# **St. Joseph's College of Commerce** (Autonomous)

163, Brigade Road, Bengaluru – 560 025

Accredited with 'A++' Grade (4<sup>th</sup> Cycle) by the National Assessment and Accreditation Council (NAAC)

Recognized by the UGC as

"COLLEGE WITH POTENTIAL FOR EXCELLENCE"



# **B.Sc. (Economics, Mathematics & Data Analytics)**

## Semester – III & IV

Syllabus as per Karnataka State Education Policy 2024

Curriculum Framework w.e.f., 2024-2025

Academic Year 2025 – 2026 *Batch 2024* 

## St. Joseph's College of Commerce (Autonomous)

Affiliated to Bengaluru City University

St. Joseph's College of Commerce (SJCC) was formerly a part of St. Joseph's College, established in the year 1882. The Commerce Department was established in the year 1949 and it became an independent college with its own building in Brigade Road in the year 1972.

The college has in its Vision a model for higher education which encourages individuals to dream of a socially just world and in its Mission a strategy to empower individuals in realizing that dream.

With an objective of imparting quality education in the field of Commerce and Management, the college has been innovating in all aspects of higher education over a long period of time. These innovations were further bolstered with the granting of autonomous status to the college by UGC in September 2005. From then on, the college has taken a lead in reforming curriculum and syllabus, examination and evaluation pattern and teaching and learning methods through the Board of Studies, the Academic Council and the Governing Council comprising eminent academicians, industry representatives and notable alumni.

The college has undergone four cycles of NAAC accreditation starting from the year 2000 in which it secured 'five stars', next in the year 2007 an 'A' grade, in the year 2012 again an 'A' grade and recently in February 2021 an 'A++'. It is one of the very few institutions in the country to have secured A++ grade in the fourth cycle under the Revised Accreditation Framework (RAF) and the first college in Karnataka to do so. The college was declared as a 'College with Potential for Excellence' in the year 2010. In 2011, SJCC was recognized as a Research Centre by Bangalore University. The college has been ranked 55th in the National Institutional Ranking Framework (NIRF) ratings of Ministry of Education, Government of India, in 2024 and it has been the only institution from Karnataka to make it consistently to the top 100 in the country.

The college offers diverse programmes in Commerce , Business Administration, Arts and Science. Under Commerce Studies it offers B.Com, B.Com (Professional- International Accounting and Finance), B.Com (BPM- Industry Integrated), B.Com (Travel and Tourism), B.Com (Analytics), B.Com (Professional - Strategic Finance), M.Com (Finance & Taxation/ Marketing & Analytics), M.Com (International Business) & M.Com (Financial Analysis). Under Business Administration it offers BBA, BBA (Entrepreneurship) and BBA (Professional-Finance and Accountancy). Under Arts it offers BA (English, Communicative English and Psychology) and Under Science it offers B.Sc (Economics, Mathematics and Data Analytics). The college also offers five one-year Post Graduate Diploma programmes.

#### THE DEPARTMENT OF ECONOMICS

The Department of Economics offers B.Sc (Economics) Honours. This Department has been started to incorporate the multidisciplinary spirit of the new NEP 2020. The B.Sc (Economics) Honours programme has been designed to provide a cutting edge expertise in mainstream economics with minor (psychology). The programme aims to develop analytical, creative and critical thinking skills for problem solving and decision making. It aims at better understanding of social, economic, psychological and political issues and also explores the full spectrum of finance. The transferable skills attained through the B.Sc (Economics) Honours are highly sought after by employers and increase the employability quotient of students in various dynamic fields. A student could be an economist, a government advisor, financial consultant,

econometrician, banker and also look forward to different government positions after successful completion of the programme. Keeping in view the new NEP, the programme is multidisciplinary in nature and integrates different fields like Psychology, Finance, Mathematics, Statistics, Operations Research, History, Politics, Environmental Studies, Model Building with an inbuilt local as well as global perspective.

New elements such as internship, case studies, seminars and research projects enhance deeper understanding of the practical applications of the programme. So, join in to embark on a whole new adventure with us. The Bachelor's degree honours programme in Economics is a full-time undergraduate programme of 4 years that aims at providing a programme structure which would retain the 'traditional' in the programme and equip the students with business acumen necessary to succeed in the professional world. On completion of B.Sc. (Economics) Honours at SJCC, students will acquire comprehensive knowledge of how the economic principles are applied in the society, family, government and private sector, business, and science.

#### **Economics Major**

- Develops expertise in mainstream economics, enhancing analytical, creative, and critical thinking for effective problem-solving and decision-making.
- Offers an interdisciplinary approach by integrating fields like Finance, Mathematics, Programming (Python & R), History, and Environmental Studies with local and global perspectives
- . Equips students with transferable skills, boosting employability for roles such as economist, government advisor, financial consultant, and banker

#### Mathematics Major

- Provides a strong foundation in core mathematical topics such as calculus, linear algebra, and optimization methods, emphasizing problem-solving and analysis.
- Focuses on practical applications, enabling students to tackle real-world problems in areas like science, engineering, and economics.
- Enhances proficiency in computational tools and techniques through projects and case studies, with applications in data analysis, operations research, and finance.

#### Data Analytics Major

- Develops essential skills in data cleaning, statistical techniques, exploratory analysis, and machine learning applications for informed decision-making.
- Offers hands-on experience with tools like Python, R, Power BI and SQL for data manipulation, visualization, and problem-solving.
- Applies knowledge to real-world challenges in industries such as finance, healthcare, and marketing through case studies and projects.

#### **OBJECTIVES OF THE BSC PROGRAMME**

• To impart knowledge to students in functional areas of economics so that they may pursue careers in economics, Maths & Data Analytics.

- To incorporate extensively along with theoretical knowledge sharing various skills (viz., Presentations, rapid reading, geopolitical awareness, time management) needed for managerial effectiveness.
- To gain diverse employment prospects, master microeconomics and macroeconomics, and cultivate problem-solving and decision-making skills.
- To develop a thorough grasp of data analysis, comprehend statistical and mathematical techniques, and master the utilization of technology for proficient data analysis.
- To acquire practical insights, apply knowledge to real-life scenarios, and make sound financial decisions.

#### I. ELIGIBILITY FOR ADMISSION

Candidates who have completed the two-year Pre-University course of Karnataka State or its equivalent are eligible for admission into this Programme.

#### **II. DURATION OF THE PROGRAMME**

The duration of the programme is three (03) years of Six Semesters. A candidate shall complete his/her degree within five (5) academic years from the date of his/her admission to the first semester. Students successfully completing three (03) years of the course will be awarded Bachelor's Degree in Economics, Mathematics & Data Analytics.

#### **III. MEDIUM OF INSTRUCTION**

The medium of instruction shall be in English.

#### **IV. ATTENDANCE**

- **a.** A student shall be considered to have satisfied the requirement of attendance for the semester, if he/she has attended not less than 75% in aggregate of the number of working periods in each of the courses, compulsorily.
- **b.** A student who fails to complete the course in the manner stated above shall not be permitted to take the End Semester Examination.

#### V. TEACHING AND EVALUATION

MSc/MA/M.Com/MBA/MFA/MBS/MTA graduates with B.Sc/BA/B.Com as basic degree from a recognized university are only eligible to teach and to evaluate the courses including part – B courses of I and II semesters except languages, compulsory additional courses and core Information Technology related courses, Skill based, Value Based and Foundation courses, mentioned in this regulation. These courses shall be taught by the Post graduates as recognized by the respective Board of Studies.

#### VI. Scheme Of Examination

ACADEMIC EVALUATION UNDER STATE EDUCATION POLICY (SEP) (EFFECTIVE FROM ACADEMIC YEAR 2024-2025)

The academic evaluation of both undergraduate (UG) and postgraduate (PG) programmes consists of two components: Continuous Internal Assessment (Formative Assessment) and End-Semester Examination (Summative Assessment).

Type of Assessment	Assessment Component	Allotte d Marks			
	CIA I (Test)	10 Marks			
Continuous Internal Assessment	CIA II (Skill-based Assessment)	10 Marks			
/ Formative Assessment	Formative Mid-Term Exam ent				
Total	40 marks (scaled down to 20 marks)				
End-Semester					
Examination	End-Semester Examination (For three hours duration)	80 Marks			
/ Summative					
Assessment					
TOTAL		100 Marks			

#### Assessment for UG Students under SEP will be as follows:

#### A. Additional Details

- **Mid-Term Exam**: The mid-term exam covers at least 40-50% of the syllabus and has duration of one hour.
- **Continuous Internal Assessment (CIA) Activities**: CIA activities are designed with clear objectives, modalities, assessment rubrics, and outcomes.

#### B. CIA improvement

There is **no provision for enhancing CIA marks** for UG students once the semester ends.

#### Attendance requirement for taking ESE

- The University Grants Commission (UGC) mandates a minimum of 75% attendance in each course to be eligible to write the End Semester Examinations (ESE).
- There is no provision for condonation of attendance under the UGC Act.

#### VII. Minimum for a pass

- **Minimum Pass Marks in Final Examination**: A minimum of 40 percent is required in each course in the End Semester Exams. The student must score at least 32 marks out of 80 in the End Semester Examination (ESE).
- **Overall Pass Requirement**: The aggregate of Continuous Internal Assessment (CIA) and End Semester Examination (ESE) should also be a minimum of 40 percent. Out of 100 marks, a student must secure at least 40 marks in each course to qualify as passed inclusive of minimum 32 marks out of 80 in End Semester Exam.

#### VIII. Grading System For Choice Based Credit System (CBCS)

The modalities and operational details are given below:

• **Grade Points**: The College adopts a ten-point grading system. The papers are marked in a conventional way for 100 marks. The marks obtained are converted to grade point according to the following table. If a student is absent for the paper the grade point assigned is 0.

**Credits**: Credits are assigned to courses based on the following broad classification

Courses Category	Instruction Hours/week	Credits		
Languages	3 Hours	3		
Major Core	4 Hours	4		
Skill Enhanceme nt Courses	1-4 Hours	1-4		
Compulsory Courses	1-2 Hours	1-2		

#### Grade point calculation

- Semester Grade Point Average (SGPA): The SGPA is calculated as the sum of the product of the credits and the grade points scored in all courses, divided by the total credits.
- Minimum SGPA required for a pass is 4.5.

#### SGPA = Total of (Credits Earned X Grade Points) ÷ Total of Corresponding Credits

- If a student has not passed in all courses or is absent, the SGPA is not assigned.
- Cumulative Grade Point Average (CGPA): The CGPA is the weighted average of all the courses taken by a student across all semesters of a programme.

#### CGPA = $\Sigma$ Total Credits in the Semester × SGPA ÷ Total Credits of the Courses

Note: SGPA and CGPA will be rounded off to two decimal places.

Grade Points	% of Marks	Gr a d e	Result/Class Description
9.00- 10.00	85 - 100	0	Outstanding

8.00- 8.99	75 - 85	A +	First Class Exemplary			
7.00						
7.99	65 - 75	А	First Class Distinction			
6.00-	55 - 65	В	First Class			
6.99	55 65	+	1150 01055			
5.50-	50-55	B	High Second Class			
5.99	20-22	D	0			
5.00-	45 50	C	Second Class			
5.49	45 - 50	C	Second Class			
4.50 -	40 45	D	Dega Class			
4.99	40 - 45	P	Pass class			
Belo	Dolour 40	R	To Do Appeor			
w 4.5	Delow 40	А	i o ke-Appear			

#### Interpretation of SGPA/CGPA and Classification of Final Result

#### IX. PATTERN OF ESE QUESTION PAPER UNDER SEP

The End Semester Examination (ESE) question paper under SEP will include questions that assess both Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS). The difficulty level of the question paper will be distributed as follows: 40% easy, 30% difficult, and 30% very challenging. Lower Order Thinking Skills (LOTS) and Higher Order Thinking Skills (HOTS).

- **Duration**: 3 Hours
- Maximum Marks: 80

The question paper pattern will be as follows:

Sections	Marks per Question	Number of Questions	Total Marks
Sectio n A	2 marks	5 questions (out of 7)	10 Marks
Sectio n B	5 marks	4 questions (out of 6)	20 Marks

Sectio n C	12 marks	3 questions (out of 5)	36 Marks
Section D	14 marks	1 question (Case Study)	14 Marks
Total			80 Marks

#### **X. REVALUATION AND RETOTALING**

Requests for **revaluation**, **retotaling**, and **photocopies of the answer book** for the End-Semester Examination (ESE) must be submitted to the Controller of Examination along with the prescribed fee within two weeks from the declaration of results.

#### XI. Absence during End Semester Examination

If a student misses the End Semester Examination, they will be marked as "Absent" and will be required to take the supplementary examination for that course during the next available opportunity only.

#### XII. Malpractice

Students will be dealt severally in case if they are found guilty of any malpractices during examination. The college has zero tolerance towards any kind of <del>foul</del> means adopted to secure marks in the exams.

#### **OUTCOME BASED EDUCATION (OBE)**

Our BSC programmes will produce graduates who will be capable of the following:

#### Programme Outcomes (POs)

- 1. Disciplinary and Inter-disciplinary Knowledge
- Demonstrates a comprehensive understanding of economic theories, principles, and concepts relevant to both microeconomics and macroeconomics.

#### 2. Decision Making Skill

- Applies critical thinking and analytical skills to make informed decisions in economic contexts, considering various solutions and their implications.
- 3. Integrated Problem-Solving and Research
- Analyzes complex economic issues and managerial challenges within specific industries or sectors, proposing suitable solutions based on research and analysis.
- 4. Critical Thinking Skill
- $_{\odot}~$  Evaluates evidence, arguments, claims, and beliefs using appropriate reasoning.
- Analyzes how parts of a whole interact to produce overall outcomes in complex systems.
- 5. Creative Thinking Skill
- Evaluates evidence, arguments, and economic claims using appropriate reasoning techniques, fostering a critical mindset.
- 6. Usage of Modern Technology and Tools
- Utilizes digital tools, data analysis techniques, and economic software to access, manage, evaluate, and create economic information effectively.
- 7. Leadership and Teamwork
- Develops leadership skills and collaborates effectively within diverse teams.
- Translates visions into shared goals and achievements.

#### 8. Ethical Conduct

• Acts ethically and sustainably in economic decision-making at local, national, and global levels.

#### 9. Collaboration

- Collaborates respectfully within multidisciplinary teams.
- Demonstrates effective communication and teamwork in diverse economic contexts.

#### 10. Self-Directed and Life-Long Learning

- Creates goals and monitors progress.
- Develops awareness of personal, environmental, and task-specific factors that affect goal attainment.

### Programme Specific Outcomes (PSOs)

#### 11. Entrepreneurial Perspectives

- Develops, organizes, and manages business ventures.
- Understands and manages risks associated with sustainable business models.

### 12. Global Perspectives and Multicultural Understanding

- Engages in effective and appropriate interaction and teamwork with individuals of different nationalities and cultures.
- Demonstrates respect for social, cultural, and linguistic diversity at local, national, and international levels

#### Programme Matrix for SEP Batch

#### (Deep Specialisation in Economics in the Vth and VIth Semester)

#### 2024 Batch

BSc (ECONOMICS, MATHEMATICS AND DATA ANALYTICS)									
Category/ Semester	I	II	III	IV		V	VI	Total Credits	
			PART A: LANGU	JAGES	r				
Languages	Lang I	Lang I	Lang I	Lang I		-	-		
4 Hrs - 3 Crs	Lang II	Lang II	Lang II	Lang II		-	-		
Part A Credits	6	6	6	6		-	-	24	
PART B: DISCIPLINE-SPECIFIC CORE & ELECTIVE COURSES									
Major Core Economics (5 Crs)	Micro economics 5 Crs	Macro economics 5 Crs	Monetary Econometrics 5 Crs	Financial economics 5 Crs	D E P S P	Basic Econometrics 5 Crs	History of Economic Thought 5 Crs		
Major Core Mathematics (5 Crs)	Introduction to Calculus and Differential Equations 5 Crs	Linear Algebra 5 Crs	Advanced Calculus and Differential Equations 5 Crs	Numerical Methods 5 Crs	E I A I S T A I	Operation Research 5 Crs	Behavioural Economics 5 Crs		
Major Core 3 Data Analytics (3Crs)	Fundamentals of Statistics 3 Crs	Advanced Statistics 3 Crs	Fundamentals of Data Analytics 3 Crs	Advanced Data Analytics – Machine Learning 3 Crs	I N E C O	International Economics 5 Crs	Public Economics 5 Crs		
Major Core 3 Data Analytics Practical (2Crs)	Fundamentals of Statistics using R Programming 2 Crs	Advanced R Programming 2 Crs	Introduction to Python Programming 2 Crs	Advanced Python Programming 2 Crs	N O M I C S	Economics of Growth and Development 5 Crs	Environmental Economics 5 Crs		
Part B Credits	15	15	15	15		20	20	100	
		PART C: SKII	LL ENHANCEMENT	COURSES/ACTIVIT	IES				
Skill Based Courses	Data Analytics using Spreadsheets (2 Crs)	Applied Mathematical Economics (2Crs)	Stock Trading (2Crs)	Social Internship (2Crs)	Aca	demic Writing (2Crs) Research Aethodology (2 Crs)	Publication Ethics (2Crs) Professional Internship (2 Crs) Research Project (2Crs)		
Value-Based Activities		Extra-Curricular Activities (1 Cr)		Extra- Curricular Activities (1 Cr)		-	Extension Activities (1 Cr)		
Part C Credits	2	3	2	3		4	7	21	
		PA	RT D: COMPULSOF	RY COURSES					
Foundation Courses	Constitutional Values I (2 Crs) Psychological Wellbeing (1 Cr)	Constitutional Values II (2 Crs)	Environmental Studies (2 Crs)	-	-		-		
Part D Credits	3	2	2	-		-	-	7	
Total Credits	26	26	25	24		24	27	152	

#### (Batch 2024-2025) Lecture Title of the Hours Credit **Course Code** CIA Category ESE Marks Course per S week Monetary 5 100 S1 24 MC 301 Major Core 5+0+0 20 80 Economics Advanced Calculus and S1 24 MC 302 Major Core 80 5+0+05 20 100 Differential Equations Fundamentals of Major Core 3 20 80 100 Data Analytics S1 24 MCT Introduction to 5+0+0303 Major Core Python 2 50 50 S1 24 MCP Practical Programming 303 Skill Enhancement 2+00 Stock Trading 2 30 50 S1 24 SE 301 20 S1 24 GE 301 General English Language 1 3+0+0 3 20 80 100 Language 2 S1 24 KN 301 Kannada 3+0+0 20 80 100 3 S1 24 HN 301 Hindi Language 2 Additional S1 24 AE 301 English Environmental UG 24 CC 301 2+0+02 50 50 Studies 25 530 650 Total credits 120

Course Matrix for B.Sc. Economics Programme (SEP Batch) Semester III

# **Semester III**

Semester	Course Code	Course Title	Course Duration	Course Type	Teaching Hours Per Week	Credits					
III	S1 24 MC 301	Monetary Economics	60	МС	5	5					
Course Objectives	This course ain prevailing in an	ns at creating an o economy. The stud	overall unde ents should l	rstanding of be able to di	the monetar fferentiate be	ry system tween the					
	demand and sup them. The course it.	ply side of money se incorporates the st	upply and the udy of inflatio	e theories and on and the mo	d approaches easures taken	related to to control					
Course Outcome	Description				T Levels	K Levels					
C01	Explain the defining the gol	nition, evolution, rol d standard, paper cu	e, and functi rrency, and c	ons of money ligital money	7, T1	K2					
CO2	Analyze differen liquidity prefere quantity theory o	nalyze different theories of money demand, including Keynes' T2 K4 quidity preference theory and Friedman's restatement of the uantity theory of money.									
CO3	Understand the money supply, a banks in the mor	Inderstand the components, measures, and determinants of T3 K3 noney supply, along with the role of commercial and central panks in the money creation process.									
CO4	Examine the type Keynesian, Mon focus on inflation	Examine the types, causes, and approaches to inflation, including T3 K4 Keynesian, Monetarist, and Structuralist perspectives, with a focus on inflation in less developed countries (LDCs).									
C05	Evaluate mone limitations, inc requirements, ar	tary policy's obje cluding open mar nd interest rate polic	ctives, instr ·ket operati ies.	ruments, an ons, reserv	d T4 re	K4					
C06	Describe the Inc Bank of India in monetary policy	lian monetary syste money supply regul framework with oth	m, the role o ation, and co er countries.	of the Reserv ompare India	e T2 s	К3					
Module 1	Introduction to	Money and Moneta	ary Economi	cs		10 Hours					
Definition of me of Money- gol Money(concept	oney- conventiona d standard-Paper ts)	l approach- modern · currency – conve	approach-Ro rtible and ir	le and Functi nconvertible	ons of Money. paper currer	Evolution ncy-Digital					
Module 2	Theory of Dema	and for Money				8 Hours					
Nominal and R Demand for Mo Theory of Mone	leal Cash Balance: ney- demand for li ey	s- Cash transaction quidity. Friedman's	and Cash Ba restatement c	lances Appro of quantity the	ach. Keynes' eory of money	Theory of - Quantity					
Module 3	Theory of Supp	ly of Money				12 Hours					
Money supply- money supply- ratio and credit	cash, coins and ba Money multiplier c creation.	lances in bank. Meas Process Commerci	sure of mone al bank and o	y – M1, M2, M central bank-	13, M4. Detern functions- cas	ninants of sh reserve					
Module 4	Inflation					10 Hours					
Inflation – defin Analysis- Mone in inflation ( sp	nition, Types, app tarist view versus ecial reference to	roaches- demand pu Structuralist View, develop countries)	ll, cost-push i Structural Ini	inflation- Key flation in LDC	nesian Inflati S, contempor	onary Gap ary issues					
Module 5	<b>Monetary Polic</b>	y			Т	8 Hours					

Moneta	Monetary Policy – Definitions and goals of monetary policy. Instruments of monetary control -Open													
Market Operations, Variations in Reserve Requirements, Bank Rate Policy - Repo rates, Reverse repo														
rate - L	limi	tation	is of m	ioneta	ry pol	ICY.								40 11
Mod	ule	In the second se												
System of note issue in India- RBI role and functions and notes issue-Composition of money supply-														
Moneta	ary		in Inc	lia (Co	ompar	ison b	etwee	en cou	ntries	).				
Skill D	eve	lopm	ent:				_ ,				,			
(These	acti	vities	are or	ily ind	icative	e, the I	acult	y mem	bers c	an inn	ovate)			
		Applying Monetary Concepts: Develop the ability to analyze and apply key monetary												
1		con	cepts s	such a	s mon	ey sup	oply, ii	nflatio	n, and	inter	est rate	es in rea	al-worl	d economic
		scer	narios.											
2		Asse	essing	Inflat	ionary	/ Impa	cts: B	uild sl	tills in	inter	oreting	inflatio	on indic	ces (CPI, WPI),
_		mea	suring	g infla	tion tr	ends,	and e	valuat	ing th	eir eff	ects on	variou	s sector	rs of the economy.
		Und	lerstar	nding l	Money	7 Dem	and ar	nd Sup	ply: E	nhanc	e analy	rtical sl	cills by	studying the
3		dete	ermina	ants of	mone	ey den	nand a	nd su	pply, i	ncludi	ng the	role of	comme	ercial and central
		ban	ks in r	noneta	ary ex	pansio	on.							
		Eva	luating	g Mon	etary	Policy	Decis	ions: I	Develo	p crit	ical thi	nking b	y revie	wing RBI's
4		mor	netary	policy	v repo	rts, an	alyzin	ıg key	policy	tools	and as	sessing	g their i	mplications for
		ecor	nomic	stabil	ity.									
		Con	iparat	ive An	alysis	of Mo	netar	y Syst	ems: S	treng	then re	search	abilitie	s by comparing
5		Indi	a's mo	onetar	y syst	em an	d poli	cy frai	newo	rk wit	h those	ofothe	er coun	tries to
		und	erstar	ıd gloł	oal fina	ancial	stabil	ity and	d econ	omic	strateg	ies.		
Books	for	Refe	rence											
1.	Ah	uja H	L Mac	croeco	nomio	cs: The	eory a	nd Pol	icy, S	Chand	& Con	ipanyP	vt Ltd.N	lew Delhi
2.	Ma	ankiw	N. Gr	egory,	Macro	oecon	omics,	Wort	h Pub	lishers	s, New `	York		
3.	Sh	apiro	Edwa	rd, Ma	croec	onom	ic Ana	lysis, (	Galgot	ia Pub	licatio	ns Pvt.I	Ltd,New	v Delhi
4.	Ac	kley (	Gardne	er, Ma	croeco	onomi	cs: Th	eory a	nd Po	licy, M	acmilla	an, New	vYork	
5.	Do	ornbus	$\frac{sch, R}{R}$	, Fisch	er, S.	and St	artz, F	<u>к., "Ма</u>	croec	onomi	cs", Mc	Graw-l	Hill,11t	h Ed
6.		souza	E., "M	acroe	conon	11CS", I	Pearso	n Edu	catior		M		Dul Ca	NX
/.	Fr	bhar	RICHAR	a I.M	acroe	-bonu	nics-i Dotrio	heorie	es and	POLICI	es, Mac	ice Doc	PUD., CO	ompany, NY
8.	пи Іот	IDDal (	ι κ. υι Ιςδ	enn ai	iu Aii	linony	Fatric	K U DI	ien, M	lacioe	COHOIN	ics, rea		l'entice, new
Mappi	ng	of CO	and P	0										
CO/P	0	PO	PO	PO	PO	PO	PO	PO	PO	PO	P01	P01	P01	
/		1	2	3	4	5	6	7	8	9	0	1	2	
<b>CO1</b>		Н	М	L	L							М		
<b>CO2</b>		Н	М	L	L		М						L	
<b>CO3</b>		М	Н	М		L	М						L	
<b>CO4</b>		L	М			L						М	Н	
CO5		Н	Μ	L	L		М						L	
<b>CO6</b>		L	H		М		М						L	

Pr	ogramm	Departmer e: B.Sc. (Economic	nt of Mathem cs. Mathemat	atics ics and Dat	a Analyti	cs)	
Semester	Course Code	Course Title	Course Duration	Cours e Type	Teachi g Hour Per Week	Teachin g Hours Per Week	
III	S1 24 MC 302	Advanced Calculus and Differential Equations	75 Hours	МС	5		5
Course Objectiv es	This cour calculus, introduce differenti and prob	'se aims to develo emphasizing thein es concepts such al equations, and lem-solving skills.	p a strong fou r applications as partial d Laplace trans	undation in in solving lifferentiatio forms. Stud	differenti real-worl on, integr lents will	al and d prol al tec gain a	integral blems. It hniques, nalytical
Course Outcomes	Descript	tion				T Leve s	K I Levels
C01	Apply cor involving	ncepts of partial di multivariable fund	fferentiation t ctions.	o solve prol	blems	T2	К3
CO2	Solve firs apply the	t order and highe m to real-world sc	er-order differ	rential equa	ations and	Т3	К3
CO3	Analyse a various te	nd solve second-o echniques.	rder different	ial equation	s using	Т3	K4
CO4	Utilize La equations	place transforms t s efficiently	o solve ordina	ary different	tial	Т3	К3
CO5	Compute functions solutions	Fourier Transfor , derivatives, int	rms, inverse egrals, and	transforms differential	, periodic equation	Т3	К3
Module 1	Differer	itial Calculus II			15 Hou	irs	
Functions of tv or more varia Euler's theore Jacobians, thei functions of tw	vo and mo bles, inclu em. Total ir propert <u>vo variable</u>	re variables and e iding explicit and derivatives, diffe ties, and illustratives. Maxima and mi	xamples, Parti implicit func rentiation of ve examples. nima of functi	ial different tions. Hom implicit ar Taylor's an ons of two y	iation of fu ogeneous nd compo d Maclaun variables.	inction functi site fu rin's se	ns of two ions and unctions. eries for
Module 2	Differer	itial Equations II:			15 Hou	ırs	
Bernoulli's equ first-order diff higher-order Complementar differential eq equations.	iation, and ferential o ordinary ry functio uations (t	l exact equations. equations. Orthog linear differen n and particular wo variables) wit	Equations red onal trajector ntial equatio integrals (sta ch constant co	lucible to ex ies in Cart ons with andard type officients. (	cact form. esian forr constant es). Simul Cauchy-Eu	Applic n. Sec : coe taneou ler dif	ations of ond and fficients. 1s linear fferential
Module 3	Differen	tial Equations III			15 Hou	rs	<i>cc</i> .
Solutions of se using: (i) Given (iii) Changing exactness and	econd-ord n part of t the deper solutions	er ordinary linear he complementary ident variable, (iv when the equation	differential 6 / function, (ii) ) Variation of 1 is exact.	equations w Changing t parameters	vith variat he indepens, and (v)	ole coe ndent Condi	efficients variable, tions for
Module 4	Laplace '	I ransforms			15 Hou	rs	

Definition and basic properties. Laplace transforms of some common functions. Basic properties of Laplace transform. Standard results. Laplace transforms of periodic functions. Laplace transforms of derivatives and the integral of function. Inverse Laplace Transform: Solving Ordinary Differential Equations using Laplace Transform.

0												
Module !	5	Fouri	ier Tra	nsfor	ms					15 Ho	ours	
Definitio	finition and basic properties. Fourier Transform of some common functions. Standard											
results. F	ts. Fourier Sine and Cosine Transforms. Inverse Fourier Transform. Fourier Transform											
of period	f periodic functions. Fourier Transform of derivatives and integrals. Solving differential											
equation	s usir	ng Four	rier Tra	ansforr	n.							
Skill De	eveloj	pment	:									
(These ac	ctiviti	es are o	only ind	dicative	e, the F	aculty	membe	ers can	innova	te)		
1.	Visua	alisatio	on of fu	nction	s of tw	o inde	pendei	nt varia	ables a	nd its Ma	axima-M	linima o
	Geo	Gebra a	nd Wo	lfram	Alpha		-					
2.	Eval	uate de	erivativ	ves and	l integr	als on	Wolfra	am Alp	ha			
3.	Solut	tion to	Differe	ential E	Equatio	n and	visuali	sation	on Wol	lfram Alp	oha	
Books f	for Re	eferen	ce:									
Textboo	ks:											
1.	Gho	sh, R. I	K., & M	aity, K.	. C. (20	22). Ar	n Introd	duction	to And	lysis: Dif	ferentia	ıl
	Calo	culus P	art - I.	New Co	entral l	Book A	gency	Pvt. Lto	d.		-	
2.	Sun	darapa	andian	V. (20	22). <i>O</i> i	rdinary	r and P	artial L	Differen	ntial Equ	ations w	vith
	Lap	lace Tr	ransfor	ms, Fou	urier Se	eries, a	nd App	lication	<i>is</i> . Tata	a McGrav	v-Hill E	ducation
	Pvt.	Ltd.										
3.	Rais	singha	nia, M.	D. (20	18). <i>La</i>	place a	ind Foi	ırier Tr	ansfor	<i>ms</i> . S. Ch	and and	l Co. Ltd
Addi	tiona	l Refe	rences	:								
1	Nar	ayan, S	6. (202	0). <i>Diff</i>	erentia	ıl Calcu	lus. S.	Chand	& Com	pany.		
2	Nar	ayan, S	5., & Mi	ttal, P.	K. (202	20). Int	tegral (	Calculu	<i>s</i> . S. Ch	and and	Co. Pvt.	Ltd.
3	Rais	singha	nia, M.	D. (202	18). <i>Or</i>	dinary	and Pa	rtial D	ifferen	tial Equa	tions. S	. Chand
	and	Co. Pv	rt. Ltd.									
4	Sim	mons,	G. F. (2	2017). /	Differei	ntial E	quatior	ıs with	Applic	ations an	d Histo	rical
	Not	es (2no	d ed.). I	McGrav	<i>w</i> -Hill I	Publish	ing Co	mpany				
Mappin	ng of (	CO and	l PO									
<b>CO</b> /	P01	P02	PO3	P04	<b>PO5</b>	P06	P07	<b>P08</b>	P09	P010	P01	P01
PO											1	2
CO1		Н	L	Н		L	Μ				М	L
CO2		Н	L	Н		L	М				М	L
CO3		Н	L	Н		L	М				М	L
CO4		Н	L	Н		L	М				М	L
CO5		Н	L	Н		L	М				М	L
C06		Н	L	Н		L	М				М	L

	Program	Departmer ne: B.Sc. (Economic	nt of Data Anal cs, Mathemati	ytics cs and Data	Analytic	5)			
Semester	Course Code	Course Title	Course Duration	Course Type	Teachi Hours F Weel	ng Per	ng er Cre		
III	S3 24 MCT 303	Fundamentals of Data Analytics	45 Hours	МСТ	3			3	
Course Objectives	This cours data pre- intelligence engineerin end of th analyze ar	se introduces stude processing, explor ce tools. It covers e ng, statistical analys e course, students nd interpret data eff	nts to the fund atory data an essential techni sis, and dashbo will develop a ectively.	amentals of alysis, visu iques such a ard creatior practical u	data anal alization, as data cl using Po nderstan	ytics, and eanin ower ding o	inc bu g, f BI. 1 of h	luding siness eature By the low to	
Course	Descript	ion				T	de	K	
CO1	Explain t limitation from dat	LevelsLevelsExplain the significance of data analytics, its applications, limitations, and ethical considerations while differentiating itT2K2							
C02	Demonst values ar techniqu	Demonstrate proficiency in data cleansing, handling missing values and outliers, and applying data transformation techniques for effective analysis							
CO3	Perform appropri identify	univariate and r ate visualization te patterns.	nultivariate d echniques to e	ata analysis xtract insig	s using hts and	Т3		К3	
CO4	Utilize Po	ower BI for data tran encies, and establis	nsformation, ha hing relationsh	ndling ips between	datasets.	T4		К3	
CO5	Apply DA design in decision-	X functions and visiteractive dashboarconation making.	ualization tech ls and enhance	niques in Po data-driven	wer BI to	Т5		К3	
Module 1	Introdu	ction to Data Analy	tics				<b>5</b> H	lours	
Meaning of Da difference betv Analytics- Prob	ta Analytic veen data llem Defini	s, its importance in analytics and data tion, data collection	various fields science, Types methods	, limitations s of Data- t	, Ethics i idy, untic	n Dat ly, Ste	a Ai eps	nalytics, in Data	
Module 2	Data Pre	eparation-Cleansin	g, Combining	and transfo	rming		10	Hours	
Cleansing- Har identifying out duplications, D engineering, sta	ndling miss liers- Boxp ata Combin andardisat	sing values- Omitti lot, removing outlic ning-merging and st ion and minimisatio	ng, Replaceme ers -IQR metho tacking of data n, Dummy enco	nt with cer od & Winsor frames, Dat oding, One-h	itral tend ization m a transfo ot, Label	lency lethoo rmati encod	and d, re on- ling	d K-NN, emoving Feature	
Module 3	EDA- Expl	oratory Data Analy	/sis (EDA) and	Visualizati	on	-	10 H	lours	
Univariate and box plots, strip	multivaria	te analysis, visualiz	ation techniqu	es including	scatter p trends in	olots, data.	hist cor	ograms, relation	

box plots, strip plots, count plots, and heatmaps, identifying patterns and trends in data, correlation analysis, insights extraction using Matplotlib and Seaborn- joint plot, pair plot, swarm plots, density plot, bar plot, categorical vs numerical data comparison, time series visualization, anomaly detection using visualization techniques.

Module 4	Introduction to Power BI – Data Transformation	8 Hours
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Introduction to Power BI, Power BI interface and components, connecting to data sources, importing data from Excel, SQL and CSV, data transformation using Power Query, removing null values, handling duplicates, merging tables, splitting tables, splitting columns, filtering rows, replacing values, grouping data, appending queries, combining queries, creating calculated columns, defining data types, creating conditional columns, applying transformations using Power Query formulas, Model View-establishing relationships between tables..

	- $        -$	
Module 5	Power BI – DAX and Dashboard Creation	12 Hours
DAX functions	(SUM, SUMX, CALCULATE, CROSSFILTER, EOMONTH), ADDCOLUMNS,	, RELATED,
RANKX, DIVID	E, IF, visualizations including cards, tree maps, line charts, pie charts, do	onut charts,
a		<i>a</i> 11 1

RANKX, DIVIDE, IF, visualizations including cards, tree maps, line charts, pie charts, donut charts, filled maps, shape maps, bar charts, clustered bar charts, stacked column charts, waterfall charts, gauge charts, KPI indicators, Q&A visualizations, decomposition trees, narratives, error bars, dashboard creation, interactive slicers, tooltips and page navigation.

#### **Books for Reference:**

C05

C06

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1	Prove	ost, F., <b>8</b>	& Fawc	ett, T. (	2013).	Data Sc	tience fo	or Busin	ess: Wh	at You N	leed to l	Know		
1	about	Data M	lining a	nd Data	-Analyt	ic Think	<i>king.</i> 0'I	Reilly M	edia.					
2	Hasti	e, T., Ti	bshira	ni, R., <mark>&amp;</mark>	ried، Fried،	man, J.	(2009)	. The El	ements	of Statis	tical Le	arning:		
2	Data I	Mining,	Inferen	ce, and l	Predicti	ion (2nd	<i>l ed.).</i> Sp	oringer.						
2	McKi	nney, V	V. (202)	<b>2).</b> Pyth	on for l	Data An	alysis: L	Data Wr	angling	y with Pa	indas, N	umPy,		
3	and Jı	ıpyter (.	3rd ed.).	O'Reill	y Media	a.								
1.	4 <b>Zheng, A., &amp; Casari, A. (2018).</b> <i>Feature Engineering for Machine Learning: Principles and Techniques for Data Scientists.</i> O'Reilly Media.													
4														
5	Bruce, P., & Bruce, A. (2017). Practical Statistics for Data Scientists: 50+ Essential													
5	Conce	pts Usir	ng R and	l Pythor	ı. O'Reil	lly Medi	a.							
6	Knafl	ic, C. N.	(2015)	<b>).</b> Storyt	telling v	vith Dat	a: A Da	ta Visua	lizatio	n Guide f	for Busir	ness		
0	Profes	ssionals.	Wiley.											
7	Powe	<b>Powell, B. (2018).</b> Mastering Microsoft Power BI: Expert Techniques for Effective Data												
/	Analy	Analytics and Business Intelligence. Packt Publishing.												
Mappin	ng of CO	) and P	0											
CO/PO	P01	P02	P03	P04	P05	P06	P07	P08	P09	P010	P01	P01		
-											1	2		
C01		Н	L	М	М	Н					L	М		
CO2		Н	L	М	М	Н					L	М		
CO3		Н	L	М	М	Н					L	М		
CO4		Н	L	М	М	Η					L	М		

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P	rogramm	Departme e: B.Sc. (Econom	nt of Data An ics, Mathema	alytics atics and D	oata Anal	lvtics)						
Semester	Course Code	Course Title	Course Duration	Cours e Type	Teachi Hours F Week	ng Per K	Credits					
III	S1 24 MCP 303	Data Analytics using Python Programming	30 Hours	МСР	2		2					
Course Objectives	This cour manipula transforn in handlin Matplotli	se equips learners tion and analysis. nation, and visuali ng and analysing o b, and Seaborn.	s with Python It covers Pyth zation. By the lata using Pyt	programn non basics, e end, parti hon librari	ning skill data clea cipants v es like N	s for da ansing, vill be p umPy, I	ta proficient Pandas,					
Course Outcomes	Descrip	tion				T Levels	K Levels					
CO1	Underst control	Inderstand Python basics, data structures, functions, and T2       K2         ontrol statements.       T2         upply data classing transformation and feature       T2										
CO2	Apply da enginee	pply data cleansing, transformation, and feature T3 K3 ngineering techniques using Python.										
CO3	Perform extract i	exploratory data nsights from data	tion to	T4	К3							
Module 1	Introdu	ction to Python				1	0 Hours					
Float, string, D operators and argument. Co problems. Loo coding.	ata Struct relations, nditions oping Sta	unda prompt, mst tures: list, tuple, se defining a functio statements: If, If tements: For and	et, array, Data on- Lambda fu clse, Elseif, l while and s	frame, arith nction, required if simple iter	hmetic op uired arg and sin rative pr	perator perator ument, ple co oblems	s, bitwise keyword nditional through					
Module 2	Data Clo Python	eansing, Combini	ing, and Tran	isformatio	on using	1	0 Hours					
Installation of statsmodels. I tendency and Winsorization data frames, D Dummy encod	of packag Data Clear K-NN, io method, Data trans ling, One-	ges: numpy, pa nsing: Handling mi dentifying outlier removing duplica formation: Featur hot, Label encodir	ndas, scipy, ssing values-> s-> Boxplot, ations, Data ( e engineering ng.	scikit-lear > Omitting, removing Combining: g, standard	rn, mat Replacer outliers merging lisation a	plotlib, ment w -IQR 1 g and s nd min	seaborn, ith central method & tacking of imisation,					
Module 3	Explorato Python	ory Data Analys	is (EDA) an	d Visualiz	ation u	sing10	Hours					
Univariate an histograms, bo in data, correla plot, swarm p series visualiz	d multiv ox plots, st ation anal olots, dens ation, and	ariate analysis, w trip plots, count pl ysis, insights extra sity plot, bar plot omaly detection us	visualization ots, and heatr action using M , categorical v sing visualizat	techniques naps, ident atplotlib a vs numeric ion technic	includi ifying pa nd Seabo cal data o ques.	ng scat tterns a rn, join compar	tter plots, and trends t plot, pair ison, time					
Books for Re	eference:											
1 Joshi	, P. (202 <mark>0</mark>	). Data Science and	d Machine Lea	rning with	Python.	Wiley In	ndia.					
2 Gupt <i>Fund</i>	a, S. (2021 amentals	L). Python Data Sc with Python. BPB	<i>ience: A Hand</i> s Publications.	s-on Guide	to Data S	cience						

3 McKinney, W. (2017). Python for Data Analysis: Data Wrangling with Pandas,

	NumPy, and IPython (2nd ed.). O'Reilly Media.												
Mapping of CO and PO													
CO/P PO PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO PO1 PO1 PO1 PO1													
0	1								9	0	1	2	
C01	Н	L	М	М	Н					L	М		
CO2	Н	L	М	М	Н					L	М		
CO3	Н	L	М	М	Н					L	М		

Semester	Course Code	<b>Course Title</b>	Course	Course	Teaching	Credit							
			Duration	Туре	Hours Per	S							
					Week								
III	S1 24 SE 301	Stock Trading	50	SEC – SB	2	2							
Course	This course enal	oles students with th	ne basic unde	erstanding of	the stock ma	rkets and							
Objectives	its functioning a	long with equipping	them with th	ie knowledge	e of trading a	nd also to							
	choose stocks us	sing fundamental and	d technical an	alyses									
Course	Description				T Levels	K							
Outcome	•					Levels							
C01	Understand capi	tal markets, IPO pro	cedures, stoc	k	T2	K2							
602	exchanges, and f	Exchanges, and financial instruments comprehensively.											
C02	10 Illustrate reg	depositories, brokers, and investor types.											
<u> </u>	Develop proficie	Develop proficiency in trading procedures, order types.											
605	and clearing and	and clearing and settlement processes. T5											
C04	Identify the fund	lamental analysis usi	ing Screener	or any	T4	K3							
	other platform												
CO5	Evaluate technic	al analysis basics, in	cluding Dow	Theory,	T5	K3							
	chart patterns, c	andlesticks, and key	technical ind	icators'									
	application												
C06	Analyse derivati	ve trading and vario	us strategies		T4	K2							
Module 1	Introduction to	Financial System				4 Hours							
Overview of F	inancial System:	Institutions, Markets	s, Instrumen	ts & Services	S - SEBI & RI	31 -							
Capital Market	s – Primary Mark	et: IPO: Types, Proc	edure & Part	ticipants – Ty	pes of Finan	cial							
Instruments – (	Credit Rating					<u>( 11</u>							
Module 2	Stock Market Pa	articipants				6 Hours							
Regulatory Bo	dies: SEBI & RBI	– Depositories – I	Depository P	articipants –	Brokers – I	nvestors:							
Institutional &	Retail Investors S	tock Exchanges – Sto	ock Market In	alces	1	<b>F</b> 11							
Module 3	Stock Irading					5 Hours							
Demat Account	t – Trading Acco	unt - Procedure for	Trading – T	ypes of Orde	ers – Clearin	z &							
Settlement – Fa	actors considered	for choosing a Broke	er										
Module 4	Fundamental A	nalysis				8 Hours							
Introduction –	Factors considere	ed for Fundamental	Analysis: Eco	nomy, Indust	try & Compar	ıy –							
Case-study Ana	alysis using Screen	ier (or any other plat	tform)		1								
Module 5	Technical Analy	ysis			-	12 Hours							
Introduction –	Dow Theory – C	hart Types – Candle	e Stick Patter	ns – Suppor	t & Resistand	:e –							
Technical Indie	cators: MACD, EM	IA, ROC, RSI & Stoc	hastic Oscilla	ators –Choos	ing Stocks us	ing							
Technical Tools	S				1								
Module 6	Derivative Trac	ling			-	10 Hours							
Introduction –	Features of a Fi	nancial Derivative -	- Types of Fi	inancial Deri	vatives –Uses	s of							
Derivatives – C	Critiques of Deriva	tives - Forward Con	tract: Featur	es, and Tradi	ing Mechanis	m –							
Futures Contra	cts: Features - Cla	ssification of Future	s Contracts &	Forward Tra	iding Mechan	ism							
– Forward Pric	es vs Future Pric	es - Options – Mone	yness of the	Options – Int	rinsic Value	and							
Time Value -	Pay-off for Option	ons - Option Tradi	ng Strategie	s: Bullish st	rategies/Bear	rish							
strategies/Neu	tral strategy-any t	wo strategies from e	each category	r									

Skill Development:													
(These	activit	ies are	only in	dicativ	e, the F	<i>aculty</i>	memb	ers can	innova	ite)			
1	I	nvestig	ate and	l prese	nt vari	ous asj	pects o	f capita	al marŀ	xets, pr	imary	market	ts, IPO types,
	p	rocedu	res, an	d parti	cipants	S							
2	E	ngage i	in a vir	tual sto	ock tra	ding si	mulati	on, app	olying k	nowle	dge ab	out sto	ck exchanges,
2	s	tock ma	arket ir	ndices,	and ty	pes of t	financi	al instr	rument	S.			
2	S	tudy SI	EBI, RB	I, and t	heir ro	oles; an	alyze t	he fun	ctions	of stoc	k excha	anges, o	lepositories,
3	· a	and depository participants.											
1	P	Participate in mock trading sessions to simulate real-life trading experiences, practicing											
4	. d	ifferen	t types	oford	ers and	l their	execut	ion.					
Ę	E	ngage i	in hanc	ls-on e	xercise	es relat	ed to c	learing	g and se	ettleme	ent pro	cesses,	ensuring
understanding of trade finalization.													
-	A	Analyze real-world charts applying Dow Theory, understanding various chart types and											
0	· io	identifying patterns.											
7	P	Practice identifying candlestick patterns like doji, hammer, etc., and learn their											
/	·   iı	implications.											
0	V	Vork w	ith tecł	nnical i	ndicate	ors like	e MACE	), EMA,	, ROC, I	RSI, and	d Stoch	astic O	scillators,
8	· a	pplying	g them	to hist	orical d	lata foi	r trend	analys	sis.				
Books	for Re	eferenc	ce:										
1	Avad	hani, Se	curity.	Analys	is & Poi	rtfolio	Manag	ement,	12th R	levised	Editior	n, Hima	laya
1.	Publi	shing H	ouse, 2	020		1							<b>D</b> 11
2.	Bhall	a, Secui	rity And	alysis &	e Portfo	olio Ma	nagem	ent, 11	th Revi	sed Ed	ition, S	Chand	Publication,
	Murn	, 2020 hv 1 1	(2023)	Techn	ical An	alveie	nf the A	linanci	al Marl	zots· 1	Compr	ohonciu	e Guide to
3.	Tradi	na Met	hods a	nd Ann	licatior	is. New	y York I	Institut	e of Fin	ance.	compre	UNCIISIV	
4.	Prasc	inna Ch	andra,	Manaç	jing Inv	vestme	nts, 6th	h Editio	n, McG	raw Hi	ill Educ	ation, 2	2021
Ц	Punit	havath	y Pand	ian, Sed	curity A	Analysi	s & Por	tfolio I	Manage	ement,	5th Edi	ition, V	ikas Publishing
Э.	Hous	e, 2013											
Маррі	ng of (	CO and	PO				1	T	1			1	
COs	P01	P02	P03	P04	P05	P06	P07	P08	P09	P01	P01	P01	
<u> </u>	ц	u		м	м		ц	м		U	1 1	2	
<u> </u>	II I.	M	н	141	M		H	M			L		
CO2	M	H	H	L	M	н	11	1*1			L		
CO4	M	H	L	M	H		Μ				L		
CO5	L	Μ	Н	<u> </u>	Μ		Н	Μ		<u> </u>	L		
<b>CO6</b>	Μ	Н	L	Μ	Н		Μ				L		

Semester	Cours	<b>Course Title</b>	Course	Course Type	Teaching	Cre	dits
	e		Duration		Hours Per	•	
TT		Eurinenneentel	45 11	Commulation	week	· .	<b>.</b>
111	CC 301	Studies	45 Hours	Compulsory	3		2
Course Obi	ectives:	500000					
The course	is structur	ed to create aware	ness, enhan	ce knowledge, a	nd develop	skills rel	ated to
environmer	ital conser	vation and sustain	ability.	0 /	1		
Course Out	comes					Τ	K
After compl	etion of th	ne course, the stud	ents will be	able to:		levels	level
CO1 Id	entify the	environmental fac	tors that de	termine sustair	nable	T3	K3
de	evelopmen	nt and describe a	n ecosyster	n along with i	ts many		
со	mponents	5.	-	-	-		
CO2 Id	entify the	various natural r	esources an	d analyse the	impact of	T3	K3
th	eir			5	L		
de	gradation	l.					
<b>CO3</b> Do	escribe th	e different types	of environ	mental polluti	ons,	T3	K3
са	uses of	51		I	,		
cli	mate char	nge and the variou	s environm	ent protections	laws.		
<b>CO4</b> A1	nalvze the	impact of popula	tion growtl	n on the enviro	nment and	<b>T3</b>	K3
th	e		0				
va	rious reha	abilitation measure	es using cas	e studies			
Module 1	Introduct	ion to Environme					
			ntal Studies	5		09 Hours	5
Introducti	on to Fr	wironmontal St	ntal Studies	tidisciplipary	naturo of	09 Hours	5 montal
Introducti	on to Er	vironmental St	udies: Mul	s tidisciplinary	nature of	09 Hours	s mental
Introducti studies, Sco SDC Coals	on to Er	nvironmental St nportance; Conce	<b>udies</b> : Mul pt of sustai	s tidisciplinary nability and su	nature of Istainabilit	09 Hours environ y develo	s mental pment,
<b>Introducti</b> studies, Sco SDG Goals	on to Er	<b>ivironmental St</b> nportance; Conce	<b>udies</b> : Mul pt of sustai	s tidisciplinary nability and su	nature of Istainabilit	<b>09 Hours</b> environ y develo	s mental pment,
Introducti studies, Sco SDG Goals Ecosystem	on to Er ope and ir : Structur	<b>nvironmental St</b> nportance; Conce	<b>udies</b> : Mul pt of sustai	s tidisciplinary nability and su n; Energy flow	nature of Istainabilit	<b>09 Hours</b> environ y develo osystem:	s mental pment, food
Introducti studies, Sco SDG Goals Ecosystem chains, food	on to Er ope and ir : Structur d webs an	re and function o d ecological succe	<b>udies</b> : Mul pt of sustai f ecosysten ssion.	s tidisciplinary nability and su n; Energy flow	nature of istainabilit in and eco	<b>09 Hours</b> environ y develo osystem:	s mental pment, food
Introducti studies, Sco SDG Goals Ecosystem chains, food Terrestrial	on to Er ope and ir : Structur d webs an Ecosyste	vironmental St nportance; Conce re and function o d ecological succe <b>ms</b> : Forest ecosyst	<b>udies</b> : Mul pt of sustai f ecosystem ssion. eem, Grasslan	s tidisciplinary nability and su n; Energy flow nd ecosystem, E	nature of istainabilit in and eco	<b>09 Hours</b> environ y develo osystem: ostem,	s mental pment, food
Introducti studies, Sco SDG Goals Ecosystem chains, food Terrestrial Aquatic eco	on to Er ope and ir : Structur d webs an Ecosyste osystems;	vironmental St nportance; Conce e and function o d ecological succe ms: Forest ecosyst ponds, streams, la	ntal Studies udies: Mul pt of sustai f ecosysten ssion. em, Grasslau ikes, rivers,	s tidisciplinary nability and su n; Energy flow nd ecosystem, E oceans	nature of istainabilit in and eco Desert ecosy	09 Hours environ y develo osystem: rstem,	s mental pment, food
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Environmental Pollution – Types, causes, effects and controls, Air, Water, soil and noise pollution, nuclear hazards and human health risks

Solid waste	e: management and control measures urban and industrial wa	aste with case
studies		
Environme	ntal Policies and Practices: Climate change, global warning	, ozone layer
depletion, a	cid rain and impacts on human communities and agriculture	
Environme	ntal Laws: Environment Protection Act, Air (Prevention an	nd Control of
Pollution)	Act, Forest Conservation Act, International agreements, Montr	eal and Kvoto
protocols a	nd Convention on Biological Diversity (CBD)	5
Nature res	erves tribal population and rights and human wildlife confli	rts in Indian
context	erves, eribar population and rights and numan whatte comm	co in malan
Module	Human Communities and Environment	10 Hours
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Human	population growth, Impacts on environment, human	health and
welfare ,Res	settlements and rehabilitation of project affected persons, case studi	es
Disaster m	anagement: Floods, earthquake, cyclones and landslides with case :	studies
Environme	nt movements: Chinko, Silent Valley, Bishnois of Rajasthan	
Environme	ental Fthics: Ecological economic social ethical aesthetic and i	nformational
value Role	of Indian and other religions and cultures in environmental cons	ervation
Furironmo	ntal communication and public awareness, case studios. CNC year	viclos in Dolhi
Ellvii Ollille	Field you out to be submitted	licies in Denn
Fleid Work	- Field report to be submitted.	
SKIII Develo	<b>opment:</b> ( <i>These activities are only indicative, the Faculty members can</i> )	innovatej
	Visit to an area to document environmental assets: river/forest/fi	ora/fauna, etc
2	Visit to a local polluted site- urban/Rural/Industrial/ Agricultura	ll
3	Study of common plants, insects, birds, and basic principles of ide	ntification
4	Study of simple ecosystems – pond, river,lake etc.	
Book for Re	eterence:	
1	Bharucha, E. (2015). Textbook of Environmental Studies.	
2	Sengupta, R. (2003). Ecology and economics: An approach to susta	inable
	development.	
3	Singh, J.S., Singh, S.P. and Gupta, S.R. (2014). Ecology, Environmer	ital Science and
	Conservation. S. Chand Publishing, New Delhi.	
4	Sodhi, N.S., Gibson, L. & Raven, P.H. (Eds). (2013). Conservation F	Biology: Voices
	from	
	the Tropics. John Wiley & Sons.	
5	Wilson, E. O. (2006). The Creation: An appeal to save life on Earth Norton.	i. New York:
6	World Commission on Environment and Development. (1987). O	ur Common
	Future.	
	Oxford University Press.	
7	Gadgil, M., & Guha, R. (1993). This Fissured Land: An Ecological	History of India.
	Univ. of California Press.	5
8	Gleeson B and Low N (eds.) (1999) Global Ethics and Environm	ent London
Ŭ	Routledge	
0	Croom Martha L Cary K Moffe and Carl Ponald Carroll (2006)	Principles of
9	Groom, Martia J., Gary K. Mene, and Carr Konau Carron. (2000).	r incipies of
10	Conservation Biology. Sunderland: Sinauer Associates.	
10	MICLUILY, P. (1996). RIVERS NO MORE: The environmental effects of da	ims (pp. 29-64).
	Zea	
	Books.	
11	McNeill, John R. (2000). Something New Under the Sun: An Envir	onmental
	History of	

	the Twentieth Century.													
	12 Nandini, N., Sunitha N., & Sucharita Tandon. (2019). A text book on Environmental Studies (AECC). Sapna Book House. Bengaluru.													
M	Mapping of CO and PO													
C	0/P0	P01	P02	PO3	P04	P05	P06	P07	P08	P09	P010	P011	l PO12	$\top$
	CO1	1	T	T	T	1			TT	М		1	I	
	COT		L	L	L			M	Н	M	H			
	CO2		L	L	L			Μ	H	М	H			
	CO3		L	L	L			М	Н	М	Н			
	CO4		L	L	L			М	Н	М	Н			