



UNIVERSITY OF CALICUT

Abstract

General and Academic IV- Faculty of Humanities- Scheme and Syllabus of BA Econometrics and Data Management Honours Programme -in tune with the CUFYUGP Regulations 2024, with effect from 2024 Admission onwards - Approved-Subject to ratification by the Academic Council-Implemented- Orders Issued

G & A - IV - B

U.O.No. 11748/2024/Admn

Dated, Calicut University.P.O, 31.07.2024

*Read:-*1.U.O.No. 3103/2024/Admn dated 22.02.2024.

2.Item No 5 of the minutes of the combined meeting of the Board of Studies in Economics UG and PG held on 23.04.2024.

3.Remarks of the Dean, Faculty of Humanities dated 25.05.2024.

4. Orders of the Vice Chancellor in the file of even No and dated 01.06.2024.

ORDER

1. The Regulations of the Calicut University Four Year UG Programmes (CUFYUGP Regulations 2024) for Affiliated Colleges, was implemented with effect from 2024 admission onwards, vide paper read as (1) above.
2. The combined meeting of the Board of Studies in Economics UG and PG held on 23.04.2024, vide paper read as (2) above, has approved the scheme and syllabus of the B.A. Econometrics and Data Management Honours programme in tune with CUFYUGP Regulations 2024 with effect from 2024 Admission onwards.
3. The Dean, Faculty of Humanities vide paper read as (3) above, has approved the minutes of the combined meeting of the Board of Studies in Economics UG and PG held on 23.04.2024.
4. Under these circumstances, considering the urgency, the Vice Chancellor has approved the minutes of the combined meeting of the Board of Studies in Economics UG and PG held on 23.04.2024 and has accorded sanction to implement the scheme and syllabus of the B.A. Econometrics and Data Management Honours programme in tune with CUFYUGP Regulations 2024 with effect from 2024 Admission onwards, subject to ratification by the Academic Council.
5. The scheme and syllabus of the B.A. Econometrics and Data Management Honours programme in tune with CUFYUGP Regulations 2024 is thus implemented with effect from 2024 Admission onwards, subject to ratification by the Academic Council.
6. Orders are issued accordingly. (Syllabus appended)

Ajayakumar T.K

Assistant Registrar

To

1.The Principals of all Affiliated Colleges 2. Deputy Registrar CDOE

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Forwarded / By Order

Section Officer

UNIVERSITY OF CALICUT

**B.A. ECONOMETRICS AND DATA MANAGEMENT
HONOURS**

(MAJOR, MINOR AND GENERAL FOUNDATION COURSES)

SYLLABUS & MODEL QUESTION PAPERS

w.e.f. 2024 admission

(CUFYUGP Regulations 2024)

**B.A. ECONOMETRICS AND DATA MANAGEMENT
HONOURS
(MAJOR, MINOR AND GENERAL FOUNDATION COURSES)**

SYLLABUS

PROGRAMME OUTCOMES (PO):

At the end of the graduate programme at Calicut University, a student would:

	Knowledge Acquisition:
PO1	Demonstrate a profound understanding of knowledge trends and their impact on the chosen discipline of study.
	Communication, Collaboration, Inclusiveness, and Leadership:
PO2	Become a team player who drives positive change through effective communication, collaborative acumen, transformative leadership, and a dedication to inclusivity.
	Professional Skills:
PO3	Demonstrate professional skills to navigate diverse career paths with confidence and adaptability.
	Digital Intelligence:
PO4	Demonstrate proficiency in varied digital and technological tools to understand and interact with the digital world, thus effectively processing complex information.
	Scientific Awareness and Critical Thinking:
PO5	Emerge as an innovative problem-solver and impactful mediator, applying scientific understanding and critical thinking to address challenges and advance sustainable solutions.
	Human Values, Professional Ethics, and Societal and Environmental Responsibility:
PO6	Become a responsible leader, characterized by an unwavering commitment to human values, ethical conduct, and a fervent dedication to the well-being of society and the environment.
	Research, Innovation, and Entrepreneurship:
PO7	Emerge as a researcher and entrepreneurial leader, forging collaborative partnerships with industry, academia, and communities to contribute enduring solutions for local, regional, and global development.

PROGRAMME SPECIFIC OUTCOMES (PSO):

At the end of the BA Econometrics and Data Management Honours programme at Calicut University, a student would:

PSO1	Understand the concepts, nature and scope of econometrics as a social science.
PSO2	Examine the socio-economic problems by quantifying and testing economic relationships and find out the strategies to overcome these problems through community engagement.

PSO3	Achieve organizational, management and leadership skills.
PSO4	Acquire skills to evaluate contemporary socio-economic issues by accessing information from various sources and analyzing the collected information using regression analysis and related techniques with the aid of different software packages.
PSO5	Understand diverse needs of the marginalized segments of the society and equip them to engage in endeavours leading to their emancipation.
PSO6	Be able to inculcate ethical values and to avoid unethical practices such as plagiarism, misrepresentation of data and violation of intellectual property rights
PSO7	Apply analytical thinking to various economic phenomena, including analysis and evaluation of economic policies, practices, evidence, arguments, claims and beliefs.
PSO8	Develop appropriate skills and knowledge to address real world economic issues in familiar and unfamiliar contexts
PSO9	Develop appropriate methodology and tools for data collection, presentation and analysis, formulate appropriate and relevant research questions, and predict cause-effect relationships to deal with problems and situations to be solved through innovative practices

**MINIMUM CREDIT REQUIREMENTS OF THE DIFFERENT PATHWAYS
IN THE THREE-YEAR PROGRAMME IN CUFYUGP**

Sl. No	Academic Pathway	Major	Minor/ Other Disciplines	Foundation Courses AEC: 4 MDC: 3 SEC: 3 VAC: 3	Intern-ship	Total Credits	Example
		Each course has 4 credits		Each course has 3 credits			
		1	Single Major (A)	68 (17 courses)			
2	Major (A) with Multiple Disciplines (B, C)	68 (17 courses)	12 + 12 (3 + 3 = 6 courses)	39 (13 courses)	2	133	Major: Econometrics and Data Management + Statistics and Data Management

3	Major (A) with Minor (B)	68 (17 courses)	24 (6 courses)	39 (13 courses)	2	133	Major: Econometrics and Data Management Minor: Data Management
4	Major (A) with Vocational Minor (B)	68 (17 courses)	24 (6 courses)	39 (13 courses)	2	133	Major: Econometrics and Data Management Minor: Taxation Practices and Procedures
5	Double Major (A, B)	A: 48 (12 courses) B: 44 (11 courses)	- The 24 credits in the Minor stream are distributed between the two Majors. 2 MDC, 2 SEC, 2 VAC and the Internship should be in Major A. Total credits in Major A should be 48 + 20 = 68 (50% of 133) 1 MDC, 1 SEC and 1 VAC should be in Major B. Total credits in Major B should be 44 + 9 = 53 (40% of 133)	12 + 18 + 9	2	133	Econometrics and Data Management, and Mathematics double major
Exit with UG Degree / Proceed to Fourth Year with 133 Credits							

B.A. ECONOMETRICS AND DATA MANAGEMENT HONOURS PROGRAMME

COURSE STRUCTURE FOR PATHWAYS 1 – 4

- | | |
|---------------------|------------------------------------|
| 1. Single Major | 2. Major with Multiple Disciplines |
| 3. Major with Minor | 4. Major with Vocational Minor |

Seme ster	Course Code	Course Title	Total Hours	Hours/ Week	Credits	Marks		
						Inter nal	Exter nal	Total
1	ECO1CJ 101/ ECO1MN 100	Core Course 1 in Major – Principles of Economics	75	5	4	30	70	100

Semester	Course Code	Course Title	Total Hours	Hours/Week	Credits	Marks		
						Internal	External	Total
		Minor Course 1	60/ 75	4/ 5	4	30	70	100
		Minor Course 2	60/ 75	4/ 5	4	30	70	100
	ENG1FA 101(1B)	Ability Enhancement Course 1 – English	60	4	3	25	50	75
		Ability Enhancement Course 2 – Additional Language	45	3	3	25	50	75
		Multi-Disciplinary Course 1 – Other than Major	45	3	3	25	50	75
		Total		23/ 25	21			525
	2	ECO2CJ 102/ ECO2MN 100	Core Course 2 in Major – Budget Analysis	75	5	4	30	70
		Minor Course 3	60/ 75	4/ 5	4	30	70	100
		Minor Course 4	60/ 75	4/ 5	4	30	70	100
ENG2FA 103(1B)		Ability Enhancement Course 3 – English	60	4	3	25	50	75
		Ability Enhancement Course 4 – Additional Language	45	3	3	25	50	75
		Multi-Disciplinary Course 2 – Other than Major	45	3	3	25	50	75
		Total		23/ 25	21			525
3	ECO3CJ 201	Core Course 3 in Major – Analytical Tools for Economics – I	60	4	4	30	70	100
	EDM3CJ 202/ EDM3M N200	Core Course 4 in Major – Basics of Economic Data Management	60	4	4	30	70	100
		Minor Course 5	60/ 75	4/ 5	4	30	70	100
		Minor Course 6	60/ 75	4/ 5	4	30	70	100
		Multi-Disciplinary Course 3 – Kerala Knowledge System	45	3	3	25	50	75
	ENG3FV 108(1B)	Value-Added Course 1 – English	45	3	3	25	50	75
		Total		22/ 24	22			550
4	ECO4CJ 203	Core Course 5 in Major – Intermediate Microeconomics	60	4	4	30	70	100

Semester	Course Code	Course Title	Total Hours	Hours/Week	Credits	Marks		
						Internal	External	Total
	ECO4CJ 204	Core Course 6 in Major – Intermediate Macroeconomics	60	4	4	30	70	100
	ECO4CJ 205	Core Course 7 in Major – Analytical Tools for Economics – II	60	4	4	30	70	100
	ENG4FV 109(1B)	Value-Added Course 2 – English	45	3	3	25	50	75
		Value-Added Course 3 – Additional Language	45	3	3	25	50	75
	ENG4FS 111(1B)	Skill Enhancement Course 1 – English	60	4	3	25	50	75
		Total		22	21			525
	5	ECO5CJ 301	Core Course 8 in Major – Advanced Microeconomics	60	4	4	30	70
EDM5CJ 302		Core Course 9 in Major – Introductory Econometrics	60	4	4	30	70	100
EDM5CJ 303		Core Course 10 in Major – Computer Fundamentals for Economic Analysis	60	4	4	30	70	100
		Elective Course 1 in Major	60	4	4	30	70	100
		Elective Course 2 in Major	60	4	4	30	70	100
		Skill Enhancement Course 2	45	3	3	25	50	75
		Total		23	23			575
6	EDM6CJ 304/ EDM8M N304	Core Course 11 in Major – Time Series Econometrics	75	5	4	30	70	100
	EDM6CJ 305/ EDM8M N305	Core Course 12 in Major – Research Methodology in Economics	60	4	4	30	70	100
	ECO6CJ 306/ ECO8MN 306	Core Course 13 in Major – Advanced Macroeconomics	60	4	4	30	70	100
		Elective Course 3 in Major	60	4	4	30	70	100
		Elective Course 4 in Major	60	4	4	30	70	100
	EDM6FS 113	Skill Enhancement Course 3 – Economic Research with R	45	3	3	25	50	75

Semester	Course Code	Course Title	Total Hours	Hours/Week	Credits	Marks			
						Internal	External	Total	
	EDM6CJ 349	Internship in Major (Credit for internship to be awarded only at the end of Semester 6)	60		2	50	-	50	
		Total		24	25			625	
Total Credits for Three Years					133			3325	
7	EDM7CJ 401	Core Course 14 in Major – Financial Econometrics	75	5	4	30	70	100	
	ECO7CJ 402	Core Course 15 in Major – Game Theory and Economic Behaviour	75	5	4	30	70	100	
	EDM7CJ 403	Core Course 16 in Major – Econometrics Analysis using SPSS	75	5	4	30	70	100	
	EDM7CJ 404	Core Course 17 in Major – Big Data Analytics	75	5	4	30	70	100	
	EDM7CJ 405	Core Course 18 in Major – Economic Tools for Decision Making	75	5	4	30	70	100	
			Total		25	20			500
8	ECO8CJ 406 / ECO8MN 406	Core Course 19 in Major – Macroeconomic Models and Measurement	75	5	4	30	70	100	
	ECO8CJ 407 / ECO8MN 407	Core Course 20 in Major – Applied Microeconomics and Evaluation	60	4	4	30	70	100	
	ECO8CJ 408 / ECO8MN 408	Core Course 21 in Major – Heterodox Economics	60	4	4	30	70	100	
	OR (instead of Core Courses 19 – 21 in Major)								
	EDM8CJ 449	Project (in Honours programme)	360*	13*	12	90	210	300	
	EDM8CJ 499	Project (in Honours with Research programme)	360*	13*	12	90	210	300	
		Elective Course 5 in Major / Minor Course 7	60	4	4	30	70	100	
		Elective Course 6 in Major / Minor Course 8	60	4	4	30	70	100	

Semester	Course Code	Course Title	Total Hours	Hours/Week	Credits	Marks		
						Internal	External	Total
		Elective Course 7 in Major / Minor Course 9 / Major Course in any Other Discipline	60	4	4	30	70	100
OR (instead of Elective Course 7 in Major, in the case of Honours with Research Programme)								
	ECO8CJ 489 (1)/ ECO8CJ 489 (2)	Methods for Quantitative Research in Economics/ Methods for Qualitative Research in Economics	60	4	4	30	70	100
		Total		25	24			600
Total Credits for Four Years					177			4425

*The teacher should have 13 hrs/week of engagement (the hours corresponding to the three core courses) in the guidance of the Project(s) in Honours programme and Honours with Research programme, while each student should have 24 hrs/week of engagement in the Project work. Total hours are given based on the student's engagement.

CREDIT DISTRIBUTION FOR PATHWAYS 1 – 4

1. Single Major
2. Major with Multiple Disciplines
3. Major with Minor
4. Major with Vocational Minor

Semester	Major Courses	Minor Courses	General Foundation Courses	Internship/Project	Total
1	4	4 + 4	3 + 3 + 3	-	21
2	4	4 + 4	3 + 3 + 3	-	21
3	4 + 4	4 + 4	3 + 3	-	22
4	4 + 4 + 4	-	3 + 3 + 3	-	21
5	4 + 4 + 4 + 4 + 4	-	3	-	23
6	4 + 4 + 4 + 4 + 4	-	3	2	25
Total for Three Years	68	24	39	2	133
7	4 + 4 + 4 + 4 + 4	-	-	-	20
8	4 + 4 + 4	4 + 4 + 4	-	12*	24
* Instead of three Major courses					
Total for Four Years	88 + 12 = 100	36	39	2	177

DISTRIBUTION OF MAJOR COURSES IN ECONOMETRICS AND DATA MANAGEMENT FOR PATHWAYS 1 – 4

1. Single Major
3. Major with Minor

2. Major with Multiple Disciplines
4. Major with Vocational Minor

Semester	Course Code	Course Title	Hours/Week	Credits
1	ECO1CJ 101 / ECO1MN 100	Core Course 1 in Major – Principles of Economics	5	4
2	ECO2CJ 102 / ECO2MN 100	Core Course 2 in Major – Budget Analysis	5	4
3	ECO3CJ 201	Core Course 3 in Major – Analytical Tools for Economics – I	4	4
	EDM3CJ 202 / EDM3M N200	Core Course 4 in Major – Basics of Economic Data Management	4	4
4	ECO4CJ 203	Core Course 5 in Major – Intermediate Microeconomics	4	4
	ECO4CJ 204	Core Course 6 in Major – Intermediate Macroeconomics	4	4
	ECO4CJ 205	Core Course 7 in Major – Analytical Tools for Economics – II	4	4
5	ECO5CJ 301	Core Course 8 in Major – Advanced Microeconomics	4	4
	EDM5CJ 302	Core Course 9 in Major – Introductory Econometrics	4	4
	EDM5CJ 303	Core Course 10 in Major – Computer Fundamentals for Economic Analysis	4	4
		Elective Course 1 in Major	4	4
		Elective Course 2 in Major	4	4
6	EDM6CJ 304/ EDM8M N304	Core Course 11 in Major – Time Series Econometrics	5	4

	EDM6CJ 305 / EDM8M N305	Core Course 12 in Major – Research Methodology in Economics	4	4
	ECO6CJ 306 / ECO8MN 306	Core Course 13 in Major – Advanced Macroeconomics	4	4
		Elective Course 3 in Major	4	4
		Elective Course 4 in Major	4	4
	EDM6CJ 349	Internship in Major	-	2
Total for the Three Years				70
7	EDM7CJ 401	Core Course 14 in Major – Financial Econometrics	5	4
	ECO7CJ 402	Core Course 15 in Major – Game Theory and Economic Behaviour	5	4
	EDM7CJ 403	Core Course 16 in Major – Econometrics Analysis using SPSS	5	4
	EDM7CJ 404	Core Course 17 in Major – Big Data Analytics	5	4
	EDM7CJ 405	Core Course 18 in Major – Economic Tools for Decision Making	5	4
8	ECO8CJ 406 / ECO8MN 406	Core Course 19 in Major – Macroeconomic Models and Measurement	5	4
	ECO8CJ 407 / ECO8MN 407	Core Course 20 in Major – Applied Microeconomics and Evaluation	4	4
	ECO8CJ 408 / ECO8MN 408	Core Course 21 in Major – Heterodox Economics	4	4
	OR (instead of Core Courses 19 – 21 in Major)			
	EDM8CJ 449	Project (in Honours programme)	13	12
	EDM8CJ 499	Project (in Honours with Research programme)	13	12
		Elective Course 5 in Major	4	4

		Elective Course 6 in Major	4	4
		Elective Course 7 in Major	4	4
OR (instead of Elective course 7 in Major, in Honours with Research programme)				
	ECO8CJ 489 (1)/ ECO8CJ 489 (2)	Methods for Quantitative Research in Economics/ Methods for Qualitative Research in Economics	4	4
Total for the Four Years				114

ELECTIVE COURSES IN ECONOMETRICS AND DATA MANAGEMENT

Sl. No.	Course Code	Title	Seme ster	Total Hrs	Hrs/ Week	Cre dits	Marks		
							Inte rnal	Exte rnal	Total
1	ECO5EJ 301	Gender Analysis in Economics	5	60	4	4	30	70	100
2	EDM5EJ 302	Growth and Development Models	5	60	4	4	30	70	100
3	EDM5EJ 303	Indian Tax System and Tax Calculations	5	60	4	4	30	70	100
4	EDM5EJ 304	Indian Economy	5	60	4	4	30	70	100
5	EDM5EJ 305	Financial Institutions and Markets	5	60	4	4	30	70	100
6	ECO5EJ 306	Human Capital and Economic Development	5	60	4	4	30	70	100
7	ECO6EJ 307	Industrial Economics	6	60	4	4	30	70	100
8	EDM6EJ 308	International Economics	6	60	4	4	30	70	100
9	EDM6EJ 309	Kerala Economy	6	60	4	4	30	70	100

10	EDM6EJ 310	Demography	6	60	4	4	30	70	100
11	EDM6EJ 311	Economic Accounting using Software	6	60	4	4	30	70	100
12	ECO6EJ 312	Economic Geography	6	60	4	4	30	70	100
13	ECO8EJ 401	Social Choice Theory	8	60	4	4	30	70	100
14	EDM8EJ 402	Actuarial Statistics	8	60	4	4	30	70	100
15	ECO8EJ 403	Economics of Education	8	60	4	4	30	70	100
16	ECO8EJ 404	Law and Economics	8	60	4	4	30	70	100
17	ECO8EJ 405	Local Level Planning	8	60	4	4	30	70	100
18	ECO8EJ 406	Finance and Technology	8	60	4	4	30	70	100

GROUPING OF MINOR COURSES

Table 1 (ECONOMETRICS AND DATA MANAGEMENT)

(The minor courses given below should not be offered to students who have taken Econometrics and Data Management/ Economics/Development Economics/Economics with Foreign Trade/Economics with Islamic Finance as the major discipline.)

(Title of the Minor: **ECONOMETRICS AND DATA MANAGEMENT**)

Group No.	Sl. No.	Course Code	Title	Semester	Total Hrs	Hrs/Week	Credits	Marks		
								Internal	External	Total
1		ECONOMIC DATA ANALYSIS								

	1	EDM1MN 101	Basics of Economic Data	1	60	4	4	30	70	100
	2	EDM2MN 101	Data Methods and Techniques	2	60	4	4	30	70	100
	3	EDM3MN 201	Database Management	3	60	4	4	30	70	100
APPLICATIONS FOR ECONOMIC DATA ANALYSIS										
2										
	1	EDM1MN 102	Computer Application for Economic data Analysis	1	60	4	4	30	70	100
	2	EDM2MN 102	Introduction to MS Excel	2	60	4	4	30	70	100
	3	EDM3MN 202	Economic Data Analysis using Excel	3	60	4	4	30	70	100

Table 2 (QUANTITATIVE ECONOMICS)

(The minor courses given below should not be offered to students who have taken Econometrics and Data Management as the major discipline. However, these two groups of minor courses may be taken by major students in Economics/Development Economics/Economics with Foreign Trade/Economics with Islamic Finance and major students from other disciplines which are not specified here.)

(Title of the Minor: **QUANTITATIVE ECONOMICS**)

Group No.	Sl. No.	Course Code	Title	Sem ester	Total Hrs	Hrs/ Week	Cr edits	Marks		
								Inte rnal	Exte rnal	Total
1		Basic Quantitative Techniques for Economics								
	1	EDM1MN 103	Quantitative Techniques for Economic Analysis I	1	60	4	4	30	70	100

	2	EDM2MN 103	Quantitative Techniques for Economic Analysis II	2	60	4	4	30	70	100
	3	EDM3MN 203	Quantitative Techniques for Economic Analysis III	3	60	4	4	30	70	100
	4	EDM8MN 303	Quantitative Techniques for Economic Analysis IV	8	60	4	4	30	70	100
2		Elementary Tools for Economic Data Analysis								
	1	EDM1MN 104	Elementary Tools for Economic Data Analysis I	1	60	4	4	30	70	100
	2	EDM2MN 104	Elementary Tools for Economic Data Analysis II	2	60	4	4	30	70	100
	3	EDM3MN 204	Elementary Tools for Economic Data Analysis III	3	60	4	4	30	70	100
	4	EDM8MN 304	Elementary Tools for Economic Data Analysis IV	8	60	4	4	30	70	100

Quantitative economics is a specialized field that focuses on the application of mathematical and statistical techniques to analyze economic phenomena and solve economic problems. Its significance and career prospects are noteworthy due to the increasing reliance on data-driven decision-making across various sectors. Quantitative economics plays a key role in government agencies, policy analysts evaluate the potential economic impact of proposed legislation and policies. They use statistical analysis to predict outcomes and assess the effectiveness of current policies. Quantitative economics has extensive real-world applications, making it a valuable field of study with diverse career prospects. Professionals in this field are equipped with the analytical tools and quantitative skills needed to tackle complex economic issues across various industries, including finance, consulting, government, academia, international organizations, and the tech industry. The ability to apply rigorous quantitative methods to real-world problems ensures that quantitative economists remain in high demand and are well-prepared to make significant contributions in their chosen careers.

GROUPING OF VOCATIONAL MINOR COURSES

Table 3 (APPLIED ECONOMICS)

(The vocational minor courses given below should not be offered to students who have taken Econometrics and Data Management as the major discipline. However, these two groups of vocational minor courses may be taken by major students in

Economics/Development Economics/Economics with Foreign Trade/Economics with Islamic Finance and major students from other disciplines which are not specified here.)

(Title of the Vocational Minor: **Applied Economics**)

Group No.	Sl. No.	Course Code	Title	Semester	Total Hrs	Hrs/Week	Credits	Marks		
								Internal	External	Total
1										
		Advanced Data Analysis in Economics								
	1	EDM1VN103	Fundamentals of Data Science in Economics	1	60	4	4	30	70	100
	2	EDM2VN103	Cross Section Data Analysis in Economics	2	60	4	4	30	70	100
	3	EDM3VN203	Time Series Data Analysis in Economics	3	60	4	4	30	70	100
	4	EDM8VN303	Panel Data Analysis in Economics	8	60	4	4	30	70	100
2										
		Applied Data Science Techniques in Economics								
	1	EDM1VN104	Applied Econometrics and Data Mining	1	60	4	4	30	70	100
	2	EDM2VN104	Big Data Applications in Economics	2	60	4	4	30	70	100
	3	EDM3VN204	Economic Data Visualisation and Storytelling	3	60	4	4	30	70	100
	4	EDM8VN304	Machine Learning in Economics	8	60	4	4	30	70	100

DISTRIBUTION OF GENERAL FOUNDATION COURSES IN ECONOMETRICS AND DATA MANAGEMENT

Semester	Course Code	Course Title	Total Hours	Hours/Week	Credits	Marks		
						Internal	External	Total

1	EDM1FM 105	Multi-Disciplinary Course 1 – Essentials of Economics	45	3	3	25	50	75
2	ECO2FM 106	Multi-Disciplinary Course 2 – Digital Economy	45	3	3	25	50	75
3	ECO3FV 108	Value-Added Course 1 – Financial Literacy and Personal Finance	45	3	3	25	50	75
4	ECO4FV 110	Value-Added Course 2 – Digital Marketing and E- Commerce Strategies	45	3	3	25	50	75
5	EDM5FS 112	Skill Enhancement Course 2 – Econometrics with Excel	45	3	3	25	50	75
6	ECO6FS 113	Skill Enhancement Course 3 – Economic Research with R	45	3	3	25	50	75

**COURSE STRUCTURE FOR BATCH A1(B2)
IN PATHWAY 5: DOUBLE MAJOR**

A1: 68 credits in Econometrics and Data Management (Major A)

B1: 68 credits in Major B

A2: 53 credits in Econometrics and Data Management (Major A)

B2: 53 credits in Major B

The combinations available to the students: (A1 & B2), (B1 & A2)

Note: Unless the batch is specified, the course is for all the students of the class

Seme ster	Course Code	Course Title	Total Hours	Hours/ Week	Credits	Marks		
						Inter nal	Exter nal	Total
1	ECO1CJ 101 / ECO1MN 100	Core Course 1 in Major Econometrics and Data Management – Principles of Economics	75	5	4	30	70	100
	BBB1CJ 101	Core Course 1 in Major B –	60/ 75	4/ 5	4	30	70	100

	ECO1CJ 102 / ECO2CJ 102* / ECO2MN 100*	Core Course 2 in Major Econometrics and Data Management – Budget Analysis (for batch A1 only)	75	5	4	30	70	100
	ENG1FA 101(1B)	Ability Enhancement Course 1 – English	60	4	3	25	50	75
		Ability Enhancement Course 2 – Additional Language	45	3	3	25	50	75
	EDM1FM 105	Multi-Disciplinary Course 1 in Econometrics and Data Management –Essentials of Economics (for batch A1 only)	45	3	3	25	50	75
		Total		24/ 25	21			525
2	ECO2CJ 101 / ECO3CJ 201*	Core Course 3 in Major Econometrics and Data Management –Analytical Tools for Economics – I	60	4	4	30	70	100
	BBB2CJ 101	Core Course 2 in Major B –	60/ 75	4/ 5	4	30	70	100
	BBB2CJ 102 / BBB1CJ 102	Core Course 3 in Major B – (for batch B2 only)	60/ 75	4/ 5	4	30	70	100
	ENG2FA 103(1B)	Ability Enhancement Course 3 – English	60	4	3	25	50	75
		Ability Enhancement Course 4 – Additional Language	45	3	3	25	50	75
	ECO2FM 106	Multi-Disciplinary Course 2 in Econometrics and Data Management – Digital Economy	45	3	3	25	50	75
		Total		22/24	21			525
3	EDM3CJ 202	Core Course 4 in Major Econometrics and Data Management – Basics of Economic Data Management	60	4	4	30	70	100
	ECO3CJ 203 / ECO4CJ 203*	Core Course 5 in Major Econometrics and Data Management – Intermediate Microeconomics	60	4	4	30	70	100

	BBB3CJ 201	Core Course 4 in Major B	60/ 75	4/ 5	4	30	70	100
	BBB3CJ 202	Core Course 5 in Major B	60/ 75	4/ 5	4	30	70	100
	BBB3FM 106 / BBB2FM 106	Multi-Disciplinary Course 1 in B –	45	3	3	25	50	75
	ECO3FV 108	Value-Added Course 1 in Econometrics and Data Management – Financial Literacy and Personal Finance (for batch A1 only)	45	3	3	25	50	75
		Total		22/24	22			550
4	ECO4CJ 204	Core Course 6 in Major Econometrics and Data Management – Intermediate Macroeconomics	60	4	4	30	70	100
		Core Course 6 in Major B	60/ 75	4/ 5	4	30	70	100
	ECO4CJ 205	Core Course 7 in Major Econometrics and Data Management – Analytical Tools for Economics – II (for batch A1 only)	60	4	4	30	70	100
	ECO4FV 110	Value-Added Course 2 in Econometrics and Data Management – Digital Marketing and E-Commerce Strategies	45	3	3	25	50	75
	BBB4FV 110	Value-Added Course 1 in B –	45	3	3	25	50	75
	EDM4FS 112 / EDM5FS 112*	Skill Enhancement Course 1 in Econometrics and Data Management – Econometrics with Excel	45	3	3	25	50	75
		Total		21/ 22	21			525
5	EDM5CJ 302	Core Course 8 in Major Econometrics and Data Management – Introductory Econometrics	60	4	4	30	70	100
		Core Course 7 in Major B –	60/ 75	4/ 5	4	30	70	100

	EDM5CJ 303	Core Course 9 in Major Econometrics and Data Management – Computer Fundamental for Economic Analysis (for batch A1 only)	60	4	4	30	70	100
		Elective Course 1 in Major Econometrics and Data Management	60	4	4	30	70	100
		Elective Course 1 in Major B	60	4	4	30	70	100
	BBB5FS 112 / BBB4FS 112	Skill Enhancement Course 1 in B	45	3	3	25	50	75
		Total		23/ 24	23			575
6	EDM6CJ 304/ EDM8M N304	Core Course 10 in Major Econometrics and Data Management – Time Series Econometrics	75	5	4	30	70	100
		Core Course 8 in Major B –	60/ 75	4/ 5	4	30	70	100
	BBB6CJ 305	Core Course 9 in Major B – (for batch B2 only)	60	4	4	30	70	100
		Elective Course 2 in Major Econometrics and Data Management	60	4	4	30	70	100
		Elective Course 2 in Major B	60	4	4	30	70	100
	ECO6FS 113	Skill Enhancement Course 2 in Econometrics and Data Management – Economic Research with R (for batch A1 only)	45	3	3	25	50	75
	EDM6CJ 349	Internship in Major Econometrics and Data Management (Credit for internship to be awarded only at the end of Semester 6)	60		2	50	-	50
		Total		24/ 25	25			625
Total Credits for Three Years					133			3325

For batch A1(B2), the course structure in semesters 7 and 8 is the same as for pathways 1 – 4, except that the number of the core and elective courses is in continuation of the number of courses in the two categories completed at the end of semester 6.

* The course code of the same course as used for the pathways 1 – 4

**CREDIT DISTRIBUTION FOR BATCH A1(B2)
IN PATHWAY 5: DOUBLE MAJOR**

Semester	Major Courses in Econometrics and Data Management	General Foundation Courses in Econometrics and Data Management	Internship/ Project in Econometrics and Data Management	Major Courses in B	General Foundation Courses in B	AEC	Total
1	4 + 4	3	-	4	-	3 + 3	21
2	4	3	-	4 + 4	-	3 + 3	21
3	4 + 4	3	-	4 + 4	3	-	22
4	4 + 4	3 + 3	-	4	3	-	21
5	4 + 4 + 4	-	-	4 + 4	3	-	23
6	4 + 4	3	2	4 + 4 + 4	-	-	25
Total for Three Years	48	18	2	44	9	12	133
	68			53		12	133
	Major Courses in Econometrics and Data Management	Minor Courses					
7	4 + 4 + 4 + 4 + 4	-			-	-	20
8	4 + 4 + 4	4 + 4 + 4	12*		-	-	24
* Instead of three Major courses							
Total for Four Years	88 + 12 = 100	12					177

**COURSE STRUCTURE FOR BATCH B1(A2)
IN PATHWAY 5: DOUBLE MAJOR**

A1: 68 credits in Econometrics and Data Management (Major A)

B1: 68 credits in Major B

A2: 53 credits in Econometrics and Data Management (Major A)

B2: 53 credits in Major B

The combinations available to the students: (A1 & B2), (B1 & A2)

Note: Unless the batch is specified, the course is for all the students of the class

Semester	Course Code	Course Title	Total Hours	Hours/Week	Credits	Marks		
						Internal	External	Total
1	ECO1CJ 101 / ECO1MN 100	Core Course 1 in Major Econometrics and Data Management – Principles of Economics	75	5	4	30	70	100
	BBB1CJ 101	Core Course 1 in Major B –	60/ 75	4/ 5	4	30	70	100
	BBB1CJ 102 / BBB2CJ 102	Core Course 2 in Major B – (for batch B1 only)	60/ 75	4/ 5	4	30	70	100
	ENG1FA 101(1B)	Ability Enhancement Course 1 – English	60	4	3	25	50	75
		Ability Enhancement Course 2 – Additional Language	45	3	3	25	50	75
	BBB1FM 105	Multi-Disciplinary Course 1 in B – (for batch B1 only)	45	3	3	25	50	75
		Total		23/25	21			525
2	ECO2CJ 101 / ECO3CJ 201*	Core Course 2 in Major Econometrics and Data Management – Analytical Tools for Economics – I	60	4	4	30	70	100
	BBB2CJ 101	Core Course 3 in Major B –	60/ 75	4/ 5	4	30	70	100
	ECO2CJ 102 / ECO2MN 100	Core Course 3 in Major Econometrics and Data Management – Budget Analysis (for batch A2 only)	75	5	4	30	70	100
	ENG2FA 103(1B)	Ability Enhancement Course 3 – English	60	4	3	25	50	75
		Ability Enhancement Course 4 – Additional Language	45	3	3	25	50	75
	ECO2FM 106	Multi-Disciplinary Course 1 in Econometrics and Data Management – Digital Economy	45	3	3	25	50	75
		Total		23/ 24	21			525

3	EDM3CJ 202	Core Course 4 in Major Econometrics and Data Management – Basics of Economic Data Management	60	4	4	30	70	100
	ECO3CJ 203 / ECO4CJ 203*	Core Course 5 in Major Econometrics and Data Management – Intermediate Microeconomics	60	4	4	30	70	100
	BBB3CJ 201	Core Course 4 in Major B	60/ 75	4/ 5	4	30	70	100
	BBB3CJ 202	Core Course 5 in Major B	60/ 75	4/ 5	4	30	70	100
	BBB3FM 106 / BBB2FM 106	Multi-Disciplinary Course 2 in B –	45	3	3	25	50	75
	BBB3FV 108	Value-Added Course 1 in B – (for batch B1 only)	45	3	3	25	50	75
		Total		22/24	22			550
4	ECO4CJ 204	Core Course 6 in Major Econometrics and Data Management – Intermediate Macroeconomics	60	4	4	30	70	100
		Core Course 6 in Major B	60/ 75	4/ 5	4	30	70	100
		Core Course 7 in Major B – (for batch B1 only)	60/ 75	4/ 5	4	30	70	100
	ECO4FV 110	Value-Added Course 1 in Econometrics and Data Management – Digital Marketing and E-Commerce Strategies	45	3	3	25	50	75
	BBB4FV 110	Value-Added Course 2 in B –	45	3	3	25	50	75
	EDM4FS 112 / EDM5FS 112*	Skill Enhancement Course 1 in Econometrics and Data Management –Econometrics with Excel	45	3	3	25	50	75
		Total		21/23	21			525

5	EDM5CJ 302	Core Course 7 in Major Econometrics and Data Management – Introductory Econometrics	60	4	4	30	70	100
		Core Course 8 in Major B –	60/ 75	4/ 5	4	30	70	100
		Core Course 9 in Major B – (for batch B1 only)	60	4	4	30	70	100
		Elective Course 1 in Major Econometrics and Data Management	60	4	4	30	70	100
		Elective Course 1 in Major B	60	4	4	30	70	100
	BBB5FS 112 / BBB4FS 112	Skill Enhancement Course 1 in B	45	3	3	25	50	75
		Total		23/ 24	23			575
6	EDM6CJ 304/ EDM8MN 304	Core Course 8 in Major Econometrics and Data Management – Time Series Econometrics	75	5	4	30	70	100
		Core Course 10 in Major B –	60/ 75	4/ 5	4	30	70	100
	EDM6CJ 305/ EDM8MN 305	Core Course 9 in Major Econometrics and Data Management – Research Methodology in Economics (for batch A2 only)	60	4	4	30	70	100
		Elective Course 2 in Major Econometrics and Data Management	60	4	4	30	70	100
		Elective Course 2 in Major B	60	4	4	30	70	100
	BBB6FS 113	Skill Enhancement Course 2 in B – (for batch B1 only)	45	3	3	25	50	75
	BBB6CJ 349	Internship in Major B (Credit for internship to be awarded only at the end of Semester 6)	60		2	50	-	50

		Total		24/ 25	25			625
Total Credits for Three Years					133			3325
To continue to study Econometrics and Data Management in semesters 7 and 8, batch B1(A2) needs to earn additional 15 credits in Econometrics and Data Management to make the total credits of 68. Suppose this condition is achieved, and the student of batch B1(A2) proceeds to the next semesters to study Econometrics and Data Management. The course structure in semesters 7 and 8 is the same as for pathways 1 – 4, except that the number of the core and elective courses is in continuation of the number of courses in the two categories completed at the end of semester 6, taking into account the number of courses in Econometrics and Data Management taken online to earn the additional 15 credits.								

* The course code of the same course as used for the pathways 1 – 4

CREDIT DISTRIBUTION FOR BATCH B1(A2) IN PATHWAY 5: DOUBLE MAJOR

Semester	Major Courses in B	General Foundation Courses in B	Internship/ Project in B	Major Courses in Econometrics and Data Management	General Foundation Courses in Econometrics and Data Management	AEC	Total
1	4 + 4	3	-	4	-	3 + 3	21
2	4	-	-	4 + 4	3	3 + 3	21
3	4 + 4	3 + 3	-	4 + 4	-	-	22
4	4 + 4	3	-	4	3 + 3	-	21
5	4 + 4 + 4	3	-	4 + 4	-	-	23
6	4 + 4	3	2	4 + 4 + 4	-	-	25
Total for Three Years	48	18	2	44	9	12	133
	68			53		12	133
	Major Courses in B	Minor Courses					
7	4 + 4 + 4 + 4 + 4	-			-	-	20
8	4 + 4 + 4	4 + 4 + 4	12*		-	-	24
* Instead of three Major courses							
Total for Four Years	88 + 12 = 100	12					177

EVALUATION SCHEME

1. The evaluation scheme for each course contains two parts: internal evaluation (about 30%) and external evaluation (about 70%). Each of the Major and Minor courses is of 4-credits. It is evaluated for 100 marks, out of which 30 marks is from internal evaluation and 70 marks, from external evaluation. Each of the General Foundation course is of 3-credits. It is evaluated for 75 marks, out of which 25 marks is from internal evaluation and 50 marks, from external evaluation.
2. The 4-credit courses (Major and Minor courses) are of two types: (i) courses with only theory and (ii) courses with 3-credit theory and 1-credit practical.
 - In 4-credit courses with only theory component, out of the total 5 modules of the syllabus, one open-ended module with 20% content is designed by the faculty member teaching that course, and it is internally evaluated for 10 marks. The internal evaluation of the remaining 4 theory modules is for 20 marks.
 - In 4-credit courses with 3-credit theory and 1-credit practical components, out of the total 5 modules of the syllabus, 4 modules are for theory and the fifth module is for practical. The practical component is internally evaluated for 20 marks. The internal evaluation of the 4 theory modules is for 10 marks.
3. All the 3-credit courses (General Foundational Courses) in Econometrics and Data Management are with only theory component. Out of the total 5 modules of the syllabus, one open-ended module with 20% content is designed by the faculty member teaching that course, and it is internally evaluated for 5 marks. The internal evaluation of the remaining 4 theory modules is for 20 marks.
4. The students can write the external examination in Economics either completely in English or in Malayalam.

Sl. No.	Nature of the Course		Internal Evaluation in Marks (about 30% of the total)		External Exam on 4 modules (Marks)	Total Marks
			Open-ended module / Practical	On the other 4 modules		
1	4-credit course	only theory (5 modules)	10	20	70	100
2	4-credit course	Theory (4 modules) + Practical	20	10	70	100

3	3-credit course	only theory (5 modules)	5	20	50	75
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1. MAJOR AND MINOR COURSES

1.1. INTERNAL EVALUATION OF THEORY COMPONENT

Sl. No.	Components of Internal Evaluation of Theory Part of a Major / Minor Course	Internal Marks for the Theory Part of a Major / Minor Course of 4-credits			
		Theory Only		Theory + Practical	
		4 Theory Modules	Open-ended Module	4 Theory Modules	Practical
1	Test paper/ Mid-semester Exam	10	4	5	-
2	Seminar/ Viva/ Quiz	6	4	3	-
3	Assignment	4	2	2	-
Total		20	10	10	20*
		30		30	

* Refer the table in section 1.2 for the evaluation of practical component

1.2. EVALUATION OF PRACTICAL COMPONENT

The evaluation of practical component in Major and Minor courses is completely by internal evaluation.

- Continuous evaluation of practical by the teacher-in-charge shall carry a weightage of 50%.
- The end-semester practical examination and viva-voce, and the evaluation of practical records shall be conducted by the teacher in-charge and an internal examiner appointed by the Department Council.
- The process of continuous evaluation of practical courses shall be completed before 10 days from the commencement of the end-semester examination.
- Those who passed in continuous evaluation alone will be permitted to appear for the end-semester examination and viva-voce.

The scheme of continuous evaluation and the end-semester examination and viva-voce of practical component shall be as given below:

Sl. No.	Evaluation of Practical Component of Credit-1 in a Major / Minor Course	Marks for Practical	Weightage
1	Continuous evaluation of practical/ exercise performed in practical classes by the students	10	50%
2	End-semester examination and viva-voce to be conducted by teacher-in-charge along with an additional examiner arranged internally by the Department Council	7	35%
3	Evaluation of the Practical records submitted for the end semester viva-voce examination by the teacher-in-charge and additional examiner	3	15%
Total Marks		20	

1.3. EXTERNAL EVALUATION OF THEORY COMPONENT

External evaluation carries 70% marks. Examinations will be conducted at the end of each semester. Individual questions are evaluated in marks and the total marks are converted into grades by the University based on 10-point grading system (refer section 5).

PATTERN OF QUESTION PAPER FOR MAJOR AND MINOR COURSES

Duration	Type	Total No. of Questions	No. of Questions to be Answered	Marks for Each Question	Ceiling of Marks
2 Hours	Short Answer	10	8 – 10	3	24
	Paragraph/ Problem	8	6 – 8	6	36
	Essay	2	1	10	10
Total Marks					70

2. INTERNSHIP

- All students should undergo Internship of 2-credits during the first six semesters in a firm, industry or organization, or training in labs with faculty and researchers of their own institution or other Higher Educational Institutions (HEIs) or research institutions.
- Internship can be for enhancing the employability of the student or for developing the research aptitude.

- Internship can involve hands-on training on a particular skill/ equipment/ software. It can be a short project on a specific problem or area. Attending seminars or workshops related to an area of learning or skill can be a component of Internship.
- A faculty member/ scientist/ instructor of the respective institution, where the student does the Internship, should be the supervisor of the Internship.

2.1. GUIDELINES FOR INTERNSHIP

1. All students shall undergo Internship or Apprenticeship in a firm, industry or organization, or training in labs with faculty and researchers of their own institution or other Higher Educational Institutions (HEIs) or research institutions.
2. For an internship, one credit of Internship means two-hour engagement per week. Accordingly, in a semester of 15 weeks' duration, two credits in this course is equivalent to 60 hours of engagement.
3. The students involved in the internship may continue their internship subject to the condition that his/her academic credits do not get affected in terms of attendance and other assignments. If the need arises, students may also have an opportunity to make use of summer & winter breaks for extending their learning from internships.
4. The internship aims to impart:
 - The students should have an understanding and ability to develop solutions for real-life problems.
 - The students will be made aware of the research ethics, professional accountability, conduct and will be able to practice the research ethics and appropriate skills in his/her own research work.
 - The student will be able to enhance academic productivity by developing writing and reading skills and can make contributions towards social and economic issues.
 - The intern can possess an attitude and skill of adaptability and flexibility for new challenges at organisational and individual level with a mindset of teamwork and collaborations.
 - To increase the likelihood of securing future employment and to explore and clarify carrier goals.
 - To develop a strong work ethics, time management and professionalism in a professional environment.
5. Role of Internship Coordinator

- An internship coordinator is a teacher, who will be nominated by the Department Council (DC) for monitoring and supervising the student during the internship duration. This person will be nominated at the start of the academic year for each batch.
- Internship Supervisor from the host institute should monitor the regularity of the intern at his/her workplace. On the completion of internship, the student should submit the project report in the prescribed format along with internship completion certificate issued by Internship Supervisor/authority from host organisation. The project report shall be evaluated by faculty member delegated by the department council.
- Students can choose following organisations and mentor from HEIs/research organizations/registered industries/registered media organizations/and companies/registered retail service providers/R&D labs and centres. They can also opt Cooperative Organisations/Banking and nonbanking organizations/Insurance companies/Stock Broking Companies/Microfinance Institutions/Other national and international reputed institutions/libraries in HEIs and registered under library council /NGOs/certified farmers/plantations/local self-governing bodies/ outside India experts working at the international level, Organisations under State Government/Central Government, elected representatives to the parliament/ state assembly. Students can also undertake an internship from national/international reputed institutions through online mode.

6. Guidelines for Internship Report

- The Internship certificate should be certified by the Head of the Institution. It should contain the Name of the Student, Name of the Internship course, Name of the Institute, Type of work done and duration of work (60 hrs).
- Internship Report should contain 3000-5000 words typed in Times New Roman, size 12, 1.5 space, on double sides and neatly soft bound. It should be submitted to the concerned Department before VI Semester University Exam Notification.
- The Internship Report should be in the following structure
 - a) Title page- Title of the Internship, Name and Register Number of the Student, Year, Name of the institute and name of the college and department.
 - b) Declaration
 - c) Certificate signed by the Head of the Institution (Internship Institute)
 - d) Index
 - e) Content Page - Introduction

Nature of the work

Methodology

Outcome of the work

Limitations

Suggestions

2.2. EVALUATION OF INTERNSHIP

- The evaluation of Internship shall be done internally through continuous assessment mode by a committee internally constituted by the Department Council of the college where the student has enrolled for the UG Honours programme.
- The credits and marks for the Internship will be awarded only at the end of semester 6.
- The scheme of continuous evaluation and the end-semester viva-voce examination based on the submitted report shall be as given below:

Sl. No.	Components of Evaluation of Internship		Marks for Internship 2 Credits	Weightage
1	Continuous evaluation of internship through interim presentations and reports by the committee internally constituted by the Department Council	Acquisition of skill set	10	40%
2		Interim Presentation and Viva-voce	5	
3		Punctuality	5	
4	Report of Institute Visit/ Study Tour		5	10%
5	End-semester viva-voce examination to be conducted by the committee internally constituted by the Department Council	Quality of the work	6	35%
6		Presentation of the work	5	
7		Viva-voce	6	
8	Evaluation of the day-to-day records, the report of internship supervisor, and final report submitted for the end semester viva-voce examination before the committee internally constituted by the Department Council		8	15%
	Total Marks		50	

3. PROJECT

3.1. PROJECT IN HONOURS PROGRAMME

- In Honours programme, the student has the option to do a Project of 12-credits instead of three Core Courses in Major in semester 8.
- The Project can be done in the same institution/ any other higher educational institution (HEI)/ research centre/ training centre.
- The Project in Honours programme can be a short research work or an extended internship or a skill-based training programme.
- A faculty member of the respective institution, where the student does the Project, should be the supervisor of the Project.

3.2. PROJECT IN HONOURS WITH RESEARCH PROGRAMME

- Students who secure 75% marks and above (equivalently, CGPA 7.5 and above) cumulatively in the first six semesters are eligible to get selected to Honours with Research stream in the fourth year.
- A relaxation of 5% in marks (equivalently, a relaxation of 0.5 grade in CGPA) is allowed for those belonging to SC/ ST/ OBC (non-creamy layer)/ Differently-Abled/ Economically Weaker Section (EWS)/ other categories of candidates as per the decision of the UGC from time to time.
- In Honours with Research programme, the student has to do a mandatory Research Project of 12-credits instead of three Core Courses in Major in semester 8.
- The approved research centres of University of Calicut or any other university/ HEI can offer the Honours with Research programme. The departments in the affiliated colleges under University of Calicut, which are not the approved research centres of the University, should get prior approval from the University to offer the Honours with Research programme. Such departments should have minimum two faculty members with Ph.D., and they should also have the necessary infrastructure to offer Honours with Research programme.
- A faculty member of the University/ College with a Ph.D. degree can supervise the research project of the students who have enrolled for Honours with Research. One such faculty member can supervise maximum five students in Honours with Research stream.
- The maximum intake of the department for Honours with Research programme is fixed by the department based on the number of faculty members eligible for project supervision, and other academic, research, and infrastructural facilities available.

- If a greater number of eligible students are opting for the Honours with Research programme than the number of available seats, then the allotment shall be based on the existing rules of reservations and merits.

3.3. GUIDELINES FOR THE PROJECT IN HONOURS PROGRAMME AND HONOURS WITH RESEARCH PROGRAMME

1. Project can be done in topics related to Economics.
2. Project should be done individually.
3. Project work can be of experimental/ theoretical/ analytical in nature.
4. There should be minimum 240 hrs. of engagement from the student in the Project work in Honours programme.
5. There should be minimum 13 hrs./week of engagement (the hours corresponding to the three core courses in Major in semester 8) from the teacher in the guidance of the Project(s) in Honours programme and Honours with Research programme.
6. The various steps in project works are the following:
 - Wide review of a topic.
 - Investigation on a problem in systematic way using appropriate techniques.
 - Systematic recording of the work.
 - Reporting the results with interpretation in a standard documented form.
 - Presenting the results before the examiners.
7. A hard copy of the report should be kept for reference at the department. A soft copy of the report should be submitted in pdf format for external evaluation well in advance.
8. It is desirable, but not mandatory, to publish the results of the Project in a peer reviewed journal.
9. The project report shall have declaration from the student and certificate from the research supervisor for originality of the work, stating that the work has not been submitted for the award of any other degree/ diploma in the same institution or any other institution.
10. Plagiarism check report has to be incorporated in the project report after the declaration of the student.
11. The project proposal, institution at which the project is being carried out, and the project supervisor should be prior-approved by the Department Council of the college where the student has enrolled for the UG Honours programme.
12. Structure of the Project

- Cover Page and Front Page
 - a. Title of the project
 - b. Degree for which project is submitted.
 - c. Name of the Candidate & University Register Number
 - d. Name of the College
 - e. Month and year of the project report submission
- Contents
 - a. Declaration by the student
 - b. Plagiarism check certificate
 - c. Certificate of the supervising teacher countersigned by the head of the department.
 - d. Acknowledgement.
 - e. Table of Contents
 - f. List of Tables
 - g. List of Figures
 - h. Introductory Chapter
 - i. Analysis Chapters
 - j. Concluding Chapter
 - k. Bibliography
 - l. Appendix
- Contents of the Introductory Chapter
 1. Introduction
 2. Review of literature
 3. Research Gap
 4. Statement of the problem
 5. Significance of the study
 6. Scope of the study
 7. Statement of objectives
 8. Hypotheses (optional)
 9. Methodology
 - a. Data sources
 - b. Tools of analysis (quantitative and qualitative)
 - c. Conceptual Framework-Optional (specification of terms and concepts)
 10. Limitations of the study
 11. Chapter outlines.

➤ Style of Report

1. Report Length: 50 to 70 pages excluding Appendix and Certificates
2. Alignment: Justify
3. Font: Times New Roman
4. Font size: 12
5. Line spacing: 1.5
6. Bibliography: APA style

3.4. EVALUATION OF PROJECT

- The evaluation of Project will be conducted at the end of the eighth semester by both internal and external modes.
- The Project in Honours programme as well as that in Honours with Research programme will be evaluated for 300 marks. Out of this, 90 marks is from internal evaluation and 210 marks, from external evaluation.
- The internal evaluation of the Project work shall be done through continuous assessment mode by a committee internally constituted by the Department Council of the college where the student has enrolled for the UG Honours programme. 30% of the weightage shall be given through this mode.
- The remaining 70% shall be awarded by the external examiner appointed by the University.
- The scheme of continuous evaluation and the end-semester viva-voce of the Project shall be as given below:

Components of Evaluation of Project	Marks for the Project (Honours/ Honours with Research)	Weightage
Continuous evaluation of project work through interim presentations and reports by the committee internally constituted by the Department Council	90	30%
End-semester viva-voce examination to be conducted by the external examiner appointed by the university	150	50%

Evaluation of the day-to-day records and project report submitted for the end-semester viva-voce examination conducted by the external examiner	60	20%
Total Marks	300	

INTERNAL EVALUATION OF PROJECT

Sl. No	Components of Evaluation of Project	Marks for the Project (Honours/ Honours with Research)
1	Skill in doing project work	30
2	Interim Presentation and Viva-Voce	20
3	Punctuality and Log book	20
4	Scheme/ Organization of Project Report	20
Total Marks		90

EXTERNAL EVALUATION OF PROJECT

Sl. No	Components of Evaluation of Project	Marks for the Project (Honours/ Honours with Research) 12 credits
1	Content and relevance of the Project, Methodology, Quality of analysis, and Innovations of Research	50
2	Presentation of the Project	50
3	Project Report (typed copy), Log Book and References	60
4	Viva-Voce	50
Total Marks		210

4. GENERAL FOUNDATION COURSES

- All the General Foundation Courses (3-credits) in Econometrics are with only theory component.

4.1. INTERNAL EVALUATION

Sl. No.	Components of Internal Evaluation of a General	Internal Marks of a General Foundation Course of 3-credits in Econometrics
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	Foundation Course in Econometrics	4 Theory Modules	Open-ended Module
1	Test paper/ Mid-semester Exam	10	2
2	Seminar/ Viva/ Quiz	6	2
3	Assignment	4	1
		20	5
Total		25	

4.2. EXTERNAL EVALUATION

External evaluation carries about 70% marks. Examinations will be conducted at the end of each semester. Individual questions are evaluated in marks and the total marks are converted into grades by the University based on 10-point grading system (refer section 5).

PATTERN OF QUESTION PAPER FOR GENERAL FOUNDATION COURSES

Duration	Type	Total No. of Questions	No. of Questions to be Answered	Marks for Each Question	Ceiling of Marks
1.5 Hours	Short Answer	10	8 – 10	2	16
	Paragraph/ Problem	5	4 – 5	6	24
	Essay	2	1	10	10
Total Marks					50

5. LETTER GRADES AND GRADE POINTS

- Mark system is followed for evaluating each question.
- For each course in the semester letter grade and grade point are introduced in 10-point indirect grading system as per guidelines given below.
- The Semester Grade Point Average (SGPA) is computed from the grades as a measure of the student's performance in a given semester.
- The Cumulative GPA (CGPA) is based on the grades in all courses taken after joining the programme of study.
- Only the weighted grade point based on marks obtained shall be displayed on the grade card issued to the students.

LETTER GRADES AND GRADE POINTS

Sl. No.	Percentage of Marks (Internal & External Put Together)	Description	Letter Grade	Grade Point	Range of Grade Points	Class
1	95% and above	Outstanding	O	10	9.50 – 10	First Class with Distinction
2	Above 85% and below 95%	Excellent	A+	9	8.50 – 9.49	
3	75% to below 85%	Very Good	A	8	7.50 – 8.49	
4	65% to below 75%	Good	B+	7	6.50 – 7.49	First Class
5	55% to below 65%	Above Average	B	6	5.50 – 6.49	
6	45% to below 55%	Average	C	5	4.50 – 5.49	Second Class
7	35% to below 45% aggregate (internal and external put together) with a minimum of 30% in external valuation	Pass	P	4	3.50 – 4.49	Third Class
8	Below an aggregate of 35% or below 30% in external evaluation	Fail	F	0	0 – 3.49	Fail
9	Not attending the examination	Absent	Ab	0	0	Fail

- When students take audit courses, they will be given Pass (P) or Fail (F) grade without any credits.
- The successful completion of all the courses and capstone components prescribed for the three-year or four-year programme with 'P' grade shall be the minimum requirement for the award of UG Degree or UG Degree Honours or UG Degree Honours with Research, as the case may be.

5.1. COMPUTATION OF SGPA AND CGPA

- The following method shall be used to compute the Semester Grade Point Average (SGPA): The SGPA equals the product of the number of credits (Ci) with the grade points (Gi) scored by a student in each course in a semester, summed over all the courses taken by a student in the semester, and then divided by the total number of credits of all the courses taken by the student in the semester,

$$\text{i.e. SGPA (Si)} = \frac{\sum_i (C_i \times G_i)}{\sum_i (C_i)}$$

where Ci is the number of credits of the ith course and Gi is the grade point scored by the student in the ith course in the given semester. Credit Point of a course is the value obtained by multiplying the credit (Ci) of the course by the grade point (Gi) of the course.

$$\text{SGPA} = \frac{\text{Sum of the credit points of all the courses in a semester}}{\text{Total credits in that semester}}$$

ILLUSTRATION – COMPUTATION OF SGPA

Semester	Course	Credit	Letter Grade	Grade point	Credit Point (Credit x Grade)
I	Course 1	3	A	8	3 x 8 = 24
I	Course 2	4	B+	7	4 x 7 = 28
I	Course 3	3	B	6	3 x 6 = 18
I	Course 4	3	O	10	3 x 10 = 30
I	Course 5	3	C	5	3 x 5 = 15
I	Course 6	4	B	6	4 x 6 = 24
	Total	20			139
	SGPA				139/20 = 6.950

- The Cumulative Grade Point Average (CGPA) of the student shall be calculated at the end of a programme. The CGPA of a student determines the overall academic level of the student in a programme and is the criterion for ranking the students.

CGPA for the three-year programme in CUFYUGP shall be calculated by the following formula.

$$\text{CGPA} = \frac{\text{Sum of the credit points of all the courses in six semesters}}{\text{Total credits in six semesters (133)}}$$

CGPA for the four-year programme in CUFYUGP shall be calculated by the following formula.

$$\text{CGPA} = \frac{\text{Sum of the credit points of all the courses in eight semesters}}{\text{Total credits in eight semesters (177)}}$$

- The SGPA and CGPA shall be rounded off to three decimal points and reported in the transcripts.
- Based on the above letter grades, grade points, SGPA and CGPA, the University shall issue the transcript for each semester and a consolidated transcript indicating the performance in all semesters.

Major Courses in Econometrics and Data Management

Programme	B.A. Econometrics and Data Management Honours				
Course Title	PRINCIPLES OF ECONOMICS				
Type of Course	Major				
Semester	I				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Basic Economics Course of 0 – 99 level				
Course Summary	This course explores important principles, basic theories and models, various economic systems and other fundamental aspects of economics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic principles of economics and its real-world applications.	U	C	Instructor-created exams / Quiz
CO2	Develop and practice the skill of thinking like an economist.	Ap	P	Practical Assignment / Observation of Practical Skills
CO3	Help the beginning student master the principles essential for understanding the economizing problem, specific economic issues, and policy alternatives.	U	P	Seminar Presentation / Group Discussion
CO4	Understand and apply the economic perspective and reason accurately and objectively about economic matters.	Ap	C	Instructor-created exams / Home Assignments
CO5	Instil in students a fascination with both the functioning of the economy and the power and breadth of economics	U	F	Writing assignments
CO6	Demonstrate critical thinking and problem-solving skills by applying the acquired knowledge to address complex economic challenges in the contemporary world.	Ap	P	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Basic Principles of Economics		10	15
	How People Make Decisions			
	1	People Face Trade-Offs	1	
	2	The Cost of Something Is What You Give	1	
	3	Rational People Think at the Margin	1	
	4	People Respond to Incentives	1	
	How People Interact			
	5	Trade Can Make Everyone Better Off	1	
	6	Markets Are Usually a Good Way to Organize Economic Activity	1	
	7	Governments Can Sometimes Improve Market Outcomes	1	
	How the Economy as a Whole Works			
	8	A Country's Standard of Living Depends on its Ability to Produce Goods and Services	1	
	9	Prices Rise When the Government Prints Too Much Money	1	
10	Society Faces a Short-Run Trade-Off between Inflation and Unemployment	1		
II	Thinking like an Economist		10	15
	11	The Economist as Scientist: The Scientific Method: Observation, Theory, and More Observation, The Role of Assumptions, Economic Models, The Circular-Flow Diagram, The Production Possibilities Frontier, Microeconomics and Macroeconomics;	4	
	12	The Economist as Policy Adviser: Positive versus Normative Analysis, Why Economists' Advice Is Not Always Followed;	3	
	13	Why Economists Disagree: Differences in Scientific Judgments, Differences in Values, Perception versus Reality	3	
III	Limits, Alternatives, and Choices		10	15
	14	The Economic Perspective: Scarcity and Choice, Purposeful Behaviour, Marginal Analysis: Comparing Benefits and Costs	3	
	15	Individual's Economizing Problem	2	
	16	Society's Economizing Problem	2	
	17	Unemployment, Growth, and the Future: A Growing Economy, Present Choices and Future Possibilities, A Qualification: International Trade	3	
IV	The Market System		15	25
	18	Economic Systems: Laissez-Faire Capitalism, The Command System, The Market System	2	
	19	Characteristics of the Market System: Private Property, Freedom of Enterprise and Choice, Self-Interest, Competition, Markets and Prices, Technology and Capital Goods, Specialization, Use of Money, Active but Limited Government	2	
	20	Five Fundamental Questions: What Will Be Produced? How Will the Goods and Services Be Produced? Who Will	4	

		Get the Output? How Will the System Accommodate Change? How Will the System Promote Progress?		
	21	The “Invisible Hand” : The Demise of the Command Systems, The Incentive Problem	3	
	22	How the Market System Deals with Risk : The Profit System, Shielding Employees and Suppliers from Business Risk, Benefits of Restricting Business Risk to Owners	4	
	Open Ended Module		30	
V		Discussion based on different economic systems prevailing in the world		
		Practical Assignments on economic decision making in different economies in the world		
		Seminar on the influence of institutions, regional cooperations, blocks and international cartels on economic policies		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Mankiw, N. G. (2021). *Principles of Economics*, 9TH EDITION, Cengage Learning. **(Module 1 and Module 2)**
2. Stiglitz, J. E., & Walsh, C. E. (2006). *Economics*. W. W. Norton. **(Module 2)**
3. McConnell, C. R., Brue, S. L., & Flynn, S. M. (2015). *Economics: Principles, Problems, and Policies*. TWENTIETH EDITION, McGraw-Hill Education. **(Module 3 and Module 4)**

ADDITIONAL READINGS

1. Team, C., & Press, O. U. (2017). *The economy: Economics for a Changing World*. Oxford University Press, USA.
2. Klein, G., & Bauman, Y. (2010). *The cartoon Introduction to economics: Volume One: Microeconomics*. Macmillan.
3. Sowell, T. (2015). *Basic Economics: A Common Sense Guide to the Economy*, FIFTH EDITION, Basic Books, New York.
4. Wheelan, C. (2010). *Naked Economics: Undressing the Dismal Science (Fully Revised and Updated)*. W. W. Norton & Company.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	3	-
CO 2	-	2	2	-	-	-	3	2	-
CO 3	-	3	2	-	1	-	1	1	-
CO 4	-	3	-	-	-	-	-	2	-
CO 5	-	-	-	-	-	-	2	3	-
CO 6	-	3	2	-	-	-	2	2	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	BUDGET ANALYSIS				
Type of Course	Major				
Semester	II				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Basic Economics Course of 0 – 99 level				
Course Summary	This course explores important concepts, documents and other fundamental aspects of budget process with reference to Central Budget in India.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic concepts and documents of budgeting.	U	C	Instructor-created exams / Quiz
CO2	Develop and practice the skill of interpretation of budget.	Ap	P	Practical Assignment / Observation of Practical Skills
CO3	Understand the roles and responsibilities of various stakeholders in the budget process.	U	P	Seminar Presentation / Group Discussion
CO4	Appreciate the insights of public finance in the real world	Ap	C	Instructor-created exams / Home Assignments
CO5	Develop critical thinking about policy issues by emphasizing the links between economic analysis and current political issues.	Ap	P	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to the Budget		10	15
	1	Budget: Definition, Budget in India	1	
	2	Features of Budget: Budget is prepared on Cash Basis, Rule of Lapse, Realistic Estimation, Budget to be on Gross/Net Basis, Form of Estimates to correspond to Accounts, Estimates to be on Departmental Basis	3	
	3	Scope of Budget: Budget Estimates, Revised Estimates, Actuals of the year preceding the current year, Consolidated Fund of India, Contingency Fund of India and the Public Account, Revenue account and Capital account	3	
	4	Budget documents: Annual Financial Statement (AFS), Demands for Grants (DG), Finance Bill, Statements mandated under FRBM Act, Expenditure Budget, Receipt Budget, Expenditure Profile	3	
II	Roles and Responsibilities		10	15
	5	Role of Legislature: Role of Parliament, President's Approval, Summary for The President, Summary for The Cabinet	2	
	6	Budget Presentation and Bills: Budget Presentation, General Discussions, Cut-Motions, Guillotine, Appropriation Bill, Finance Bill, Vote on Account	2	
	7	Role of Executive: Role of The Executive in The Budget Process, Role of Ministry of Finance, Role of Budget Division, Department of Expenditure, Administrative Ministries, Financial Advisers	2	
	8	Role of Constitutional Authorities: Controller General of Accounts, Niti Aayog, Finance Commission, Reserve Bank of India, Comptroller and Auditor General of India	2	
	9	Parliamentary Control: Estimates Committee, Department Related Standing Committees, Public Accounts Committee	2	
III	Budget Process		10	15
	10	Budget Circular	1	
	11	Estimates of Receipts: Revenue Receipts, Estimates of Capital Receipts	1	
	12	Estimates of Expenditure: General Guidelines for Preparation of Estimates of Expenditure, Information for Pre-Budget Discussions, Pre-Budget Discussions & Finalization of Provisional Estimates	2	
	13	Provisions for North Eastern Region and Sikkim	1	
	14	Special Instructions for the Composite Demand for Civil 'Pensions': Arrangements for submission of estimates, Compassionate Fund, Central Government Employees' Insurance Scheme	1	
	15	Estimates to be included in Demands for Grants Controlled by Budget Division	1	
	16	Instructions related to allocation for SC/ ST sub-component	1	

	17	Disclosures under FRBM Act: Guarantees given by the Government, Tax Revenues raised but not realized, Arrears of Non -Tax Revenues, Asset Register	2	
IV	Budget Finalization		15	25
	18	Budget Activities	1	
	19	Timelines for Budget Activities	2	
	20	Scrutiny of Statement of Budget Estimates (SBE): Centre's Expenditure, Centrally Sponsored Schemes and other Transfers, Expenditure Type (voted expenditure, charged expenditure, recovery, receipt)	5	
	21	Outcome Budget / Output-Outcome Monitoring Framework (OOMF)	2	
	22	Budget in Parliament: Lok Sabha, Rajya Sabha	5	
V	Open Ended Module		30	
		Analyze the budget allocations for specific sectors (e.g., education, healthcare, infrastructure) over time. Look for trends and changes.		
		Consider how the government's commitment to addressing various issues is reflected in budget allocations		
		Discuss the impact of budget decisions on different groups, regions, and sectors		
		Research the concept of outcome budgeting, which emphasizes efficient resource utilization and fiscal discipline		
		Discuss pressures affecting public sector budgeting, including the quantity of money available and how it's allocated		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Budget Manual 2022, Ministry of Finance, Government of India (**All modules**)

ADDITIONAL READINGS

1. Shim, J. K., & Siegel, J. G. (2008). *Budgeting basics and beyond*. Wiley.
2. Burt, E. S., Fleming, P. H., Clark, M. B., & Valuation, L. C. O. D. O. F. M. a. R. (1988). *Financial Budget Manual*.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	-	2	-	-	-	3	1	-
CO 3	-	-	-	-	-	-	-	3	-
CO 4	-	-	-	-	-	-	3	3	-
CO 5	-	2	-	-	2	-	3	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ANALYTICAL TOOLS FOR ECONOMICS I				
Type of Course	Major				
Semester	III				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Course of 0 – 99 level				
Course Summary	Students shall acquire in-depth knowledge and able to explain the concepts of sets, functions, Differentiation, Integration and their applications in Economics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To Understand the basic concept of set theory and functions	U	C	Instructor-created exams / Quiz
CO2	To Apply differentiation in solving economic problems	Ap	P	Practical Assignment / Observation of Practical Skills
CO3	To apply integration in solving economic problems	U	P	Seminar Presentation / Group Discussion
CO4	To analyse relationship between economic variables mathematically, analyze, optimize and interpret them	An	P	Instructor-created exams / Home Assignments
CO5	To equip the students to identify a problem, investigate to find out relevant facts and find a logical conclusion	Ap	F	Viva Voce/Project
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks		
I	Set theory and Functions		10	15		
	1	Set theory: concepts, set operations, relations, functions and their properties	4			
	2	Elementary types of functions – linear, quadratic, cubic, polynomial, exponential and logarithmic	3			
	3	Graphs of functions-linear and quadratic algebraic functions	1			
	4	Applications of functions in Economics	2			
II	Differential Calculus		18	25		
	5	Limits and continuity of functions	2			
	6	Meaning of Derivative, Rules, Derivative of single variable and multi variable (except trigonometric function)	2			
	7	Derivatives of implicit functions and Inverse functions	2			
	8	Rate of change- Slope of a curve	2			
	9	Partial Differentiation	2			
	10	Marginal concepts related to Economic functions, Elasticity	2			
	11	Second order Derivatives	2			
	12	Conditions for Optimisation, Single and Multivariate Optimisation	2			
	13	Application in consumption and production decisions	2			
	III	Integral Calculus			10	15
		14	Meaning of integral, The Definite Integral, Rules of Integration, Integration by substitution		3	
		15	Integration by parts		2	
16		Area under a curve-estimation of producers and consumers surplus.	1			
17		The First and Second Fundamental Theorems of Calculus	2			
18		The Mean Value Theorem for integrals.	2			
IV		Linear Models and Matrix		10	15	
	19	Matrix: Meaning, Types and operations	2			
	20	Linear Models and Matrix Algebra and their Applications in Economics	3			
	21	Rank of a Matrix- Solving linear equations using Matrix Inverse	2			
	22	Determinants, Properties of Determinants and Cramer's Rule and their applications	3			
V	Open Ended Module		12			

	1	Develop critical thinking and problem-solving skills by applying statistical methods in Economic theories		
	2	Discussion based on statistical tools		
	3	Practical Assignments		
	4	Seminar		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Chiang, A and Wainwright, K. (2005). Fundamental methods of mathematical economics. Boston, Mass. McGraw- Hill/Irwin. EC (1262)-18.08.202219(**Module 1,2,3,4&5**)
2. Hoy, M., Livernois, J., McKenna, C., Rees, R., Stengos, T. (2001). Mathematics for Economics, Prentice-Hall India. (**Module 1,2,3,4&5**)
3. Sydsaeter and P. Hammond, Mathematics for Economic Analysis, Pearson Educational Asia: Delhi, 2002. (**Module 1,2,3,4&5**)
4. Introduction to Mathematical Economics, Third edition, Edward T Dowling, Schaum's outline series, McGraw – Hill (Module 1,2,3,4&5)

ADDITIONAL READINGS

1. A. Chiang & K. Wainwright: Fundamental Methods of Mathematical Economics, McGraw Hill.
2. E. Silberberg & Suen: The Structure of Economics, McGraw Hill
3. Simon & Blume, Mathematics for Economists, Viva Books.
4. Rudin W.: Principles of Mathematical Analysis, McGraw-Hill
5. D. Varberg, E. J. Purcell, S. E. Rigdon. Calculus, Eighth Edition, Prentice Hall.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	-	-	1	-	-	2	-	3
CO 3	-	-	-	1	-	-	2	-	3
CO 4	-	-	-	1	-	-	2	-	3
CO 5	-	2	-	-	-	-	2	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	BASICS OF ECONOMIC DATA MANAGEMENT				
Type of Course	Major				
Semester	III				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Courses of 100 – 199 level				
Course Summary	This course provides students with foundational knowledge in data, data management, data analysis, and the relationship between economic theory and data.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand how data, databases, and data management relate to econometric theory	U	F	Quiz/Instructor-created exams
CO 2	Evaluate contemporary socio-economic issues through diverse methods of data collection	E	P	Group Discussion
CO 3	Create an idea about data analysis software commonly employed in Economic Research	C	C	Writing assignments and instructor-created exams
CO 4	Apply acquired knowledge for collecting, processing, and interpreting relevant Data	AP	P	Practical Assignment/Seminar Presentation
CO 5	Evaluate economic problems using various data sources, fostering a comprehensive approach to problem-solving.	E	P	Practical Assignment
CO 6	Demonstrate practical skill to analyse complex economic problems in the contemporary world	C	M	Practical Assignment/Presentation

* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C)
- Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge(M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I		Origins of Data	10	15
	1	Data: Introduction to Data, What is Data? Definitions	2	
	2	Database: What is database and database management	1	
	3	Data structures: Cross-sectional data - Time series data- Panel data or Longitudinal data- experimental data- Pooled cross-section	1	
	4	Different levels of measurement: Nominal Scale, Ordinal Scale, Interval Scale and Ratio Scale	1	

	5	Economic theory and data: An introduction to the role of data in economic history –From Physiocrats to Modern economists	1	
	6	Physiocrats – Francois Quesnay – Tableau Economique	1	
	7	David Hume	1	
	8	William Petty	1	
	9	Simon Kuznets	1	
II	Methods of Data Collection		15	20
	10	Collection of Primary data: Observation, Surveys, Interviews and Focus Groups	2	
	11	Collection of Secondary data: Published data & Unpublished data	1	
	12	Collecting Data from existing Indian Data Sources (Concepts only): National Sample Survey Organization (NSSO), Central Statistical Organization (CSO), National Statistical Office (NSO), Annual Survey of Industries (ASI), Reserve Bank of India (RBI)- Handbook of Statistics on Indian Economy- SEBI Handbook of Statistics- Datasets (Employee Provident Fund Organization [EPFO], Ministry of Corporate Affairs [MCA], Database on Indian Economy [DBIE], Census datasets- Open Government Data Platform India- National Family Health Survey (NFHS)	6	
	13	Collecting Data from existing International Data Sources (Concepts only): UN Data- Monthly Bulletin of Statistics (MBS), SDG Indicators, UN Comtrade database, United Nations Conference on Trade and Development (UNCTAD), World Development Indicators (WDI), IMF Databases -World Economic Outlook Databases, Climate Change Indicators Dashboard, International Financial Statistics, Financial Access Survey, Government Finance Statistics- The World Bank Data Catalog- The Global Findex Data Base- Federal Reserve Economic Database (FRED)	6	
III	Data processing, Data analysis and Interpretation		12	20
	14	Data Processing Operations: Editing, Coding, Classification, and Tabulation	2	
	15	Data analysis: Types of analysis -Descriptive analysis, Correlation analysis, Causal analysis, Multivariate analysis and Inferential analysis	3	
	16	Data analysis software for Social Science (Concept only): SPSS, R	2	
	17	STATA, SAS	2	
	18	Python	1	
	19	Interpretation: Meaning of Interpretation, Why Interpretation, Technique of Interpretation	2	
IV	Data Management		11	15

	20	Data Management: What is Data Management? – Why should you do data Management?- Data life Cycle: Old data Lifecycle - New data Lifecycle, Data Roadmap	4	
	21	Planning for data management: Importance of planning for data management- Creating a data management plan-What a data management plan covers	3	
	22	Data Policies: Data Privacy Policies- Data retention Policies - Data ownership Policies - Data and copyright Policies - Data management Policies – Data Sharing Policies	4	
V	Open ended module		12	
		Select an economic dataset and conduct a comprehensive analysis.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Nils B Weidmann (2023): Data management for Social Scientists, Cambridge University Press, United Kingdom (**Module 1,2,4&5**)
2. Hajela T. N. (2008): History of Economic Thought, Ane Book Pvt. Ltd, New Delhi (**Module 1**)
3. Kristin Briney (2015): Data management for Researchers: Organize, Maintain and Share your Data for Research Success (**Module 1,2,4&5**)
4. C. R Kothari & Gaurav Garg (2023): Research Methodology, 5th edition, New Age International Publishers, New Delhi (**Module 2 & 3**)

ADDITIONAL READINGS

1. Gabor Bekes & Gabor Kezdi (2021): Data Analysis for Business, Economics and Policy, Cambridge University Press, United Kingdom
2. Damodar N Gujarati, Dawn C Porter and Sangeetha Gunasekar, Basic Econometrics, 5th Edition, McGraw Hill Education
3. Wayne L. Winston (2017) Microsoft Excel 2016 - Data Analysis and Business Modeling, PHI Learning Private Limited.
4. Gary Koop,(2013) Analysis of Economic Data, John Wiley and Sons Ltd
5. Charles D. Kirkpatrick (2012): Time the Markets: Using Technical Analysis to Interpret Economic Data, FT Press
6. R. Mark Sirkin(2006) Statistics for the Social Sciences, SAGE Publications, New Delhi
7. Lambert K A(2015) Fundamentals of Python-First programs, Cengage Learning India
8. Jared P Lander(2014)R for Everyone: Advanced Analytics and Graphics, Pearson Education, India

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<https://datacatalog.worldbank.org/home>

<https://www.ers.usda.gov/data-products/international-macroeconomic-data-set.aspx>

<https://www.imf.org/en/Data#data>

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	-	2	-	-	-	-	-
CO 2	-	2	-	3	1	-	-	-	-
CO 3	-	-	-	3	-	-	-	-	-
CO 4	-	-	-	-	-	-	3	-	-
CO 5	-	3	-	2	1	-	-	-	3
CO 6	-	-	2	-	-	-	-	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓		✓	✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INTERMEDIATE MICROECONOMICS				
Type of Course	Major				
Semester	IV				
Academic Level	200 – 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics of 100 – 199 level				
Course Summary	This course focuses on the behaviour of consumers under certain conditions, optimisation in production, different conditions prevailing in competitive markets and the choices of a competitive firm.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To understand the core concepts and methods of microeconomics	U	C	Instructor-created exams / Practical Assignment
CO2	Understand the basic elements of consumption and production theories.	U	F	Writing assignments / Quiz
CO3	To analyze the consumer choice under different conditions of preferences.	An	P	Observation of Practical Skills / Group Discussion
CO4	Apply the economic perspective and reason accurately in relation to different competitive market conditions.	Ap	P	Observation of Practical Skills / Home Assignments
CO5	To solve and interpret stylized problems based on microeconomic models.	An	P	Group Discussion / Instructor-created exams

CO6	Use microeconomic models to evaluate real-world microeconomic phenomena and issues.	E	M	Practical Assignment Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)				
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Choice Under Certainty		10	15
	1	Optimal Choice determination: Budget Line – Marginal Rate of Substitution;	2	
	2	Consumer's Equilibrium using indifference curves -	2	
	3	Interior Optimum - Boundary Optimum.	2	
	4	Optimisation: Perfect Substitutes and Perfect Complements.	2	
	5	Estimating Utility Functions and implication of the MRS condition.	2	
II	Comparative Statics in Consumer Theory		14	20
	6	Offer Curves: Income Offer Curves- Engel Curves – Normal, Inferior and Giffen Goods –	3	
	7	Perfect Substitutes and Perfect Complements – Homothetic and Quasilinear preferences - Price Offer Curves:	2	
	8	Perfect Substitutes and Perfect Complements – Discrete Goods – Inverse Demand Function	1	
	9	Revealed Preference Approach: WARP and SARP;	2	
	10	The total change in demand: The substitution effect and income effect with suitable examples.	2	
	11	Rates of changes.	1	
	12	Elasticity-Price elasticity of demand-The elasticity of linear demand curve-Income elasticity of demand; cross elasticity of demand;	2	
	13	Consumer Surplus.	1	

III	Optimisation In Production		12	17
	14	Short run and long run production function- Cost curves- Profit Maximisation in the Short Run and Long Run.	5	
	15	Cost Minimisation - Returns to Scale and the Cost Function	5	
	16	Cobb Douglas Production Function	2	
IV	The Analysis of Competitive Markets		12	18
	17	Short run and long run Equilibrium in perfectly competitive firm and industry	3	
	18	Monopoly – linear demand curve – Mark up pricing – Inefficiency of monopoly-Dead Weight Loss-	2	
	19	Price Discrimination-bundling-Two-part tariffs	2	
	20	Monopolistic Competition-Product differentiation-selling cost	2	
	21	Oligopoly-collusive versus non collusive oligopoly-	2	
	22	Kinked demand curve model.	1	
V	Open ended module		12	
		Discussion based on different market structures in the world		
		Seminars to analyse changing equilibrium conditions under different market structures.		
		Practical Assignments to compare and relate market of different products with different market structures.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. H.R Varian (2009), Intermediate Microeconomics- A Modern Approach. W W Norton & Co

2. Pindyck, R. and Rubinfeld, D. Microeconomics (2017, Ninth Edition). ISBN: 978-1-292-21-331-6.

ADDITIONAL READINGS

1. Dominick Salvatore (2013): Microeconomics: Theory and Applications- 5th Edition, Oxford
2. A Koutsoyiannis (1979): Modern Microeconomics- 2nd Edition, Macmillan
3. Gregory Mankiw (2006) Principles of Microeconomics, (Paperback) South Western
4. Robert Y Awh (1976): Microeconomics: Theory and Applications- John Wiley & Sons.
5. Watson and Getz (2004): Price Theory and its Uses- 5th Edition, AITBS Publishers and Distributors.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	1	-	-	-	-	-	1	1
CO 2	3	1	-	1	-	-	1	1	1
CO 3	3	2	-	1	-	-	1	2	1
CO 4	-	3	2	1	1	-	1	2	2
CO 5	2	1	-	1	-	-	2	2	3
CO 6	-	2	2	2	2	-	3	2	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INTERMEDIATE MACROECONOMICS				
Type of Course	Major				
Semester	IV				
Academic Level	200 - 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Course of 100 – 199 level				
Course Summary	This course explores important concepts, basic theories and models and other fundamental macro aspects of economics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the important concepts of economics and its real-world applications.	U	C	Instructor-created exams / Quiz
CO2	Develop and practice the skill of thinking like an economist.	Ap	P	Practical Assignment / Observation of Practical Skills
CO3	Help the student master the macroeconomic aspects essential for understanding the economic climate, specific economic issues, and policy alternatives.	U	P	Seminar Presentation / Group Discussion
CO4	Understand and apply the macroeconomic perspective and reason accurately and objectively about economic matters.	Ap	C	Instructor-created exams / Home Assignments
CO5	To make the students curious about the functioning of the economy and the power and breadth of economics	U	F	Writing assignments
CO6	Demonstrate critical thinking and problem-solving skills by applying the acquired knowledge to address complex economic challenges in the contemporary world.	Ap	P	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Classical Macroeconomics		12	17
	1	The Classical Revolution, Production, Employment: Labor Demand, Labor Supply,	2	
	2	Equilibrium Output and Employment: The Determinants of Output and Employment, Factors That Do Not Affect Output,	2	
	3	The Quantity Theory of Money: The Equation of Exchange, The Cambridge Approach to the Quantity Theory,	2	
	4	Theory, The Classical Aggregate Demand Curve, The Classical Theory of the Interest Rate,	3	
	5	Policy Implications of the Classical Equilibrium Model: Fiscal Policy, Monetary Policy	3	
II	The Keynesian System		12	17
	6	The Problem of Unemployment, The Simple Keynesian Model: Conditions for Equilibrium Output,	2	
	7	The Components of Aggregate Demand: Consumption, Investment, Government Spending and Taxes,	2	
	8	Determining Equilibrium Income, Changes in Equilibrium Income,	1	
	9	Fiscal Stabilization Policy,	1	
	10	Exports and Imports in the Simple Keynesian Model Money in the Keynesian System: Interest Rates and Aggregate Demand,	2	
	11	The Keynesian Theory of the Interest Rate,	2	
	12	The Keynesian Theory of Money Demand, The Effects of an Increase in the Money Supply	2	
III	The orthodox Keynesian school		12	17
	13	The IS–LM model for a closed economy: Money Market Equilibrium: The LM Schedule, Product Market Equilibrium:	2	
	14	The IS Schedule, The IS and LM Schedules Combined, Underemployment equilibrium in the Keynesian model,	2	
	15	Factors That Affect Equilibrium Income and the Interest Rate:	1	
	16	Monetary Influences: Shifts in the LM Schedule, Real Influences: Shifts in the IS Schedule,	1	
	17	The Relative Effectiveness of Monetary and Fiscal Policy: Policy Effectiveness and the Slope of the IS Schedule, Policy Effectiveness and the Slope of the LM Schedule,	2	
	18	The IS–LM model for an open economy,	2	

	19	The Phillips curve and orthodox Keynesian economics, The central propositions of orthodox Keynesian economics	2	
IV	Aggregate Supply and Demand		13	19
	20	The Keynesian Aggregate Demand Schedule, The Keynesian Aggregate Demand Schedule Combined with the Classical Theory of Aggregate Supply,	3	
	21	A Contractual View of the Labor Market: Sources of Wage Rigidity, A Flexible Price–Fixed Money Wage Model, Labor Supply and Variability in the Money Wage: Classical and Keynesian Theories of Labor Supply,	3	
	22	The Keynesian Aggregate Supply Schedule with a Variable Money Wage, Policy Effects in the Variable-Wage Keynesian Model,	3	
	23	The Effects of Shifts in the Aggregate Supply Schedule: Factors That Shift the Aggregate Supply Schedule	4	
V	Open ended module		12	
		Discussion based on different schools of thought		
		Practical Assignments		
		Seminar		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Froyen, R. T., (2013). Study guide macroeconomics theories and policies, tenth edition, Pearson Education India
2. Brian Snowden and Howard R. Vane (2005), Modern Macroeconomics: Its Origins, Development and Current State, Edward Elgar

ADDITIONAL READINGS

1. Goodwin, N., Harris, J. M., Nelson, J. A., Roach, B., & Torras, M. (2015b). Macroeconomics in context. Routledge.
2. Sikdar, S. (2020). Principles of macroeconomics. Oxford University Press.
3. Mankiw, N. G., Kneebone, R. D., & McKenzie, K. J. (2023). Principles of Macroeconomics, 9th Edition. Cengage Canada.
4. DeLorme, C. D., & Ekelund, R. B. (1983). Macroeconomics. Plano, Tex.: Business Publications.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO 7	PSO 8	PSO 9
CO 1	3	-	-	1	-	-	-	-	-
CO 2	1	1	1	1	-	-	2	1	-
CO 3	3	2	-	2	-	-	2	1	-
CO 4	3	2	-	2	-	-	3	2	-
CO 5	2	1	-	-	-	-	-	1	-
CO 6	1	-	2	1	3	-	2	1	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ANALYTICAL TOOLS FOR ECONOMICS II				
Type of Course	Major				
Semester	IV				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Course of 0 – 99 level				
Course Summary	This course introduces students about statistical methods for economic analysis. Students shall acquire in-depth knowledge in the concepts of probability, probability distributions, theory of estimation, hypothesis testing and their applications in economic analysis.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Basic understanding of computation of probability.	U	C	Instructor-created exams / Quiz
CO2	Identify various probability distributions and its applications	Ap	P	Practical Assignment / Observation of Practical Skills
CO3	Understand estimation of mean, variance and population of parameters of sampling distributions	U	P	Seminar Presentation / Group Discussion
CO4	Understand and Apply hypothesis testing for economics theories	Ap	C	Instructor-created exams / Home Assignments
CO5	Develop critical thinking and problem-solving skills by applying statistical methods in Economic theories and acquired knowledge to address complex economic challenges in the contemporary world.	Ap	F	Viva Voce/Project
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Elementary Probability Theory		14	21
	1	Concepts- Set theory- Permutations and Combinations, Definitions of Probability - classical, empirical and axiomatic approaches- Addition and multiplication laws	3	
	2	Conditional probability- Bay's theorem	2	
	3	Random variables- probability distribution- Mathematical expectation- moments	3	
	4	Two random variables: joint, Marginal and conditional probability functions	3	
	5	Computing expected values- Covariance and correlation coefficients	3	
Probability Distributions			11	16
II	6	Discrete Probability Distributions, Binomial , Poisson, Uniform - simple applications	4	
	7	Continuous probability distributions- Normal, Lognormal and Exponential Distributions (Derivations are not expected)	4	
	8	Concept of law of large numbers and Central limit theorem	1	
	9	Distribution function- Distribution function of one random variable	2	
III	Theory of Estimation		12	17
	10	Statistical Inference, Concept of population, sample- Sampling distributions- Standard error	3	
	11	Distributions of sample mean, Sample variance - chi square Student's t, and F distributions	3	
	12	Small and large sample properties of Z, t, Chi Square and F	2	
	13	Estimation of population parameters using method of OLS	1	
	14	Estimation of population parameters using method of maximum likelihood procedures	1	
	15	Point and interval estimation- Confidence intervals for population parameters	1	
	16	Properties of estimators	1	
IV	Testing of Hypothesis		11	16
	17	Simple and composite hypothesis- Null and alternative hypothesis	1	
	18	Type I and Type II error, Critical region- Level of significance, Power of a test	1	
	19	Test procedure - Test of significance in respect of Mean, Proportion, Variance and Correlation coefficient and their differences	2	
	20	Chi Square test of goodness of fit, and test for independence of attributes	2	
	21	Non parametric tests - Sign test, Wilcoxon- Mann Whitney U Test, Signed rank test	3	
	22	Kruskal Wallis test, Wald-Wolfowitz test	2	

V	Open Ended Module		12	
	1	Develop critical thinking and problem-solving skills by applying statistical methods in Economic theories		
	2	Discussion based on statistical tools		
	3	Practical Assignments		
	4	Seminar		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Paul G. Hoel, Sidney C. Port, Charles J. Stone: Introduction to Probability Theory, Universal Book Store, Delhi (Module 1)
2. John E. Freund's Mathematical Statistics with Applications, Pearson, 2014 (Module2)
3. G Casella and R L Berger, Statistical Inference, Duxbury Advanced Series, Cengage Learning, 200 and William G. Cochran, Sampling Techniques, John Wiley, 2007(Module 3)
4. Mood, A.M., F.A.Greybill and D.C. Boes: Introduction to the theory of statistics, McGraw Hill (Module 4)
5. Goon, Gupta and Dasgupta, Fundamentals of Statistics, Volume 1, 2, World Press(Module 4)

ADDITIONAL READINGS

1. Taro Yamane, Statistics: An Introductory Analysis, Harper & Row, Edition 3,1973
2. Hoel PG: Introduction to Mathematical Statistics, John Wiley & Sons, Edition 4,1971
3. YP Agarwal: Statistical Methods: Concepts, Application and Computation, Sterling Publishers1986
4. Sidney Siegal, N. John Castellan: Non parametric Statistics for Behaviour Sciences, Edition 2, 1988, McGraw-Hill
5. Tulsian, P.C and Vishal Pandey: Quantitative Techniques, Pearson Education, NewDelhi
6. S.P. Gupta: Statistical Methods, Sulthan Chand and Sons, NewDelhi.
7. Hooda R.P: Statistics for Business and Economics, Mac Million, NewDelhi
8. Alpha C Chiang: Fundamental Methods of Mathematical Economics, 2 nd Ed. -International Student Edition, McGrawhill
9. Edward T Dowling: Introduction to Mathematical Economics, Third Edition, Shaum's Outlines, Tata McGrawhill Publishing Co. Ltd, New Delhi.
10. SreenathBaruah: Basic Mathematics and its applications in Economics, Macmillan India Ltd

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	-	-	1	-	-	3	1	
CO 3	1	-	-	1	-	-	-	-	3
CO 4	-	-	1	2	-	-	2	-	3
CO 5	-	-	-	-	-	-	2		3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ADVANCED MICROECONOMICS				
Type of Course	Major				
Semester	V				
Academic Level	300-399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Course of 0 – 99 level				
Course Summary	This course focuses on market on factor inputs, various aspects of general equilibrium and economic efficiency, the behaviour of consumers under uncertain conditions and basic concepts of behavioural economics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To understand the fundamental methods and theories of microeconomics	U	C	Instructor-created exams / Practical Assignment
CO2	Understand the functioning of factor markets.	U	C	Writing assignments / Quiz
CO3	To analyze the concept of general equilibrium and welfare analysis.	An	P	Observation of Practical Skills / Group Discussion
CO4	Apply microeconomic concepts to analyse real-life economic situations.	Ap	P	Observation of Practical Skills / Home Assignments
CO5	To evaluate consumer behaviour under uncertain conditions	E	P	Group Discussion / Instructor-created exams
CO6	Develop microeconomic models to evaluate real-world microeconomic phenomena and issues.	C	M	Practical Assignment Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)				
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs:	Marks
I	MARKET FOR FACTOR INPUTS		13	18
	1	Competitive Factor Markets - Demand for a Factor input with a single variable input	3	
	2	Demand for a Factor input with a several variable inputs	3	
	3	Supply of inputs - Equilibrium	3	
	4	Factor markets with Monopoly Power	2	
	5	Factor markets with Monopsony Power	2	
II	GENERAL EQUILIBRIUM AND ECONOMIC EFFICIENCY		15	20
	6	Efficiency in Exchange - The Advantages of trade	2	
	7	Edgeworth Box Diagram - Efficient Allocations	2	
	8	Contract Curve - Economic Efficiency of Competitive Markets	2	
	9	Equity and Efficiency - The Utility Possibilities Frontier	2	
	10	Social Welfare Functions	2	
	11	Equity and Perfect Competition	1	
	12	Efficiency in Production - Input efficiency - Production Possibility Frontier - Marginal Rate of Transformation	3	
	13	Efficiency in Output Markets	1	
III	UNCERTAINTY AND CONSUMER BEHAVIOUR		10	16
	14	Describing Risk- Probability- Expected Value – Variability -	1	
	15	Preferences towards Risk – Risk Averse- Risk Neutral – Risk Loving	2	
	16	Reducing Risk – Diversification – Law of Large Numbers – Actuarial Fairness	2	
	17	The Value of Information	2	
	18	Demand for Risky Assets – Trade-off between risk and return – Investor’s Choice Problem	3	
IV	BEHAVIOURAL ECONOMICS		10	16
	19	Reference Points and Consumer’s preferences	3	
	20	Endowment Effect – Loss Aversion – Framing- Fairness	3	
	21	Rules of Thumb and Biases in Decision making –	2	
	22	Anchoring – Rules of Thumb – Law of Small Numbers	2	
V	Open Ended Module		12	
	Discussion based on different market securities and its valuation.			
	Practical Assignments about firms’ decision making in calculating the worthiness of a capital investment.			

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Pindyck, R. and Rubinfeld, D. Microeconomics (2017, Ninth Edition). ISBN: 978-1-292-21-331-6.
2. H.R Varian (2009), Intermediate Microeconomics- A Modern Approach. W W Norton & Co

ADDITIONAL READINGS

1. Dominick Salvatore (2013): Microeconomics: Theory and Applications- 5thEdition, Oxford
2. A Koutsoyiannis (1979): Modern Microeconomics- 2ndEdition, Macmillan
3. Gregory Mankiw (2006) Principles of Microeconomics, (Paperback) South Western
4. Robert Y Awh (1976): Microeconomics: Theory and Applications- John Wiley & Sons.
5. Watson and Getz (2004): Price Theory and its Uses- 5thEdition, AITBS Publishers and Distributors.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	3	1	-	1	-	-	1	1	-
CO 3	3	2	-	1	-	-	1	1	-
CO 4	-	3	2	1	1	-	1	2	2
CO 5	2	1	-	1	-	-	2	2	2
CO 6	-	2	2	2	2	-	3	2	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INTRODUCTORY ECONOMETRICS				
Type of Course	Major				
Semester	V				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	1. Analytical Tools for Economics I of 200-299 level 2. Analytical Tools for Economics II of 200-299 level				
Course Summary	This course provides a comprehensive understanding of econometrics, covering the meaning, scope, and methodology of the field, along with techniques such as regression analysis, OLS, and hypothesis testing. Students also learn to apply advanced concepts, including, the coefficient of determination, and the incorporation of dummy variables for more nuanced regression analyses.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Recall definitions of econometrics, regression analysis, and other foundational terms and concepts.	R	F	Quiz/Instructor-created exams
CO 2	Understand the uses and various approaches of econometrics, including the methodology underlying econometric analyses.	U	P	Instructor-created exams
CO 3	Apply different application of hypothesis testing.	AP	C	Practical Assignments/ Instructor-created exams
CO 4	Analyse real-world economic data with econometric techniques learned throughout the course and interpret the results effectively.	AN	P	Practical Assignment/Seminar Presentation
CO 5	Evaluate the significance of econometric findings, considering both statistical and practical implications.	E	P	Practical Assignment
CO 6	Apply various econometric techniques to address complex real-world problems.	AP	M	Practical Assignment/
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P), Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	An Overview of Econometrics & Regression Analysis		15	20
	1	What is Econometrics? Uses of Econometrics	1	
	2	Alternative Econometric Approaches	1	
	3	Methodology of econometrics	1	
	4	What is Regression Analysis? Dependent Variables, Independent Variables, And Causality	2	
	5	Linear regression model	2	
	6	The nature and sources of data	1	
	7	The concept of PRF - Significance of stochastic error term -The SRF	1	
	8	Simple Linear Regression Model: Method of Ordinary Least Squares-Assumptions underlying the method of least squares	3	
	9	Properties of estimators - Gauss Markov theorem	1	
	10	Coefficient of determination	1	
11	R ² –Normality assumption	1		
II	Hypothesis Testing and Statistical Inference		12	15
	12	Hypothesis testing - T test and F test - P value	4	
	13	Practical versus statistical significance - Prediction.	2	
	14	Testing the overall significance of the regression model -F test	3	
	15	Testing the equality of two regression coefficients: restricted least squares - Chow test	3	
III	Econometric Problems		9	20
	16	Multicollinearity - Nature, consequences, detection and remedial measures	3	
	17	Autocorrelation - Nature, consequences, detection, and remedial measures	3	
	18	Heteroscedasticity - Nature, consequences, detection and remedial measures.	3	
IV	Dummy Variable Regression Model		12	15
	19	Dummy variable: Features of dummy variable: Dummy variable Trap	2	
	20	ANOVA and ANCOVA models	3	
	21	Different applications of dummy variable-Dummy variables and seasonal analysis-Structural analysis-Piecewise linear regression.	3	
	22	Regression through the origin-functional forms of regression models, log-log, log-lin, lin-log and reciprocal models	4	
V	Open ended module		12	
		Apply any econometric technique learned from the course to real-world economic data and interpret the results effectively.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Damodar N Gujarati, Dawn C Porter, Sangeetha Gunasekar (2012): Basic Econometrics (fifth edition) McGrawHill. (Module 1,2,3,4&5)
2. Damodar N Gujarati (2011): Econometrics by Example, First Edition, Palgrave, MacMillan. (Module 1,2,3,4&5)
3. A H Studenmund (2017): Using Econometrics: A Practical Guide, Fifth Edition, Pearson Education. (Module 1,2,3,4&5)

ADDITIONAL READINGS

1. Jeffrey M Wooldridge (2018): Introductory Econometrics: A Modern Approach, 7th Edition, Thomson South Western.
2. William H Greene (2018): Econometric Analysis, 8th Edition, Pearson Education.
3. Christopher Dougherty (2007): Introduction to Econometrics, Third Edition, Oxford University Press.
4. Robert S Pindyck and Daniel L Rubinfeld (1998): Econometric Models and Economic Forecasts, Fourth Edition, McGraw Hill International Edition.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	3	-	-	-	-	-	-	-	-
CO 3	-	-	-	3	-	-	-	-	-
CO 4	-	1	-	-	-	-	-	2	3
CO 5	-	-	-	-	-	-	3	-	-
CO 6	-	1	-	2	1	-	-	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓		✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓		✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	COMPUTER FUNDAMENTALS FOR ECONOMIC ANALYSIS				
Type of Course	Major				
Semester	V				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-		60
Pre-requisites	Basic courses on Computer and Mathematics of 200 – 299 level				
Course Summary	This course provides a comprehensive understanding of computer fundamentals. Through experience with Microsoft Excel 2013, students learn to analyse data and report it, while also honing their ability to assess the accuracy, reliability, and appropriateness of various software tools for specific tasks.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand fundamental concepts of computers and basic computer applications	U	F	Quiz/Instructor-created exams
CO 2	Analyse various applications of computers to realize economic situations	AN	C	Practical Assignment
CO 3	Create data analysis workflows and reports using Microsoft Excel 2013	C	P	Writing assignments\ Instructor-created exams
CO 4	Evaluate the accuracy and reliability of data analysis results obtained through computer applications	E	P	Practical Assignment/Seminar Presentation
CO 5	Evaluate the suitability and effectiveness of different software tools for testing research problems	E	C	Group Discussions
CO 6	Apply analytical skills to evaluate Economic issues using Microsoft Excel 2013, leveraging this knowledge to create reports	AP	M	Practical Assignment
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Computer Fundamentals		11	15
	1	Introduction to Computers: Types of computers based on purpose, technology, size and storage capacity	3	
	2	Organisation of Basic concepts: Hardware and software/output unit/CPU-Memory unit-storage unit-Motherboard-Cards ports	4	
	3	Application of computers: Role of computers in Business, Science, Education, Entertainment, and data communications, Emerging Information technology	2	
	4	Limitations of Computers	1	
II	Data Representation in Computers		10	15
	5	Introduction: Bits and Bytes - Number Systems for Data Representation	1	
	6	Coding Schemes: BCD Code, EBCDIC Code, ASCII Code	2	
	7	Conversion of Numbers: Converting Decimal Number to Binary Number- Converting Binary Number to Decimal Number	2	
	8	Converting Decimal Real Numbers to Binary Real Numbers- Converting Binary Real Numbers to Decimal Real Numbers	2	
	9	Binary Arithmetic: Addition, Subtraction, Multiplication and Division	3	
III	Application Software		12	15
	10	Word Processors: Word Processing: Advantages of word Processing, Features of word Processing, Microsoft Word, Google Docs, Libre-Office Writer	2	
	11	Database management packages: Database management Systems (DBMS)—advantages of Database management	2	
	12	Types of Database Management Systems	2	
	13	Major DBMS products: dbase, FoxBASE, FoxPro, <i>Microsoft Access</i> , MySQL, Paradox, Oracle, Sybase, and IBM <i>Informix</i>	2	
	14	Presentation Packages: Introduction-Presentation presentation package Features of Presentation Package - Advantages of presentation package	2	
	15	Types of presentation packages: Microsoft PowerPoint, Lotus Freelance graphics, Adobe Presenter 8, Open Office Impress, and Apple Keynote	2	
	16	Spreadsheet Packages: Spreadsheet- Features: Use of Excel in Economics and business analysis		

	17	Different types of spreadsheets: Paper spreadsheets, Electronic spreadsheets, Lotus 1-2-3 spreadsheets, Microsoft Excel, Google Sheets		
IV	Computer Applications to Economics		15	25
	18	E-commerce: Meaning, Definition and Features	2	
	19	Advantages – Disadvantages of E-Commerce	2	
	20	E-Banking: Internet Banking: Meaning Definition, Features, Advantages and Limitations.	2	
	21	Mobile Banking: Meaning Definition, Features, Advantages and Limitations.	1	
	22	Automatic Teller Machine, Electronic Fund Transfer, Tele-Banking and E-Cheque	3	
	23	E-payment systems: credit cards, e-cash, e-wallet, introduction to Secure Electronic Transaction (SET)	2	
	24	E-Trading: Meaning – Definition- Features	1	
V	Open ended module		12	
		Practical Assignment Topic: Sales Analysis Using Microsoft Excel 2013/ Create visualizations such as pie charts, bar graphs, or line graphs to represent budget data and financial trends.		

Note: The course is divided into five modules, with four modules together having total 24 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 24 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. Ashok Arora (2015), Computer Fundamentals and Applications, Vikas Publishing House, Pvt. Ltd (Module 1,2,3,4&5)
2. Faithe Wempen (2014), Computing Fundamentals: Introduction to Computers, John Wiley & Sons (Module 1,2,3,4&5)

Additional Readings:

1. Dr.C. S. Rayudu (2004), Commerce & E-Business, Himalaya Publishing, Mumbai, 2004
2. Frye, C. D. (2014). Microsoft Excel 2013: Step-by-Step, Microsoft Press US
3. Jelen, B. (2013). Charts and Graphs: Microsoft Excel 2013, Que Publishing

4. Mishra S K and J C Binwal (1991), Computer Applications in Social Science Research, New Delhi: Vikas Publishing House Pvt.Ltd
5. Rajaraman, V. (2010). Fundamentals of Computers, Fifth Edition, Prentice Hall of India Learning Pvt. Ltd., New Delhi.
6. Sanders, D. H. (1988), Computers Today, McGraw Hill (3rd Edition)
7. Suresh T . Viswanathan (2001), The Indian Cyber Laws, third edition, Bharat Law House, New Delhi
8. Winston, W. (2014). Microsoft Excel 2013 Data Analysis and Business Modeling, Prentice Hall India Learning Private Limited
9. Wood, M.B. (1983), Introduction Computer Security, Broadman Associates, Delhi.

Mapping of Cos with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	-	-	-	1	-	3	-	-
CO 3	-	-	-	-	-	-	-	2	3
CO 4	-	-	-	3	-	1	-	-	-
CO 5	-	3	-	-	-	-	-	-	-
CO 6	-	-	2	-	-	-	1	3	-

Correlation levels:

Level	Correlation
-	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/ Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓		✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	TIME SERIES ECONOMETRICS				
Type of Course	Major				
Semester	VI				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Basic Econometrics course of 200 – 299 level				
Course Summary	This course aims to equip students with the necessary skills to perform rigorous time series analysis and forecasting, providing a solid foundation in both classical and modern methodologies.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Recall key concepts and definitions related to time series analysis	R	F	Quiz/Instructor-created exams
CO 2	Understand the difference between stationary and non-stationary processes and discuss the implications of each for time series analysis.	U	C	Quiz/Instructor-created exams
CO 3	Apply ARIMA and VAR models to historical time series data to analyze trends, seasonality, and cycles within the context of specific case studies.	AP	P	Practical Assignments
CO 4	Analyze time series data and identify the presence of spurious regression in economic data sets.	AN	P	Practical Assignment
CO 5	Evaluate the effectiveness of different forecasting models, in predicting future values based on model fit statistics and forecast error metrics.	E	P	Practical Assignment/Seminar Presentation
CO 6	Create and execute a multivariate time series analysis project to predict and interpret interactions between multiple economic indicators.	C	M	Practical Assignment/Seminar Presentation
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Classical Time Series Analysis		10	15
	1	Classical time series analysis, Components of time series data	2	
	2	Utility of time series analysis, Measurement of trend, seasonality and cycles	2	
	3	Moving averages and smoothing techniques to time series analysis	2	
	4	Classical time series decomposition models, Additive and multiplicative models	2	
	5	Forecasting using smoothing techniques and time series decomposition methods: applications in Finance	2	
II	Modern Time Series Analysis		17	20
	6	Tools of modern time series analysis	2	
	7	Stochastic and stationary process	2	
	8	Tests of stationary	2	
	9	Trend vs. difference stationary process	2	
	10	Dickey-Fuller and augmented dickey fuller tests	3	
	11	Spurious regression and co-integration of time series	2	
	12	Engle-Granger test, CRDW test	2	
	13	Error correction mechanism	2	
III	Univariate Time Series Analysis		12	20
	14	Time series analysis and forecasting, Linear time series analysis	2	
	15	Autocorrelation function and partial auto-correlation function	2	
	16	Auto-regressive (AR) models	2	
	17	Moving average (MA) models	2	
	18	Box-Jenkins (BJ) ARMA and ARIMA models	2	
	19	Identification – estimation and forecasting with ARIMA models—economic applications.	2	
IV	Multivariate Time Series Analysis		9	15
	20	Multivariate time series analysis and forecasting	2	
	21	Vector autoregressive (VAR) models: advantages and problems	3	
	22	Estimation and forecasting with VAR– impulse response function - Johansen Co-integration test on VAR- Granger causality test –applications in finance.	4	
V	Open ended module		12	
		<ul style="list-style-type: none"> Apply ARIMA modeling techniques to a real-world dataset, perform parameter estimation, and make forecasts. Analyze and predict interactions between multiple economic indicators using Vector Autoregressive (VAR) models. 		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in

the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Damodar N Gujarati, Dawn C Porter, Sangeetha Gunasekar (2012): Basic Econometrics (fifth edition) McGrawHill. (Module 1,2,3,4&5)
2. Damodar N. Gujarati (2011): Econometrics by Example, First Edition, Palgrave, MacMillan. (Module 1,2,3,4&5)
3. Kerry Patterson (2000): An introduction to Applied Econometrics: A Time Series Approach, First Edition, Palgrave (Module 1,2,3,4&5)

ADDITIONAL READINGS

1. A. H. Studenmund (2017): Using Econometrics: A Practical Guide, Fifth Edition, Pearson Education.
2. Jeffrey M. Wooldridge (2018): Introductory Econometrics: A Modern Approach, 7th Edition, Thomson South Western.
3. William H. Greene (2018): Econometric Analysis, 8th Edition, Pearson Education.
4. Robert S Pindyck and Daniel L Rubinfeld (1998): Econometric Models and Economic Forecasts, Fourth Edition, McGraw Hill International Edition.
5. James H Stock and Mark W Watson (2017): Introduction to Econometrics, Third Edition, Pearson, Addison Wesley.
6. Walter Enders (2010): Applied Econometric Time Series, Third Edition, Wiley India Edition.
7. Richard Harris and Robert Sollis (2006): Applied Time Series Modeling and Forecasting, First Edition, Wiley Student Edition.
8. Dimitrios Asteriou and Robert Hall (2015): Applied Econometrics, 3rd Edition, Oxford University Press.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	3	-	-	-	-	-	-	-	-
CO 3	-	1	-	3	1	1	-	-	-
CO 4	-	-	-	-	-	-	3	-	-

CO 5	-	2	-	-	-	-	-	3	3
CO 6	-	-	2	-	-	-	3	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignments	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓		✓	✓
CO 4	✓		✓	✓
CO 5	✓	✓	✓	✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	RESEARCH METHODOLOGY IN ECONOMICS				
Type of Course	Major				
Semester	VI				
Academic Level	300-399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Course of 200-299 level				
Course Summary	This course, Research Methodology in Economics, equips students with the tools to design and execute economic research, apply quantitative and qualitative analysis, and interpret economic data.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand different research types and methodologies to determine the most effective approach for specific research questions in various contexts.	U	F	Quiz/Instructor-created exams
CO 2	Understand the research problems related to economic issues	U	P	Group Discussion
CO 3	Analyse various types of research and research methodologies to determine the most effective approach for addressing research problems	AN	C	Home Assignments/Instructor-created exams
CO 4	Create a research plan using appropriate methods for data collection and analysis.	C	P	Practical Assignment
CO 5	Apply advanced data analysis techniques to interpret results accurately	AP	P	Practical Assignment
CO 6	Create well-structured research reports and effectively communicate research findings and recommendations	C	M	Practical Assignment/
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C), Procedural Knowledge (P), Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction of Research Methodology		12	15
	1	Meaning of Research: Objectives of Research	1	
	2	Types of Research	2	
	3	Research Approaches, Significance of Research	2	
	4	Research Methods versus Methodology	2	
	5	Research and Scientific Methods	2	
	6	Criteria of Good Research	1	
	7	Problems Encountered by Researchers in India	2	
II	Various Stages of Research		14	20
	8	Identifying a Research Problem	2	
	9	Literature Review and tools for the reference collection	2	
	10	Critical Evaluation of Literature Review	2	
	11	Formulation of hypotheses	2	
	12	Research design	2	
	13	Data analysis	2	
	14	Interpretation of Result	2	
III	Research Design		8	15
	15	Meaning of Research Design	2	
	16	Need for Research Design, Framework and Parameters	2	
	17	Approaches to Research Design: Qualitative and Quantitative	2	
	18	Types of Research Design: Explanatory, Descriptive, Diagnostic, Experimental, Exploratory and Hypothesis Testing Design	2	
IV	Interpretation and Report Writing		14	20
	19	Meaning of Interpretation, Why Interpretation?	2	
	20	Technique of Interpretation, Precaution in Interpretation	2	
	21	Significance of Report Writing, Different Steps in Writing Report	3	
	22	Layout of the Research Report, Types of Reports	2	
	23	Oral Presentation	2	
	24	Mechanics of Writing a Research Report, Precautions for Writing Research Reports	3	
V	Open ended module		12	
		<ul style="list-style-type: none"> • Evaluation of Research Designs in Peer-Reviewed Articles • Students are assigned to select a research question and develop a comprehensive plan that outlines how both qualitative and quantitative methods could be applied to answer the question. • Prepare a Research Report 		

Note: The course is divided into five modules, with four modules together having total 24 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 24 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Kothari R.C. (2012) Research Methodology, Methods and Techniques, 2nd Ed., New Age International Publishers (Module 1,2,3,4&5)
2. Bryman, A. (2016). Social Research Methods. Oxford University Press. (Module 1,2,3,4&5)
3. Bordens, K. S., & Abbott, B. B. (2002). Research design and methods: A process approach. McGraw-Hill. (Module 1,2,3,4&5)

ADDITIONAL READINGS

1. Bairagi, V., & Munot, M. V. (Eds.). (2019). Research methodology: A practical and scientific approach. CRC Press.
2. Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approach. Sage publications
3. Don E. Ethridge (2004), Research Methodology in Applied Economics: Organizing Planning and Conducting Economics Research, John Wiley and Sons
4. Neuman, W. L. (2008), Social Research Methods: Quantitative and Qualitative Approach, Pearson.
5. Bhandarkar, P.L. & Wilkinson, T.S. (2016). Methodology and Techniques of Social Research. Himalaya Publishing House, Mumbai.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	2	2	-	-	-	-	-	-	-
CO 2	-	-	-	3	-	-	-	-	-
CO 3	-	-	-	-	-	-	-	-	3
CO 4	-	-	-	3	-	1	-	-	-
CO 5	-	-	-	-	2	-	-	3	-
CO 6	-	3	-	-	-	-	-	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓		✓	✓
CO 5	✓		✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ADVANCED MACROECONOMICS				
Type of Course	Major				
Semester	VI				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Intermediate Macroeconomics course of 200 – 299 level				
Course Summary	This course explores important concepts, theories, models and other fundamental macro aspects of economics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the important concepts of economics and its real-world applications.	U	C	Instructor-created exams / Quiz
CO2	Develop and practice the skill of thinking like an economist.	Ap	P	Practical Assignment / Observation of Practical Skills
CO3	Help the student master the macroeconomic aspects essential for understanding the economic climate, specific economic issues, and policy alternatives.	AN	P	Seminar Presentation / Group Discussion
CO4	Apply the macroeconomic perspectives and reason accurately and objectively about economic matters.	EV	C	Instructor-created exams / Home Assignments
CO5	To make the students curious about the functioning of the economy and the power and breadth of economics	C	F	Writing assignments
CO6	Demonstrate critical thinking and problem-solving skills by applying the acquired knowledge to address complex economic challenges in the contemporary world.	Ap	P	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	The orthodox monetarist school		11	16
	1	The quantity theory of money approach,	2	
	2	The expectations-augmented Phillips curve analysis,	3	
	3	The monetary approach to balance of payments theory and exchange rate determination,	3	
	4	The orthodox monetarist school and stabilization policy	3	
II	The new classical school and the real business cycle school		12	18
	5	The structure of new classical models,	1	
	6	Equilibrium business cycle theory,	2	
	7	The policy implications of the new classical approach,	3	
	8	The real business cycle school: Real business cycle theory, The structure of a real business cycle model,	3	
	9	A real business cycle aggregate demand and supply model,	2	
	10	The policy implications of real business cycle theory	1	
III	The new Keynesian school		10	15
	11	The fall and rise of Keynesian economics, New Keynesian economics,	3	
	12	Core propositions and features of new Keynesian economics, Nominal rigidities,	2	
	13	Dornbusch's overshooting model,	2	
	14	Real rigidities,	1	
	15	New Keynesian business cycle theory, Policy implications	2	
IV	The new political macroeconomics		15	21
	16	Political distortions and macroeconomic performance, Political influences on policy choice,	2	
	17	The role of government, Politicians and stabilization policy,	2	
	18	Alternative approaches to the 'political business cycle': an Overview,	2	
	19	The Nordhaus opportunistic model, The Hibbs partisan model,	2	
	20	The decline and renaissance of opportunistic and partisan models, Rational political business cycles,	2	
	21	Rational partisan theory, Opportunistic and partisan behaviour: a synthesis,	2	
	22	Politics, time inconsistency, credibility and reputation, Policy implications of politico-economic models	3	
V	Open Ended Module		12	
	1	Consumer theories after Keynes		
	2	Investment Theories		
	3	Theories of demand for money and supply of money		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final

exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Brian Snowdon and Howard R. Vane (2005), *Modern Macroeconomics: Its Origins, Development and Current State*, Edward Elgar

ADDITIONAL READINGS

1. Goodwin, N., Harris, J. M., Nelson, J. A., Roach, B., & Torras, M. (2015b). *Macroeconomics in context*. Routledge.
2. Sikdar, S. (2020). *Principles of macroeconomics*. Oxford University Press.
3. Mankiw, N. G., Kneebone, R. D., & McKenzie, K. J. (2023). *Principles of Macroeconomics*, 9th Edition. Cengage Canada.
4. DeLorme, C. D., & Ekelund, R. B. (1983). *Macroeconomics*. Plano, Tex. : Business Publications.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO 9
CO 1	3	1	-	-	-	-	-	-	-
CO 2	1	2	-	1	-	-	2	2	-
CO 3	3	-	-	1	-	-	-	2	-
CO 4	-	3	1	2	-	-	3	1	-
CO 5	3	-	-	-	-	-	2	1	-
CO 6	-	2	2	3	2	-	1	2	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	FINANCIAL ECONOMETRICS				
Type of Course	Major				
Semester	VII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75'
Pre-requisites	Microeconomics and Macroeconomics course of 200 – 299 level				
Course Summary	To understand the theoretical aspects of development and the factors influencing it.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the fundamental concepts of financial markets and time series analysis	U	C	Instructor-created exams / Quiz
CO2	Analyze and model univariate and multivariate asset returns using statistical techniques	An	P	Practical Assignment
CO3	Apply advanced models to assess volatility and risk in financial time series.	Ap	F	Seminar Presentation
CO4	Apply extreme value theory for quantile estimation and Value at Risk (VaR) calculations.	Ap	C	Instructor-created exams / Home Assignments
CO5	Conduct independent research and analysis on topics related to financial markets and time series.	U	F	Viva

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Financial Markets and Financial time series: Basic concepts		10	15
	1	Introduction to financial markets	1	
	2	Overview of some theoretical models of financial markets (Capital Asset Pricing Model, Efficient market hypothesis, random walk model, Multifactor Pricing Model)	2	
	3	Definitions of asset returns, distributional properties and stylized facts of asset returns; Definitions of market risk	2	
	4	Introduction to basic concepts of time series analysis– Stochastic process. Time Series as a discrete stochastic process.	2	
	5	Characteristics of a Stochastic process (mean, standard	2	

		deviation, autocovariation, autocorrelation, partial autocorrelation).		
	6	Stationary and non-stationary stochastic process. Concept of ergodicity and Wold's decomposition theorem.	1	
II	Modelling Univariate asset returns		16	25
	7	Modelling Univariate stationary asset returns: Autoregressive Models AR(p), Moving Average Models MA(q), Autoregressive Moving Average Models ARMA(p,q).	2	
	8	Stationarity and Invertibility Conditions. Properties of these models in terms of autocorrelation and partial autocorrelation functions.	2	
	9	Yull-Walker equations. Estimation of the parameters of AR(p), MA(q) and ARMA(p,q) process.	3	
	10	Box-Jenkins Framework of model building - identification, estimation and diagnostic checks.	3	
	11	AIC, SBC Criteria and Portmanteau Statistic	2	
	12	Univariate non-stationary asset returns: Series with deterministic time trend and Unit Root processes.	2	
	13	Comparing Trend-Stationary and Unit Root Processes. Unit Root tests – Dickey-Fuller test, Augmented Dickey-Fuller and Philips Perron tests.	2	
III	Modelling Multivariate & Asset returns volatility		10	15
	14	Weak Stationarity; Cross-Correlation matrices; Vector models for asset returns – Vector Autoregressive Models, Granger Causality, Impulse response Analysis and Orthogonalized Impulse Response Analysis;	3	
	15	Unit Root non-stationarity and co-integration,	1	
	16	Cointegrated Vector Autoregressive Models; Error Correction Models	1	
	17	Features of volatility in financial time series; ARCH, GARCH, EGARCH and other variations of conditional heteroscedasticity models.	1	
	18	Multivariate GARCH models; Constant-Correlation and Time-Varying Correlation Models	3	
	19	The Dynamic Conditional Correlations (DCC) model.	1	
IV	Extreme Values, Quantile Estimation and Value at Risk (VaR)		9	15
	20	VaR as a quantile risk measure of asset portfolios; econometric approaches to VaR estimation	3	
	21	Extreme value theory (EVT) – review of EVT, Fisher Tippette Theorem; generalized extreme value distribution; empirical estimation of extreme values of financial time series	3	
	22	Application of EVT in VaR estimation	3	
V	Open ended module		30	
		Comparative analysis of theoretical models in financial markets.		

		Application of ARMA models in financial time series data.		
		Analysis of unit root processes and trend stationarity in asset returns.		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. R. S. Tsay, 2005, Analysis of Financial Time Series, Wiley Series in Probability and Statistics, 2nd edition (RT) (Module 1, 2, 3,& 4)
2. J. Y. Campbell, A. W. Lo, and A. C. MacKinlay, 1997, The Econometrics of Financial Markets, Princeton University Press (CLM) (Module 1, 2, 3,& 4)
3. T. C. Mills and R. N. Markellos, The Econometric Modelling of Financial Time Series, 2008, Cambridge University Press, 3rd edition (TM) (Module 1, 2, 3,& 4)
4. J. D. Hamilton, 1994, Time Series Analysis, Princeton University Press (JH) (Module 1, 2, 3,& 4)

ADDITIONAL READINGS

1. Chris Brooks, 2002, Introductory Econometrics for finance, Cambridge University press
2. Christian Gourieroux and JoAnn Jasiak, 2001, Financial Econometrics: Problems, Models, and methods, Princeton university press
3. Peijie Wang, 2008, Financial Econometrics, Taylor & Francis
4. Walter Enders, 2004, Applied Econometric Time Series, John Wiley and Sons

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	1	-	2	-	-	-	-		2
CO 2	-	-	-	1	-	-	-	3	-
CO 3	-	-	-	3	-	2	-	3	-
CO 4	-	3	1	2	-	-	3	3	2
CO 5	-	-	-	-	3	-	-		3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓	✓	✓	✓

Programme	B.A. Econometrics and Data Management Honours				
Course Title	GAME THEORY AND ECONOMIC BEHAVIOUR				
Type of Course	Major				
Semester	VII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Advanced Microeconomics course of 300 – 399 level				
Course Summary	The expected outcome is for students to gain a comprehensive understanding of game theory principles and their application in economics, fostering strong analytical, problem-solving, and policy evaluation skills essential for tackling real-world economic challenges.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the theory of games	U	C	Instructor-created exams / Quiz
CO2	Analyze the decision making under interdependent situations	An	P	Practical Assignment
CO3	Evaluate different strategies	E	P	Seminar Presentation
CO4	Can predict the optimal strategies of players and how the players can exploit strategic situations for their benefit	Ap	P	Instructor-created exams / Home Assignments
CO5	The students can understand how to formulate different real-life situations as games	Ap	P	Viva

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to Game Theory		5	8
	1	What is game theory?	1	
	2	History of game theory	1	
	3	Theory of rational choice	2	
	4	Interacting decision makers	1	
II	Strategic Games and Nash Equilibrium		14	22
	5	Strategic games: examples	3	
	6	Nash equilibrium: concept and examples	2	
	7	Best response functions	2	
	8	Dominated Actions	2	
	9	Symmetric games and symmetric equilibria	2	

	10	Illustrations of Nash equilibrium-Cournot and Bertrand's model of duopoly market	3	
III	Mixed Strategy Equilibrium		15	23
	11	Introduction	2	
	12	Strategic games with randomisation	2	
	13	Mixed strategy Nash equilibrium: concept and examples	2	
	14	Dominated Actions	2	
	15	Pure equilibria when randomization is allowed	3	
	16	Equilibrium in a single population	2	
	17	Formation of Players' beliefs	2	
IV	Extensive Games with perfect information		11	17
	18	Introduction to extensive games	2	
	19	Strategies and outcomes	2	
	20	Nash equilibrium- Subgame perfect Nash equilibrium	2	
	21	Backward induction	2	
	22	Illustrations of Extensive Games and Nash Equilibrium-Stackelberg model of duopoly markets	3	
V	Open Ended Module		30	
	1	Seminar on other examples like ; <i>Bach or Stravinsky, Matching Pennies the Stag Hunt</i> etc		
	2	Discussion on the importance of game theory in modern economy		
	3	Exercises- saddle point		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE

- Osborne, Martin J. *An introduction to game theory*. Vol. 3. No. 3. New York: Oxford university press, 2004.

ADDITIONAL READINGS

- Gibbons, Robert. "An introduction to applicable game theory." *Journal of Economic Perspectives* 11.1 (1997): 127-149.
- Gibbons, Robert, and Robert Gibbons. "A primer in game theory." (1992).
- Fudenberg, Drew, and Jean Tirole. *Game theory*. MIT press, 1991.
- Pindyck, Robert S. *Microeconomics*. 2018.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	2	-	-	1	-	-	-	-
CO 2	-	-	2	3	-	-	-	-	-
CO 3	-	-	2	1	2	-	-	-	-
CO 4	-	-	-	-	-	-	3	-	2
CO 5	-	-	-	-	-	-	-	3	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMETRICS ANALYSIS USING SPSS				
Type of Course	Major				
Semester	VII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Basic Econometrics course of 200 – 299 level				
Course Summary	This course explores the important principles and theories of balance of payment, foreign exchange transactions and working of current International Monetary system. It also explores the foreign exchange management in Indian context .				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will demonstrate a solid understanding of economic analysis principles, including descriptive and inferential statistics, regression analysis, time series analysis, and panel data analysis.	U	C	Instructor-created exams / Quiz
CO2	Students will develop proficiency in using SPSS software for data manipulation, descriptive statistics, hypothesis testing, regression analysis, time series analysis, and panel data analysis.	An	P	Practical Assignment
CO3	Students will be able to apply statistical techniques learned in the course to analyze real-world economic data, interpret results, and draw meaningful conclusions.	Ap	F	Seminar Presentation / Group Discussion
CO4	Students will enhance their critical thinking and problem-solving skills by applying economic analysis techniques to address research questions and solve economic problems.	E	F	Instructor-created exams / Home Assignments
CO5	The course will prepare students for advanced studies in	C	C	Viva

	economics, business, or related fields, as well as for professional practice in research, data analysis, and decision-making roles.			
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to Economic Analysis and SPSS		10	16
	1	Overview of Economic Analysis: Definition, importance, and applications.	2	
	2	Introduction to SPSS: Understanding the interface, data types, importing data, and basic data manipulation.	3	
	3	Descriptive Statistics: Measures of central tendency and measures of dispersion	3	
	4	graphical representation of data in SPSS.	2	
II	Inferential Statistics for Economic Analysis		12	18
	5	Probability Distributions: Understanding normal distribution, Standard Normal distribution, F distribution, chi-squaredistribution, and t-distribution	3	
	6	Applications of Probability distributions in economic analysis.	2	
	7	Hypothesis Testing: Formulating null and alternative hypotheses	2	
	8	Conducting t-tests, chi-square tests, and ANOVA tests in SPSS.	3	
	9	Confidence Intervals: Calculating confidence intervals for means and proportions using SPSS.	2	
III	Regression Analysis		12	18
	10	Simple Linear Regression: Understanding the concept, assumptions, and interpretation of results.	2	
	11	Multiple Linear Regression: Extending regression to multiple predictors and assessing model fit	3	
	12	Interpreting regression coefficients.	2	
	13	Regression Diagnostics: Checking assumptions	1	

	14	Detecting outliers	2	
	15	Addressing multicollinearity in SPSS.	2	
IV	Time Series and Panel Data Analysis		12	18
	16	Time Series Data: Introduction to time series data, trend analysis, and seasonality.	2	
	17	Time Series Forecasting: Using SPSS to forecast economic variables, understanding forecasting models such as ARIMA.	2	
	18	Decomposition Techniques: Seasonal decomposition of time series data using SPSS.	2	
	19	Panel Data Structure: Understanding panel data, fixed effects, and random effects models.	2	
	20	Panel Data Regression: Estimating panel data models using SPSS	1	
	21	Interpreting fixed and random effects.	1	
	22	Advanced Panel Data Techniques: Handling unbalanced panels, testing for heteroscedasticity, and conducting Hausman tests in SPSS.	2	
V	Open ended module		30	
		Students will apply the skills learned throughout the course to conduct an economic analysis using real-world data. They will utilize SPSS to perform descriptive and inferential statistics, regression analysis, and time series analysis, and present their findings in a comprehensive report.		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. "Economic Analysis" by David A. Anderson and John B. Taylor.
2. "Statistics for Business and Economics" by Paul Newbold, William L. Carlson, and Betty Thorne.
3. "Discovering Statistics Using IBM SPSS Statistics" by Andy Field.

ADDITIONAL READINGS

1. "Introduction to Econometrics" by Jeffrey M. Wooldridge.
2. "Time Series Analysis: Forecasting and Control" by George E. P. Box, Gwilym M. Jenkins, Gregory C. Reinsel, and Greta M. Ljung.

3. "SPSS Statistics: A Practical Guide" by Julie Pallant.
4. "Applied Regression Analysis and Other Multivariable Methods" by David G. Kleinbaum, Lawrence L. Kupper, and Keith E. Muller.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	3	-	2	2	-	2	3	3
CO 3	-	-	-	-	-	3	-	-	-
CO 4	-		1	2	3	-	3	3	-
CO 5	1	-	-	-	3	-	2	-	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

1. Quiz / Assignment/ Viva Voce/ Discussion / Seminar
2. Internal Exam
3. Practical Assignments (20%)
4. Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓		

Programme	B.A. Econometrics and Data Management Honours				
Course Title	BIG DATA ANALYTICS				
Type of Course	Major				
Semester	VII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Economics course of 200 – 299 level				
Course Summary	The students will be able to identify the role of big data in economic theory, using big data for prediction purpose and make capable for helping private and public policies				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the characteristics and sources of data	U	F	Instructor-created exams / Quiz
CO2	Analyze different Motivating applications	Ap	C	Practical Assignment / Observation of Practical Skills
CO3	Evaluate Architectures for big data collection	E	P	Seminar Presentation / Group Discussion
CO4	Apply Big Data for Prediction and Public Policy	Ap	P	Instructor-created exams / Home Assignments
CO5	Create programs for big data analytics	C	M	Running programs
CO6	Demonstrate critical thinking and problem-solving skills by applying the acquired knowledge to address complex economic challenges in the contemporary world.	Ap	M	Viva Voce

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	The Role of Economic Theory in big data		12	19
	1	Characteristics of Big data.	2	
	2	The need for Analytics and Understanding Analytics	2	

	3	Impact of analytics on business; Being analytically competitive;	2	
	4	Models and algorithms in Analytics;	2	
	5	The Analytics Methodology	2	
	6	Advantages of big data in the economic research and policymaking	1	
	7	Challenges and risks in big data	1	
II	Major economic data sources		9	14
	8	Sources of big data - National and International	3	
	9	Motivating applications: web scraping, social media, Google.	3	
	10	Real time data (Social media and the labor market)	3	
III	Using Big Data to Advanced Economic Theory		10	15
	11	Tool and Tech Landscape: A review of technology used in data storage, data processing, and data science; Popular tools used in Data Science and when to use each	3	
	12	Using Big Data for Prediction and Public Policy	2	
	13	Architectures for big data collection, analysis, and storage.	2	
	14	Using micro data to answer macroeconomic questions	2	
	15	Finance and high frequency trading	1	
IV	Machine learning methods		14	22
	16	Linear Regression Models and their applications	2	
	17	Logistics Regression Models and their applications	2	
	18	Time Series Forecasting	2	
	19	k-nearest-neighbors, classification and regression trees, random forests.	2	
	20	An overview of neural networks and deep learning: Images, sounds, text, as sources of information.	2	
	21	Text mining: natural language processing, latent Dirichlet allocation, sentiment analysis.	2	
	22	Big Data Analytics with R.	2	
V	Open Ended Module		30	
		NFHS data extraction techniques		
		NSSO data extraction techniques		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. “Big Data: A Revolution That Will Transform How We Live, Work, and Think” by Viktor Mayer-Schönberger and Kenneth Cukier, Houghton Mifflin Harcourt, 2013
2. “Machine-learning Techniques in Economics: New Tools for Predicting Economic Growth” by Atin Basuchoudhary, James T. Bang, and Tinni Sen, Springer.

3. Hal R. Varian, Big Data: New Tricks for Econometrics, The Journal of Economic Perspectives , Spring 2014, Vol. 28, No. 2 (Spring 2014), pp. 3-27, American Economic Association
4. “Data Science for Economics and Finance: Methodologies and Applications” edited by Sergio Consoli, Diego Reforgiato Recupero, and Michaela Saisana, Springer.

ADDITIONAL READINGS

1. Antenucci, Dolan, et al. (2014) “Using social media to measure labor market flows.” Working paper no. w20010. National Bureau of Economic Research.
2. Athey, S. (2018). “The impact of machine learning on economics”, in The Economics of Artificial Intelligence: An Agenda. University of Chicago Press.
3. BDS Taddy, M. (2019) Business Data Science: Combining Machine Learning and Economics to Optimize, Automate, and Accelerate Business Decisions. McGraw Hill.
4. Choi, Hyunyoung and Hal Varian (2009). “Predicting the present using Google Trends” Working paper.
5. Dave Donaldson and Adam Storeygard, The View from Above: Applications of Satellite Data in Economics, The Journal of Economic Perspectives, Fall 2016, Vol. 30, No. 4 (Fall 2016), pp. 171 - 198, Published by: American Economic Association.
6. Einav, Liran, and Jonathan D. Levin. (2013) “The data revolution and economic analysis.” Working paper no. w19035. National Bureau of Economic Research.
7. Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)
8. Liran Einav and Jonathan Levin, The Data Revolution and Economic Analysis, Innovation Policy and the Economy , Vol. 14, No. 1 (January 2014), pp. 1-24, The University of Chicago Press on behalf of the The National Bureau of Economic Research
9. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
10. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	-	3	2	2	3	-	2
CO 2	-	1	1	2	2	-	-	2	3
CO 3	-	1	-	-	2	2	3	2	3
CO 4	-	1	2	2	-	2	-	3	3
CO 5	-	2	-	3	2	2	3	3	3
CO 6	-	1	2	2	2	2	3	3	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMIC TOOLS FOR DECISION MAKING				
Type of Course	Major				
Semester	VII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Economics course of 200 – 299 level				
Course Summary	The course covers developmental experiences of Kerala, Demography, Human Development and Social Inclusion, Population and Human Development, Development Issues, state finance and planning. It also covers assignment on identification of data base on Kerala Economy and discussion regarding the Economic Review and the State Budgets and Prepare reports based on discussions.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand microeconomic principles to analyze individual and firm behavior in different market structures.	U	F	Instructor-created exams / Quiz/ Practical Assignment
CO2	Assess and interpret macroeconomic indicators and policy measures to determine their impact on the economy.	E	F	Practical Assignment
CO3	Utilize and implement decision analysis techniques to make optimal choices under uncertainty.	AP	P	Seminar Presentation / Group Discussion
CO4	Perform cost-benefit analysis to evaluate the economic viability of projects and policies.	AN	P	Instructor-created exams / Home Assignments
CO5	Synthesize and present economic insights and recommendations effectively through written reports and presentations.	C	F	Practical Assignment / Presentations
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Microeconomic Principles and Decision Analysis		14	21
	1	Introduction to Economics: Definitions of economics, Scarcity, choice, and opportunity cost, the economic way of thinking	1	
	2	Economic Models and Decision-Making Frameworks: The role of models in economics, Types of economic models: descriptive, predictive, and prescriptive, Building and using economic models	1	
	3	Rational Decision-Making and Utility Maximization: Rational behavior and decision-making, Utility theory and preference, Marginal analysis in decision-making	2	
	4	Supply and Demand Analysis: The law of demand and supply, Determinants of demand and supply, Market equilibrium and effects of shifts in demand and supply	2	
	5	Elasticity of Demand and Supply: Price elasticity of demand and supply, Income and cross-price elasticity, Applications of elasticity in economic decision-making	2	
	6	Consumer Theory and Utility Maximization: Budget constraints, Preferences and utility functions, Consumer equilibrium and the impact of changes in income and prices	2	
	7	Production Theory and Cost Analysis: Production functions and types of inputs, Short-run and long-run production costs, Economies of scale and scope	2	
	8	Market Structures: Perfect Competition, Monopoly, Oligopoly, Monopolistic Competition: Characteristics and outcomes of different market structures, Pricing and output decisions in various market structures, Efficiency and welfare implications	2	
II	Macroeconomic Principles and Decision Analysis		10	16
	9	Aggregate Demand and Aggregate Supply: The AD-AS model, Determinants of aggregate demand and supply, Equilibrium in the AD-AS model and economic fluctuations	1	
	10	Decision-Making Under Uncertainty: Types of uncertainty and risk, Decision-making criteria under uncertainty	1	
	11	Probability Theory and Risk Assessment: Basics of probability theory, Risk assessment techniques, Expected value and variance	2	
	12	Expected Utility Theory: Concept of expected utility, Risk aversion and risk preference, Applications in decision-making	2	
	13	Decision Trees and Sequential Decision-Making, Structure and components of decision trees, Solving decision trees, Applications in business and policy	2	
	14	Sensitivity Analysis and Scenario Planning: Conducting sensitivity analysis, Scenario planning techniques, Uses in strategic decision-making	2	

III	Cost-Benefit Analysis and Game Theory		10	16
	11	Principles of Cost-Benefit Analysis: Fundamentals of cost-benefit analysis, Identifying and measuring costs and benefits, Discounting future benefits and costs	2	
	12	Discounted Cash Flow Analysis: Concept of time value of money, Net present value (NPV) and internal rate of return (IRR), Applications in investment decisions	2	
	13	Valuation of Non-Market Goods and Externalities: Valuing public goods and externalities, Methods: contingent valuation, hedonic pricing, etc., Challenges in valuation	2	
	14	Basics of Game Theory: Introduction to game theory, Types of games: cooperative vs. non-cooperative, Nash equilibrium and dominant strategies, Strategic form games and Nash equilibrium, Applications in economics and business	2	
	15	Prisoner's Dilemma and Coordination Games, Sequential and Simultaneous Games. Applications of Game Theory in Business Strategy and Negotiations	2	
IV	Behavioral and Environmental Applications		11	17
	16	Introduction to Behavioral Economics: Behavioral vs. traditional economics	1	
	17	Heuristics and Biases in Decision-Making: Common heuristics: availability, representativeness, anchoring, Biases and their impact on decisions	1	
	18	Prospect Theory and Loss Aversion: Basics of prospect theory, Concepts of loss aversion and framing effects	2	
	19	Nudge Theory and Behavioral Interventions: Principles of nudge theory, Applications in policy-making and marketing	2	
	20	Applications of Behavioral Economics in Policy-Making and Marketing	2	
	21	Environmental Valuation Methods: Contingent Valuation, Hedonic Pricing	2	
	22	Economic Instruments for Environmental Management (Taxes, Subsidies, Cap-and-Trade): Market-based instruments for environmental protection, Effectiveness and efficiency of different instruments	1	
V	Open Ended Module		30	
		Choose a consumer decision (e.g., buying a car). Use utility theory to analyze the decision, listing preferences and constraints.		
		Analyze a business scenario involving uncertainty (e.g., launching a new product). Use decision-making criteria (maximax, maximin, minimax regret) to make recommendations.		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-

semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCES:

1. Krugman, P., & Wells, R. (2018). *Microeconomics* (5th ed.). Worth Publishers.
2. Mankiw, N. G. (2020). *Principles of Economics* (9th ed.). Cengage Learning.
3. Mankiw, N. G. (2019). *Macroeconomics* (10th ed.). Worth Publishers.
4. Blanchard, O. (2017). *Macroeconomics* (7th ed.). Pearson.

ADDITIONAL READINGS

1. Pindyck, R. S., & Rubinfeld, D. L. (2017). *Microeconomics* (9th ed.). Pearson.
2. Varian, H. R. (2014). *Intermediate Microeconomics: A Modern Approach* (9th ed.). W.W. Norton & Company.
3. Carlton, D. W., & Perloff, J. M. (2015). *Modern Industrial Organization* (4th ed.). Pearson.
4. Church, J. R., & Ware, R. (2000). *Industrial Organization: A Strategic Approach*. McGraw-Hill.
5. Dixit, A. K., & Nalebuff, B. J. (2010). *The Art of Strategy: A Game Theorist's Guide to Success in Business and Life*. W.W. Norton & Company.
6. Clemen, R. T., & Reilly, T. (2013). *Making Hard Decisions with DecisionTools Suite* (3rd ed.). Cengage Learning.
7. Boardman, A. E., Greenberg, D. H., Vining, A. R., & Weimer, D. L. (2018). *Cost-Benefit Analysis: Concepts and Practice* (5th ed.). Cambridge University Press.
8. Mishan, E. J., & Quah, E. (2020). *Cost-Benefit Analysis* (6th ed.). Routledge.
9. Thaler, R. H., & Sunstein, C. R. (2009). *Nudge: Improving Decisions about Health, Wealth, and Happiness*. Penguin Books.
10. Kahneman, D. (2011). *Thinking, Fast and Slow*. Farrar, Straus and Giroux.
11. Tietenberg, T., & Lewis, L. (2018). *Environmental and Natural Resource Economics* (11th ed.). Routledge.
12. Hanley, N., Shogren, J. F., & White, B. (2013). *Introduction to Environmental Economics* (2nd ed.). Oxford University Press.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	3	1	-	-	-	-	3	3
CO 2	2	1	2	2	-	-	3	-	-
CO 3	-	2	-	-	-	-	3	-	-
CO 4	1	2	-	-	2	-	3	-	-
CO 5	1	-	-	-	-	-	3	3	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓	✓	✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	MACROECONOMIC MODELS AND MEASUREMENT				
Type of Course	Major				
Semester	VIII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	3	-	2	75
Pre-requisites	Macroeconomics Course of level 300 – 399				
Course Summary	This course is a modern approach to macroeconomics by building macroeconomic models from microeconomic principles, consistent with the way that macroeconomic research is conducted today.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Allows deeper insights into economic growth processes and business cycles.	U	C	Instructor-created exams / Quiz
CO2	Integrates the study of macroeconomics with approaches in courses in microeconomics and in field courses in economics	Ap	P	Seminar Presentation / Group Discussion
CO3	Develop a comprehensive and broad perspective of what macroeconomic theory is today	U	P	Seminar Presentation / Group Discussion
CO4	Apply macroeconomic models and tools in specific contexts and to particular problems	E	P	Instructor-created exams / Home Assignments
CO5	Construct models suitable for specific contexts	C	F	Practical Assignment / Observation of Practical Skills
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Measurement Issues in Macroeconomics		13	20
	1	Macroeconomic Models	2	
	2	Microeconomics Principles behind Macroeconomic Models	2	
	3	Disagreements in Macroeconomics	2	
	4	What do we learn from Macroeconomic Analysis	2	
	5	Labour Market measurement: unemployment rate, participation rate, employment/population ratio	2	
	6	Business cycle measurement: Regularities in GDP Fluctuations, Co-movement among economic time series, co-movements between the price level and real GDP and between the inflation rate and real GDP, co-movements among labor market variables and real GDP	3	
II	Closed Economy One Period Macroeconomic Model		12	18
	7	Competitive equilibrium	2	
	8	Optimality	2	
	9	Sources of social inefficiency	2	
	10	Effects of change in government purchases	2	
	11	Effects of change in total factor productivity	2	
	12	Effects of a distorting labour income tax	2	
III	Two Period Model of Consumption-Savings Decision		11	18
	13	Two Period Model of the Economy	2	
	14	The Consumer's Lifetime Budget Constraint	1	
	15	The Consumer's Preferences	1	
	16	Consumer Optimization	1	
	17	How the consumer responds to changes in his or her current income, future income, and the market real interest rate	2	
	18	Competitive equilibrium	2	
	19	The Ricardian Equivalence Theorem	2	
IV	Money, Banking, Prices and Monetary Policy		9	14
	20	Monetary Intertemporal Model – Fisher relation – Competitive equilibrium	3	
	21	Money neutrality in the monetary intertemporal model.	3	
	22	Conventional Monetary Policy, the Liquidity Trap, and Unconventional Monetary Policy	3	
V	Construction of Macroeconomic Models with reference to Indian Economy		30	
		Practical assignments to measure labour market related concepts in India		
		Presentation of macroeconomic model constructed in Indian		

		context		
		Group discussions on social inefficiency		
		Debate: Conventional Vs Unconventional Monetary Policy		

Note: The syllabus has five modules. There should be total 22 units in the first four modules together, composed of the theory topics. The number of units in the last module can vary. There are 45 instructional hours for the first four modules and 30 hrs for the final one. Module V is designed to equip students with practical skills. The 20 marks for the evaluation of practical will be based on Module V. Internal assessments (30 marks) are split between the practical module (20 marks) and the first four modules (10 marks). The end-semester examination for the theory part will be based on the 22 units in the first four modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Williamson, S. D. (2017). *Macroeconomics*, Global Edition. Pearson Higher Ed. (All modules)

ADDITIONAL READINGS

1. Romer, D. (2019). *Advanced Macroeconomics*. McGraw-Hill/Irwin.
2. Hoover, K. D. (2012). *Applied Intermediate Macroeconomics*. Cambridge University Press.
3. Ljungqvist, L., & Sargent, T. J. (2018). *Recursive Macroeconomic Theory, fourth edition*. MIT Press.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	-	-	-	-	-	3	2	-
CO 3	-	-	-	-	-	-	2	3	-
CO 4	-	-	1	-	-	-	2	3	-
CO 5	-	-	-	-	-	-	1	2	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	APPLIED MICROECONOMICS AND EVALUATION				
Type of Course	Major				
Semester	VIII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Microeconomics course of 300 – 399 level				
Course Summary	This course provides different aspects of microeconomic analysis while emphasizing real-world economic problems and incorporating coverage of the most innovative subjects in the discipline.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand mechanism of market	U	F	Instructor-created exams / Quiz
CO2	Analyse the market situation when externality is present	An	P	Instructor-created exams / Quiz
CO3	Evaluate market working with asymmetric information	E	P	Seminar Presentation / Group Discussion
CO4	Apply economic theory to solve welfare maximization problems and for fair allocation	Ap	P	Instructor-created exams / Home Assignments/Viva-voce
CO5	Create a model for depicting the real nature of welfare of society	C	M	Practical Assignment / Observation of Practical Skills
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Exchange		18	25
	1	Market Trade	2	
	2	The Algebra of Equilibrium	2	
	3	Walras' Law	2	
	4	Relative Prices	2	
	5	The Existence of Equilibrium	2	
	6	Equilibrium and Efficiency	2	
	7	The Algebra of Efficiency	2	
	8	Implications of the First Welfare Theorem	2	
9	Implications of the Second Welfare Theorem	2		
II	Welfare		10	15
	10	Aggregation of Preferences	2	
	11	Social Welfare Functions	2	
	12	Welfare Maximization	2	
	13	Individualistic Social Welfare Functions	2	
III	Externalities		10	15
	15	Quasilinear Preferences and the Coase Theorem	3	
	16	Production Externalities	3	
	17	Market Signals	2	
IV	Asymmetric Information		10	15
	19	The Market for Lemons, Quality Choice, Adverse Selection	4	
	20	Moral Hazard, Moral Hazard and Adverse Selection	3	
	21	Signalling	2	
V	Application of Microeconomic Theories in India		12	
		Discussion based on welfare effects of pollution and environmental degradation in India		
		Practical Assignments on calculation of producer and consumer welfare in a given market		
		Seminar on how changes in policy alter the market equilibrium and impact social welfare		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Varian, H. R. (2014). *Intermediate Microeconomics with Calculus: A Modern Approach: International Student Edition*. W. W. Norton & Company. (All modules)

ADDITIONAL READINGS

1. Mas-Colell, A., Whinston, M. D., & Green, J. R. (2018). *Microeconomic Theory*.
2. Munoz-Garcia, F. (2017). *Advanced Microeconomic Theory: An Intuitive Approach with Examples*. MIT Press.

3. Schotter, A. (2009). *Microeconomics: A Modern Approach*.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	-	-	-	-	-	3	2	-
CO 3	-	-	-	-	-	-	2	3	-
CO 4	-	-	-	-	-	-	3	-	-
CO 5	-	-	-	-	-	-	-	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	HETERODOX ECONOMICS				
Type of Course	Major				
Semester	VIII				
Academic Level	400 – 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Advanced economic course on Microeconomics, Macroeconomics and Development Economics of 300 – 399 level				
Course Summary	This course intends to provide an alternative perception to the economic theories, principles and concepts.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To understand the alternative approach to economics	U	C	Instructor-created exams / Practical Assignment
CO2	Understand the various theories of value and the heterodox theories of distribution.	U	C	Assignments / Quiz
CO3	To discern the micro-macro links from the perspective of heterodox economics.	Ap	P	Observation of Practical Skills / Group Discussion
CO4	To view aggregation problems from a different perspective and redefine welfare accordingly	Ap	P	Observation of Practical Skills / Home Assignments
CO5	Use systemist framework to evaluate real-world economic problems and issues.	E	P	Group Discussion / Instructor-created exams
CO6	To explore feminist, ecological and radical discourses.	E	P	Group Discussion / Practical Assignment Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	A Heterodox View of the Economy		8	12
	1	What is heterodox economics?	1	
	2	Evolution of heterodox economics	2	
	3	From classical political economy to neoclassical economics	1	
	4	From classical political economy to heterodox economics	1	
	5	Heterodox economic theory and the social provisioning process.	3	
II	Module 2: Heterodox Theories of Value		10	14
	6	Theory of Value by Adam Smith	2	
	7	Ricardo's conception of value	2	
	8	Marxian approach to value	2	
	9	Sraffa's approach	4	
III	Module 3: Heterodox Theories of Distribution		15	22
	10	Recent developments in heterodox theories	3	
	11	Classical and Marxian theory	3	
	12	Cambridge theory	2	
	13	Neo-Kaleckian theory	2	
	14	The functional-size distribution nexus - Different sectors and different classes	2	
	15	Econo-physics and the 'two-class theory of income distribution'	3	
IV	Module 4: Micro- Macro link in Heterodox Economics		15	22
	16	Aggregates and aggregation in science	2	
	17	<i>A heterodox perspective on the micro-macro link: The whole is more than the sum of its parts</i>	3	
	18	Relations matter: There is real novelty	2	
	19	Aggregation and Welfare	2	
	20	Systemism as a general frame work	2	
	21	Systemism and heterodoxy - key ideas and concepts	2	
	22	Heterodox economics in a systemist framework	2	
V	Open Ended Module		12	
		Discussion based on Feminist Economics, Ecological Economics and Radical Economics		
		Seminars to discuss and evaluate the state of affairs and policy related to women and ecology.		
		Group discussion and Assignments to understand radical economics.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Jo, T., Chester, L., & D’Ippoliti, C. (2017). *The Routledge Handbook of Heterodox Economics: Theorizing, Analyzing, and Transforming Capitalism*. Routledge.

ADDITIONAL READINGS

1. Mearman, A., Berger, S., & Guizzo, D. (2019). *What is Heterodox Economics?: Conversations with Leading Economists*. Routledge.
2. Lee, F. (2009). *A history of heterodox economics: Challenging the mainstream in the twentieth century*. Routledge.
3. Hermann, A., & Mouatt, S. (2020). *Contemporary issues in Heterodox Economics: Implications for Theory and Policy Action*. Routledge.
4. Armstrong, P. (2020). *Can heterodox economics make a difference?: Conversations With Key Thinkers*. Edward Elgar Publishing.
5. Harvey, J. T., & Garnett, R. F. (2008). *Future directions for heterodox economics*. University of Michigan Press.
6. Lee, F. S., & Lavoie, M. (2012). *In defense of Post-Keynesian and heterodox economics: Responses to Their Critics*. Routledge.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	2	-	-
CO 2	3	-	-	-	-	-	2	-	-
CO 3	-	-	-	-	-	-	3	2	-
CO 4	-	-	-	-	-	-	-	3	2
CO 5	-	-	-	1	1	-	2	3	-
CO 6	-	3	-	-	-	-	3	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓		✓
CO 5	✓	✓		✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	METHODS FOR QUANTITATIVE RESEARCH IN ECONOMICS				
Type of Course	Major				
Semester	VIII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-		60
Pre-requisites					
Course Summary	This course provides a comprehensive foundation in research design and statistical analysis techniques for economic research, covering topics such as research methodology, data collection methods, statistical analysis, software applications, and advanced topics including regression analysis and econometrics, with a focus on ethical considerations throughout the research process.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Demonstrate a solid understanding of the fundamental principles of research design, including different types of research methodologies and sampling techniques.	U	F	Instructor-created exams / Quiz
CO2	to apply various statistical analysis techniques, such as hypothesis testing, regression analysis, and econometric methods, to real-world economic research problems	Ap	P	Practical Assignment
CO3	critically analyze research problems, identifying gaps in existing literature, formulating meaningful research questions, and selecting appropriate research designs to address these questions.	E	F	Seminar Presentation / Group Discussion
CO4	Synthesize information from various sources, including primary and secondary data, to create well-constructed and logically organized research proposals and projects.	Ap	P	Instructor-created exams / Home Assignments

CO5	Evaluate the reliability and validity of research findings, interpret statistical results, and communicate their research effectively through written reports and presentations. They will also.	E	C	Instructor-created exams / Home Assignments
CO 6	Create comprehensive research projects that demonstrate a mastery of quantitative research methods in the field of economics	Ap	P	
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Foundations of Research Design		12	18
	1	Introduction to Research Methodology - Definition and importance of research	2	
	2	Types of research- exploratory, descriptive, explanatory	1	
	3	Research Problem Formulation: Literature review - Identifying research gaps - Developing research objectives and hypotheses	2	
	4	Research Design and Types - Experimental vs. non-experimental designs - Cross-sectional vs. longitudinal designs - Quasi-experimental designs	3	
	5	Sampling Techniques - Probability and non-probability sampling methods- Sample size determination	3	
	6	Sampling errors and biases	1	
II	Data Collection Methods		12	16
	7	Survey Research - Questionnaire design and construction -	2	
	8	Sampling in surveys – Pilot survey - Survey administration and data collection	3	
	9	Validity and Reliability – Test of Validity and reliability	2	
	10	Randomized control trials - Experimental and control groups	2	
	11	Secondary Data - Utilizing existing datasets	2	
	12	Ethical considerations in data collection	1	
III	Statistical Analysis Techniques		12	18
	13	Descriptive Statistics - Frequency distributions - Graphical representation of data	3	

	14	Inferential Statistics - Hypothesis testing- Confidence intervals - t-tests, ANOVA, ANCOVA,	3	
	15	Correlation Regression analysis.	2	
	16	Data Interpretation - Communicating statistical findings effectively - Presentation: Creating visualizations and tables	4	
IV	Software Applications and Advanced Topics		12	18
	17	Introduction to Statistical Software - Familiarisation of software like R /Python/SPSS	3	
	18	Data import, cleaning and basic analysis	1	
	19	Advanced Regression Analysis - Multiple regression - Logistic regression Model diagnostics	3	
	20	Econometrics in Economic Research - Time-series analysis	2	
	21	Panel data analysis- Instrumental variable methods.	2	
	22	Research ethics.	1	
V	Open Ended Module		12	
		Discussion: Identify a research paper (Qualitative research work)		
		Practical Assignments: Review of various research works and identify different research methods		
		Seminar: Prepare a research proposal and present it		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. "Research Methodology: A Step-by-Step Guide for Beginners" by Ranjit Kumar New age international Publishers.
2. Research Methodology in Social Sciences Paperback by Shridhar Patil & Aditya - New India Publishing Agency
3. Methodology of Research In Social Sciences, Krishnaswamy, O.R. Himalya publishing House,
4. Research Methodology in Social Sciences" by Devendra Thakur Deep & Deep Publications

ADDITIONAL READINGS

1. Bryman, A. (2016). Social Research Methods. Oxford University Press.
2. Bordens, K. S., & Abbott, B. B. (2002). Research design and methods: A process approach. McGraw-Hill.

3. Bairagi, V., & Munot, M. V. (Eds.). (2019). Research methodology: A practical and scientific approach. CRC Press.
4. Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	1	-	-	-	-	-	-	-
CO 2	-	-	-	-	-	-	-	3	
CO 3	-	-	-	3	-	-	-	-	2
CO 4	-	-	-	-	-	-	3	1	-
CO 5	-	-	-	-	-	2	-	-	2
CO6	-	-	-	-	-	-	3	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	METHODS FOR QUALITATIVE RESEARCH IN ECONOMICS				
Type of Course	Major				
Semester	VIII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites					
Course Summary	This course provides a comprehensive overview of qualitative research methods in economics, covering topics such as philosophical foundations, research design, sampling, data collection techniques, analysis techniques, interpretation, and advanced topics including ethical considerations and the integration of qualitative methods with big data approaches.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Articulate the philosophical foundations of qualitative research, distinguishing between post-positivism, critical realism, and constructivism.	U	F	Instructor-created exams/Quiz
CO2	Conduct data analysis skillfully, through advanced approaches like discourse analysis and ethnographic content analysis, synthesizing information from diverse sources.	An	P	Practical Assignment
CO3	Critically evaluate ethical challenges in advanced qualitative research designs and assess the strengths and limitations of various qualitative methods.	E	F	Seminar Presentation / Group Discussion
CO4	Proficiently design and justify complex qualitative research studies utilizing advanced methodologies such as multi-method approaches and case studies.	Ap	P	Instructor-created exams / Home Assignments

CO5	Produce an original publishable-quality research paper, creatively applying emerging trends in qualitative research, including big data and digital ethnography.	Ap	F	Instructor-created exams / Home Assignments
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	
I	Introduction to Qualitative Research in Economics		16	22
	1	Overview of Research Methods – Quantitative and qualitative strength and limitations of Qualitative research.	2	
	2	Philosophical Foundations - Understanding ontology and epistemology in qualitative research - Positivism - constructivism – Critical realism	3	
	3	Review of literature	2	
	4	Formulation of research problem - Identification conceptualization and operationalization of the problem	3	
	5	Research Design in Qualitative Research - Defining research questions and objectives	3	
	6	Choosing appropriate qualitative research designs - Case study, grounded theory, ethnography, and phenomenology	3	
II	Sampling and Data Collection Techniques in Qualitative Research		12	18
	7	Sampling methods: Purposeful sampling technique- Snowball sampling - Critical case sampling-Theoretical sampling.	3	
	8	Data collection methods: In-Depth Interviews - Focus Group Discussions - Observation	3	
	9	Document Analysis -Examining primary and secondary sources	2	
	10	Multi method approach	2	
	11	Case study approach	2	
III	Data Analysis in Qualitative Research		10	15
	12	Techniques: Thematic analysis - Content analysis - Constant comparative analysis	2	
	13	Coding and categorization- Discourse analysis- Narrative analysis.	2	

	14	Scaling Techniques: Likert Scale – Thurstone scale – Guttman scale	2	
	15	Introducing Qualitative Data Software	2	
	16	Interpretation and Writing	2	
	17	Hermeneutics. The role of theory in qualitative research in economics	2	
IV	Advanced Topics in Qualitative Research in Economics		10	15
	18	Recent trends and issues in Qualitative research	2	
	19	Power Dynamics And reflexivity	2	
	20	Big data and qualitative Research methods	2	
	21	Ethical considerations specific to qualitative research.	2	
	22	Evaluating the impact of economic policies	2	
V	Open ended module		12	
		Discussion: Identify a research paper (Qualitative research work)		
		Practical Assignments: Preparation of interview Shedule/ questionnaire		
		Seminar: Review a research paper and present it		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

5. Qualitative research methods in economics: A practical guide. **Uwe Flick** -Sage Publications Ltd.
6. Research Methodology in Social Sciences Paperback by Shridhar Patil & Aditya - New India Publishing Agency
7. Krishnaswamy, O.R. Methodology of Research In Social Sciences, Himalya publishing House, 1993

ADDITIONAL READINGS

5. Bryman, A. (2016). Social Research Methods. Oxford University Press.
6. Bordens, K. S., & Abbott, B. B. (2002). Research design and methods: A process approach. McGraw-Hill.

7. Bairagi, V., & Munot, M. V. (Eds.). (2019). Research methodology: A practical and scientific approach. CRC Press.
8. Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	1	1	-	-	-	-	-	-	-
CO 2	-	-	-	3	-	-	-	2	
CO 3	-	-	-	-	-	-	3	-	2
CO 4	-	-	-	-	-	-	-	3	-
CO 5	-	-	-	-	-	2	-	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	

Elective Courses in Econometrics and Data management

Programme	B.A. Econometrics and Data Management Honours				
Course Title	GENDER ANALYSIS IN ECONOMICS				
Type of Course	Elective				
Semester	V				
Academic Level	300-399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Course of 200 – 299 level				
Course Summary	This course provides a detailed understanding of gender equality, gender empowerment strategies, and social security policies that promote gender well-being.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic concepts of gender and gender economics and to recognise the gender mainstreaming initiatives.	U	C	Instructor-created exams / Quiz/Assignment
CO2	Examine the peculiarities, role and challenges of gender in the labour market participation	E	C	Instructor-created exams / Practical Assignment / Observation of Practical Skills
CO3	Analyse the basic tools of gender Economics	An	P	Instructor-created exams / Seminar Presentation / Group Discussion
CO4	Develop the attitude and ability to preserve the concept of women empowerment and gender equality in the society.	Ap	P	Instructor-created exams / Home Assignments
CO5	Suggest and practice certain measures for protecting gender equality and gender well being	Ap	P	Writing assignments/Survey/Debate
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to Gender Economics		12	17
	1	Concepts of gender and sex-Femininity and masculinity	1	
	2	Definition and Scope of Gender Economics	1	

	3	Historical Milestones of Gender Mainstreaming - Global perspective (UNDP measures, UN SDGs, CEDAW etc)	2	
	4	Gender Main streaming efforts in India-73 rd and &74 th amendments of Indian constitution, Gender budgeting, Beti Bachao Beti Padhao, Mahila Shakti Kendra, The National Crèche Scheme, Pradhan Mantri Matru Vandna Yojna, Pradhan Mantri Ujjwala Yojana, Sukanya Samridhi Yojna (SSY), Skill Upgradation & Mahila Coir Yojna etc.	3	
	5	Gender mainstreaming efforts of Local self-government- WCP, GRC, Jagratha Samithi, Kudumbasree,etc.	1	
	6	Transgender policy of India and Kerala	1	
	7	Demography of female population in India-Age structure, mortality rates, Inter-state variations in sex ratio, Causes of declining sex ratio, Measurement of fertility and its control	3	
II	Gender and Labour Market		12	17
	8	workforce participation across Gender –Basic Statistics (world &India), Contribution of Claudin Goldin-U shape Curve	3	
	9	Challenges in informal and Formal Economy–Gender Discrimination and Exploitation in the Labour Market	2	
	10	Time use and Indian Time Use survey (1999-2000& 2019) for assessing women’s labour at home and workplace	3	
	11	Women’s Contribution to National Economy in terms of sectoral shares in GDP and employment	2	
	12	Impact of technology and modernization on women’s work participation	1	
	13	Effects of globalization and liberalization on women	1	
III	Tools for Gender Economics		10	15
	14	Gender Planning-Definition, importance, process and stakeholders	3	
	15	Gender Budgeting: Definition, Importance, process and stakeholders	3	
	16	Gender Auditing: Definition, Importance and process	4	
IV	Tools for Women Empowerment		14	21
	17	Women and education- GER ratio in India -Addressing gender inequalities in education	3	
	18	Gender equity in health-access to nutrition	2	
	19	Women’s participation in decision making	2	
	20	Gender equity in Assets -Protection of property rights	2	
	21	Crimes against women in India-Basic statistics	3	
	22	Schemes for safety net for women	2	
V	Open Ended Module		12	
	1	Perform Gender auditing of a leading institution		
	2	Discuss the reasons for increasing women crimes in Kerala		
	3	Gender-based discrimination in assets: carry out a local survey		
	4	Student led seminar on national and international laws for women’s rights		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22

units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Sen, Sujatha (2012), *Gender Studies*- Dorling Kindersley (India) Pvt.Ltd, New Delhi
2. Krishna Raj .M, Sudarshan.R.M, and Shariff.A (1999), *Gender, Population and Development*, Oxford University Press, New Delhi
3. Ellina Samantroy (2022), *Women's Paid and Unpaid Work: Insights from the Time Use Survey and Methodological Issues*, V.V. Giri National Labour Institute, Noida, U.P.

ADDITIONAL READINGS

1. Sen, Suvarna (2006), *Gender and Development*, ICFAI University Press, Hyderabad.
2. Dutta, Nandita and, Sumitra Jha (2014), *Women and Rural Development*, Pacific Books International Delhi.
3. Jitendra Ahirrao (2013), *Entrepreneurship and Rural Women in India*, New Century Publications, New Delhi.
4. A. Venkateswarlu, et al. (2013), *Dimensions of Female Sex Ratio: Interstate Variations in India*, Serials Publications, New Delhi.
5. Desai, N and M.K Raj (1974), *Women and Society in India*, SNDT University, Mumbai.
6. Sen, Amartya. (1990), *More than 100 million Women are Missing*, New York Review of Books, vol.37, No.20, 1990.
7. Govt.of India (2009), *Gender Equality and Women Empowerment in India*, National Family Health Survey 2005-06 (NFHS-3), IIPS, Mumbai.
8. John Mary. E (1996), *Gender and Development in India*, EPW, 31(47), PP 3071-77).
9. Pal, Manoranjan et.al (Ed) (2011), *Health, Nutritional Status and Role of Women in India*, Oxford University Press, New Delhi.
10. E Boserup (1970), *Women's Role in Economic Development*, George Allen and Unwin, London.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	1	-	-	2	-	-	-	-
CO 2	1	2	-	3	-	-	2	-	-
CO 3	-	-	1	3	-	-	2	-	-
CO 4	-	-	-	2	-	-	3	2	-
CO 5	-	-	-	-	-	2	3	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar/ Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	GROWTH AND DEVELOPMENT MODELS				
Type of Course	Elective				
Semester	V				
Academic Level	300 – 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics Course of 200 – 299 level				
Course Summary	This course explores theories and methodologies related to economic and social progress, emphasizing sustainable development and global perspectives. Students study factors influencing growth, analyze developmental challenges, and formulate strategies for inclusive progress				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand how development models by studying theories and economic situations	U	C	Instructor-created exams / Quiz
CO2	Evaluate the contribution of different sectors to the national income of the country.	E	F	Practical Assignment / Observation of Practical Skills
CO3	Analyse the demography of the country as potential capital for its development.	An	F	Seminar Presentation / Group Discussion
CO4	Create the growth models in the Indian context.	C	C	Instructor-created exams / Home Assignments
CO5	Understand the pros and cons of growth models adopted in India and formulate a pertinent growth model.	U	P	Writing assignments
CO6	Analyze various types of planning models with a focus on understanding their characteristics and applications	AN	P	Practical Assignment
* Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) #: Factual Knowledge (F) and Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Growth Theories		12	15
	1	Introduction-Background and Beginning of 'Development Economics' Defining growth and development	2	
	2	Growth models: Harrod-Domar Model; Solow Model of long-run Growth; Joan Robinson Model; Kaldor model	5	
	3	The Basic Cambridge Approach to Harrods Instability Problem-Arrow's Learning by doing	3	
	4	Samuelson's surrogate production function approach to Economic growth.	2	
II	Development Theories		10	20
	5	Schumpeter's theory, Rostow's stages of economic growth, and Nurkse's theory	3	
	6	Big Push Theory, Critical Minimum Effort Thesis	2	
	7	Balanced Growth- Unbalanced Growth	2	
	8	Low-Level Equilibrium Trap	1	
	9	Lewis's Model of Unlimited supply of labour- Dependency theory of underdevelopment- Myrdal's theory of circular causation	2	
III	Social, Institutional and Sectoral Aspects of Development		14	20
	10	Measures of Inequality and Poverty Measuring	2	
	11	Development and Development Gap	1	
	12	Human Development Index and other indices of development— quality of life	2	
	13	Importance of Population in Economic Growth; Population as a limit to growth and as its ultimate source: Theory of Demographic Transition	1	
	14	Introduction of migration- Rural-Urban Migration, Characteristics of migration.	1	
	15	The Harris Todaro Model of Migration	1	
	16	New Technology and Sustainable Agriculture, Globalization and Agriculture	2	
	17	Markets and Inter-linkages in Agriculture	2	
	18	Rationale and pattern of industrialization in developing countries; The choice of Techniques and appropriate technology	2	
IV	Planning in India		12	15
	19	Need for planning, Arguments for and against planning	2	

	20	Types of planning: Planning by Direction and Planning by Inducement, Financial Planning and Physical Planning; Indicative planning and Imperative Planning, Rolling Plans and Fixed Plans, Centralised and Decentralised Planning, Economic Planning	5	
	21	A brief review of India's plan models-LPG Model	2	
	22	Resource allocation: Need for investment criteria in developing countries versus future, alternative investment criteria, and cost-benefit analysis.	3	
V	Open ended module		12	
	Analyzing the Impact of Sustainable Development Goals (SDGs) on Local Communities: A Case Study Approach			

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, is only for the external examination.

REFERENCE:

1. S. K. Misra and V. K. Puri (2005), Growth and Development, Himalaya Publishers, Mumbai
2. Thirlwall, A P (2005). Growth and Development, 8E, Palgrave MacMillan, New York
3. Todaro, Michael P and Stephen C Smith (2003), Economic Development, 8E, Pearson Education, New Delhi

ADDITIONAL READINGS

1. Hendrik Van Den Berg (2016), Economic Growth and Development, 3rd edition. World Scientific Publishing Co.
2. A Sen (1970): Growth Economics: Selected readings; Penguin A N Agarwala and S P Singh (1958): The Economics of Underdevelopment, Volumes I, II, and III; Oxford University Press
3. Hywel G Jones (1976) An Introduction to Modern Theories of Economic Growth: McGraw Hill.
4. Kaushik Basu, 1998; Analytical Development Economics: The Less Developed Economy Revisited. Oxford Indian Paperbacks.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	2	-	1	-	-	-	1	-
CO 2	-	-	-	2	-	-	-	-	-
CO 3	-	-	-	-	-	-	3	-	-
CO 4	-	-	-	-	1	-	-	2	-

CO 5	-	3	-	-	-	-	-	-	-
CO 6	-	-	-	-	-	-	-	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/ Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓		✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INDIAN TAX SYSTEM AND TAX CALCULATIONS				
Type of Course	Elective				
Semester	V				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Intermediate Level Economics Courses of 200 – 299 level				
Course Summary	The Indian tax system and tax calculation course provides a comprehensive understanding of the country's taxation principles, laws, and policies. Students learn to evaluate tax structures, calculate taxes accurately, and analyze tax planning strategies.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand the key features of Indian tax laws, including the structures and scopes of direct and indirect taxes	U	F	Quiz/Instructor-created exams
CO 2	Apply knowledge of Indian tax laws to accurately calculate taxes for individuals, businesses, and other entities in compliance with current tax regulations and provisions.	AP	P	Group Discussion
CO 3	Analyze various tax planning techniques to identify opportunities for minimizing tax liabilities while adhering to legal standards, using deductions, exemptions, and incentives available under the law.	AN	C	Writing assignments and instructor-created exams
CO 4	Understand and explain the ethical responsibilities of tax professionals, focusing on maintaining confidentiality, avoiding conflicts of interest, and upholding integrity in all tax-related activities.	U	P	Writing assignments Seminar presentations
CO 5	Evaluate the fundamental principles of taxation in India to comprehend their rationale and implications on individuals, businesses, and the broader economic environment.	E	P	Practical Assignment

CO 6	Evaluate the effectiveness and equity of taxation policies implemented by the Indian government, analyzing their success in achieving fiscal objectives.	E	M	Practical Assignment/ Presentation
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C)				
#: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	BASIC CONCEPT		10	15
	1	Tax System: Meaning and features of taxes in India	2	
	2	Types of Taxes: Direct tax and Indirect tax	1	
	3	Direct Tax: Meaning and Features, Corporate tax, income tax, gift tax, minimum alternate tax	2	
	4	Indirect Tax: Meaning and features, Sales tax, value-added tax, Goods and Services Tax, Excise, - Difference between direct and indirect tax in India	2	
	5	Tax importance and scope of tax planning for individuals, HUFs and corporations	1	
	6	Strategies for tax optimization	1	
	7	Role and functions of tax authorities; CBDT, GST council	1	
II	Public revenue and tax calculations		15	20
	8	Public Revenue: Meaning and characteristics-Objectives of Public Revenue	2	
	9	Sources of public revenue: Tax revenue and non-tax revenue	1	
	10	Canons of Taxation: Canon of Equity, Canon of Certainty, Canon of Convenience, Canon of Economy, Canon of Productivity, Canon of Elasticity, Canon of Diversity, Canon of Expediency, Canon of Simplicity, and Canon of Coordination	3	
	11	Incidence and shifting of tax burdens: Ability to pay, Cost of service and Benefit Impact	3	
	12	Major taxes in India: Income tax, VAT, GST, and OCTROI	3	

	13	Calculation of personal and corporate income tax (with suitable examples)	3	
III	Assessment		12	20
	14	Clubbing of income and aggregation of income set off and carry forward losses	2	
	15	Income exempt from taxes, Deductions in computing total income, Rebates and Relief of tax	3	
	16	Assessment of agricultural income, Computation of agricultural income	2	
	17	Calculation of tax on integration, Assessment of individuals, AMT Assessment of HUF	2	
	18	Tax planning relating to clubbing and aggregation of income	1	
	19	Set off and carry forward losses, Agricultural income, Individual assessment,	2	
IV	Computation of taxable income under different heads		11	15
	20	Income from salary: Meaning-Allowances	1	
	21	Deduction from salary income-computation of salary income and qualified savings eligible for deduction u/s 80 C (problems on the computation of income from salaries)	4	
	22	Income from household properties: meaning and annual value; Deemed to be let-out: Deemed ownership-co-ownership: deductions from annual value and computation of income from house property (problems on the computation of income from household properties)	6	
V	Real-world Applications		12	10
		Comprehensive Tax Calculation project: Calculate the Income Tax and GST		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Dr. Vinod; K. Singhania (2024) Direct Taxes: Law and Practice, Taxman Publications
2. T. S. Reddy and Dr. Y. Hari Prasad Reddy (2019), Business Taxation, Margham Publications
3. Premraj and Sreedhar (2024) Income Tax, Hamsrala Publications

ADDITIONAL READINGS

1. B. B. Lal and N. Vashisht (2012), Direct Taxes: Income Tax Wealth Tax and Tax Planning, I K International Publishing House Pvt. Ltd
2. Dr. S.P Goyal and Dr. H.C. Mehrotra (2022), Direct Tax, including Tax Planning & Management, Sahitya Bhavan Publication.
3. V. Balachandran and S. Thothadri (2013), Taxation Law and Practice, PHI Learning.
4. V.P. Gaur and D.B. Narang (2021), Income Tax and Practice, Kalyani Publications
5. Dr. R. K. Jain (2020) Direct Tax System Income Tax, SBPD Publications

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	1	-	-	-	-	-	-	-	-
CO 2	-	3	-	-	-	-	-	-	-
CO 3	-	-	-	2	-	-	-	-	-
CO 4	-	-	-	-	-	2	-	-	-
CO 5	-	-	-	-	-	-	-	3	-
CO 6	-	-	-	-	-	-	3	-	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓	✓	✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INDIAN ECONOMY				
Type of Course	Elective				
Semester	V				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-		60
Pre-requisites	Course on Microeconomics and Macroeconomics of level 200 - 299				
Course Summary	This course explores important issues related to Development such as Poverty, Unemployment, Inequality and Inflation. The measurements of Development Issues are also incorporated the topics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Help in understanding the major development issues faced by Indian Economy and its historical precedents.	U	C	Instructor-created exams / Group Discussion.
CO2	Help in analysing the impact of public policy framed to deal with development issues such as Poverty, inequality in income distribution, unemployment and fiscal deficit.	An	F	Instructor-created exams/ Seminars/ Projects
CO3	Help in evaluating the conceptual framework methodology, trends and policy measures adopted regarding the development issues	E	C	Seminar Presentation / Group Discussion
CO4	After studying the development issues of Indian Economy, students will be exposed to economic reforms in India and problems of Indian economy	Ap	P	Instructor-created exams / Home Assignments
CO5	Students will learn how to think critically about public policy issues and made capable of measuring poverty and unemployment in a small region	E	M	Writing assignments/ Group Discussions
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)				
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks		
I	Historical Precedents of Development Issues of Indian Economy		6	9		
	1	History of development Issues of Indian Economy	2			
	2	Basic indicators of Development: Real income, Health and Education	1			
	3	Basic issues in economic development	1			
	4	Institutional framework and policy regimes	2			
II	Poverty		14	20		
	5	Concepts of poverty- Absolute Measurement of Poverty, Relative measurement of Poverty, Multi -Dimensional Poverty	3			
	6	Poverty Estimation-Poverty Line Calculation- Consumption verses Income levels- Data collection Methods -URP, MRP	4			
	7	Multi-dimensional poverty index.	1			
	8	Post-Independence Poverty Estimation- Tendulkar Committee (2009) -Rangarajan Committee.	2			
	9	Trends of Poverty	2			
	10	Poverty Alleviation Programmes	1			
	11	Economic Characteristics of High- Poverty Groups	1			
	III	Inequality			13	19
		12	Income Inequalities in India -Causes of Income Inequalities in India		2	
13		Measurements of Inequality-Lorenz Curve- Gini coefficient	2			
14		The Ahluwalia- Chenery Welfare Index	2			
15		Trends of Inequality in India.	3			
16		Government Policy to tackle the problem of inequality	2			
17		Policy Options on Income Inequality and Poverty	2			
IV	Unemployment:		15	22		
	18	Types and Structure of unemployment	3			
	19	Conceptual framework of key employment and unemployment indicators:	4			
	20	Nature and Estimates of Unemployment in India	3			
	21	Government Policy for Removing Unemployment	3			
	22	Major Employment Programmes	2			
V	Open ended module		12			
		Discussion based on the trends in fiscal deficit and inflation in India	3			
		A simple project for the Measurement of poverty using MRP method in a Ward of LSG	5			
		A simple project for the Measurement of Unemployment in the local territory using any one methodology	5			

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Report Based on Study Tour: A study tour is recommended because it may add direct experience to learners about different economic culture of the country. All the students need to prepare a report of the tour that includes the places they visited, its importance etc and submit it to the Head of the Department soon after the completion of the tour.

REFERENCE:

1. Nicholas C. Hope, et al. *Economic Reform in India : Challenges, Prospects, and Lessons*, edited by, Cambridge University Press, 2013. (Module 1)
2. [V.K. Puri](#), [S. K. Misra](#), [Bharat Garg](#) -. *Indian Economy including Union Budget 2023-24*, 2023, Himalaya Publishing House. (Module 2,3,4 and 5)
3. [Uma Kapila](#): *Indian Economy Performance and Policies (23rd edition)*, Academic Foundation. (Module 2,3,4 and 5)
4. Singh, Shrawan Kumar. *Understanding the Indian Economy from the Post-Reforms of 1991, Volume II : Anatomy of the Indian Economy*, Business Expert Press, 2020. (Module 4)
5. Michael P. Todaro, Stephen C. Smith : *Economic Development (12th edition)*, Pearson (Module 1,2,3 and 4)

ADDITIONAL READINGS

1. Sreenivasan, T., Banerjee, A. V., Bardhan, P., & Somanathan, R. (2019). *Poverty and Income Distribution in India*, Juggernaut.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	2	-	1	-	-	3	-	-
CO 3	-	-	-	2	-	-	3	-	-
CO 4	-	3	1	2	-	-	3	-	-
CO 5	-	3	-	-	2	-	2	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Field work and project report (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Field work- project	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	FINANCIAL INSTITUTIONS AND MARKETS				
Type of Course	Elective				
Semester	V				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-		60
Pre-requisites	Macroeconomics course of 200 – 299 level				
Course Summary	This course provides a comprehensive understanding of financial markets, covering their functions, structure, and regulatory frameworks, while also delving into various aspects of investments and the basics of stock market operations.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic functions, structure, and regulation of the financial market.	U	C	Quiz/Instructor-created exams
CO2	Analyze various financial aspects of investments.	AN	P	Seminar Presentation
CO3	Apply appropriate skills to address real-world issues in the financial market	Ap	P	Seminar Presentation / Group Discussion
CO4	Understand the concept of financial management and its importance	U	C	Instructor-created exams / Home Assignments
CO5	Evaluate different financial instruments, such as stocks, and bonds, including their characteristics, and risk profiles	E	F	Writing assignments
CO6	Evaluate real-world scenarios of foreign exchange and derivative market transactions	E	P	Practical Assignment
* Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) #: Factual Knowledge (F) and Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I		Introduction to Financial Systems and Financial Markets	14	20
	1	Financial system: Meaning-Functions of Financial system	2	
	2	Indian Financial System-Financial Development-Saving and Investment	3	

	3	Components of Financial System: Financial Institutions-Financial Market-Financial Instruments-Financial Services	2	
	4	Financial Integration-Regulation and Deregulation	2	
	5	Regulatory Institutions: SEBI: Meaning and Functions	2	
	6	RBI-Meaning and Functions	2	
	7	Stock market in India	1	
	Money Market		10	14
II	8	Money market: Meaning -Functions of Money Market	2	
	9	Instruments of the money market: Commercial Bills-Treasury Bills-Call money	2	
	10	Certificate of Deposit-Commercial Paper	2	
	11	Banker's acceptance- Repurchase agreements	2	
	12	Money market mutual funds: Features of a developed money market	2	
	Capital Market		12	18
III	13	Meaning and Functions of Capital Market	1	
	14	Structure of Capital Market in India	1	
	15	Primary market: Meaning -Kinds of issues in Primary Market-Public issues-Rights issues-Bonus issues-Private placement	2	
	16	Secondary market: Meaning - Role of secondary market	2	
	17	The distinction between primary market and secondary market	2	
	18	Stock Exchange: Meaning-Objectives-Functions of Stock Exchange	2	
	19	Bombay Stock Exchange, National Stock Exchange	2	
	Foreign Exchange and Derivative Market		12	18
IV	20	Introduction: -Characteristics of the foreign exchange market	2	
	21	Dealing room transactions: Merchant Transactions-Interbank Transactions; The distinction between Merchant Transactions and Interbank Transactions	4	
	22	Meaning -Functions of Derivative Market; Types of derivatives: Swap contract-Forward contract-option contract-futures contract; Platforms for options trade-Trading mechanics-Option premium-Profits and losses with options	6	
	Real-world applications		12	
V	Case Study Analysis of Financial Market Trends and Institutional Strategies			

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks)

are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. Bhole, L. M. (2017) Financial Institutions and Markets, Tata McGraw Hill Company Ltd., New Delhi
2. Bhole, L. M (2000), Indian Financial System, Chugh Publications, Allahabad.

Additional Readings

1. Anthony Saunders and Marcia Millon Cornett (2007): Financial Markets and Institutions: A Modern Perspective, TATA McGraw Hill, New York.
2. Bharati V Pathak (2011): The Indian Financial System, Pearson Education India
3. Robert O. Edmister. (1980), Financial Institutions, Markets and Management, McGraw Hill, New York.
4. Goldsmith, R. W.(1969) Financial Structure and Development, Yale, London.
5. Hanson, J. A. and S. Kathuria (2001) India, A Financial Sector for 21st Century, Oxford University Press, New Delhi.
6. John C Hull (1995): Introduction to Futures and Options Markets -Prentice Hall India.
7. Johnson, H. J. (1999) Financial Institutions and Markets, McGraw Hill, New York.
8. Khan, M. Y. (2019) Indian Financial System, Tata McGraw Hill, New Delhi.
9. Rajesh Chakrabarti and Sankar De (2010): Capital Markets in India-Response Sage New Delhi.
10. Robert A Strong (2002): Derivatives: An Introduction- Thomson South-Western.
11. S Gurusamy (2009): Financial Markets and Institutions-McGraw Hill Higher Education.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	-	-	-	-	1	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	-	-	-	-	-	-	3	-
CO 4	-	-	2	-	-	-	-	-	-
CO 5	-	-	-	-	-	-	3	-	-
CO 6	-	-	-	-	-	-	-	3	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

Quiz / Assignment/ Viva Voce/ Discussion / Seminar

Internal Exam

Practical Assignments (20%)

Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/ Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓		✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	HUMAN CAPITAL AND ECONOMIC DEVELOPMENT				
Type of Course	Elective				
Semester	V				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Course on Intermediate Economics of level 200 - 299				
Course Summary	This course explores the intersection between development economics and the economics of human capital				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the relationship between human capital and economic development	U	C	Instructor-created exams / Quiz
CO2	Analyze the various theories of human capital and economic development	An	P	Practical Assignment
CO3	Evaluate the different theoretical models	Ap	F	Seminar Presentation / Group Discussion
CO4	Apply the theoretical models to real situations	Ap	C	Instructor-created exams / Home Assignments
CO5	Create empirical research models	C	P	Viva
CO6				

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P)
Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction		10	15
	1	Human Capital : Definition and Concepts	2	
	2	Relation between Human Capital and Economic Development	2	
	3	Measurement of Human Development	2	
	4	HDI and India	2	
	5	Problems of Human Capital Formation	2	
II	Theoretical Aspects		12	20
	6	Solow Model and Effective Capital	2	
	7	Convergence Hypothesis	2	

	8	Solow Residual	2	
	9	Research on Human Capital and Economic Growth	3	
	10	India's Experience	3	
III	Advanced theories		12	20
	11	Theoretical models on Human capital and Economic Growth	3	
	12	Human Capital formation	2	
	13	Endogenous growth models	2	
	14	Multiple equilibrium and Non-linearity in Human Capital and Economic growth	3	
	15	Overlapping Generations model- Paul Samuelson & Peter Diamond	2	
IV	Empirical Aspects		14	15
	16	The Empirics	2	
	17	Linear and Non-linear Specifications	2	
	18	Non –parametric method and their application	2	
	19	Migration and regional economic growth	3	
	20	Demographic characteristics and economic growth	2	
	21	Economic Policy and Human capital	2	
	22	Human Capital and Development experiences of Kerala	1	
V	Open Ended Module		12	
		Assignments, Empirical studies, Problem Discussion		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Andreas Savvides and Thanasis Stengos: Human Capital and Economic Growth:Stanford University Press 2009
2. A . P Thirlwall: Growth and Development
3. Michael P Todaro and Stephen C Smith:Economic Development
4. N Gregory Mankiw: Macro Economics

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO 1	3	-	-	-	2	-	-
CO 2	-	-	-	2	-	-	2
CO 3	-	2	-	2	-	-	3
CO 4	-	2	-	1	1	-	3
CO 5	-	2	-	1	-	2	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INDUSTRIAL ECONOMICS				
Type of Course	Elective				
Semester	VI				
Academic Level	300-399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics course of 200 – 299 level				
Course Summary	This course is designed to explore the basic concepts, nature and scope, theories and practices of industrial economics in a cogent and analytical manner particularly in the Indian context.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Identify the basic concepts and scope of Industrial Economics	U	C	Instructor-created exams / Quiz
CO2	Analyse the different forms of organisation and its motives	An	C	Instructor-created exams /Practical Assignment
CO3	Examine the general determinants and approaches of industrial location and explore the motives of mergers and acquisition	An	C	Instructor-created exams/ Seminar Presentation / Group Discussion/
CO4	Evaluate the major source of industrial finance, financial statements, Ratio analysis and break-even analysis procedures in the Indian context.	E	p	Instructor-created exams / Home Assignments/ Practical Assignment
CO5	Analyse basic investment decisions on the basis of project evaluation methods and cost benefit analysis	An	p	Instructor Created exams/Practical Assignment /Writing assignments
CO6	Access industrial practices prevailing in India on the basis of Industrial policy 1991, Labour rules, Industry innovations, Special economic zone, Ratio analysis and break-even point calculation etc	Ap	P	Debate/panel discussion/ survey /Assignments
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Basics and Scope of Industrial Economics		12	15
	1	Nature and Scope of Industrial Economics	1	
	2	The organizational form and alternative motives of the firm	3	
	3	The concept of Production function and optimal input	3	
	4	Efficiency and Size of the firm	3	
	5	The effect of Firm size on other performance indicators and conduct	2	
II	Industrial Location Analysis		12	15
	6	The General determinants of industrial location	1	
	7	Geographical approaches to industrial location	3	
	8	Economic theories of industrial location	4	
	9	Operational approaches to industrial location	1	
	10	Industrial location trends in India	1	
	11	Concepts and motives for industrial diversification, vertical integration and mergers	2	
III	Industrial Finance and Accounting		12	20
	12	Types of finance and Sources of Industrial Finance (internal and external)	2	
	13	Contribution of various sources of finance in Indian Situation	2	
	14	Basic accounting procedure and financial statements (balance sheet and Profit & Loss account only)	3	
	15	Assessment of Financial soundness and Ratio analysis	3	
	16	Breakeven analysis and its application in financial management	2	
IV	Investment Decisions		12	20
	17	Nature and types of Investment decisions	1	
	18	Preparation of time profile of a project	2	
	19	Methods of project evaluation	4	
	20	Ranking of projects: NPV vs IRR	1	
	21	Risk and uncertainties in project proposal	2	
	22	Appraisal of public projects: social cost benefit analysis	2	
V	Open Ended Module		12	
	1	Conduct Student-led seminar on New Industrial policy 1991		
	2	Organize discussion on Industry and Innovation (Startup, Unicorn etc.		
	3	Conduct financial ratio analysis and breakeven analysis of selected companies		
	4	Organize a quiz competition on Labour rules in India		
	5	Panel discussion on Special Economic Zones: Progress and problems		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Barthwal, R.R (2018), *Industrial Economics*, 3RD Revised Edition, New Age International (p) Limited, New Delhi (Module 1,2,3,4&5)
2. Prasanna Chandra (1995), *Financial Management-Theory and Practice-* Tata McGraw Hill, New Delhi (Module 3&4)

ADDITIONAL READINGS

1. Hay D A and Morns D J (1979), *Industrial Economics: Theory and Evidence*, Oxford university Press
2. Roger Clarke (1985) *Industrial Economics*, Basil Blackwell, New York.
3. Smith D M (1971) *Industrial Location: An Economic and Geographic Analysis-* John Wiley, New York.
4. Francis Cherunilam (1994), *Industrial Economics: Indian Perspective*, Himalaya Publishing House, Mumbai.
5. Uma Kapila (2003), *Understanding the problems of Indian Economy*, Academic Foundation, New Delhi.
6. CDS: Balakrishnan P and Pushpangadan K (1994) Total Factor Productivity Growth in Indian Manufacturing: A Fresh Look- Working Paper No. 259, Thiruvananthapuram.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	1	2	-	2	-	-	-	-	-
CO 3	-	3	-	2	-	-	-	-	-
CO 4	-	-	-	3	-	-	-	2	-
CO 5	-	-	-	2	-	-	2	3	-
CO 6	-	-	-	-	-	-	2	3	

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Debate/ Discussion / Seminar/Survey
- Internal Exam
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INTERNATIONAL ECONOMICS				
Type of Course	Elective				
Semester	VI				
Academic Level	300-399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics Course of 200 – 299 level				
Course Summary	This course covers international economics, including global trade, monetary systems, and economic policy. Students will learn about the complexities of international economic interactions, preparing them for a career in the global market..				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic tools and theories of International Trade	U	F	Instructor-created exams/quizzes
CO2	Understand the significance of international trade in the global economy.	U	F	Seminar Presentation / Group Discussion
CO3	Evaluate the possible gain to a country due to International Trade	E	C	Seminar Presentation / Group Discussion
CO4	Analyse the effects of economic growth on trade and welfare	AN	P	Instructor-created exams / Home Assignments
CO5	Evaluate how international trade influences factor prices.	E	P	Writing Assignments/ Practical Assignments
CO6	Analyze how technical advances affect trade patterns and economic outcomes.	AN	P	Practical Assignment
* Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) #: Factual Knowledge (F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	TRADE THEORIES		10	15
	1	Meaning of International Trade and its importance	2	
	2	Basic analytical tools: Production Possibility Curve, Community indifferent curve, Offer curve	3	
	3	A brief idea about comparative cost theory: Opportunity Cost theory and Reciprocal Demand Theory	2	
	4	The modern theory of factor endowments: The H-O Theory	2	
	5	Leontief Paradox	1	
II	INTERNATIONAL FACTOR PRICES AND GAINS FROM TRADE		16	25
	6	International Trade and Factor prices	2	
	7	Samuelsson factor price equalisation theory	2	
	8	Factor intensity reversals: Single and multiple factor intensity reversal	2	
	9	Stoper-Samuelson theorem, Rybczynski theorem	2	
	10	Meaning of gain from trade	2	
	11	Potential gain and Actual gain	1	
	12	Measurement of gain from trade	2	
	13	Factors determining the gain from trade	1	
	14	Gain from trade in the case of a large and small country	1	
	15	Static and Dynamic gains from trade	1	
	III	TECHNICAL PROGRESS		
17		Meaning of technical progress	2	
18		Technical progress and international trade	2	
19		Types of technical progress	2	
20		Effects of technical progress on trade	2	
IV	BALANCE OF PAYMENTS		14	20
	21	Defining Balance of payment and Balance of trade	3	
	22	Structure of balance of payments	2	
	23	Equilibrium and disequilibrium in balance of payment	3	

V	24	India's balance of payment since 1991	3	
	25	Meaning and functions of IMF	3	
		Open ended module	12	
		Compare and contrast traditional and modern theories of International trade Study about the relevance of international trade theories in explaining current International transactions between countries.		

Note: The course is divided into five modules, with four modules together having total 25 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 25 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCES:

1. Dominick Salvatore (2011), International Economics: Trade and Finance, 10th edition, John Wiley
2. Kindleberger, Charles (1973), International Economics, Richard D. Irwin, Inc.
3. Paul Krugman, Maurice [Obstfeld](#) (2017), International Economics: Theory and Policy, 10th, Pearson Education

ADDITIONAL READINGS:

1. Obstfeld, and Marc Melitz (2012), International economics, 9th edition, Pearson Education
2. Bo Sodersten and Geoffrey Reed, (1994), International economics, 3rd edition, Macmillan publication

MAPPING OF COS WITH PSOS:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	1	1	-	-	-	-	2	-	-
CO 2	-	-	-	-	3	-	-	3	-
CO 3	-	-	-	2	-	-	-	-	-
CO 4	-	-	-	3	-	-	-	-	-
CO 5	-	-	-	-	-	-	2	-	-
CO 6	-	2	-	-	-	-	1	-	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓	✓	✓	✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	KERALA ECONOMY				
Type of Course	Elective				
Semester	VI				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-		60
Pre-requisites	Basic Economics Course of 200 – 299 level				
Course Summary	The course covers developmental experiences of Kerala, Demography, Human Development and Social Inclusion, Population and Human Development, Development Issues, state finance and planning. It also covers assignment on identification of data base on Kerala Economy and discussion regarding the Economic Review and the State Budgets and Prepare reports based on discussions.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To understand the developmental experiences of Kerala Economy.	U	F	Instructor-created exams / Discussions/ Quiz
CO2	To examine the population changes, Human Development and Inclusive growth in Kerala	E	F	Instructor-created exams/ Discussions/Quiz
CO3	To understand and examine the major development issues of Kerala.	E	P	Instructor-created exams/ Seminar Presentation / Discussion/Quiz
CO4	To evaluate state finances and planning in Kerala and enable them to be a part of policy implementation.	E	P	Instructor-created exams / Group Discussion/ Assignments/ Quiz
CO5	To understand data base on Kerala Economy, conduct a discussion and prepare reports	U	F	Group Discussion/ Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)				
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Development Experiences of Kerala		11	16
	1	Economic Growth in Kerala	2	
	2	Structural Transformation in Kerala	2	
	3	Sectoral performance and Development of Infrastructure in Kerala	2	
	4	Kerala Model of Development	3	
	5	Rebuild Kerala Initiative	2	
II	Demography, Human Development and Social Inclusion		16	23
	6	Changing Demographic Profile in Kerala	2	
	7	Labour, Employment and Skill Development	2	
	8	Migration: Types, Causes, Trends and Impacts	2	
	9	Urbanization: Causes, Trends and Challenges	2	
	10	Education and Health	2	
	11	Gender and Development	2	
	12	Social Security Measures in Kerala	2	
III	Development Issues of Kerala Economy		11	16
	13	Unemployment: Causes, Trend and Consequences	2	
	14	Growth of Informal Sector in Kerala	2	
	15	Greying Population: Trend, Concern and Challenges	2	
	16	Banking and Tourism	2	
	17	External Sector in Kerala: External Trade- Pattern and Trend.	3	
IV	State Finance and Planning		10	15
	18	Financial Indicators of State Government	2	
	19	Fiscal Deficit and Public Debt	2	
	20	People's Plan Campaign and Decentralized Planning	2	
	21	Fiscal Decentralization: Achievements and Challenges in Kerala	2	
	22	Inclusive Growth in Kerala	2	
V	Open ended module		12	

1	Assignment on identification of data base on Kerala Economy and interpretation of the given data	
2	Conduct a discussion regarding the Economic Review and the State Budgets and ensure a debate/quiz related to the various budgets	
3	Prepare reports based on discussions	

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCES:

1. Oommen, M.A. (1999) Rethinking Development: Kerala's Development Experience, Concept, New Delhi.
2. Prakash, B.A. (2004) Kerala's Economic Development: Performance and Prospects in the Post Liberalisation Period, Sage Publications, New Delhi.
3. Mani, Sunil (2020) Kerala and the World Economy, Centre for Development Studies (Under the aegis of Govt. Of Kerala & Indian Council of Social Science Research), Thiruvananthapuram.
4. Zachariah K.C & Irudaya Rajan.S (2013) Diaspora in Kerala's Development, Daanish Books,
5. Prakash, B.A.&Jerry Alwin (2018) Kerala's Economic Development: Emerging Issues and Challenges, Sage Publications, New Delhi
6. Sundar Ramanathaiyer & Stewart Macpherson (2000) Social Development in Kerala: Illusion and Reality? Ashgate Publishing, UK.
7. State Urbanization Report 2012.
8. Kerala Migration Survey Report 2018
9. Kerala Development Report 2021
10. Kerala Economic Review for various years.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	1	-	-	-	-	-	3	-	-
CO 2	-	2	-	-	-	-	3	-	-
CO 3	-	2	-	-	-	-	3	-	-
CO 4	1	2	-	-	-	-	3	-	-
CO 5	1	-	-	-	-	-	3	-	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓		

Programme	B.A. Econometrics and Data Management Honours				
Course Title	DEMOGRAPHY				
Type of Course	Elective				
Semester	VI				
Academic Level	300-399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics Course of 200 – 299 level				
Course Summary	The course covers the dynamics of population growth, theoretical aspects of population, demographic data sources, empirical and policy implications of demographic issues in a developing country like India.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic concepts, theories, policies and data sources of demography	U	C	Instructor-created exams / Quiz
CO2	Analyse the population dynamics with respect to fertility, mortality, nuptiality, migration and urbanisation	An	p	Instructor-created exams/ Practical Assignment /
CO3	Examine the age and sex composition of population in developed and less developed countries	E	C	Instructor-created exams/ Seminar Presentation / Observation of Practical Skills
CO4	Evaluate the effectiveness of India's current population policy in addressing the country's demographic challenges.	E	C	Instructor-created exams / Group Discussion Home Assignments/
CO5	Equip the students with practical skills needed to interpret contemporary demographic issues and to frame suitable demographic policies	C	P	Writing assignments/Group Discussion/ Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to Demography		12	17
	1	Nature and scope of population studies, population studies and Demography	1	
	2	Interrelation between Population studies and other Disciplines	1	
	3	Development of population studies	2	
	4	Theories of Population - Malthusian Theory, Optimum theory of population and theory of demographic transition	4	
	5	Sources of demographic data in India- Census, Civil Registration System, National Sample Survey, Demographic Survey – National Family Health survey (Recent report in detail)	4	
II	Population Dynamics		16	23
	6	Fertility- Meaning, Fecundity and fertility, sterility, Natural fertility, Factors affecting fertility.	2	
	7	Basic measures of Fertility: crude birth rate (CBR), general fertility rate (GFR), child-woman ratio (CWR), Age specific Fertility rate (ASFR), total fertility rate (TFR), gross reproduction rate (GRR), and net reproduction rate (NRR).	2	
	8	Mortality -Meaning; Sources of mortality Data, Factors affecting mortality	2	
	9	Basic measures of mortality: Crude death rate (CDR), Age specific death rate (ASDR), infant mortality rate (IMR), crude mortality rate (CMR), maternal mortality ratio (MMR), Neonatal mortality rate (NMR), standardised death rate (SDR) and Life tables	2	
	10	Nuptiality- Meaning; Concepts- age at marriage, Synthetic and decadal synthetic cohort methods- Mean age at widowhood and divorce- Trends in age at marriage	2	
	11	Migration: General terms and concepts, types of migration, factors affecting migration	3	
	12	Urbanization: concept and measurement, Recent trends in urban population.	3	
III	Age and Sex Composition of population		10	15
	13	Age pyramids: types, concepts of stationary, stable and quasi - stationary population	2	
	14	Patterns of sex and age structure in developed and developing countries	2	
	15	Age and sex structure in India	2	
	16	Benefits and issues associated with Demographic dividend	2	
	17	Ageing of population	2	
IV	Population policy in India		10	15
	18	History of Family planning in India	2	
	19	Family Planning Programme– Organisational structure, approaches to family planning programme implementation, family planning methods and achievements	3	
	20	The child survival and safe motherhood (CSSM) Programme	2	

	21	Reproductive and child health programme (RCH	1	
	22	National Population Policy 2000	2	
V	Open Ended Module		12	
	1	construct and interpret life tables based upon the latest population data		
	2	Conduct a ward level population survey to identify the age and sex composition of particular locality		
	3	Student-led seminars on key global demographic trends		
	4	Debate on population growth and sustainable development.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, is only for the external examination.

REFERENCE:

1. Asha A. Bhende & Tara Kanitkar (2019). *Principles of Population Studies*. Nineteenth Edition, Himalaya Publishing house, Mumbai (Module 1 ,2, 3 &4)
2. S. N. Agarwala (1997) *India's Population Problems*. Second Edition McGraw-Hill Publishing company Ltd. New Delhi (Module 2,3&4)
3. UNCTAD *Handbook of Statistics 2023*(Module 3, Unit 14)

ADDITIONAL READINGS

1. Nancy E Riley & James McCarthy (2003) *Demography in the age of postmodern*. First Edition, Cambridge University Press, UK
2. Srinivasan, K. And A. Shariff (1998), *India: Towards Population and Demographic goals*, Oxford University Press, New Delhi
3. J N Desai M.L Jhingan, B.K Bhatt (2016), 'Demography' Vrinda Publications (P) Ltd
4. Government of India: *Census of India and Related Monographs and Reports*.
5. U.N: *Methods of Measuring Internal Migration- 1979*
6. Bose, A., (1996), *India's Basic Demographic Statistics*, B. Publishing Corporation, New Delhi

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	2	-	3	2	-	2	-	-
CO 3	-	2	-	3	-	-	2	-	-
CO 4	-	1	-	2	-	-	3	3	-
CO 5	-	3	-	2	-	-	1	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

Quiz / Assignment/ Viva Voce/ Discussion / Seminar

- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMIC ACCOUNTING USING SOFTWARE				
Type of Course	Elective				
Semester	VI				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics course of 200 – 299 level				
Course Summary	This course seeks basic information about research and its ideas, literature, formation, analysis, interpretation, and presentation.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the process of economic accounting and financial reporting	U	C	Instructor-created exams / Quiz
CO2	Analyze the tools for economic accounting	An	P	Practical Assignment
CO3	Evaluate accounting method	Ap	E	Seminar Presentation / Group Discussion
CO4	Apply the methods of economic accounting	Ap	C	Instructor-created exams / Home Assignments
CO5	Create complete skills for accounting and financial reporting	U	P	Practical Exam

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P)
Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Economic Accounting		11	16
	1	Single entry system of accounting	2	
	2	Determinants of inclusive and sustainable growth	2	
	3	Double entry system of accounting	2	
	4	Determination of profit or loss under accounting	2	
	5	Practical problem with excel	3	
II	Accounting issues of shares		13	19
	6	Share and types of share, Share capital of Companies	3	
	7	Issues of shares	3	
	8	Application – Allotment and calls on shares	3	

	9	Practical problems with four companies of share capital collection through software	4	
III	Accounting issues of Debentures		11	16
	10	Debentures	2	
	11	Types of Debentures	2	
	12	Issues of Debentures	3	
	13	Interest on Debentures	2	
	14	Collection of capital of a company-Example	2	
IV	Case Study		13	19
	15	Visit a suitable market in our locality and take a case study of a company	2	
	16	Trace out the various capital sources of the company	2	
	17	Prepare the share capital account separately	1	
	18	Preparation of Debentures accounts	1	
	19	Prepare the Assets account of the company	1	
	20	Prepare the Expenditure statement of the company by using a Excel spread sheet	1	
	21	Prepare the Balance sheet of the company	4	
	22	Suggestions for the best performance of the company	1	
V	Open ended		12	
		Discussion and Seminar Presentation- methods of accounting		
		Practical Assignments- Tools for economic accounting and financial reporting		
		Seminar- problems of accounting.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. S. N Maheshwari – Financial Accounting
2. Nipun Jaswal-Excel for Finance and Accounting

ADDITIONAL READINGS:

1. Goyal V K – Financial Accounting , Excel Books, New Delhi
2. B.S Raman- Advanced Accounting

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7
CO 1	3	-	-	-	-	-	-
CO 2	-	3	-	1	-	-	-
CO 3		2	-	3	-	-	-
CO 4	-	3	1	3	-	2	2
CO 5	3	-	-	-	3	2	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMIC GEOGRAPHY				
Type of Course	Elective				
Semester	VI				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics Course of 200 – 299 level				
Course Summary	This course is designed for Economics students interested in understanding the spatial dimensions of economic activities and the impact of geographical factors on economic development. It combines economic theories with a focus on regional disparities, trade patterns, and the role of space in shaping economic outcomes.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To remember the knowledge to key social and economic issues in the context of economic globalisation	R	F	Discussion / Debates
CO2	Understand the basic concepts in Economic Geography	U	C	Instructor-created exams / Quiz
CO3	Analyse and apply key concepts and theoretical approaches in economic geography	An	P	Practical Assignment
CO4	Discuss and critically evaluate these concepts and theoretical approaches	Ap	F	Seminar Presentation / Group Discussion
CO5	Apply these concepts and theoretical approaches to key social and economic issues in the context of economic globalisation	Ap	C	Instructor-created exams / Home Assignments
CO6	Discuss policy options for overcoming inequality and uneven development in the globalising world	E	M	Viva
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks		
I	Space and Economy: Some facts		8	12		
	1	Spatial Inequalities: A Brief Historical Overview	3			
	2	The Space-Economy and the Industrial Revolution	2			
	3	Regional Disparities: When an Ancient Phenomenon Becomes Measurable	3			
II	Space in Economic Thought		21	31		
	4	Economics and Geography: A Puzzling History of Reciprocal Ignorance	3			
	5	Definition of Economic Geography	2			
	6	Nature of Economic Geography	2			
	7	Scope and importance of Economic Geography	2			
	8	Recent trends and approaches in economic geography.	2			
	9	Neo-classical-inspired	2			
	10	Location theory	2			
	11	Marxist-inspired approaches,	2			
	12	Evolutionary and institutionalist inspired approaches,	2			
	13	New economic geography	2			
	III	Economic Activity and Space			6	9
		14	Location of Economic Activity-Agricultural Location theory of Von Thunen.		2	
15		Location of Secondary Activity- Industrial Location Theory of A.Weber and E. Hoover	2			
16		Location of Tertiary Activity-Contribution of Walter Christaller and August Losch.	2			
IV	New Economic Geography (NEG)		13	18		
	17	Emergence of a new global economy -transnational integration and its spatial outcomes.	3			
	18	Core-Periphery Model (Krugman Model)	2			
	19	Baldwin-Forslid Model	2			
	20	Venables Model	2			
	21	Helpman-Krugman Model	2			
	22	Melitz Model	2			
V	Open ended module		12			
		Investigate and analyse economic disparities between two regions using various indicators				

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Coe, N.M., P.F. Kelly and H.W.C. Yeung *Economic Geography: A Contemporary Introduction*. (Oxford: Blackwell, 2007) [ISBN 9781405132190].
2. *Economic Geography: The Integration of Regions and Nations*, Authors: Pierre-Philippe Combes , Jacques-François Thies , Thierry Mayer(2008)

ADDITIONAL READINGS:

Books

1. "Geography, Trade and Competition" by Paul Krugman:
2. Introduction to concepts in Economic Geography Sections from the Dictionary of Human Geography
3. Clark, G.L., M.P. Feldman and M.S. Gertler (eds) *The Oxford Handbook of Economic Geography*. (Oxford; New York: Oxford University Press, 2003) [ISBN 9780199250837].
4. Dicken, P. *Global Shift: Mapping the Changing Contours of the World Economy*. (London: Sage, 2007) fifth edition [ISBN 9781593854362].
5. Dicken, P. and P. Lloyd *Location in Space: Theoretical Perspectives in Economic Geography*. (New York: Harper Collins Publishers, 1990) third edition [ISBN 9780060416775].
6. Ellwood, W. *The No-nonsense Guide to Globalization*. (London: Verso, 2001) [ISBN 9781904456445]. Hudson, R. *Economic Geographies: Circuits, Flows and Spaces*. (London: Sage, 2005) [ISBN 9780761948940].
7. Knox, P. and J. Agnew *The Geography of the World Economy*. (London: Arnold; New York: John Wiley and Sons, 2008) fifth edition [ISBN 9780340948354].
8. MacKinnon, D. and A. Cumbers *An Introduction to Economic Geography: Globalization, Uneven Development and Place*. (Harlow: Pearson/Prentice Hall, 2007) [ISBN 9780131293168].
9. Pike, A., A. Rodriguez-Pose and J. Tomaney *Local and Regional Development*. (London and New York: Routledge, 2006) [ISBN 9780415357180].
10. Sheppard, E. and T.J. Barnes (eds) *A Companion to Economic Geography*. (Malden, MA: Blackwell, 2002) [ISBN 9780631235798]. Stiglitz, J. *Globalization and its Discontents*. (London: Penguin, 2002) [ISBN 9780393324396]

Journals

1. Amin, A. and N. Thrift 'Neo-Marshallian Nodes in Global Networks', *International Journal of Urban and Regional Research* (16) 1992, pp.571–87.
2. Asheim, B. 'Industrial Districts as "Learning Regions": a condition for prosperity', *European Planning Studies* 4(4) 1996, pp.379–400.
3. Beaverstock, J.V., R.G. Smith and P.J. Taylor 'World City Network: A New Metageography?', *Annals of the Association of American Geographers* 90(1) 2000, pp.123–34.
4. Clark, G. 'Money Flows Like Mercury: The Geography of Global Finance', *Geografiska Annaler Vol. 87B* (2) 2005, pp.99–112.
5. Coe, N.M., M. Hess, H.W.C. Yeung, P. Dicken and J. Henderson "'Globalizing" Regional Development: A Global Production Networks Perspective', *Transactions of the Institute of British Geographers* 29(4) 2004, pp.468–84.

6. Graham, S. 'Global Grids of Glass: On Global Cities, Telecommunications and Planetary Urban Networks', *Urban Studies* 36 (5/6) 1999, pp.929–49.
7. Henderson, J., P. Dicken, M. Hess, N. Coe and H.W.C. Yeung 'Global Production Networks and the Analysis of Economic Development', *Review of International Political Economy* 9(3) 2002, pp.436–64. Hudson, R. 'The Learning Economy, the Learning Firm and the Learning Region: A Sympathetic Critique of the Limits to Learning', *European Urban and Regional Studies* 6(1) 1999, pp.59–72.
8. James, A. 'Demystifying the Role of Culture in Innovative Regional Economies', *Regional Studies* 39(9) 2005, pp.1197–216.
9. MacKinnon, D., A. Cumbers and K. Chapman 'Learning, Innovation and Regional Development: A Critical Appraisal of Recent Debates', *Progress in Human Geography* 26(3) 2002, pp.293–311. Morgan, K. 'The Learning Region: Institutions, Innovation and Regional Renewal', *Regional Studies* 31(5) 1997, pp.491–503.
10. Smith, A., A. Rainnie, M. Dunford, J. Hardy, R. Hudson and D. Sadler 'Networks of Value, Commodities and Regions: Reworking Divisions of Labour in Macro-regional Economies', *Progress in Human Geography* 26(1) 2002, pp.41–63

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	3	-	2	-	-	2	3	3
CO 3		2	-	2	-		-	2	3
CO 4	-	3	2	3	-	2	3	3	-
CO 5	3	-	-	-	-	2	2	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	SOCIAL CHOICE THEORY				
Type of Course	Elective				
Semester	VIII				
Academic Level	400 – 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Course on Microeconomics and Macroeconomics of level 300 – 399				
Course Summary	This course is intended to introduce various topics in social choice theory, which is a formal analysis of general preference aggregation and voting rules.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To understand the historical background and development of social choice theory.	U	F	Discussion / Debates
CO2	To discuss and develop the concepts in social choice theory.	Ap	C	Instructor-created exams / Quiz
CO3	Demonstrate how individual choices in a society can be aggregated and translated into a collective choice	An	P	Practical Assignment
CO4	Discuss and critically evaluate the theories in social choice.	Ap	F	Seminar Presentation / Group Discussion
CO5	Examine how collective decision-making processes influence the well-being of society.	Ap	C	Instructor-created exams / Home Assignments
CO6	Empirical analysis of social choice theory in political decision-making processes.	E	M	Project
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Elements of Social Choice Theory		9	13
	1	Historical Background and development of social choice theory.	3	
	2	A special case with two alternatives- Simple Majority.	2	
	3	May's Theorem	2	
	4	Condorcet winner criterion	2	
II	General Difficulties of Preference Aggregation		20	29
	5	Binary relations	2	
	6	Preference Aggregation rule	2	
	6	Arrow's Theorem	2	
	7	Possibilities of preference aggregation	2	
	8	The liberal paradox	2	
	9	The Gibbard-Satterthwaite theorem	2	
	10	The aggregation of welfare measures or qualitative ratings	2	
	11	Sen's extension of Arrow's framework	2	
	12	The aggregation of judgments	2	
	13	The paradoxes of judgment aggregation	2	
III	Voting Rules		10	15
	14	Majoritarian methods- Sequential majority	2	
	15	Copeland voting rule	2	
	16	Positional Methods- Plurality	2	
	17	Approval Voting	2	
	18	Borda Score Voting rule	2	
IV	LIBERAL PARADOX		9	13
	19	Sen's Liberal Paradox	3	
	20	Gibbard's modification	2	
	21	Escape routes	2	
	22	Game Forms and Liberal Paradox.	2	
V	Open ended module		12	
	1	Social choice in political contexts: Parliamentary systems		
	2	Economic implications of voting rules in legislatures Empirical analysis of political decision-making processes		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Handbook of Social Choice and Welfare edited by Kenneth Joseph Arrow, Amartya Sen, Kōtarō Suzumura
2. A.K.Sen (2017), *Collective Choice and Social Welfare*, Expanded Edition, Penguin.
3. A.K. Sen (1983), *Choice, Welfare and Measurement*, OUP.
4. A.K. Sen (1986), *Social Choice Theory* in Arrow and Intrilligator (ed) Handbook of Mathematical Economics, Vol III, North Holland.

ADDITIONAL READINGS:

1. Kenneth J. Arrow (1963), *Social Choice and Individual Values*, 2nd ed., Wiley.
2. K. Suzumura (1983), *Rational Choice, Collective Decisions and social Welfare*, Cambridge University Press.
3. Wriglesworth (1985), *Libertarian Conflicts in Social Choice*, Cambridge University Press.
4. M. Richter (1966), Revealed Preference Theory,
 - a. *Econometrica*.
5. M. Richter (1967), Rational Choice in Chipman et al. (ed)
 - a. *Preference, Utility and Demand*.
6. Prasanta K. Pattanaik (1994), Some non-welfaristic issues in Welfare Economics in Dutta (ed) *Welfare Economics*, OUP.
7. Gaertner, Pattanaik and Suzumura (1992), Individual Rights Revisited, *Economica*.
8. A. Gibbard (1974), A Pareto Consistent Libertarian Claim,
 - a. *Journal of Economic Theory*.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	3	-	2	-	-	2	3	3
CO 3		2	-	2	-		-	2	3
CO 4	-	3	2	3	-	2	3	3	-
CO 5	3	-	-	-	-	2	2	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ACTUARIAL STATISTICS				
Type of Course	Elective				
Semester	VIII				
Academic Level	400 – 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics Course of 200 – 299 level				
Course Summary	This course on actuarial statistics delves deeply into how insurance functions within society, emphasizing its key roles, necessity, and influence on both social security and economic growth. It encompasses a broad range of insurance types, such as life and general insurance, and discusses the governing principles, legal contexts, and statistical models that shape their implementation and impact.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand the fundamental principles of Insurance	U	F	Quiz/Instructor-created exams
CO 2	Analyze the role of Insurance in Economic Development and social security	AN	P	Group Discussion
CO 3	Understand different types of general insurance policies	U	C	Writing assignments and instructor-created exams
CO 4	Apply mathematical and statistical models to analyze insurance claims, estimate risks, and calculate premiums	AP	P	Practical Assignment/Seminar Presentation
CO 5	Evaluate the legal frameworks governing life and general insurance, understanding the general principles of insurance contracts	E	P	Practical Assignment
CO6	Create advanced theoretical concepts to address complex Insurance Issues	C	M	Practical Assignment
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C)				

#: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P)
Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Introduction to Insurance		15	15
	1	Insurance: Meaning and Functions of insurance, Need of insurance	3	
	2	Insurance as a social security tool	1	
	3	Insurance and economic development	2	
	4	Principles of insurance: principle of utmost good faith, insurable interest, indemnity, contribution, subrogation, loss of minimization, cause Proxima	3	
	5	Various kinds of insurance—life insurance and general insurance	2	
	6	General Insurance: Fire, Marine, Medical, Personal accident, Property and Motor vehicle	2	
	7	Life Insurance Vs. General Insurance	2	
II	Life Insurance		10	20
	8	Law relating to life insurance	2	
	9	General principles of life insurance contract	2	
	10	Insurance is payable at the moment of death and the end of the year of death	2	
	11	Level benefit insurance	2	
	12	Endowment insurance-deferred insurance and varying benefit insurance	2	
III	Utility Theory		12	20
	13	Insurance and utility theory	2	
	14	Models for individual claims and Approximation for the distribution of the sum	3	
	15	Application to Insurance	2	
	16	Survival until death for a person aged X	2	
	17	Accurate future lifetime	1	
	18	Force of mortality	2	

IV	Multiple Life Functions		11	15
	19	Multiple life functions life and last survivor status	2	
	20	Insurance and multiple life functions	2	
	21	Evolution for special mortality laws: multiple decision associated single decrement tables	3	
	22	Central of multiple decrements, central force, and multiple decrements. Uniform distribution assumption for multiple decrements.	4	
V	Open ended module		12	
		Analyze how different types of insurance contribute to public health and economic stability		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. David C. M. Dickson, Mary R. Hardy, and Howard R. (2019), Actuarial Mathematics for Life Contingent Risks, Cambridge University Press
2. Bedi. H.L. (1972), Theory and Practice of Banking, Selbstverl
3. Maheshwari. S.N. (1983), Banking Law and Practice, Kalyani Publications
4. Dale S. Borowiak and Arnold F. Shapiro (2013), Financial and Actuarial Statistics: An Introduction, Second Edition, CRC Press

Additional reading

1. Leonard A. Asimow and Mark M. Maxwell (2010), Probability and Statistics with Applications, ACTEX Publications.
2. Stuart A. Klugman, Harry H. Panjer, and Gordon E. Willmot (2019), Loss Models: From Data to Decisions, Wiley
3. Sheldon M. Ross (2014), Introduction to Probability Models, 11th Edition, Academic Press, Inc
4. Elisa T. Lee and John Wenyu Wang (1980), Statistical Methods for Survival Data Analysis, 3rd, Wiley

Mapping of COS with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	1	-	-	-	-	-	-	-	-
CO 2	-	-	-	2	-	-	-	-	-
CO 3	1	-	-	-	-	-	-	-	-
CO 4	-	2	-	-	1	-	-	-	-
CO 5	-	-	-	-	-	1	3	-	-
CO 6	-	-	-	-	-	-	2	2	2

Correlation levels:

Level	Correlation
-	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/ Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/ Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓		✓	✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMICS OF EDUCATION				
Type of Course	Elective				
Semester	VIII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Courses of 200 – 299 level				
Course Summary	This course provides an overview of economics of education to lay out the evidence as clearly as possible, note agreements, disagreements, and unresolved points in literature, and to help students develop the tools necessary to draw their own conclusions.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To explore the interrelationship between economics and education in the modern society	U	F	Instructor-created exams / Quiz
CO2	To examine the demand, supply, costs and benefits of education within the purview of economic development	Ap	P	Practical Assignment / Observation of Practical Skills
CO3	To understand the economic imperative of manpower planning and human resource development for a country	U	P	Seminar Presentation / Group Discussion
CO4	To get an overview of the education scenario of both India and Kerala	Ap	P	Instructor-created exams / Home Assignments
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Education, Economics and the Modern Society		10	14
	1	Education in the modern world	2	
	2	Socio-economic significance of education	2	
	3	Economists' perception of education	2	
	4	Education as a public/merit good	2	
	5	Economics of education: The subject matter, framework and significance	2	
II	Education and Economic Development		12	18
	6	Education as the prime mover of modern society	2	

	7	Education and economic growth	2	
	8	Indicators of economic and educational development	2	
	9	Stages of economic and educational development	2	
	10	Demand for education and its major determinants	2	
	11	Supply of Education and its major determinants	2	
III	Cost and Benefits of Education		12	18
	12	Education as an investment – Private return and social return	2	
	13	Costs and benefits of education – Direct and indirect social benefits – Cost-benefit analysis of education	4	
	14	Rate of return analysis	2	
	15	Input-output analysis	2	
	16	Wastage and stagnation in education	1	
	17	Educational budgets	1	
IV	Human Capital and Manpower Planning		14	20
	18	Economic imperative of human capital	2	
	19	Human resource development – Process of human resource development – Indicators of human resource development –	5	
	20	Linking education with the economy	2	
	21	Educational planning	2	
	22	Manpower planning – Features and techniques of manpower planning and forecasting	3	
V	Open Ended Module		12	
		Discussion based on the primary, secondary, higher secondary and higher education scenario of India and Kerala		
		Practical Assignments on Initiatives for educational development		
		Seminar on the new education policy and its impacts on the national and regional economy		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, is only for the external examination.

REFERENCE:

1. Chattopadhyay, S. (2012). *Education and Economics: Disciplinary Evolution and Policy Discourse*. OUP India. (All modules)

ADDITIONAL READINGS

1. Lovenheim, M., & Turner, S. E. (2019). *Economics of education*. Worth.
2. Brewer, D. J., & McEwan, P. J. (2010). *Economics of education*. Elsevier.
3. Rao, D. P. (2010). *Economics of Education and human development in India: Essays in Honour of Prof. K.S. Chalam*.
4. Akinyemi, S. (2013). *The economics of education*. Strategic Book Publishing.
5. Bhat, F. A., & Gull, K. (2018). *An Introductory Economics of Education*.
6. Lok, J. (2022). *Education How brings economic growth*.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	1	-	-	-	-	-	3	-	-
CO 2	-	1	-	-	-	-	2	3	-
CO 3	2	-	-	-	-	-	3	1	-
CO 4	-	-	-	1	2	-	-	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓

Programme	B.A. Econometrics and Data Management Honours				
Course Title	LAW AND ECONOMICS				
Type of Course	Elective				
Semester	VIII				
Academic Level	400 – 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Microeconomics course of 200 – 299 level				
Course Summary	This course provides an introductory exposure to law, legal theory and the way legal system functions and how legal process impact on the efficiency of economic activities/transactions				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand how the legal aspect influences the economic behaviour and understand major legal traditions, especially in India.	U	C	Instructor-created exams / Quiz
CO2	Conduct economic analysis of law related to the regulation and enforcement of property rights and contracts.	Ap	P	Practical Assignment /Case Studies in Indian context
CO3	Evaluate relative merits and demerits of various economic analyses of law in property rights and contract law.	U	P	Seminar Presentation / Group Discussion
CO4	Apply economics in the theory of property rights and contract law.	Ap	C	Instructor-created exams / Home Assignments/Cases in the Indian context
CO5	Create alternative cases in property rights and contract law in the Indian context, with the insights gained from the course, which provide better policy insights.	U	F	Writing assignments
CO6	Demonstrate critical thinking and problem-solving skills by applying the acquired knowledge to address complex economic challenges in law in the contemporary world.	Ap	P	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Module	Unit	COURSE CONTENT	Hours	Marks
I	An Introduction to Law and Economics		12	18
	1	Economic analysis of law	1	
	2	Why should Economists study law?	2	
	3	How to analyze legal and economic issues.	2	
	4	The Primacy of efficiency over distribution in analyzing private law	2	
	5	Efficiency criteria – Pareto, Kaldor-Hicks	2	
	6	Nash Equilibrium, Fairness Criteria.	2	
	7	Markets and efficiency and Market failure	1	
II	An Introduction to Law and Legal Institutions		6	10
	8	The Civil law and the common law traditions.	1	
	9	The institutions of Judicial systems in India –	1	
	10	Legal Principles, and the functioning of Legal system	2	
	11	Economic Theory of Legal Process - Sue - Trial –Appeals – Judiciary - Lawyers’ Profession.	2	
III	Theory of Property Right		15	21
	12	The Nature and Function of Property Rights -	1	
	13	The origin of institution of property - The Legal Concept of Property.	2	
	14	Enforcement of property rights - Bargaining Theory - An Economic Theory of Property –	4	
	15	Property Rights and Coase Theorem	2	
	16	The Public Use of Private Property	2	
	17	Eminent domain and Regulation of Property – Applications.	2	
	18	An Introduction to Intellectual Property Rights (IPRs).	2	
	IV	The Economics of Contract Law		
19		An Introduction to Contracts	1	
20		Complete and Incomplete Contracts - The Elements of Valid and Invalid Contracts.	3	
21		Bargaining theory- Economic Theory of Contract.	6	
22		Contracts and Efficient Exchange - Legal Remedies as Incentives: Applications.	5	
V	Open Ended Module		12	
	Various Case Studies in Economics Property Rights – Various Case Studies in Economics of Contract			

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

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2. Posner, Richard A. (1998). Economic Analysis of Law. (5th edition) Little Brown, Boston.
3. Seervai H M (1991) Constitutional Law of India, Vol. 1-3 NM Tripathi.

ADDITIONAL READINGS

1. Melvin Aron Eisenberg, The Nature of the Common Law (1989). Harvard University Press, Cambridge.
2. BarzelYoran, The Economics of Property Rights (1988). Cambridge University Press.
3. Steven Shavell (2004) "Foundations of Economic Analysis of Law, Harvard University Press: Cambridge MA.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	3	-	1	-	-	2	-	-
CO 3	3	-	-	1	-	-	-	-	-
CO 4	-	3	1	2	-	-	3	-	-
CO 5	3	-	-	-	-	-	2	-	-
CO 6	-	2	2	3	3	-	3	-	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	LOCAL LEVEL PLANNING				
Type of Course	Elective				
Semester	VIII				
Academic Level	400 - 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics course of level 200 – 299				
Course Summary	This course explores the importance of Panchayati Raj Institutions, the process of decentralization and the concept of project appraisal as well as the components and theories of local economic development.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand various local government institutions	U	C	Instructor-created exams / Quiz
CO2	Analyse the role of decentralization process	An	P	Practical Assignment
CO3	Evaluate various local development models	Ap	F	Seminar Presentation / Group Discussion
CO4	Apply the theoretical knowledge to current project appraisal of various kinds	Ap	C	Instructor-created exams / Home Assignments
CO5	Create complete understanding of the local level planning	U	F	Viva
CO6				
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to Panchayati Raj Institutions		12	17
	1	Panchayati Raj Institutions- Evolution of Panchayati Raj Institutions in India	2	
	2	Aims and Objectives of Panchayati Raj Institutions – Functions	3	
	3	Recommendation of various Committee - Balwant Rai Mehta committee- Ashok Mehta Committee – G V K Rao Committee – L M Singhvi Committee	3	
	4	Features of Panchayati Raj Institutions	2	
	5	The 73 rd and 74 th Constitutional Amendments	2	
II	The process of Decentralization		9	14
	6	Decentralized Planning in Kerala	2	
	7	How Kerala is Different	1	
	8	History – Evolution – importance of People’s plan movement	3	
	9	The role of Kudumbashree	3	
III	The concept of Project Appraisal		12	17
	10	The role of Local Government Agencies (LGAs) in Project Appraisal Framework	2	
	11	Introduction to Project Evaluation	1	
	12	Methods of Project Evaluation – Return on Investment (ROI) – Cost - Benefit analysis (CBA) – Net Present Value (NPV) – Internal Rate of Return (IRR) – The Payback Period – Risk Adjusted Discount Rate (RADR)	5	
	13	Steps to conduct a project evaluation	2	
	14	challenges in Project monitoring and evaluation	2	
IV	The Local and regional Development		15	22
	15	Introduction: Local and Regional Development	1	
	16	what kind of local and regional development and for whom?	2	
	17	Concepts and theories of local and regional development	2	
	18	Traditional model	2	
	19	Pure agglomeration Model	2	
	20	Local community model	2	
	21	Territorial innovation model	2	
	22	Sustainable Development Model	2	
V	Open ended module		12	
		Discussion based on different methods of prevailing project evaluation		
		Practical Assignments to visit the local level institutions to conduct the project evaluation		
		Seminar on the presenting the relevance of best project evaluation methods		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, is only for the external examination.

REFERENCE:

1. Isaac, T. T., & Franke, R. W. (2002). *Local democracy and development: The Kerala people's campaign for decentralized planning*. Rowman & Littlefield. **(Module 1 and Module 2)**
2. Goel, S. L., & Shalini, R. (2003). *Panchayati Raj in India: theory and practice*. Deep and Deep Publications Pvt. Ltd. **(Module 2)**
3. Harberger, A. C., & Harberger, A. C. (1972). *Techniques of project appraisal* (pp. 1-21). Palgrave Macmillan UK. **(Module 3)**
4. Pike, A., Rodríguez-Pose, A., & Tomaney, J. (2016). *Local and regional development*. Routledge. **(Module 4)**
5. Kačar, B., Curić, J., & Ikić, S. (2016). Local economic development in theories of regional economies and rural studies. *Економика пољопривреде*, 63(1), 231-246 **(Module 4)**

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	2	-	2	-	-
CO 3	3	-	-	1	-	-	-	-	-
CO 4	-	3	-	-	3	-	3	1	2
CO 5	3	-	1	-	-	-	2	-	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	FINANCE AND TECHNOLOGY				
Type of Course	Elective				
Semester	VIII				
Academic Level	400 – 499				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Financial Economics course of 200 – 299 level				
Course Summary	This course introduces fundamental building blocks of financial technologies and real-world applications.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To familiarize the students with the Finance and technological sector	U	C	Instructor-created exams / Quiz
CO2	It outlines how new technologies are transforming the financial services industry.	An	P	Practical Assignment
CO3	Examine the fundamental differences between the traditional and modern financial sectors, focusing on the impact of innovation and technology on business models, products, applications, and customer interfaces.	Ap	F	Seminar Presentation / Group Discussion
CO4	To explore how AI, machine learning, deep learning, blockchain, and open APIs are applied within the financial technology industry.	Ap	C	Instructor-created exams / Home Assignments
CO5	To design and implement case study-oriented learning experiences for students, focusing on various sectors of financial technology.	E	M	Viva
CO6				
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction		11	15
	1	Finance and technology	1	
	2	Finance sector	2	
	3	Innovation in Finance	1	
	4	Disruption in Finance	4	
	5	Introduction to the Finance and technology's landscape	2	
	6	Application of Finance and technology	1	
II	FinTech Architecture and FinTech Technologies		11	15
	7	Overview of FinTech architecture.	2	
	8	Importance of Finance and Technological architecture	2	
	9	Features of Finance and Technological architecture	2	
	10	Introduction to Block chain integration in FinTech	2	
	11	Merits and Demerits of Block chain in Fin Tech	1	
	12	Introduction to Open Application Programming Interfaces (APIs).	1	
	13	Exploring the applications of AI and ML in finance	1	
III	India's Fintech Sector		11	15
	14	Overview of various fintech sectors in India	1	
	15	The regulatory framework for fintech in India	1	
	16	Regulatory compliance issues in the Indian fintech space	5	
	17	Trends in FinTech and the Fintech landscape in India	2	
	18	Examining key players, institutions, innovations, and challenges.	2	
IV	India's Fintech Sector - Case studies		15	25
	19	Real Time Payments and Neo Banking	5	
	20	Wealth technology and Insurance technology	4	
	21	Lending and Blockchain	1	
	22	The impact of Fintech on the Financial Inclusion and broader economy	5	
V	Open Ended Module		12	
	1	To take up case studies with respect to the various sectors of Fintech in India		
	2	Describe the role of different technologies in the fintech sector.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Phadke, Sanjay. 2023. Fintech Future: The Digital DNA of Finance Paperback – 23 September.

2. Atlantic Singh, Jaspal. 2022. Financial Technology (FinTech) and Digital Banking in India Hardcover – 1 November.
3. Chishti, S., & Barberis, J. (2016). The Fintech book: The financial technology handbook for investors, entrepreneurs and visionaries. John Wiley & Sons.
4. Gyorfı, L., Ottucsak, G., & Walk, H. (Eds.). (2012). Machine learning for financial engineering (Vol. 8). World Scientific.
5. Harvey, C. R., Ramachandran, A., & Santoro, J. (2021). DeFi and the Future of Finance. John Wiley & Sons.
6. Kube, N. (2018). Daniel Drescher: Blockchain basics: a non-technical introduction in 25 steps: Apress, 2017, 255 pp, ISBN: 978-1-4842-2603-2.
7. Moilanen, J., Niinioja, M., Seppänen, M., & Honkanen, M. (2019). API economy 101: changes your business. BoD-Books on Demand.
8. Realini, C., & Mehta, K. (2015). Financial Inclusion at the Bottom of the Pyramid. FriesenPress.
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10. Cevik, S. (2024). Is Schumpeter Right? Fintech and Economic Growth.
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14. Migozzi, J., Urban, M., & Wójcik, D. (2023). “You should do what India does”: FinTech ecosystems in India reshaping the geography of finance. Geoforum, 103720.
15. Nelaturu, K., Du, H., & Le, D. P. (2022). A review of blockchain in fintech: taxonomy, challenges, and future directions. Cryptography, 6(2), 18.
16. Premchand, A., & Choudhry, A. (2018, February). Open banking & APIs for transformation in banking. In 2018 international conference on communication, computing and internet of things (IC3IoT) (pp. 25-29). IEEE.
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18. Renduchintala, T., Alfauri, H., Yang, Z., Pietro, R. D., & Jain, R. (2022). A survey of blockchain applications in the fintech sector. Journal of Open Innovation: Technology, Market, and Complexity, 8(4), 185.
19. Rafay, A. (Ed.). (2019). FinTech as a Disruptive Technology for Financial Institutions. IGI Global.

ADDITIONAL READINGS:

1. Inc42. 2023. State of Indian Fintech Report 2023. Available at <https://inc42.com/reports/state-of-indian-fintech-report-q1-2023/>
2. Mordor Intelligence. India Fintech report. Available at <https://www.mordorintelligence.com/industry-reports/india-fintech-market>
3. https://www.ey.com/en_in/financial-services/how-is-the-fintech-sector-in-india-poised-forexponential-growth
4. <https://www.pwc.in/industries/financial-services/fintech.html>
5. <https://rbsa.in/wp-content/uploads/reports/research-reports/RBSA-Advisors-PresentsFinTech-Industry-in-India-February2021.pdf>

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	3	-	2	-	-	2	3	3
CO 3		2	-	2	-		-	2	3
CO 4	-	3	2	3	-	2	3	3	-
CO 5	3	-	-	-	-	2	2	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓	✓	

Minor Courses (Econometrics and Data Management)

Programme	B.A. Econometrics and Data Management Honours				
Course Title	BASICS OF ECONOMIC DATA				
Type of Course	Minor				
Semester	I				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics Course of 0 – 99 level				
Course Summary	The courses explore the concept and significance of data and observe various types of economic data, their measurement techniques and data collection methods. It examines how to Prepare data for analysis and present it in graphs and statistics.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand the fundamental concept of data and its significance in various fields	U	C	Quiz/Instructor-created exams
CO 2	Understand and differentiate between different types of economic data	U	C	Group Discussion
CO 3	Create proficiency in obtaining data through appropriate sources and methods	C	F	Writing assignments and instructor-created exams
CO 4	Analyze and interpret key economic output measures	AN	P	Practical Assignment/Seminar Presentation
CO 5	Apply various methods of data collection, including primary and secondary techniques	AP	P	Practical Assignment
CO 6	Evaluate the data using graphical methods, descriptive statistics, and interpretation.	E	M	Practical Assignment/ Presentation

* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C)
#: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Introduction to Data		10	20
	1	Origins of Data: Introduction to Data, What is Data? -What is Economic Data?	2	
	2	Types of Economic Data: Time series, Cross-sectional, and panel data	2	
	3	Obtaining data: Microeconomic data, Macroeconomic data and Financial data	1	
	4	Economics Data: Output measures: GNP, Price index, CPI, GDP price deflator, PPI	2	
	5	Economics Data: Labour Force statistics: Employment, Unemployment, LFPR	1	
	6	Economics Data: Financial Data- Interest Rates, Stock price indexes	1	
	7	Economics Data: International Data- PWT, World Bank	1	
II	Methods of Data Collection		10	15
	8	Collection of Primary data: Observation Method, Interview Method	2	
	9	Collection of data through Questionnaires and Schedules	2	
	10	Content- Analysis	2	
	11	Collection of Secondary data: Published data & Unpublished data	2	
	12	Case Study Method	2	
III	Preparing Data for Analysis		15	20
	13	Types of Variables: Qualitative and Quantitative, Binary/Dummy Variable; Stock and Flow Variable	5	
	14	Relational Data and Linking Data Tables	2	
	15	Discovering and Managing Missing Values	2	
	16	Why do exploratory Data Analysis? Uses	2	
	17	Organising Data Tables: Raw data tables, clean and tidy data labels, work file(s) for analysis	4	
IV	Working with Data: Graphical Methods and Descriptive Statistics		13	15
	18	Time series graphs, Histograms, and XY-Plots	3	
	19	Mean, Median, Mode, Standard deviation, Percentile (concepts)	4	
	20	Expected Values and Variances	2	
	21	Correlation	2	
	22	Regression	2	
V	Open ended module		12	
		Select an economic dataset and conduct a comprehensive analysis.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. Nils B Weidmann (2023): Data management for Social Scientists, Cambridge University Press, United Kingdom
2. Gary Koop (2013), Analysis of Economic Data, John Wiley & Sons Ltd
3. Gabor Bekes & Gabor Kezdi (2021): Data Analysis for Business, Economics and Policy, Cambridge University Press, United Kingdom
4. C. R Kothari & Gaurav Garg (2023) Research Methodology, 5th edition, New Age International Publishers, New Delhi

Additional Readings:

1. Gabor Bekes & Gabor Kezdi (2021): Data Analysis for Business, Economics and Policy, Cambridge University Press, United Kingdom
2. R. Mark Sirkin (2006), Statistics for the Social Sciences, SAGE Publications, New Delhi
3. Kristin Briney (2015): Data management for Researchers: Organize, Maintain and Share your Data for Research Success

Mapping of COS with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	2	-	-	-	-	-	-	-	-
CO 2	2	-	-	-	-	-	-	-	-
CO 3	-	-	3	2	-	1	-	-	-
CO 4	-	3	-	-	-	-	-	2	-
CO 5	-	-	-	3	-	-	2	-	3
CO 6	-	-	-	-	1	-	-	-	3

Correlation levels:

Level	Correlation
-	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓		v	✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	DATA METHODS AND TECHNIQUES				
Type of Course	Minor				
Semester	II				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Statistics Course of 0 – 99 level				
Course Summary	This course provides a foundational understanding of statistics, covering topics such as population and sample, variable types, measurement scales, and sampling methods, with practical applications in processing data and understanding sampling fundamentals like estimation and sample size determination.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Recall the fundamental concepts of statistics, including types of variables, measurement scales, and sampling methods.	R	F	Quiz/Instructor-created exams
CO 2	Understand the significance of statistics in various fields, and analyze the advantages and limitations of different sampling techniques.	U	C	Group Discussion/Writing assignments
CO 3	Apply measurement and scaling techniques to categorize and analyze data effectively, and select appropriate sampling methods for different research scenarios.	C	F	Writing assignments and instructor-created exams
CO 4	Evaluate the reliability and validity of data using statistical tests.	E	P	Seminar Presentation
CO 5	Assess the quality of data processing operations, and identify potential problems in data processing	AP	P	Practical Assignment
CO 6	Execute a comprehensive analysis of an economic dataset using appropriate statistical techniques, and communicate findings through presentations	C	M	Practical Assignment/Presentation
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge(M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Overview of Statistics		10	15
	1	Population and Sample	1	
	2	What is statistics? Why study Statistics?	1	
	3	Opportunities for Statisticians	1	
	4	Variables and constants	1	
	5	Types of Variables: Quantitative, Discrete, Continuous, and Categorical	1	
	6	Measurement scale: Nominal scale, Ordinal scale, Interval scale, Ratio scale	1	
	7	Tests of sound measurement: Test of Validity, Test of Reliability, Test of Practicality	2	
	8	Scaling: The Meaning of Scaling	1	
	9	Important Scaling Techniques: Rating scale, Method of Rank order	1	II
Sampling Methods		12	20	
10	Sampling: Introduction and Advantages of Sampling	2		
11	Sample designs: Probability sampling & non-probability sampling	2		
12	Probability sampling: Simple random sample & Systematic random	2		
13	Stratified random sampling, Cluster random sampling & Multi-stage sampling	2		
14	Non-probability sampling: Convenience sample, Judgment sample, & Quota sampling	2		III
15	Sampling with or without replacement	2		
Processing Data		10	20	
16	Processing Operations: Introduction	1		
17	Editing	1		
18	Coding	2		
19	Classification	2		
	20	Tabulation	2	IV
	21	Problems in Processing	2	
Sampling Fundamentals		16	15	
22	Need for Sampling: Some Fundamental Definitions: Universe/Population, Sampling Frame, Sampling design, Static(s) and parameter(s), Sampling error, Precision, Confidence level and significance level, Sampling distribution	4		
23	Sampling Theory	2		
24	Standard Error	2		
25	Estimation	2		
26	Estimating the population Mean	2		
27	Estimating Population Proportion	2		
28	Sample Size and its Determination	2		
V	Open ended module		12	

		<p>Apply statistical methods and techniques to analyze customer satisfaction survey data:</p> <ul style="list-style-type: none"> • Obtain a dataset containing responses from a customer satisfaction survey • Construct appropriate graphical representations (histograms, box plots, etc.) to visualize the distribution of satisfaction ratings and other key variables. • Prepare a presentation summarizing the key findings 		
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Note: The course is divided into five modules, with four modules together having total 28 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 28 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. C A Hesse & J B Oforu (2017), Statistical Methods for Social Science, Akrong Publication Limited, Ghana
2. C. R Kothari & Gaurav Garg (2023) Research Methodology, 5th edition, New Age International Publishers, New Delhi

Additional Readings:

1. Gabor Bekes & Gabor Kezdi (2021): Data Analysis for Business, Economics and Policy, Cambridge University Press, United Kingdom
2. R. Mark Sirkin (2006), Statistics for the Social Sciences, SAGE Publications, New Delhi
3. Nils B Weidmann (2023): Data management for Social Scientists, Cambridge University Press, United Kingdom
4. Gary Koop (2013), Analysis of Economic Data, John Wiley & Sons Ltd

Mapping of Cos with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	-	-	-	-	-	-	-
CO 2	1	-	2	-	-	-	-	-	-
CO 3	-	2	-	3	-	-	-	-	-
CO 4	-	-	-	-	1	-	2	3	-
CO 5	-	-	-	-	-	1	-	-	-
CO 6	-	1	-	-	-	-	-	-	3

Correlation levels:

Level	Correlation
--	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/ Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/ Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓		✓	✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	DATABASE MANAGEMENT				
Type of Course	Minor				
Semester	III				
Academic Level	200 – 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics course of 100 - 199				
Course Summary	This course provides a comprehensive overview of database management systems, covering everything from their history and fundamental concepts to data modeling and relational database design. Students will gain practical skills in creating and managing efficient databases suited for real-world applications.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand the historical development of database management systems (DBMS) and differentiate between data, information, and metadata.	U	F	Quiz/Instructor-created exams
CO 2	Evaluate various database architectures and file organization techniques for their effectiveness in database management.	E	C	Quiz/Group Discussion
CO 3	Apply conceptual database design principles	AP	P	Writing assignments and instructor-created exams
CO 4	Analyze data using the Entity-Relationship (ER) model to structure databases that accurately reflect real-world complexities.	AN	P	Practical Assignment/Seminar Presentation
CO 5	Understand relational database design concepts, focusing on normalization processes to create efficient and reliable database schemas.	U	C	Practical Assignment
CO 6	Apply ER diagram notations to the visual structure	AP	P	Practical Assignment/Presentation
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C)				

#: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P)
Metacognitive Knowledge (M)

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Introduction to Database Management Systems		10	20
	1	Introduction: History of Database Systems: Three generations of DBMS	1	
	2	Data. Information-Compare Data and Information, Metadata	1	
	3	Database, Database Management system (DBMS)	1	
	4	Application Program, Data warehouse and Data Warehousing Data Dictionary, Distributed database, File-based system.	1	
	5	Comparison of different file organisations	1	
	6	Factors affecting choice of file organisation- Difference between File management and Database Management	1	
	7	Conceptual Database Design: Database Administrator (DBA)-Main Functions	1	
	8	Database Users, Characteristics of Database approach, Database systems, and Database Architecture	1	
	9	DBMS Components	2	
II	Data Models		15	20
	10	Schema-Instances	1	
	11	DBMS Architecture: 3-tier Architecture/ANSI-SPARC Architecture	2	
	12	Data Independence, Database Languages	2	
	13	Procedure for Database Access: Data Manager- File manager and Disk manager	1	
	14	Data Structure	1	
	15	Data Model—Components-Categories	2	
	16	Three types of Record-based models: characteristics, Advantages and Disadvantages	4	
	17	Comparison of Three Record-Based Models, Which Data Model to Select?	2	
III	Data Modeling using ER-Model		11	15
	18	ER Model: Basic Terminology Related to ER Model: Entities, Entity type, Relationships, Degree of a relationship, connectivity or cardinality, Attributes,	4	
	19	Notations Used in ER Diagrams	1	
	20	Strong and weak entity sets	2	
	21	Generalisation, Specialisation and Aggregation	2	
	22	Translating the ER Model into a Relational Model	2	
IV	Relational database model		12	15
	23	Relational model: logical view of data, keys, integrity rules.	6	
	24	Relational database design: features of good relational database design, atomic domain, and normalization (1NF, 2NF, 3NF, BCNF).	6	
V	Open ended module		12	

		Design a Database and generate required tables. E.g., Bank, College Database		
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Note: The course is divided into five modules, with four modules together having total 24 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 24 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. Rajiv Chopra (2010), Database Management System (DBMS) A Practical Approach, S. Chand Limited
2. Abraham Silberschatz, Henry Korth, and S. Sudarshan (2013), Database system concepts, 6th Ed., McGraw Hill International

Additional Readings:

1. C. J. Date, A. Kannan and S. Swamynathan (2006), An Introduction to Database Systems, 8th ed., Pearson Education,
2. Ramez Elmasri and Shamkant B. Navathe (2016), Fundamentals of Database Systems, 7th ed., Pearson
3. Raghu Ramakrishnan, 2003, Database Management Systems, 3rd ed., McGraw Hill

Mapping of COS with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	1	3	2	-	-	-	-	-
CO 4	-	-	-	-	1	-	2	3	-
CO 5	-	-	-	-	-	2	-	-	-
CO 6	-	-	-	-	-	-	-	-	3

Correlation levels:

Level	Correlation
-	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/ Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓		✓	✓
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	COMPUTER APPLICATION FOR ECONOMIC DATA ANALYSIS				
Type of Course	Minor				
Semester	I				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Computer Course of 0 – 99 level				
Course Summary	This course equips students with a foundational understanding of computer concepts and practical skills in software applications and data analysis, laying the groundwork for advanced studies in computer science or careers in various fields where computer literacy is required.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Recall the basic classifications of computers, recognize the fundamental components of hardware and software, and memorize key coding schemes	R	F	Quiz/Instructor-created exams
CO 2	Understand the organization of basic computer concepts and the roles of computers in various sectors.	U	C	Practical Assignment
CO 3	Apply their knowledge to utilize application software	AP	P	Writing Assignments/ Instructor-created exams
CO 4	Evaluate the accuracy and reliability of data analysis results obtained through computer applications	E	P	Practical Assignment/ Seminar Presentation
CO 5	Evaluate the suitability and effectiveness of different software tools for specific tasks	E	F	Group Discussions
CO 6	Apply the skills to writing documents, making slides, keeping data organized, and analysing data with spreadsheets	AP	M	Practical Assignment
* - Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) # - Factual Knowledge(F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge(M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Computer Fundamentals		18	26
	1	Introduction to Computers: Types of computers based on purpose, technology, size and storage capacity	2	
	2	Limitations of Computers	2	
	3	Organisation of Basic concepts: Hardware and software/output Unit/CPU -Primary and secondary memory-Storage unit-Motherboard-Cards ports	2	
	4	Software: Application, System and Utility	2	
	5	Machine language and assembly language	2	
	6	Components of OS: DOS, Windows and UNIX	2	
	7	Data Representation: Bits and Bytes: Number Systems for Data Representation	2	
	8	Coding Schemes: BCD Code, EBCDIC Code, ASCII Code	2	
	9	Application of computers: Role of computers in Business, Science, Education, Entertainment, and data communications	2	
II	Data Communication and Computer Networks		10	14
	10	Data Communication: Need for data communications	1	
	11	Network of computer: Types of network: LAN, Intranet and Internet	2	
	12	Internet applications on the World Wide Web. E-Mail, browsing and searching.	2	
	13	Search Engines: Google, Bing, Yahoo, DuckDuckGo, Google Scholar	2	
	14	Introduction to HTML: Role of HTML	3	
III	Application Software		12	18
	15	Word Processors: Word processing- MS Word: Word basics, creation of documents, editing, formatting and printing documents	2	
	16	Presentation Packages: MS-PowerPoint: Features, Creation of Slide, Types of view, Slide master, Templates and Slide transition	2	
	17	MS-Access: Features: Data Field, Record, Database file, Types of files, Types of records, Data type.	3	
	18	Spreadsheet Packages: Basics of the Worksheet: Data entering in Worksheet	3	
	19	Basic calculations: Sum, Average, Sqrt, Max, Min, and count	2	
IV	SPSS Applications		8	12
	20	SPSS: Introduction and Features	2	
	21	Entering data, data and variable view, create work file, column settings, data editor, data file, save data file and output window	3	

	22	Measures of central tendency: Mean, median, mode and standard deviation	3	
V	Open ended module		12	
		Practical Assignment Topic: Create visualizations such as pie charts, bar graphs, or line graphs to represent budget data and financial trends using SPSS		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. Ashok Arora (2015) Computer Fundamentals and Applications, Vikas Publishing House, Pvt. Ltd
2. Faithe Wempen (2014) Computing Fundamentals: Introduction to Computers, John Wiley & Sons

Additional Readings:

1. Frye, C. D. (2014). Microsoft Excel 2013: Step by Step, Microsoft Press US
2. Jelen, B. (2013). Charts and Graphs: Microsoft Excel 2013, Que Publishing
3. Walkenbach, J. (2013). Excel 2013 Formulas, John Wiley & Sons Inc
4. Winston, W. (2014). Microsoft Excel 2013 Data Analysis and Business Modeling, Prentice Hall India Learning Private Limited
5. Ajai S.Gaur and Sanjaya S.Gaur (2008), Statistical Methods for Practice and Research, Response Books-Sage Publications Pvt. Ltd., New Delhi.
6. Ravichandran, D. (2001), Introduction to Computers and Communication, Tata Mc Graw Hill Publishing Company Ltd., New Delhi.
7. Kanter (2000), Introduction to Computers – Management Information Systems, Prentice Hall of India Ltd., New Delhi.

Mapping of Cos with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	2	-	-	-	-	-	-
CO 2	-	1	-	-	-	-	-	-	-
CO 3	-	-	-	3	-	-	-	-	-
CO 4	-	-	-	-	-	2	-	-	-
CO 5	-	-	-	-	1	-	2	3	-
CO 6	-	-	-	-	-	-	-	-	3

Correlation levels:

Level	Correlation
-	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/ Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/ Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓		✓
CO 6	✓		✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	INTRODUCTION TO MS EXCEL				
Type of Course	Minor				
Semester	II				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Computer course of 0 – 99 level				
Course Summary	This course offers a comprehensive overview of Microsoft Excel 19, covering the essentials of spreadsheets, understanding basic terms, mastering worksheet operations, and managing cells. Additionally, students will delve into creating and utilizing formulas across various categories and illustrate charts and graphs for data visualization.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Recall basic functions of Microsoft Excel and identify key components	U	C	Quiz/Instructor-created exams
CO 2	Understand how to apply cell formatting, and utilize basic Excel features to organize data within spreadsheets.	U	C	Writing assignments/ instructor-created exams
CO 3	Apply the skill to execute data organization and manipulation tasks using Excel's functionalities	AP	P	Practical Assignment
CO 4	Analyze data using a range of Excel formulas and functions from different categories	AN	P	Practical Assignment/Seminar Presentation
CO 5	Create and customize charts and graphs, interpreting and representing data visually to support analysis and decision-making processes.	C	P	Practical Assignment
CO 6	Apply Excel's advanced features and shortcuts to optimize data management processes, increasing productivity and efficiency in data handling tasks	AP	M	Practical Assignment
* - Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Overview of Microsoft Excel		18	26
	1	Spreadsheet	1	
	2	Microsoft Excel 2019: Features - Launch Excel	1	
	3	Worksheets, Workbooks and Workspace	1	
	4	Spreadsheet terms: Quick Access Toolbar, Search bar, Title Bar, File Bar, Name box, Cell, Range, Status bar, New sheet, Ribbon, Formula bar, view option	6	
	5	Editing worksheet: Changing Column width and Row height Formatting: Font, Alignment and Number: Adding Borders and Colors to Cells	4	
	6	Cell Address: Inserting and Deleting: Cell(s), Row(s) and Column(s)	1	
	7	Insert/Copy, Move, Rename/Delete Worksheet	1	
	8	Selection in a worksheet: Cell selection, Selecting Data Range, Row(s)/Column(s) Selection, Entire Worksheet Selection	2	
	9	Entering information in a worksheet	1	
II	Basic Functions and Formulas		13	19
	10	Basic steps for creating a formula	1	
	11	Financial	2	
	12	Logical	2	
	13	Text	2	
	14	Date and Time	2	
	15	Math & Trig	2	
	16	Statistical	2	
III	Charts and Graphs		9	13
	15	Charts	1	
	16	Creating a chart	2	
	17	Moving a chart	1	
	18	Chart Tools	1	
	19	Formatting a chart	3	
	20	Changing chart types	1	
IV	Special Features		8	12
	21	Auto Sum, Auto Fill, Freeze Panes, Auto Format, Page Setup, Page Breaks, and Display Formulas	3	
	22	Sort Data, AutoFilter, Custom Filter	2	
	23	Keyboard Shortcuts: Open a workbook, Create a new workbook, Save a workbook, Print a workbook, Close a workbook, Cut, Copy, Paste, Undo, Redo, Find, Replace, Clear cell contents	2	
	24	Add-Ins	1	

V	Real-world applications		12	
		<ul style="list-style-type: none"> • Analyze a year’s worth of sales data for a company and prepare monthly and annual financial reports using MS Excel • Develop a grading system for a class of students to calculate final grades based on scores from exams, quizzes, and homework using MS Excel 		

Note: The course is divided into five modules, with four modules together having total 24 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 24 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. Frye, C. D. (2014). Microsoft Excel 2013: Step-by-Step, Microsoft Press US
2. Jelen, B. (2013). Charts and Graphs: Microsoft Excel 2013, Que Publishing
3. Walkenbach, J. (2013). Excel 2013 Formulas, John Wiley & Sons, Inc

Additional Readings:

1. Winston, W. (2014). Microsoft Excel 2013 Data Analysis and Business Modeling, Prentice Hall India Learning Private Limited
2. Ajai S.Gaur and Sanjaya S.Gaur (2008), Statistical Methods for Practice and Research, Response Books-Sage Publications Pvt. Ltd., New Delhi.

Mapping of COS with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	1	-	-	-	-	-	-
CO 2	-	-	2	-	-	-	-	-	-
CO 3	-	-	-	-	-	2	-	-	-
CO 4	-	1	-	2	1	-	-	-	-
CO 5	-	-	-	-	-	-	1	2	2
CO 6	-	-	3	-	-	-	-	-	-

Correlation levels:

Level	Correlation
--	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓		✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓		✓	✓
CO 6	✓		✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMIC DATA ANALYSIS USING EXCEL				
Type of Course	Minor				
Semester	III				
Academic Level	200 – 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Computer Course of level 100 – 199				
Course Summary	This course provides comprehensive knowledge for analysing social science statistics using Microsoft Excel 19 through mathematical computations and statistical functions. It provides training in advanced Excel features such as conditional formatting, VLOOKUP, and PMT functions, along with skills for effective data presentation using charts and integration with other applications.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand the basic features of Microsoft Excel and apply standard mathematical operations using Excel formulas.	U	F	Quiz/Practical Assignment
CO 2	Analyze data sets to compute statistical measures using Excel's statistical functions.	AN	F	Practical Assignment
CO 3	Evaluate financial scenarios using Excel's PMT function	E	P	Writing assignments
CO 4	Create various types of charts and graphs in Excel to effectively present and visualize data, enhancing their ability to communicate statistical information.	C	P	Seminar Presentation
CO 5	Create information from multiple worksheets and sources within Excel to build complex formulas and functions, such as VLOOKUP, conditional formatting, and linking worksheets.	C	C	Practical Assignment
CO 6	Apply logical functions like IF and utilize date and lookup functions to manage data more efficiently	AP	M	Practical Assignment
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Introduction to Mathematical Computations and Statistical Functions		12	15
	1	Introduction to MS Excel 19: Features	1	
	2	Formulas: Open the Data file, create a basic formula, Copying and pasting formulas	2	
	3	Addition, Subtraction, Division, Multiplication, and Power	4	
	4	Components of a function: = FunctionName(Arguments)	1	
	5	The SUM Function, The Count Function, The Average Function, The MAX and MIN Functions, and the Percentage Function	4	
II	Formulas, Logical and Lookup Functions		20	25
	6	Estimation of Mean, Median and Mode, Standard deviation and Coefficient of variation	4	
	7	Estimation of growth rates	1	
	8	Estimation of trend equations	1	
	9	Estimation of Correlation and Regression equations	3	
	10	Descriptive Statistics	2	
	11	IF Function	2	
	12	Vlookup Function	3	
	13	DATE Functions	1	
	14	Smart Lookup	1	
	15	Conditional Formatting	2	
III	Functions for Personal Finance		8	15
	16	Key Terms for Loans; Collateral, Down Payment, Interest Rate, Mortgage, Principal, Residual Value, and Length (concepts only)	2	
	17	The PMT Functions for Loans: Arguments for the PMT Function: Rate, Nper, Pv, [Fv], [Type]	3	
	18	The PMT Function when there is a down payment	2	
	19	Linking Worksheets	1	
IV	Presenting Data with Graphs		8	15
	20	Importance of Visualizing Data: Different Types of Charts in Excel: Choosing a Chart Type	4	
	21	Data Preparation: Formatting charts, Pasting a Chart image into Word	3	
	22	Interpreting Charts	1	
V	Real-world Applications		12	
		Gather economic data such as household income, employment rates, and business revenue from different regions or countries. Using Excel, they will apply descriptive statistical tools to summarize and understand the data, identifying key economic disparities. Further, they will use regression analysis to		

		investigate the factors influencing economic growth or recession in these regions.		
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Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. L. Winston Wayne (2019) Microsoft Excel 2019: Data Analysis & Business Model, PHI Learning Pvt. Ltd.
2. Manisha Nigam (2019), Data Analysis with Excel, BPB Publications
3. Thomas J. Quirk (2021), Excel 2019 for Social Science Statistics: A Guide to Solving Practical Problems (Excel for Statistics), 2nd ed., Springer

Additional Readings:

1. Noreen Brown; Barbara Lave, et al. (2021) Beginning of Microsoft Excel 2019: A complete guideline of Microsoft Excel 2019, Kindle Edition
2. Lokesh Lalwani (2019) Excel 2019 All-In-One: Master the new features of Excel 2019 / Office 365, BPB Publications

Mapping of COS with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	2	-	-	-	-	-	-
CO 2	-	-	1	-	-	2	-	-	-
CO 3	-	-	-	-	-	-	3	-	-
CO 4	-	1	-	-	-	-	-	2	-
CO 5	-	-	-	1	-	-	-	-	2
CO 6	-	-	-	-	-	2	-	-	-

Correlation levels:

Level	Correlation
--	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/ Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓	✓	✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓		✓	✓
CO 6			✓	

Minor Courses (Quantitative Economics)

Programme	B.A. Econometrics and Data Management Honours				
Course Title	QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS I				
Type of Course	Minor				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics and Mathematics Course of 0 – 99 level				
Course Summary	This course covers fundamental mathematical skills essential for comprehending various economic terminologies and solving associated problems.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the meaning and significance of mathematical terms commonly used in economics, like averages, ratios, and percentages	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Analyse graphical representations of economic data.	An	C	Instructor-created exams /Practical Assignment
CO3	Evaluate the economic problems using mathematical methods	E	C	Instructor-created exams /Seminar Presentation / Group Discussion
CO4	Apply mathematical models to analyze real-world economic situations	An	C	Instructor-created exams / Home Assignments
CO5	Critically evaluate the assumptions underlying mathematical models and assess their applicability to specific economic situations.	An	P	Writing assignments/ Seminar/ presentation/ Group activities
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction		6	10
	1	Meaning and importance of mathematical economics	2	
	2	Nature of mathematical economics-mathematical v/s nonmathematical economics- mathematical economics versus econometrics	2	
	3	Ingredients of mathematical model-variables constants and parameters-equations and identities	2	
II	Functions and their diagrammatic representation		14	15
	4	Definition and examples of functions	2	
	5	Classifications of functions	2	
	6	The equation of a straight line-slope intercept form- slope point form-two point form- Parallel and Perpendicular lines	2	
	7	The graph of functions- rectangular co-ordinate system	2	
	8	Parabola- Rectangular hyperbola	2	
	9	Solution of equations in one variable	2	
	10	Simultaneous equations in two variables	2	
III	Basic Economic Functions and diagrams		17	25
	11	Demand functions- demand schedule- demand curve –nature of demand curves and price elasticity of demand	3	
	12	Supply function- supply schedule- supply curve	2	
	13	Total revenue functions and curves- Marginal Revenue curve-Average revenue curve	2	
	14	Cost functions -Total, Marginal and average cost curves	2	
	15	Utility functions- and curves	2	
	16	Indifference curves for consumer goods	2	
	17	Consumption function, Saving function, investment function &Curves	2	
IV	Equilibrium analysis in economics		11	20
	18	The meaning of equilibrium	2	
	19	Partial Market equilibrium- a linear model	2	

	20	Partial market equilibrium: A nonlinear model- Quadratic equation versus quadratic function- Quadratic formula-	3	
	21	General market equilibrium- two commodity market model- n commodity case	2	
	22	Equilibrium in National income analysis	2	
V	Open ended module		12	
	1	Assignment – theory part of demand, consumption, cost etc		
	2	Seminar on theory topics		
	3	Draw graphs and diagrams using excel		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Edward T. Dowling, *Introduction to Mathematical Economics* (3rd Edition), Schaum's Outline Series, McGRAW-HILL
2. Alpha C Chiang: *Fundamental Methods of Mathematical Economics*, 2nd Ed. -Inter National Student Edition, Mc Grawhill

ADDITIONAL READINGS

1. Harrison, Michael, and Patrick Waldron. *Mathematics for economics and finance*. Routledge, 2011.
2. Taro Yamane: *Statistics - An Introductory Analysis*, Harper & Row, Edition 3. Geoff Renshaw, *Maths for economics*, 2nd edition, Oxford University Press.
3. Qazi Zameeruddin, Vijay K Khanna, S K Bhambri, *Business Mathematics*, Second Edition, Vikas Publishing House, New Delhi.
4. Sydsaeter, Knut. *Mathematics for economic analysis*. Pearson Education India, 2013.
5. Cvitanic, Jaksa, and Fernando Zapatero. *Introduction to the economics and mathematics of financial markets*. MIT press, 2004.
6. S.P. Gupta: *Statistical Methods*, Sultan Chand and Sons, New Delhi.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	3	1	-	-	-	-	-	-	-
CO 2	1	3	-	1	-	-	1	3	2
CO 3	1	3	-	1	-	-	-	-	-
CO 4	1	3	1	2	1	-	-	3	1
CO 5	1	2	-	3	-	1	-	2	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS II				
Type of Course	Minor				
Semester	II				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics and Mathematics Course of 0 – 99 level				
Course Summary	This course aims to equip students with fundamental mathematical skills essential for comprehending various economic terminologies and solving associated problems.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the meaning and significance of mathematical terms commonly used in economics	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Analyse economic data	An	C	Instructor-created exams /Practical Assignment
CO3	Evaluate the economic problems using mathematical methods	E	C	Instructor-created exams /Seminar Presentation / Group Discussion
CO4	Apply mathematical models to analyze real-world economic situations	An	C	Instructor-created exams / Home Assignments
CO5	Critically evaluate the assumptions underlying mathematical models and assess their applicability to specific economic situations.	An	P	Writing assignments/ Seminar/ presentation/ Group activities
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Exponential and logarithmic functions		14	15
	1	Exponential functions-	3	
	2	Rule of exponents	2	
	3	Logarithmic functions	2	
	4	Rules of logarithms	2	
	5	Logarithmic transformation of non-linear functions	2	
	6	Common logarithm and natural logarithm – characteristic – mantissa-antilogarithm	3	
II	Financial Mathematics		10	15
	7	Arithmetic and geometric sequence and series	2	
	8	Simple interest, compound interest and annual percentage rates	2	
	9	Net present value and internal rate of return	2	
	10	Annuities, debt repayments, sinking funds	2	
	11	The relationship between interest rates and the price of bonds	2	
III	Derivative and Rules of differentiation		8	15
	12	Limits and continuity	2	
	13	Rules of differentiation	2	
	14	Higher order derivatives	2	
	15	Implicit differentiation	2	
IV	Uses of derivatives in economics		16	25
	16	Increasing and Decreasing Functions	2	
	17	Concavity and Convexity	2	
	18	Relative Extreme-Inflection Points	2	
	19	Marginal concepts	2	
	20	Optimization of Functions-conditions	2	
	21	Successive derivative test for optimisation	3	
	22	Relationship among total average and marginal concepts	3	

V	Open ended module		12	
	1	Seminar on Production and function		
	2	Discussion on importance of differentiation in economics		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Edward T. Dowling, Introduction to Mathematical Economics (3rd Edition), Schaum's Outline Series, McGRAW-HILL
2. Alpha C Chiang: Fundamental Methods of Mathematical Economics, 2nd Ed. -Inter National Student Edition, Mc Grawhill
3. Renshaw, G. Maths for Economics (2nd Edition, Oxford University Press, 2009)
4. Essential Mathematics for Economics and Business, Teresa Bradley and Paul Patton, Revised by Teresa Bradley, Wiley Student Edition

ADDITIONAL READINGS

1. Harrison, Michael, and Patrick Waldron. *Mathematics for economics and finance*. Routledge, 2011.
2. Taro Yamane: Statistics - An Introductory Analysis, Harper & Row, Edition 3. Geoff Renshaw, Maths for economics, 2nd edition, Oxford University Press.
3. Qazi Zameeruddin, Vijay K Khanna, S K Bhabri, Business Mathematics, Second Edition, Vikas Publishing House, New Delhi.
4. Sydsaeter, Knut. *Mathematics for economic analysis*. Pearson Education India, 2013.
5. Cvitanic, Jaksza, and Fernando Zapatero. *Introduction to the economics and mathematics of financial markets*. MIT press, 2004.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	1	-	-	-	-	-	-	-
CO 2	1	3	-	1	-	-	1	-	-
CO 3	1	3	-	1	-	-	-	-	-
CO 4	1	3	1	2	-	-	-	3	2
CO 5	1	2	-	3	-	-	-	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS III				
Type of Course	Minor				
Semester	III				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economics and Mathematics course of 100 – 199 level				
Course Summary	This course aims to equip students with fundamental mathematical skills essential for comprehending various economic terminologies and solving associated problems.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will understand the interdependencies among different sectors of the economy and how input-output tables capture the flow of goods, services, and payments between sectors.	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Students will understand the concept of integration and its applications in calculating areas under curves, representing cumulative quantities such as total revenue, total cost, and consumer surplus.	An	C	Instructor-created exams /Practical Assignment
CO3	Students will be able to formulate real-world decision-making problems as linear programming models, identifying decision variables, objective functions, and constraints.	E	C	Instructor-created exams /Seminar Presentation / Group Discussion
CO4	Students will apply calculus in understanding their economic interpretation and implications for welfare analysis	An	C	Instructor-created exams / Home Assignments
CO5	Critically evaluate the assumptions underlying mathematical models and assess their applicability to specific economic situations.	An	P	Writing assignments/ Seminar/

				presentation/ Group activities
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Calculus of multi variable functions		12	20
	1	Functions of Several Variables and Partial Derivatives	2	
	2	Rules of Partial Differentiation	2	
	3	Higher-Order Partial Derivatives	2	
	4	Optimization of Multivariable Functions -	2	
	5	Constrained Optimization with Lagrange Multipliers -Significance of the Lagrange Multiplier	2	
	6	Concept of Total and Partial Differentials- Concept of Total Derivatives	2	
II	Calculus of multi variable functions in economics		15	20
	7	Multivariable functions in economics- Marginal Utility-Marginal Productivity.	2	
	8	Income Determination-Multipliers and Comparative Statics-	2	
	9	Income and Cross Price Elasticities of Demand.	2	
	10	Optimization of Multivariable Functions in Economics	2	
	11	Constrained Optimization of Multivariable functions in economics	3	
	12	Cobb Douglass production function- properties	2	
	13	CES production function -properties	2	
III	Linear Programming -an introduction		8	10
	14	Definition and scope of linear programming	2	
	15	Basic terminology: decision variables, objective function, constraints, feasible region.	2	
	16	Formulation of Linear Programming Problems-	2	
	17	Examples of LPP formulations in economic contexts (e.g., production planning, resource allocation).	2	

IV	Method of LPP		13	20
	18	Graphical solution	2	
	19	Simplex Method- Maximization and minimization (simple problems only)	4	
	20	Concept of duality and dual problems.	2	
	21	Economic interpretation of dual variables-.	2	
	22	Dual simplex method	3	
V	Open ended module		12	
	1	Assignment		
	2	Seminars		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Edward T. Dowling, Introduction to Mathematical Economics (3rd Edition), Schaum's Outline Series, McGRAW-HILL
2. Alpha C Chiang: Fundamental Methods of Mathematical Economics, 2nd Ed. -Inter National Student Edition, Mc Grawhill
3. Agarwal NP and Sonia Agarwal, Operations Research and Quantitative Techniques, RBS A Publishers, New Delhi ,2009
4. Anand Sharma, Operations Research, Himalayan Publishing House, 2014 ,Mumbai

ADDITIONAL READINGS

1. Harrison, Michael, and Patrick Waldron. *Mathematics for economics and finance*. Routledge, 2011.
2. Taro Yamane: Statistics - An Introductory Analysis, Harper & Row, Edition 3. Geoff Renshaw, Maths for economics, 2nd edition, Oxford University Press.
3. QaziZameeruddin, Vijay K Khanna, S K Bhambri, Business Mathematics, Second Edition, Vikas Publishing House, New Delhi.
4. Sydsaeter, Knut. *Mathematics for economic analysis*. Pearson Education India, 2013.
5. Cvitanic, Jaksa, and Fernando Zapatero. *Introduction to the economics and mathematics of financial markets*. MIT press, 2004.
6. S.P. Gupta: Statistical Methods, Sultan Chand and Sons, New Delhi.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO08	PSO09
CO 1	3	1	-	-	-	-	-	-	-
CO 2	1	3	-	1	-	-	1	-	-
CO 3	-	3	-	1	-	-	-	1	-
CO 4	1	-	1	2	-	3	-	2	-
CO 5	1	2	-	3	-	2	3	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	QUANTITATIVE TECHNIQUES FOR ECONOMIC ANALYSIS IV				
Type of Course	Minor				
Semester	VIII				
Academic Level	300 – 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Quantitative Economics course of 200 – 299 level				
Course Summary	This course aims to equip students with a comprehensive understanding of economic principles, analytical skills for interpreting real-world data, and the ability to assess and propose solutions to complex economic issues in various sectors.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will recall and demonstrate understanding of key mathematical concepts used in economics, such as calculus, linear algebra, and optimization techniques.	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Students will apply mathematical tools to solve economic problems, including optimization problems, equilibrium analysis, and dynamic economic modelling.	Ap	C	Instructor-created exams /Practical Assignment
CO3	Students will analyze economic phenomena using mathematical models, including evaluating the effects of policy changes, identifying trade-offs, and assessing the stability and efficiency of economic systems..	An	C	Instructor-created exams /Seminar Presentation / Group Discussion
CO4	Students will critically evaluate the strengths and limitations of mathematical approaches in economics, including considering assumptions, interpreting model results, and assessing the relevance of mathematical techniques to real-world economic issues.	E	C	Instructor-created exams / Home Assignments

CO5	Critically evaluate the assumptions underlying mathematical models and assess their applicability to specific economic situations.	An	P	Writing assignments/ Seminar/ presentation/ Group activities
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Theory of consumer behaviour		16	23
	1	Basic concepts- Utility function-indifference curve-MRS	2	
	2	Utility maximisation-First and second order conditions-the choice of a utility index-two special cases	2	
	3	Demand function- compensated demand function- demand curve-price and income elasticities of demand	2	
	4	Substitution and income effect-The Slutsky equation- direct effects-cross effects-substitutes and complements	2	
	5	Linear expenditure system	1	
	6	Separable and additive utility functions-	2	
	7	Homogenous and homothetic utility functions	2	
	8	Indirect utility functions and duality theorem	2	
	9	Theory of revealed preference	1	
II	Theory of production		10	15
	10	Production Function – Producers equilibrium – derivation of input demand functions	2	
	11	Cobb-Douglas production function - CES production function -VES production function- Translog production.	4	
	12	Cost function: Derivation of cost as a function of output-Duality - Shepherd's lemma-	2	
	13	Technological progress and production function.	2	
III	Mathematical treatment of market equilibrium		14	20
	14	Equilibrium under perfect competitive market- an application to taxation	2	

	15	Profit maximisation under monopoly- price discrimination under monopoly	3	
	16	Multi-plant monopolist-multiple product monopolist- taxation and monopoly output- revenue maximizing monopolist	3	
	17	Duopoly and oligopoly: Homogenous product quasi competitive solution-The Cournot and stackleberg solution	4	
	18	Duopoly and oligopoly: Differentiated product- Market shares solution-kinked demand curve solution	2	
IV	Optimisation over time		8	12
	19	Basic concepts- Bond market- market rate of reurn-discount rate and present value	2	
	20	Multi period consumption	2	
	21	Investment theory of a firm	2	
	22	Interest rate determination	2	
V	Open Ended Module		12	
	1	Discussion on the characteristics of different types of market		
	2	Assignment on monopolistic competition		
	3	Cartels and price leadership		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. J.M Henderson and R.E Quandt (1980): *Microeconomic Theory: A Mathematical Approach*- McGraw Hill International Ltd.
2. Edward T. Dowling, *Introduction to Mathematical Economics* (3rd Edition), Schaum's Outline Series, McGRAW-HILL
3. Alpha C Chiang: *Fundamental Methods of Mathematical Economics*, 2nd Ed. -Inter National Student Edition, Mc Grawhill

ADDITIONAL READINGS

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2. Taro Yamane: *Statistics - An Introductory Analysis*, Harper & Row, Edition 3. Geoff Renshaw, *Maths for economics*, 2nd edition, Oxford University Press.

3. QaziZameeruddin, Vijay K Khanna, S K Bhambri, Business Mathematics, Second Edition, Vikas Publishing House, New Delhi.
4. Sydsaeter, Knut. *Mathematics for economic analysis*. Pearson Education India, 2013.
5. Cvitanic, Jaks, and Fernando Zapatero. *Introduction to the economics and mathematics of financial markets*. MIT press, 2004.
6. S.P. Gupta: Statistical Methods, Sultan Chand and Sons, New Delhi.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO08	PSO09
CO 1	3	1	-	-	-	-	-	-	-
CO 2	1	3	-	1	-	-	1	-	-
CO 3	-	3	-	1	-	-	-	1	-
CO 4	1	-	1	2	-	3	-	2	-
CO 5	1	2	-	3	-	2	3	-	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ELEMENTARY TOOLS FOR ECONOMIC DATA ANALYSIS 1				
Type of Course	Minor				
Semester	I				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics and Statistics Course of 0 – 99 level				
Course Summary	This course explores important issues related to information collection methods, arrangement of information and different technique of information presentation.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Helps to understand the principles behind different data collection techniques. Helps to Compare and contrast various classification algorithms.	U	C	Instructor-created exams / Group Discussion.
CO2	Helps to demonstrate the use of different data collection tools and techniques in real-world scenarios. Implement data classification algorithms on sample datasets. Solve problems related to data collection and classification using appropriate methods.	Ap	F	Instructor-created exams/ Seminars/ Projects
CO3	Helps to evaluate the strengths and weaknesses of different data collection methods and sampling methods. Makes the students able to assess the performance of classification algorithms in terms of accuracy and efficiency.	An	C	Seminar Presentation / Group Discussion
CO4	Apply data collection and classification techniques to real-world problems in diverse domains such as healthcare, finance, or marketing. Develop a project that involves collecting and classifying data to solve a practical issue.	Ap	C	Instructor-created exams / Home Assignments
CO5	Helps the students to develop a Design and to implement a comprehensive data collection and classification strategy for a complex problem.	C	F	Writing assignments/ Presentations
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Economic Data		8	12
	1	What is Economic Data? Usages of Economic Data.	2	
	2	Types and Features of Economic Data- Primary and Secondary Data	1	
	3	Sources of Economic Data.	1	
	4	Methods of Data Collection-Census and Sample survey	2	
	5	Planning the survey-Stages	2	
II	Sampling and Sample Designs		14	20
	6	Theoretical Basis of Sampling-Law of Statistical regularity, law of Inertia of large numbers	2	
	7	Method of sampling- Probability and Non probability sampling	2	
	8	Probability sampling methods-Simple Random Sampling, Stratified random sampling- proportionate and Dis proportionate stratified sampling, systematic sampling	4	
	9	Non probability sampling -Judgement sampling, convenience sampling, quota sampling	2	
	10	Determination of sample size	2	
	11	Merits and Limitations of Sampling	1	
	12	Sampling and Non Sampling Errors	1	
III	Arrangements of Data		10	15
	13	Need for arranging Data	1	
	14	Types of Data Classification-Geographical, Chronological, Quantitative and Qualitative.	3	
	15	Construction of Frequency Distribution- Discrete and Continuous Frequency distribution	6	
IV	Data presentation methods		16	23
	16	Tables- Simple and Complex tables	2	
	17	Diagrams-Bar Diagrams- Pie Diagrams-Three Dimensional diagrams-	2	
	18	Choice of a suitable diagram	1	
	19	Graphs-graphs of time series-Two scale graphs-Range chart- Band graph- Semi logarithmic Line graphs	4	

	20	Arithmetic and Ratio scale Graph	1	
	21	Graphs of frequency Distribution- Frequency polygon- frequency curve- histogram-ogives- less than and more than ogives.	5	
	22	Limitations of Diagrams and Graphs	1	
V	Open Ended Module		12	
	Assignments on preparing questionnaires related to a relevant Economic phenomenon.			
	Data Management using spread sheet- Graphical presentation of Data-Line, Bar and Pie Diagrams			

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, is only for the external examination.

References

1. S.C. Gupta., *Fundamentals of Statistics*. Mumbai: Himalaya Publishing Company. (Module 1,2,3 and 4)
2. S.P.Gupta. *Statistical Methods*, New Delhi: Sulthan Chand & Sons .(Module 1,2,3 and 4)

Additional Readings

1. Anderson, Sweeny, & Williams. (n.d.). *Statistics for business and Economics*. Thompson Education.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	3	-	-	-	-	-	-		
CO 2	-	3	-	1	-	-	2		
CO 3	3	-	-	1	-	-	-		
CO 4	-	3	1	2	-	-	3	3	
CO 5	3	-	-	-	-	-	2		3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Field work and project report (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Field work- project	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ELEMENTARY TOOLS FOR ECONOMIC DATA ANALYSIS II				
Type of Course	Minor				
Semester	II				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic Economics and Mathematics course of 0 – 99 level				
Course Summary	This course explores important issues related to different measures of Central tendency, Dispersion, Skewness, Kurtosis and Moments. The course provides the knowledge on the wise and timely use of the descriptive statistics in Economics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Helps to understand the different, statistical measures commonly used in data analysis.	U	C	Instructor-created exams / Group Discussion.
CO2	Students will be able to apply various measures of central tendency, dispersion, skewness, kurtosis, and moments to analyze and interpret economic data effectively.	Ap	C	Instructor- created exams/ Seminars/ Projects
CO3	The course will help the students to evaluate the appropriateness of different descriptive statistical techniques in various economic contexts, demonstrating critical thinking and analytical skills.	An	F	Seminar Presentation / Group Discussion
CO4	The students will be made capable of demonstrate proficiency in utilizing descriptive statistics to summarize, interpret, and communicate economic data accurately and persuasively.	Ap	C	Instructor-created exams / Home Assignments
CO5	Students will be able to analyse the reliability and limitations of descriptive statistics in economic analysis, enabling informed decision-making in real-world scenarios.	An	F	Writing assignments/ Presentations
CO6	The students will be made capable to demonstrate the ability to communicate complex statistical concepts and their economic implications clearly and	C	F	Assignments to solve practical data set

	coherently to diverse stakeholders, fostering effective collaboration and decision-making.			
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Measures of Central Tendency		12	18
	1	Requisites of a good average	1	
	2	Arithmetic mean- calculation, properties- merits and demerits- weighted and combined arithmetic mean	3	
	3	Median- and other partition values- calculation- graphic method- merits and demerits.	2	
	4	Mode- Computation – Graphic Location- Merits and demerits	2	
	5	Harmonic Mean and Geometric mean- computations- Mathematical Properties- Uses	3	
	6	Relationship among Averages	1	
II	Measures of Dispersion		23	34
	7	Meaning, objectives and significance of the measures of dispersion	2	
	8	Characteristics of an ideal measure of dispersion	2	
	9	Absolute and relative measures of dispersion	2	
	10	Range- Computation- merits and demerits- uses	1	
	11	Quartile deviation- computation- merits and demerits	2	
	12	Mean Deviation-computation- mean deviation about mean- mean deviation about median- relative measure- merits and demerits uses of mean deviation.	3	
	13	Standard deviation- computation- mathematical properties- combined standard deviation- variance- coefficient of variation- merits and demerits of standard deviation	5	
	14	Standard Deviation of a combined series	2	
	15	Lorenz curve- Ginni Coefficient-	2	
16	Relations between various measures of dispersion	2		
III	Skewness and Kurtosis		8	11

	17	Skewness- measures of skewness- Karl Pearson's coefficient of skewness- Bowley's measure of Skewness- Kelly's measure of skewness.	5	
	18	Kurtosis- meaning and interpretations-measures of kurtosis	3	
IV	Moments		5	7
	19	Relations between central and raw moments	2	
	20	Sheppard's correction for grouping errors.	1	
	21	Pearson's β and γ coefficients based on moments	1	
	22	Coefficient of skewness based on moments.	1	
V	Open ended module		12	
	23	Diagrammatic illustrations of possible averages and Dispersion measures		
	24	Comprehensive understanding of a frequency distribution with measures of central tendency, dispersion, skewness and Kurtosis.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

References

1. S.C. Gupta., *Fundamentals of Statistics*. Mumbai: Himalaya Publishing Company.
2. S.P.Gupta. *Statistical Methods*, New Delhi: Sulthan Chand & Sons

Additional Readings

1. Anderson, Sweeny, & Williams. (n.d.). *Statistics for business and Economics*. Thompson Education.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	3	-	1	-	-	2	-	-

CO 3	3	-	-	1	-	-	-	-	-
CO 4	-	3	1	2	-	-	3	3	2
CO 5	3	-	-	-	-	-	2	3	3
CO 6	-	2	2	3	3	-	3	2	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Field work and project report (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Field work- project	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓		
CO 6				

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ELEMENTARY TOOLS FOR ECONOMIC DATA ANALYSIS III				
Type of Course	Minor				
Semester	III				
Academic Level	200-299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Elementary Course on central tendency, Dispersion, Skewness, Kurtosis and Moments of level 100 – 199				
Course Summary	This course provides knowledge on correlation, Regression, Time series and Index numbers and its economic application				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Helps to understand the significance of correlation and regression coefficients in economic analysis.	U	C	Instructor-created exams / Group Discussion.
CO2	Students will be able to analyse various economic phenomenon in the light of correlation, regression and coefficient of determination.	An	F	Instructor- created exams/ Seminars/ Projects
CO3	The student will be able to evaluate the economic phenomenon such as inflation, growth etc. by using the knowledge on index numbers and time series.	E	p	Seminar Presentation / Group Discussion
CO4	The students will be made capable of demonstrate proficiency in utilizing inferential statistics to summarize, interpret, and communicate economic data accurately and persuasively.	Ap	C	Instructor-created exams / Home Assignments
CO5	Students will be able to analyse the economic data with the help of softwares and capable of constructing simple models incorporating regression coefficients	C	F	Writing assignments/ Presentations

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)

- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Correlation Analysis		11	16
	1	Meaning and Types of Correlation	2	
	2	Methods of Studying correlation- scatter diagram- Correlation graph- Karl Pearson's Coefficient of correlation-rank Correlation- Method of concurrent Deviation	4	
	3	Properties of Correlation coefficient-Probable error	2	
	4	Coefficient of Determination- Meaning, Problems and Interpretation.	2	
	5	Lag and lead correlation	1	
II	Linear Regression Analysis		11	16
	6	Meaning, types and Uses of Regression	2	
	7	Difference between Correlation and Regression	1	
	8	Regression Lines- X on Y and Y on X- Uses of Regression lines on Prediction	4	
	9	Calculation for regression equations- method of Least Squares	2	
	10	Properties of Regression coefficients	1	
	11	Standard error of an estimate	1	
III	Index Numbers		15	22
	12	Meaning, Uses and Types of index numbers	1	
	13	Problems in the construction of index numbers	1	
	14	Methods of Constructing Index Numbers- Simple Aggregate Method, weighted Aggregate Method, Simple Average of Price Relatives and Weighted average of price relatives	5	
	15	Tests of index numbers- unit test- Time reversal test- factor reversal test- Circular test	2	
	16	Fixed base and chain based index numbers	2	
	17	Base shifting- splicing and deflating of index numbers	1	
	18	Cost of living index numbers- steps in the construction- uses of cost of living index numbers	2	
	19	Limitations of index numbers	1	
IV	Introduction to Time Series Analysis		11	16
	20	What is Time series? Components of Time Series	3	

	21	Measurement of Trend- graphic method- Method of Semi Averages- Method of Curve fitting by Principle of Least squares	4	
	22	Measurement of Seasonal Variations- Simple average method- ratio to trend method-Ratio to moving average- method of link relatives- Deseasonalisation of data	4	
V	Open Ended Module		12	
		CPI, WPI and Stock Price Indices- BSE-SENSEX and NSE-NIFTY		
		Calculation of correlation and regression using Excel		
		Trend line fitting in excel		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

References

1. S.C. Gupta., *Fundamentals of Statistics*. Mumbai: Himalaya Publishing Company.(Module 1,2,3 and 4)
2. S.P.Gupta. *Statistical Methods*, New Delhi: Sulthan Chand & Sons .(Module 1,2,3 and 4)

Additional Readings

1. Anderson, Sweeny, & Williams. (n.d.). *Statistics for business and Economics*. Thompson Education.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-		
CO 2	-	3	-	1	-	-	2		
CO 3	3	-	-	1	-	-	-		
CO 4	-	3	1	2	-	-	3	2	
CO 5	3	-	-	-	-	-	2	3	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Field work and project report (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Field work- project	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓		
CO 6				

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ELEMENTARY TOOLS FOR ECONOMIC DATA ANALYSIS IV				
Type of Course	Minor				
Semester	VIII				
Academic Level	300 – 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Elementary knowledge on Estimation theory, Testing of Hypothesis and Descriptive Statistics of level 200 – 299				
Course Summary	This course provides knowledge on F test, ANOVA, Interpolation and extrapolation and interpretation of data and statistical fallacies essential for economic data analysis and conducting economic research.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Helps to understand the purpose of the F test in comparing variances or testing the equality of means, how ANOVA compares means across multiple groups or factors. Helps to Interpret interpolated values and their significance in the context of data analysis and helps to recognize the importance of accurate data interpretation in research and decision-making.	U	C	Instructor-created exams / Group Discussion.
CO2	Students will be able to analyse various economic research problems using F test and ANOVA . Compare and contrast different interpolation methods based on their suitability for specific datasets.	An	F	Instructor-created exams/ Seminars/ Projects
CO3	Helps to evaluate the appropriateness of using ANOVA in different research contexts, Assess the reliability of interpolated values in decision-making contexts and the potential impact of inaccuracies. Evaluate the impact of accurate data interpretation on decision-making processes and public perception.	E	p	Seminar Presentation / Group Discussion

CO4	The students will be made capable of applying interpolation techniques to estimate missing or intermediate values within a dataset.	Ap	C	Instructor-created exams / Home Assignments
CO5	Helps the students to design experimental studies or research questions suitable for ANOVA analysis. To design interpolation strategies for datasets with irregular or missing data points. Synthesize findings from multiple sources to form well-founded interpretations and conclusions.	C	F	Writing assignments/ Presentations
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
			10	15
	1	F Statistic	2	
	2	Critical values of F distribution	2	
	3	Chief features of F Distribution	2	
	4	Applications of F distribution	2	
	5	Relation between t, F and Chi-square Distribution	2	
II	Analysis of Variance		13	19
	6	ANOVA-Meaning, Definition and Assumptions	2	
	7	One way Classification	3	
	8	Hypothesis testing	3	
	9	Two Way classification	5	
III	Interpolation and Extrapolation		14	20
	10	Meaning and assumptions	1	
	11	Uses of Interpolation	2	
	12	Methods of Interpolation	2	
	13	Graphic Method	2	
	14	Algebraic method	2	
	15	Method of Parabolic curve fitting	2	

	16	Interpolation with arguments at unequal intervals	2	
	17	Inverse interpolation	1	
IV	Interpretation of Data and statistical Fallacies		11	16
	18	Interpretation of Data and statistical Fallacies- meaning and need	2	
	19	Factors leading to mis-interpretation of Data	2	
	20	Bias, Inconsistencies of definition, faulty generalization and inappropriate comparisons	2	
	21	Wrong interpretation of statistical measures.	3	
	22	Effect of wrong interpretation of data	2	
V	Open Ended Module		12	
		Perform a one-way ANOVA to determine if there are significant differences in test scores between the three schools.		
		Obtain data on the yield of crops from different fields across two regions (Region A, Region B) and two soil types (Sandy, Clayey). Perform a two-way ANOVA to examine the effects of region and soil type on crop yield.		
		Provide students with a data set containing a series of measurements taken at regular intervals, with some missing values. Instruct students to use linear interpolation to estimate the missing values based on the neighboring data points.		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

References

1. S.C. Gupta., *Fundamentals of Statistics*. Mumbai: Himalaya Publishing Company.(Module 1,2,3 and 4)
2. S.P.Gupta. *Statistical Methods*, New Delhi: Sulthan Chand & Sons .(Module 1,2,3 and 4)

Additional Readings

1. Anderson, Sweeny, & Williams. (n.d.). *Statistics for business and Economics*. Thompson Education.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-		
CO 2	-	3	-	1	-	-	2		
CO 3	3	-	-	1	-	-	-		
CO 4	-	3	1	2	-	-	3	2	
CO 5	3	-	-	-	-	-	2	3	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Field work and project report (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Field work-project	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓			✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓		
CO 6				

Vocational Minor Courses (Applied Economics)

Programme	B.A. Econometrics and Data Management Honours				
Course Title	FUNDAMENTALS OF DATA SCIENCE IN ECONOMICS				
Type of Course	Vocational Minor				
Semester	I				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic economics course of 0 – 99 level				
Course Summary	This course focuses on various aspects of income tax calculations, basic components of income, tax deductions, tax exemptions and tax regimes.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	To understand the relevance of data science in economics.	U	C	Instructor-created exams / Practical Assignment
CO2	To understand the basic elements of how data is collected, managed and stored for data.	U	F	Writing assignments / Quiz
CO3	To analyze data with a variety of statistical methods and models	An	P	Observation of Practical Skills / Group Discussion
CO4	To analyze data using various visualization techniques.	An	P	Observation of Practical Skills / Home Assignments
CO5	Apply contemporary models, such as machine learning, AI etc to solve economic problems	Ap	P	Practical Skills / Instructor-created exams
CO6	To develop an analytical, interdisciplinary understanding of concepts, theories and associate them with real life situations	C	M	Practical Assignment Viva Voce

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Mark
I	INTRODUCTION TO DATA SCIENCE		10	15
	1	Definition, Big Data and Data Science, Datafication.	2	
	2	Data Science Profile, Meta-Definition	2	
	3	Statistical Inference	2	
	4	Populations and Samples	1	
	5	Philosophy of Exploratory Data Analysis	1	
II	MATHEMATICAL TOOLS		16	23
	7	Matrices to represent relations between data	3	
	8	linear algebraic operations on matrices	3	
	9	Descriptive Statistics	4	
	10	Probability	3	
	11	Correlation Analysis.	3	
III	DATA MUNGING		10	15
	12	Properties of Data	2	
	13	Languages for Data Science	2	
	14	Collecting Data	2	
	15	Cleaning Data	2	
	16	Crowdsourcing	2	
IV	STATISTICAL ANALYSIS		12	17
	17	Sampling from Distributions	2	
	18	Statistical Distributions	2	
	19	Statistical Significance	2	
	20	Permutation Tests P-values	2	
	21	P-values	2	
V	Open Ended Module		12	
		Linear Regression Better Regression Models, Regression as Parameter Fitting		
		Better Regression Models		
		Regression as Parameter Fitting		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Steven S. Skiena, "The Data Science Design Manual", Springer 2017.
2. Rachel Schutt & O'neil, "Doing Data Science", Straight Talk from The Frontline O'REILLY, ISBN:978-1-449-35865-5, 1st edition, October 2013.
3. Joel Grus, "Data Science from Scratch" First Edition, April 2015 2. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, "An Introduction to Statistical Learning-with Applications in R", 2013

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	3	-	-	-	-	-	-	-	-
CO 3	-	-	-	3	-	-	2	-	-
CO 4	-	-	-	2	-	-	3	-	-
CO 5	-	-	-	2	-	-	2	3	-
CO 6	-	-	-	2	-	-	2	3	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments
- Final Exam

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	CROSS SECTION DATA ANALYSIS IN ECONOMICS				
Type of Course	Vocational Minor				
Semester	II				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic economics course of 0 – 99 level				
Course Summary	This course aims to equip students with the economic cross-section data analysis				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will understand the principles underlying regression analysis, including the simple regression model, multiple regression analysis, and the assumptions of OLS estimation.	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Students will apply econometric techniques to estimate causal effects, conduct regression analysis, and interpret the results using statistical software.	An	C	Instructor-created exams /Practical Assignment
CO3	Students will analyze the strengths and limitations of different econometric models, assess the validity of causal claims, and identify potential sources of bias or error in regression analysis.	Ap	C	Instructor-created exams /Seminar Presentation / Group Discussion
CO4	Students will evaluate the reliability of regression results, critically assess empirical research studies, and determine the effectiveness of econometric techniques in addressing economic questions.	C	C	Instructor-created exams / Home Assignments
CO5	Students will design and implement regression models to analyze specific economic phenomena, generate new research questions, and propose innovative econometric approaches to address them.	C	P	Writing assignments/ Seminar/ presentation/ Group activities

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Economic questions and data		6	9
	1	Economic questions	2	
	2	Causal effects idealized experiments -estimation of causal effects- forecasting and causality	2	
	3	Structure of data-Experimental versus observational data-Cross-section data- Time series data- Pooled cross section data- Panel or longitudinal data	2	
II	The simple regression model		16	23
	4	Definition of the Simple Regression Model	1	
	5	Deriving the Ordinary Least Squares Estimates	2	
	6	Properties of OLS on Any Sample of Data-Fitted Values and Residuals-Algebraic Properties of OLS Statistics	3	
	7	Goodness-of-Fit	2	
	8	Units of Measurement and Functional Form-The Effects of Changing Units of Measurement on OLS Statistics-Incorporating Nonlinearities in Simple Regression	3	
	9	Expected Values and Variances of the OLS Estimators-	2	
	10	Regression through the Origin and Regression on a Constant	1	
III	Multiple Regression Analysis: Estimation		16	23
	11	The Model with Two Independent Variables -The Model with k Independent Variables	2	
	12	Obtaining the OLS Estimates-Interpreting the OLS Regression Equation- On the Meaning of “Holding Other Factors Fixed” in Multiple Regression- OLS Fitted Values and Residuals -A “Partialling Out” Interpretation of Multiple Regression	4	
	13	Comparison of Simple and Multiple Regression Estimates- Goodness-of-Fit-Regression through origin	3	
	14	The Expected Value of the OLS Estimators- including irrelevant variable-omitted variable bias	2	
	15	The Variance of the OLS Estimators- The Components of the OLS Variances. Multicollinearity- Variances in Misspecified Models- Estimating Standard Errors of the OLS Estimators	3	
	16	Efficiency of OLS: The Gauss-Markov Theorem	2	
IV	Multiple Regression Analysis: Inference		10	15
	17	Sampling Distributions of the OLS Estimators	2	
	18	Testing Hypotheses about a Single Population Parameter: The t Test	2	
	19	Confidence Intervals	1	
	20	Testing Hypotheses about a Single Linear Combination of the Parameters	2	
	21	Testing Multiple Linear Restrictions: The F Test	2	

	22	Reporting Regression Results	1	
V	Open Ended Module		12	
	1	Data collection		
	2	Analysis of data using software like SPSS		
	3	Interpret the result		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Wooldridge, Jeffrey M. "Introductory econometrics, Wooldridge." (Sixth edn) (Module 1,2,3,&4).
2. Stock, James H., and Mark W. Watson. *Introduction to econometrics*. Pearson, 2020. (Module 1)

ADDITIONAL READINGS

1. Gujarati, Damodar. *Econometrics by example*. Bloomsbury Publishing, 2014.
2. Gujarati, Damodar N., and Dawn C. Porter. *Basic econometrics*. McGraw-hill, 2009.
3. Dougherty, Christopher. *Introduction to econometrics*. Oxford university press, USA, 2011.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	2	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	1	-	1	1	-	3	-	-
CO 4	-	2	-	3	1	2	-	2	3
CO 5	-	3	1	3	1	-	-	-	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	TIME SERIES DATA ANALYSIS IN ECONOMICS				
Type of Course	Vocational Minor				
Semester	III				
Academic Level	200 – 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Econometrics course of 100 – 199				
Course Summary	This course aims to equip students with the economic data analysis				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will understand the principles underlying regression analysis and the properties of OLS estimation.	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Students will apply econometric techniques to estimate causal effects, conduct regression analysis, and interpret the results using statistical software.	An	C	Instructor-created exams /Practical Assignment
CO3	Students will analyse the strengths and limitations of different econometric models, assess the validity of causal claims, and identify potential sources of bias or error in regression analysis.	Ap	C	Instructor-created exams /Seminar Presentation / Group Discussion
CO4	Students will evaluate the reliability of regression results, critically assess empirical research studies, and determine the effectiveness of econometric techniques in addressing economic questions.	C	C	Instructor-created exams / Home Assignments
CO5	Students will design and implement regression models to analyse specific economic phenomena, generate new research questions, and propose innovative econometric approaches to address them.	C	P	Writing assignments/ Seminar/ presentation/ Group activities
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Economic data		5	8
	1	The structure of Economic Data	1	
	2	Cross – Sectional Data	1	
	3	Time Series Data	1	
	4	Pooled Cross Sections	1	
	5	Panel or Longitudinal Data	1	
II	Basic Regression Analysis with Time Series Data		16	23
	6	The Nature of Time Series Data	2	
	7	Examples of Time Series Regression Models	3	
	8	Finite Sample Properties of OLS under Classical Assumptions	3	
	9	Functional Form, Dummy Variables, and Index Numbers	4	
	10	Trends and Seasonality	4	
III	Further Issues in Using OLS with Time Series Data		16	23
	11	Stationary and Weakly Dependent Time Series	3	
	12	Asymptotic Properties of OLS	4	
	13	Using Highly Persistent Time Series in Regression Analysis	4	
	14	Dynamically Complete Models and the Absence of Serial Correlation	2	
	15	The Homoskedasticity Assumption for Time Series Models	3	
IV	Serial Correlation and Heteroskedasticity in Time Series Regressions		11	16
	16	Properties of OLS with Serially Correlated Errors	1	
	17	Serial Correlation in the Presence of Lagged Dependents Variables	1	
	18	Testing for serial correlation	2	
	19	Correcting for Serial Correlation with Strictly Exogenous Regressors	2	
	20	Differencing and Serial Correlation	2	
	21	Serial Correlation – Robust Inference after OLS	1	
	22	Heteroskedasticity in Time Series Regressions	2	
V	Open Ended Module		12	
	1	Data collection		
	2	Analysis of data using software like SPSS		
	3	Interpret the result		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Wooldridge, Jeffrey M.” Econometrics.” (2011) (Module1,2,3,&4).

ADDITIONAL READINGS

1. Gujarati, Damodar N., and Sangeetha. *Basic econometrics*. McGraw-hill, (Fourth Edition) 2007.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	2	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	1	-	1	1	-	3	-	-
CO 4	-	2	-	3	1	2	-	2	3
CO 5	-	3	1	3	1	-	-	-	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	PANEL DATA ANALYSIS IN ECONOMICS				
Type of Course	Vocational Minor				
Semester	VIII				
Academic Level	300 – 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	200 – 299 level course on Data Analysis in Economics				
Course Summary	This course aims to equip students with the economic data analysis				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will understand the basics of panel data	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Students will understand the advantages and disadvantages of panel data	U	C	Instructor-created exams /Practical Assignment
CO3	Students will learn econometric techniques for panel data	C	C	Instructor-created exams /Seminar Presentation / Group Discussion
CO4	Students will study applications in various fields of economics	C	C	Instructor-created exams / Home Assignments
CO5	Students will apply these techniques in appropriate data settings	Ap	C	Writing assignments/ Seminar/ presentation/ Group activities

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	INTRODUCTION TO PANEL DATA		8	12
	1	Panel data: Meaning	1	
	2	Panel data: Some examples	2	
	3	Panel data: Benefits and limitations	2	
	4	Panel data: Brief History	1	
	5	Sources and types of panel data	2	
II	FUNDAMENTALS OF PANEL DATA: BASIC TERMINOLOGIES		12	17
	6	Balanced and Unbalanced panel data	1	
	7	Compact Panel	1	
	8	Attrition	1	
	9	Long Panel	1	
	10	Short panel	1	
	11	Homogeneous panel data models	2	
	12	Heterogeneous panel data models	2	
	13	Dynamic panel data model	2	
	14	Stationarity	1	
III	TYPES OF PANEL ANALYTIC MODELS: BASIC		15	22
	15	Fixed effects model: Meaning and Examples	4	
	16	Random effects model: Meaning and Examples	4	
IV	SIMPLE PANEL DATA METHODS		13	19
	17	Policy analysis with Pooled Cross Sections	2	
	18	Two period panel data analysis	2	
	19	Policy analysis with two period panel data analysis	2	
	20	Differencing with more than two time periods	2	
	21	Advanced panel data methods	2	
	22	Test of hypothesis with panel data	3	
V	Open ended module		12	
	1	Data collection		
	2	Analysis of data using software like SPSS		
	3	Interpret the result		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Badi.H.Baltagi, Econometric analysis of Panel data , Springer,2021
2. Manual Arellano, Panel Data Econometrics,OOxford University Press,2003

ADDITIONAL READINGS

1. Donggyu Sul, Panel Data Econometrics, Taylor & Francis LTD.
2. Gujarati, Damodar. *Econometrics by example*. Bloomsbury Publishing, 2014.
3. Gujarati, Damodar N., and Dawn C. Porter. *Basic econometrics*. McGraw-hill, 2009.
4. Dougherty, Christopher. *Introduction to econometrics*. Oxford university press, USA, 2011.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	2	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	1	-	1	1	-	3	-	-
CO 4	-	2	-	3	1	2	-	2	3
CO 5	-	3	1	3	1	-	-	-	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	APPLIED ECONOMETRICS AND DATA MINING				
Type of Course	Vocational Minor				
Semester	I				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic courses in Economics and Statistics of level 0 – 99 level				
Course Summary	This course provides an opportunity for students to acquire knowledge about the applications of econometrics.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will Understand basic features of applied econometrics like methodology, concept and scope	U	C	Instructor-created exams / Quiz/ Assignments
CO2	Students will apply Econometric techniques to analyse consumer behaviour, including demand estimation, elasticity measurement, and Engel curve and demand forecasting	Ap	C	Instructor-created exams /Practical Assignment/ Group Discussion
CO3	Students will analyse the use of Applied econometrics techniques in production functions	An	C	Instructor-created exams / Practical Assignment
CO4	Students will demonstrate knowledge of fundamental concepts in data mining, including data preprocessing, and its working and acquire knowledge about different software in data mining	F	C	Instructor-created exams / Home Assignments/Seminar presentations
CO5	Students will understand the ethical and legal issues associated with data mining, including privacy concerns, data security, bias, and fairness.	C	P	Writing assignments/ Seminar/ presentation/ Group activities
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)				
# - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Module	Unit	Content	Hrs	Marks
I	Introduction		8	12
	1	Nature, Meaning and Scope of Applied Econometrics	2	
	2	Theoretical vs. Applied Econometrics	1	
	3	Concept of Econometrics Model	1	
	4	Methodology of Applied Econometrics	2	
	5	Properties of a good Econometric model	1	
	6	Limitations of a good Econometric model	1	
II	Consumer Behaviour		10	14
	7	Specification and estimation of demand functions	3	
	8	Price elasticity estimation	3	
	9	Engel curve.	2	
	10	Forecasting and decision making	2	
III	Producer's behaviour		15	22
	11	Estimation of production function	3	
	12	Cobb Douglas production function	3	
	13	CES production function	3	
	14	Cost function analysis	3	
	15	Measurement of partial and total factor productivity.	3	
IV	Data mining		15	22
	16	Data mining- concept and definition and objectives	1	
	17	Data mining- objectives	1	
	18	Benefits of data mining	1	
	19	Data mining process and its working	4	
	20	Different software's in data mining	3	
	21	Application of data mining in Economics	2	
	22	Big data analytics	3	
V	Open ended module		12	
	1	Hands on experience in data analysis		
	2	Practical sessions using statistical software's		
	3	Interpretation and presentations of result		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Raw and Miller. R.L., Applied Econometrics, PHI, Delhi, 1959.
2. "Data Mining: Techniques, Concepts, and Applications" by Dunham, K.Srinivasa and K. Rajendra Prasad

ADDITIONAL READINGS

1. Gujarati, Damodar. *Econometrics by example*. Bloomsbury Publishing, 2014.
2. Gujarati, Damodar N., and Dawn C. Porter. *Basic econometrics*. McGraw-hill, 2009.
3. S. Sumathi and S. N. Sivanandam "Data Mining: Techniques and Applications" by
4. A.Colin Cameron and Pravin K. Trivedi "Microeconometrics: Methods and Applications"
5. Koutsoyiannis, A. (1977) *Theory of Econometrics An Introductory Exposition Econometric Methods*
Macmillan

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	1	-	1	1	-	3	2	1
CO 4	3	2	-	3	1	3	-	2	3
CO 5	-	3	1	3	1	-	-	2	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5	✓	✓		

Programme	B.A. Econometrics and Data Management Honours				
Course Title	BIG DATA APPLICATIONS IN ECONOMICS				
Type of Course	Vocational Minor				
Semester	II				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Basic courses on Economics and Mathematics of 0 – 99 level				
Course Summary	The students will be able to identify the role of big data in economic theory, using big data for prediction purpose and make capable for helping private and public policies				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the characteristics and sources of data	U	F	Instructor-created exams / Quiz
CO2	Analyze different Motivating applications	Ap	C	Practical Assignment / Observation of Practical Skills
CO3	Evaluate Architectures for big data collection	E	P	Seminar Presentation / Group Discussion
CO4	Apply Big Data for Prediction and Public Policy	Ap	P	Instructor-created exams / Home Assignments
CO5	Create programs for big data analytics	C	M	Running programs
CO6	Demonstrate critical thinking and problem-solving skills by applying the acquired knowledge to address complex economic challenges in the contemporary world.	Ap	M	Viva Voce

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P)
Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	The Role of Economic Theory in big data		5	8
	1	Characteristics of Big data.	1	
	2	The need for Analytics and Understanding Analytics: Impact of analytics on business; Being analytically competitive; Models and algorithms in Analytics; The Analytics Methodology	2	

	3	Advantages of big data in the economic research and policymaking	1	
	4	Challenges and risks in big data	1	
II	Major economic data sources		15	22
	5	Sources of big data - National and International	2	
	6	India specific data sources- National Sample Survey Organization (NSSO), Central Statistical Organization (CSO)	3	
	7	Reserve Bank of India (RBI)- Handbook of Statistics on Indian Economy- SEBI Handbook of Statistics	3	
	8	Global data sources- UN Data-Monthly Bulletin of Statistics (MBS),SDG Indicators, United Nations Conference on Trade and Development (UNCTAD), World Development Indicators (WDI), IMF Databases- The World Bank Data Catalog- Federal Reserve Economic Database (FRED)	3	
	9	Motivating applications: web scraping, social media, Google.	2	
	10	Real time data (Social media and the labour market)	2	
III	Using Big Data to Advanced Economic Theory		14	20
	11	Tool and Tech Landscape: A review of technology used in data storage, data processing, and data science; Popular tools used in Data Science and when to use each	3	
	12	Using Big Data for Prediction and Public Policy	2	
	13	Architectures for big data collection, analysis, and storage.	3	
	14	Using micro data to answer macroeconomic questions	3	
	15	Finance and high frequency trading	3	
IV	Machine learning methods		14	20
	16	Linear Regression Models and their applications	2	
	17	Logistics Regression Models and their applications	2	
	18	Time Series Forecasting	2	
	19	k-nearest-neighbors, classification and regression trees, random forests.	2	
	20	An overview of neural networks and deep learning: Images, sounds, text, as sources of information.	2	
	21	Text mining: natural language processing, latent Dirichlet allocation, sentiment analysis.	2	
	22	Big Data Analytics with R.	2	
V	Open Ended Module		12	
		NFHS data extraction techniques		
		NSSO data extraction techniques		
		Data pulling/extracting exercises, data cleaning exercises, data treatment exercises		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. “Big Data: A Revolution That Will Transform How We Live, Work, and Think” by Viktor Mayer-Schönberger and Kenneth Cukier, Houghton Mifflin Harcourt, 2013
2. “Machine-learning Techniques in Economics: New Tools for Predicting Economic Growth” by Atin Basuchoudhary, James T. Bang, and Tinni Sen, Springer.
3. “Data Science for Economics and Finance: Methodologies and Applications” edited by Sergio Consoli, Diego Reforgiato Recupero, and Michaela Saisana, Springer.
4. Antenucci, Dolan, et al. (2014) “Using social media to measure labor market flows.” Working paper no. w20010. National Bureau of Economic Research.
5. Athey, S. (2018). “The impact of machine learning on economics”, in The Economics of Artificial Intelligence: An Agenda. University of Chicago Press.
6. BDS Taddy, M. (2019) Business Data Science: Combining Machine Learning and Economics to Optimize, Automate, and Accelerate Business Decisions. McGraw Hill.
7. Choi, Hyunyoung and Hal Varian (2009). “Predicting the present using Google Trends” Working paper.
8. Dave Donaldson and Adam Storeygard, The View from Above: Applications of Satellite Data in Economics, The Journal of Economic Perspectives, Fall 2016, Vol. 30, No. 4 (Fall 2016), pp. 171-198, Published by: American Economic Association.
9. Einav, Liran, and Jonathan D. Levin. (2013) “The data revolution and economic analysis.” Working paper no. w19035. National Bureau of Economic Research.
10. Hal R. Varian, Big Data: New Tricks for Econometrics, The Journal of Economic Perspectives , Spring 2014, Vol. 28, No. 2 (Spring 2014), pp. 3-27, American Economic Association
11. Jay Liebowitz, “Big Data and Business Analytics” Auerbach Publications, CRC press (2013)
12. Liran Einav and Jonathan Levin, The Data Revolution and Economic Analysis, Innovation Policy and the Economy , Vol. 14, No. 1 (January 2014), pp. 1-24, The University of Chicago Press on behalf of the The National Bureau of Economic Research
13. Michael Berthold, David J. Hand, "Intelligent Data Analysis", Springer, 2007.
14. Seema Acharya, Subhasini Chellappan, "Big Data Analytics" Wiley 2015.
15. Sendhil Mullainathan and Jann Spiess, Machine Learning: An Applied Econometric Approach, The Journal of Economic Perspectives, Spring 2017, Vol. 31, No. 2 (Spring 2017), pp. 87-106, American Economic Association
16. Stephen Hawkins , Brief Answers to the Big Questions (Selected Chapters)
17. Yuval Harari, 21 Lessons for the 21st Century

MAPPING OF COS WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	3	2	2	3	2	3
CO 2	1	1	1	2	2	2	3	2	3
CO 3	1	1	1	2	2	2	3	2	3
CO 4	1	1	2	2	2	2	3	3	3
CO 5	2	2	1	3	2	2	3	3	3
CO 6	1	1	2	2	2	2	3	3	3

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMIC DATA VISUALISATION AND STORYTELLING				
Type of Course	Vocational Minor				
Semester	III				
Academic Level	200 – 299				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economic Data Analysis course of 100 – 199 level				
Course Summary	Students will learn how to extract insights from economic data, create compelling visualizations, and craft engaging narratives, through a hands-on approach,				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Students will demonstrate an understanding of the principles of data storytelling and its relevance in economic contexts.	U	C	Written reflections on the importance of data narratives in economic analysis.
CO2	Students will analyze economic data narratives to extract insights and patterns.	An	C	Case studies or real-world examples where students critically evaluate data stories and identify underlying economic implications.
CO3	Students will be able to create effective time series visualizations using appropriate tools (e.g., Excel, Python, R).	Ap	C	A portfolio of time series graphs showcasing economic trends and patterns.
CO4	Students will design comprehensive data narratives that integrate visualizations and storytelling	C	C	Final presentations or reports where students develop and present their own data stories on economic topics
CO5	Students will develop original data-driven narratives related to economic trends and patterns.	C	C	Assessment of individual or group projects showcasing data narratives and visual designs.
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to Data Visualization		8	12
	1	Foundations of Data Visualization (Understanding the importance of visualizing economic data; Types of data (quantitative, categorical, time-series); Choosing appropriate visualization techniques)	3	
	2	Data Visualization Tools and Software (Introduction to popular tools (e.g., Python libraries like Matplotlib, Seaborn, Plotly; R packages; Excel))	3	
	3	Exploratory Data Analysis (EDA) (Data cleaning and preprocessing; Handling missing values); Outlier detection and treatment; Data transformation)	2	
II	Data Story Exploration & Explanation		15	22
	4	Understanding Economic Data Collection and Analysis (Finding relevant economic data sources; Collecting and cleaning economic data; Basic data analysis techniques)	2	
	5	Spotting Stories Within Numerical Data (Identifying trends, anomalies, and patterns; Extracting meaningful insights from economic datasets; Using descriptive statistics to reveal narratives)	2	
	6	Developing a Data Mindset for Decision-Making (Understanding the impact of data on decision-making; Interpreting economic indicators and their implications; Cultivating a critical approach to data analysis)	3	
	7	Crafting Compelling Narratives Using Data (Weaving economic data into coherent stories; Presenting data-driven arguments effectively; Using storytelling techniques to engage the audience)	1	
	8	Exploring Visual Infographics for Economic Data (Types of infographics (bar charts, pie charts, heatmaps, etc.); Choosing the right chart for specific economic contexts; Creating visually appealing and informative infographics)	3	
	9	Revealing New Insights Through Data Visualization (Leveraging interactive visualizations (scatter plots, line charts, etc.); Highlighting correlations and	2	

		causations; Uncovering hidden relationships in economic data)		
	10	Avoiding Pitfalls and Deceptive Visual Representations (Ethical considerations in data visualization; Common mistakes (misleading scales, cherry-picking data); Ensuring transparency and accuracy in infographics)	2	
III	Visualizing Time Series Data		15	22
	11	Line Plots and Time Series Graphs (Understanding the basics of line plots and their suitability for visualizing time series data; Creating line graphs to represent economic trends over time; Highlighting seasonality, cyclical patterns, and long-term changes using time series graphs)	2	
	12	Seasonal Subseries Plots (Exploring seasonal variations in economic data; Constructing subseries plots to visualize patterns within specific seasons (e.g., monthly or quarterly); Identifying recurring patterns and anomalies related to seasons)	4	
	13	Autocorrelation Plots (Analyzing autocorrelation in time series data; Creating autocorrelation plots to assess the relationship between observations at different lags; Detecting periodicity and potential predictive patterns)	3	
	14	Histograms for Time Series Data (Using histograms to understand the distribution of economic variables over time; Identifying central tendencies, variability, and potential outliers; Comparing the distribution of economic indicators across different time periods)	2	
	15	Interactive Visualizations for Dynamic Data (Building interactive dashboards that allow users to explore economic data over time; Incorporating tooltips, sliders, and other interactive elements)	2	
	16	Identifying Anomalies and Outliers (Detecting sudden changes, spikes; Visualizing anomalies using scatter plots, box plots, Understanding the impact of outliers on economic analysis) and Comparing Multiple Time Series (Visualizing economic performance across different sectors, regions, or countries; Overlaying multiple time series on a single graph for comparative analysis)	2	

IV	Data Story Narrative		10	14
	17	Narrative Structure for Data Stories (Understanding the fundamental elements of storytelling (e.g., protagonist, complication, resolution); Applying narrative structures (e.g., Aristotle’s Tragedy Structure, Campbell’s Hero’s Journey) to data stories; Crafting a compelling narrative arc for economic data insights)	2	
	18	Setting the Scene: Current Situation (Introducing the context and background of the economic problem or scenario; Describing the current state of affairs using relevant data points; Creating a hook to engage the audience in the data story)	2	
	19	Insights Leading to the Central Point (Unveiling key insights derived from economic data analysis; Presenting data-driven findings that build up to the central insight; Using visualizations to support and emphasize these insights)	1	
	20	Recommendations and Implications (Proposing actionable recommendations based on the data insights; Discussing the implications of the central insight for decision-makers; Addressing potential challenges or risks associated with the recommendations)	2	
	21	Crafting Engaging Data Narratives (Techniques for making data stories memorable and persuasive. Weaving data points into a coherent and relatable narrative; Balancing quantitative information with qualitative storytelling)	2	
	22	Effective Communication Techniques (Tailoring the data story to different audiences (e.g., executives, policymakers, general public); Choosing the right tone, language, and level of detail; Leveraging storytelling techniques (e.g., anecdotes, metaphors) to enhance understanding and retention)	1	
V	Open ended module		12	
	1	Ethical Considerations in Data Visualization (Explore the ethical implications of data visualization in economic contexts; Discuss issues related to bias, misrepresentation, and privacy; Encourage critical thinking about responsible data visualization practices)		
	2	Interactive and Dynamic Visualizations (Dive into creating interactive dashboards and dynamic		

		visualizations; Understand the benefits of interactive elements (e.g., tooltips, filters, animations); Learn how to engage users through interactive data exploration)		
	3	Visualizing Uncertainty and Risk (Address uncertainty in economic data (e.g., confidence intervals, prediction intervals); Visualize risk scenarios using probabilistic methods; Explore techniques for conveying uncertainty in economic forecasts)		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Dykes, B. (2020). Effective Data Storytelling: How to Drive Change with Data, Narrative, and Visuals. John Wiley & Sons.
2. Kirk, A. (2019). Data Visualization: A Handbook for Data-Driven Design (2nd Edition). Sage.

ADDITIONAL READINGS

1. "Data storytelling and visualisation" by The Economist
2. "Data Visualization and Storytelling" by NYU Wagner

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	2	1	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	1	-	1	1	-	3	-	-
CO 4	-	2	-	3	1	2	-	2	3
CO 5	-	3	1	3	1	-	-	-	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments

- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	MACHINE LEARNING IN ECONOMICS				
Type of Course	Vocational Minor				
Semester	VIII				
Academic Level	300 - 399				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	4	4	-	-	60
Pre-requisites	Economic Data Analysis course of 200 – 299 level				
Course Summary	This course aims to equip students to explore statistical models, multivariate linear regression, tree-based models, deep learning, and advanced topics like causal inference and ethical considerations in ML for economics				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the Foundations of Statistical Models and Optimization in Economics	U	C	Written exam or concept-based questions
CO2	Analyze Model Diagnostics and Residual Analysis in Multivariate Linear Regression	An	C	Case study or practical assessment involving residual analysis and interpretation of influential observations
CO3	Apply Variable Selection Techniques in Multivariate Linear Regression	Ap	C	Practical assignments involving stepwise regression, regularization methods, and feature importance analysis.
CO4	Create Interpretable Machine Learning Models	C	C	Project or assignment where students build and interpret ML models (e.g., using SHAP values or LIME) on economic datasets.
CO5	Develop Ethical AI Practices in Economics	C	P	Research paper or presentation discussing ethical considerations, bias mitigation, and privacy-preserving techniques in ML applications for economics.
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Introduction to Statistical Models and Optimization		5	7
	1	Statistical models	1	
	2	Loss functions	2	
	3	Optimization techniques	2	
II	Review of Multivariate Linear Regression		15	22
	4	Introduction to Multivariate Linear Regression (Overview of linear regression with multiple independent variables; Assumptions and limitations; Interpretation of coefficients)	2	
	5	Matrix Representation and Notation (Representing multiple regression equations using matrices; Matrix algebra for regression; Vector notation for model parameters)	2	
	6	Model Estimation and Inference (Least squares estimation; Hypothesis testing for regression coefficients; Confidence intervals)	3	
	7	Model Diagnostics and Residual Analysis (Checking model assumptions (linearity, homoscedasticity, normality); Residual plots and influential observations; Detecting multicollinearity)	2	
	8	Variable Selection Techniques (Stepwise regression (forward, backward, and hybrid approaches); Regularization methods (Lasso, Ridge); Feature importance and selection criteria)	3	
	9	Interaction Effects and Nonlinear Terms: (Incorporating interaction terms; Polynomial regression; Splines and piecewise linear models)	2	
	10	Applied Examples and Case Studies (Real-world applications of multivariate linear regression in economics; Case studies illustrating practical use and interpretation)	1	
III	Beyond Linear Regression		15	22
	11	Generalized Linear Models (GLMs) (Introduction to GLMs as an extension of linear regression; Different link functions (e.g., logistic, Poisson) for modeling non-normal response variables; Applications in economics (e.g., binary choice models, count data models))	2	
	12	Nonparametric Regression Techniques (Kernel regression and local regression; Smoothing splines; Advantages and limitations of nonparametric approaches)	4	
	13	Tree-Based Models (Decision trees and ensemble methods (e.g., Random Forest, Gradient Boosting); Interpretability and predictive power; Handling missing data and categorical variables)	3	
	14	Support Vector Machines (SVM) (Basics of SVM for classification and regression) Kernel trick and hyperparameter tuning; Economic applications (e.g., credit risk assessment, stock market prediction)) Neural Networks and Deep Learning (Introduction to artificial neural networks (ANNs)); Feedforward architecture, activation functions, and backpropagation.	2	
	15	Deep learning architectures (e.g., CNNs, RNNs) and their relevance in economics)	2	
	16	Model Evaluation and Selection (Cross-validation techniques; Model comparison using metrics (e.g., RMSE, AIC, BIC); Bias-variance trade-off and overfitting)	2	

IV	Advanced Topics in Machine Learning for Economics		13	19
	17	Causal Inference and Econometrics (Counterfactual analysis and causal inference; Propensity score matching and regression discontinuity design; Incorporating machine learning techniques for causal analysis)	2	
	18	Time Series Forecasting (ARIMA (AutoRegressive Integrated Moving Average) models; Exponential smoothing methods; Deep learning for time series prediction (e.g., LSTM networks))	2	
	19	Natural Language Processing (NLP) in Economics (Text mining and sentiment analysis; Topic modeling (e.g., Latent Dirichlet Allocation); Applications in analyzing economic news, research papers, and social media data)	2	
	20	Reinforcement Learning (RL) for Decision-Making (Markov Decision Processes (MDPs) and RL fundamentals; Q-learning, policy gradients, and actor-critic algorithms; Economic applications (e.g., optimal pricing, resource allocation))	2	
	21	Interpretable Machine Learning (SHAP (SHapley Additive exPlanations) values and feature importance; LIME (Local Interpretable Model-agnostic Explanations); Ensuring transparency and accountability in ML models)	2	
	22	Ethical Considerations in ML for Economics (Bias and fairness in ML models; Privacy-preserving techniques; Responsible AI practices in economic applications)	3	
V	Open ended module		12	
	1	Economic Forecasting with Machine Learning (Explore how ML techniques can enhance economic forecasting; Discuss time series models, ensemble methods, and deep learning for predicting economic indicators (e.g., GDP growth, inflation rates); Consider the challenges of incorporating ML into existing forecasting frameworks)		
	2	Ethical and Social Implications of ML in Economics (Delve into the ethical considerations related to ML deployment in economic contexts; Discuss bias, fairness, and transparency; Explore case studies where ML models have had unintended consequences in economic decision-making)		
	3	Interdisciplinary Applications of ML in Economics (Investigate how ML intersects with other fields (e.g., behavioral economics, finance, development economics); Explore applications such as recommender systems for personalized financial advice, fraud detection, and impact evaluation. Encourage students to think beyond traditional economic paradigms)		

Note: The course is divided into five modules, with four modules together having total 22 fixed units and one open-ended module with a variable number of units. There are total 48 instructional hours for the fixed modules and 12 hours for the open-ended one. Internal assessments (30 marks) are split between the open-ended module (10 marks) and the fixed modules (20 marks). The final exam, however, covers only the 22 units from the fixed modules. The 70 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. James, G., Witten, D., Hastie, T., & Tibshirani, R. (2013). An Introduction to Statistical Learning. New York: Springer.

ADDITIONAL READINGS

1. Murphy, K. P. (2012). Machine Learning: A Probabilistic Perspective. MIT Press.
2. Hastie, T., Tibshirani, R., Friedman, J., & Franklin, J. (2005). The Elements of Statistical Learning: Data Mining, Inference, and Prediction.
3. Bishop, C. M. (2006). Pattern Recognition and Machine Learning. Springer.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO 8	PSO9
CO 1	2	-	-	-	-	-	-	-	-
CO 2	-	2	-	-	-	-	-	-	-
CO 3	-	1	-	1	1	-	3	-	-
CO 4	-	2	-	3	1	2	-	2	3
CO 5	-	3	1	3	1	-	-	-	2

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar /Survey
- Internal Exam
- Practical Assignments
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓	✓	✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓	✓	✓
CO 5		✓	✓	

General Foundation Courses in Econometrics and Data Management

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ESSENTIALS OF ECONOMICS				
Type of Course	MDC				
Semester	I				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic course on stock market of level 0 - 99				
Course Summary	Essential of Economics are a comprehensive introductory course that provides a foundational understanding of key economic concepts, theories, and their practical applications.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Recall and describe key economic concepts	R	C	Quiz/Instructor-created exams
CO 2	Understand the fundamental principles of economics, including micro and macroeconomics, the theory of demand and supply, and National income concepts	U	C	Group Discussion
CO 3	Apply theories of demand, supply, production, and cost to analyse real-world economic problems	AP	C	Writing assignments and instructor-created exams
CO 5	Evaluate economic theories and models using real-world data, focusing on their applicability and limitations in explaining economic phenomena	E	P	Practical Assignment
CO 6	Analyse the factors affecting demand and supply, including market dynamics and the influence of various determinants on economic behaviour	AN	M	Practical Assignment/ Presentation
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Introduction to Economics		8	12
	1	What is economics? Definitions	1	
	2	Why study economics?	1	
	3	Microeconomics Versus Macroeconomics	2	
	4	Relationship With Other Social Sciences (History, Political Science, Law, Psychology, Sociology)	1	
	5	Basic Problems of an Economy	1	
	6	Production Possibility Curve (PPC)	1	
	7	Economic System	1	
II	Theory of Demand and Supply		12	18
	8	Utility; utility function; marginal utility; law of diminishing marginal utility	2	
	9	Concept of Demand: The Law of Demand, Determinants of demand, Types of Demand	2	
	10	Demand Function: Market Demand Curve	1	
	11	The elasticity of Demand (price, Income and cross-elasticity of demand)	2	
	12	Concept of Supply: The Law of Supply, Determinants of Supply	2	
	13	Supply Function: Market Supply Curve	1	
	14	Elasticity of Supply	1	
	15	Market Equilibrium.	1	
III	Theory of Production and Costs		6	10
	16	Production Function-Types of production function (short run and long run) Economies of scale.	3	
	17	Cost: cost function, Opportunity cost, variable cost, fixed cost, total cost, marginal cost, average cost,	3	
IV	National Income Concepts and Meaning		10	10
	18	GDP, GNP, NDP and NNP GDP at factor cost and market price GNP at market price and factor cost; NDP at market price and factor cost; NNP at market price and factor cost	5	
	19	Personal Income, Disposable income, Per-capita income, and National Income: Estimation of National Income	5	
V	Open ended module		9	
		Discussion based on different market structures in the world Practical Assignments to compare and relate market of different products with different market structures		

Note: The course is divided into five modules, with four modules together having total 19 fixed units and one open-ended module with a variable number of units. There are total 36 instructional hours for the fixed modules and 9 hours for the open-ended one. Internal assessments (25 marks) are split between the open-ended module (5 marks) and the fixed modules (20 marks). The final exam, however, covers only the 19

units from the fixed modules. The 50 marks shown in the last column, distributed over the first four modules, is only for the external examination.

Reference:

1. Gregory Mankiw (2006) Principles of Microeconomics (Paperback) South Western Educational Publishing
2. Dominick Salvatore (2003): Microeconomics: Theory and Applications, 4th Edition, Oxford University Press
3. Gregory Mankiw (2019) Macroeconomics, 10th Ed. Worth Publishers Inc., U.S.

Additional Readings:

1. Robert S Pindyck and Daniel L Rubinfeld (2009): Microeconomics, 8th Edition, Pearson India.
2. E. Case Karl, C. Fair Ray, and E. Oster Sharon (2017) Principles of Economics, 12th, Pearson Education
3. A Koutsoyiannis (1979): Modern Microeconomics- 2nd Edition, Macmillan.
4. Diwedi, D N (2005). Macroeconomics Theory and Policy Tata McGraw-Hill

Mapping of COS with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	3	-	-	-	-	-	-	-	-
CO 3	-	3	1	-	-	-	-	-	-
CO 4	-	-	-	3	1	-	-	-	-
CO 5	-	-	-	-	-	1	3	-	-
CO 6	-	1	-	1	1	-	-	2	1

Correlation levels:

Level	Correlation
-	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5	✓		✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	DIGITAL ECONOMY				
Type of Course	MDC				
Semester	II				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic course on Economics of 0 – 99 level				
Course Summary	This course is designed to provide a theoretical and practical knowledge about digital economy				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the Historical foundations and impact of the digital economy.	U	C	Instructor-created exams / Quiz, Assignment
CO2	Analyze business and innovation in the digital age.	An	P	Case Study Analysis,
CO3	Critically evaluate the role of data and analytics.	E	M	Research Paper, Debate Participation
CO4	Assess the policy and social implications of the digital economy.	Ap	p	Instructor-created exams / Home Assignments

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Foundations of the Digital Economy		12	17
	1	The Rise of the Digital Economy: Historical context, key technologies, economic impact of digital economy on economic growth, productivity and employment.	2	
	2	Definition and Meaning of Digital Economy	1	
	3	Digital Goods and Services: Characteristics, pricing models, and distribution channels.	2	
	4	Platforms and Marketplaces: Two-sided markets, network effects, and platform power.	2	
	5	Data & Information Economics: The information value chain, big data.	2	
	6	Privacy: Data protection and security – privacy concerns	1	

	7	Theories of Digital Economy: Growth theory of digital economy – endogenous growth theory – monetary theory of digital economy	2	
II	Business and Innovation in the Digital Age		8	11
	8	E-commerce and Online Retail: Business models, customer behaviour, and logistics challenges.	2	
	9	Logistic – Logistic – models – challenges of E-commerce		
	10	The Sharing Economy: Collaborative consumption, platform competition, and regulatory issues.	2	
	11	Fintech and Financial Innovation: Digital payments, cryptocurrencies, and blockchain technology	2	
	12	Digital Transformation and Strategy: How businesses are adapting to the digital environment.	2	
III	Data and Analytics		8	11
	13	The Role of Data and Analytics – Big data, data analytics, and their importance in the digital economy.	3	
	14	Emerging trends and technologies shaping the future of the digital economy, such as AI, blockchain, and the metaverse.	4	
	15	The ethical implications of data collection and usage	1	
IV	Policy and Social Implications of the Digital Economy		8	11
	16	Competition Policy and Antitrust in the Digital Era: Regulating platform monopolies and market dominance	2	
	17	Intellectual Property and Copyright in the Digital Age: Challenges of protecting digital content and innovation.	2	
	18	Digital Divide and Inequality: Access to technology, skills development, and social justice concerns.	2	
	19	The Future of Work in the Digital Economy: Automation, job displacement, and new skills requirements.	2	
IV	Digital Economy and India		9	
		Discussion based on different digital systems, platforms, technologies, etc. prevailing in India		
		Practical Assignments on digital economy in India		
		Seminar on the digital economy and shaping of policies in India		

Note: The course is divided into five modules, with four modules together having total 19 fixed units and one open-ended module with a variable number of units. There are total 36 instructional hours for the fixed modules and 9 hours for the open-ended one. Internal assessments (25 marks) are split between the open-ended module (5 marks) and the fixed modules (20 marks). The final exam, however, covers only the 19 units from the fixed modules. The 50 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Harld Overby and Jan Arild Audestad (2021). *Introduction to Digital Economics: Foundation, Business Models and Case Studies*. Springer.
2. Don Tapscott and Anthony D. Williams (2016). *The Digital Economy: Concepts and Applications*. McGraw-Hill Education (Module I)
3. Liu, Z. (2022). *Principles of Digital Economics: Innovation Theory in the Age of Intelligence*. Springer Nature. (Module 1, Unit 7)

ADDITIONAL READINGS

1. Mayer-Schönberger, V., & Cukier, K. (2013). *Big data: A Revolution that Will Transform how We Live, Work, and Think*. Houghton Mifflin Harcourt.
2. Davenport, T., & Harris, J. (2017). *Competing on Analytics: Updated, with a New Introduction: The New Science of Winning*. Harvard Business Press.
3. Russell, S., & Norvig, P. (2021). *Artificial Intelligence: A Modern Approach*, Global Edition. Pearson Higher Ed.
4. Zuboff, S. (2019). *The Age of Surveillance Capitalism: The Fight for a Human Future at the New Frontier of Power*. Profile Books.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	2	-	1	1	-	1	-	-
CO 2	2	3	3	3	-	2	2	-	-
CO 3		1	-	2	2	3	2	-	-
CO 4	2	3	1	3	3	1	3	-	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (30%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓			✓
CO 2	✓		✓	✓
CO 3	✓	✓	✓	✓
CO 4	✓	✓	✓	✓

Programme	B.A. Econometrics and Data Management Honours				
Course Title	FINANCIAL LITERACY AND PERSONAL FINANCE				
Type of Course	Value Added Course				
Semester	III				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic course on Economics of 0 – 99 level				
Course Summary	This course provokes the students on the importance of personal financial planning and imparts basic financial literacy principles, with the intention of building in them capability to manage personal finances optimally in various stages of life.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic principles of personal finance and its applications.	U	C	Instructor- created exams / Quiz
CO2	Develop and practice the skill of planning and managing personal finances efficiently.	Ap	P	Practical Assignment / Creating a sample personal financial plan
CO3	Help the students master the concept of time value of money and provide them with necessary skills to beat inflation and maintain the purchasing power of money.	U	C	Seminar Presentation / Group Discussion
CO4	Understand and apply structured personal financial techniques in real life situations.	Ap	P	Instructor- created exams / Home Assignments
CO5	Provide the students with an understanding of various financial products like bank accounts, insurance products and equities and enable them	U	F	Writing assignments

	to acquire a diversified portfolio of financial products in real life.			
CO6	Demonstrate critical thinking and problem-solving skills by applying the acquired knowledge to evaluate complex financial products.	Ap	P	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Personal Financial Planning/Financial Literacy		10	14
	Basics of financial planning			
	1	Meaning of financial planning and the importance of financial planning.	1	
	2	Risk vs return (inflation risk, market risk and exchange risk).	1	
	3	Planning for the short, medium and long term.	3	
	4	Introducing financial products that suit short, medium and long time horizons.		
	5	Short term and money market or debt instruments		
	6	Long term and asset backed investments.		
	Time value of money			
	7	Inflation and its impact on personal financial security,	3	
	8	Concepts of absolute income and real income.		
	9	Concepts of nominal rate of interest and real rate of interest.		
	10	Principles of compounding and discounting.	2	
II	The financial planning process		08	11
	11	The fact find or taking stock ones financial situation, identifying present provisions and shortfalls.	3	
	12	Setting SMART (specific, measurable, achievable, realistic, timebound) financial goals.	2	
	13	Concept of diversification-putting your eggs into different baskets.	1	
14	Physical assets like commodities (gold, silver and other precious metals) and properties.	2		
III	Financial products		08	11
	15	Savings bank accounts, current account, fixed deposits, recurring deposits. Introducing and debit cards. Modes of transfers-IMPS, NEFT, RTGS, UPI.	2	
	16	Bonds, debentures and other debt funds.	1	
	17	Equity market products, Risks involved in equity market investments. stocks, shares, equities, mutual funds, derivatives, options.	3	
	18	NSE, BSE, OTC Exchange of India. Stock market indices, Nifty, SENSEX, S&P, NASDAQ.	2	

IV	Insurance and pension products		10	14
	19	Insurance as a risk management device. Life insurance, (introduce various types of life products like term insurance, endowment plans,	2	
		unit-linked policies (ULIPs etc.), Riders in insurance (eg. critical illness benefit, hospitalisation benefit, permanent total disability etc.). Property and casualty insurance, health/medical insurance. Two rules of calculating life cover-multiples of salary and the inflation rule.	2	
	20	The need for retirement security. Pension products. Difference between statutory pension system and contributory pension. National Pension system and its features. Tier I and Tier II contributions in the NPS . Investment options-active choice and auto choice.	2	
	21	Annuities. Difference between annuities and pensions. Various types of annuities-fixed, variable and equity linked.	2	
	22	Retirement pension policies of life insurance companies. Annuity service providers (ASP). Role of IRDAI and PFRDA as regulators.	2	
V	Open Ended Module		9	
		Discussion based on the exit of governments from pension provision.		
		Practical Assignments to create a sample personal financial plan for an individual/ family making provisions for emergency funds, savings, insurances and retirement schemes.		
		Seminar/workshop on investor awareness with a focus on stock/equity investments.		

Note: The course is divided into five modules, with four modules together having total 19 fixed units and one open-ended module with a variable number of units. There are total 36 instructional hours for the fixed modules and 9 hours for the open-ended one. Internal assessments (25 marks) are split between the open-ended module (5 marks) and the fixed modules (20 marks). The final exam, however, covers only the 19 units from the fixed modules. The 50 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Lokesh Sehgal (2023). Learn and Practice Financial Planning
2. Nevar Theodore Malabre (2020). Financial Literacy: Understanding the Basics of Financial Investments
3. Purvi Kothari and Keyur Mehta (2010). Financial Investment and Financial Planning

ADDITIONAL READING

1. Kana Sukumaran (2024). Personal Finance: A Treatise on Financial Literacy
2. Introduction to Financial Planning (2017) By Indian Institute of Banking and Finance
3. Prasanna Chandra. Financial Management: Theory and Practice

MAPPING OF COS WITH PSOS:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	3	-
CO 2	-	2	2	-	-	-	3	2	-
CO 3	-	3	2	-	1	-	1	1	-
CO 4	-	3	-	-	-	-	-	2	-
CO 5	-	-	-	-	-	-	2	3	-
CO 6	-	3	2	-	-	-	2	2	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	DIGITAL MARKETING AND E-COMMERCE STRATEGIES				
Type of Course	Value Added Course				
Semester	IV				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic course on Economics of 0 – 99 level				
Course Summary	The course equips students to understand the basics of marketing and how effectively they can use digital medias to run a successful business venture.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand the basic principles of marketing	U	C	Instructor- created exams / Quiz
CO2	Develop and practice the skill of planning and managing e commerce	Ap	P	Practical Assignment / Creating a sample personal financial plan
CO3	Help the students master the concept of digital marketing and provide them with necessary skills to run an online business	U	C	Seminar Presentation /Group Discussion
CO4	Understand and apply digital marketing techniques in real business world.	Ap	P	Instructor- created exams /Home Assignments
CO5	Provide the students with an understanding of various digital platforms and marketing strategies and enable them to run successful business	U	F	Writing assignments
CO6	Demonstrate critical thinking and problem-solving skills by applying theacquired knowledge in complex business world	Ap	P	Viva Voce

* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C)
- Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P)Metacognitive Knowledge (M)

DETAILED SYLLABUS:

Module	Unit	Content	Hrs	Marks
I	Basic concepts of marketing		10	14
	1	Meaning of marketing	1	
	2	Customer value	1	
	3	Customer relationship management- concept and process	3	
	4	Customer buying behaviour		
	5	Buyer decision process		
	6	Competitor analysis	3	
	7	New product development		
	8	Price strategies		
	9	Positioning strategies	2	
10	Market targeting			
II	Introduction to Digital marketing		08	11
	11	Meaning, evolution and channels of digital marketing	3	
	12	Search Engine Optimization, Search Engine Marketing.	2	
	13	Content Marketing	1	
	14	Social media platforms and marketing	2	
III	The concept of E-Commerce		08	11
	15	Meaning and concept, E- commerce v/s Traditional Commerce	2	
	16	Importance, features & benefits of E- Commerce	1	
	17	Impacts, Challenges & Limitations of E- Commerce and Supply chain management	3	
	18	Payment systems and security issues	2	
IV	Website planning		10	14
	19	Website Planning & Creation : Content Marketing Strategy, Keywords Research and Analysis	3	
	20	Web Presence and Creating content	3	
	21	Different types of display advertising	2	
	22	Google analytics	2	
^v	Open Ended Module		9	
V		Discussion on various social media platforms		
		Practical Assignments case study on the success story of any popular e-commerce provider.		

Note: The course is divided into five modules, with four modules together having total 19 fixed units and one open-ended module with a variable number of units. There are total 36 instructional hours for the fixed modules and 9 hours for the open-ended one. Internal assessments (25 marks) are split between the open-ended module (5 marks) and the fixed modules (20 marks). The final exam, however, covers only the 19 units from the fixed modules. The 50 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. E-Commerce Strategy, Technologies and Applications, Whitley, David, Tata McGraw Hill.
2. Philip Kotler and Eduardo Roberto, Social Marketing: Strategies for Changing Public Behavior, The Free Press, 1989.

ADDITIONAL READING

1. Philip Kotler, Marc Oliver Opresnik, and Kahzon Takaoko, *Digital Marketing Management and Transformation by Innovation* (2020) Philip Kotler and Christian Sarkar, *Losing Our Democracy* (2020)

MAPPING OF COS WITH PSOS:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	3	-
CO 2	-	2	2	-	-	-	3	2	-
CO 3	-	3	2	-	1	-	1	1	-
CO 4	-	3	-	-	-	-	-	2	-
CO 5	-	-	-	-	-	-	2	3	-
CO 6	-	3	2	-	-	-	2	2	-

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COS TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMETRICS WITH EXCEL				
Type of Course	SEC				
Semester	V				
Academic Level	100 - 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic Economics Course of 0 – 99 level				
Course Summary	This course offers a comprehensive overview of Microsoft Excel 19, covering the essentials of spreadsheets, understanding basic terms, mastering worksheet operations, and managing cells. It provides broad knowledge for analysing social science statistics using Microsoft Excel 19 through mathematical computations and statistical functions.				

Course Outcomes (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO 1	Understand the basic features of Microsoft Excel and apply standard mathematical operations using Excel formulas.	U	F	Quiz/Practical Assignment
CO 2	Create various types of charts and graphs in Excel to effectively present and visualize data, enhancing their ability to communicate statistical information.	C	P	Practical Assignment
CO 3	Analyze data sets to compute statistical measures using Excel's statistical functions.	AN	F	Practical Assignment
CO 4	Analyze data using a range of Excel formulas and functions from different categories	AN	P	Practical Assignment/Seminar Presentation
CO 5	Analyze Time Series statistics using Excel formulas and functions	AN	P	Practical Assignment/Seminar Presentation
CO 6	Apply Excel's advanced features and shortcuts to optimize data management processes, increasing productivity and efficiency in data handling tasks	AP	M	Practical Assignment
* Remember (R), Understand (U), Apply (AP), Analyse (AN), Evaluate (E), Create (C) #: Factual Knowledge (F), Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Detailed Syllabus:

Module	Unit	Content	Hrs	Marks
I	Introduction to Excel		10	15
	1	Introduction to MS Excel 19: Features - Worksheets - Workbooks – Workspace	2	
	2	Spreadsheet terms: Quick Access Toolbar, Search bar, Title Bar, File Bar, Name box, Cell, Range, Status bar, Ribbon, Formula bar	2	
	3	Importance of Visualizing Data: Different Types of Charts in Excel: Choosing a Chart Type	1	
	4	Data Preparation: Formatting charts, Pasting a Chart image into Word - Interpreting Charts	1	
	5	Formulas: Open the Data file, create a basic formula, Copying and pasting formulas	1	
	6	Addition, Subtraction, Division, Multiplication, and Power	1	
	7	Components of a function: = FunctionName(Arguments)	1	
	8	The SUM Function, The Count Function, The Average Function, The MAX and MIN Functions, and the Percentage Function	1	
II	Basic Statistics Methods using Excel		10	15
	9	Measures of Central Tendency: Mean, median and mode; Geometric and Harmonic means	2	
	10	Measures of Dispersion: Range, interquartile range and quartile deviation, mean deviation, standard deviation and Lorenz curve, Moments, Skewness and Kurtosis	2	
	11	Partition Values: Quartiles; Deciles; Percentiles	1	
	12	Estimation of Correlation, Estimation of Regression equations	2	
	13	Goodness of fit (R ²)	1	
	14	Descriptive Statistics	2	
III	Time Series Statistics		8	10
	15	Measurement of Secular trend: Freehand curve method or eye inspection method - Semi-average method; Method of moving average, Method of least squares.	5	

	16	Measurement of seasonal variations: Method of simple averages; Ratio to trend method; Ratio to moving average method; Link relative method	3	
IV	Index Numbers		8	10
	17	Index Function	2	
	18	Simple, Unweighted, Laspeyres, Paasche	3	
	19	Splicing	3	
V	Real-world Applications		9	
		Gather economic data such as household income, employment rates, and business revenue from different regions or countries. Using Excel, they will apply descriptive statistical tools to summarize and understand the data, identifying key economic disparities. Further, they will use regression analysis to investigate the factors influencing economic growth or recession in these regions.		

Note: The course is divided into five modules, with four modules together having total 19 fixed units and one open-ended module with a variable number of units. There are total 36 instructional hours for the fixed modules and 9 hours for the open-ended one. Internal assessments (25 marks) are split between the open-ended module (5 marks) and the fixed modules (20 marks). The final exam, however, covers only the 19 units from the fixed modules. The 50 marks shown in the last column, distributed over the first four modules, are only for the external examination.

Reference:

1. L. Winston Wayne (2019) Microsoft Excel 2019: Data Analysis & Business Model, PHI Learning Pvt. Ltd.
2. Anderson, D. R., Sweeney, D. J., Williams, T. A., Camm, J. D., & Cochran, J. J. (2014). Essentials of Statistics for Business and Economics. Boston: Cengage Learning.
3. Levine, D. M. (2005). Statistics for Managers Using Microsoft Excel. (5th ed.). New York: Prentice.

Additional Readings:

1. Winston, W. (2014). Microsoft Excel 2013 Data Analysis and Business Modeling, Prentice Hall India Learning Private Limited
2. Ajai S.Gaur and Sanjaya S.Gaur (2008), Statistical Methods for Practice and Research, Response Books-Sage Publications Pvt. Ltd., New Delhi.

3. Lind, D. A., Waite, C. A., Marchal, W. G., & Wathen, S. A. (2005). Basic Statistics for Business & Economics. New York: McGraw-Hill.
4. Gupta, S. C., & Kapoor, V. K. (2007). Fundamentals of Applied Statistics. (4th ed.). New Delhi: Sultan Chand & Sons.

Mapping of Cos with PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	-	-	2	-	-	-	-	-	-
CO 2	-	-	1	-	-	2	-	-	-
CO 3	-	-	-	-	-	-	3	-	-
CO 4	-	1	-	-	-	-	-	2	-
CO 5	-	-	-	1	-	-	-	-	2
CO 6	-	-	-	-	-	2	-	-	-

Correlation levels:

Level	Correlation
--	Nil
1	Slightly/Low
2	Moderate/ Medium
3	Substantial/High

Assessment Rubrics:

- Quiz/Assignment/Viva Voce/Discussion/ Seminar
- Internal Exam
- Practical Assignments (20%)
- End semester Exam (70%)

Mapping of COs to Assessment Rubrics:

	Internal Exam	Quiz/Assignment/Viva Voce/Discussion/ Seminar	Practical Assignments	End semester Exam
CO 1	✓	✓	✓	✓
CO 2	✓		✓	✓
CO 3	✓		✓	✓
CO 4	✓	✓		✓
CO 5	✓	✓	✓	✓
CO 6			✓	

Programme	B.A. Econometrics and Data Management Honours				
Course Title	ECONOMIC RESEARCH WITH R				
Type of Course	SEC				
Semester	VI				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours
	3	3	-	-	45
Pre-requisites	Basic Economics, Basic Mathematics and Basic Statistics courses of 0 – 99 level				
Course Summary	This course provides an introductory exposure to Economics research using ‘R’ with imparting basic programming skills in the various functions in R, which enable the students to apply various functions learned in Economic Research.				

COURSE OUTCOMES (CO):

CO	CO Statement	Cognitive Level*	Knowledge Category#	Evaluation Tools used
CO1	Understand basic programming in R.	U	C	Instructor-created exams / Quiz
CO2	Analyse various loops and use them appropriately	Ap	P	Practical Assignment /Case Studies in the Indian context
CO3	Evaluate various data analysis tools and employ them appropriately.	U	P	Seminar Presentation / Group Discussion
CO4	Apply various functions/models in Economic Research	Ap	C	Instructor-created exams / Home Assignments/Cases in the Indian context
CO5	Design various models and use it in the data analysis.	E	P	Writing assignments
CO6	Demonstrate problem-solving skills by applying the acquired knowledge in R software to address complex economic challenges in the contemporary world.	Ap	P	Viva Voce
* - Remember (R), Understand (U), Apply (Ap), Analyse (An), Evaluate (E), Create (C) # - Factual Knowledge(F) Conceptual Knowledge (C) Procedural Knowledge (P) Metacognitive Knowledge (M)				

Module	Unit	Content	Hrs	Marks
I	Introduction to R and R studio.		7	10
	1	Basics of R programming	1	
	2	R Markdown files	2	
	3	Primitive Object Types: Vectors, List	2	
	4	Matrices, Arrays, Factors, Data frames.	2	
II	Loops in R and Functions in R.		6	8
	5	if, else, while and for loops.	2	
	6	apply () class functions	2	
	7	Writing your own function	2	
III	UNIT 3 Data management with Tidyverse		12	17
	8	Importing and exporting data	2	
	9	Introduction to tidyverse and tidy workflow	2	
	11	Data extraction	2	
	12	Data cleaning	1	
	13	Data formatting and wrangling	2	
	14	Creating summary statistics tables	1	
	15	Basic data analysis using tidyverse	2	
IV	UNIT 4 Data Visualisation and Basics of Plotting in R		11	15
	16	Creating plots with base R functions.	1	
	17	Introduction to ggplot. Data visualization using ggplot2	1	
	18	Linear models - Generic functions for extracting model information - Linear (Multiple Regression) Models	3	
	19	The (Model Formula in Straight Line Regression) - Analysis of variance (ANOVA) and ANOVA tables	6	
V	Open Ended Module		9	
	Use Various models learned in the above modules			

Note: The course is divided into five modules, with four modules together having total 19 fixed units and one open-ended module with a variable number of units. There are total 36 instructional hours for the fixed modules and 9 hours for the open-ended one. Internal assessments (25 marks) are split between the open-ended module (5 marks) and the fixed modules (20 marks). The final exam, however, covers only the 19 units from the fixed modules. The 50 marks shown in the last column, distributed over the first four modules, are only for the external examination.

REFERENCE:

1. Zamora Saiz, A., Quesada González, C., & Mondéjar Ruiz, D. (2020). Introduction to R. *An Introduction to Data Analysis in R: Hands-on Coding, Data Mining, Visualization and Statistics from Scratch*, 9-67.
2. Hafner, S. (2019). An Introduction to R for Beginners. (www.researchgate.net/publication/325170649_An_Introduction_to_R_for_Beginners).
3. <https://rstudio-education.github.io/hopr/preface.html>
4. <https://r4ds.had.co.nz/>

ADDITIONAL READINGS

1. Maindonald, J., & Braun, J. (2006). *Data analysis and graphics using R: an example-based approach* (Vol. 10). Cambridge University Press.
2. www.cran.r-project.org.

MAPPING OF COs WITH PSOs:

	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8	PSO9
CO 1	3	-	-	-	-	-	-	-	-
CO 2	-	3	-	1	-	-	2	-	-
CO 3	3	-	-	1	-	-	-	-	-
CO 4	-	3	1	2	-	-	3	1	-
CO 5	3	-	-	-	-	-	2	1	1
CO 6	-	2	2	3	3	-	3	1	1

CORRELATION LEVELS:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

ASSESSMENT RUBRICS:

- Quiz / Assignment/ Viva Voce/ Discussion / Seminar
- Internal Exam
- Practical Assignments (20%)
- Final Exam (70%)

MAPPING OF COs TO ASSESSMENT RUBRICS:

	Internal Exam	Quiz / Assignment/ Viva Voce/ Discussion / Seminar	Practical Assignment	End Semester Examination
CO 1	✓	✓		✓
CO 2	✓		✓	✓
CO 3	✓	✓		✓
CO 4	✓	✓		✓
CO 5		✓	✓	✓
CO 6			✓	