DELHI TECHNOLOGICAL UNIVERSITY

(*Established by Govt. of Delhi vide Act 6 of 2009)*

(formerly Delhi College of Engineering)

University School of Management and Entrepreneurship

MA (ECONOMICS)

For Academic Session 2024-25 and Onwards

About MA (Economics) Programme

The MA (Economics) programme offered at the University School of Management & Entrepreneurship (USME), East Delhi Campus, Delhi Technological University, provides a comprehensive blend of theoretical and applied economics, enriched by interdisciplinary approaches. The two-year, four-semester programme emphasizes a robust understanding of core, pure, and applied economics, while integrating skills from areas such as analytics and management. The programme is designed to prepare students for a wide array of career paths, from corporate roles in analytics to academic research. With its focus on modern economic challenges and practical tools, graduates will have a strong foundation to pursue further studies or secure positions in industries such as finance, consulting, and public policy.

- **Practice-Based and Data Analytics-Focused Curriculum:** The programme ensures that students not only grasp economic theory but also acquire practical skills in data analytics, modelling, and simulation. The focus on data analytics allows students to work with real-world economic and financial data sets, preparing them for the demands of industry.
- **Strong Foundation in Economic Theory with Emerging Streams:** The curriculum offers a solid grounding in traditional economics while incorporating cutting-edge and emerging fields, including Behavioural Economics, GIS and Remote Sensing, Spatial Econometrics, Energy Economics, Health Economics, Applied Quantitative Finance etc.
- **General Elective Courses from Management and Business Analytics:** Students can electives from the management and business analytics domains, gaining exposure to the latest business analytics trends, broadening their knowledge in areas like organizational behaviour, strategic management, and business policy, further enhancing their employability in corporate sectors.
- **Hands-on Experience with Economic/Financial Databases:** Workshops on key databases such as NSSO, NFHS, ASI, CMIE, and Eikon ensure that students gain practical exposure to handling, extracting, and analysing complex datasets.
- **Data Extraction, Visualization, and Analytics:** The programme integrates multiple courses and lab-based workshops dedicated to teaching students how to work with data—right from extraction and visualization to analysis, modelling, and simulation. Workshops on primary data collection and analysis further develop crucial research skills.
- **Immersive Industry Exposure**: Through projects, internships, and interactive sessions, students engage with industry experts, providing them with the opportunity to apply academic learning in real-world settings.
- **Mandatory Dissertation Spanning Two Semesters**:
  - Third Semester: Students select a research topic, conduct a thorough literature review, and either design questionnaires or gather secondary data depending on the research question.
  - Fourth Semester: The focus shifts to analysis and writing. Students engage deeply with their data, drawing insights that will form the basis of their dissertation, resulting in a well-researched and professionally written thesis.

Program Outcomes/Program Learning Outcomes of MA Economics:

On completion of the programme, the students will be able to:

PO 1: Demonstrate an advanced knowledge of economics fundamentals

PO 2: Analyse current economic issues using appropriate analytical tools and formulate policy prescriptions

PO 3: Frame a logical paradigm for modelling and interpreting the behaviour and interactions of households, firms, and government institutions

PO 4: Imbibe the skills needed in analysing the increasingly digitized information-rich economy

PO 5: Apply the concepts and tools of economics in domains such as analytics, financial modelling, health and other niche cutting edge areas.

Program Educational Objectives (PEOs) of MA Economics:

PEO 1: To acquire knowledge of mathematical and statistical techniques necessary for economic analysis of policy issues

PEO 2: To develop the skills required for collection, organization, tabulation and analysis of empirical data

PEO 3: To get acquainted with the current and past trends in India's development trajectory and analyse future growth potential

PEO 4: To gain effective decision-making and inter-personal skills

PEO 5: To demonstrate an ability to use tools and techniques required for undertaking cutting-edge research in economics

Program Specific Outcomes (PSOs) of MA Economics:

PSO 1: Apply economic theory to understand how organisations interact with each other and with users/customers/clients and use this understanding to guide data analysis

PSO 2: Possess a theoretical and applied understanding of the use of econometrics and statistics for analysing descriptive and causal inference

PSO 3: Use various tools to clean, organize, query, summarize, visualize, and model large volumes and varieties of data

PSO 4: Manage and analyze big data from various perspectives leveraging technology at the disposal of organizations for economic analysis and analytics

PSO 5: Develop policies and enable decision making with the use of insights generated from economic theory, analytics tools and an understanding of real-world business and policy problems

Curricular Structure

L	Lecture	**T**	Tutorial	**P**	Practical
CWS	Class Work Sessional	**PRS**	Practical Sessional	**MTE**	Mid Term Examination
ETE	End Term Examination	**PRE**	Practical Examination	**MOOC**	Massive Open Online Courses

	CURRICULAR COMPONENTS	**Credits**
(a) Department Core Courses (DCC)		
	Core Courses	56
	Workshop/Seminar courses **(Non-credit – Pass required; marks not included in the CGPA; 1 in each semester)**	**-**
	Total	**56**
(b) Departmental Elective Courses (DEC)/ General Elective Courses (GEC)		
	General Elective Courses/MOOCs (Evaluation of MOOCs as per DTU norms; Max. 4 credits from MOOCs per semester)	12
	Departmental Specific Elective Courses	16
	Dissertation	8
	Non-credit (Audit) optional courses from GECs (Grade obtained to be reflected in the Marksheet but not included in the overall CGPA calculation)	Max 1 course in each semester
	Total	**36**
GRAND TOTAL		**92**

Semester-wise Programme Structure

Semester	Core	Depart mental Elective	GEC/ MOOCs	Dissertation	Workshop/ Seminar Courses	Optional Audit Courses from GECs	Total
I	22	-	-	-	Non-Credit Compulsory	Non-credit Optional	**22**
II	22	-	-	-	Non-Credit Compulsory	Non-credit Optional	**22**
III	8	8	4	4	Non-Credit Compulsory	Non-credit Optional	**24**
IV	4	8	8	4	Non-Credit Compulsory	Non-credit Optional	**24**
Total	56	16	12	8	-	-	**92**

Semester-wise Courses

First Semester

Course Code	Name of the Course	Nature of Course	Credits	Contact Hours			Relative Weights				
				L	T	P	CWS	PRS	MTE	ETE	PRE
MAE101	Microeconomics I	Core	5	4	1	0	25		25	50	
MAE103	Macroeconomics I	Core	5	4	1	0	25		25	50	
MAE105	Mathematical Methods for Economics I	Core	5	4	1	0	25		25	50	
MAE107	Introduction to Statistics and Econometrics	Core	5	4	1	0	25		25	50	
MAE109	Introduction to R	Core	2	0	0	4		50			50

MAE111	Workshop (Compulsory)	Non-credit									
	Optional Audit Course from GECs	Non-credit									
		Total credits	**22**								

Second Semester

Course Code	**Name of the Course**	**Nature of Course**		**Contact Hours**			**Relative Weights**				
			Credits	**L**	**T**	**P**	**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
MAE102	Microeconomics II	Core	5	4	1	0	25		25	50	
MAE104	Macroeconomics II	Core	5	4	1	0	25		25	50	
MAE106	Mathematical Methods for Economics II	Core	5	4	1	0	25		25	50	
MAE108	Econometric Methods	Core	5	4	1	0	25		25	50	
MAE110	Econometric Analysis with R	Core	2	0	0	4		50			50
MAE112	Workshop (Compulsory)	Non-credit									
	Optional Audit Course from GECs	Non-credit									
		Total credits	**22**								

Third Semester											
Course Code	**Name of the Course**	**Nature of Course**		**Contact Hours**			**Relative Weights**				
			Credits	**L**	**T**	**P**	**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
MAE201	Indian Economy	Core	4	4	0	0	25		25	50	
MAE203	Development Economics	Core	4	4	0	0	25		25	50	
MAE205	Dissertation	Core	4	-	-	-		40			60
MAE207	Workshop (Compulsory)	Non-credit									
MAE2xx	DSE I	Elective	4	4	0	0	25		25	50	
MAE2xx	DSE II	Elective	4	4	0	0	25		25	50	
	Any course from GECs/MOOCs	Elective	4	4	0	0	25		25	50	
	Optional Audit Course from GECs	Non-credit									
		Total credits	**24**								

Fourth Semester											
Course Code	**Name of the Course**	**Nature of Course**		**Contact Hours**			**Relative Weights**				
			Credits	**L**	**T**	**P**	**CWS**	**PRS**	**MTE**	**ETE**	**PRE**
MAE202	Contemporary Issues in Development Economics	Core	4	4	0	0	25		25		50
MAE204	Dissertation	Core	4	-	-	-		40			60
MAE206	Workshop (Compulsory)	Non-credit									
MAE2xx	DSE III	Elective	4	4	0	0	25		25	50	
MAE2xx	DSE IV	Elective	4	4	0	0	25		25	50	
	Any course from GECs/MOOCs	Elective	4	4	0	0	25		25	50	
	Any course from GECs/MOOCs	Elective	4	4	0	0	25		25	50	
	Optional Audit Course from GECs	Non-credit									
		Total credits	**24**								

List of Discipline Specific Electives for Semester III (Students need to choose any two courses – DSE I and DSE II from the list below)

1. Microeconomics MAE209: Game Theory 1 MAE211: Industrial Organisation 1
2. Macroeconomics MAE213: Dynamic Macroeconomics MAE215: Macroeconomics of Development
3 History of Economic Thought MAE217: Evolution of Economic Ideas MAE219: Political Economy
4 Econometric Methods and Applications MAE221: Microeconometrics MAE223: Time Series Analysis
5. New Streams in Applied Economics MAE225**:** Environmental Economics MAE227: Health Economics MAE229: Behavioural Economics MAE231: Experimental Economics MAE233: Corporate Finance MAE235: Economics of Education

List of Discipline Specific Electives for Semester IV (Students need to choose any two courses – DSE III and DSE IV from the list below)

1 Microeconomics MAE208: Game Theory 2 MAE210: Industrial Organisation 2
2 Macroeconomics MAE212: Monetary Theory and Policy MAE214: International Macroeconomics
3 Econometric Methods and Applications MAE216: Spatial Econometrics MAE218: Panel Data Econometrics MAE220: Advanced forecasting methods

4 New Streams in Applied Economics

MAE222: Energy Economics
MAE224: Labour Economics
MAE226: Financial Economics
MAE228: Law and Economics
MAE230: Remote Sensing and GIS
MAE232: International Trade
MAE234: Public Economics

LIST OF GENERAL ELECTIVE COURSES (GECs) FOR MA (ECONOMICS)

S No	Course Code	Course Name	Credits	Contact Hours			Relative Weights				
				L	T	P	CWS	PRS	MTE	ETE	PRE
1	MAG001	Strategic Management	4	4	0	0	25	-	25	50	-
2	MAG002	Operations and Supply Chain Management	4	4	0	0	25	-	25	50	-
3	MAG003	Database Management Systems	4	2	0	4	15	25	20	40	-
4	MAG004	Machine Learning	4	4	0	0	25	-	25	50	-
5	MAG005	Big Data Analytics	4	4	0	0	25	-	25	50	-
6	MAG006	Data Querying & Visualization	4	2	0	4	15	25	20	40	-
7	MAG007	Introduction to Big Data Systems	4	4	0	0	25	-	25	50	-
8	MAG008	Corporate Mergers, Acquisitions and Restructuring	4	4	0	0	25	-	25	50	-
9	MAG009	Investment Management	4	4	0	0	25	-	25	50	-

10	MAG010	International Financial Management	4	4	0	0	25	-	25	50	-
11	MAG011	Financial Analytics	4	4	0	0	25	-	25	50	-
12	MAG012	Investment Banking & Financial Services	4	4	0	0	25	-	25	50	-
13	MAG013	Financial Derivatives	4	4	0	0	25	-	25	50	-
14	MAG014	Financial Reporting & Analysis	4	4	0	0	25	-	25	50	-
15	MAG015	Financial Risk Management	4	4	0	0	25	-	25	50	-
16	MAG016	Marketing Management	4	4	0	0	25	-	25	50	-
17	MAG017	Marketing Analytics	4	4	0	0	25	-	25	50	-
18	MAG018	Industrial Relations and Labour Legislation	4	4	0	0	25	-	25	50	-
19	MAG019	Training and Development	4	4	0	0	25	-	25	50	-
20	MAG020	Data Analysis Techniques	4	2	0	4	15	25	20	40	-

I SEMESTER

MAE101: Microeconomics I (L:4, T:1, P:0)

Course Objectives:

The objective of this course is to provide students fundamental understanding of the strategic behaviour of economic agents and familiarize them with the mathematical techniques that economists use in making routine decisions. The course lays a foundation for more advanced courses in the later semester, equipping students with understanding of the markets, consumer behaviour, production and cost theories.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Demonstrate an advanced knowledge of different market structures

CO2: Determine appropriate costing methods and optimisation techniques in different product and market scenarios

CO3: Analyse the nature of consumer demand in different product and market scenarios

CO4: Recognize the reasons behind market failure and the role of government in dealing with those failures

Syllabus:

Unit 1: Prices, Markets and Efficiency

Voluntary exchange, Pareto efficiency, quasilinear utility, cost functions, demand and supply, market equilibrium, comparative statics, taxes and subsidies, public goods, externalities.

Unit 2: Choice theory and Consumer Demand

The axiomatic approach, utility representation, demand and expenditure functions, Walras law and its implications, duality, Slutsky and Hicks decomposition, the envelope theorem and its applications, revealed preference, integrability, welfare evaluation of economic changes employing money-metric utility functions, separable preferences, testable implications.

Unit 3: Production, Costs and the Firm

Production technologies and their properties, functional representations of production technologies, Production possibility sets, Cost and supply functions, cost minimization and profit maximization, input demand and output supply, non-profit motives.

Unit 4: Monopoly

Pricing and quantity, Profit maximization, dead-weight loss, non-linear pricing, two part tariff, price discrimination, discriminating monopoly, perfect discrimination, natural monopoly Ramsey pricing; contestable markets; multi-product monopoly, multi plant monopoly, durable good monopoly, Lerner index, quality distortion, monopolistic screening.

Textbooks:

1. Jehle, G. and P. Reny (2001): Advanced Microeconomic Theory, Addison Wesley.
2. Maskin, E. and J. Riley (1984): Monopoly with Incomplete Information, Rand Journal of Economics, 15: 171- 96.
3. Mas-Collel, A., M. Whinston and J. Green (1995): Microeconomic Theory, 2nd ed. Oxford University Press.
4. Hall Varian (1992), Microeconomic Analysis, 3rd ed. WW Norton & Co.

MAE103: Macroeconomics I (L:4, T:1, P:0)

Course Objectives:

The objective of this course is to familiarise the students with (a) the concepts and issues in modern macroeconomics such as dynamic general equilibrium model, modern economic growth theories and optimization techniques, as is applied in theory and practice across the world; (b) the major mathematical tools used in modern macro analyses.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe the theory of Classical and Keynesian system of macroeconomics and develop a general equilibrium theory

CO2: Analyse aggregate macro models with different assumptions about expectation formation and assess their policy implications.

CO3: Apply the methods of dynamic optimization to the standard problems of macroeconomics.

CO4: Identify the different factors determining economic growth in a country both in the short run and the long run.

Syllabus:

Unit 1: Aggregate Macro Models

The classical system; the Keynesian system; Role of expectations in the aggregative framework; various theories of expectation formation; solving aggregative macro models with different assumptions about expectation formation and their policy implications.

Unit 2: Mathematical Preliminaries

Methods of solving Ordinary Difference Equations; Systems of first-order difference equations; Steady states, Stability, Phase Diagrams, Linearization.
Infinite Horizon Optimization in Discrete Time: Stationary Dynamic Programming with Discounting; Euler Equations and Transversality Condition; Solution techniques.

Unit 3: Microfounded Macro Models

Lucas Critique and the need for microfoundations; the Dynamic General Equilibrium (DGE) approach to macro analysis: optimization problem of a representative household; optimization problem of a representative firm.

Unit 4: Growth and Overlapping Generations models

Neoclassical Growth Models - The Solow model; The Ramsey-Cass-Koopmans model; The Samuelson-Diamond Overlapping Generations model.
Endogenous Growth Models – the Basic AK-Model; Romer Model; Models with Human Capital and Externalities.

Textbooks:

1. Acemoglu, D. (2009): Introduction to Modern Economic Growth, Princeton University Press.
2. The Foundation of Modern Macroeconomics by Ben J. Heijdra, Second edition, Oxford University Press, 2009.
3. Barro, Robert J and Sala-i-Martin, Xavier (B&SM). Economic Growth. Second Edition. Prentice Hall, India. 2004.
4. Galor, O. (2010): Discrete Dynamical Systems, Springer-Verlag.
5. Minford, P. and Peel. D. (2019): Advanced Macroeconomics: A Primer, 2nd Edition, Edward Elgar.
6. Romer, D. (2012): Advanced Macroeconomics, 4th edition, New York: McGraw Hill.
7. Sorensen, P.B. and Whitta-Jacobsen, H.J. (2010): Introducing Advanced Macroeconomics: Growth and Business Cycles, 2nd Edition, McGraw-Hill.
8. Wickens, M. (2011): Macroeconomic Theory: A Dynamic General Equilibrium Approach , 2nd edition, Princeton University Press.

MAE105: Mathematical Methods for Economics I (L:4; T:1: P:0)

Course Objectives:

The objective of this course is to introduce and teach mathematical methods used to understand theories and concepts in different schemes of Economics.

Course Outcomes:

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

CO1: Acquire required mathematical sophistication to elucidate its applications in different areas of economics

CO2: Develop a basic understanding of linear algebra and tools of linear algebra in economics

CO3: Apply the concepts and tools of calculus to solve economic problems CO4:

Identify the role of differential equations in economic modelling

Syllabus:

Unit 1: Linear Algebra

Vector in n-dimensions. Vector spaces in Rn. Spanning set. Matrices. Singular and nonsingular matrices. Inversion of a matrix. Idempotent Matrix. Rank. Orthogonal Projection. Linear equations: homogeneous and non-homogeneous. Linear dependence and independence. Basis and finite-dimensional vector space, Extension of a linear independent set to a basis, subspace and its dimension. Norm and inner product. Orthogonality. Orthogonal basis. Projection of a vector on a sub-space. Row-space and column-space. Nullity.

Unit 2: Calculus

Sequences and convergence, Closed and open sets, Limit points, Functions of several independent variables, Geometry, Continuity, Partial derivatives; change in the order of differentiation, Mean-Value Theorem and Taylor's Theorem, Integrals of a function depending on a parameter continuity and differentiability. Interchange of Integrals.

Unit 3: Optimization Techniques

Multivariable Optimization; Lagrange multiplier method. Maxima and Minima of several variables. Convex sets; Separation theorems for convex sets; Elements of linear programming.

Unit 4. Differential Equations

Introduction to Differential Equations; First and second order differential equations; integral curve; Methods of Solving Differential Equations; Direction diagram and slope field; qualitative theory and stability.

Textbooks:

1. Abbott, S. (1997): Understanding Analysis, Springer.
2. Apostol, T. (1991): Calculus, Volumes 1 and 2, Wiley.
3. Simmons, G. and Krantz, S. (2006): Differential Equations, McGraw Hill.
4. Strang, G. (2006):Linear Algebra and its Applications, Thomson Brooks/Cole.
5. Sundaram, R. (1996): A First Course in Optimization Theory, Cambridge University Press.

MAE107: Introduction to Statistics and Econometrics (L:4, T:1, P:0)

Course Objectives:

The objective of this course is to provide the students fundamental knowledge of basic statistics and econometrics, and prepare them for more advanced courses in these disciplines in the later semesters. The course covers a basic introduction of probability theory, discrete and continuous probability models, marginal and joint distributions, point and interval estimation and hypothesis testing. In the econometrics part, introduction to simple and multiple linear regression models and violations of the classical linear regression model are discussed.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Demonstrate theoretical knowledge of statistics and basic econometric techniques used in the empirical analysis of economic relationship

CO2: Structure problems in economics so that relevant statistical tests can be carried out

CO3: Use regression analysis for understanding relationship among variables

CO4: Identify the violations of key classical assumptions in single and multiple regressions to modify the regression models appropriately

CO5: Display original, independent and critical thinking, and demonstrate the ability to hypothesise and test develop theoretical concepts in Economics

Syllabus:

Unit 1: Random Variables and Probability Distributions

Sample spaces; counting methods; conditional probability; Bayes' Theorem; discrete, continuous and mixed random variables; multivariate distributions; distributions of functions of random variables; expectations, conditional expectations and other moments; jointly distributed random variables; density and distribution functions for jointly distributed random variables; covariance and correlation coefficients

Unit 2: Sampling Theory and Statistical Inference

Principal steps in a sample survey; methods of sampling; the role of sampling theory; properties of random samples; estimation of population point parameters using methods of moments and maximum likelihood procedures; properties of estimators; confidence intervals for population parameters; testing of hypotheses; defining statistical hypotheses; distributions of test statistics; testing hypotheses related to population parameters; Type-I and Type-II errors; power of a test; inferences based on two samples; analysis of paired data; inferences concerning a difference between population proportions; inferences concerning two population variances

Unit 3: Simple Linear Regression

Introduction to the subject matter of Econometrics; notion of causality; simple linear regression model; two variable case estimation of model by method of ordinary least squares; properties

of estimators; goodness of fit; tests of hypotheses; scaling and units of measurement; confidence intervals; Gauss-Markov theorem; forecasting

Unit 4: Multiple Linear Regression

Estimation of parameters in multiple linear regression model; goodness of fit - R^2 and adjusted R^2; partial regression coefficients; testing hypotheses – individual and joint; functional forms of regression models; qualitative (dummy) independent variables; consequences, detection and remedies of multicollinearity, heteroscedasticity and auto-correlation; Specification Analysis: Omission of a relevant variable; inclusion of irrelevant variable; JB statistic and DW Statistic.

Textbooks:

1. DeGroot, Morris H. and Schervish, Mark. J. (2012): Probability and Statistics, 4th edition, Addison-Wesley
2. Gujarati, D.N. and Porter, D.C. (2008): Basic Econometrics, McGraw-Hill, New York
3. Hogg, Robert V.; Makean, J and Craig, Allen T. (2014): Introduction to Mathematical Statistics, Prentice Hall, 7th edition
4. Hwang, Jessica and Blitzstein, Joseph (2014): Introduction to Probability, CRC Press
5. Stock, James H. and Watson, Mark W. (2011): Introduction to Econometrics, Pearson Education Inc
6. Wooldridge, Jeffrey (2012):Introductory Econometrics: A Modern Approach, SouthWestern

MAE109: Introduction to R Programming (L:0, T:0, P:4)

Course Objectives:

The objective of this course is to provide the students a basic knowledge of R: a free and opensource programming language and software environment used for statistical computing and graphics. R is widely used by data analysts, statisticians, and data scientists around the world. The course starts with an introduction to the R environment, followed by a discussion on data import and handling and functions and logical statements. It concludes with a discussion on performing various statistical operations in the R environment.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Install and use R Programming Language in R Studio IDE to perform basic tasks in data analysis

CO2: Use R functions for numerical analysis

CO3: Be able to use functions and logical statements

CO4: Produce data visualisations with the ggplot package

CO5: Demonstrate and execute key concepts and techniques employed in statistical analysis using R

Syllabus:

Unit 1: R Basics

Installing R and R Studio; The R user Interface; R packages; Expressions, Objects, Symbols, Functions; Syntax: Constants, Operators, Expressions, Control Structures, Accessing Data Structures; Vectors and Matrices; R Objects: Primitive object types, vectors, lists, other object types. Symbols and Environment: Symbols, Global environment, environment and functions, exceptions

Unit 2: Functions and Logical Statements

Functions: Arguments, Return values, Function as arguments, side effects. Object Oriented Programming: Overview, Defining Classes, new objects, accessing slots, working with objects, creating coercion methods, methods, basic classes. High performance R with built in math functions, lookup tables etc. Logical Statements, Loops and Repeats

Unit 3: Working with Data

Entering Data Within R, Entering Data Using R Commands, Using the Edit GUI, Saving and Loading R Objects, Importing Data from External Files, Exporting and Importing Data from Databases. Preparing Data: Combining Data Sets, Transformations, Binning Data, Subsets, Summarizing Functions, Data Cleaning, An overview of R graphics.

Unit 4: Statistics with R

Analyzing Data: Summary Statistics, Correlation and Covariance, Principal Components Analysis, Factor Analysis, Bootstrap Resampling. Probability Distributions: Normal Distribution, Common Distribution-Type Arguments, Distribution Function Families. Statistical Tests for Continuous and Discrete Data, Power Tests: Experimental Design Example, t-Test Design, Proportion Test Design, ANOVA Test Design.

Textbooks:

1. Cotton, R., Learning R: a step-by-step function guide to data analysis. 1st edition. O'reilly Media Inc.
2. Gardener, M.(2017). Beginning R: The statistical programming language, WILEY.
3. Lawrence, M., & Verzani, J. (2016). Programming Graphical User Interfaces in R. CRC press.
4. Adler, J. (2012), R in a Nutshell: A Desktop Quick Reference, O'reilly publications, Second Edition
5. Wickham, H. &Grolemund, G. (2016), R for Data Science: Import, Tidy, Transform, Visualize, and Model Data, O. Reilly Media.

MAE 111: Workshop

A 2–3-week workshop on a topic as decided by the Department. Student would have to compulsorily attend all the sessions of the workshop and obtain a Pass Grade in the exam to be conducted after the workshop.

II SEMESTER

MAE 102: Microeconomics II (L:4, T:1, P:0)

Course Objectives:

The objective of the course is to acquaint the student with advanced modern microeconomic theory by focussing on issues related to uncertainty and risk in decision-making, analysing general equilibrium and welfare economics, and understanding market failure and its associated causes. By the end of the course, students will be able to develop an acumen of thinking like an economist.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify issues related to uncertainty and risk in decision-making.
CO2: Analyse the exchange economy using general equilibrium models and productions being dependent on different market structures.

CO3: Analyse and develop social choice models used in measuring economic welfare

CO4: Identify, analyse and assess the presence of market failure situations in the case of public goods

Syllabus:

Unit 1: Choice under Uncertainty

The von-Neumann-Morgenstern axioms and expected utility theory, Monetary Lottery and Risk Aversion, Arrow Pratt Measure of Absolute Risk Aversion, Insurance and portfolio choice, Comparing risk: First order and second order stochastic dominance

Unit 2: General Equilibrium Analysis

General Equilibrium Analysis: Barter; Core of Exchange economy; Market exchange; General equilibrium models of exchange and production; Existence of competitive equilibria; Competitive equilibrium as Core allocation Uniqueness and Stability of Competitive equilibrium; Comparative statics.

Welfare Properties of Competitive Equilibria - First and Second Fundamental Theorems of Welfare Economics; Efficiency and fairness of Market wage; Factor Price Equalization Theorem.

Unit 3: Welfare Economics

Welfare Criteria - Fairness; Pareto optimality; Kaldor efficiency; Scitovsky Criterion; Samuelson Criterion; Cost Benefit Analysis.
Social Choice; Social Welfare Function; Arrow's Impossibility Theorem and the related results.

Unit 4: Market Failures

Market failure; Sources of market failure and their implications; Externalities; Public Good.

Textbooks:

1. Jehle, G. and P. Reny (2001): Advanced Microeconomic Theory, Addison Wesley.
2. Pratt, J. (1964): Risk aversion in the small and in the large, Econometrica 32, 122-136.
   3. Mas-Collel, A., M. Whinston and J. Green (1995): Microeconomic Theory, 2nd ed. Oxford University Press
4. Diamond P. and Stiglitz J. (1974): Increases in risk and in risk aversion, Journal of Economic Theory 8, 337-360.
5. Hall Varian (1992), Microeconomic Analysis, 3rd ed. WW Norton & Co.

MAE 104: Macroeconomics II (L:4, T:1, P:0)

Course Objectives:

This course is an advanced level course in Macroeconomics. The course content is prepared to get comprehensive theoretical understanding of modern macroeconomics in the short-run. This will pay special attention to the analysis for real business cycles, new classical framework, and new Keynesian framework. The course is also designed to provide students the knowledge of stochastic difference equations in the context of rational expectation theory. The course is organized to update the students the theoretical insights of the modern macroeconomic thoughts explaining business fluctuation and the relevance of stabilization policies especially in the short-run.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe and assess the modern macroeconomic thoughts explaining business fluctuation and the relevance of stabilization policies especially in the short-run.

CO2: Develop the power of analysing and diagnosing critical issues relating to modern macro issues and business cycles.

CO3: Identify the major mathematical tools used in modern macro analyses and build a scientific method of understanding a theory by proof.

CO4: Display original, independent and critical thinking, and demonstrate the ability to develop theoretical concepts related to macroeconomics.

Syllabus:

Unit 1: Stochastic Difference equations

First-Order Linear Systems; Scalar Linear Rational Expectations Models; Multivariate Linear Rational Expectations Models.

Unit 2: New Classical Model

Imperfect information; certainty equivalence behaviour; rational expectations; Lucas supply curve; random walk with drift, white noise; Lucas Critique; Anticipated and unanticipated monetary policy.

Unit 3: New Keynesian Model

New Keynesian Model-basic framework: menu cost argument, efficiency wage, implicit contracts, explicit wage bargaining, insider outsider models, coordination failures; Price stickiness (Calvo and Rottenberg); Optimum pricing; Dynamic IS and new Philips curve; Monetary policy effectiveness. Monetary Policy Design: Rule vs Discretion. Sticky Wages and Unemployment.

Unit 4: Real Business Cycle Theory

Basic factors of business cycles-evidence and issues; Real business cycle theory-basic structure with and without labour; Intra-temporal trade-off between consumption and labor supply; Consumption and labor supply with uncertainty; Explanation for output and employment fluctuations for special and general cases of the model; Money in utility; Effectiveness of Monetary Policy.

Textbooks:

1. The Foundation of Modern Macroeconomics by Ben J. Heijdra, Second edition, Oxford University Press, 2009.
2. Galor, O. (2010): Discrete Dynamical Systems, Springer-Verlag.
3. Gali, Jordi (2015): Monetary Policy, Inflation, and the Business Cycle, 2nd Edition, Princeton University Press.
4. Minford, P. and Peel. D. (2019): Advanced Macroeconomics: A Primer, 2nd Edition, Edward Elgar.
5. The ABCs of RBCs, by Georg McCandless, Harvard University Press, 2008.
6. Romer, D. (2012): Advanced Macroeconomics, 4th edition, New York: McGraw Hill.
7. Sorensen, P.B. and Whitta-Jacobsen, H.J. (2010): Introducing Advanced Macroeconomics: Growth and Business Cycles, 2nd Edition, McGraw-Hill.
8. Wickens, M. (2011): Macroeconomic Theory: A Dynamic General Equilibrium Approach , 2nd edition, Princeton University Press.

MAE 106: Mathematical Methods for Economics II (L:4; T:1: P:0)

Course Objectives:

The objective of this course is to introduce and teach advanced topics of mathematics used to understand economic problems, theories and concepts in different schemes of Economics.

Course Outcomes:

Upon completion of course, the student will be able to

CO1: Develop mathematical sophistication in derivations and writing proofs

CO2: Identify the basic tools of real analysis to understand, solve and derive economic theories.

CO3: Solve economic problems using methods of dynamic optimization.

CO4: Develop economic models using mathematical methods

Syllabus:

Unit 1: Basic Real Analysis

In normed spaces, notions of open, closed and compact sets, continuous functions, their optima and their existence. Notions of differentiability of mappings between Euclidean spaces, chain rule, higher order derivatives. Implicit and inverse function theorem, comparative statics.

Unit 2: Dynamic Optimisation I

Calculus of variations and economic applications, Transversality Conditions, Infinite Planning Horizon, Saddle-path stability, Constrained Problems, Solution of Economics Models using Dynamic Optimisation

Unit 3: Dynamic Optimisation II

Optimal Control Theory, Vector spaces, The principle of optimality, Concavity and differentiability of the value function, Euler-Lagrange equations, Infinite Horizon Problems, Deterministic dynamics, Models with constant returns to scale, Nonstationary models, Dynamic Programming, Stochastic dynamic programming, Stochastic Euler equations, Stochastic dynamics, Solution of Economics Models using Dynamic Programming

Unit 4: Economic Models

Utility and Partial Equilibrium Market Model; Application of Matrix in Market Model and National Income Model; Input-Output Analysis; Applications of Differential Equations in Economics.

Textbooks:

1. Abbott, S. (1997): Understanding Analysis, Springer.
2. Munkres, J. (1975): Topology: A First Course, Prentice-Hall.
3. Stokey, Nancy L., and Robert E. Lucas, Jr., with Edward C. Prescott. Recursive Methods in Economic Dynamics. Cambridge, MA: Harvard University Press, 1989.
4. Acemoglu, Daron. Introduction to Modern Economic Growth. Princeton, NJ: Princeton University Press, 2008.
5. Chiang, Alpha C. Elements of Dynamic Optimization. Long Grove, IL: Waveland Press, 1999.
6. Luenberger, David. Optimization by Vector Space Methods. New York, NY: WileyInterscience, 1997.
7. Kamien, Morton I., and Nancy L. Schwartz. Dynamic Optimization: The Calculus of Variations and Optimal Control in Economics and Management. 2nd ed.

MAE108: Econometric Methods (L:4, T:1, P:0)

Course Objectives:

The objective of this course is to equip the students with some of the advanced topics in econometrics. The course starts with a discussion on the problem of endogeneity and estimation using instrumental variables, followed by topics in simultaneous equation modelling. Students are also exposed to econometric models with discrete and limited dependent variables. The course concludes with an introduction to panel data estimation techniques.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Conduct independent econometric and statistical analysis of data in an applied research setting
CO2: Demonstrate an advanced knowledge of econometric methods for cross section and panel data

CO3: Apply a range of econometric models and tools that are useful when dealing with discrete dependent variables

CO4: Model and interpret data in the presence of problems, such as omitted variables and endogenous regressors, that are prevalent in most econometric modelling settings

CO5: Make informed decisions about the model building process and the relevance of theoretical models in conducting applied work

Syllabus:

Unit 1: Endogeneity and Instrumental Variables Method

Omitted variables; measurement errors; reverse causality; motivation for instrumentation; simultaneity bias; problem of endogeneity; IV Estimation

Unit 2: Simultaneous Equations Model

Seemingly Unrelated Regressions (SUR) model; Simultaneous Equations Models: The Simultaneous Equation Bias and Inconsistency of OLS Estimators; The Identification Problem; Rules, of Identification-order and Rank Condition; Method of Estimating Simultaneous Equation System; Recursive Method and OLS; Indirect Least Square (ILS); 2SLS; 3SLS – Applications.

Unit 3: Models with discrete and limited dependent variables

Models with discrete dependent variables: Binary, Multinomial, Ordered, Sequential, and Randomised; Models of limited dependent variables: Censored model and Truncated models

Unit 4: Panel Data Models

The Pooled OLS Regression Model; Unobserved Heterogeneity; the Fixed Effect Least Squares Dummy Variable Model; the Fixed Effect within Group Estimator; the Random Effects Model; Maximum Likelihood versus Generalized Method of Moments Estimation

Textbooks:

1. W. Greene, Econometric Analysis, Prentice Hall
2. J.M. Wooldridge, Introductory Econometrics: A modern approach, South Western Cengage Learning
3. J. Johnston and J. DiNardo, Econometric Methods
4. G. S. Madala, Limited Dependent and Qualitative Variables in Econometrics, Cambridge University Press
5. G. Judge et al., The Theory and Practice of Econometrics, Wiley

MAE110: Econometric Analysis with R (L:0, T:0, P:4)

Course Objectives:

This course puts statistical theory and econometric method into practice by making students work with data and cases in an R environment. Students will be taught to write their own program with R for generating summary statistics, undertaking data visualization, estimation, hypothesis testing and applying advanced econometric methods. The key objective is to help students develop skills in working with data to generate actionable insights.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Run simple and multiple linear regressions in R

CO2: Use R to implement various econometric techniques to deal with the issues of e endogeneity

CO3: Produce data visualisations to reveal meaningful trends in data

CO4: Handle panel data estimation techniques in R

CO5: Interpret and critically evaluate applied work and econometric findings

Syllabus:

Unit 1: Linear Regression Analysis in R

Running a simple and multiple OLS regression in R; Testing for Linear Restrictions and Parameter Stability; Model specifications; Regression Diagnostics: Collinearity, Autocorrelation, Heteroscedasticity; Normality of residuals; . Model Selection Criteria (AIC, SIC) and Tests (Adding and Omitting Variables, Non Linearities: Squares, Cubes and Logs, Ramsey's RESET test)

Unit 2: Limited dependent variable and maximum likelihood estimation

Binary outcome: Logit and Probit; Maximum likelihood estimation (MLE); Multinomial outcome; Generalized linear model

Unit 3: Simultaneous Equation Models in R

Estimation of Simultaneous Equation Systems in R; Recursive Method and OLS; Indirect Least Square (ILS); 2SLS; 3SLS – Applications.

Unit 4: Panel Data Estimation in R

Importing panel data in R; the Fixed Effect Least Squares Dummy Variable Model; the Fixed Effect within Group Estimator; the Random Effects Model; Generalized Method of Moments Estimation

Textbooks:

1. Data Analysis and Graphics Using R (2010), by John Maindonald and John Braun
2. Applied Econometrics with R (2008) by Achim Zeileis and Christian Kleiber
3. Mostly Harmless Econometrics (2008) by Joshua Angrist and Jorn-Steffen Pischke
4. Econometrics (2015) by Bruce Hanse
5. Discrete Choice Methods with Simulation (2003) by Kenneth Train

MAE112: Workshop

A 2–3-week workshop on a topic as decided by the Department. Student would have to compulsorily attend all the sessions of the workshop and obtain a Pass Grade in the exam to be conducted after the workshop.

Semester III

MAE 201: Indian Economy (L: 4, T: 0, P: 0)

Course Objectives:

The objective of this course is to introduce students to economic development and policy in India, with a focus on current debates, and to equip them with the ability to analyze policies using economic tools. The course aims to facilitate students in comprehending the trends in the Indian economy using the tools and methods taught in other courses.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and describe key features of the Indian economy and their implications for economic development

CO2: Analyze and compare the performance of the Indian economy with other major economies

CO3: Categorize and differentiate the major challenges facing the Indian economy and predict their implications for future economic development

CO4: Design and construct policy solutions to address the challenges facing the Indian economy, drawing on the tools of economics and policy analysis

CO5: Justify the effectiveness of different policy solutions to promote economic development and social welfare in India, based on evidence from recent research and policy debates

Syllabus:

Unit 1: Macro Economic Policies and their Impact

Nature and Significance of Indian economic reforms; Performance of India's economy in the pre-reforms and post-reforms period; State intervention in the Indian Economy; Financial Sector Reforms and Performance; Recent Trends and Turns in the Indian Growth Story

Readings

- Arvind Subramanian and Josh Felman (2021) India's Stalled Rise-How the State Has Stifled Growth, published in foreign affairs on 14.12. 2021

- Chatterjee, Shoumitro, and Arvind Subramanian. India's inward (re) turn: Is it Warranted? Will it Work? Ashoka Center for Economic Policy, Policy Paper 01 (2020).
- Mohan, Rakesh, and Partha Ray. Indian financial sector: Structure, trends and turns. International Monetary Fund, 2017.
- Rakshit, M. (2011). The Pre-reforms Indian Economy: Plan Strategy, Development Experience, and the Payments Crisis. In Macroeconomics of Post-reform India. Oxford University Press
- Rakshit, M. (2011) Some Macroeconomics of India's Reforms Experience. In Macroeconomics of Postreform India. Oxford University Press
- Mohan, R. (2019). Moving India to a new growth trajectory: Need for a comprehensive big push. Brookings India Research Paper.
- Ahluwalia, M. S. (2019). India's economic reforms: Achievements and next steps. Asian Economic Policy Review.

Unit 2: Sectoral Analysis: Agriculture

Performance of Indian Agriculture; Trends in Farm Income; Economic Reforms and Agriculture; Impact of Climate Change on Agriculture; Land Reforms; Technology Adoption; Sustainable Agriculture Practices

Readings

- Dev, M. (2018) Transformation of Indian Agriculture? Growth, Inclusiveness and Sustainability. Working paper 2018-026, Indira Gandhi Institute of Development Research, Mumbai.
- Ramesh Chand, Raka Saxena, Simmi Rana (2015) Estimates and Analysis of Farm Income in India, 1983–84 to 2011–12, Economic & Political Weekly May 30, 2015 Vol. l No 22
- Acharya, S., & Mehrotra, S. (2020). The Agricultural Market Reforms: Is there a tradeoff between efficiency and equality? working paper series, Institute of human development.
- Roy, SD. (2017). Economic reforms and agricultural growth in India, vol.52, special article, 4th. Economic & Political Weekly
- Chatterjee, S., Kapur, D. (2017). Six puzzles in Indian agriculture. India Policy Forum 2016, Vol. 17.
- Ministry of Finance. (2017). Climate, climate change and agriculture. Ch. 6 in Economic Survey

Unit 3: Sectoral Analysis: Industry and Services

Economic Reforms in Industry and Services; Global Value Chains; Trends in Employment; Policies to address Challenges of Unemployment and Low Manufacturing Growth

Readings

- Nagaraj, R. (2017). Economic Reforms and Manufacturing Sector Growth. Economic and Political Weekly.
- Chakraborty J. Nagaraj, R. (2020). Has India Deindustrialised Prematurely? A Disaggregated Analysis. Economic and Political Weekly.
- Mukherjee, Deeparghya (2021) Is India Moving Up the Global Value Chain? A Sectoral Study of Indian Exports. Economic and Political Weekly, 56(20), 12-15
- Achin Chakraborty, 2015, Reforming Labour Markets in States: Revisiting the Futility Thesis, Economic and Political Weekly, May 16, 20
- Thomas, J.J. (2018). Economic Growth without Employment: The story of Indian Manufacturing in Hill and Patil (eds.), Employment Policy in Emerging Economies. Routledge, London and New York.
- Chanda, R. (2019). India's Services Sector; trends, opportunities and challenges, in Uma Kapila(ed.), Indian economy-2; Macroeconomic policies, Sectoral Developments and Performance. (Chp.29)
- Sen, K., Das, D. (2015). Where have all the workers gone? The puzzle of declining labour intensity in organised Indian manufacturing. Economic and Political Weekly, 50(23), 108-115.
- Roy, S. (2016). Faltering Manufacturing Growth and Employment: Is 'Making' the Answer?. Economic & Political Weekly, 51(13), 35-42.
- Babu, Suresh & Podikkalathil, Jithin. (2020). Reviving Industrial Growth — Need to Address Demand Constraint. Economic and Political Weekly, 55(30), 16-20
- Dipak Mazumdar and Sandip Sarkar (2009) "The Employment Problem in India and the Phenomenon of the 'Missing Middle' The Indian Journal of Labour Economics, Vol. 52, No. 1, 2009

Unit 4: Sectoral Analysis: Trade and Labour

Trade Policy Reforms since 1991; New Foreign Trade Policy; Evolving Role of Multilateral Organisations; Labour Laws in India; Labour Reforms in India

Readings

- New Foreign Trade Policy (https://www.dgft.gov.in/CP/?opt=ft-policy)

- Trade Policy Review (prepared by secretariat/govt, WTO 2020) chapter 2: Trade and Investment Regimes
- Harsh Vardhan Singh – Trade Policy Reforms since 1991, working paper 02, Brookings India
- Bhagwati and Panagariya, 2012, A Multitude of Labour Laws and their Reforms in India's Tryst with Destiny, Collins Business, Noida, Ch. 8.
- Roy Choudhury Anamitra, and Kingshuk Sarkar. "Labour reforms in a neo-liberal setting: Lessons from India." Global Labour Journal 12, no. 1 (2021).

MAE 203: Development Economics (L: 4, T: 0, P: 0)

Course Objectives:

The aim of this course to familiarize students with recent research on issues concerning economic development, in general and development economic policy framework in India, in particular; with an emphasis on contemporary debates, and to train them in the conduct of policy analysis using the tools of economics. In particular, the course will help students to understand the application of economic theory, and the statistical and econometric techniques that they are taught in other courses. The approach is modular, and will vary with time, depending on the nature of current policy discourse and recent research in the area of study.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe empirical concepts of poverty, inequality, unemployment and welfare

CO2: Identify theoretical foundations of health, education and gender, and their linkages with development economics

CO3: Describe theoretical foundations and empirical research in Indian agriculture

CO4: Analyze current policy debates and contribute to policy making in an informed way. CO5:

Conduct independent research in these areas

Syllabus:

Unit 1: Poverty, inequality, unemployment and Welfare

- Definitions, Measures and Mechanisms, Inequality axioms and principles; connections between inequality and development; inequality trends at international level;

- Conceptualisation of the poverty lines at domestic and international levels; characteristics of the poor; capability approach to poverty; mechanisms that generate poverty traps and path dependence of growth processes.
- Inclusive Growth, Distributional Issues and Policies: Demography, Poverty and Unemployment; strategies for attaining sustainable growth, reducing poverty, income inequality and use of theory and empirical analysis to address issues in these areas.
- Understanding the importance of measuring welfare, basic needs theory, welfare, sustainability and development; objective and subjective criteria for construction of welfare indicators; wellbeing and progress; an understanding and measurement of various development and welfare indicators. To mention a few: HDI, IHDI, GDI, GII, MPI, HI, EFA, EFA-DI, QLEI and other. International and interstate comparisons of these indicators will also be covered.

Unit 2: Agriculture

- Agricultural Markets, agricultural reforms, micro finance and rural-urban migration.
- Risk mitigation strategies of farmers and agricultural insurance
- Agriculture price policy and innovations

Unit 3: Health and education

- Role of Health and education in Development
- Health systems and international comparisons
- Education and inequality

Unit 4: Gender and development

- Conceptualizing and theorizing gender and development
- Mainstreaming gender
- Work and gender relations
- Gender and inequality

Textbooks/References:

- Bardhan, P. and C. Udry (1999), Development Microeconomics, Oxford University Press.
- Basu, K. (2003), Analytical Development Economics: The Less Developed Economy Revisited, The MIT Press.
- Meier, G. and J. Rauch (2004), Leading Issues in Economic Development, 7th edition, Oxford University Press.
- Phelps, C. E. (2017). *Health economics*. Routledge
- Hanushek, E. A., Machin, S. J., & Woessmann, L. (Eds.). (2016). *Handbook of the economics of education*. Elsevier.

- Bradley, S., & Green, C. (Eds.). (2020), *The Economics of Education: A Comprehensive Overview*
- Momsen, Janet (2020). *Gender and development*. Routledge. 3rd Edition • Moser, C. (2012). *Gender Planning and Development* (pp. 63-87). Routledge.
- Kabeer, N. (2003). *Gender Mainstreaming in Poverty Eradication and the Millennium Development Goals: A handbook for policy-makers and other stakeholders. Commonwealth Secretariat.*
- Agarwal, B. (1997). "Bargaining" and gender relations: Within and beyond the household. *Feminist economics*, 3(1), 1-51.
- HDI Measures of Health and Education, technical note, available at: http://hdr.undp.org/sites/default/files/hdr_2013_en_technotes.pdf
- Government of India document on: "Quality of Life for Elderly Index assesses well-being of India's ageing population", available at: https://www.pib.gov.in/PressReleasePage.aspx?PRID=1744755
- Part V, Education Development Index in *Elementary Education in India: Analytical Report*. *Part V, DISE*, (2007) 167-185, available at: untitled
- "Healthy States, Progressive India Report on the Ranks of States and Union Territories", Ministry of Health and Family Welfare, available at: Health Book Niti Final for Web Education GPS - India - Overview of the education system (EAG 2021) (oecd.org) Health Index (niti.gov.in)

Other Journal Articles:

The following journal articles will form a background material for the students:

- Chaurey, R. (2015): Labor regulations and contract labor use: Evidence from Indian firms, Journal of Development Economics.
- Das, S.; Ghate, C. and Robertson, P. (2015): Remoteness, urbanization and India's unbalanced growth, World Development.
- Fishman, R.; Lall, U.; Modi, V. and Parikh, N. (2016): Can electricity pricing save India's groundwater? Evidence from a novel policy mechanism in Gujarat, Journal of the Association of Environmental and Resource Economists.
- Gaiha, R.; Jha, R. and Kulkarni, V. (2015): Affluence, Obesity and Non-communicable diseases in India, in Gaiha et al., Diets,Malnutrition and Disease, Oxford University Press.
- Gangopadhyay, S. Lensink, R. and Yadav, B. (2015): Cash or in-kind transfers? Evidence from a randomised control trial in Delhi, India, Journal of Development Studies.
- Kaushal, N. and Muchomba, F. (2015): How consumer price subsidies affect nutrition, World Development.

- Anderson, S. (2007). The economics of dowry and brideprice. *Journal of Economic Perspectives*, 21(4), 151-174.
- Aizer, A. (2010). The gender wage gap and domestic violence. *American Economic Review*, 100(4), 1847-59.
- Heath, R. (2014). Women's access to labor market opportunities, control of household resources, and domestic violence: Evidence from Bangladesh. *World Development*, 57, 3246.
- Neetha, N. (2018). *Migration, gender and care economy*. Routledge India
- Boeri, N. (2018). Challenging the gendered entrepreneurial subject: Gender, development, and the informal economy in India. *Gender & Society*, 32(2), 157-179.
- Altinok, Nadir, and Geeta Kingdon. "New evidence on class size effects: A pupil fixed effects approach." *Oxford Bulletin of Economics and Statistics* 74, no. 2 (2012): 203-234.
- Abhijit Banerjee, Shawn Cole, Esther Duflo, Leigh Linden. "Remedying Education: Evidence from Two Randomized Experiments in India", *Quarterly Journal of Economics*, 122, No. 3, Aug 2007, Pages 1235–1264.
- Goldin, C., & Katz, L. F. (2010). *The race between education and technology*. Harvard university press.
- Kingdon, G. G., & Teal, F. (2007). Does performance related pay for teachers improve student performance? Some evidence from India. *Economics of Education Review*, *26*(4), 473-486.

MAE 209: Game Theory 1 (L:4, T:0, P:0)

Course Objectives:

The purpose of this course is to familiarize students with the field of game theory, which has practical uses in fields such as economics, political science, sociology, and engineering. The course will cover the essential tools of game theory and various equilibrium concepts. Understanding game theory will enable students to analyze real-world situations like market behaviour and election voting.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe theoretical foundations of game theory

CO2: Analyze various equilibrium concepts in game theory

CO3: Identify applications of game theory and their implications

CO4: Display original, independent, and critical thinking, and demonstrate the ability to develop the facility of using some of these tools to model and analyse situations of conflict and cooperation

Syllabus

Unit 1: Introduction to Game Theory: The concept of Games and Their Representation

Formal representation of games; Notions of Equilibrium in Game Theory: dominant strategy equilibrium, iterated domination arguments, rationalizability, Motivation and definition of Nash Equilibrium, mixed strategy Nash equilibrium: concept and examples

Unit II: Game Theory under Complete Information

Static Games of Complete Information; Dynamic Games of Complete information; Dynamic Games of Complete but Imperfect information; Economic Applications

Unit III: Game Theory under Incomplete Information

Static Games of incomplete information – Bayesian Nash Equilibrium; Dynamic Games of Incomplete Information – Perfect Bayesian Equilibrium; Trembling Hand Perfection; Economic Applications

Unit IV: Economics of Information

Types of Asymmetric Information - Moral Hazards, Adverse Selection, Signalling, Market for Lemons; Principal Agent Problem; Efficiency of Market Outcomes under Asymmetric Information

Textbooks/References:

- Gibbons, R. (1992), A Primer in Game Theory, Prentice-Hall.
- Mas-Colell, A.; Whinston, M. and Green, J. (2006): Microeconomic Theory, Oxford University Press.
- Osborne, M. (2004): An Introduction to Game Theory, Oxford University Press.
- Osborne, M. and Rubinstein, A. (1994): A Course in Game Theory, MIT Press.
- Fudenberg, D. and Tirole, J. (1991), Game Theory, MIT Press.

MAE 211: Industrial Organisation 1 (L:4, T:0, P:0)

Course Objectives:

The objective of this course is to provide the students fundamental knowledge of basic theoretical models of industrial organisation. This field is mainly concerned with different strategic motives and interactions in oligopolistic markets, employing the techniques taught in the course on Game Theory. It also provides a theoretical framework for analysis of antitrust/competition policy, as well as other policies relating to regulation, innovation, intellectual property rights, and strategic trade policy.

Course Outcomes:

Upon completion of the course, the student would be able to

CO1: Demonstrate theoretical knowledge of market structure and firm's behaviour

CO2: Describe the theoretical framework for the analysis of market concentration

CO3: Identify different strategies applied by firms to acquire monopoly power

CO4: Analyse and apply microeconomic models to models of industrial economics

Syllabus

Unit 1: Oligopoly

Cournot Competition – Duopoly Cournot Vs Collusion; Sequential Moves- Leader Follower Model; Bertrand Market Structure, Capacity Constraint- Edgeworth Paradox, Collusion, Entry Barriers, Differentiated Products (Cournot & Bertrand), Location Models

Unit 2: Economics of R& D Licencing and 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

Unit 3: Barriers to Entry and Exit and Network Externalities

Entry Barrier- Limit Pricing, Capacity Constraints; Judo Economics- Gelman and Salop Model; Low Price as Signalling Device – Milogram and Roberts Model; Reaction To Partial Entry; Predatory Pricing; Predation in Learning and Network Industries

Unit 4: Bundling and Tying

Economics of bundling and tying, strategic reasons and efficiencies, market structures and outcomes

Textbooks/References

- Belleflamme, P. and Peitz, M.: Industrial Organization: Markets and Strategies, Cambridge University Press (2015)
- Tirole, J.: The Theory of Industrial Organization, MIT Press (1988)
- Shy, O.: Industrial Organization: Theory and Applications, MIT Press (1996)
- Armstrong, M. and Porter, R.: Handbook of Industrial Organization, Vol. III, NorthHolland (2007)
- Church, J., Roger Ware (2000), Industrial Organization: A Strategic Approach, McgrawHill, International Editions
- Economides, Nicholas, the Economics of Networks, 1996, International Journal of Industrial Organization(14), 673-699.

MAE 213: Dynamic Macroeconomics

Course Objectives:

The main focus of this course is on dynamic programming and its fundamental role in modern macroeconomics. After starting with the necessary mathematical tools, several applications in labour economics, economic growth, and asset pricing are introduced. The course pursues a hands-on approach so that students not only gain theoretical insights but also learn numerical tools to solve dynamic economic models

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe the tools and techniques necessary to formulate and solve dynamic models

CO2: Analyse macroeconomic policy issues using theoretical models and quantitative methods

CO3: Apply the equilibrium approach to macroeconomics as a general method for analysing real-world macroeconomic problems

CO4: Critically evaluate macroeconomic theories and policies, and assess their strengths and weaknesses

Syllabus:

Unit 1: Review of Dynamic Programming and Optimal Growth

Unit 2: Neoclassical Growth Model Beyond Growth: Asset Pricing, Public Finance, Overlapping Generations

Growth with Overlapping Generations; Applications of the Neoclassical Growth Model

Unit 3: Business Cycles

Consumption; Real Business Cycle Models; Monetary, Non-Neutrality, the Phillips Curve, Nominal Rigidities; New Keynesian Models

Unit 4: Monetary and Fiscal policy

Optimal monetary policy in the New Keynesian model; Monetary policy rules; The practice of monetary policy: goals, strategies, implementation; Government expenditures and fiscal multipliers; Budget deficits and debt sustainability

Textbooks/References:

- David Romer. Advanced Macroeconomics. McGraw-Hill Economics, 5th edition, 2018.
- Olivier J. Blanchard and Stanley Fischer. Lectures on Macroeconomics. MIT press, 1989.
- Jordi Gal´ı. Monetary policy, inflation, and the business cycle: an introduction to the new Keynesian framework and its applications. Princeton University Press, 2nd edition, 2015.
- Ljungqvist, L. and T. Sargent: Recursive Macroeconomic Theory, Fourth Edition, MIT Press, 2018.
- Adda, J. and R. Cooper: Dynamic Economics: Quantitative Methods and Applications, MIT Press, 2003.
- Farhi, E., C. Sleet, et al. (2012): "Non-linear Capital Taxation without Commitment." Review of Economic Studies .
- Taylor, John B. and Uhlig, Harald (2016): Handbook of Macroeconomics, North-Holand: Elsevier

MAE 215: Macroeconomics of Development (L:4, T:0, P:0)

Course Objectives:

The rise of effective organizations, in both the private and public sector, is a central feature of economic growth and development. This course studies the challenges of creating effective organizations in the developing world. It thus sits in between microeconomic analysis of individual and household behaviour, and truly "macroeconomic" analysis of economic aggregates such as capital, labour, and output. The two fundamental questions (i) What explains the vast divergence in growth patterns across the world? (ii) What is an appropriate government policy (if any) in a low-income-low growth country which can usher in a "high growth" regime? have motivated the course and the modern growth theories beyond Solow have tried to provide the explanations. This course is designed to provide the proximate and deeper views of macroeconomics of development.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Analyse theories explaining growth differences across countries
CO2: Compare various policies that promote growth

CO3: Describe how market imperfections, and regulations become crucial in the growth process

CO4: Analyse institutional and cultural characteristics that might be the root cause of underdevelopment in many poor countries.

Syllabus:

Unit 1: Development, growth and Aggregate Factor Accumulation

Basic Facts and Questions; Measuring Development; The Solow Model and Development Accounting; Alternatives to Solow Model

Unit 2: Causes of Growth-I (Human Capital, R&D, Technology)

- AK Model, Spill overs and Human Capital - Human Capital and Economic Growth, First-Generation Models of Endogenous Growth
- R&D, Varieties vs. Quality, Directed Technological Change - Variety Models, Models of Competitive Innovations, Directed Technological Change, Distance to the frontier and technology diffusion, Appropriate versus inappropriate technologies

Unit 3: Causes of Growth -II

Market Structure; Capital Flows and Learning; Regulations and Politics: Inequality, Taxation and Growth; Democracy versus Oligarchy

Unit 4: Causes of Growth – III

- History versus Expectations: Underdevelopment as coordination failure; Multiple equilibria in technology adoption
- Culture: Culture, risk and entrepreneurship; Culture, patience and occupational choice.

Textbooks/References:

- Acemoglu, D. Introduction to Modern Economic Growth, 2007 • Acemoglu, D. “Directed Technical Change.” Review of Economic Studies 69 (2001): 781-810.
- Aghion, P., P. Howitt, M. Brant-Collett, and C. Garcia-Peñalosa. Endogenous Growth Theory. Cambridge, MA: MIT Press, 1998.
- Aghion, P., and P. Howitt. “A Model of Growth through Creative Destruction.” Econometrica 60 (1992), 323-351.
- Alesina, Alberto, and Rodrik, Dani (1994), “istributive Politics and Economic Growth." Quarterly Journal of Economics 109: 465-490.
- Ben-Porath, Yoram (1967), “The Production of Human Capital and the Life Cycle of Earnings." Journal of Political Economy 75: 352-365.
- Caballero, R., and A. Jaffe. “How High Are the Giants Shoulders?” In NBER Macroeconomics Annual 1993. Edited by Olivier Blanchard and Stanley Fischer. Cambridge, MA: MIT Press, 1993.
- Nelson, Richard R.,and Edmund S. Phelps (1966): “Investment in Humans, Technological
- Diffusion,and Economic Growth." American Economic Review 56: 69-75.
- Romer, P. M. “Endogenous Technological Change.” Journal of Political Economy 98 (1990): 71-102

MAE 217: Evolution of Economic Ideas (L:4, T:0, P:0)

Course Objectives:

This course discusses the evolution of recent economic ideas and its linkages with various economic outcomes. The course focuses on introducing the students with current economic issues and evolved ideas governing major economic discourse.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe the significance of recent economic theories and ideas

CO2: Identify the tools necessary for policy formulation

CO3: Analyse current policy debates

CO4: Identify potential research avenues in the emerging streams of economics

Syllabus:

Unit 1: Economic Governance of Commons

The Tragedy of the Commons - Old problem New Approach; Evolution of Institutions for Collective Action; Governing the Commons; Rational Choice Theory of Collective Action

Unit 2: Climate Change and Macroeconomic Analysis

Climate Change as Global Public Good; Climate Economics and DICE Modelling; Social Cost of Carbon; Climate Policies

Unit 3: Technology and Development

Locating Technology in a discourse on development; Firms, Innovation and Market Structure - The Schumpeterian Hypothesis, Incentives to innovate under alternative market forms: neoclassical models, Empirical validation of the Schumpeterian hypothesis - Appropriability and Patents - Problems of appropriability, market failure and solutions; Economics of Patents; Diffusion of Innovations

Unit 4: Economics of Networks

Meaning and significance of networks; Network formation; Local public goods games on a network; Social Learning, Rumour Diffusion; Financial Networks

Textbooks/References:

- Beyond Markets and States: Polycentric Governance of Complex Economic Systems: Nobel Prize Lecture, December 8, 2009
- Hardin, Garrett. “The Tragedy of the Commons.” *Science* 162 (1968): 1243–1248.

- Elinor Ostrom: A Behavioural Approach to the Rational Choice Theory of Collective Action. *The American Political Science Review* Vol. 92, No. 1 (Mar., 1998): 1-22
- Elinor Ostrom (1997) Governing Commons: The Evolution of Institution for Collective Actions
- William D. Nordhaus (2018) Climate change: The Ultimate Challenge for Economics* Nobel Prize Lecture, December 8, 2018
- Nordhaus, William D. 1977. "Economic Growth and Climate: The Carbon Dioxide Problem," American Economic Review, American Economic Association, vol. 67(1), pages 341–346, February.
- Nordhaus, William D. 1994. Managing the Global Commons: The Economics of Climate Change, Cambridge, MA, MIT Press, USA.
- William D. 2013. "Integrated Economic and Climate Modelling," in Handbook of Computable General Equilibrium Modelling, P. Dixon and D. Jorgenson, eds.: Elsevier, 1069–131
- Tirole, J (1988), The Theory of Industrial Organisation, Chapter 10, MIT Press: Cambridge, MA.
- Schumepter, J. (1943), Capitalism, Socialism and Democracy, Chapters 7 and 8, Unwin: London.
- Stoneman, Paul (1983), The Economic Analysis of Technological Change, Chapter 1, Oxford University Press: Oxford.
- Stoneman, Paul (ed.) (1995), Handbook of Economics of Innovation and Technological Change, Chapters 1, 4, Blackwell: Oxford.
- Jackson, M. O. Social and economic networks, PUP, 2010.
- David Easley and Jon Kleinberg, Networks, Crowds and Markets, Cambridge University Press, 2010.

MAE 219: Political Economy (L:4, T:0, P:0)

Course Objectives:

This course is the fundamental building block of the political economy stream of specialization that the MA economics programme offers along with other streams of specialization. This course analyses the divide between Classical and Neoclassical theories of value and distribution and also exposes students to the historical evolution of economic thought, both in terms of theories and methods. This course explores some of the fundamental structural changes and dynamics of the advanced capitalist system. Particularly, the course analyses the changes in the organization of production, labour market institutions as well as shifts in corporate, managerial, financial and inter-firm governance structures. It further analyses the role of the state in the era of globalization, by studying both its changed ideological foundation and varied practices. It also examines the shifts in the nature, scope and ideology of the state under globalisation.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the historical trajectories in the evolution of the global political economic framework

CO2: Analyse the conceptual agreements and disagreements between Marxian theories and praxis and other critical theories which embody a departure from the Marxian ideas

CO3: Demonstrate the ability to understand and interpret Marxist and other critical theories and apply them to social problems

CO4: Analyse the existing social and political structures and their links with the economic processes

Syllabus

Unit 1: Capitalism as an Evolving Economic System

Basic features; accumulation and crisis; monopoly capitalism— alternative perspectives; Changing Dynamics of capitalist production, organisational form and labour process: Fordist and Post-Fordist production; The changing dynamics of the organisation of production, markets and labour process.

Unit 2: Capitalism, Neoliberalism and Financialization

The State in the Era of Globalisation: Ideology, Theory and Practice: Theoretical foundations and ideological underpinnings of the neoliberal state; The neoliberal state in practice: social contradictions, instability, and the nature of resolutions in a globalized world. The Changing Role of Finance: The changing role of finance in the dynamics of capital accumulation and the shifts in corporate structure; Financialization: its nature and consequences; The role of finance in the globalised economy

Unit 3: The Global and the National Political Economy

The Social Dimension: Globalization and Uneven Development – Growth, inequality and crisis in an uneven geographical spread and its social ramifications

Unit 4: Classical Political Economy, Marxism and Imperialism

Unit 5: **Gender in political economy perspective**

Dimensions of Gender in work, accumulation and globalization

Textbooks/References:

- Baran, P. (1973). *The political economy of growth.* Chapter 3. Pelican.

- Harvey, D. (2014). *Seventeen contradictions and the end of capitalism.* Chapter 3. Oxford University Press.
- Heilbroner, R. (1985). *The nature and logic of capitalism.* Chapter 4. W. W. Norton.
- Heinrich, M. (2012). *An introduction to the three volumes of Karl Marx's Capital*. (English translation by A. Locascio). Monthly Review Press.
- Kalecki, M. (1972). Political aspects of full employment. In E. Hunt, J. Schwarz (eds.): *A critique of economic theory*. Penguin Books.
- Schumpeter, J. (1976). *Capitalism, socialism and democracy.* Chapters 6, 7 and 8. George Allen and Unwin.
- Shaikh, A. (2000). Economic crises. In T. Bottomore, et al. (eds.): *The dictionary of Marxist thought*. Maya Blackwell.
- Sweezy, P. (1942). *The theory of capitalist development*. Monthly Review Press.
- Dore, R. (2008). Financialisation of the global economy. *Industrial and Corporate Change,* 17, 1097-1112.
- Dumenil, G., Levy, D. (2011). *The crisis of neoliberalism.* Chapter 1. Harvard University Press.
- Harvey, D. (2005). *A brief history of neoliberalism.* Introduction, Chapters 1- 3. Oxford University Press.
- Bhaduri, A. (2002). Nationalism and economic policy in the era of globalization. In D. Nayyar (ed.): *Governing globalization: Issues and institutions*. Oxford University Press.
- Chang, D. (2009). Informalising labour in Asia's global factory. *Journal of Contemporary Asia,* 39, 161-179.
- Nayyar, D. (2003). Globalisation and development. In H.-J. Chang (ed.): *Rethinking development economics.* Anthem Press.
- Reddy, N. (2003). Economic globalisation, past and present: The challenges to labour. In K. Jomo, K. Jin (eds): *Globalization and its discontents, revisited*. Tulika Books.
- Rodrik, D. (2011). *The globalization paradox: Why global markets, states and democracy can't coexist*. Oxford University Press.
- P Patnaik, The Value of Money
- B Fine, Rereading Capital
- Gottfried, H. (2013). *Gender, work and economy: Unpacking the global economy.* Chapter 10. Polity Press
- Sen, A. (1990). Gender and cooperative conflicts. In I. Tinker (ed.): *Persistent inequalities: Women and world development.* Oxford University Press.

MAE 221: Microeconometrics (L:4, T:0, P:0)

Course Objectives:

The focus of this course is on microeconometric analysis, which involves analysing the economic behaviour of individuals or firms using individual-level data. The course will provide students an

extensive understanding of statistical methods and their application in modern applied microeconometrics research. These methods include regression models, matching models, difference-in-differences and other techniques used for analysing individual-level data in various social science disciplines.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the key concepts and principles of microeconometrics and understand how they apply to individual-level data analysis.

CO2: Describe and differentiate between various statistical methods and techniques used in modern applied microeconometrics research

CO3: Predict and generate new insights into the economic behavior of individuals or firms by using microeconometric analysis to identify and measure causation rather than mere association

CO4: Analyse the findings of microeconometrics research

Syllabus:

Unit 1: Introduction

Meaning and Significance of Microeconometrics; Dynamics and Setting of Real World Experiments

Unit 2: Comparing Similar Individuals

Regression Models; Matching Models; Regression Discontinuity

Unit 3: Simulating Unobserved Outcomes

Instrumental Variables; Selection Models

Unit 4: Intertemporal Comparisons

Before-After; Difference-in-Differences and its Extensions; Synthetic Controls

Textbooks/References:

- W.H. Greene, Econometric Analysis, Prentice Hall
- A.C. Cameron & P.K. Trivedi, "Microeconometrics: Methods and Applications", Cambridge University Press
- J.M. Wooldridge, "Econometric Analysis of Cross Section and Panel Data", MIT Press
- R. Davidson & J.G. MacKinnon, "Estimation and Inference in Econometrics", Oxford University Press

MAE 223: Time Series Analysis (L: 4, T: 0, P: 0)

Course Objectives:

In this course, students will be introduced to the concepts and techniques of time series analysis and their relevance to economics. The primary objective of the course is to equip students with the necessary technical skills to apply time series models using software. Students will gain the ability to use time series econometrics to address a wide range of macro and financial data problems.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and understand the key concepts and techniques used in time series analysis

CO2: List and differentiate between various time series models and their assumptions

CO3: Predict future values and trends of time series data using appropriate forecasting techniques

CO4: Describe and analyze time series data using graphical and statistical tools to detect patterns and trends

Syllabus:

Unit 1: Introduction to Time Series Data and Analysis
Stochastic Processes; Correlation and Autocorrelation Functions; Stationarity: Unit-Root Test; ARIMA Models

Unit 2: Conditional Heteroscedastic Models

Characteristics of Volatility; The Arch Model; The Garch Models: M-Garch, E-Garch and TGarch

Unit 3: Vector Autoregression Model, Co-Integration and Forecasting

Introduction to VAR Analysis; Causality in Time Series: Granger Causality Test and Toda and Yamamoto Causality Tests; Co-Integration and Error Correction Model; Testing for Cointegration – Engle – Granger Methodology – Johansen Methodology; ARDL Bounds Testing Approach

Unit 4: Panel Data Methods

Panel Data Unit Root Tests; Panel Data Cointegration Test; Panel Estimation (FMOLS and DOLS)

Textbooks/References:

- W. Enders, Applied Econometric Time Series, 4th ed., Willey, 2015
- Hamilton, J.D., Time Series Analysis. Princeton: Princeton University Press
- Patterson, K, “An Introduction to Applied Econometrics a Time Series Approach”

• Hayashi, Fumio, Econometrics. Princeton: Princeton University Press, 2000
• Paul S.P. Cowpertwait and Andrew V. Metcalfe, Introductory Time Series with R, Springer-Verlag, New York, 2009
• Greene, W. (2018): Econometric Analysis, 8th Edition, Pearson

MAE 225: Environmental Economics (L: 4, T: 0, P: 0)

Course Objectives:

The objective of this course is to present a perspective on environmental sustainability in the context of economic development. While environmental degradation is a global phenomenon, there are vast differences in the effects of it on poor countries. It is well established that rich countries are largely the cause of it. The core areas of study are approaches to environmental sustainability; accent on Environmental Kuznets Curve and Pollution Haven Hypothesis; valuation of environmental services and assets; environmental problems – air, water and soil pollution; environmental externalities – Pigouvian Tax; Control- direct regulation and marketbased instruments (taxes and tradable permits); Global Warming and Climate Change.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify different approaches to achieving environmental sustainability and their applications

CO2: Analyse the relationship between trade, pollution, and the environment

CO3: Apply methods of environmental valuation to assess the impact of economic activities on the environment

CO4: Differentiate between market-based, non-market based, and hybrid approaches to control environmental problems

CO5: Describe the basics of global warming and climate change and their potential impact on the environment and society

Syllabus:

Unit 1 – Environmental Sustainability and Economic Development

Approaches to environmental sustainability: Sustainability: Behavior, Property Rights and Economic Growth; Environmental Sustainability and Consumption Approach. The relation between Environment and Development: Environmental Kuznets Curve. Trade-Environment triangle. Pollution Haven Hypothesis.

Unit 2 – Environmental Valuation

Use value, option value and non-use value. Revealed Preference and Stated preference; Hedonic functions; Household production function. Travel cost method- Zonal, individual and random utility. Hypothetical markets and Contingent valuation.

Unit -3 Environmental issues and Control

Bio-diversity loss. Depletion of Common property. Deforestation. Air, water and soil pollution. Pollution abatement methods: Market solutions - pollution charges, marketable permits, and better-defined property rights. Pigouvian Tax. Coase bargaining solutions. Non-market solutions to pollution control. Command and control approach. Hybrid approach – combining standards and pricing. Liability rules, information disclosure and voluntary action. Circular Economy and Waste Management.

Unit 4 Global Warming and Climate Change

Climate Change: Natural factors and anthropogenic factors. Ozone layer depletion – causes, potency and policy. Climate change and loss of biodiversity. Adaptation & Mitigation strategies. Combined strategies – Improved mass transit, Indigenous people's land rights, decentralized energy distribution, sustainable agro-forestry and protection of coastal wetlands.

Textbooks/References:

- Bhanu Murthy, K. V. & Sakshi Gambhir (2017) 'International trade and foreign direct investment: empirical testing of the trade–environment triangle', Transnational Corporations Review, 9:2, 122-134.
- Jha, Raghbendra and Murthy, K. V. Bhanu, 'Sustainability: Behavior, Property Rights and Economic Growth' (September 1999). MacArthur Foundation Project on World Environmental Organization Working Paper No. 03, Available at SSRN: https://ssrn.com/abstract=235608 or http://dx.doi.org/10.2139/ssrn.235608
- Jha, Raghbendra and Murthy, K. V. Bhanu (2006) Environmental Sustainability -A Consumption Approach, Routledge, London, ISBN 9780415544283.
- K. G. Maler, J. Vincent: Handbook of Environmental Economics, Elsevier (2005)
- Phaneuf and Requate: A Course in Environmental Economics: Theory, Policy and Practice, Cambridge University Press (2017).
- Freeman, Herriges and Kling: The Measurement of Environmental and Resource Values: Theory and Methods, 3rd ed. RFF Press/Routledge (2014).
- W. Baumol, W. Oates: The Theory of Environmental Policy. Cambridge University Press (1988).
- Champ, Boyle and Brown: A Primer on Nonmarket Valuation. Springer (2003).
- Ananya Ghosh Dastidar and Yamini Gupta (2016). Contemporary Issues in Trade Environment and Policy, Ane Books, New Delhi.
- Narayan Singh and Amit Kumar Thakur (2016). Climate Change and Environmental Issues, The Energy Research Institute, New Delhi.

MAE 227: Health Economics (L:4, T:0, P:0)

Course Objectives:

The primary focus of the course is to provide students with an in-depth understanding of key economic concepts used by health economists to analyse health and healthcare markets. In this course, health issues will be examined using various economics tools, such as microeconomics, game theory, behavioural economics, and econometrics. The primary goal is to enhance students' knowledge of economic theory and empirical research in critical areas of health economics, enabling them to apply this knowledge to current health policy and management issues.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify key economic concepts and theories used in health economics, such as demand and supply, market failures, and incentives
CO2: Predict and analyze the impact of health policies and interventions on healthcare markets and population health outcomes

CO3: Describe and justify the methods used in economic evaluation to inform health policy decision-making

CO4: Analyse possible solutions to address current and emerging issues in health economics, such as healthcare financing, insurance, and access to care

Syllabus:

Unit 1: Introduction to Health Economics

Introduction to health economics: the economic way of thinking about health; health measurement, health care spending; determinants and long run trends; health and socioeconomic status; health and economic development

Unit 2: Models of Health and Health Insurance

Economic models of health; Health Insurance: introduction and moral hazard; adverse selection in health insurance; social insurance in India and global examples

Unit 3: Behavioural Economics of Health

Unhealthy behaviour-evidence and policy issues

Unit 4: Health Valuation

Health valuation: mortality risk valuation, static model, life cycle model, empirical models

Textbooks/References:

- Bhattacharya, J., Hyde, T. and Tu, P.: Health Economics, Palgrave
- Grossman, Michael (1972): "On the Concept of Health Capital and the Demand for Health", Journal of Political Economy 80(2)
- Case, A., Lubotsky, D., and Paxson, C. (2002): "Economic Status and Health in Childhood: The Origins of the Gradient", American Economic Review. 92(5): 1308-34
- Becker,G., and Murphy, K. (1988): "A Theory of Rational Addiction", Journal of Political Economy 96(4):675-700
- Acemoglu, D. and Johnson, S. (2007: "Disease and Development: The Effect of Life Expectancy on Economic Growth", Journal of Political Economy, 115(6): 925-85
- Miguel, E., and Kremer, M. (2004): "Worms: Identifying Impacts on Education and Health in the Presence of Treatment Externalities", Econometrica, 72(1): 159-217

MAE 229: Behavioural Economics (L:4, T:0, P:0)

Course Objectives:

This course introduces the principles and methods of behavioural economics at the microeconomic and macroeconomic levels. Students will learn about topics such as heuristics, biases, and nudging strategies, and how to incorporate psychologically-motivated assumptions into economic models. The course will also emphasize the importance of cognitive ability, social interaction, moral incentives, and emotional responses in explaining economic outcomes. By contrasting behavioural economics with standard economic models, students will be able to interpret the implications of these assumptions for policy development and business strategy. Additionally, the course covers the applications of behavioural economics in public policy, game theory, and finance.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Analyse evidence of systematic deviations from neoclassical economic behaviour predictions, and evaluate psychological explanations for these anomalies

CO2: Integrate psychologically-motivated assumptions into economic models and analyse their implications for economic behaviour

CO3: Examine how behavioural models alter predictions for equilibrium behaviour and welfare analysis, and evaluate their impact on optimal policy

CO4: Differentiate between predictions of neoclassical and behavioural models

Syllabus:

Unit 1: Introduction to Behavioural Economics

Nature of Behavioural economics; Origins of behavioural economics; Neo-classical and behavioural approaches to studying economics; Heuristics and Biases; Nudge theory and its applications in public policy

Unit 2: Microeconomic Foundations of Behavioural Economics

Prospect Theory; Decision-making under risk and uncertainty; Reference Dependence and Loss Aversion; Intertemporal Decision Making

Unit 3: Behavioural Game Theory

Nature of behavioural game theory; mixed strategies; bargaining; social preferences: altruism, envy, fairness and justice; intentions, reciprocity and trust; limited strategic thinking

Unit 4: Applications of Behavioural Economics in Finance

Money illusion and monetary policy; Beliefs, biases and heuristics in financial markets; behavioural aspects of individual investing; behavioural corporate finance

Textbooks/References:

- Erik Angner, A Course in behavioural Economics, Palgrave Macmillan 2012
- Richard Thaler and Carl Sunstein, Nudge: Improving Decisions about Health, Wealth and Happiness, Penguin UK 2009
- Behavioral Finance, William Forbes, Wiley, 2009
- Nick Wilkinson and Matthias Hales, An Introduction to Behavioural Economics, 2nd Edition, Palgrave Macmillan 2012
- Bernheim, B.D., DellaVigna, S., Laibson, D.: Handbook of Behavioral Economics, Vol. 1, North-Holland (2018)
- Bernheim, B.D., DellaVigna, S., Laibson, D.: Handbook of Behavioral Economics, Vol. 2, North-Holland (2019)
- Camerer, C.: Behavioral Game Theory: Experiments in Strategic Interaction, Princeton University Press (2003)
- Camerer, C., Loewenstein, G., Rabin, M.: Advances in Behavioral Economics, Princeton University Press (2004)
- Dhami, S.: The Foundations of Behavioural Economic Analysis, Oxford University Press (2016)

MAE 231: Experimental Economics (L:4, T:0, P:0)

Course Objectives:

This course aims to provide students with an understanding of the significant influence that experimental methods have on economic theory formulation, policymaking, and empirical data collection and analysis. By exploring experimental results from published research articles, the course will introduce students to the design of laboratory and field experiments. The key goal of the course is to equip students with the knowledge and skills necessary to analyse experimental data and apply experimental methods to economic research.

Course Outcomes:
Upon completion of the course, the student would be able to:

CO1: Identify and explain the basic principles of experimental methods in economics

CO2: Analyse the advantages and limitations of experimental methods in theory formulation, policy analysis, and empirical data collection and analysis

CO3: Compare the results of laboratory (also field/survey) experiments with non-experimental data

CO4: Design and generate experimental studies that test specific hypotheses related to economic behaviour

Syllabus :

Unit 1: Introduction to Experimental Economics

Economics as an Experimental Discipline; Emergence of Experimental Economics; Purposes and Limitations of Experiments

Unit 2: Principles of Economic Experiments

Realism and models; Controlled economic environments; Induced-value theory; Parallelism; Practical Applications

Unit 3: Experimental Design

Direct Experimental Control; Indirect Control: Randomization; Other Designs; Who and How many Subjects; Pilot Experiments; Lab Setup; Data Analysis and Reporting of Results

Unit 4: Economic Applications

Market and Game Theory Experiments; Decision Theory Experiments; Field and Survey Experiments

Textbooks/References:

- Friedman, D and Sunder, S. (1994) "Experimental Methods: A Primer for Economists", Cambridge University Press
- Bowles, S (2005) "Microeconomics: Behaviour, Institutions and Evolution," Oxford University Press, New Delhi
- Kagel, J and Roth, A (Ed.) (1995) "The Handbook of Experimental Economics," Princeton University Press
- Kahneman, D. and Tversky, A (2000) (Eds.) "Choices, Values and Frames," Cambridge University Press
- Gibbons, R (1992) "Game Theory for Applied Economists," Princeton University Press

MAE 233: Corporate Finance (L: 4, T: 0, P: 0)

Course Objectives:

The course focuses on how firms raise finance, deploy long term finance and the structure of their debt and equity. It involves major financial decisions – long-term investment policy (capital budgeting), capital structure and dividend policy. It dwells upon agency, asymmetric information, moral hazard and adverse selection problems. The course will study different aspects of lender-borrower relationships and their market outcomes.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and describe the basic concepts and principles of corporate finance

CO2: Analyse and compare various methods of capital budgeting, such as net present value, internal rate of return, and payback period, and apply them to real-world investment decisions

CO3: Differentiate between various sources of financing for corporations, such as equity, debt, and hybrid securities, and analyse their advantages and disadvantages in different situations

CO4: Construct and justify financial models for valuation of companies and their securities, and predict the impact of different strategic decisions on the company's value

Syllabus:

Unit 1: Basics of Corporate Finance

Objectives of Corporate Finance – Profit Maximization vs. Wealth Maximization. Functions of Corporate Finance- planning, organizing, directing and controlling finance. Changing role of finance managers - Organization of finance function. Foreign exchange risk management; cash management; working capital management. Agency model; problem and agency cost – Stockholders and Managers; Bondholders and Society. Asymmetric information – Moral Hazard and Adverse Selection

Unit 2: Capital Budgeting

Time Value of Money. Present and future value of single payments. Annuities and perpetuities. Capital rationing. Capital budgeting decisions – Discounted cash flows; NPV, IRR and MIRR. Risk adjusted return. Sensitivity analysis, Scenario analysis and Simulation. Cost of capital – cost of equity and cost of debt. Full and partial amortization.

Unit 3: Capital Structure

Capital Structure decisions – Overview of financing choices. The financing process; internal and external financing; Operational and financial leverage; Business risk and its effect on the use of financial leverage; Determination of the optimal capital structure. Modigliani and Miller - Propositions I and II - Theories for determining optimal capital structure - Static theory, Signaling theory, Bankruptcy theory, Pecking order theory. Supply-side factors affecting capital structure. Corporate finance in practice –Planning the capital structure: EBIT and EPS analysis. ROI & ROE analysis.

Unit 4- Dividend Policy

Dividend policy – factors affecting the dividend policy - dividend policies- stable dividend, stable payout. Theories of dividend policy: relevance and irrelevance dividend decision. Walter's and Gordon's model, Modigliani and Miller approach. Dividend policies – stable dividend, stable payout and growth. Bonus shares and stock split corporate dividend behavior. Legal and procedural aspects of dividends Corporate Dividend Distribution Tax- empirical evidence of dividend policy. Analyzing cash returned to the stockholders - cash flow approach and comparable firm approach

Textbooks/References:

- Amaro de Matos, J. (2001): Theoretical Foundation of Corporate Finance, Princeton University Press.
- Freixas, X. and Rochet, J.C. (2008): Microeconomics of Banking, MIT Press.
- Tirole, J. (2006): The Theory of Corporate Finance, Princeton University Press.

- Eugene Brigham and Joel Houston (2015). Fundamentals of Financial Management, Cengage, New Delhi, 14th Ed.
- Financial Management & Policy by James c. Van Horne 12th edition, Pearson, 2012.

MAE 235: Economics of Education (L:4, T:0, P:0)

Course Objectives:

This course discusses the economic aspects of current issues in education, using both economic theory and econometric tools. The course aims at giving the students an online on various issues discussed in the empirical literature. Topics include discussion of basic human capital theory, production of education, costing and finance of education, the growing impact of education on earnings and earnings inequality, the labour market for teachers, implications of the introduction of technology (computers) on education, the effectiveness of mid-career training for adult workers, the roles of school choice, and educational outcomes and inequality in demand for education and educational outcomes.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify key economic theories and concepts relevant to the study of education

CO2: Analyse the role of education in economic growth and development, and predict the implications of education policies for individuals and society.

CO3: Describe the impact of educational inequality on economic outcomes and social mobility, and differentiate between the causes and consequences of such inequality

CO4: Construct and justify a research design for analysing the effectiveness of education policies and programs

Syllabus

Unit 1: The Role of Education in Human Development

Macro issues in education, human capital theory and returns to education; Signalling theory; Education and labour market outcomes; Costs and benefits of education

Unit 2: Analysis of School Education

Educational interventions and attainments; Education financing, standards and accountability

Unit 3: Higher Education and Training

Issues of higher education in India; Role of internship and apprenticeship in improving labour market outcomes

Unit 4: Education and Inequality

Inequality in uptake and outcomes; Role of affirmative action in education

Textbooks/References:

- Hanushek, E. A., Machin, S. J., & Woessmann, L. (Eds.). (2016). *Handbook of the economics of education*. Elsevier.
- Becker, G. S. (2009). *Human capital: A theoretical and empirical analysis, with special reference to education*. University of Chicago press.
- Altinok, Nadir, and Geeta Kingdon. "New evidence on class size effects: A pupil fixed effects approach." *Oxford Bulletin of Economics and Statistics* 74, no. 2 (2012): 203-234.
- Abhijit Banerjee, Shawn Cole, Esther Duflo, Leigh Linden. "Remedying Education: Evidence from Two Randomized Experiments in India", *Quarterly Journal of Economics*, 122, No. 3, Aug 2007, Pages 1235–1264.
- Bradley, S., & Green, C. (Eds.). (2020), *The Economics of Education: A Comprehensive Overview*
- Ronald G., Ehrenberg and Robert S., Smith. *Modern Labor Economics: Theory and Public Policy,* **11**th edition, Addison Wesley
- Hanushek, Eric A., 2005, *Economic Outcomes and School Quality,* International Academy of Education and International Institute for Educational Planning.
- Goldin, C., & Katz, L. F. (2010). *The race between education and technology*. Harvard university press.
- Kingdon, G. G., & Teal, F. (2007). Does performance related pay for teachers improve student performance? Some evidence from India. *Economics of Education Review*, *26*(4), 473-486.
- Kingdon, G. G. (2020). The private schooling phenomenon in India: A review. *The Journal of Development Studies*, *56*(10), 1795-1817.
- Varughese, A. R., & Bairagya, I. (2021). Interstate variation in household spending on education in India: Does it influence educational status?. *Structural Change and Economic Dynamics*, *59*, 405-415.
- Cullen, Julie Berry, Brian A Jacob, and Steven Levitt (2006) 'The effect of school choice on participants: Evidence from randomized lotteries.' *Econometrica* 74(5), 1191–1230
- Kingdon, G. G. (2007). The progress of school education in India. *Oxford Review of Economic Policy*, 23(2), 168-195

- Borooah, V. K. (2012). Social identity and educational attainment: the role of caste and religion in explaining differences between children in India. *Journal of Development Studies*, *48*(7), 887-903.
- Chin, A. (2005). Can redistributing teachers across schools raise educational attainment? Evidence from Operation Blackboard in India. *Journal of development Economics*, *78*(2), 384-405.
- Tholen, G., Brown, P., Power, S., & Allouch, A. (2013). The role of networks and connections in educational elites' labour market entrance. *Research in Social Stratification and Mobility*, *34*, 142-154.
- Silva, P., Lopes, B., Costa, M., Melo, A. I., Dias, G. P., Brito, E., & Seabra, D. (2018). The million-dollar question: can internships boost employment?. *Studies in Higher Education*, *43*(1), 2-21.

Semester IV

MAE 202: Contemporary Issues in Development Economics (L: 4, T: 0, P: 0)

Course Objectives:

The aim of this course to familiarize students with contemporary issues in economic development, in general and development economic policy framework in India, with an emphasis on trade and globalization, changing international relations, technology and innovation and environment and sustainability. The course will help students to understand the emerging debates in international perspectives of development economics. The approach is modular, and will vary with time, depending on the nature of current policy discourse and recent research in the area of study.

Course Outcomes:

Upon completion of the course, the student would be able to:
CO1: Analyse empirical concepts of trade and globalization in the context of development economics
CO2: Identify the dynamics of international relations, debt and crises
CO3: Analyse theoretical foundations and empirical research in innovation and technology CO4: Analyse current policy debates and contribute to policy making in the field of environment and development
CO5: Conduct independent research in these areas

Syllabus:

Unit 1: Trade and Globalization

New trade theories and trade policies; FDI and offshoring; International agreements on labour and environment; New Protectionism

Unit 2: Debt and International Relations
International debt and development; Two-gap models; transfer paradox; international debt issues; loan pushing; debt forgiveness; loan buybacks; debt-equity swaps; empirical studies

Unit 3: Technology and Innovation
IPRs and Development; TRIPs Agreement; innovation systems; IPR and technology transfer, problems with IPR

Unit 4: Environment and sustainability
Environment and development; International Environmental problems and sustainability; Climate change implications and policies; Energy transition and security

Textbooks/References:

- Eaton, Jonathan (1993): Sovereign debt: A primer, *World Bank Economic Review*, 7(2), 137-172.
- Maskus, Keith E. (2000): Intellectual *Property Rights and the Global Economy*, Institute for International Economics, Washington, D.C.
- Kanwar, Sunil (2012): Intellectual Property Protection and Technology Licensing: The Case of Developing Countries, *Journal of Law and Economics*, 55(3), 539-564.
- Ivus, Olena (2010): Do stronger patent rights raise high-tech exports to the developing world?, *Journal of International Economics*, 81(1), 38-47.
- Javorcik, Beata S. (2004), The Composition of Foreign Direct Investment and Protection of Intellectual Property Rights: Evidence from Transition Economies, *European Economic Review*, 48(1), 39-62
- Watal, Jayashree (2000): Pharmaceutical Patents, Prices and Welfare Losses: Policy Options for India Under the WTO TRIPS Agreement, *The World Economy*, 23(5), 733752.
- Feenstra, R., Taylor, A. (2014). *International Trade*, 3rd ed. Worth Publishers
- Pelling, M. (2010). Adaptation *to climate change: from resilience to transformation*. Routledge.
- IPCC Climate Change 2014: Mitigation of Climate Change (in the press); http://mitigation2014.org
- The environment write, 2009. "*Defining sustainability: weak sustainability*".
- Jonathan Harris and Brian Roach (2018). *Environmental and Natural Resource Economics: A Contemporary Approach*, Routledge
- Fouquet, R. Historical energy transitions: speed, prices and system transformation. *Energy Res. Soc. Sc*i. 22, 7–12 (2016)
- Cherp, A., & Jewell, J. (2014). The concept of energy security: Beyond the four As. *Energy Policy*, 75, 415-421.

- Carley, S., & Konisky, D. M. (2020). The justice and equity implications of the clean energy transition. *Nature Energy*, 5(8), 569-577.

MAE 208: Game Theory 2 (L:4, T:0, P:0)

Course Objectives:

The main aim of this course is to introduce the students to various applications of game theory. Upon completing the course, students should be able to use the tools of game theory to model and analyze situations involving both conflict and cooperation.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe the nature and significance of studying problems in a game theoretical setup
CO2: Analyze the equilibrium concepts in a game setup

CO3: Identify the real-world applications of game theory

CO4: Demonstrate the ability to develop the facility of using some of these tools to model and analyse situations of conflict and cooperation

Syllabus:

Unit 1: Mechanism Design and their Applications in Auctioning and Bargaining

Basic concepts; revelation principle; truthful implementation; Groves-Clarke mechanisms; Applications of mechanism design to bargaining and auctions- Bidding behavior in the four standard auctions: First-price sealed bid, second price sealed bid, Dutch auction, English auction; Revenue equivalence theorem

Unit II: Matching Theory and Applications

Evolution of matching theory; concept of frictionless matching; directed search and competing mechanism design; applications

Unit III: Global Games and their Applications

Concept, evolution and significance of global games and their applications in economics and other disciplines

Unit IV: Repeated Games and their Applications

Concept, evolution and significance of repeated games and their applications in economics and other disciplines

Textbooks/References:

- Battigalli, P. (2018): Analysis of Strategic Thinking-Part I

- Borgers, T. (2015): An Introduction to the Theory of Mechanism Design, Oxford University Press.
- Krishna, V. (2009): Auction Theory, Elsevier-Academic Press.
- Mailath, G. and Samuelson, L. (2006): Repeated Games and Reputations, Oxford University Press.
- Milgrom, P. (2017): Discovering Prices: Auction Design in Markets with Complex Constraints, Cambridge University Press.
- Morris, S. and Shin, H. (2003): Global games: theory and applications, in: Advances in Economics and Econometrics (Eighth World Congress of the Econometric Society, Cambridge University Press.
- Muthoo, A. (1999): Bargaining Theory with Applications, Cambridge University Press.
- Roth, A. and Sotomayor, M. (1990): Two-sided Matching, Cambridge University Press
- Sandholm, W. (2010): Population Games and Evolutionary Dynamics, MIT Press
- Vulkan, N.; Roth, A. and Neeman, Z.(2013): The Handbook of Market Design, Oxford University Press

MAE 210: Industrial Organisation 2 (L:4, T:0, P:0)

Course Objectives:

In this course, students will explore the latest advancements in Industrial Organisation theory, with a focus on how modern firms create and maintain market imperfections. The course will cover various topics related to this subject, including recent developments, and aims to equip students with a theoretical understanding of different phenomena in industrial organisation. By the end of the course, students will be well-prepared to conduct research in this field.

Course Outcomes:

Upon completion of the course, the student would be able to

CO1: Identify key recent concepts and theories of industrial organization and their relevance to real-world business practices

CO2: Predict and analyse the effects of product quality, reputation, and advertising on consumer behaviour and market outcomes in different market structures

CO3: Solve and construct economic models to analyse the dynamics of competition in industries with network effects, switching costs, and intermediated goods

CO4: Design and justify public policies aimed at regulating and promoting competition in industries with network effects and network standards

Syllabus:

Unit 1: Competition with switching Costs, Network Effects and Network Standards

Consumer search, consumer inertia, competitive effects of switching cost, market with network goods, network effect, network effects and switching costs, markets for several network goods, oligopoly pricing and standardisation, strategies in standards wars

Unit 2: Product Quality, Reputation and Advertising

Vertical product differentiation, quality choice, demand effect, advertising and competition, advertising and price signals, advertising and quality, informative and persuasive advertising

Unit 3: Markets with Intermediated Goods

Intermediaries as dealers, intermediaries as match-makers, intermediaries as two-sided platforms, intermediation and information, information overload, intermediation and reputation

Unit 4: Public Policies in Network Goods

Regulation, auction and auction markets

References/Textbooks:

- Belleflamme, P. and Peitz, M.: Industrial Organization: Markets and Strategies, Cambridge University Press (2015)
- Tirole, J.: The Theory of Industrial Organization, MIT Press (1988)
- Shy, O.: Industrial Organization: Theory and Applications, MIT Press (1996)
- Armstrong, M. and Porter, R.: Handbook of Industrial Organization, Vol. III, NorthHolland (2007)

MAE 212: Monetary Theory and Policy (L: 4, T: 0, P: 0)

Course Objectives:

This advanced course aims to equip students with a solid understanding of Monetary Economics and Policy. Prior knowledge of macroeconomics at an intermediate to high level is assumed. Starting with an introduction to basic concepts of money, the course will delve into advanced theories related to money supply and demand. Furthermore, students will explore the intricacies of monetary policy through advanced theories. By the end of the course, students will have a thorough understanding of Monetary Economics and Policy at an advanced level.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and describe the basic concepts and functions of money

CO2: List and categorize the different types of monetary aggregates used to measure the money supply and analyse their relevance to the macroeconomy

CO3: Predict and analyse the impact of monetary policy on key macroeconomic variables such as inflation, output, and employment

CO4: Design and justify appropriate monetary policy responses to different economic scenarios

CO5: Generate insights on the role of the central bank in implementing monetary policy and its interaction with other policymakers and economic agents

Syllabus:

Unit 1: Basic Concepts of Money

Money definitional aspects- Functional and Empirical; nominal vs. real; neutrality of money. Money, Financial Assets, intermediation, and money market. Demand for Money: Baumol's Inventory analysis for Transactions Demand; Money vs. Bond Holding; Demand and Savings Deposits. Money in the Utility function (MIUF). Money in the economy: A general equilibrium analysis. Tobin's Portfolio Approach. Expected Utility Function

Unit 2: Monetary Aggregation

Weak Separability; User cost of Assets; Divisia Index Numbers; Certainty Equivalence. Monetary Reserves: Reserve Identity; Interest Elastic Money Supply. Modified LM function **Unit**

3: Monetary Policy and the Macroeconomy

Supply of Credit: Supply and Demand for credit; Credit Market analysis; Impact of policy on credit; Term structure and risk structure of interest rates, Theories of term structure of interest rates—Expectations theory, Market segmentation theory, Preferred habitat theory

Unit 4: Monetary Policy and the Central Bank

Targets of Monetary Policy- Monetary Aggregates vs. interest rates; Inflation Targeting and Taylor rule. IS and Interest Rate Targeting (IRT). New Keynesian Models of Monetary Policy, Monetary Growth Theory, The OLG model of money

Textbooks/References:

- Jagdish Handa (2009) Monetary Economics, Second Edition, Routledge, London
- Willam H. Branson (2005) Macroeconomic Theory and Policy, East-West, New Delhi
- Gali, J. (2015): Monetary Policy, Inflation, and the Business Cycle, Princeton University Press
- Walsh, C. (2017): Monetary Theory and Policy, 4th Edition, MIT Press
- Woodford, M. (2003): Interest and Prices: Foundations of a Theory of Monetary Policy, Princeton University Press
- Gale, D. (2010). Money and General Equilibrium. In: Durlauf, S.N., Blume, L.E. (eds) Monetary Economics. The New Palgrave Economics Collection. Palgrave Macmillan, London. https://doi.org/10.1057/9780230280854_28

MAE 214: International Macroeconomics (L: 4, T: 0, P: 0)

Course Objectives:

The course is aimed at providing students with a comprehensive knowledge of International Macroeconomics, set in an open-economy framework. The content enables the study of trade cycles in emerging economies. The course explains stylized facts found in the international macroeconomy with the help of theories and models. Students will be equipped with the key tools needed to formulate and solve problems analytically and provided with an appreciation of how these tools can be used to understand real world events and policy.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and describe the key concepts and theories related to International Macroeconomics, including the determination of exchange rates, balance of payments, and international trade

CO2: List and categorize the different factors that influence product market and asset market equilibrium in an open economy, such as fiscal and monetary policies, and analyze their impact on macroeconomic variables

CO3: Analyse and differentiate between the different international macroeconomic policy frameworks and their effectiveness in achieving macroeconomic goals

CO4: Compare and evaluate the stylized facts and theories related to business cycles in open economies, including the role of international trade, exchange rates, and unemployment

CO5: Design and justify appropriate international macroeconomic policy responses to various macroeconomic challenges such as currency crises, financial market disruptions, and global imbalances

Syllabus:

Unit 1: Product market and Asset Market Equilibrium in Open Economy

Capital flows and monetary policy trade-offs in emerging market economies; Current Account and Equilibrium in Small Open economy and Large Open Economy; Global imbalances and balances of payment accounting; An Open Endowment Economy

Unit 2: Stylized Facts on Business Cycles

The Open Economy Real-Business-Cycle Model; Standard New Keynesian model with Open Economy – Basic set up; Equilibrium, Open Economy IS curve; New Keynesian Phillips Curve; Optimal Monetary Policy

Unit 3: Business Cycles, Trade, Exchange Rates and Unemployment

Business Cycles in Emerging Countries: Productivity Shocks Versus Financial Frictions; Interest-Rate Shocks; Importable Goods, Exportable Goods and the Terms of Trade; Nontradable Goods and The Real Exchange Rate; Nominal Rigidity, Exchange Rates and Unemployment

Unit 4: Policy Frameworks

Exchange Rate Policy and Capital Controls; Financial Frictions and Aggregate Instability. Sovereign debt, default, and crises: Sovereign Default; Government debt in international macroeconomics; sovereign debt crises; International capital flow puzzles.

Textbooks/References:

- Gopinath, G.; Helpman, E. and Rogoff, K. (2014)(ed): *Handbook of International Economics*, Vol. 4. Amsterdam: Elsevier.
- Schmitt-Grohe, S.; Uribe, M. and Woodford, M. (2016): *International Macroeconomics*, Princeton University Press.
- Uribe, M. and Schmitt-Grohe, S. (2017): *Open Economy Macroeconomics*, Princeton University Press.
- Paolo Cavallino and Boris Hofmann (2022) *Capital flows and monetary policy trade-offs in emerging market economies* BIS Working Papers No 1032.
- Olivier Blanchard (2021) *Macroeconomics*, 8th Ed., Pearson, New Delhi.
- Mankiw Gregory N. (2012) *Macroeconomics*, Worth Publications.

MAE 216: Spatial Econometrics (L:4, T:0, P:0)

Course Objectives:

This course explores the theoretical foundations, methods, techniques for spatial econometrics. The course aims to provide students with the knowledge and skills necessary to investigate socioeconomic problems, with the consideration of the effects of spatial dependence and spatial heterogeneity. Essential concepts of spatial econometrics are presented, including the fundamental spatial concepts and the core components of spatial regression models for both cross-sectional and panel (time series) data.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Quantify spatial dependence in empirical variables
CO2: Describe the roles played by spatial dependence and spatial heterogeneity in solving social and economic problems
CO3: Identify spatial econometric estimation methods
CO4: Test and interpret estimated relationships that contain spatial elements
CO5: Apply methods of spatial econometrics in economic analysis

Syllabus:

Unit 1: Overview of Spatial Econometrics
Introduction to spatial data and spatial econometrics: Geostatistical data, Lattice data, and Point data; Regional science overview, Stationarity and Ergodicity of spatial random process

Unit 2: Spatial Weights and Spatial Autocorrelation
Characterising Spatial Autocorrelation: Variaogram, Semi-variaogram; Covariogram and Correlogram. Fitting a Variogram: Miminum Norm Quadratic Estimation; Generalized Least Squares Estimation; Maximum-likelihood and Restricted Maximum-Likelihood Estimation

Unit 3: Spatial Regression Models
Spatial dependency, Spatial autoregressive processes, Spatial lag models (SLM), Spatial error models (SEM), Spatial Durbin models (SDM), Models dealing with spatial heterogeneity, Dealing with both spatial dependency and spatial heterogeneity: spatial regime models (SRM), Spatial panel model and other spatio-temporal analysis, Practical applications of spatial econometric models

Unit 4: Estimation and Hypothesis Testing
Maximum likelihood estimation with spatial dependence in the dependent variable and the model errors. Likelihood ratio test and Lagrange multiplier tests for spatial process models

Unit 5: Software Exercises
Applications on ArcGIS (including ArcPy - Python for ArcGIS); Applications on R.

Textbooks/References:

- Statistics for Spatial Data by Noel A. C. Cressie (Wiley-Interscience Publication)
- Spatial Econometrics: Methods and Models by Luc Anselin (Kluwer Academic Press)
- Giuseppe Arbia (2014): A Primer for Spatial Econometrics - With Applications in R, Palgrave Macmillan.
- L. Anselin (1988): Spatial Econometrics: Methods and Models. Dordrecht: Kluwer.
- J.P. Elhorst (2014): Spatial Econometrics: From Cross-Sectional Data to Spatial Panels. Heidelberg: Springer.
- J. LeSage and R.K. Pace (2009): Introduction to Spatial Econometrics. Boca Raton, FL: CRC Press.
- Giuseppe Arbia, Badi H. Baltagi (2008): Spatial Econometrics - Methods and Applications, Physica-Verlag Heidelberg, Springer.
- Guangqing Chi and Jun Zhu (2019): Spatial Regression Models for the Social Sciences, Thousand Oaks, CA: SAGE Publications.

- J. Paul Elhorst (2010): "Applied Spatial Econometrics: Raising the Bar", *Spatial Economic Analysis*, 5:1, 9-28, DOI: 10.1080/17421770903541772
- Anselin, L. (1995): "Local Indicators of Spatial Association - LISA", *Geographical Analysis*, 27(2), 93-115. https://doi.org/10.1111/j.1538-4632.1995.tb00338.x
- Anselin, L., Bera, A. K. (1998): "Spatial Dependence in Linear Regression Models with an Introduction to Spatial Econometrics", *Statistics Textbooks and Monographs*, *155*, 237-290.
- Kelejian, H. H., & Prucha, I. R. (1998): "A Generalized Spatial Two-Stage Least Squares Procedure for Estimating a Spatial Autoregressive Model with Autoregressive Disturbances", *The Journal of Real Estate Finance and Economics*, *17*(1), 99-121. https://doi.org/10.1023/A:1007707430416

MAE 218: Panel Data Econometrics (L: 4, T: 0, P: 0)

Course Objectives:

This is a course dealing with 'panel' or 'longitudinal' data sets. This course provides a theoretical and empirical overview of econometric techniques that may be used when studying panel data. When feasible, the theoretical discussion of econometric techniques will be illustrated with empirical studies that use those same techniques.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the advantages of panel data as compared to other data structures

CO2: Apply econometric techniques for panel data

CO3: Analyse the applications of panel data econometrics in empirical research

CO4: Construct and analyse the inferences drawn from panel data econometrics models

Syllabus:

Unit 1: Static Panel Data Models

Understanding the data structure and the role of unobserved heterogeneity. The decomposition of the total variability at two or more levels, and the heterogeneity bias. Methods: fixed, random, and correlated effects. Guided hands-on session on the topics.

Unit 2: Dynamic Panels

Understanding endogeneity. Instrumental variables (IV) in panel data models, and the problem of overfitting and weak instruments. Methods: alternative data transformations; first-differences and IV, GMM-DIF, -LEV, -SYS estimators, the principal components analysis applied to the set of instruments. Guided hands-on session on the topics.

Unit 3: Heterogeneous Panels

ARDL specification and Pesaran's poolability. Methods: Mean-Group (MG) and Pooled-MG estimators; demeaning and cross-correlated effects. Guided hands-on session on the topics.

Unit 4: Non-Stationary Panels

Integration and cointegration. Methods: first- and second-generation unit roots tests; Pedroni and Westerlund cointegration tests; Guided hands-on session on the topics.

Textbooks/References:

- W.H. Green, Econometric Analysis, 8th Ed., Pearson, 2018
- Wooldridge, J., Econometric Analysis of Cross Section and Panel Data, MIT Press,2nd Ed.,2010.
- Badi H. Baltagi, Econometric Analysis of Panel Data, 4th ed., Chichester, UK: John Wiley & Sons, 2008 **OR** 5th ed., Wiley, 2013.
- Cameron, A.C., and P.K. Trivedi, Microeconometrics Using Stata. Stata Press, Revised edition., 2010.

MAE 220: Advanced Forecasting Methods (L:4, T:0, P:0)

Course Objectives:

The aim of this course is to gain a comprehensive understanding of the techniques used in economic analysis for forecasting. The course covers a range of quantitative methods commonly employed in economic and business forecasting, with a particular emphasis on time series analysis. Additionally, the course will explore methods for assessing the performance of forecasting techniques and provide practical applications for forecasting.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and describe the different types of forecasting methods used in economic and business analysis, including univariate and multivariate models, as well as judgmental techniques

CO2: List and categorize the key features of univariate models, such as smoothing techniques, and apply them to real-world data

CO3: Predict and solve economic problems using the Box-Jenkins (ARIMA) methodology for time series analysis, and compare its advantages and limitations relative to other forecasting techniques

CO4: Analyze and differentiate between the different types of multivariate models used in forecasting, such as regression analysis and vector autoregression (VAR) models, and apply them to real-world data

CO5: Compare and evaluate the relative effectiveness of different forecasting methods for different types of data and economic contexts

Syllabus:

Unit 1: Overview of Forecasting
Applications of forecasting; Forecasting methods and forecast horizons; Measures and tests of accuracy; Choosing between forecasting methods; Unbiasedness and Rationality.

Unit 2: Univariate Models: Smoothing Techniques
Seasonal adjustment, Averaging methods; Exponential smoothing methods; Time Series Decomposition; Unit roots.

Unit 3: Box-Jenkins (ARIMA) Methodology
Moving average (MA) models, Autoregressive (AR) models, Mixed autoregressive-moving average (ARMA) models, ARIMA models, Specification of ARIMA model; Model identification, Model estimation, Diagnostic checking, Model selection criteria

Unit 4: Multivariate Models
Multivariate regression model; Implications of violation of OLS assumptions for forecasting; Observational Equivalence, Reduced-form representation; Estimation, forecasting and simulation with simultaneous equation model (SEM); VAR models; Cointegration

Unit 5: Judgmental Forecasting
Jury of executive opinion; Delphi approach; Sales force composite methods; Anticipatory surveys and market research-based assessments

Textbooks/References:

- Box, G.E.P., G.M. Jenkins, and G.C. Reinsel (2008), Time Series Analysis: Forecasting and Control, 4th Edition, John Wiley & Sons Inc.

- Robert Pindyck, Daniel Rubinfeld (1997): Econometric Models and Economic Forecasts, (Fourth Edition), McGraw-Hill.
- John E. Hanke, Dean W. Wichern (2014): Business Forecasting, (Ninth Edition), Pearson.
- Rob J. Hyndman, George Athanasopoulos (2018): Forecasting Principles and Practice, Otexts, https://otexts.com/fpp2/
- George E. P. Box, Gwilym M. Jenkins, Gregory C. Reinsel, Greta M. Ljung (2015): Time Series Analysis - Forecasting and Control, (Fifth Edition), Wiley.
- Chris Brooks (2019): Introductory Econometrics for Finance, (Fourth Edition), Cambridge University Press.
- Walter Enders (2015): Applied Econometric Time Series, (Fourth Edition), Wiley.

MAE 222: Energy Economics (L:4, T:0, P:0)

Course Objectives:

The main goal of this course is to explore the theoretical and empirical aspects of energy from an economic perspective. The course will examine various energy-related issues that are relevant to environmental concerns, with a focus on applying economic principles to address topics such as energy demand and supply, energy markets, environmental impacts, investment in renewable energy sources, and policies and regulations governing the energy sector. By the end of the course, students will have a broader understanding of energy-related decision-making as technology developers, energy managers, entrepreneurs, policy makers, researchers, or simply as individuals making decisions related to their personal energy use in everyday life.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Analyse the various factors that contribute to energy demand and forecast future energy demand, using appropriate quantitative techniques

CO2: Differentiate between different energy sources, identify the factors that determine their supply, and assess the implications for energy markets

CO3: Describe the various issues related to energy access, including energy poverty, distributional impacts, and policies aimed at increasing energy access

CO4: Analyse the regulatory and governance frameworks that influence energy markets, and assess their effectiveness in promoting energy security, sustainability, and affordability

Syllabus:

Unit 1: Energy Demand Analysis and Forecasting

Economic foundations of energy demand: Consumer demand for energy, Producer demand (input demand) for energy; Energy demand management; Rebound effect; Introduction to Decomposition analysis; Forecasting of Energy Demand

Unit 2: Energy Supply Analysis

Depletable primary energy resource: Economics of exploration, Optimal extraction rule, Investment decision; Economics of secondary energy supply (electricity); Economics of renewable energy supply: Growth curve and Rate of exploitation; Drivers of renewable energy, Cost features, Support mechanism (feed-in-tariff, competitive bidding process, renewable obligations)

Unit 3: Energy Access

Energy use ladder; Indicators of energy poverty; Affordability; Energy poverty and Environmental protection

Unit 4: Regulation and Governance in Energy Markets

Price formation in competitive markets; Externality and market failure; Economic regulation of energy markets; Energy taxes, Subsidies, and Social welfare

Unit 5: Energy-Environment Interaction

Economics of climate change; Climate change policies

Unit 6: Energy-Efficiency and Innovation

Policy of energy efficiency, Innovation in energy technology

Textbooks/References:

- L. Hunt, J. Evans (eds.): International Handbook on the Economics of Energy, Edward Elgar (2011)
- Kneese, J. Sweeney (eds.): Handbook of Natural Resource and Energy Economics, Vol. III, Elsevier Science Publishers (1993)
- J. Shogren: Encyclopaedia of Energy, Natural Resource, and Environmental Economics, Newnes (2013)
- Subhes C. Bhattacharyya (2019): Energy Economics: Concepts, Issues, Markets And Governance, 2nd Edition, Springer.
- Uğur Soytaş, Ramazan Sarı (Edited) (2019): Routledge Handbook of Energy Economics, Routledge.
- Dahl, Carol Ann (2015): International energy markets - understanding pricing, policies, and profits, Second Edition, PennWell Corporation.
- Peter Zweifel, Aaron Praktiknjo, Georg Erdmann (2017): Energy Economics: Theory and Applications, Springer.

- Stevens, P. (2000). An Introduction to Energy Economics. In Stevens, P. (ed.) The Economics of Energy, Vol. 1, Edward Elgar, Cheltenham, UK.
- Peter M. Schwarz (2017): Energy Economics, Routledge.
- Roy L. Nersesian (2016): Energy Economics: Markets, History and Policy, Routledge.
- Thomas Tietenberg and Lynne Lewis (2006): Environmental and Natural Resource Economics, 8th Edition, (Boston, MA: Addison Wesley)
- Warick McKibbin and Peter Wilcoxen (2002): "The Role of Economics in Climate Change Policy," Journal of Economic Perspectives, Winter. 16(2): 107-129.
- Hartwick, J. M, and Olewiler, N. D.(1986). The Economics of Natural Resource Use. Harper and Row Publishers, New York, USA.

MAE 224: Labour Economics (L:4, T:0, P:0)

Course Objectives:

The course on Labour Economics primarily focuses on the theoretical constructs that explain contribution of labour in the process of economic development. Students would get exposed to the contesting perspectives on labour evolving from Classical, Keynesian, Neo-classical theories and political economy framework. It includes the foundations of the theory of wage determination, theories related to labour market segmentation and would critically review the demand-supply framework of labour market and focus on the macroeconomics of the labour markets. The course would introduce the concepts of gendered segregation of labour markets, care work of women, changing structures of labour markets. It would also explore the contemporary debates relating to labour regimes; labour flexibility, unionisation of labour, rights and labour laws; emerging patterns of informality and changing structures of labour market institutions.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the issues related to the economics of labour and development

CO2: Analyse the contribution of labour in the process of economic development, from different perspectives

CO3: Describe the theories on labour segmentation, gender segregation and employment

CO4: Identify and describe the institutional aspects of labour markets in India and related debates on labour regimes, emerging patterns of informality, unionisation and structural changes in employment

Syllabus:

Unit 1: Conceptualising Labour

Labour as unique factor; 'passive' factor reducible to abstract values; voluntary and involuntary unemployment; Lucas critique; choice theoretic perspective and its critique; labour and labour power, 'reserve army of labour'

Unit 2: Perspectives on Labour

Micro and Macro Perspectives on Labour, labour market segmentation and duality in labour market. Gendered segregation of labour market.

Unit 3: Women, Work and Labour Markets

Gendered labour markets, understanding women's employment and women's work, unpaid work including unpaid care work, sexual division of labour

Unit 4: Contemporary Debates on Labour Market

Accumulation and regulation regimes; labour market flexibility debate; non-wage employment and informality; labour market segmentation; structural change in growth and employment

Textbooks/References:

- Fine, B. (2002). *Labour market theory: a constructive reassessment*. Routledge.
- The Labour Market Under Capitalism, Prabhat Patnaik, The Indian Journal of Labour Economics, Vol. 49, No. 1, 2006
- Alderman, H., Chiappori, P. A., Haddad, L., Hoddinott, J., & Kanbur, R. (1995). Unitary versus collective models of the household: is it time to shift the burden of proof?. The World Bank Research Observer, 10(1), 1-19.
- Besley, T., & Burgess, R. (2004). Can labor regulation hinder economic performance? Evidence from India. The Quarterly journal of economics, 119(1), 91-134.
- Chowdhury, J. (2005). Contested history of Neo-classical economic models of households in development. BRAC University Journal, Vol. II, No. 2, 2005, pp. 23-33
- Ferber, M. A. (2003). A Feminist Critique of the Neoclassical Theory of the Family. In S. M. Karine (Ed.), Women, Family, and Work: Writings on the Economics of Gender (pp. 9–24). John Wiley & Sons.

- Spencer, D. A. (2006). Work for all those who want it? Why the neoclassical labour supply curve is an inappropriate foundation for the theory of employment and unemployment. Cambridge Journal of Economics, 30(3), 459-472.
- Srivastava, R. S. (2016). Myth and reality of labour flexibility in India. The Indian Journal of Labour Economics, 59, 1-38.
- Ghosh, J. (2009). Never done and poorly paid: Women's work in globalising India. Women's Unlimited.
- Ghosh, J. (2012). Women, labor, and capital accumulation in Asia. Monthly Review, 63(8), 1-14.
- Humphries, J. (1977). Class struggle and the persistence of the working-class family. Cambridge Journal of Economics, 1(3), 241-258. • Koggel, C. M. (2003). Globalization and women's paid work: Expanding freedom? Feminist Economics, 9(2–3), 163–183.
- Agarwala, R. (2013). Informal labor, formal politics, and dignified discontent in India. Cambridge University Press.
- Jha, P. (2008). Globalization and labour in India: emerging challenges and responses. Labour and the challenges of globalization: what prospects for transnational solidarity, 65-80.
- Kerswell, T., & Pratap, S. (2019). Worker cooperatives in India. Singapore: Palgrave Macmillan.
- Roychowdhury, A. (2018). Labour law reforms in India: all in the name of jobs. Routledge India.
- Sundar K. S. (2008) 'Trade Unions in India: From Politics of Fragmentation to Politics of Expansion and Integration?'. In Benson J. Zhu Y. (eds) Trade Unions in Asia: An Economic and Sociological Analysis, London, Routledge, pp. 157–176.
- Sundar K. S. (2022) Impact of COVID 19, Reforms and Poor Governance on Labour Rights in India, Synergy Books India.
- Sundar, K. S. (Ed.). (2019). Perspectives on Neoliberalism, Labour and Globalization in India: Essays in Honour of Lalit K. Deshpande. Palgrave Macmillan.
- Custers, P. (1997). Capital accumulation and women's labour in Asian economies. Zed Books.
- Antonpoulos, Rani and Indira Hirway eds., Chapter 1 and 2 in Unpaid Work and The Economy: Gender, Time Use and Poverty in Developing Countries, Palgrave Macmillan, 2010.
- Sundar, K. S. (2005). Labour flexibility debate in India: A comprehensive review and some suggestions. Economic and Political Weekly, 2274-2285.
- RoyChowdhury, S. (2003). Old classes and new spaces: Urban poverty, unorganised labour and new unions. Economic and Political Weekly, 5277-5284.
- George, S., & Sinha, S. (Eds.). (2017). Redefined Labour Spaces: Organising Workers in Post-Liberalised India. Taylor & Francis.

- Harriss-White, B. (2003). India working: Essays on society and economy (No. 8). Cambridge University Press.

MAE 226: Financial Economics (L:4, T:0, P:0)

Course Objectives:

Financial Economics explores the intricate relationships between finance, economics, and business. This course will delve into topics such as financial markets, modern investment theory, financial derivatives, and corporate finance. Through the course, students will learn how to analyse the risks and returns of financial investments, understand the workings of financial markets, and explore the ways in which corporate finance and investment strategies impact the broader economy. By the end of the course, students will have developed a deep understanding of the principles that govern financial markets.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and describe the key features of financial markets, including different types of financial instruments and market participants

CO2: Analyze and predict the behaviour of financial markets using modern investment theory, including the concepts of risk and return, diversification, and portfolio optimization

CO3: Differentiate between different types of financial derivatives, such as futures, options, and swaps, and explain how they can be used for hedging and speculation

CO4: Justify the optimal financial decisions for corporations based on corporate finance theories, including capital budgeting, capital structure, and dividend policy

Syllabus:

Unit 1: Financial Markets

Financial Markets and Financial Instruments; Real Assets and Financial Assets; Stocks, Rate of Interest, Exchange Rates; Indian Financial Markets, Regulations and SEBI

Unit 2: Modern Investment Theory

Securities Markets Operational Efficiency and Efficient Market Hypothesis; Modern View of

Security Analysis, Performance of Securities Market, Price Earning Ratios; The Determinants of Equity Prices, Estimating Fair Value, Capital Asset Pricing Models (CAPM), Arbitrage Pricing Theories (APT), Multifactor Models; Fixed Income Securities, Bond Valuation and Analysis, Bond Portfolio Management

Unit 3: Financial Derivatives

Derivatives Forward Markets and Future Markets; Mechanics of Futures Markets and Price Determination; Hedgers, Speculators, Hedging Strategies; Options and Option Pricing, the Payoffs from Buying and Selling Options, Put-Call Ratio and Parity; Mechanics and Properties of Stock Options;

Unit 4: Corporate Finance

Corporate Finance: Patterns of corporate financing: common stock; debt; preferences; convertibles; capital structure and the cost of capital; corporate debt and dividend policy; the Modigliani-Miller theorem; the efficient market hypothesis

Textbooks/References:

- Alexander, G.J., W.F. Sharpe and J.V. Bailey (2002), Fundamentals of Investments, Third Edition, Prentice-Hall of India Private Limited, New Delhi
- Chandra, P. (1999), Financial Management: Theory and Practice, Galgotia Publishers
- Hull, J.C. (2002), Options, Futures, and other Derivatives, Fifth Edition, Prentice-Hall
- Francis, J.K. (1991), Investments: Analysis and Management, McGraw-Hill
- R.E.Bailey(2005) The Economics of Financial Markets, Cambridge University Press
- Z. Bodie, Robert Merton and David Cleeton (2009), Financial Economics, Pearson
- Z. Bodie, A. Kane and A. Marcus(2008), Investments, McGraw-Hill
- Amaro de Matos, J. (2001): Theoretical Foundation of Corporate Finance, Princeton University Press
- Freixas, X. and Rochet, J.C. (2008): Microeconomics of Banking, MIT Press
- Tirole, J. (2006): The Theory of Corporate Finance, Princeton University Press

MAE 228: Law and Economics (L:4, T:0, P:0)

Course Objectives:

The focus of this course is on exploring the multifaceted relationship between law and economics. The course delves into the ways in which legal and regulatory frameworks impact economic analysis and shape the rules governing economic activities. Laws can significantly influence the behavior of private producers, consumers, and other economic agents by altering the incentives in

the game. As a result, students will gain an understanding of how these factors can impact the allocation of resources, efficiency, and equity.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe the importance of Laws in economic analysis
CO2: Analyse the laws as organizing forces on actions of private citizens
CO3: Illustrate the economic approaches of regulatory rules
CO4: Demonstrate an inter-disciplinary approach towards law and economics

Syllabus:

Unit 1: Introduction

Interaction of law and economics, Efficiency criteria in law and economics

Unit 2: Property Law

Role of property rights in economic transactions; Allocating and establishing ownership rights; conflicting property rights and externalities; Common property; The Coase theorem

Unit 3: Contract Law

Need for a contract; Legal contract; Role of Contracts for functioning of markets; Efficient contracts; Complete and Incomplete Contracts; Reliance; Damages measures and their efficiency properties; Contracts as instrument of risk-allocation and information revelation; Regulatory Contracts; Contracts and Courts.

Unit 4: Economics of Tort

Tort laws, Liability rules, Accident laws, Product liability, Efficiency properties of liabilities rules; Incentives for precaution, The role of uncertainty and insurance.

Unit 5: Crime and Punishment

Criminal intents and public harm, Rational crime, Economic goal of criminal law, Severity versus certainty of punishment, Fines versus imprisonment.

Unit 6: Further Topics

Aspects of intellectual property rights and the WTO; Environmental laws; Insolvency and bankruptcy code.

Textbooks/References:

- Thomas J. Miceli (1997): The Economic of the Law, Oxford University Press.
- Polinsky, A. Mitchell and Steven Shavell (Editors) (2007): Handbook of Law and Economics, Volumes 1 and 2, North Holland, Amsterdam.
- Alan Devlin (2014): Fundamental Principles of Law and Economics, Routledge.
- Shadlen, Ken (2005): "Policy Space for Development in the WTO and Beyond: The Case of Intellectual Property Rights", Working Paper No. 05-06, Global Development and Environment Institute, https://ageconsearch.umn.edu/record/15577
- Renuka Sane (2014): "The way forward for personal insolvency in the Indian Insolvency and Bankruptcy Code", Working paper No. 251, NIPFP, New Delhi.
    - https://nipfp.org.in/media/medialibrary/2019/02/WP_251_2019.pdf

MAE 230: Remote Sensing and GIS (L:4, T:0, P:0)

Course Objectives:

The course on Remote Sensing and GIS provides an introduction to the use of geographical approaches in solving business and economic problems. It covers topics such as GIS and Remote Sensing in business and economic applications, spatial data collection techniques, designing maps for a business and economics study, GIS analysis and mapping techniques, and exploring open data, voluntary Geographic Information, and crowd-sourcing. By the end of the course, students will have developed a sound understanding of how to leverage GIS and remote sensing technologies to make informed business and economic decisions, and will have gained practical experience working with these technologies.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the fundamental concepts of remote sensing and GIS and how they apply to business and economic problems
CO2: List and explain the different types of spatial data collection techniques and tools used in remote sensing and GIS
CO3: Predict and evaluate the outcomes of using GIS and remote sensing in business and economic applications

CO4: Describe and compare the different techniques for designing maps for a business and economics study using GIS
CO5: Analyse and sort spatial data using GIS analysis and mapping techniques, and apply them to business and economic problems

Syllabus:

Unit 1: Geographical Approaches to Business and Economic Problems

Introduction; Mapping and evidence-based decision; Geography and national spatial data infrastructure; Strategic role of geography in business and economics; Geography of service provision; Process for using geographic data and tools

Unit 2: GIS and Remote Sensing in Business and Economics Applications

Introduction to GIS and Remote Sensing; Spatial Data sources for business and economics related issues; National infrastructure for spatial data; Applications in logistics, operations, marketing and sales and service delivery; GIS for business and economics applications; GIS project design
Introduction to Quantum GIS (QGIS) and its user interface

Unit 3: Spatial Data Collection Techniques

Using GPS for spatial business data collection; Using Mobile Phones for GIS data collection using Open Data Kit (ODK); Understanding different layers in GIS; Bringing tabular data into GIS (Excel, SPSS, and Access etc.); Selecting subsets of map features from geo processing; Cartographic skill in map making; GIS as an information reporting tool for organization

Unit 4: Designing maps for a business and economics study

Assemble base maps for emergency preparedness; Reducing GIS data from large coverage to an area of interest; Cutting points of interest; Extracting subsets of GIS data for mapping; Design and building numeric scales for mapping attributes; Making a digital map from paper map/scanned map; Making thematic map; Build professional map' layouts for presentations and reports; Composing a market share map for retail distributors; Mapping suppliers; Mapping customers through geocoding; Building and coding the new variables

Unit 5: GIS Analysis and Mapping Techniques

Comparative Business Site-Location Feasibility Analysis; Cost/Benefit analysis in GIS;

Proximity analysis/neighborhood analysis; Multi criteria analysis in business site selection; Investigate spatial patterns and trends; Cluster /hot spot analysis

Unit 6: Exploring open data, voluntary Geographic Information, and crowd Sourcing

Voluntary Geographic Information and crowd sourced projects; Mapping social media data; OpenStreetMap and its application in open data; Downloading source data from OpenStreetMap; Online publishing interactive and dynamic map; Creating Custom Web maps without programming using Google earth

Textbooks/References:

- Bernhardsen, T (2002), Geographic Information Systems: An Introduction. New York: John Wiley and Sons.
- Breslin, P., Frunzi, N., Napolean, E., Ormsby, T., Getting to Know ArcView GIS. San Fransisco: ESRI Press.
- Principles of Geographical Information Systems for Land Resource Assessment — P. A. Burrough.
- Geographical Information Systems – Principles Vol.1 — Goodchild.

MAE 232: International Trade (L:4, T:0, P:0)

Course Objectives:

This course provides an in-depth understanding of the broad principles and theories that govern the flow of trade in goods, services, and capital at the global level, both in the short and long term. The course material, spread across different modules, emphasizes the theory and nature of the subject, which will enable students to analyze the impact of trade policies followed at the national and international levels, as well as their welfare implications at the macro level, and the distribution of trade gains between North and South, with a particular focus on India. Studying this course during the era of globalization will equip students with knowledge of the potential consequences on income, employment, and social standards, as well as possible policy solutions.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Analyse historical as well as contemporary issues in trade theory and policy
CO2: Describe classical theories of comparative advantage, imperfect competition, political economy of trade agreements and protectionism

CO3: Identify the analytical tools relating to the issues of migration, trade and capital formation

CO4: Review traditional theories of international trade and recent developments in the economic literature including FDI and global production chains

Syllabus:

Unit 1: Trade Theories

Adam Smith and absolute advantage theory of trade; Ricardo and comparative advantage; its limitations; production possibility curve; gain from trade; determination of international equilibrium price; factors affecting terms of trade; comparative advantage in Heckscher Ohlin Model; relationship between factor prices and commodity prices; factor price equalization theorem; factor intensity reversal; the empirical evidence on Heckscher Ohlin theory; Leontief Paradox

Unit 2: Gains from Trade, Commercial Policy, and Economic Growth

The rationale of tariffs, quotas and subsidies; Infant industry argument; tariffs and factor income distribution; Stolper-Samuelson Theorem; Rybczynski Theorem – tariffs, terms of trade and domestic prices; The optimum tariff rate – tariffs, subsidies and distortions in commodity and factor markets; effective rate of protection; welfare implications of tariffs – Non-tariff barriers; Effects of quotas and other quantitative restrictions; tariffs versus quotas; Theory of customs union

Unit 3: Imperfect Competition

Imperfect competition, homogeneity: Krugman, Brander-Spencer models Monopolistic competition, heterogeneity; Generalised oligopoly framework, heterogeneity

Unit 4: FDI and production chains

FDI and global production, FDI vs. exports, political economy of trade agreements and upcoming issues of protections, trade and growth; immiserizing growth; endogenous growth with homogeneity and heterogeneity, migration, international trade and capital formation

Textbooks/References:

- Antras, P. (2016): Global Production: Firms, Contracts, and Trade Structure, Princeton University Press
- Dornbusch, R.; Fischer, S. and Samuelson, P. (1977): Comparative advantage, trade, and payments in a Ricardian model with a continuum of goods, American Economic Review 67, 823-39
- Dornbusch, R.; Fischer, S. and Samuelson P. (1980): Heckscher-Ohlin trade theory with a continuum of goods, The Quarterly Journal of Economics 95, 203-224.

- Feenstra, R. (2015): Advanced International Trade: Theory and Evidence, Princeton University Press
- Feenstra, R. (2010): Measuring the gains from trade under monopolistic competition, Canadian Journal of Economics, 1-28.
- Gopinath, G.; Helpman, E. and Rogoff, K. (2014) (eds.): Handbook of International Economics, Vol. 4, Elsevier
- Bhagwati, Jagdish (1964), "The Pure Theory of International Trade", Economic Journal, Vol. 74, pp. 1-78

MAE 234: Public Economics (L: 4, T: 0, P: 0)

Course Objectives:

Public Economics is a large and rapidly expanding field of research. It is concerned with normative and positive aspects of a government's activities in an economy. Normative analysis is concerned with how a government should behave to improve social welfare and positive analysis studies the implications of government activities on the behavior of individuals and communities. Governments intervene through regulation, taxation, redistributive transfers, and the provision and production of private and public goods. This course will focus on public spending on public goods, regulation in the presence of externalities and redistributive policy. It will cover important theoretical results in the field and a number of case studies from across the world economy.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Analyze the role of the state in a modern economy and identify the different forms of social expenditure, such as education, health, social welfare, and public goods, that it provides.

CO2: Describe the different market failures, such as externalities and public goods, and evaluate the effectiveness of regulatory mechanisms in correcting these failures.
CO3: Compare and contrast different measures of inequality and distributive justice

CO4: Differentiate between various forms of preference aggregation, such as voting and markets, and analyze their potential for generating public debate and collective decision-making.

CO5: Construct models to solve public economics problems, such as tax policy and social welfare, and justify policy recommendations based on theoretical and empirical analysis

Syllabus:

Unit 1: Social State and Social Expenditure

The emergence of a social state; The evolution of social spending across the world ; Taxation, Tax Evasion and Black Income

Unit 2: Public Goods, Externalities and Regulation

Efficiency in the provision of public goods; theories of contract in provision of public goods; Theories of contract in Land Acquisition; land supply regulations; Sources of externalities, their relationship to contracts and markets and their regulation

Unit 3: Inequality and Distributive Justice

Theories of justice, Discrimination, Public policies to tackle group inequalities

Unit 4: Preference Aggregation and Public debate

How do we determine provision when we do not know preferences? ; Voting and other forms of information aggregate in democracies

Textbooks/References:

- Anthony Atkinson and Joseph E Stiglitz: Lectures on public economics, Princeton University Press (2015)
- Peter Lindert: Growing public: Volume 1, the story: Social spending and economic growth since the eighteenth century, Cambridge University Press (2006)
- Glenn Loury (1994): Self-censorship in public discourse: a theory of political correctness and related phenomena. Rationality and Society 6(4), 428 – 461
- Thomas Piketty: Capital in the 21st century, Cambridge: Harvard University Press (2014)
- J. Rawls: Justice as fairness: A restatement, Harvard University Press (2001)
- J. Roemer: Equality of opportunity, Harvard University Press (2009)
- Bolton, P. and M. Dewatripont: Contract Theory, MIT Press (2005)
- Stiglitz, J. and Rosengard, J.: Economics of the Public Sector, 4th edition, W. W. Norton and Company (2015)
- Mirrlees, James et al. (2011). Tax by Design, Oxford University Press, Available at: https://www.ifs.org.uk/publications/5353

SYLLABUS OF GEC COURSES

MAG001: Strategic Management (L: 4, T: 0, P: 0)

Course Objectives:

This course aims to provide students with an overview of all essential applications of business policy and strategic management. The course covers strategy analysis, formulation of strategies at different levels of the organization, resource allocation, interplay between strategy and structure, global, multidomestic and local strategies as well as blue ocean strategy

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and discuss strategic decisions taken by organizations

CO2: List the basic concepts, principles and practices associated with strategy formulation and implementation.

CO4: Analyse and critically evaluate real-life corporate and business strategy company situations and recommend feasible solutions

CO5: Conduct and present a credible business analysis in a team setting

Syllabus:

Unit 1: Nature of Strategic Management

Concept of Strategy; Mintzberg's 5Ps of Strategy; Strategic Decision Making; Strategic Management Process; Strategists and their roles; Competitive advantage, internal context, organization design

Unit 2: Strategy Identification

Vision Mission, Goals and Objectives. External Environmental Analysis; Analysing Companies Resource in Competitive Position; RBV model, IO model, SWOT Analysis. Competitive & competitor analysis, PESTEL analysis. Strategies for competing in Global Markets; Strategic Analysis and Choice – BCG, GE, Directional Policy and Hofer's Matrices; Industry and Competitive Analysis

Unit 3: Strategic Formulation

Porter's Generic Strategies, Grand Strategies. Strategic Alliances, External Context, The spectrum of competition and Niche market. Value chain analysis- Competition in concentrated market, entry and the advantage of incumbency, creating and capturing value in the chain.

Unit 4: Strategy Implementation

Resource Allocation; Structural Considerations and Organisational Design. Leadership and Corporate Culture.

Unit 5: Strategy Evaluation

Importance and Nature of Strategic Evaluation; Strategic and Operational Control

Acquisitions and Mergers, Popularity and reasons for M&A, Problems in achieving acquisition success, Effective acquisition, Corporate restructuring, focusing.

Unit 6: Globalization and Strategy

Multi Domestic, Global, Transnational Strategies. Business Level and corporate level, International Cooperative Strategy, Network cooperative strategy. Blue and red ocean strategies.

References

- Strategic Management: Concepts: Competitiveness and Globalization by Michael A. Hitt , R. Duane Ireland , Robert E. Hoskisson, CENGAGE Learning 2015.
- Srategic Management by Garth Saloner, Andrea Shepard, Joel Podolny · 2008, Wiley Publications
- Strategic Management and Business Policy by Thomas L. Wheelen, J. Hunger, W. Glueck, Pearson Publications

MAG 002: Operations and Supply Chain Management (L: 4, T: 0, P: 0)

Course Objectives:

The objective of this course is to develop an understanding of the strategic importance of operations & supply chain management (SCM) and how it can provide a competitive advantage in the market place. Further, the course will seek to explain the relationship between Operations and SCM and other business functions, such as Marketing, Finance, Accounting and Human Resource.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Analyse the key operations decisions that impact the competitiveness of a business

CO2: Identify areas of improvement in process performance

CO3: Evaluate capacity requirements of facilities/processes in long & short terms

CO4: Identify major issues in managing inventories

Syllabus

Unit 1

Introduction to Production Management- role, scope and interface with marketing, finance, strategy; Introduction to Supply Chain Management, Types of production systems, Concepts of productivity. Demand forecasting, Time Series, Regression Analysis and Qualitative techniques, Concept of Strategic fit, Classification of SCs

Unit 2

Product Design and Process Selection, Service Design, Outsourcing, Value Engineering, QFD, Concurrent Engineering, Facility Planning- location, layout

Unit 3

Inventory management in Deterministic and uncertain environment, Classification of Inventory, Material Requirements Planning (MRP),

Unit 4

Vendor selection, rating, Supply management, Inbound logistics, Warehouse management, JIT, Distribution requirements planning (DRP).

Unit 5

Total Quality Management (TQM), Six-sigma, ISO 9000, MIS, Distribution management, Outbound logistics, Channels of distribution.

Unit 6

Flexibility and Agility in SC, Mass Customization, Supply Chain restructuring, Smart Pricing, IT in SCM, Performance measurement of Supply Chains.

References:

- Operations Management: Theory and Practice | Third Edition | By B.Mahadevan, Pearson Publications

- Charry, S.N (2005). Production and Operation Management- Concepts, Methods & Strategy. John Wiley & Sons Asia Pvt. Limited
- Adam Jr., E and Ebert, R. (1998). Production and Operation Management

MAG003: Database Management Systems (L: 2, T: 0, P: 4)

Course Objectives:

This course seeks to equip students with techniques of maintaining organizational data in structured form for easy retrieval and decision making.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the features of database management systems
CO2: Describe the fundamental elements of logical data modelling and relational database management system
CO3: Explain the basic concepts of relational data model, entity-relationship model, relational database design and relational algebra
CO4: Formulate SQL queries on data for data definition, manipulation, retrieval and analysis

Syllabus:

Unit 1: Introduction
File Systems and Database; Components of Database ManagementSystems, Advantages of DBMS; Database Management Models: Relational, Network, Hierarchical, Object Oriented

Unit 2: Logical Data Modelling
Entity-Relationship Data Model, Normalization and its significance and different levels of normalization

Unit 3: Relational Database Design
Physical Database Design, Integrity Constraints, database security and disaster recovery Strategies

Unit 4: Querying RDBMS
Structured Query Language (Data Definition, Data Manipulation, Data Control), Aggregate

Functions, Nested Sub Queries, Views

Unit 5: Data base Design and Transaction Processing

Mapping ER/EER model to relational database, functional dependencies, Lossless decomposition, Normal forms(up to BCNF). ACID properties, Concurrency control

Unit 6: File Structure and Indexing

Operations on files, File of Unordered and ordered records, overview of File organizations, Indexing structures for files(Primary index, secondary index, clustering index), Multilevel indexing using B and B+ trees.

References:

- Ramakrishnan R. and Gehrke J. (2014) Database Management Systems, McGraw Hill.
- Connolly T. And Begg C. (2008) Database Systems: A Practical Approach to Design, Implementation and Management, 6/e, Pearson.
- Elmasri, R. &Navathe, S. B. (2015) Fundamentals of Database Systems, Pearson Education, Seventh Edition.
- Sumathi S. & Esakkirajan S. (2007) Fundamentals of Relational Database Management Systems, Springer.

MAG004: Machine Learning (L: 4, T: 0, P: 0)

Course Objectives:

The objective of the course is to learn what machine learning is and how it is related to data analysis and statistics. The course will impart knowledge on how various machine learning algorithms search for data patterns which can be used to make decisions and predictions for practical problem solving.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe the basic concepts and techniques of machine learning
CO2: Use machine learning concepts to solve practical problems.
CO3: Describe the functioning and applications of some popular machine learning algorithms.
CO4: Apply the concepts of supervised, unsupervised and reinforcement learning, etc.

Syllabus:

Unit 1: Introduction to Machine Learning

Learning Issues, Designing a learning system, perspectives & issues in machine learning, concept learning and general to specific ordering. Overview of different tasks: classification, regression, clustering

Unit 2: Categorization of Machine Learning Techniques

Categories of machine learning techniques with brief introduction of each category: Decision trees, Bayesian learners, Ensemble learners, neural networks, support vector machines, rule-based learning, search-based techniques

Unit 3: Decision Trees and Artificial Neural Networks

Decision Trees: Introduction, Tree representation, Appropriate problems, Hypothesis space search, inductive bias, issues. Artificial Neural Networks: Introduction, Network representation, appropriate problems, perceptrons, back-propagation

Unit 4: Bayesian Learners

Bayesian learners: Introduction, Bayes theorem and concept learning, maximum likelihood and least-squared error hypothesis, maximum likelihood hypothesis for predicting probabilities, minimum description length principle

Unit 5: Unsupervised Learning

Introduction, Clustering & Association, k-nearest neighbor learning, Apriori algorithm for association rule learning problems

Unit 6: Reinforcement Learning

Introduction, The learning task, Q learning, Non-deterministic rewards & actions, temporal difference learning

References:

- Mitchell, T. (2013), Machine Learning, McGraw Hill.
- Malhotra, R. (2016). Empirical Research in Software Engineering: Concepts, Analysis & Applications, CRC press.
- I.H. Witten & E. Frank (2005), Data Mining: Practical Machine Learning Tools & Techniques, Elsevier, Second Edition.
- Murphy, K.P. (2012), Machine Learning: A probabilistic perspective, MIT Press
- Mohri, M., Rostamizadeh, A. and Talwalkar, A. (2012), Foundations of Machine Learning, MIT Press.
- Harrington, P. (2012), Machine Learning in Action, Dreamtech Press
- Bell, J. (2014), Machine Learning for Big Data: Hands-On for Developers and Technical Professionals, Wiley
- Haykin, S. (2016), Neural Networks and learning Machines, Pearson

MAG005: Big Data Analytics (L: 4, T: 0, P: 0)

Course Objectives:

A Big Data ecosystem is the one with huge volumes of information and transaction data. The objective of the course is to learn tools and techniques to apply analytics on such data which would point to various business benefits including new revenue generation opportunities, better customer service, more effective marketing, better operational efficiency and a competitive edge over rivals. It will enable analysis of untapped data for business intelligence and analytics.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Discuss the concept and challenges of big data

C02: Apply skills and tools to analyse and manage big data

CO3: Describe various big data frameworks and applications

CO4: Discuss the impact of making big data decisions on business growth and strategy

Syllabus:

Unit 1

Predictive Analytics – Supervised – Unsupervised learning – Neural networks – Kohonen models – Normal – Deviations from normal patterns – Normal behaviours – Expert options – Variable

entry - Mining Frequent itemsets - Market basket model – Apriori Algorithm – Handling large data sets in Main memory – Limited Pass algorithm – Counting frequent item sets in a stream – Clustering Techniques – Hierarchical – K- Means – Clustering high dimensional data Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications.

Unit 2

Hadoop Components of Hadoop, Features Of 'Hadoop', Network Topology In Hadoop, Hadoop Installation, HDFS: Read Operation, Write Operation, Access HDFS using JAVA API, Access HDFS Using COMMAND- LINE INTERFACE

Unit 3

MapReduce Fundamentals How MapReduce works, How MapReduce Organizes Work, Understanding Map Reducer Code, Explanation of Sales Mapper Class, Explanation of Sales Country Reducer Class, Explanation of Sales Country Driver Class, Two types of counters, Map Reduce Join

Unit 4

FLUME and SQOOP What is SQOOP in Hadoop? What is FLUME in Hadoop? Some Important features of FLUME

Unit 5

Introduction to PIG, Create your First PIG Program, Pig Installation, Pig Demo

Unit 6

What is OOZIE? How does OOZIE work? Example Workflow Diagram Oozie workflow application Why use Oozie? Features of OOZIE

Textbooks:

- Rajaraman, A. & Ullman, J.D. (2014), Mining of Massive Datasets, Cambridge University Press.
- Rungta, K. (2016), LearnHadoop in 1 Day: Master Big Data with this complete Guide, Amazon Digital.
- Meir-Huber, M. (2015), Kick Start: Hadoop: Learn Hadoop in Hours!, Amazon Digital.

MAG006: Data Querying & Visualization (L: 2, T: 0, P: 4)

Course Objectives:

The objective of the course is to implement database system management concepts.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the components of SQL Server Express and demonstrate proficiency in setting up and managing a database, including creating, deleting, and designing tables, establishing relationships, and implementing normalization and indexes

CO2: List and apply various SQL querying techniques, including writing queries, using joins and set operators, and modifying data in a database

CO3: Predict and construct stored procedures and functions to streamline database operations, while effectively managing database administration tasks such as maintenance planning and execution.

CO4: Describe the importance of database backup and recovery, analyze different recovery models, and design backup strategies for ensuring database security and integrity

Syllabus:

Unit 1: Introduction
SQL Server Express Setup, Creating a Database, Table: Creation, Deletion, Table Design, Relationships, Normalization, Indexes.

Unit 2: Working with SQL
Queries, Joins, Set Operators, Modifying Data

Unit 3: Stored Procedures and Functions, Database Administration & Maintenance
Creating a stored procedure, controlling its execution, If else, Begin end, while, case, Functions: scalar, table valued, Database administration: setting up maintenance plan in SQL server, running the maintenance plan, emailing the reports.

Unit 4: Database Backup and Recovery
Transaction Logs, Recovery, Recovery Models, Changing the recovery model, backups,

backup strategy, performing a backup, restoring a database, Database security and Logins.

Unit 5: Views and Triggers
Views: Encrypting, Creating, Indexing, Triggers: DDL, Log-on, DML, Trigger Order.

Unit 6: Advanced SQL Queries
Sequence, Subqueries, IN Clause, EXISTS Clause

References:

- Mitnick, G. (2017), SQL: Create Your Own Database FAST! The Most Important and Core Functions to Mastering SQL, Amazon Asia pacific Holdings
- Fehily, C. (2014) SQL: Database Programming, Questing Vole Press

MAG007: Introduction to Big Data Systems (L: 4, T: 0, P: 0)

Course Objectives:

The course focuses on providing students with a comprehensive understanding of big data analytics. They will explore the value and challenges of big data, learn about its sources and infrastructure, and understand its key features like volume, veracity, velocity, and variety. Additionally, students will study analytic scalability, analysis approaches, and innovative methods for data extraction. They will also delve into stream computing concepts and gain practical exposure to prominent big data frameworks and applications like MapReduce, Hadoop, and NoSQL databases. Ultimately, the course aims to equip students with the analytical skills needed to navigate and leverage big data technologies effectively.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe Big Data and its Business Implications
CO2: Identify the components of Hadoop and Hadoop Eco-System
CO3: Analyse the map reduce framework
CO4: Describe and analyse stream computing including estimation of moments

Syllabus:

Unit 1: Introduction to Big Data Analytics

Nuances of big data – Value – Issues – Case for Big data – Big data options Team challenge –Big data sources – Acquisition – Nuts and Bolts of Big data. Features of Big Data - Security,Compliance, auditing and protection - Evolution of Big data – Best Practices for Big data Analytics - Big data characteristics - Volume, Veracity, Velocity, Variety

Unit 2: Data Analysis
Evolution of analytic scalability – Convergence – parallel processing systems – enterprise analytic sand box – analytic data sets – Analytic methods Analysis approaches – Statistical significance – business approaches – Analytic innovation – Traditional approaches – Iterative

Unit 3: Stream Computing
Introduction to Streams Concepts – Stream data model and architecture - Stream Computing, Sampling data in a stream – Filtering streams – Counting distinct elements in a stream – Estimating moments

Unit 4: Frameworks and Applications
Map Reduce Framework - Hadoop – Hive - – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Hbase – Impala

References:

- Ohlhorst, F.J. (2013), Big Data Analytics: Turning Big Data into Big Money, Wiley and SAS Business Series.
- Franks, B. (2012), Taming the Big Data Tidal Wave: Finding Opportunities in Huge Data Streams with Advanced Analytics, Wiley and SAS Business Series
- Rajaraman, A. & Ullman, J.D. (2014), Mining of Massive Datasets, Cambridge University Press.
- Rungta, K. (2016), LearnHadoop in 1 Day: Master Big Data with this complete Guide, Amazon Digital.

MAG008: Corporate Mergers, Acquisitions and Restructuring (L: 4, T: 0, P: 0)

Course Objectives:

The objective of this course is to develop expertise in identifying inorganic growth strategies through mergers, acquisitions and restructuring of corporate enterprises for enhancing the value.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify key differences between the mergers and acquisition
CO2: Describe the process of mergers and acquisitions, restructuring of organizations
CO3: Carry out the valuation of mergers
CO4: Apply their knowledge in the practical setting

Syllabus:

Unit 1: Introduction to Mergers

Nature of acquisitions and amalgamations. types of merger – motives behind mergers – theories of growth of the firms and organic, inorganic growth strategies – value creation in horizontal, vertical and conglomerate mergers – internal and external change forces contributing to M & A activities A strategic perspective- industry life cycle and product life cycle analysis in M&A decision, strategic approaches to M&A- SWOT analysis, BCG matrix, Porter's Five forces model

Unit 2: Regulatory Framework

Legal and regulatory frame work of M & A – provisions of Company's Act 2013, Indian Income Tax act 1961 – SEBI takeover code, Provisions of Competition Act

Unit 3: Merger Process

Dynamics of M&A process; identification of targets and process of due diligence, preparation of due diligence report, deal restructuring. Process of merger integration – organizational and human aspects – managerial challenges of M & A, Integration of merged entity; process and problem, proxys and takeover tactics.

Unit 4: Corporate Bankruptcies

Concept of Bankruptcy, Identification and Management thereof

Unit 5: Corporate restructuring

Different methods of restructuring – joint ventures – sell off and spin off – divestitures – equity carve out – leveraged buy outs (LBO) – management buy outs – master limited partnerships – employee stock ownership plans (ESOP), Going Private.

Unit 6: Valuation of M&A

Valuation approaches : discounted cash flow valuation , relative valuation , valuing operating and

financial synergy, valuing corporate control; cash offer, share exchange ratio – mergers as a capital budgeting decision

References:

- Patrick Gaughan , Mergers, Acquisitions and Corporate Restructurings, John Wiley.
- Donald DePamphilis , Mergers and Acquisitions Basics, Elsevier.
- Mergers acquisitions and Business valuation Ravindhar Vadapalli–Excel books, 1/e 2007
- Ashwath Damodaran – Corporate Finance-Theory and Practice–John Wiley & Sons.
- S. F. Reed, A. R. Lajoux and H. Peter Nesvold The Art of M&A, Fourth Edition: A Merger Acquisition Buyout Guide, Mc Graw Hill Education

MAG009: Investment Management (L: 4, T: 0, P: 0)

Course Objectives:

The objectives of this course is to provide a theoretical and practical background in the field of investments, enable to design and manage the bond as well as equity portfolios in the real word. It will also help in understanding valuing equity and debt instruments. Student will also learn to manage the mutual funds and be able to measure the portfolio performances.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Description of classification of assets such as stock and bonds
CO2: Allocate investments into stock and bond portfolios
CO3: Assess the risk preferences of Individuals
CO4: Create and manage diversified portfolios

Syllabus:

Unit 1: Introduction
Investment: Objectives, investment methods – Vehicles of Investments: Security and non-security forms of investment, Concept and measurement of Risk: Diversifiable and Non-diversifiable.

Unit 2: Investment Environment
Types of markets – Commodity markets, Capital Market-Primary and secondary markets, and Currency Markets – major players and instruments, Functioning of stock exchanges, trading and settlement procedures at NSE & BSE. SEBI and Market Regulations, Efficient Market Hypothesis.

Unit 3: Security analysis

Fundamental analysis; Concept and measurement of intrinsic value, Company- Economy-Industry Analysis, Technical analysis – Charting the p[rice behavior, identification of indicators and oscillators, outliers, Share price and trading volume; trend analysis, sentiment indicators.

Unit 4: Analysis and valuation of bonds

Types of bonds, Term structure of interest rate, Bond yields, pricing theorems, , default risk analysis, determination of yield curves, YTM – Concept of Duration and immunization strategies, Valuation of preference and equity shares.

Unit 5: Portfolio Management

Portfolio design: Asset allocation decision, risky & risk free assets-Utility analysis, Traditional and Modern Portfolio theory, Markowitz diversification model, selecting an optimal portfolio – concept and evaluation techniques, Portfolio performance evaluation and revision: Sharpe & Treynor Jensen's measure & Tobin's Q, Active and passive strategies , International Diversification.

Unit 6: Elements of Financial Planning and Wealth management:

Meaning and Features, Phases in Wealth Management Process,Wealth pyramid, Major product offerings, Key trends and limitations, Wealth Creation and key drivers for Wealth Management services, Client profiling

References:

- Jordan & Fischer , Investment Analysis and Portfolio management — (latest edition)
- Zvi Bodie, Kane, Marcus & Mohanty, Investments — TMH – (latest edition).
- Martin J. Pring, Martin Pring's Complete Guide to Technical Analysis An Indian Perspective, Shroff
- Robert Haughen, Modern Investment Theory, Pearson.
- Frank K. Reilly, and Keith C. Brown, Investment Analysis and Portfolio Management, 8th Edition, Thomson, 2012.
- Rajiv D. Khatalawala, How to profit from Technical Analysis, Vision Books.
- Aswath Damodaran, Damodaran on Valuation, 2ed Paperback – Wiley.
- Graham, Dodd and Kottle, Security Analysis, McGrawHill

MAG010: International Financial Management (L: 4, T: 0, P: 0)

Course Objectives:

The objectives are to introduce the environment of international finance and its implications on international business, to analyse the nature and functioning of foreign exchange markets, determination of exchange rates and interest rates and their forecasting, to define and measure foreign exchange risks and to identify risk management strategies.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe the international financial environment
CO2: Apply international financial theory
CO3: Assess the forces influencing global finance and their role in global business strategies
CO4: Evaluate cross-border investment opportunities for undertaking various capital budgeting and short-term cash flow management decisions

Syllabus:

Unit 1: Introduction
International financial Environment- Importance, rewards & risk of international finance- Goals of MNC- International Business methods–Exposure to international risk- International Monetary system- Multilateral financial institution-Government influence on exchange rate.

Unit 2: International flows of funds
Balance of payments (determination of current account, capital account & ORA)-International Trade flows-International Capital Flows-Agencies that facilitate International flows – Equilibrium, disequilibrium & adjustment of Balance of payment & Trade deficits.

Unit 3: International Financial Markets
Foreign exchange markets-foreign exchange trading-Cash & Spot exchange markets-foreign exchange rates &quotation- forward markets-Exchange rate Behavior-Cross Rates-Foreign exchange market participants-arbitrage profit in foreign exchange markets, Swift Mechanism.

Unit 4: Foreign Exchange exposure and Foreign exchange risk Management
Measuring exchange rate movements-Exchange rate equilibrium – Factors effecting foreign exchange rate forecasting exchange rates- international parity relationship: interest rate parity, purchasing power parity & fisher effects. Management of Transaction exposure- Management of Translation exposure- Management of Economic exposure-Management of political Exposure-Management of Interest rate exposure. Hedging against foreign exchange exposure – Forward market- Futures Market- options Market- Currency Swaps-Interest rate Swap- Cross currency Swaps

Unit 5: International Investment decision

International Capital Budgeting: Concept, Problems associated, Evaluation of a project, Risk Evaluation, and Impact on Value. Foreign Direct investment –Foreign portfolio investment-International Financial instruments, International Bond & Equity market, sovereign risk.

References:

- P.G. Apte-International Finance Management- (Tata McGraw Hill),4/e
- Levi, Maurice, International Finance , New York, McGraw Hill Inc., latest edition
- Eun & Resnick – International Finance Management ---(TataMcGraw Hill), 4/e
- Jeff Madura, International Finance Management ---(Thomson), 7/e,2004
- Sharan Vyuptkesh, International Financial Management 6th Edition, PHI
- Thummuluri Siddaiah, International Financial Management, Pearson Education India

MAG011: Financial Analytics (L: 4, T: 0, P: 0)

Course Objectives:

The objective of the course is to empower the ability to create and interpret effective financial models for corporate finance. The course provides a step-by-step process of creating an integrated financial model which would project the future financial performance of a company, which can be used by financial advisory firms, equity research and banking sector likewise.

Course Outcomes:

Upon completion of the course, the student would be able to:
CO1: Assess financial evaluation of a scenario given historical data
CO2: Describe various portfolio models
CO3: Analyse the valuation of options and bonds
CO4: Describe simulation of stock prices

Syllabus:

Unit 1: Corporate Finance and Valuation – I

Basic Financial Calculations: Overview, Present Value and Net Present Value, Internal Rate of Return (IRR) and Loan Tables, Multiple IRR, Flat Payment Schedules, Future Values and Applications, Pension Problem, Continuous Compounding, Discounting Using Dated Cash Flows. Corporate Valuation Overview: Four Methods to Compute Enterprise Value, Using Accounting

Book Values to Value a Company, Efficient Markets Approach, Enterprise Value & Free Cash Flows, Consolidated Statement of Cash Flows. Calculating the Weighted Average Cost of Capital (WACC): Overview, Computing Firm's Equity, Firm's Debt, Firm's Tax Rate, Firm's Cost of Debt, Firm's Cost of Equity, Implementing the Gordon Model.

Unit 2: Corporate Finance and Valuation – II

Valuation Based on the Consolidated Statement of Cash Flows: Overview, Free Cash Flow (FCF): Measuring the Cash Produced by the Business, Reverse Engineering the Market Value. Pro Forma Financial Modeling: Overview, How Financial Models Work: Theory and an Initial Example, Free Cash Flow (FCF): Measuring Cash Produced by Business, Using FCFto Value the Firm, Valuation Procedure, Modeling of Fixed Assets, Sensitivity Analysis, Debt as a Plug, Incorporating in Pro Forma.

Unit 3: Portfolio Models

Portfolio Models—Introduction: Overview, Computing Returns for Apple (AAPL) and Google (GOOG), Portfolio Means and Variances, Envelope Portfolios. Calculating Efficient Portfolios: Overview, Definitions and Notation, Five Propositions on Efficient Portfolios and the CAPM. Calculating the Variance-Covariance Matrix: Overview, Computing the Sample Variance-Covariance Matrix, Correlation Matrix, Computing the Global Minimum Variance Portfolio (GMVP),Four Alternatives to the Sample Variance-Covariance, Using Option Information to Compute the Variance Matrix.

Unit 4: Valuation of Options

Introduction to Options: Overview, Basic Option Definitions, Option Payoff and Profit Patterns, Option Strategies, Option Arbitrage Propositions. The Binomial Option Pricing Model: Overview, Two-Date Binomial Pricing, State Prices. The Black-Scholes Model: Overview, The Black-Scholes Model, Black-Scholes Pricing Function, Calculating the Volatility, Implied Volatility, Dividend Adjustments to the Black-Scholes, Pricing Structured Securities, Bang for the Buck with Options, Black (1976) Model for Bond Option Valuation.

Unit 5: Valuing Bonds

Duration: Overview, Duration Patterns, Bond with Uneven Payments, Non-Flat Term Structures and Duration. Immunization Strategies: Overview, Model of Immunization, Convexity. Modeling the Term Structure: Overview, Basic Example, Several Bonds with the Same Maturity, Fitting a Functional Form to the Term Structure, The Properties of the Nelson-Siegel Term Structure, Term Structure for Treasury Notes.

Unit 6: Monte Carlo Methods

An Introduction to Monte Carlo Methods: Overview, Computing π Using Monte Carlo, A Monte Carlo Simulation of the Investment Problem. Simulating Stock Prices: Overview, What Do Stock Prices Look Like? Lognormal Price Distributions and Geometric Diffusions, Lognormal Distribution Look, Simulating Lognormal Price Paths, Technical Analysis, Calculating the Parameters of the Lognormal Distribution from Stock Prices.

References:

- Benninga, S. (2014), Financial Modeling, MIT Press, Fourth Edition.
- Winston, W. (2010), Financial Models Using Simulation and Optimization II, Palisade Corp.
- Lemieux, V.L. (2012), Financial Analysis and Risk Management: Data Governance, Analytics and Life Cycle Management, Springer.
- Van Deventer, D.R. & Imai, K. (1996), Financial Risk Analytics: A Term Structure Model Approach for Banking, Insurance and Investment Management, Irwin Professional Publishing.
- Ryzhov, P. (2013), Haskell Financial Data Modeling and Predictive Analytics, Packt Publishing.
- Benett, M.J. &Hugen, D.L. (2016), Financial Analytics with R: Building a Laptop Laboratory for Data Science, Cambridge University Press.
- Baesens, B., Rosch, D. &Scheule, H. (2017), Credit Risk Analytics: Measurement Techniques, Applications and Examples in SAS, Wiley.
- Sengupta, C. (2011), Financial Analysis and Modeling, Wiley.

MAG012: Investment Banking & Financial Services (L: 4, T: 0, P: 0)

Course Objective:

This course delves into the structure, management and practices of investment banking (IB) from larger more universal players to boutique operations. It covers the creation of value through financial advisory services, looks into the business practices of private equity, hedge funds. and trading operations; and the role of each in facilitating investment, the deployment of capital and the changing face of risk- taking activities.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Apply the financial concepts and techniques to analyse activities and transactions in investment banking
CO2: Describe capital market issuance process and required due diligence
CO3: Identify various type of financial services and their intricacies
CO4: Identify and examine corporate governance, ethical and legal issues

Syllabus:

Unit 1: Introduction to Investment Banking
Overview of Securities Market, Segments, Products and Participants. Investment Banking and allied activities, The Structure of Investment Bank and employment opportunities, The IB client and Investment Banking – Value add by Investment Banks and Client needs – Pitch Book Framework, Primary Markets and Securities Issuance.

Unit 2: Investment Banking in Equity Markets
Security and Business Valuation, The Importance of Valuation, Enterprise and Equity Value, Valuation Methods & Comparable Company Analysis, IPO Analysis, Pre-Issues Management, Private Equity and Placements, Equity Underwriting – key players and syndicate formation, IPOs and Follow On Issues, Domestic Issue Management

Unit 3: Investment Banking in Fixed Income Markets
The spectrum of Fixed Income Alternatives, Issuance in Fixed Income Primary Markets and procedures, Fundamentals of Credit/Fixed Income Bonds Markets, Secondary Markets for Fixed Income in India, Asset Securitization, Credit Rating Agencies, Asset Backed Securities – Underwriting and Distribution.

Unit 4: Raising finance from Overseas Markets
Basic concepts of International Money Market, Intermediation, Euro-Dollar Market, Various Instruments – ADR/ GDR, FCCB, ECB – Regulatory Aspects, Contribution of Derivatives to International Funds market, Overseas Issues – Management and Procedures

Unit 5: Corporate Restructuring and Investment Banking
Rationale behind Corporate Restructuring, Debt Restructuring – Concept and Categorization criterion, Expansion, Tender offers, sell-offs and Spin-offs, Disinvestments, Mergers and Acquisitions – Accounting and Legal aspects involved.

Textbooks/References:

- Rosenbaum, J., Pearl, J., Perella, J.R., (2009). "Investment Banking: Valuation, Leveraged Buyouts, and Mergers and Acquisitions", MISL-Wiley.

- Subramanyam, P. (2005), "Investment Banking", Tata McGraw-Hill.
- Fleuriet, M. (2008), "Investment Banking Explained: An Insider's Guide to the Industry (Professional Finance & Investment)", McGraw-Hill Education.

- Kantz, M. and Johnson, R.R. (2014), "Investment Banking for Dummies", John Wiley and Sons. Damodaran, A. (2012), "Investment Valuation: Tools and Techniques for Determining the Value of any Asset", (3rd Ed.) Paperback, Wiley.
- Dun and Bradstreet (2009), Wealth Management, Tata Mc. Graw Hill. Jeff Madura (2017), "Financial Markets and Instutions", Cengage Learning.

MAG013: Financial Derivatives (L: 4, T: 0, P: 0)

Course Objectives:

The course aims at imparting skills of managing Risk through options, futures and derivatives.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Differentiate between hedging and speculation
CO2: Evaluate pricing for futures and forwards
CO3: Identify different hedging strategies
CO4: Design the mechanics, valuation and trading strategies of derivative market

Syllabus:

Unit 1: Introduction to Financial Derivatives
Forwards, futures, options, swaps and other derivative instruments. Basics of hedging credit, currency and interest rate risks -Difference between hedging and speculation -Hedge Funds vs Mutual Funds.

Unit 2: Fundamentals of Forwards and Futures
Organisation and structure, trading mechanism, cost of carry model, Determination of forward and future prices: Pricing of futures and forwards on investment assets, commodities, currencies and interest rate.

Unit 3: Hedging Strategies using Forwards and Futures
Short hedge and long hedge using futures, cross hedging of portfolio and commodities using futures.

Unit 4: Option fundamentals
Building Blocks, calls, puts, and underlying; Basic Option Pricing: European options, American options, forward-spot parity, put call parity, Option Greeks, the binomial option-pricing model. Binomial and Black-Scholes Option Valuation, Hedging strategies using Options: Option Positions and Strategies, Construction of option strategies in various market situations and their pay off; Betting on a large price decrease, betting on a small price increase.

Unit 5: Swaps and Derivatives
Introduction and motive for Swaps; Introduction to Interest Rate Derivative.

Unit 6: Risk Management
Objective of Risk management, Identifying types of risk, Quantifying risk and Hedging techniques, Credit default swaps, Total return swaps, Credit spread options, Collateralized debt obligation, Introduction to VaR.

References:

- John C.Hull Options Futures & Other Derivatives- - (Pearson Education), latest edition
- B.R. Bagri, N.D. Vohra, Futures and Options , Mc GrawHill Education.
- Introduction to Derivatives and Risk Management – Chance –Thomson Learning, latest edition.
- Merton H. Miller, Merton Miller on Derivatives, Wiley
- Robert W Kolb, Futures, Options and Swaps – Blackwell Publishing.

MAG014: Financial Reporting & Analysis (L: 4, T: 0, P: 0)

Course Objectives:

The course seeks to equip students with a thorough understanding of financial reporting principles and techniques essential for sound financial decision-making. Beginning with the fundamentals, students will identify the purpose of financial reporting and its various users, while delving into the conceptual framework that underpins financial statements. Moving forward, they will analyse the structure of financial statements, including the balance sheet, income statement, and cash flow statement, and gain insight into additional disclosure statements crucial for transparency and corporate governance. Subsequently, students will delve into the components of financial statements, such as inventories, receivables, assets, leases, revenue, income tax, and retained earnings, enabling them to predict and analyse financial performance effectively. Additionally, students will explore accounting standards in India and IFRS, comparing their applicability and benefits, and understanding the convergence towards global standards.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the purpose and users of financial reports, and describe the conceptual framework guiding financial statement preparation

CO2: List and analyse the structure of financial statements, including balance sheets, income statements, and cash flow statements, along with additional disclosure statements crucial for corporate transparency

CO3: Predict and categorize the components of financial statements, including inventories, receivables, assets, leases, revenue, and income tax, enabling effective financial analysis

CO4: Analyse and differentiate between various financial analysis techniques, such as ratio analysis, comparative analysis, and common-size analysis, to interpret financial statements and assess financial performance accurately

Syllabus:

Unit 1: Basis of Financial Reporting
Purpose of financial reporting, users of financial reports, conceptual framework for financial statements

Unit 2: Understanding Financial Statements
Structure of Financial Statements: Introduction, Statement of Financial Position (Balance Sheet), Statement of Earnings (Income Statement), and Statement of Cash Flows (Cash Flow Statement). Additional disclosure statements: Need for Additional Statements, Auditor's Report, Director's Report, Chairman's message, Electronic Dissemination, Corporate Governance.

Unit 3: Components of Financial Statements
Inventories, Receivables, Assets (Fixed Tangible, Intangible), Leases, Revenue, Income-Tax, Retained Earnings.

Unit 4: Analysis & Interpretation of Financial Statements
Ratio Analysis – Liquidity, Solvency, Activity & Profitability Analysis, Comparative & Common Size Analysis (Vertical & Horizontal Analysis), Financial Statement Variation by Type of Industry Expanded Analysis: Financial Ratios used in Annual Reports, Management's use of Analysis (Du-pont Analysis), Graphing Financial Information

Unit 5: Accounting Standards in India & IFRS

Introduction of Indian Accounting Standards, Concept of accounting standard, Accounting standard board in India, Applicability of Indian Accounting standards, Comparison between Indian Accounting standards and IFRS, Need and convergence towards Global Standards, Benefit of convergence to IFRS in India

References:

- Foster, George. Financial Statement Analysis, (2nd Edition). Pearson Education Pvt Ltd.
- Stickney, C.P., Financial Reporting, Financial Statement Analysis and Valuation: A Strategic Perspective, South Western, Latest Edition.
- White, G.T., Sondhi, A.C. and Fried, D., The Analysis and Use of Financial Statements,Wiley India, New Delhi, Latest Edition.

MAG015: Financial Risk Management (L: 4, T: 0, P: 0)

Course Objectives:

To provide an understanding and an appreciation of the principles and practices of risk management in order to enable production of the optimum strategy for the handling of risk in an organization. The practices of risk management has been there for quite sometime for financial institutions globally. However the Global Financial Crisis of 2008 has turned the spotlight on importance of Financial Risk Management. With need to develop better risk prediction models and hedging strategy, it has generated a lot of research interest & job opportunities. Nowadays, the financial firms use it as strategic tool to lower their losses and generate better risk adjusted sustainable profits. In addition, the practices of risk management are applied by leading world class non-financial corporates with same vigor as financial firms. Recall that risks pertaining to interest rate, foreign currency, commodity, markets and operations to name a few also affects the sustainability and profitability of corporates as much as it affects purely financial institutions.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify and classify various types of financial risks, such as market, credit, liquidity, and operational risks, elucidating their impact on organizational performance and strategic decision-making

CO2: Analyze and apply quantitative risk metrics like Value at Risk (VaR) and Expected Shortfall to measure and manage financial risk exposures effectively, ensuring prudent risk management practices

CO3: Describe and assess methodologies for measuring volatility and credit risk, including ARCH, GARCH, and credit rating processes, facilitating informed risk assessment and portfolio management decisions

CO4: Design and execute stress testing scenarios to evaluate the resilience of financial systems under adverse conditions, adhering to regulatory guidelines and enhancing risk governance frameworks for sustainable risk management practices

Syllabus:

Unit 1: Fundamental of Risk Management

Typology of Risks: Market Risk, Credit Risk, Liquidity Risk, Operational Risk, Business & Strategic Risk, Reputation Risk, The Risk Management Process, Identifying Risk: Known & Unknown, Quantitative Risk Metrics: VaR & Expected Shortfall, Tail Risk, Systemic Risk, Human Agency & Conflicts of Interest, Risk Aggregation, Balancing Risk & Reward, Enterprise Risk Management.

Unit 2: Measures of Financial Risk

Mean-Variance Framework, The Normal Distribution, VaR, Expected Shortfall, Coherent Risk Measures, Calculating and Applying VaR: Linear Vs Non-Linear Portfolios, Historical Simulation, Portfolio Valuation, Term Structures, Stressed Measures, The Delta-Normal Model, Monte Carlo Simulation, Estimating Parameters Values, Correlation Breakdown, Worst Case Analysis

Unit 3: Measuring & Monitoring Volatility

Deviation from Normality, Unconditional & Conditional Normality, Slow Changes vs Regime Switching, Volatility measures, Estimating the Current Volatility, ARCH, GARCH, Long Horizon Volatility, Implied Volatility, Correlation.

Unit 4: Credit Risk & Operational Risk

Credit Ratings, Credit Spreads & Risk Premiums, Rating Process: Outlooks & Watchlists, Rating Stability, Through the Cycle vs Point-in-Time; Alternatives to Ratings, Internal Ratings, Rating Transitions. Sovereign Credit Risks, Foreign Currency Defaults, Local Currency Defaults, Impact of Sovereign Default.

Measuring Credit Risks: The Basel Committee, Economic Capital, Data on Defaults, Model for determining Capital, Gaussian Copula Model, The Vasicek Model, Credit Metrics, & Risk Allocation.

Operational Risk & its Measurement: Types of Operational Risks, The Large Risks, Basel II Regulation, Determining the Loss Distribution, Monte Carlo Simulation & Power Law. Reducing the Operational Risk, Insurance

Unit 5: Stress Testing

Stress Testing vs VaR and ES, Choosing Scenarios, Model Building, Reverse Stress Testing, Regulatory Stress Testing, Governance, Basel Stress Testing Principle.

References:

- Risk Management and Financial Institutions, 5th Edition by John C. Hull ISBN: 978-1-119- 44811-2
- Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk, 2nd Edition by Steve L. Allen ISBN: 978-1-118-17545-3
- Financial Risk Manager Handbook: FRM Part I / Part II, + Test Bank, 6th Edition by Philippe Jorion, GARP (Global Association of Risk Professionals)
- Financial Instituions Management-A Risk Management Approach by Anthony Saunders and Marcia Millon Cornett
- Risk Management and Shareholder's Value in Banking by Andrea Resti and Andrea Sironi
- Strategic Risk Taking by Aswath Damodaran
- Enterprise Risk Management by John Fraser and Betty Simkins
- Risk Management in Commodity Markets by Helyette Geman

MAG016: Marketing Management (L: 4, T: 0, P: 0)

Course Objectives:

The basic objective of this course is to develop an understanding of the underlying concepts, strategies and the issues involved in managing the marketing efforts of a firm.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Identify the roles and functions of marketing within a diverse range of organizations
CO2: Describe key marketing concepts, theories and techniques for the analysis of dynamic marketing environment
CO3: Develop the marketing mix for an organization
CO4: Critically analyze an organization's marketing activities

Syllabus:

Unit 1: Introduction

Introduction to marketing function; genesis, approaches to marketing, concept of customer value, customer satisfaction and delight. Marketing mix concept, classification of goods and services; goods- service continuum. Emerging fields of marketing- green marketing, digital marketing, viral marketing, neuro marketing.

Unit 2: Marketing Environment

Analyzing needs and trends Macro Environment - Political, Economic, Socio-cultural, Legal, Ecological and Technical Environment – PEST analysis. Micro Environment – Industry & Competition.

Unit 3: Market Segmentation, Targeting and Positioning

Definition, Need & Benefits. Bases for market segmentation of consumer goods, industrial goods and services. Segment, Niche & Local Marketing, Effective segmentation criteria, Evaluating & Selecting Target Markets, Concept of Target Market and Concept of positioning – Value Proposition & USP.

Unit 4: Product and Pricing Decisions

Types of new product, new product development, managing Product Life Cycle, test marketing a new product. Branding decisions; packaging and labeling; new trends in packaging. Pricing objectives, Factors influencing pricing decision - approaches to pricing – Price & Non-price competition, setting the price and managing the price changes.

Unit 5 Distribution and Promotion Decisions

Importance, functions of distribution channels - introduction to the various channels of distribution, designing marketing channels. Direct Marketing, Impact of technology & Internet on distribution. Promotional Mix - Advertising, Sales Promotion, Personal Selling, Public Relations. Impact of technology & Internet on Promotion

Unit 6 Marketing Organization and Control:

Concept, Types - Functional organization, Product Focused organization, Geographic Organization, Customer Based Organization, Matrix organization. Organization structure for a wide customer orientation. Need of marketing control and audit.

References:

- Kotler Philip, Keller Kevin Lane, Koshy Abraham and Jha Mithileshwar - Marketing Management: A South Asian Perspective (Pearson Education 14th Edition).
- Lamb CW, Hair JF, Sharma, D and McDanial, C- MKTG-A South Asian Perspective, Cengagae Publication.
- Stanton William J - Fundamentals of Marketing (Mc Graw Hill)
- Ramaswamy V.S. and Namakumari S - Marketing Management: Planning, Implementation and Control (Macmillian, 3rd Edition).
- Etzel, M., Walker, B., Stanton, W. and Pandit, A (2009) Marketing Management, Tata McGrawHill, New Delhi
- Mc. Carthy and Perreault -Basic Marketing: A Global Marketing Approach (Tata Mc Graw Hill, 15th Edtion).
- Saxena, Rajan (2009), Marketing Management, Fourth Edition, Tata McGraw Hill Pvt. Ltd.New Delhi.

MAG017: Marketing Analytics (L: 4, T: 0, P: 0)

Course Objectives:

The objective of the course is to thoroughly understand the marketing dynamics and get accustomed with various marketing methods so that an efficient decision is made which would even work in diversified settings. A successful marketing strategy involves efficient decision making, where decisions could range from product pricing, selection of a distribution channel, planning the product advertisement or any other. The course would enable an effective course of action by analyzing data with quantitative marketing methods.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe marketing research methods used in marketing management

CO2: Solve typical data-driven marketing problems

CO3: Discuss the dynamics involved in a marketing decision

CO4: Evaluate and design the right strategy for dynamic settings

Syllabus:

Unit 1: Introduction and Market Insight
Introduction to marketing analytics, models and metrics, Market Insight: Market

terminology, market data sources, market sizing, pestle market analysis, porter five forces analysis.

Unit 2: Market Segmentation and Competitive Analysis
Market segmentation: market segmentation, market targeting, market positioning. Competitive Analysis: Competitive information, analysis and action.

Unit 3: Business strategy and operations
Business strategy: strategic scenarios, strategic decision models, strategic metrics, Business operations: forecasting, predictive analysis, data mining, balanced scorecard, critical success factors.

Unit 4: Product and Service analytics, Price analytics, Product and Service Analytics: Conjoint analysis, decision tree models, portfolio resource allocation, product and service metrics, attribute preference testing. Price analytics: pricing techniques and assessments, profitable pricing, pricing for business markets, price discrimination.

Unit 5: Distribution Analytics and Promotion Analytics

Distribution Analytics: Distribution channel characteristics, retail location selection, channel evaluation and selection, multi-channel distribution, distribution channel metrics. Promotion Analytics: Promotion budget estimation, promotion budget allocation, promotion metrics for traditional and social media

Unit 6: Sales Analytics and Analytics in Action

Sales Analytics: Consumer sales process, ecommerce sales model, sales metrics, profitability metrics, support metrics. Analytics in Action: Rapid decision models, metrics in marketing campaigns, excel excellence, data driven presentations.

Textbooks/References:

- Sorger, S. (2013), Marketing Analytics: Strategic Models and Metrics, AdmiralPress.
- Winston, W.L. (2014), Marketing Analytics: Data-Driven Techniques with Microsoft Excel, Wiley, First Edition.
- Artun, O., Levin, D. (2015), Predictive Marketing: Easy Ways Every Marketer Can Use Customer Analytics and Big Data, AgileOne.
- Grigsby, M. (2015), Marketing Analytics: A practical guide to real marketing
- science, Kogan Page Limited.
- Venkatesan, R., Farris, P., Wilcox, R.T. (2014), Cutting Edge Marketing Analytics:
- Real World Cases and Data Sets for Hands On Learning, Pearson Education.

- Bendle, N.T., Farris, P.W., Pfeifer, P.E., Reibstein, D.J. Marketing Metrics, Pearson
- Education, Third Edition.
- Sharma, H. (2017), Master the Essentials of Email Marketing Analytics, Blurb.
- Jacobs, D. (2016), Marketing Analytics: Optimize Your Business with Data Science in R, Python, and SQL, Dave Jacobs.

MAG018: Industrial Relations and Labour Legislation (L: 4, T: 0, P: 0)

Course Objectives:

Industrial Relations play an important role in organizations. Organizational efficiency and performance are intricately interlinked with industrial relations. This course will expose students to the conceptual and practical aspects of industrial relations at the macro and micro levels.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: Describe Industrial relation and its evolution over a period of time

CO2: Identify critical features of trade union act and industrial dispute act along with their relevance in the age of virtual and structureless organisations

CO3: List out varieties of modes of workers ' participation in management

CO4: Analyse key features, status, significance and need of amendments in various legislations related to workman

Syllabus:

Unit 1: Industrial Relation Management

Concept- Evaluation – Background of industrial Relations in India- Influencing factors of IR in enterprise and the consequences. Economic, Social and Political environments: Employment Structure – Social Partnership – Wider approaches to industrial relation – Labour Market.

Unit 2: Trade Union

Introduction – Definition and objective – growth of Trade Union in India-trade Union Act, 1926 and Legal framework-Union recognition-Union Problems-Employees Association-introduction, Objective Membership, Financial Status.

Unit 3: Quality of Work Life

Workers' Participation in Management – Worker's Participation in India, shop floor,

Plant Level, Board Level – Workers' Welfare in India scenario- Collective bargaining concepts & Characteristics – Promoting peace.

Unit 4: Industrial Disputes

Meaning, nature and scope of industrial disputes – Cases and Consequences of Industrial Disputes – Prevention and Settlement of industrial disputes in India.The Industrial Disputes Act 1947**,** Employee Grievances: Causes of grievances – Conciliation, Arbitration and Adjudication procedural aspects for Settlement of Grievances – Standing Orders – Code Discipline.

Unit 5: Legal Framework of Industrial Relations

Settlement Machinery for Industrial Disputes: Conciliation, Arbitration & Adjudication, Legislation: The Trade Unions Act 1926, The Industrial Dispute Act 1947, The Factory's Act 1948, The Contract Labor Act 1970, The Payment of Bonus Act, 1965, The Industrial Employment (Standing Orders) Act 1972, The Minimum Wages Act 1948, The Payment of Wages Act 1936, The Workmen's Compensation Act 1923, The ESI Act 1948, The Employees' Provident Fund and Miscellaneous Provisions Act 1952 and The Maternity Benefits Act 1961, Overview of these Acts Only.

Textbooks/References:

- Ghosh, P. &Nandan, S. (2015), Industrial Relations and Labour Laws, McGraw Hill Education; 2015.
- Srivastava, S.C. (2012), Industrial Relations and Labour Laws, Vikas Publishing House.
- Padhi, P.K. (2011), Labor and Industrial Laws. Prentice Hall of India.
- Srivastava S.C (2012), Industrial Relations and Labour Laws, 6/e, Vikas Publishing House.
- Sen, R. (2009). Industrial relations: text and cases (2nd ed.). New Delhi: Macmillan Publishers.
- VenkataRatnam, C. S. (2006). Industrial relations. New Delhi: Oxford University Press.

MAG019: Training and Development (L: 4, T: 0, P: 0)

Course Objectives:

This course provides students with an overview of the role of Training and Development in Human Resource Management. Students will also be equipped with a basic understanding of the skills required to assess employee training needs, design and administer employee training and development programs, and evaluate both the efficiency and effectiveness of such programs.

Course Outcomes:

Upon completion of the course, the student would be able to:

CO1: List training and development needs for contemporary organisations.
CO2: Analyse organizational, societal and individual costs and benefits of training and development programs and thereby generate constructive feedbacks based on this cost-benefit analysis.
CO3: Develop, analyse and apply advanced training strategies and specifications for the delivery of training programs

CO4: Describe appropriate implementation, monitoring and assessment procedures of training.

Syllabus:

Unit 1: Introduction
The Changing Organizations, HR and the Training Functions, Models of Training; Systematic Model, the Transitional Model, The Learning Organization, Training as Consultancy

Unit 2: Training Needs Analysis
The Process and Approaches of TNA, Team Work for Conducting Training Needs Analysis, TNA and Training Process Design

Unit 3: Training Design & Evaluation
Understanding & Developing the Objectives of Training, Facilitation of Training with Focus on Trainee (Motivation of Trainee, Reinforcement, Goal setting), Training with Focus on Training Design (Learning Environment, Pre-training Communication etc.) Facilitation of Transfer with Focus on Organization Intervention (Supervisor Support, Peer Support, Trainer Support, Reward Systems, Climate etc.)

Unit 4: Effective Trainer
Selecting the trainer and preparing a lesson plan, skills of an effective Trainer, Programme methods and techniques. Implementation and Evaluation of Training Programme. Levels of Evaluation, CIPP Model and CIRO model, Training Audit and Cost Analysis.

Unit 5: Management Development
Approaches to Management Development, Sources of Knowledge / Skill acquisition, Types of management Development Programmes. EDP's / Seminars and Conferences, Symposia.

Unit 6: Emerging Trends in Training

New learning interventions, Technology in training-CBT- multimedia training, e learning/online learning- distance learning, Competency based Training, Assessment Centres.

Textbooks/References:

- Blanchard, P. N., Thacker, W. J., &Anand Ram, V. (2015), Effective Training: Systems, Strategies and Practices, Pearson India Ltd.
- Lynton, R.P, Pareek U (2011), Training for Development, Sage Publication.
- Balakrishnan Lalitha, Ramachandran (2015), Training and Development, 1/e,Vijay Nicole Imprints Pvt. Ltd.
- Robins P. S., (2015), Training Interpersonal Skills, 6/e, Pearson Education.
- Raymond Noe, A. (2005). Employees Training and Development", McGraw Hill Publication.
- Kozlowski, S. W. J. &Slas, E. (Ed.). (2009). Learning, training, and development in organizations. New York: Routledge.
- Steve W.J. Kozlowski, Eduardo Salas (2009). Learning, Training, and
- Development in Organizations. Taylor & Francis.

MAG020: Data Analysis Techniques (L: 2, T: 0, P: 4)

Course Objectives:

The course aims to equip the students with an understanding of the research process, tools like Advanced Excel/Excel Solver/SPSS or other related software to facilitate managerial decision making.

Course Outcomes:

CO1: Identify and employ fundamental Excel functionalities and formulas for data manipulation and analysis, enabling efficient data processing and report generation

CO2: Predict and apply advanced Excel features and MIS reporting techniques, including conditional formatting and dashboard creation, to enhance data visualization and presentation for decision-making purposes

CO3: Analyse and interpret statistical data using SPSS, performing correlation analysis, regression analysis, and hypothesis testing to derive actionable insights and inform strategic decision-making

CO4: Solve real-world business problems using operations research techniques, such as linear programming and simulation, to optimize resource allocation and improve operational efficiency

Syllabus:

Unit 1: Basics of Excel

Essential shortcuts, Paste Special (Value, Transpose), Absolute & Relative referencing. Data Analytics using Excel: Sort & Filter, SUBTOTAL, SUMIFS, COUNTIFS, Pivot Table for multivariable analysis, Computations, Sum, Max, Min, Average, Count, Generating multiple reports, VLOOKUP, HLOOKUP, IF, Nested IFs, AND, OR etc.

Data Cleaning and MIS reporting: LEFT, RIGHT, MID, UPPER, PROPER, LOWER, TRIM, Find & Replace, Go To Etc. MIS reporting: Automatic row-wise Subtotal, Conditional Formatting, File Password Select Dashboard Techniques, Grouping, Hide-Unhide Columns & Rows etc.

Unit II: Basics of SPSS

Introduction: Data Editor, Importing Data, Exporting SPSS output, The Syntax Editor, Saving Files, Missing data, Sort Cases and Select Cases, Recoding variables, Computing variables The SPSS Chart Builder: Histogram, Boxplots, Graphic Means: Bar Charts and Line Charts, Graphing relationships: The Scatterplot, Editing Graphs

Advanced Topics in SPSS: Frequencies command, Descriptive command, Cross-tabulations

Unit III: Data Analytics using SPSS

Building Statistical Models, Correlation Analysis, Regression Analysis, Parametric Tests: t-tests, z- test, paired t-test, ANOVA, Non-Parametric Test: Chi Square test, Mann-Whitney test

Unit IV: Operations research techniques using MS-Excel Solver

Linear Programming Problems, Simplex Method, Sensitivity Analysis, Transportation Problem, Assignment Problem and Simulation Techniques, Monte Carlo method using MS-Excel solver or other related software.

References:

- Barry Render B., Ralph M. Stair , Michael E. Hanna , Trevor S. Hale (2014); Quantitative Analysis for Management, 12e, Pearson.
- Andy Field; Discovering Statistics Using IBM SPSS Statistics, 4th Edition; Sage Publications
- John Walkenbach; Excel 2016 Bible; Wiley Publications
- John MacInnes; An Introduction to Secondary Data Analysis with IBM SPSS Statistics, Sage Publishing.
- Anil Maheshwari (2017); DATA ANALYTICS; McGraw Hill Education