ఆంధ్రప్రదేశ్ కేంద్రీయ విశ్వవిద్యాలయం आंध्रप्रदेश केंद्रीय विश्वविद्यालय

CENTRAL UNIVERSITY OF ANDHRA PRADESH

Ananthapuramu

SCHOOL OF ARTS, HUMANITIES AND SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS

Postgraduate Programme Structure
as per the UGC Credit Framework (NEP 2020)

Vidya Dadati Vinayam
(Education Gives Humility)

M.Sc. Economics and Data Analytics

"The digital Economy must be built on decent work which gives humans dignity"
- Guy Ryder, ILO

Programme Structure
(With effect from AY 2024 - 25)

SCHOOL OF ARTS, HUMANITIES AND SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS

M.Sc. Economics and Data Analytics

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SCHOOL OF ARTS, HUMANITIES AND SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS

M.Sc. Economics Data Analytics

1. Introduction to the Programme

The Master of Science in Economics and Data Analytics (MED) programme at the Central University of Andhra Pradesh is designed for those who want to gain the in-demand skills needed to succeed in today's job market. The programme aims to produce competent and well-equipped graduates, who are capable of making meaningful contributions to the business world, armed with both theoretical knowledge and practical experience. Emphasizing critical thinking and problem-solving, the curriculum aims to develop analytical skills crucial for navigating the ever-evolving business landscape. The programme combines knowledge of human behavior and decision-making from economics with the latest data analytics techniques. It has a strong foundation on both economics and data analytics through core courses. Technical skills and competencies are at the heart of the programme where students will be familiar with handling data software packages like R, Python, and SPSS. It also offers a variety of elective courses in econometrics and data analytics. Students have the opportunity to put their skills into practice through talks with industry professionals, internship, dissertations, and field surveys. Such a multidisciplinary approach helps students to gain hands-on experience, refining their skills and preparing them for real-world challenges. These practical components not only deepen students' understanding but also foster professional growth, ensuring they are well-equipped to thrive in various professional settings.

2. Programme Vision

The vision for the programme is to be a globally recognized leader in providing advanced education that integrates economic theory with econometrics and statistical applications with latest packages. It aspires to empower students with the knowledge, skills, and ethical framework necessary to excel in a dynamic and interconnected world. Through innovative research, interdisciplinary collaboration, and a commitment to excellence, it aims to prepare our graduates to address complex economic challenges and make meaningful contributions tosociety. The vision is to create a vibrant learning community that fosters intellectual curiosity, critical thinking, and lifelong learning, and equips students to become leaders in academia, industry, government, and beyond.

3. Programme Objectives

The purpose of this programme is to:

- Foster a dynamic environment that nurtures students' intellectual, social, cultural, ethical, and spiritual growth, preparing them for active citizenship, meaningful employment, and lifelong learning in an interconnected world.
- Embrace diverse, adaptable, and practical teaching approaches that cater to the diverse learning styles of students, promoting effective learning outcomes.
- Bridge the gap between academia and industry by engaging industry partners, faculty, research scholars, and students in collaborative research projects that address real-world challenges.
- Establish partnerships with corporate entities through Memoranda of Understanding (MoUs) to provide students with training opportunities that align with the needs of the global job market and society.
- Support and recognize the achievements of faculty, scholars, and students across all disciplines, including patents, publications, and research grants, to enhance the academic reputation of the institution.
- Cultivate a strong network of alumni and student mentors, fostering holistic student development, wellness, integrity, leadership, and resilience through professional exchanges and mentorship programs.

4. Learning Outcomes

The learning outcomes are designed to equip students with the knowledge, skills, and abilities necessary to succeed in careers related to economics, data analysis, and decision-making:

- Acquire a deep understanding of economic theory, including microeconomics, macroeconomics, econometrics, and statistics as well as applied economics principles.
- Develop proficiency in statistical analysis, data mining, and machine learning techniques for analyzing complex economic data sets.
- Apply statistical methods, econometric techniques, and data visualization tools to analyze economic data and draw meaningful conclusions.
- Utilize programming languages and statistical software packages effectively for data manipulation and analysis.
- Develop the ability to critically evaluate economic theories and models, and apply them to real-world economic problems.
- Apply economic theory and data analytics techniques to identify and solve complex economic problems and make informed decisions.
- Effectively communicate economic analyses and findings to diverse audiences, both orally and in writing.
- Understand the intersections between economics, data analytics, and other fields such as computer science, business, and public policy.
- Understand the ethical considerations involved in economic analysis and data analytics, and adhere to professional standards in research and practice.
- Develop expertise in specific areas of economics and data analytics through elective courses, research projects, and practical experience.
- Develop the ability to conduct independent research, including formulating research questions, designing studies, collecting and analyzing data, and presenting findings.
- Gain hands-on experience with statistical software, data visualization tools, and other technologies used in economic analysis and data analytics.
- Work effectively in teams to solve complex problems and achieve common goals, demonstrating leadership and interpersonal skills.
- Conduct independent research, including formulating research questions, designing studies, and analyzing data to produce meaningful insights.
- Develop the skills and knowledge necessary to pursue careers in a variety of fields, including economic research, data analysis, financial services, consulting, and government.

5. Pedagogy of the Programme

The pedagogy for MSc in Economics and Data Analytics involves creating an engaging learning environment that integrates theory with practical application. The programme emphasizes interactive lectures, group discussions, problem-solving activities, and hands-on projects. Field visits, household surveys, and dissertation work with faculty guidance enable students to analyze real-world economic issues, apply theoretical concepts, and enhance critical thinking skills. Collaboration and peer learning are encouraged, fostering teamwork and communication. Students gain practical experience with statistical software, enhancing their technological proficiency in applied economics and business. The curriculum also includes interdisciplinary studies, exposing students to intersections with fields like computer science, business, and public policy to provide a comprehensive understanding of economic phenomena and their implications. Projects and research assignments challenge students to address complex societal challenges, developing their analytical and problem-solving abilities. The programme culminates in a capstone project or thesis, allowing students to apply their knowledge and skills to significant research questions or practical problems in economics and data analytics. Networking events, career fairs, and mentorship programs connect students with alumni and industry professionals, facilitating their transition into the workforce.

6. Programme Structure

- The Master of Education (MED) programme is structured over two years, divided into four semesters, comprising a total of 91 credits.
- The curriculum is meticulously designed to incorporate Core Courses, Discipline-Specific Electives, Multidisciplinary Courses, and MOOCs, ensuring a comprehensive and enriching learning journey.
- With a focus on meeting the current demands of the Government, non-government, and private sectors, the programme offers a selection of nine discipline-specific electives, providing students with a broad range of courses to choose from.
- Throughout Semesters I, II, and III, students will specialize by selecting a Discipline Specific Elective and completing all related courses.
- To augment their learning experience, students are expected to complete one MOOCs course in each of the first three semesters.
- Following the completion of the second semester, students will embark on a two-month summer internship, where they will gain practical experience and submit a comprehensive report during the third semester.
- In the final semester (Semester IV), students will undertake a six-month Dissertation Work, allowing them to apply their acquired knowledge and skills in a practical setting and contribute meaningfully to the field of education.

SCHOOL OF ARTS, HUMANITIES AND SOCIAL SCIENCES
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M.Sc. Economics and Data Analytics Semester and Course wise Credits

Semester	Course Code	Discipline Specific Elective	IDE	CCC	SIP	Dissertation	Lab#	Total Credits
1	MED101 (4) MED102 (4) MED103 (4) MED104 (4)	MED111 (4)	MED112 MOOC (3)	-	-	-	MED103 (1)	**23**
II	MED201 (4) MED202 (4) MED203 (4)	MED211 (4)	MED212 MOOC (3)	MED213 (4)	-	-	MED201 (2) MED202 (2) MED213 (2)	**23**
III	MED301 (4) MED302 (4) MED303 (4) MED304 (4)	MED311 (4)	MED312 / MOOC (3)	MED313 (4)	MED314 (2)	-	MED301 (2) MED303 (2) MEC304 (2) MED311 (1)	**29**
IV	MED401(4)	-		-	-	MED411 (16)	MED401 (2)	**20**
Total	**48**	**12**	**09**	**08**	**02**	**16**	**16**	**95**

IDE: Inter-disciplinary Electives **CCC:** Common Compulsory Course
SIP: Summer Internship Project **# Lab:** Credits are excluded from total credits to avoid double count.

SCHOOL OF ARTS, HUMANITIES AND SOCIAL SCIENCES
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M.Sc. Economics and Data Analytics: Programme Structure

Sl. No.	Course Code	Title of the Course	Credit Points	Credit Distribution		
				L*	P/S*	T/L*
Semester I						
1	MED101	Microeconomic Theory	4	3	1	
2	MED102	Macroeconomic Theory	4	3	1	
3	MED103	Computational Statistics with MS Excel/Power Bi/Stata	2	2		
		Lab: MS Excel/Power Bi/Stata	2			2
4	MED104	Econometrics Analysis	4	3	1	
5	**Elective-I: Any one of the following**		4	3	1	
	MED111	Public Economics				
		Money and Banking				
		Industrial Economics				
6	MED112	*IDE-I: MOOCs	3	3		
Total			**23**	**17**	**4**	**2**
Semester II						
1	MED201	Database for Economics	2	2		
		Lab: Database for Economics	2			2
2	MED202	Applied Econometrics	2	2		
		Lab: Applied Econometrics	2			2
3	MED203	Indian Economy	4	3	1	
4	**Elective-II: Any one of the following**		4	3	1	
	MED211	Financial Economics				
		Health Economics				
		Public Policy Analysis				
5	MED212	*IDE-II : MOOCs	3	3		
6	MED213	CCC-I: Introduction to Artificial Intelligence and Machine Learning	2	2		
		Lab: Introduction to Artificial Intelligence and Machine Learning	2			2
Total			**23**	**14**	**1**	**8**
Semester III						
1	MED301	Data Analytics with R	2	2		
		Lab: Data Analytics with R	2			2
2	MED302	International Economics	4	3	1	
3	MED303	Research Methodology and Data Analysis using SPSS	2	2		
		Lab: SPSS and LaTeX	2			2
4	MED304	Time Series Econometrics	2	2		
		Lab: Time Series Econometrics	2			2
5	**Elective-II: Any one of the following**		4	3	1#	1#
	MED311	Economics of Artificial Intelligence#				
		Insurance Economics				
		Entrepreneurship Development				
6	MED312	IDE-III: MOOCs	3	3		
7	MED313	CCC-II: Building Mathematical Ability and Financial Literacy	4	3	1	
8	MED314	Summer Internship Programme	2			2
Total			**29**	**18**	**2**	**9**
Semester IV						
1	MED401	Data Analytics with Python	2	2		
		Lab: Data Analytics with Python	2			2
2	MED411	Dissertation	16			16
Total			**20**	**2**		**18**
Grand Total			**95**	**51**	**7**	**37**

Note: *As per the choice of the students and the instructor # Lab for MED311 and tutorial for MED312 and MED313
L: Lectures; **P/S:** Presentation/Seminars; **T/L:** Tutorials/Lab

Note: 1. MOOCs are chosen by the student based on the availability of the courses offered on SWAYAM & other related platforms suggested or approved by the Department.
2. The Programme template and the title of the courses are tentative, any changes as required may be made.

M.Sc. Economics and Data Analytics: Semester-wise Credit Distribution

Semester	Total Credits	Cumulative credit at the end of the semester
1	23	23
II	23	46
III	29	75
IV	20	95

- **Required Credit:** The minimum required credit to be earned by the student to award the degree is 95. However, they can earn credits in excess of 91 by taking other courses. The upper limit will be 98 credits.
- **Assessment Pattern:**
  - **Theory Course:** 40% of internal [formative evaluation -- two best out of three tests (for a maximum of 15 marks each = 30 marks) - and seminar/ assignments/attendance (10 marks)] and 60% (summative evaluation - semester end examination).
  - **Lab Components:** 60% of internal exam/lab and 40% (summative evaluation - semester end examination).
- **End Semester Examination:** Maximum Marks: 60 Time: 3 Hours
- **Dissertation/Project Report**: Evaluation: 60 marks and Viva-Voce: 40 marks

SCHOOL OF ARTS, HUMANITIES AND SOCIAL SCIENCES
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M.Sc. Economics and Data Analytics

Important Information to Students

i. Eligibility: A Bachelor's degree in Economics with at least 50% marks in aggregate and at least 50% marks in Economics with Mathematics/Statistics; Or Bachelor's degree with at least 60% marks in aggregate any of the allied subjects viz. Commerce, Statistics, Mathematics, Engineering or any of the Social Sciences subjects with Mathematics/Statistics.

ii. The minimum duration for completion of the programme is four semesters (two academic years) and the maximum duration is eight semesters (four academic years) or as per amendments made by the regulatory bodies from time to time.

iii. A student should attend at least 75% of the classes, seminars, practicals in each course of study.

iv. All theory courses in the programme carry a Continuous Internal Assessment (CIA) component to a maximum of 40 marks and Semester End Examination (SEE) for a maximum of 60 marks. The minimum pass marks for a course is 40%.

v. All lab components carry a Continuous Internal Assessment (CIA) component to a maximum of 60 marks and Semester End Practical Examination (SEE) for maximum of 40 marks. The minimum pass marks for a course in 40%.

vi. A student should pass separately in both CIA and the SEE, i.e., a student should secure 16 (40%) out of 40 marks for theory and 24 (40%) out of 60 marks in the lab components in CIA. A student should secure 24 (40%) out of 60 marks for theory and 16 (40%) out of 40 marks for lab components in the SEE.

vii. There are 3 CIA tests for each course per semester from which the best 2 performances are considered for the purpose of calculating the marks in CIA. A record of the continuous assessment is maintained by the academic unit. A record of the continuous assessment is maintained by the academic unit.

viii. Each CIA contains 15 marks, out of the best 2 tests scores are considered for 30 marks. Out of the remaining 10 marks, 5 marks are awarded for assignments, class presentations and class participation and the remaining 5 marks are awarded for punctuality, and attendance of the student.

Marks for the Attendance will be considered as follows:

S. No	Attendance (%)	Marks
1	95% or more	5
2	90-94%	4
3	85-89%	3
4	80-84%	2
5	75-79%	1

ix. A student failing to secure the minimum pass marks in the CIA is not allowed to take the semester end examination of that course. S/he has to redo the course by attending special classes for that course and get the pass percentage in the internal tests to become eligible to take the end semester examination.

x. Semester-end examination shall consist of objective type questions, descriptive type questions, short answer questions and case studies or any other recommended by the Board of Studies (BoS).

xi. Students failing a course due to lack of attendance should redo the course.

xii. Re-evaluation is applicable only for SEE papers and shall not be entertained for other components such as lab/practical /thesis/ dissertation/ internship etc.

xiii. An on-campus elective course is offered only if 10 or 50% of the students registered, whichever is higher.

SEMESTER WISE DETAILED SYLLABUS

SEMESTER-I

Course Code : **MED101** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Microeconomic Theory**

Course Objectives:

The aim of this course is to:

- Familiarize the students with the economic behaviour of individuals, firms and markets.
- Analyse the various aspects of consumer behaviour, theory of production, price and output determination and theory of general equilibrium.

Course Learning Outcomes:

By the end of the course, students can be able to;

- Understand economic behaviour of individuals, firms and markets.
- Apply mathematical tools and techniques to study behaviour of economic agents.

Course Outline:

Unit-I: [15 Hours]

Theory of Consumer Behaviour: Consumption Decision - Optimisation under alternative preference structures - Utility, indifference curves and revealed preference; Comparative statics of the consumer's decision; Elasticity; Consumer surplus; Utility theory under Uncertainty.

Unit-II: [15 Hours]

Production and Cost Analysis: Production functions; Rate of technical substitution, technical progress, cost functions; economies of scale and scope, profit maximization, cost minimization, Traditional and modern theories of Costs.

Unit-II: [20 Hours]

Market Equilibrium: Perfect Competition; price-controls and shortages; Sources of monopoly power, monopoly market equilibrium, price discrimination, Monopolistic Competition; Oligopoly – non-collusive and collusive oligopoly models.

Unit-II: [10 Hours]

Pricing Principle: Pricing principle - Break-even Analysis - Average or full cost pricing - Mark up pricing - Limit pricing theory - Bains version - Silos - Labini model of limit pricing.

Suggested Reading:

Varian, H. R., *Intermediate Microeconomics: A Modern Approach*, 3rd Edition, 2010.

Walter Nicholson and Christopher Snyder, *Microeconomic Theory - Basic Principles and Extensions*, Cengage India Private Limited, 12th Edition.

References:

Anindya Sen, *Microeconomics Theory and Applications*, OUP India, 2nd Edition.

B. Douglas Bernheim, Michael D. Whinston., *Microeconomics*, McGraw-Hill Companies, Eighth Edition.

David M. Kreps, *A Course in Microeconomic Theory*, Princeton University Press, 1990.

David M. Kreps, *Microeconomic Foundations: Choice and Competitive Markets*, Princeton University Press, 2013.

Hal R. Varian, *Intermediate Microeconomics with calculus*, W. W. Norton & Company, 1st Edition.

Hal R. Varian, *Microeconomic Analysis*, W. W. Norton & Company; 3rd Edition, 1992.

Mas-collel, Whinston and Green, *Microeconomic Theory*. OUP, 1995.

Nicholson, W., *Microeconomic Theory: Basic Principles and Extensions*, South Western Thomson Learning, Eighth Edition, 2002.

Course Code : **MED102** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Macroeconomic Theory**

Course Objectives:

The main aim of this course is to:

- Build the theoretical understanding of Macroeconomics theories.
- Develop analytical skills in understanding Indian Macroeconomic policy.

Course Learning Outcomes:

By the end of the course, students are expected to:

- Understand the implication of the trend of change of macroeconomic variables like income, employment, and prices on an economy.

Course Outline:

Unit-I: [15 Hours]

National Income Accounting: Accounting structure, key concepts in accounting, circular flow of income, computational problems - Expenditure approach, income approach and value added approach for measurement, input-output tables.

Unit-II: [15 Hours]

Theories of Consumption: The Psychological Law of Consumption - Kuznets's Consumption Puzzle - Fisher's Inter-temporal Choice Model - Permanent Income Hypothesis - Life Cycle Hypothesis.

Unit-III: [15 Hours]

Theories of Investment, Demand and Supply of Money: The Neoclassical Theory of Investment - Capital Theory and Theory of the Firm - Finance and the Cost of Capital - The Accelerator Theory of Investment - The Stock Market and Tobin's Q Theory; Baumol Inventory Theory of Money, Quantity Theory of Money, High Powered Money, Money Multiplier.

Unit-IV: [15 Hours]

Neoclassical and Keynesian Macroeconomic Models: Fiscal and Monetary Policy in IS-LM Model, Relative Efficacy, Aggregate Supply and Aggregate Demand, Open Economy Models.

Suggested Readings:

Blanchard, O., and S. Fischer, *Lectures on Macroeconomics*. Cambridge, MA: MIT Press, 1989.
Mankiw, N. Gregory, *Principals of Macroeconomics*. Cengage Learning, 7th Edition 2014.
Samuelson, P. A and Nordhaus. W. D, *Macroeconomics*, McGraw Hill, 2012.

References:

Brian Snowdon and Howard R.Vane, *Modern Macroeconomics: It's Origins, Development and Current State*. Edward Elgar, UK, 2005.
D'souza Errol, *Macroeconomics*. Person Publication, New Delhi, 2008.
David Romer, *Advanced Macroeconomics*. 4th Edition, McGraw-Hill Irwin, 2012.
Dornbuschet. al, *Macroeconomics*. 10th Edition, Tata McGrawHill, New Delhi, 2008.
Obstfeld,M., and K.Rogoff, *Foundations of International Macroeconomics*. Cambridge, MA: MIT Press, 1996.
R.T.Froyen, *Macroeconomics, Theory and policies*, Prentice Hall, 2008.
Scarth, W. *Macroeconomics: An Introduction to Advanced Methods*, Titles on Demand, 2010.
Taylor, Lance, *Reconstructing Macroeconomics - Structuralist Proposals and Critiques of the Mainstream*, Harvard University Press, Cambridge, Massachusetts, 2004.

Course Code : **MED103** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **L 30 T/L 60**	Course Title **Computational Statistics with MS Excel/Power BI/Stata**

Course Objectives:
The course aims to;

- Comprehend fundamental statistical concepts, including data presentation, descriptive statistics, and probability theory.
- Apply various statistical methods for data analysis, including calculating descriptive measures, computing probabilities, and implementing linear regression models.
- Analyze relationships between variables using correlation and regression techniques, and distinguish between different types of probability distributions.
- Evaluate and interpret the results of hypothesis tests and statistical analyses for drawing meaningful conclusions in economic contexts.

Course Learning Outcomes:
By the end of the course, the students will/ able to understand:

- The usefulness of probability distribution and testing of hypothesis in economic decision making.
- Develop computational statistical design/solution for data based problems in research.

Prerequisite: Knowledge in Microsoft Excel

Course Outline:

Unit-I: [25 Hours]

Data Presentation and Descriptive Statistics: Introduction to statistics; Understanding the Data, Tabular and Graphical presentation of data; measures of central tendency, dispersion, skewness, kurtosis and moments; Census, population and sample; Parameters and estimators; Sampling methods and distributions, sampling errors; Point and interval estimates.

Unit-II: [20 Hours]

Probability Theory: Introduction to probability; Approaches to assigning probabilities; Rules for computing probabilities; Contingency tables and tree diagrams; Principles of counting; Bayes' theorem; Random Variable; Discrete and Continuous probability; Probability Distribution, Mathematical Expectation; Discrete Distributions and Continuous Distributions.

Unit-III: [20 Hours]

(A) Correlation and Regression: Introduction to correlation - Correlation coefficient, Karl Pearson's Correlation Coefficient, Spearman's Rank Correlation; Introduction to regression - Simple linear regression, Method of ordinary least square, Multiple regression; **(B) Introduction to Time Series Analysis (C) Introduction to Index Numbers.**

Unit-IV: [25 Hours]

Tests of Hypothesis: Introduction to Hypothesis - Simple versus composite hypothesis, Level of significance in hypothesis testing and critical region; Type-I and type-II error and Power of a test; Hypothesis test based on z, t, F and $\chi 2$ statistic; Goodness-of-fit test- Analysis of variance; The analysis of contingency tables (Chi-square test for testing independence of two classification criteria).

Suggested Readings:

Anderson, Sweeney and Williams, *"Statistics for Business and Economics"*, Cengage India, 11th Edition, 2011.
Bluman, Allan G, *"Elementary Statistics: A Step By Step Approach"*, Boston: McGraw-Hill, 11th Edition, 2022.
Gupta, S. C., "*Fundamentals of Statistics"*, Sultan Chand and Sons, New Delhi, 2020.

References:

Ken Black, "*Business Statistics"*. John Wiley, student edition, 2004.
Ross, S. M, "*Introduction to Probability Models*" Academic press, 2014.
Allen Webster, "*Applied Statistics for Business and Economics"*. McGraw-Hill International Edition, 1998.
Clark, Megan J. and John A. Randal, "*A First Course in Applied Statistics"*. Pearson Education, New Zealand, 2011.
Hogg, R. and A. Craig, J., "*Introduction to Mathematical Statistics"*, McGraw-Hill, 1965.
Levin R.I, "*Statistics for Management"*. Prentice hall Inc, Paperback, 2008.
Mood, Graybill and Boes, "*Introduction to the Theory of Statistics"*, McGraw-Hill, 1974.
Nagar, A. L. and R. K Das, *Basic Statistics*, Oxford University Press, 1983.

Course Code : **MED104** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Econometric Analysis**

Course Objectives:

The aim of the course is to:

- Introduce the basic econometric tools for data analysis.
- Understand the methods of econometric analysis and their application in empirical research.

Course Learning Outcomes:

By the end of the course, students will be able to;

- Learn classical linear regression model, statistical inference in regression model, problems in regression and uses of dummy variables and estimation with independent and limited dependent dummy variables.

Course Outline:

Unit-I: [15 Hours]

The Linear Regression Models: Bi-variate and multi-variate linear regression models, CLRM assumptions, Ordinary Least Squares estimation, Properties of OLS and the Gauss- Markov theorem; Hypothesis testing, goodness of fit; matrix approach to linear regression models.

Unit-II: [15 Hours]

Functional Forms of Regression Models: Choice of functional forms-Log-linear, Double log and lin-Log models, Reciprocal and polynomial models, Choice of functional form, Interpreting coefficients in different functional forms and applications, Specification error and tests for specification error.

Unit-III: [20 Hours]

Relaxation of CLRM Assumptions and Problems in Regression: Violation of CLRM assumptions and its consequences, detection and remedial measures of multicollinearity, heteroskedasticity and autocorrelation.

Unit-IV: [10 Hours]

Maximum Likelihood Estimation: Introduction to binary and limited dependent variable, Limitation of the linear probability model(LPM), Method of maximum likelihood estimation and its properties (including consistency), Probit and Logit models, Multinomial models.

Suggested Readings:

Greene, William H, *Econometric Analysis*, Prentice Hall, 6th Edition, 2008.

Gujarati, D and Porter, *Basic Econometrics*, McGraw Hill/Irwin, 5th Edition 2009.

Johnston J. and DiNardo, J, *Econometric Methods*, McGraw-Hill, 4th Edition 1997.

References:

Christopher Dougherty, *Introduction to Econometrics.* Oxford University Press, 3rd Edition, Indian edition, 2007.

G. S. Maddala, *Introduction to Econometrics*. Wiley Publishers, 4th Edition, Indian Edition, 2009.

Ramanathan, Ramu, *Introductory Econometrics with Applications*, Thomson Asia Pvt Ltd., Singapore, 5th Edition, 2002.

Stock, James H., and Mark W. Watson, *Introduction to Econometrics*, Addison-Wesley Series in Economics, Second Edition 2006.

Wooldridge, J., *Introductory Econometrics*: *A Modern Approach*. Nelson Education, 2015.

Course Code : **MED111** Course Type : **Elective-I** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Public Economics**

Course Objectives:

The main objective of this course is to:

- Gain a comprehensive understanding of government interventions in improving efficiency and provision of public goods and improving efficiency.
- Develop the ability to critically evaluate public policies related to taxation, expenditure, and redistribution.
- Equip students with the analytical tools and knowledge needed to make informed decisions and recommendations about public finance and policy.

Course Learning Outcomes:

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

- Understand critically the role of Government in market mechanism
- Critically analyze and explain the rationale behind various government interventions in the economy, including the provision of public goods
- Assess the economic impact of different types of fiscal policies, including taxation and expenditure programs.
- Understand the status social welfare and security in the economy
- Apply theoretical frameworks and empirical evidence to formulate well-founded policy recommendations for addressing contemporary public economic issues

Course Outline:

Unit-I: [15 Hours]

Public Economics: Role of government, mixed economy, Market failure, externalities, Fundamental principle of public finance; Indian tax system; Revenue of the Union, State and local bodies; Direct and Indirect taxes; Tax and non-tax revenue, Principle of taxation.

Unit-II: [15 Hours]

Public Expenditure: Trends in Public expenditure, Causes and effects of Public expenditure - Theories of public expenditure, Social Security; income distribution and welfare programs; welfare policies in the India.

Unit-III: [15 Hours]

Public Debt: Sources and importance of public borrowing, effects of public debt, tax vs. debt, burden of public debt, Methods of debt redemption, trends and pattern of public debt in India, issues in public debt management.

Unit-IV: [15 Hours]

Budgetary Policy and Fiscal Federalism: Indian Budget policy and types of budgets – Zero based budget, budget as an instrument of economic policy, Objectives of fiscal policy and monetary policy; Fiscal federalism in India; Resource transfer from Union to States, Centre-State financial relation.

Suggested Readings:

Gruber, J, *Public Finance and Public Policy*, Worth Publishers, 5th Edition, 2016.
Musgrave, R.A. and P. B. Musgrage, *Public Finance in Theory and Practice*. McGraw Hill, Tokyo, 2017.
Rosen, H. and Gayer, T, *Public Finance*, McGraw-Hill, 10th Edition, 2014.

References:

Atkinson, A and Stiglitz, J, *Lectures in Public Economics*. McGrawHill, New Delhi, 1980
Auerbach, A., Chetty, R., Feldstein M. and Saez, E, *Handbook of Public Economics*. Vol. 5, 2013.
Cullis, J. and P. Jones, *Public Finance and Public Choice*, OUP, 2nd Eedition, 1998.
D K Srivastava, *Issues in Indian Public Finance*, New Century Publications, Delhi, 2005.
Goode, R, *Government Finance in Developing Countries*. TMH, New Delhi, 1986
Government of India: Ministry of Finance, Budget Documents, various years.

Course Code : **MED111** Course Type : **Elective-I** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Money and Banking**

Course Objectives:

The objectives of this course are to

- Provide an understanding on operation of monetary forces, evolution of money, and development banking and banking sector reforms.

Course Learning Outcomes:

- The learners will get an information and understanding about Indian banking system.
- The learners will learn in detail about the operation of monetary forces through multitude of channels - market, non-market, institutional and money market.

Course Outline:

Unit-I: [15 Hours]

Introduction: Concept of money and its functions – Role of money: Monetary policy, output stabilization and inflation control; Role of banks for the economy: Financial intermediation, Commercial banks, RRB and NBFCs.

Unit-II: [15 Hours]

Demand and Supply of Money: Quantity theory of money, Supply of Money: Central bank, money-multiplier and money supply; Empirical analysis of money demand and money supply with special reference to India

Unit-III: [15 Hours]

Reserve Bank of India and its Monetary Policy: Overall monetary policy framework –instruments, targets and objectives – transmission mechanism: Money versus credit view –channels of monetary transmission; Adoption of Inflation Targeting by RBI.

Unit-IV: [15 Hours]

Banking Supervision and Regulation in India: Supervisory role of RBI – CAMELS - Management of credit risk, market risk and operational risk; Incidence of high NPAs of banks in India in recent years.

Suggested Readings:

Mishkin, Frederic, *The Economics of Money, Banking, and Financial Markets*, Pearson Addition Wesley, New York, 7th Eedition, 2008.

Pierce D.G. and P.J. Tysome, *Monetary Economics: Theories*, Evidence and Policy, 2nd Edition, Butterworths, London, 1985.

References:

Enoch, Charles and John H. Green (ed.) *Banking Soundness and Monetary Policy: Issues and Experiences in the Global Economy*, International Monetary Fund, 1997.

Reserve Bank of India: *Report on Currency and Finance*, various issues.

Samantaraya, Amaresh, *Conduct of Monetary Policy in India: Changing Dimensions in the Post-reform Period*, TR Publications, Chennai, 2015.

Course Code : **MEC111** Course Type : **Elective-I** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Industrial Economics**

Course Objectives:

- To provide an introduction to theory and empirical work in Industrial Economics.
- To analyze various aspects of strategic interaction between firms and the determinants of industrial structure.
- Discusses the role of policy in the context of competition and industrial policies and regulation.

Course Learning Outcomes:

By the end of this course students can be able to:

- Analyze and interpret deals the concepts of industry, market product, industrial locations and industrial marketing and various aspects of strategic interaction between firms and the determinants of industrial structure.

Course Outline:

Unit-I: [15 Hours]

Organizational Form Structure and Productivity: Organizational forms- Types and choice of form of organization; Business motives –Market structure: Seller's Concentration; Product Differentiation; Profitability; Nature and Innovation – Industrial Productivity-Measurement and factors of productivity.

Unit-II: [15 Hours]

Theories of Industrial Location and Pattern: General determinants of industrial location; Approaches to industrial location analysis: -Alfred Weber's theory; Sergeant Florence's theory of industrial location, - Need for balanced regional development of industries; Government policy and approach for the development of backward regions in India.

Unit-III: [15 Hours]

Indian Industrial Growth and Labour: Industrial policy in India - Role of Public and private sectors; recent trends in Indian industrial growth; policies and program for the development of Micro, Small Medium enterprises (MSME) in India. Industrial labour- Problems, policies, and reforms in India; Industrial legislation and social security measures in India.

Unit-IV: [15 Hours]

Industrial Finance: Importance of finance to industrial development, Owned, and external funds for industrial development; Role, and types of institutional finance- Role of IFCI, IDBI, SIDBI, MSFC,ICICI, SFCs, SIDC, commercial banks, etc., in industrial development, trend and problems of industrial finance in India.

Suggested Readings:

AhluwaliaI.J., *Industrial Growth in India*, Oxford University Press, New Delhi, 1985.
Barthwal, R.R., *Industrial Economics*, Wiley Eastern Ltd., New Delhi, 1985.
Cherunilam, F., *Industrial Economics - Indian Perspective*, Himalaya Publishing House, Mumbai, 3rd Edition, 1994.

References:

Cabral, L.M.B., Introduction to Industrial Organization, MIT Press, 2nd Edition, 2017.
Belleflamme, P., Peitz, M. ,*Industrial Organization. Markets and Strategies,* CUP, 2nd Edition, 2015.
Hay,DA and Morris DJ, *Industrial Economics: Theory and Evidence*, OUP, New Delhi, 1979.
Divine, P.J. et.al., *An Introduction to Industrial Economics*, George Allenand Unwin Ltd., London, 1976.
Barthwal, R.R, *Industrial Economics*, Wiley Eastern limited, New Delhi, 1985.
Seth R, *Industrial Economics*, Ane Books Pvt Ltd, 2010.
Reserve Bank of India, *Special Issues on Industry and Government of India, Economic Survey* (Annual).
Sai Singh, A. and A.N. Sadhu., *Industrial Economics*, Himalaya Publishing House, Bombay 1988.

SEMESTER-II

Course Code : **MED201** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **L 30 T/L 60**	Course Title **Database for Economics**

Course Objective:
The course aims to;

- Comprehend the fundamental concepts of databases, their importance in economic research, and the role of SQL in managing economic data.
- Install, set up, and effectively utilize Database Management Systems (DBMS) to create, manage, import, and export economic datasets.
- Analyze and manipulate complex economic data by applying advanced SQL techniques, including JOIN operations, aggregation, filtering, subqueries, and analytical functions.
- Evaluate and optimize SQL queries for efficient data retrieval and perform basic database design and administration tasks.
- Develop strategies for accessing and integrating economic data from various online databases and APIs using SQL.

Course Learning Outcomes:
After completion of the course, students can be able to:

- Build conceptual data models for a variety of economic research and development
- Use different database modeling and design techniques for data analysis.
- Develop a working database application using a DBMS software for data analysis.

Course Outline:

Unit-I: [20 Hours]

A. Introduction to Databases for Economics: Overview of databases and their importance in economic research; Types of databases: Relational, NoSQL, etc. **B. SQL Fundamentals for Economic Data Management:** Understanding SQL and its role in querying databases; Basic SQL commands: Retrieving and manipulating economic data using SQL queries

Unit-II: [25 Hours]

Database Management Systems (DBMS) for Economic Data: Introduction to popular DBMS systems (e.g., MySQL, PostgreSQL, SQLite); Installation and setup of a DBMS environment; Creating and managing databases and tables for economic datasets; Importing and exporting economic data into/from the DBMS; Database security and privacy; Database design and administration.

Unit-III: [25 Hours]

Advanced SQL Techniques for Economic Analysis: Working with multiple tables: JOIN operations; Aggregating data using GROUP BY clause; Filtering grouped data using the HAVING clause; Subqueries and Common MySQL functions relevant to economic analysis; Analytical functions and window functions in MySQL; MySQL optimization: indexing, query plan, and execution time.

Unit-IV: [20 Hours]

Accessing and Analyzing Economic Databases: Introduction to economic databases and data sources (e.g., FRED, World Bank, IMF); Exploring available economic datasets and APIs; Accessing economic data using SQL queries.

Suggested Readings:

Martin Fowler and Pramod Sadalage, *NoSQL Distilled: A Brief Guide to the Emerging World of Polyglot Persistence*, Addison-Wesley Educational Publishers Inc; 1st Edtition, 2012.

Raghu Ramakrishnan, *Database Management Systems*, McGraw Hill Education; 3rdEdt, 2002.

Thomas Nield, *Getting Started with SQL*, O'Reilly Media publishers, 1st Edition, 2016.

References:

Allen G. Taylor, *SQL All-in-One for Dummies*, John Wiley & Sons; 2nd Eedition, 2011.

Ben Forta, *SQL in 10 Minutes*, Sams Publishing; 4th Eedition, 25 October 2012.

Hector, Jeff, and Jennifer, *Database Systems: The Complete Book*, Pearson; 2nd Edition, 4 September 2008.

Peter Rob, *Database Principles: Fundamentals of Design, Implementations and Management*, Cengage Learning; 2nd Edition, 2013.

Redmond, E. and Wilson, J. *Seven Databases in Seven Weeks: A Guide to Modern Databases and the NoSQL movement* (1st Ed.). Raleigh, NC: The Pragmatic Programmers, LLC, 2012.

Course Code : **MED202** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **L 30 T/L 45**	Course Title **Applied Econometrics**

Course Objectives:

The objectives of this course are to:

- Teach students how to apply econometric techniques to analyze real-world economic data and test economic theories.
- Help students interpret econometric results accurately and draw meaningful conclusions from empirical analyses.
- Equip students with the skills to design and conduct empirical research studies in economics, including formulating hypotheses, collecting data, and estimating econometric models.

Course Learning Outcomes:

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

- Develop the ability to use appropriate econometric methods, such as regression analysis, time series analysis, and panel data analysis to economic datasets.
- Apply econometric techniques to solve real-world economic problems, such as estimating the impact of policy interventions or forecasting economic trends.

Course Outline:

Unit-I: [15 Hours]

Fundamental Concepts, structure of economic data, basics of data handling, Classical Linear Regression Model: Estimation, Hypothesis testing, interpretation; Economic Applications.

Unit-II: [15 Hours]

Violating assumptions of Classical Linear Regression Model: Multicollinearity, Heteroskedasticity, Autocorrelation, Misspecification - detection, solution, Economic Application.

Unit-III: [20 Hours]

Dummy variable and Limited Dependent Variable Regression Model: use of dummy variable (intercept and coefficient), test for structural stability; Linear Probability Model, Logit, Probit and Tobit Models –Estimation and Interpretation; Economic Application.

Unit-IV: [25 Hours]

Time Series Econometrics: Autoregressive Time Series Models, Box–Jenkins Methodology, the ARCH–GARCH Models; Vector Autoregressive (VAR) Models and Causality Tests; Non-Stationarity and Unit-Root Tests; Cointegration and Error-Correction Models; Identification in Standard and Cointegrated Systems; Economic Applications.

Suggested Reading:

Mills, Terence C., and Kerry Patterson. *Palgrave Handbook of Econometrics,* Volume 2: Applied Econometrics. Palgrave Macmillan, 2009.

Reference:

Asteriou, Dimitrios, and Stephen G. Hall. *Applied Econometrics*. London: Palgrave Macmillan, 2011.
Studenmund, A.H. *Using Econometrics: A Practical Guide*. England: Pearson Education Limited, 2014.

Course Code : **MED203** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Indian Economy**

Course Objectives:

- Main objective of this course is to provide a detailed analysis of the modern history of various sectors of the Indian economy.

Course Learning Outcomes:

After completion of the course student can be able to:

- Understand the structure of Indian Economy with sectoral comparison.
- Understand the various development indices associated with the development of the economy.
- Understand the Indian economy and help them to prepare for competitive exams.
- Evaluate the effectiveness of various government programmes and propose alternative policy Directions.
- Understand social Infrastructure and social security measures in India
- Understand India's international trade and with international organizations

Course Outline:

Unit-I: [15 Hours]

Structure of Indian Economy: Features of Indian Economy-Demographic, Development indices, Inequality, Poverty, Unemployment, Inflation, Healthcare system, Education; Trends in National Income Growth and Structure. **(B) Sectoral comparison of Indian Economy:** Agriculture- Growth and issues, Industry-Performance, problems and prospects, Service Sector- Growth and performance.

Unit-II: [15 Hours]

Planning and Economic Development: Economic Planning in India; Five Year Plans; Planning commission v/s NITI Ayog; Industrial Policies in India - New Economic Policy; Make in India – Start-ups - MSMEs – Industry 4.0.

Unit-III: [15 Hours]

Social Infrastructure and Social Security: Social security measures in organized and unorganized sector; Pension; Health and medical insurance; disability benefits; Maternity benefits; Poverty alleviation schemes; Distribution; Housing; Food Security Act.

Unit-IV: [15 Hours]

India and Foreign Trade: India's foreign trade value composition and direction; Balance of payment since 1991; Foreign capital flow; WTO and India; Impact of Global financial crisis.

Suggested Readings:

V. K. Puri S. K. Misra, Indian Economy, 39th Edition, Himalaya Publishing House, 2021.

Agarwal, A. N. Indian Economy. Vikash Publishing Co. Delhi, (Latest Edition).

Datt, R. and K. P. M. Sundaram Indian Economy. S. Chand and Co. New Delhi, (Latest Edition).

References:

J Bhagwati and TN Srinivasan, *India's Economic Reforms* 1993.

Arvind Panagariya. *India's Trade Reform*. India Policy Forum, 2004.

François Bourguignon, *The Globalization of Inequality*. Princeton University Press, 2015.

Gupta, S.B. (Latest Edition): *Monetary Planning in India*, Oxford University Press, Delhi, (Latest Edition).

Jean Dreze and Amartya Sen, *An Uncertainty Glory: India and its Contradictions.* PUP, 2013.

Uma Kapila, *Indian Economy Performance and Policies*, 22nd Edition, Academy Foundation, 2021-22.

Indira Dutta and Vinod Sen, *Contemporary issues of India* (Latest Edition)

Uma Kapila, *Indian Economy since Independence A comprehensive and critical analysis of India's economy*, 1947-2021, 32nd Edition 2021-22

S.P. Singh, *Agricultural Economics*, 2021

Economic Survey (Latest)

Course Code : **MED2I1** Course Type : **Elective-II** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Financial Economics**

Course Objectives:

The objectives of this course are to:

- Provide a comprehensive understanding of the functioning of financial markets in the emerging context of regulation and globalization of markets.
- Equip the students with the tools and technical apparatus necessary to analyze financial markets and financial institutions.

Course Learning Outcomes:

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

- Familiar with the basic economic and financial economic concepts necessary to understand the functioning of the financial institutions / markets, and public systems.

Course Outline:

Unit-I: [15 Hours]

Introduction to Financial Markets: Definition & Functions of Financial Markets, Classification of Financial Markets, Money Market, Capital Market and Instruments, Credit Rating, Introduction to Ratio Analysis.

Unit-II: [15 Hours]

Securities and Equity Price: The supply of securities; Corporate securities, capital asset pricing model, Introduction to Mutual Funds**,** Role of Mutual Funds in Financial Markets, Advantages; Disadvantages of Mutual Funds Types of Mutual Funds Mutual Fund & AMFI.

Unit-III: [15 Hours]

Derivative Market: Introduction to Derivatives, Concept of Derivatives, Importance of Derivatives in Financial Markets, Participants in the Derivatives Market, Types of Derivatives, SEBI Guidelines for Derivatives Trading in India.

Unit-IV: [15 Hours]

Financial Market Regulations: Importance of Regulations in Financial Markets Objectives of Financial Market Regulations, Role of Government & Regulatory Bodies, Key Financial Regulators in India, Ethics in Finance. Securities Contract Regulation Act

Suggested Readings

Campbell, J.Y, A.W. Lo and A.C. Mackinlay, *The Econometrics of Financial Markets*. PUP, 1997.
Chandra, P, *Financial Management: Theory and Practice*. Galgotia Publishers, 1999.

References:

Benninga, S, *Financial Modelling*. MIT Press, 1997.
Bhole, L.M, *Financial Institutions and Markets: Structure, Growth and Innovation*. Tata McGraw-Hill Publishing Company Limited, New Delhi, 1991.
Black, F, M.C. Jenson and M.A. Scholes, *"The Capital Pricing Model: Some Empirical Tests"*, in M.C. Jenson (ed.) Studies in the Capital Markets, Praeger, New York.
Brahmaiah, B. and P. Subba Rao, *Financial Futures and Options*, Himalaya Publishing House, Mumbai, 1998.
Chi-Fu Huang and R.H. Litzenberger, *Foundations for Financial Economics*. North Holland, New York, 1988.
Damodharan, Aswath, *Corporate Finance Theory and Practice*, John Wiley and Sons, 1997.
E. J. Elton and M. J. Gruber, *Modern Portfolio Theory and Investment Analysis*, Wiley, London.
Eicjberger, Jurgen and I R Harper, *Financial Economics*. Oxford University Press, 1997.
Grainblatt, M. and S. Titman, *Financial Markets and Corporate Strategy*. McGraw Hill International edt., 1998.

Course Code **: MED211** Core/Elective **: Elective-II** No. of Credits **: 4.00** No. of Hours : **60**	Course Title **Health Economics**

Course Objective:

- To enable the students to understand how scarce healthcare resources are allocated among competing interventions and among groups in society.
- Students can explore the basic concepts and practical issues faced by decision makers at all levels in the health system in allocating scarce resources.

Course Learning Outcomes:

The students will be able to

- Equip with analytical reasoning and tools of health economics and their normative foundations and ethical implications.
- Use economic models to understand behaviors of actors in the health care sector
- Undertake economic evaluation in healthcare, with an emphasis on identifying, measuring, valuing and analyzing health outcomes and costs.

Course Outline:

Unit-I: [15 Hours]

Health and Economic Development: The state and scope of health economics, Human Capital and health, Health dimensions of development; dual Relationship between Health and Economic Status, Determinants of health: Poverty, Malnutrition and Environmental quality, Components of economic appraisal of health programme.

Unit-II: [15 Hours]

Costs and Benefits of Health Services: Private benefits and costs of providing health services, the failure of the market to provide essential health services, the provision of health services by the government. Application of cost benefit analysis to public health and family planning projects, benefits and costs (both private and social) of training to professional manpower in health sector.

Unit-III: [15 Hours]

Health and Human Capital: Health as human capital approach: measurement of mortality: value of statistical of life, years of life lost; morbidity valuation: Cost of illness, Burden of disease: Meaning and significance.

Unit-IV: [15 Hours]

Disability-adjusted life years (DALYs): The DALY framework: Components and postulates, Disability-adjusted life years (DALYs) versus Quality-Adjusted Life Year (QALY), the Global Burden of Disease (GBD) assessment, Burden of Disease (BD) and Disability-adjusted life years (DALY): A critical appreciation. Health Accounting: National health accounts and Health expenditure efforts.

Suggested Readings:

Anthony J. Cuyler and Joseph P, Handbook of Health Economics, Newhouse North Holland, e. d. Elsevier Science, 2000.

References:

Clewar, Ann, and David Perkins. *Economics of Health Care Management*. London Prentice Hall, 1998.

Folland, Sherman, Allen Goodman, and Miron Stano, *The Economics of Health and Health Care*, New York: MacMillan, 3rd Edition, 2001.

Sherman Folland, Allen C. Goodman, and Miron Stano, *The Economics of Health and Health*, 2004.

William, Jack, *Principles of Health Economics for Developing Countries*. WB Institute Development Studies, 1999.

World Development Report, *Investing in Health*. The World Bank, 1993.

Bhattacharya, J., Hyde, T., Tu, P, *Health Economics*, Palgrave Macmillan, 2014.

World Health Organisation, *The economics of the social determinants of health and health inequalities: A resource book.* World Health Organisation, 2013/Latest.

Course Code : **MED211** Course Type : **Elective-II** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Public Policy Analysis**

Course Objectives:
The course has been designed to enable the students to:

- Recognize the theoretical and empirical tools required for policy design and evaluation.
- Create policy reports using case studies and real-world examples by analysing economic tools.

Course Learning Outcomes:
On successful completion of this course, students can be able to:

- Get detailed information on economic policy and analysis and a critical awareness of the latest developments in professional practice.
- Understand major economic policy debates and a systematic understanding of the theoretical and empirical dimensions of the international economic environment.

Course Outline:

Unit-I: [15 Hours]

A. Introduction to Policy Analysis: Meaning and Definition - Public Policy - Basic Concepts and Theoretical Background for Policy Analysis: **B. Macroeconomic Policies and their impact:** Macro Economic Policies and Development Role of Monetary and Fiscal Policies in Developing Countries - Financial Policy - Inflation and Economic Development - Resources Mobilization, Impact of WTO: TRIPs, TRIMs, & GATS.

Unit-II: [15 Hours]

Agriculture policies and performance in India: National Policies on Agriculture - Agriculture Policy Vision 2020 - Subsidies - Minimum Support Prices - Public Distribution System - Terms of Trade in Agriculture - Agricultural Policy in the Context of WTO - Impact of Agricultural Policy on Agricultural Sector. Agriculture: policies and performance; production and productivity; credit; labour markets and pricing; land reforms; regional variations.

Unit-III: [15 Hours]

Industrial policies and performance in India: Industrial Policy: Industrial Policy in India since Independence - Industrial Licensing Policy – LPG- New Economic Policy - Impact of Policy Changes on Industrial Production - Structural Changes - Corporate Social Responsibility (CSR). Industry: policies and performance; production trends; small scale industries; public sector; trade and foreign investment policy, labour regulation.

Unit-IV: [15 Hours]

Social Sector Policies in India Population Policies: Demographic Dividend - Population Policy 2000 - Poverty and Unemployment Policies - MGNREGA - Unorganised Sector Labour Policies - Health Policies. Education Policies & Right to Education (RTE) - Food Security and Right to Food - Right to Employment - Right to Information - MDGs and SDGs.

Suggested Readings:

Acharya Shankar, *India's Economy: Some Issues and Answers*, Academic Foundation, New Delhi, 2003.
Anthony E. Boardman, et. al., *Cost Benefit Analysis: Concepts and Practice*, Englewood Cliffs, New Jersey, 2001.
Bhagwati, J., Panagariya, A. *A multitude of labor laws and their reforms. in India's tryst with destiny*. CB, 2012.

References:

Bardach,, *A Practical Guide for Policy Analysis: The Eightfold Path to More Effective Problem Solving*, W. D.C., 2011.
Chanda, R., *Services Led Growth*. In K. Basu, A. Maertens (eds.): New Oxford companion to economics in India. OUP, 2012.
David L. Weimer and Aidan R. Vining, *Policy Analysis: Concepts and Practice*, Englewood Cliffs, New Jersey, 2010.
DuttRuddar, and K. P. M.Sundaram, *Indian Economy*, S. Chand and Company, New Delhi, 2004.
Dye, T. (2013) *Understanding Public Policy*, Englewood Cliffs, NJ, Prentice Hall.
Hanson., and Kathuria, *India-A Financial Sector for the Twenty-First Century*, World Bank, (Edt) OUP, 2001.
HanumanthaRao C. H., *Agriculture, Food Security, Poverty Environment - Essays on Post Reform India*, OUP, 2006.
Kapila Uma, *Indian Economy since Independence*, Academic Foundation, New Delhi, 2015.
Misra S.K. &V.K. Puri, *Indian Economy-Its Development Experience*, Himalaya Pub., House, Mumbai, 2011.

Course Code : **MED213** Course Type : **CCC-I** No. of Credits : **4.00** No. of Hours : **L 30 T/L 60**	Course Title **Introduction to Artificial Intelligence and Machine Learning**

Introduction:

The course "Introduction to Artificial Intelligence (AI) & Machine Learning (ML)" is designed to provide postgraduate students with a comprehensive foundation in two crucial domains: AI & ML by using Python programming. This interdisciplinary course aims to equip students with fundamental conceptss and practical skills that are increasingly valuable in today's technology-driven world.

Course Objectives:

- To familiarize students with the fundamental concepts, theories, and applications of artificial intelligence. Students will gain insight into the various subfields of AI, such as machine learning, natural language processing, computer vision, and robotics.
- To introduce students to the basics of Python programming, enabling them to write code, solve problems, and understand programming constructs. This objective emphasizes building a programming foundation as a prerequisite for implementing AI algorithms.

Learning Outcomes:

After completion of the course, students will be able to:

- Students will have a clear understanding of the fundamental concepts and terminology of Artificial Intelligence, enabling them to discuss and comprehend AI-related topics.
- Students will be proficient in writing Python programs, understanding syntax, and applying programming constructs. This skill set will serve as a solid foundation for further programming endeavours.

Course Outline:

Unit-I: [15 Hours]

Introduction to Artificial Intelligence: Definition – Future of Artificial Intelligence - Characteristic of Intelligent Agents – Typical Intelligent Agents –Problem Solving Approach to Typical AI problems. Problem solving by Searching: Uninformed and informed strategies and implementation; Path planning; Constraint Satisfaction Problems (CSP).

Unit-II: [20 Hours]

Knowledge Representation: Logical Agents– Propositional and first order Predicate logic-inference– Knowledge representation and Automated Planning– Uncertain Knowledge and Reasoning: Quantifying uncertainty– probabilistic reasoning;

Unit-III: [25 Hours]

Machine learning & AI Applications: Machine learning basics - Learning from examples - forms of learning (supervised, unsupervised, reinforcement learning) – simple models (linear & logistic regression) - Deep Learning AI applications: Natural Language Processing - Language Models – Machine Translation; Speech Recognition; Computer Vision - Image classification.

Unit-IV: [15 Hours]

Python Programming: Introduction-The Python Programming Language, History, features, Installing Python, Running Python program, Debugging: Syntax Errors, Runtime Errors, Semantic Errors – Experimental Debugging, Formal and Natural Languages, The Difference between Brackets, Braces, and Parentheses. Variables and Expressions Values and Types– Variables, Variable & Keywords Type conversion – Operator and Operands – Expressions–Interactive – Mode and script Mode, Order of Operations. Conditional Statements: if, if- else, nested if –else -Looping: for, while, nested-loops. Control statements: Terminating loops, skipping specific conditions.

Unit-V: **[15 Hours]**

Functions: Function Calls, Type Conversion Functions, Math Functions, Adding New Functions, Definitions and Uses, Flow of Execution, Parameters and Arguments, Variables and Parameters. Strings: Strings, String Slices, Strings are immutable, and Searching–Looping–and counting String methods – the in operator–String Comparison – String operations Lists: Values and Accessing Elements, Lists are mutable, traversing a List, Deleting elements from List–, Built-in List Operators, Concatenation, In Operator, Built-in List functions and methods.

Suggested Reading:

M.Tim Jones, "*Artificial Intelligence: A Systems Approach* (Computer Science)", Jones and Bartlett Publishers, Inc.; 1st Edition, 2008.

Burkahard A Meier*, Python GUI programming Cook book*-, Packt Publication 2nd Edition.

S.Russell and P.Norvig, "*Artificial Intelligence: A Modern Approach"*, PrenticeHall, 4th Edition 2022.

References:

Barry, P. (2016). *Head first Python: A brain-friendly guide*. O'Reilly Media, Inc. 2016

Lutz, M. (2013). *Learning python: Powerful object-oriented programming*. O'Reilly Media, Inc. 2013

Lavika Goel, *Artificial Intelligence: Concept and Applications*, Willy, 2021

Nils J. Nilsson, "*The Quest for Artificial Intelligence*", Cambridge University Press, 2009.

SEMESTER-III

Course Code : **MED301** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **L 30 T/L 60**	Course Title **Data Analytics with R**

Course Objective:
The course aims to;

- Comprehend R programming fundamentals and data import methods.
- Apply R for data transformation, manipulation, and visualization.
- Analyze economic data using R for descriptive statistics, correlation, bivariate analysis, and hypothesis testing.
- Evaluate and interpret econometric model performance (regression, trees, forests).
- Develop R-based econometric and time series models for prediction and decision-making, including basic machine learning.

Course Learning Outcomes:
On completion of the course, students can be able to:

- Analyze data by using R Programme.
- Handle big datasets to generate valid inferences.

Course Outline:

Unit-I: [20 Hours]

A. Introduction to R programming: Overview of R programming, Environment setup with R Studio, R commands, variables and data types, control structures, R packages; **B. Reading and getting data into R (External Data):** Using csv files, xml files, web data, json files, databases, excel files; Data transformation, data integration and manipulation; Working with R charts and graphs.

Unit-II: [25 Hours]

Statistical Analysis in using R: Descriptive statistics: mean, median, mode, variance, etc.; Correlation analysis and heatmaps; Univariate and bivariate analysis; Probability Theory; Hypothesis testing: t-tests, chi-square tests, ANOVA, etc.; Confidence intervals and p-values; non-parametric tests; Interpreting statistical results.

Unit-III: [25 Hours]

Econometric Modelling in R: Linear regression: simple and multiple regression; Logistic regression for classification; Decision trees and random forests; Model evaluation metrics: R-squared, MAE, RMSE, accuracy, precision, recall, etc.; Model assumptions and diagnostics; Overfitting, underfitting and model selection using caret and glmnet; Prediction and decision making.

Unit-IV: [20 Hours]

Time Series Analysis Using R: Time series components: trend, seasonality, noise; Decomposition techniques; Time series modelling in R; Time series forecasting methods: moving average, ARIMA, exponential smoothing; Brief introduction to machine learning using R using mlr and h2o.

Suggested Readings:

An Introduction to R, Notes on R: *A Programming Environment for Data Analysis and Graphics*. W. N. Venables, D.M. Smith and the R Development Core Team.Version3.0.1 (2013-05-16). URL: https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf

Reference:

Dunlop et, al. *Statistics and Data Analysis: From Elementary to Intermediate*. Prentice Hall, 2000.
G Casella and R. L. Berger, *Statistical Inference*, Thomson Learning 2002.
Hastie, Trevor, et. al., *The elements of statistical learning*. Vol. 2.No. 1. New York: springer, 2009.
Jared P Lander, *R for Everyone: Advanced Analytics and Graphics*, Pearson Education, 2013
Joseph F Hair, William C Black et. Al., *"Multivariate Data Analysis"*, Pearson Education, 7th Edition, 2013.
Mark Gardener, *"Beginning R - The Statistical Programming Language"*, John Wiley & Sons, Inc., 2012.
Michael Berthold, David J. Hand, *Intelligent Data Analysis*, Springer, Latest Edition.
Montgomery, et. al. *Applied statistics and probability for Engineers*. John Wiley & Sons, 2010.
P. Dalgaard. Introductory Statistics with R, 2nd Edition. (Springer 2008)
W. N. Venables, D. M. Smith and the R Core Team, "*An Introduction to R.*" 2013.

Course Code : **MED302** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **60**	Course Title **International Economics**

Course Objectives:

The main aims of this course are to:

- Provide an understanding of theories of international trade, trade policies, balance of payments, international institutions, economic integration and Trade Policies in India.
- Improve the analytical skills of the students to relate theory with current trade affairs.

Course Learning Outcomes:

After completion of the course, students can able to:

- Develop a strong theoretical background of international trade.
- Interpret the empirical aspects such as international trade reforms and their impact on Indian economy.

Course Outline:

Unit-I: [15 Hours]

Introduction to Trade: Absolute Advantage, Comparative Advantage: Trade, Growth, and Economic Interrelatedness; Trade and National Characteristics, the Structure of Trade, Gains from trade with homogenous and heterogeneous agents, Offer curves: Equilibrium Terms of Trade.

Unit-II: [15 Hours]

Trade Theories: Hecksher-Ohlin model, Stolper-Samuelson, Rybcznski theorem and factor-price equalization theorem, Leontief paradox; Tariffs and welfare dynamics for small and large countries perspective; Tariffs versus quantitative restrictions; the optimum tariff; Empirical modelling of trade policy; Monopolistic competition models of trade, Tariff versus quota.

Unit-III: [15 Hours]

Balance of Payments and Macro Adjustment Mechanisms: Balance of Payments, Capital Flows, National Accounts, Determinants and Foreign exchange Market Equilibrium, Monetary Policy and Fiscal Policy, Fixed and Flexible Exchange Rate Regimes, Sterilization, Devaluation and BOP Crisis.

Unit-IV: [15 Hours]

Economic Integration and International Institutions: Forms of Economic and regional Integration: Regional Agreements, ASEAN, NAFTA, European Union, Customs Union, Trade Creation and Trade Diversion; IMF, IBRD, WTO, Free trade areas.

Suggested Readings:

Bhagwati, J., A. Panagariya, and T. Srinivasan.*Lectures on International Trade*, MIT Press, 2nd Edition, 1998.
Keith Pilbeam, *International Finance*. Palgrave, 3rd Edition 2001.
Paul R. Krugman& Maurice Obstfeild: *International Economics*, Pearson Education, 2005.
Salvatore, D, *International Economics*., Wiley India, New Delhi, 8th Edition, 2000.

References:

Caves Frankel & Jones, *World Trade & Payments: An Introduction*, Pearson Education, 2007.
Caves, R, R. Jones, and J. Frankel, *World Trade and Payments: an Introduction*. Addison- Wesley, 1993.
Dornbusch, *Open Economy: Macro Economy*, Basic Books, New York, 1980.
Feenstra. R., *Advanced International Trade: Theory and Evidence*. Princeton University Press, 2009.
Henry Thompson, *International Economics: Global Markets and Competition*, CUP, 2nd Edition, 2009.
James Gerber, *International Economics*. Pearson, 6th Edition, 2013.
Krugman and Obsfeild, *International Economics- Theory and Policy*. Addison Wesley, 5th Edition, 2006.
Soderston, B. and Reed G, *International Economics*, McMillan Press, 3rd Edition, 1998.
London Carbaugh, R. J, *International Economics*. 11th Edition, Thomson South Western, New Delhi, 1994.
Van Marrewijk, C., *International Economics*. OUP, 2007.

Course Code : **MED303** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **L 30 T/L 60**	Course Title **Research Methodology and Data Analysis using SPSS**

Course Objective:

The aim of this course is to;

- Comprehend research methodology fundamentals, including types, steps, and hypothesis principles.
- Apply data collection, processing, analysis techniques, and structure research reports.
- Analyze data using SPSS for descriptive statistics, correlation, regression, and hypothesis testing.
- Create academic documents and research reports using LaTeX.
- Evaluate data for preparation and assess research ethics and plagiarism.

Course Learning Outcomes:

After completion of this course, student can be able to:

- Develop an understanding on procedures involved in undertaking research.
- Follow sampling framework, use of data analysis tool, and writing report.

Course Outline:

Unit-I: [15 Hours]

Introduction: Definition, Characteristics and Classification of Research, Types of Research; Steps of research, identifying research problem, Hypothesis- Importance and definition - Null and Alternative Hypothesis, Types of errors in testing of Hypothesis, Testing of Hypothesis, and level of significance.

Unit-II: [15 Hours]

(A) Collection, Processing and Analysis of Data: Primary and secondary data, Methods of collection of Primary Data; Editing, coding and classification of data; Tabular and graphical presentation. **(B) Report Writing:** Types of research reports - Structure of a research report - Presentation of tabular data and figures; Preparing bibliography- foot notes and annexure; Style of reference writing; Ethics in research; Plagiarism in research.

Unit-III: [30 Hours]

Introduction to SPSS (Statistical Package for Social Sciences): Data entry and cleaning; Tabulation; Central Tendencies, Measures of Distribution, Measures of Asymmetry; Graphs; Transform / Select Data; Correlation and Linear Regression; Estimation and Hypothesis Testing; and other Statistical Dependence techniques.

Unit-IV: [30 Hours]

Introduction to LaTeX: Installation of the software LaTeX; Understanding Latex compilation - Basic Syntax- Writing equations; Page Layout- Titles, Abstract Chapters, Sections, References, citation; Table of contents, Figure handling - numbering, List of figures, List of tables, Generating index; Packages: Geometry, Hyperref, amsmath, amssymb, algorithms, algorithmic graphic, color; Classes: article, book, report, slides, etc.

Suggested Readings:

Firuza Karmali Aibara, *A Short Introduction to Latex: A Book for Beginners*, Create space Independent Publishing Platform, 2019.

Kothari, C.R. *Research Methodology: Methods and Techniques*. New Age International Publishers, New Delhi, Latest Edition.

Lokesh Jasrai, *Data Analysis Using SPSS*, SAGE Publications India Pvt Ltd, New Delhi, 2020.

Panneerselvam R, *Research Methodology*, Prentice Hall India Learning Private Limited; Second Edition, 2013.

W LNeuman, *Social Research Methods, Quantitative and Qualitative Approaches*.Pearson, 2012.

References:

Bernard, H. R. *Analysis of Qualitative Data*. Sage, UK, 2010.

Bose, Pradip Kumar, *Research Methodology*. ICSSR, New Delhi, 1995.

Bryman, Alan, *Quality and Quantity in Social Research*, Unwin Hyman, London Hughes, 1998.

Bryman, Alan, *Social Research Methods*. Oxford University Press, 2nd edition, 2004.

Fink, Arlene & J Kosecoff, *How to Conduct Surveys A step by step Guide*. Sage, UK, 1998.

Keith, *Introduction to Methodology*, Sage Publication India Pvt Ltd., New Delhi, 1986.

William J Goode and Paul K Hatt: *Methods in Social Research*, McGraw- Hill. Latest Edt.

Course Code :**MED304** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **L 30 T/L 45**	Course Title **Time Series Econometrics**

Course Objective:

- To familiarize students with time series econometric techniques, commonly used in financial analysis, policy formulation and academic research.
- To provide lab sessions where students apply these concepts using relevant data.

Learning Outcomes:

- The students will be able to choose the appropriate time series techniques to analyse various economic problems and draw suitable inferences.

Course Outline:

Unit-I: [15 Hours]

Basic Concepts of Time Series: The concept of data generating process - Stochastic process and Deterministic process, white noise process, stationary and non-stationary stochastic process - with and without intercept and trend, difference stationary and trend stationary process, concept of unit root, tests for detecting unit root.

Unit-II: [20 Hours]

Univariate Time Series Models: Autoregressive (AR) model, Moving Average (MA) model, ARMA, ARIMA and SARIMA models, Box Jenkins Methodology - Model identification, diagnostics, forecasting - Dynamic vs static forecasts, Smooth transition models.

Unit-III: [20 Hours]

Multivariate Time Series Models: Cointegration - Engle Granger and Johansen Juselius methodology, error correction model - VAR models -lag length selection, factorization - Cholesky decomposition and structural factorization, Causality tests in VAR framework, impulse response functions, variance decomposition - ARDL approach - Cointegration with mix of I(0) and I(1) variables, bounds testing, error correction model; NARDL model.

Unit-IV: [20 Hours]

Volatility modelling: Modelling high frequency data; testing for ARCH effect, estimating ARCH models - ARCH, GARCH, ARCH - M, TGARCH, EGARCH, diagnostic checks.

Suggested Readings:

Chris Brooks, *Introductory Econometrics for Finance*. Cambridge UP, 2002.
James D. Hamilton, *Time Series Analysis*. Princeton University Press, 1994.
Pesaran, M. H. (2015). *Time Series and Panel Data Econometrics*. Oxford University Press.
Walter Enders, *Applied Econometric Time Series*, Wiley, 4th Edition, 2015.

References:

Bernardo, Jose M. and Adrian F. M. Smith, *Bayesian Theory*. Wiley Series in Probability and Statistics, John Wiley & Sons, 1994.
Chan, Joshua, Gary M. Koop, Dale J. Poirier and Justin L. Tobias, *Bayesian Econometric Methods,* Cambridge University Press, 2nd Edition, 20119.
Davidson, R., & MacKinnon, J. G., *Econometric theory and methods*. (Vol. 5). New York: OPU, 2004.
Kerry Patterson, *An Introduction to Applied Econometrics*. Palgrave Macmillan, 2000.
Koopmans, L. H., *The Spectral Analysis of Time Series*. Elsevier, 1995.
Peter Kennedy, *A Guide to Econometrics*, Blackwell Publishing, 2008.
Priestley, M. B. Spectral analysis and time series: probability and mathematical statistics, Academic Press, 1981.
Verbeek, M. *A Guide to Modern Econometrics*.John Wiley & Sons, 2008.

Course Code : **MED311** Course Type : **Elective-III** No. of Credits : **4.00** No. of Hours : **L 30 T/L 60**	Course Title **Economics of Artificial Intelligence**

Course Objective:

The aim of this course is to;

- Comprehend the historical development, fundamental concepts, and broad societal role of Artificial Intelligence as a General Purpose Technology.
- Analyze the multifaceted economic impacts of AI on growth, employment, income distribution, and international trade.
- Evaluate the role of AI in technological innovation, including its effects on productivity, labor, and new task creation.
- Apply insights from Machine Learning to areas like market design, privacy, and behavioral economics.
- Synthesize policy implications for an economy increasingly shaped by Artificial Intelligence.

Course Learning Outcomes:

- Students will be able to gain a deep understanding of the economic aspects of artificial intelligence.

Course Outline:

Unit-I: [20 Hours]

Artificial Intelligence (AI) as a General Purpose Technology (GPT): History of AI development. Algorithms and data; AI's present and potential role in various industries; AI to Deep Learning; Comparing Human and Artificial Intelligence; AI and modern productivity paradox; Technological Elements of Artificial Intelligence; A Theory of Decision-Making and Artificial Intelligence; A Political-Economy Perspective

Unit-II: [25 Hours]

Growth, Jobs, and Inequality: Artificial Intelligence, Income, Employment; Artificial Intelligence, Automation, and Work; Artificial Intelligence and Economic Growth; Artificial Intelligence and Recombinant Growth; Artificial Intelligence and Income Distribution; Artificial Intelligence and International Trade; Public Policy in an AI Economy

Unit-III: [25 Hours]

Artificial Intelligence and Innovation: Modeling Technology; Parameterizing Technology; Bias of Technological Change; Decomposing Technological Change; Labor-Saving Technological Progress; The Task-Based Framework of Production; Tasks, Labor-Saving Progress, and New Tasks; Information Goods; A Model of Digital Innovation; Economic Effects of Digital Innovation; Public Policy Implications

Unit-IV: [20 Hours]

Machine Learning and Economics: Impact of Machine Learning on Economics; Artificial Intelligence, Labor, Productivity; Machine Learning and Market Design; Privacy, Algorithms, and Artificial Intelligence; Artificial Intelligence and Behavioral Economics.

Suggested Readings:

Agrawal, Ajay, Gans, Joshua, and Avi Goldfarb, *Prediction Machines, The Simple Economics of Artificial Intelligence,* Harvard Business Review Press, 2018.

Ajay Agrawal, Joshua Gans and Avi Goldfarb, *The Economics of Artificial Intelligence*. OUP, 2019.

Nicholas Negroponte, Being Digital, Alfred a Knopf Inc, 199
http://governance40.com/wp-content/uploads/2018/12/Nicholas-Negroponte-Being-Digital-Vintage-1996.pdf

References:

Andrew McAfee and Erik Brynjolfsson, *Machine, Platform, Crowd: Harnessing Our Digital Future*; W. W. Norton & Company, 2017.

Andrew McAfee and Erik Brynjolfsson, *Race against the Machine: How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy*, Digital Frontier Press, 2012.

Brynjolfsson, Eric., & McAfee, A. *The second machine age: Work, progress, and prosperity in a time of brilliant technologies*. WW Norton & Company, 2014.

David Harel. *Computers Ltd.: What They Really Can't Do*, Oxford University Press, 2003.

Jaron Lanier, *Who Owns the Future*, Simon & Schuster, 2014.

Schwab, K. *The Fourth Industrial Revolution*. Crown Business, 2017

The Future of Global Value Chains Business as Usual or "A New Normal"? STI Policy Note, September 2017, OECD

Course Code : **MED311** Core/Elective : **Elective-III** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Insurance Economics**

Course Objectives:

- To understand the terms and conditions of insurance sector in India
- To provide strong focus and develop research skill in the Insurance sector

Course Learning Outcomes:

On completion of the course, students can be able to:

- Evaluate the growth and Development of Insurance Business.
- Understand the working and functioning of the Insurance Sector.
- Study the inter-relationship between Insurance & Risk Management.

Course Outline:

Unit-I: [15 Hours]

Introduction to Insurance Economics: Economic Security; Human quest for economic security through time; Exposure to losses; Role and definition of insurance; Risk pooling and risk transfer; Economic and legal perspectives, Social vs. private insurance; Life vs. non-life insurance; Classification of life, health and general insurance policies.

Unit-II: [15 Hours]

Fundamentals of life & health insurance: Functions of life & health insurance; Mathematical basis of life insurance; Plans of life insurance; Legal aspects of life insurance; Provisions of policies; Individual health insurance; Uses and types of evaluation; Principles of underwriting of life & health insurance; Group insurance and superannuation (pension) schemes IRDA.

Unit-III: [15 Hours]

Fundamentals of uncertainty & risk: Pure risk & speculative risk; Expected utility and decision-making under uncertainty; Expected utility & demand for the insurance; Moral hazard and insurance demand Unit- Concept of risk management; Essentials of risk management; Elements of risk assessment; Risk control & risk financing. Reinsurance distribution systems.

Unit-IV: [15 Hours]

Introduction to general insurance: Concept of short term risk; Basics of the following concepts - Common law, equity, proposal/accidence, indemnity, insurable interest, contribution subrogation; representation; utmost good faith, material fact, physical hazard, moral hazard, policy endorsements conditions/warranties; selection and inspection of risks; rating and calculation of premiums; tariffs and non-tariffs; technology development and general insurance.

Suggested Readings:

Black. K. Jr. and H. D. Skipper Jr., *Life & Health Insurance*, Prentice Hall, Upper Saddle River, New Jerssey, 2000.

Dionne, G. and S.E. Harrington (eds.), *Foundations of Insurance Economics*, Kluwer Academic Publishers, Boston, 1997.

Pteffer, I. And D. R. Klock, *Perspectives on Insurance,* Prentice Hall Inc., Engleword Cliffs, 1974.

Williams Jr., C.A. M.L. Smith and P.C. Young, *Risk Management and Insurance*, McGraw Hill, New York, 1995.

References:

Skipper Jr., H.D.(ed.) *International Risk & Insurance : An Environmental Managerial Approach*, Irwin McGraw Hill, 1988.

United Nations Conference on Trade and Development, *The Promotion of Risk Management in Developing Countrie*s, UNCTAD, Geneva, 1987.

Insurance Institute of India, *Life Assurance Underwriting*, (IC-22), Mumbai.

Insurance Institute of India, *General Insurance Underwriting*, (IC-22), Mumbai.

Government of India, *Old Age and Income Security* (OASIS) Report (Dave Committee Report), New Delhi, 1998.

Insurance Regulation and Development Authority, IRDA Regulations, New Delhi. 2001.

Course Code : **MED311** Course Type : **Elective-III** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Entrepreneurship Development**

Course Objectives:

- To enable the students to understand the concept of Entrepreneurship and to learn the professional behavior of an entrepreneur.
- To identify changes and trends which create business opportunities and to analyze the environment for potential business opportunities.
- To provide conceptual exposure on converting idea to a successful entrepreneurial firm.

Course Learning Outcomes:

On completion of syllabus student can be able to

- Understand on the basic concepts of entrepreneurship promotion and business opportunities to familiars with knowledge about business and project reports for starting a new ventures on team based.

Course Outline:

Unit-I: [15 Hours]

Introduction: Meaning and types, Traits of entrepreneurship, Barriers to entrepreneurship, the entrepreneurial culture, Stages in entrepreneurial process, Women entrepreneurship.

Unit-II: [15 Hours]

Entrepreneurship development: Opportunity Identification and Evaluation, Generation and screening the project ideas, Market analysis, Technical analysis, Cost-benefit analysis and network analysis, Project formulation, Setting up of Enterprises.

Unit-III: [15 Hours]

Business Planning Process: Meaning of business plan- Business plan process- Advantages of business planning- preparing a model project report for starting a new venture (Team-based project work).

Unit-IV: [15 Hours]

Funding and Sources of Finance: Long term, Medium term and Short term sources - Venture capital- Venture capital process- Business angles- Commercial banks- Government Grants and Schemes.

Suggested Readings:

Reddy, *Entrepreneurship: Text & Cases* - Cengage, New Delhi.
Kuratko/rao, *Entrepreneurship: A South Asian Perspective*. Cengage, New Delhi.
Leach/Melicher, *Entrepreneurial Finance*, Cengage. , New Delhi.
K. Sundar, Entrepreneurship *Development*, Vijay Nicole Imprints private Limited
Khanka S.S., *Entrepreneurial Development*, S. Chand& Co. Ltd., New Delhi, 2001.
Sangeeta Sharma, *Entrepreneurship Development*, PHI Learning Pvt. Ltd., 2016.

References:

Barringer, B., *Entrepreneurship: Successfully Launching New Ventures*, Pearson, 3rd Edi, 2011.
Bessant, J., and Tidd, J., *Innovation and Entrepreneurship*, John Wiley & Sons, 2nd Edition 2011.
Desai, V., *Small Scale Industries and Entrepreneurship*, Himalaya Publishing House, 2011.
Donald, F.K., *Entrepreneurship- Theory, Process and Practice*, Cengage Learning, 9th Edition, 2014.
Hirsch, R.D., Peters, M. and Shepherd, D., *Entrepreneurship*, Tata McGraw-Hill Education Pvt.Ltd., 6th Edition, 2006.
Mathew, J.M., *Entrepreneurship Theory at Cross Roads: Paradigms and Praxis*, Dream Tech, 2nd Edition, 2006.
Morse, E., and Mitchell, R., *Cases in Entrepreneurship: The Venture Creation Process*, Sage South Asia, 2008.
Nagendra and Manjunath, V.S., *Entrepreneurship and Management*, Pearson, 2010.
Reddy, N., *Entrepreneurship: Text and Cases*, Cengage Learning, 2010.
Roy, R., *Entrepreneurshi*p, Oxford University Press, 2nd Edition, 2011.
Stokes, D., and Wilson, N., *Small Business Management and entrepreneurship*, Cengage Learning, 6th Edition, 2010.

Course Code : **MED313** Course Type : **CCC-II** No. of Credits : **4.00** No. of Hours : **60**	Course Title **Building Mathematical Ability and Financial Literacy**

Course Objectives:

- Master basic set theory, permutations, combinations, and mathematical logic. Apply logical reasoning to analyze propositions and conditional statements.
- Understand financial instruments like stocks, shares, loans, insurance, and income tax liabilities.
- Analyze data using graphical representations. Compute measures of central tendency, dispersion, correlation, and regression.
- Understand money functions, banking operations, and monetary policy tools. Evaluate the role of Reserve Bank of India and monetary policy objectives.
- Apply mathematical and statistical techniques to financial scenarios. Make informed decisions about personal finance and economic policies based on analytical reasoning.

Learning Outcomes

After completion of the course student should be able to:

- Ability to apply set theory, permutations, combinations, and logical reasoning to solve problems effectively. Proficiency in analyzing propositions and conditional statements using mathematical logic.
- Competence in calculating cost price, profit, loss, and various financial aspects like simple and compound interest.
- Proficiency in understanding and managing financial instruments such as stocks, shares, loans, insurance, and income tax liabilities.
- Competency in analyzing and interpreting data through graphical representations. Proficiency in computing measures of central tendency, dispersion, and conducting correlation and regression analyses.
- Financial Literacy Enhancement: Understanding the functions of money, banking operations, and monetary policy tools. Ability to evaluate the role of the Reserve Bank of India and comprehend monetary policy objectives.

Course Outline:

Unit-I: [15 Hours]

Mathematics: Basic set theory and Permutations and combinations. Mathematical logic: Introduction, proposition and truth values, logical connectives, tautology and contradiction, logical equivalences, converse, inverse and Contra positive of a conditional statement.

Unit-II: [15 Hours]

Commercial Mathematics: Cost price, selling price, profit and loss, simple interest, compound interest (reducing balance and flat rate of interest), stocks and shares. Housing loan and insurance, simple equated monthly installments (EMI) calculation. Income tax: simple calculation of individual tax liability.

Unit-III: [15 Hours]

Statistics: Sources of data: primary and secondary; types of data, graphical representation of data. Population, sample, variable, parameter.Statistic, simple random sampling, use of random number tables. Measures of central tendency: arithmetic mean, median and mode; measures of dispersion: range, variance, standard deviation and coefficient of variation. Bivariate data: scatter plot, Pearson's correlation coefficient, simple linear regression.

Unit-IV: [15 Hours]

Financial literacy: Definition, Function and Theories of Money: Money and its functions -The concepts and definitions of money- Measurement of money –Advantages of money - Scheduled and Non-scheduled Banks-Commercial Banks, its functions and credit creation –High powered Money-usage of debit and credit cards-Functions of a central bank -Quantitative and qualitative methods of credit control- Bank rate policy-Cash

reserve ratio - Open market operations–Statutory liquidity ratio-Repo rate–Reverse Repo rate- Selective credit control- role and functions of Reserve Bank of India-Objectives and limitations of monetary policy With special reference to India.

Suggested Reading

Building Mathematical Ability, Foundation Course, University of Delhi, S. Chand Publications.
J. Medhi. *Statistical Methods* (An Introductory text); Wiley Eastern Ltd. (latest edition).
Lewis, M. K. and p. d., *Monetary Economics*. Oxford University press, Newyork, 2000

References:

Brahmaiah, B. and P. Subbarao, *Financial Futures and Options*, Himalaya Publishing House, Mumbai, 1998.
C Rangarajan: *Indian Economy: Essays in Money and Finance*, UBS Publishers' Distributors Ltd, 1999.

Course Code : **MED314** Course Type : **Core** No. of Credits : **2.00** No. of Hours : **4 to 6 Weeks**	Course Title **Summer Internship Programme**

The Summer Internship Programme (SIP) is 4 credits course with 4 to 6 weeks duration in the summer vacation (approximately May-June), after the 2nd semester end examination. Internship is intended to gain practical knowledge related to economic concepts and econometric applications. The students are expected to learn how organizations in practice apply the economic concepts and econometric techniques in their operations. The students should submit their Internship report along with the nature of work done during the Internship and the certificate from the organization where the Internship was carried out. The candidates should also present their Internship repot in the seminar before the department faculty which will evaluate the Internship work. The internship report carries marks of 60 (sixty) and remaining 40 (Forty) marks would be for Viva-Voce that will be conducted by the Department as per the rules and regulations of the University.

SEMESTER-IV

Course Code : **MED401** Course Type : **Core** No. of Credits : **4.00** No. of Hours : **L 30 T/L 60**	Course Title **Data Analytics with Python**

Course Objective:
The aim of this course is to;

- Grasp Python programming fundamentals and data preprocessing.
- Utilize Python for data visualization and exploratory analysis.
- Analyze economic data with Python for hypothesis testing and statistical interpretation.
- Assess Python-based machine learning models and their performance.
- Develop Python-based time series models and apply basic machine learning for decision-making.

Course Learning Outcomes:

- Students will be able to handle big datasets and undertake statistical and econometric analysis.

Course Outline:

Unit-I: [25 Hours]

Introduction to Python programming: Introduction to python: Overview of python and its data analysis libraries (NumPy, pandas, Matplotlib, Seaborn); Data preprocessing and cleaning: Importing data into python; Handling missing data: imputation techniques; Dealing with outliers and anomalies; data transformation, data integration and manipulation.

Unit-II: [22 Hours]

Data Visualization and Exploratory Data Analysis: Descriptive statistics: Histograms, box plots, scatter plots; Correlation analysis, Data visualization; Hypothesis testing: t-tests, chi-square tests, ANOVA, etc.; Confidence intervals and p-values; Non-parametric tests; Interpreting statistical results.

Unit-III: [25 Hours]

Model Development in Python: Linear regression: simple and multiple regression; Logistic regression for classification; Decision trees and random forests; Model evaluation metrics: R-squared, MAE, RMSE, accuracy, precision, recall, etc.; Model assumptions and diagnostics; Model evaluation using visualization; Overfitting, Underfitting and Model Selection; Prediction and decision making.

Unit-IV: [18 Hours]

Time Series Analysis Using Python: Time series components: trend, seasonality, noise; Decomposition techniques; Time series modelling; Time series forecasting methods: moving average, ARIMA, exponential smoothing; Brief introduction to machine learning using python.

Suggested Readings:

McKinney, W. *Python for data analysis: Data wrangling with Pandas, NumPy, and IPython.*, O'Reilly Media, Inc., 2012.
Swaroop, C. H. *A Byte of Python. Python Tutorial*, 2003.
Ken Black, *Business Statistics for Contemporary Decision Making*. "John Wiley & Sons, Inc", 6th Editing.

References:

Anderson Sweeney Williams, *Statistics for Business and Economics*. Cengage Learning, 2011.
David W. Hosmer, Stanley Lemeshow, *Applied Logistic Regression* (Wiley Series in probability and statistics)."Wiley-Interscience Publication", 2000.
Douglas C. Montgomery, George C. Runger, *Applied Statistics & Probability for Engineering*. Wiley & Sons, Inc, 2002.
Jay L. Devore, *Probability and Statistics for Engineering and the Sciences*. Cengage Learning, 2011.
Jiawei Han and Micheline Kamber, *Data Mining: Concepts and Techniques*, 2006.
Leonard Kaufman, Peter J. Rousseeuw, *Finding Groups in Data: An Introduction to Cluster Analysis*. Wiley & Sons, 1990.
Sarah Stewart, *Python Programming - Python Programming for Beginners*, Platinum Press LLC, 2019.

Course Code : **MED411** Course Type : **Core** No. of Credits : **16.00** No. of Hours : **One Semester**	Course Title **Dissertation**

Students are required to submit the synopsis on any selected research topic as per the prescribed guidelines. The M.Sc. Economics and Data Analytics students in the final semester would be required to do dissertation. The research work is to be related to the specialization area chosen by the student. For example, a student who has chosen Labour Economics as specialization will have to do a project/field work related to labour economics and submit a dissertation. Dissertation submitted by the students would be evaluated by an External Examiner appointed by the University for marks of 60 (sixty). Remaining 40 (Forty) marks would be for Viva-Voce that will be conducted by the Department as per the rules and regulations of the University.