, Death rate, IMR, CMR, MMR, Morbidity rate (Acute and Chronic), Disability Adjusted Life Year (DALY), Quality Adjusted Life Year (QUALY), Sex Ratio.

Unit II

Demand and Supply of Health Care:

Demand for Health Care – Case of Health Care Accessibility – Socio Economic and Cultural Features, Determining Health Status – Supply of Health, Health Care Delivery System – Pricing of Health Care.

Unit III

Health Financing & Policy:

Health Expenditure – Public & Private – Direct and Indirect – Health Insurance – Concept of User Cost – Health Policy of WHO, National Health Policy – NRHM, Health as a State Subject.

Unit IV

Education: Investment in Human Capital:

Rate of Return to Education: Private and Social; Quality of Education; Signaling or Human Capital; Theories of Discrimination; Gender and Caste Discrimination in India. Literacy Rates, School articipation, School Quality Measures with special reference to India.

Suggested Readings:

1. Henderson J.W. *Health Economics and Policy* .Thomson learning. Latest Edition.
2. Ramankutty. *A Premier of Health System Economics*. Allied publications. New Delhi. 2007
3. Ronald G., Ehrenberg and S. Robert and Smith. *Modern Labor Economics: Theory and Public Policy*. Addison Wesley. 2005.
4. William, Jack. *Principles of Health Economics for Developing Countries*. World Bank Institute Development Studies. 1999.
5. World Development Report. *Investing in Health*. The World Bank, 2014.

Course Title: Operational Research

Course Code: ECO310

L	T	P	Credits
4	0	0	4

Course Objective: The course is designed to introduce the students with various quantitative techniques which are of great importance for quantitative decision-making.

Learning Outcomes: At the end of the course a student should be able to handle the application of scientific methods, techniques and tools to problems involving the operations of a system so as to provide those in control of the system with optimum solution to the problem.

Unit – I   15 hour

Introduction to OR, Operations research in India, Nature, scope and feature of Operations research, OR & management decision making, Limitation of OR, Types of OR models, Principles of OR modeling, Typical applications of OR/scope of OR, Phases and processes of OR study/ methodology of, operation research and Techniques/ tools of operations research

Unit –II   15 hour

Duality- Concept of duality in LPP, Formulation of the dual problem, Rules for constructing the dual problem, Primal-Dual relationship, Interpreting the Primal-Dual relationship, -Dual of the Dual is Primal, -Dual Simplex, Steps in Dual Simplex

Sensitivity Analysis- Sensitivity analysis, Limitations of Sensitivity analysis

Transportation Models- Introduction, Terminology used in Transportation model, Basic assumptions of model, Tabular presentation of model, Optimal solution of Transportation problem, Methods for initial basic feasible solutions- NWCM, LCM, VAM, Optimality Tests- Stepping stone method,, Modified distribution method, Degeneracy in Transportation problem, Profit maximization in Transportation problem, Unbalanced Transportation problems, **Trans-Shipment Problem**

Unit –III   15 hour

Assignment Models- Introduction, Mathematical Formulation, Hungarian method [Minimization case]/HAM, Steps to follow, Maximization case in Assignment Problems, **Travelling salesman Problems**, Un-balanced Assignment Problem, Air Crew assignment, Prohibited assignment/ Constrained assignment problem, LPP formulation of Assignment Problem

Queuing Theory- Introduction, Features of Queuing system, Service system, Basic Notations, Queuing models- Probabilistic, Deterministic, Mixed

Inventory control- Meaning, Inventory decisions, Types of Inventory, Factors affecting IC policy, Objectives of IC, Scope of IC, IC systems- P& Q, Inventory Models-Deterministic models (EOQ), Price break approach, Safety stocks- factors & methods, Approaches to IC- ABC, VED.

Unit – IV   15 hour

Game Theory- Introduction, Significance of Game theory, Essential features of Game theory, Limitations Game theory, Strategy & Types of strategy, The Maximin-Minimax principle, Saddle point, Types of problems-Games with pure strategies, Games with mixed strategies (8 methods), Limitations of Game theory

Network Analysis- PERT and CPM- Introduction, History of PERT & CPM analysis, Objectives of Network Analysis, Applications of Network Model, Terminology or Concepts used, Errors in Network Logic, Rules to frame a Network, Fulkerson's Rule to numbering of events, Stages of project management, Activity Times & Critical Path Computation of Critical Path Slack & Float, PERT- Steps & computing

variance, Merits & demerits of PERT, CPM- Time estimating & Limitations, Comparison between PERT & CPM, Project Cost analysis- Direct & indirect costs, The lowest cost schedule, Crashing of jobs, Allocation & leveling of resources (through CPM)

Decision Theory- Introduction, Components- Act, Event & Outcome, Types of decision making- Certainty, Risk, Uncertainty, Decision making under Risk, Decision making under Uncertainty, Decision Tree Diagram, Standard Symbol

Suggested Readings

1. Kalavathy, S. *Operations Research*. Vikas Publishing House. New Delhi.

2. Kapoor, V.K. *Operations Research*. Sultan Chand & Sons. New Delhi.

3. Paneerselvam, R. *Operations Research*. Prentice Hall of India. New Delhi.

4. Sharma, J.K. *Operations Research: Theory and Applications*. Macmillan India Ltd., New Delhi.

5. Taha, H.A. *Operations Research: An Introduction*. Prentice Hall of India. New Delhi.

6. Vohra, N.D. *Quantitative Techniques in Management*. Tata McGraw Hill Publishing Company Ltd.

7. Chawla, Gupta and Sharma. *Operations Research*. Kalyani Publishers. New Delhi. 14th edition