B.Com.(BusinessAnalytics)

Syllabus

AFFILIATEDCOLLEGES

ProgramCode:2AQ

2025–2026 onwards

BHARATHIARUNIVERSITY

(AStateUniversity,Accreditedwith"A++"GradebyNAAC, Ranked 21st among Indian Universities by MHRD-NIRF)

Coimbatore-641046,TamilNadu,India

Program Educational Objective (PEOs)	
The**B.Com(BusinessAnalytics)** program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PEO1	To develop the strong foundation of business analytical techniques and methods blended with commerce and computer related courses
PEO2	By applying business analytical techniques which helps in problem solving and decision making for business concern
PEO3	This program helps to explore wide knowledge in big data technologies and algorithms to give better inference for various business.
PEO4	Hands on experience in differents of two are helps to resolve complex business analytical problem.
PEO5	To identify and resolve practically relevant business analytic tools to handle data based on diversified commerce conjecture to build and sustain a competitive Advantage by expanding analytics capabilities for successful career.

Program Specific Outcomes(PSOs)	
After the successful completion of B**.Com(BusinessAnalytics)** program,the students are expected to	
PSO1	Hands-on learning of leading analytical tools.
PSO2	To acquire the ortical knowledge of data science tools, but will also gain exposure to business perspectives.
PSO3	The Career opportunities after completionofB.Com(BA)degreeare Business Analyst, Quantitative Analyst,Operations Research Analyst and Market research Analyst.
PSO4	Prospective career opportunities and growth in the field of big data analytics
PSO5	Learning trending programming language for career advancements

Program Objectives (POs)	
The **B.Com(BusinessAnalytics)** program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PO1	Comprehensive knowledge about various too lsand technique so business Analytics
PO2	Integrating research with business analytics
PO3	Enhance career opportunities globally and nationally in the emerging field of business analytics
PO4	Learn emerging programming language for professional purposes
PO5	Applying business analytical tools in decision making and practical problems.

BHARATHIAR UNIVERSITY:COIMBATORE 641046
BACHELOR OF COMMERCE WITH BUSINESS ANALYTICS (AFFILIATEDCOLLEGES)
(For the students admitted during the academic year 2023–24onwards)

Part	Course Code	Title of the Course	Credits	Hours		Maximum Marks		
				Theory	Practical	CIA	ESE	Total
	FIRST SEMESTER							
I		Language-I	4	6		25	75	100
II		English-I	4	6		25	75	100
III		Core I: Financial Accounting	4	5		25	75	100
III		Core :II–Fundamentals of Business Analytics	4	4		25	75	100
III		Allied I–Business Statistics I	2	4		25	75	100
III		Core III :Computer Applications Practical-I–Analysis with Excel	3	-	3	30	45	75
IV		Environmental Studies#	2	2		-	50	50
	Total		**23**	**27**	**3**	**155**	**470**	**625**
	SECONDSEMESTER							
I		Language-II	4	6		25	75	100
II		English-II	2	4		25	25	50*
II		Language proficiency for employability **Naan Mudhalvan Scheme** http://kb.naanmudhalvan.in/Bharathiar_University_(BU)	2	2		25	25	50**
III		Core IV–C++	4	6		25	75	100
III		CoreV Computer Application Practica lII–C++	4	-	4	25	75	100
III		Allied II– Business Statistics II	2	6		25	75	100
IV		Value Education–Human Rights#	2	2		-	50	50
	Total		**20**	**26**	**4**	**150**	**400**	**550**
	THIRD SEMESTER							
I		Language-III	4	6		25	75	100
II		English–III	4	4		25	75	100
III		Core VI–Business Data Mining	3	4		25	75	100
III		Core VII- Security Analysis and Portfolio Management+	3	3		25	75	100
III		Core VIII–Database Programming	3	3		30	45	75
III		Allied III: Operations and Strategic Management	2	2		30	45	75
III		Core-IX: Computer Applications Practical III–Database Programming	3	-	4	25	75	100
IV		**Skill based Subject -I : Naan Mudhalvan-Digital Skills for Employability(Microsoft Office Essentials)http://kb.naanmudhalvan.in/ Special: Filepath/Microsoft_ Course_ Details.xlsx**	**2**	**-**	**-**	25	75	100
IV		Skilled Based Course II–Technological Analytics–Java and Linux Fundamentals	3	2		30	45	75
IV		Tamil@/Advanced Tamil#(or)Non-major Elective I: Yoga for Human Excellence / Women's Rights # Constitution of India Health & Wellness	1 1	1 1		- 25	25	50
		Total	**29**	**26**	**4**	**240**	**635**	**875**

	FOURTH SEMESTER							
I		Language-IV	4	6		25	75	100
II		English–IV	4	4		25	75	100
III		Core X–R Programming	3	3		25	75	100
III		Core XI–Business Intelligence	3	4		30	45	75
III		Core XII–Principles of Financial Management	4	4		25	75	100
III		Allied IV: Principles of Marketing	2	3		30	45	75
III		Core XIII: Computer Application Practical IV–Analysis with SPSS&R	3	-	4	25	75	100
IV		Skill based Subject-III **Nan Mudhalvan – office Fundamentals**http://kb.naanmudhalvan.in/BharathiarUniversity_(BU)	2			25	75	100
IV		Tamil@/Advanced Tamil# (or) Non-major elective - II: General Awareness#	2	2		-	50	50
		Total	**27**	**26**	**4**	**210**	**590**	**800**
	FIFTHSEMESTER							
III		Core XIV–Python	4	6		25	75	100
III		Core XV–Cost and Management Accounting	4	6		25	75	100
III		Core XVI–Income Tax	4	6		25	75	100
III		Core XVII–Computer Applications: Python-Practical-V	4	-	4	25	75	100
III		**Elective-I** A. Business Organisation and Models B. Marketing Analytics C. Legal Aspects of Business	3	5		30	45	75
IV		Skill Based Course IV:SAS &SCILAB	3	3		30	45	75
IV		SkillBasedSubject-V: Naan Mudhalvan- Accounting and Trading Essentials for Employability(Banking, Lending and NBFC Products and Services- I) http://kb.naanmudhalvan.in/images/3/37/BFSI-2_2023 -2024.pdf	2		-	25	75	100
		Total	**24**	**26**	**4**	**185**	**465**	**650**

	SIXTH SEMESTER							
III		Core XVIII–Hadoop	3	5	-	25	75	100
III		Core XIX–Computer Applications: Hadoop - Practicals VI	2	-	5	25	75	100
III		Core XX-Practical VII–SAS & SCILAB	2	-	4	30	45	75
III		**Elective II** A. Financial Markets and Institutions B. Cyber Law C. Social Media Analytics	3	5	-	30	45	75
III		**Elective III** A. HR Analytics B. Digital Marketing C. Supply Chain and Logistics Analytics	3	5	-	30	45	75
III		Project Viva Voce	4	6	-	30	45	75
IV		Skill-based Subject-VI: **Naan Mudhalvan- Fintech Course (Capital Markets / Digital Marketing/ OperationalLogistics)** **http://kb.naanmudhalvan.in/Bharathiar_University_(BU**	2	-	-	25	75	100
V		Extension Activities@	2	-	-	50	-	50
		TOTAL	**21**	**21**	**9**	**245**	**405**	**650**
		GRAND TOTAL	**144**	**152**	**28**	**1185**	**2965**	**4150**

List of elective papers (College can choose any one of the papers as elective)		
Elective I	**A**	Business Organisation and Models
	B	Marketing Analytics
	C	Legal Aspects of Business
Elective II	**A**	Financial Markets and Institutions
	B	Cyber Law
	C	Social Media Analytics
Elective III	**A**	HR Analytics
	B	Digital Marketing
	C	Supply Chain and Logistics Analytics

No Continuous internal assessment (CIA) only University Examination. @ No University Examination. Only Continuous internal assessment (CIA)

*English II University Semester Examination will be conducted for 50 marks (as per existing pattern of examination) and it will be converted for 25 marks.

** Naan Mudhalvan - Skill courses- external 25 marks will be assessed by industry and internal will be offered by respective course teacher.


First
Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core I		FINANCIAL ACCOUNTING	5	-	-	5
Pre-requisite		HIGHER SECONDARY: Basic concepts of Accounts	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To provide a strong foundation in fundamental accounting concepts ,various elements of financial statements and relevant accounting standards.
- To be familiar with partnership, companies and inventory accounts.
- To in culcate the knowledge of international financial reporting standards.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Relate accounting concepts and conversion to prepare financial statements	K1
2	Outline the preparation of final accountsusingAS1&5	K2
3	Explain the preparation of Depreciation and Bank Reconciliation statement	K2
4	Examine the concepts of consignment and joint venture.	K4
5	Outline the preparation of partnership accounts	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	**INTRODUCTION**	**18--hours**
Accounting Concepts and Accounting Conventions –Journal–Ledger–Trial Balance.		
Unit:2	**FINAL ACCOUNTS**	**15--hours**
Final Accounts –AS1, 5.		
Unit:3	**BANK RECONCILIATION STATEMENT**	**15--hours**
Depreciation–AS6-Bank ReconciliationStatement–AS27.		
Unit:4	**CONSIGNMENTS AND JOINT VENTURES**	**15--hours**
Consignment–Joint Venture.		
Unit:5	**PARTNERSHIP ACCOUNTS**	**10--hours**
Partnership Accounts–Admission ,Retirement an death.		
Unit6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**75--hours**

Text Book(s)

1. JainSPandNarangKL-AdvancedAccountancy-KalyaniPublishers-Reprint2016&18th Edition.
2. Reddy TS &Murthy–Financial Accounting– Margam Publications– 2016, 6th Edition.

Reference Books	
1	NagarajanK.L.,Vinayagam. N&P .L.Mani – SultanChand & Sons –2010,1st Edition
2	S.K.Maheswari,T.S.Reddy-Advanced Accountancy-Vikas publishers
Related Online Contents [MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	https://www.youtube.com/watch?v=FuDFXg4Onzc
2	https://www.youtube.com/watch?v=Z71rEnjW-Z4
3	https://www.youtube.com/watch?v=91m0siLj3-o
Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	M
CO3	S	S	S	M	S
CO3	S	M	S	S	S
CO4	S	S	S	M	S
CO5	S	M	S	S	S

Course code		TITLE OF THE COURSE	L	T	P	C
Core II		FUNDAMENTALS OF BUSINESS ANALYTICS	4			4
Pre-requisite		Basic In Business Analytics	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To achieve and establish vital understanding of big data application in business intelligence.
- To institute the concept of systematic transformation of process-oriented data into information of underlying business process.
- To exhibit knowledge of data analysis techniques and to apply principles of data sciences integrating enterprise reporting.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Outline the business analytical role	K2
2	Examine the business view of information technology application	K4
3	Explain the concepts of OLTP,OLAP and BI	K3
4	Demonstrate the data integration and data modelling concepts	K4
5	List the concepts of Enterprise reporting and BI in real world	k4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TO THE BA	15--hours

Introduction to the BA Role: Business Analysis -Business Analyst - The evolving role of the Business Analyst - The BA roadmap: different levels of business analysis - The basic rules of Business &Business Analysis-Classical Requirements and Tasks performed by Business Analysts. **Project Definition and Scoping:** Aspects - Projects phases - Project approaches (Waterfall, Agile, Iterative, Incremental) - The role of the BA across the project lifecycle.

Unit:2	INFORMATION TECHNOLOGY APPLICATIONS	10--hours

Business view of Information Technology Applications: Core business process–Baldrige Business Excellence framework-Key purpose of using IT in business-Enterprise Applications - Information users and their requirements**. Data Definition:** Types of Data – Attributes and Measurement – Types of data sets – Data quality – Types of Digital Data.

Unit:3	OLTP and OLAP	10--hours

Introduction to OLTP and OLAP–OLTP–OLAP–Different OLAP Architectures–OLTP and OLAP – Data models for OLTP and OLAP– Role of OLAP Tools in BI Architecture. **Business Intelligence –** Business Intelligence defined – Evolution of BI and Role of DSS, EIS, MIS and Digital Dashboards – Need for BI – BI value chain – Introduction to Business Analytics. **BI Definitions and Concepts –** BI Component Framework **–** Need for BI – BI Users –Business Intelligence applications –BI roles and responsibilities.

Unit:4	DATAINTEGRATION	15--hours

Data Integration –Data Warehouse–Goals –Data sources–Extract –Transform, Load–Data Integration–Technologies–Data Quality maintenance–Data profiling. **Data Modelling–** Basics–Types–Techniques–Fact table –Dimension Table–Typical Dimensional Models–Dimensional modeling life cycle – Designing the Dimensional Model.

Unit:5	KPI and PERFORMANCE MANAGEMENT	8--hours
Measures, Metrics, KPI sand Performance Management– Definition -Measurement system terminology – Role of Metrics and metrics supply chain – fact based decision making and KPIS use of KPIs – potential source for metrics. **Enterprise Reporting –** Report standardization – Balanced score card – dashboards – scoreboards vs. dashboards. **BI in Real world –** BI and mobility– BI and cloud computing–BI for ERP systems–Social CRM and BI.		
Unit6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**60--hours**

Text Book(s)	
1	RNPrasad,Seema Acharaya-Fundamentals of Business Analytics–Wiley–Revised Edition 2015.
2	Pang-NingTan, Michael Steinbach, VipinKumar–Introduction to Data Mining–Pearson Education - Revised Edition 2015.
Reference Books	
1	Haydn Thomas–Demonoid–Business Analysis Fundamentals–Pears on Education– 2015 Revised Edition

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	M	S	M	S	S
CO3	S	S	S	S	M
CO4	S	S	S	M	M
CO5	S	S	M	M	M

Course code		TITLE OF THE COURSE	L	T	P	C
ALLIED I		BUSINESS STATISTICS–I	4			2
Pre-requisite		ALLIEDI:BUSINESS STATISTICS–I	Syllabus Version			2025-2026

Course Objectives:

The main objectives of this course are to:

- To enrich the knowledge in statistics and to solve the statistical problems in analysis of business problems.
- To be familiar with data collection, graphical presentation and classification of tables.
- To inculcate the knowledge of relationship between measures of variation and value deviation.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Produce appropriate graphical and numerical descriptive statistics for different types of data.	K1
2	Apply statistical concepts to analyze the business problems.	K2
3	Explain the concepts of average and range of data collection.	K2
4	Examine the relationship between the variations.	K4
5	Outline the preparation of graph and table.	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

UNIT–I	**INTRODUCTION OF BUSINESS STATISTICS**	**Hours- 12**

Introduction of Business Statistics-Functions, Scope, Importance and Limitations of Statistics-MeaningofDataandinformation-ClassificationandCollectionofPrimaryandSecondaryData- Preparing Primary data collection tools- Sampling & Sampling techniques.

UNIT–II	**PRESENTATION OF DATA**	**Hours- 12**

Presentation of Data – Formation of Frequency distribution table – Classification and Tabulation-Diagrammatic (1D, 2D) and graphical presentation- Graphs of Frequency Distribution –frequency curves – Ogive curve.

UNIT–III	**CENTRAL TENDENCY**	**Hours- 12**

Measures of Central tendency–Different methods of calculation of Mean,Median,Mode,Geometric Mean and Harmonic Mean – Empirical Relation.

UNIT-IV	**MEASURES OF DISPERSION**	**Hours- 12**

Measures of Dispersion - Different methods of calculation of Range, Quartile deviation, Mean Deviation,Standarddeviation(GroupedandUngroupeddata),CoefficientofVariation–Relationship between measures of variation, Correcting incorrect values of standard deviation,Lorenz curve.

UNIT-V	**CORRELATION**	**Hours- 12**

Skewness – Meaning – Measures of skewness- Pearson's and Bowley's coefficient of skewness Correlation- Meaning and Definition- scatter diagram, Karl Pearson's coefficient of correlation, Spearman's Rank correlation, and Methods of Least squares.

	Total Lecture hours	**60--hours**

Reference Books	
1	S.P.GuptaandM.P.Gupta, Business Statistics–Sultan Chand &Sons Educational Publishers– New Delhi., 18th Edition -
2	Medhi. J ., Statistical Methods: An introductory text. New Age, 1992. 2014
3	J.K.Sharma, Business Statistics, Pearson Education India, 2007.
4	KVKSharma, Statistics Made Simple: Do it Yourself onPC-
5	Gupta,S.C,andV.K.Kapoor, Fundamentals of Mathematical Statistics-Cultan Chand &Sons – New Delhi. 2001
6	MoodA.M.GraybillF.AandBoesD.C,Introduction to the Theory of Statistics, McgrawHill.
7	
8	PHI Publication
RelatedOnlineContents [MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	
2	
3	
Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	M
CO3	S	S	S	M	S
CO3	S	M	S	S	S
CO4	S	S	S	M	S
CO5	S	M	S	S	S

Course code		TITLE OF THE COURSE	L	T	P	C
Core III		COMPUTER APPLICATION PRACTICALS I – ANALYSIS WITH EXCEL	-	-	-	3
Pre-requisite		Basics knowledge in MS-Office	Syllabus Version	2025-2026		

Course Objectives:

The main objectives of this course are to:

- To inculcate the knowledge of MS Excel
- To understand the basic statistics tools &methods

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	To outline the Analytical commands in Excel	K2
2	To identify the statistical tools for problem solving	K2
3	To analyze a program using appropriate analytical tool	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

(45Hours)

1. Suppose that at the beginning of May 2012 you purchased shares in Apple, Inc. (Nasdaq: AAPL). It is now five years later and you decide to evaluate your holdings to see if you have done well with this investment .The table below shows the market prices of AAPL:

DATE	PRICE
2012	59.77
2013	121.19
2014	188.75
2015	135.81
2016	256.88
2017	337.41

a) Enter the data, as shown,into a worksheet and format the table as shown.

b) Create a formula to calculate rate of return for each year. Format the results as percentages with two decimal places.

c) Calculate the total return for the entire holding period. What is the compound average annual rate of return?

d) Create a Line chart showing the stock price from May2006toMay2011. Make sure to title the chart and label the axes. Now, create an XY Scatter chart of the same data. What are the differences between these types of charts? Which type of chart is more appropriate for this data?

e) Experiment with the formatting possibilities of the chart. For example,

you might try changing it to a 3-D Line chart and fill the plot area with a marble background. Is there any reason to use this type of chart to display this data? Do the "enhancements" help you to understand the data.

2. In your position as research assistant to a portfolio manager, you need to analyze the profitability of the companies in the portfolio. Using the data for Chevron Corporation below:

FiscalYear	2017	2016	2015	2014	2013
TotalRevenue	1,98,198	1,71,636	2,64,958	2,20,904	2,04,892
NetIncome	19,024	10,483	23,931	18,688	17,138

a) Calculate the net profit margin for each year.
b) Calculate the average annual growth rates for revenue and net income using the GEOMEAN function. Is net income growing more slowly or faster than total revenue? Is this a positive for your investment in the company?
c) Calculate the average annual growth rate of total revenue using the **AVERAGE** function. Is this result more or less accurate than your result in the previous question? Why?
d) Create a Column chart of total revenue and net income. Be sure to change the chart so that the x-axis labels contain the year numbers, and format the axis so that 2017 is on the far right side of the axis.

3. Repeat Problem 2 using the data below for Qualcomm Inc. However, this time you should create a copy of your worksheet to use as a template. Replace the data for Chevron with that of Qualcomm.

Fiscal Year	2017	2016	2015	2014	2013
TotalRevenue	10,991	10,416	11,142	8,871	7,526
NetIncome	3,247	1,592	3,160	3,303	2,470

a) Do you think that Qualcomm can maintain the current growth rates of sales and net income over the long run? Why or why not?

b) Which company was more profitable in 2010? Which was more profitable if you take alonge rview? Would this affect your desire to invest in one company over the other?

4. Using the data for Paychex, Inc.(Nasdaq: PAYX),presented below:

Fiscal Year	2017	2016	2015	2014	2013
Sales	$ 2000.82	$ 2082.76	$ 2066.32	$ 1886.96	$1674.60
EBIT	729.31	812.08	854.82	743.27	674.77
Total NetI ncome	477.00	533.54	576.14	515.45	464.91
Dividends Per Share	1.24	1.24	1.22	1.02	0.69
Basic EPS from total operations	1.32	1.48	1.56	1.35	1.23

Total assets	5,226.30	5,127.42	5,309.79	6,246.52	5,549.30
Accounts payable	37.3	37.33	40.25	46.96	46.67
Total liabilities	3,824.32	3785.94	4113.15	4294.27	3894.46
Retained earnings	856.29	829.50	745.35	1595.10	1380.97
Net cash from operating activity	610.92	688.77	724.67	631.23	569.23

a) Calculate the ratio of each year's data to the previous year for each of the above items for Pay chex,Inc. For example, for the year 2010, $2,000.82/$2,082.76 = 0.9607.

a) From your calculations in part a, calculate each year"s rate of growth. Using the example in parta,therat is0.9607,so the percentage growth in sales for 2010 is 0.9607 – 1 or – 3.93%.

b) Calculate the average growth rate (using the **AVERAGE** function)of each of the above items using the results you calculated in part b. These averages are arithmetic averages.

c) Use the **GEOMEAN** function to estimate the compound annual average growth rate (CAGR) for each of the above items using the results that you calculated in part a. Be sure to subtract 1 from the result of the **GEOMEAN** function to arrive at a percent change. These averages are geometric averages.

d) Compare the results from part c (arithmetic averages using the **AVERAGE** function) to those for part d (geometric averages using the **GEOMEAN** function)for each item.Is it true that the arithmetic average growth rate is always greater than or equal to the geometric average (CAGR)?

Contrast the results for the geometric averages to those for the arithmetic average for the variables listed below. What do you observe about the differences in the two growth estimates for Sale and Accounts Payable? What do you observe about the differences in the two estimates for Total Assets and Retained Earnings? Hint: Look at the results from part b (the individual yearly growth rates)for each variable to draw some conclusions about the variation between the arithmetic and geometric averages

1. Sales
2. EBIT
3. Total Assets
4. Accounts Payable
5. Retained Earnings

2. Cashbudget using What If Analysis
3. Using Goal Seek to calculate Break Even Points
4. Sensitivity analysis of Capital Budgeting–Scenario Analysis,NPV Profile Charts
5. Financial Forecasting-Income Statement,Assets and Liabilities on Balance Sheet
6. Analysing Data sets with Tables and PivotTables.

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	S
CO3	S	S	S	S	M

Second Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core IV		C++	6			4
Pre-requisite		Basic knowledge in C	Syllabus version	2025-2026		

Course Objectives:

The main objectives of this course are to:

- To understand the concepts of object oriented programming.
- To develop programming skill sin C++ language.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Define the concepts of Object Oriented Programming in C ++	K1
2	Summarize the concepts of tokens ,expression and control structures C++	K2
3	Develop program involving classes and objects & other concepts.	K3
4	Apply the concept of operator overloading	K4
5	Explain the use of pointer in developing c++ program	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TO OBJECT ORIENTED PROGRAMMING	20--hours

Principles of Object Oriented Programming – A Look at Procedure and Object Oriented Programming Paradigm–Basic Concepts of Objects Oriented Programming–Benefits of OOP – Object Oriented Languages – Application of OOP – Beginning with C++ – What is C++ – Application of C++ – C++ Statements – Structure of C++ Program.

Unit:2	OPERATORSIN C++	18--hours

Tokens, Expressions and Control Structures–Tokens–Keywords–Identifiers–Basic and User Defined Data Types – Operators in C++ – Operator Overloading – Operator Precedence – Control Structures. Functions in C++ – The Main Function– Function Prototyping – Cal lby Reference – Return by Reference – Inline Functions.

Unit:3	CLASSES AND OBJECTS	17--hours

Classes and Objects – Introduction – Specifying A Class – Defining A Member Function – Static Data Members–Arrays of Objects–Objects as Function Arguments –Friendly Function – Pointers to Members. Constructors and Destructors – Constructors – Copy Constructors – Dynamic Constructors – Destructors.

Unit:4	OPERATOR OVERLOADING	15--hours

Operator Overloading – Type Conversions – Introduction – Defining Operator Overloading – Overloading: Unary and Binary Operators – Overloading Binary Operators Using Friends – Manipulation of String Using Operators–Rules for Overloading Operators –Types Conversions – Inheritance – Extending Classes – Defining Derived Classes – Single, Multilevel, Multiple, Hierarchical and Hybrid Inheritance – Virtual Base Classes – Abstract Classes.

Unit:5	VIRTUAL FUNCTIONS &WORKING WITH FILES	18--hours

Pointers, Virtual Functions and Polymorphism–Pointers to Objects–Pointers to Derived Classes – Virtual Functions. Working With Files – Classes For File Stream Operations – Opening and Closing of a File – File Pointers and their Manipulation – Sequential I/O Operations.

Unit6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**90--hours**

Text Book(s)	
1	Balaguruswamy.E-Object Oriented Programming withC++,Tata McGraw Hill Publishing Co. Ltd, 4th edition, Reprint 2009.
2	Ravichandran.D-Programming withC++,Tata McGraw Hill PublishingCo.Ltd,5th edition, Reprint 2009.
Reference Books	
1	VenugopalK.R.,Rajkumar,RavishankarT.-MasteringC++,TataMcGrawHillPublishing Co. Ltd, 2nd edition, Reprint 2008.
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	
2	
3	
Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	M	M
CO5	S	S	M	M	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core V		COMPUTER APPLICATION PRACTICAL II – C++			4	4
Pre-requisite		Basic application knowledge in C	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To in culcate C++programming ability among the students.
- To provide knowledge about the implementation of C++concepts into programming

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Demonstrate C++ Programming Structure	K1,K2
2	Apply operators and functions of C++	K3
3	Illustrate the object oriented concept in programming	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

60--hours

Syllabus

1. Odd and Even series
2. Maximum and Minimum Numbers
3. Arithmetic operations using member functions
4. Students details
5. Details of manager using array of objects
6. Computation of mean values using friend function
7. Swapping of two values using friend function
8. Static Member function using static data member
9. Sum of two complex numbers using constructors
10. String Manipulation using dynamic constructors
11. Destroy the object using Destructors
12. Simple and compound interest using Single Inheritance
13. Calculation of Depreciation
14. Hybrid Inheritance
15. Virtual Functions.

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	M	S	S
CO3	S	S	S	S	S

Course code		TITLE OF THE COURSE	L	T	P	C
Allied II		Business Statistics II	6			2
Pre-requisite		Basic Knowledge in Arithmetic Calculation	Syllabus Version			2025-2026

Course Objectives:

The main objectives of this course are to:

- To analysis a data for the purpose of exploration using descriptive and inferential statistics.
- To solve the creative application statistical problems
- To enable the students to learn the Statistical methods of inferential statistics.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Explain the creative application of linear regression in multivariate context for predictive purpose.	K1
2	Understand probability and sampling distribution.	K2
3	Understand the concepts of chi-square test.	K2
4	Understand the statistical tools for multivariate data set.	K2
5	Examine the data reliability and validity of the data set.	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

UNIT–I	REGRESSIONANALYSIS	Hours- 18

Regression Analysis - Meaning of regression and linear prediction- Regression in two variables- Regression equation - Regression coefficients, Standard errors of estimates, Coefficient of determination.

Time Series-Meaning, Components and models–Business fore casting-Methods of estimating trend-Graphic, semi-average, Moving average and Method of Least squares-Different variation(Seasonal, cyclical, irregular).

UNIT–II	PROBABILITY	Hours- 18

Probability – introduction, meaning and application of Probability – Addition and Multiplication theorem- Bayes theorem – Practical problems.

Sampling from finite population–simple random sampling, stratified random sampling and systematic sampling- estimation of mean, total and their standard errors. Sampling and non-Sampling errors (concepts only).

UNIT–III	HYPOTHESIS & STANDARD DEVIATIONS	Hours- 18

Test of Hypothesis: Type I error and II errors- one tailed and two tailed test -Test of significance – standard error- large sample tests with respect to mean, standard deviation proportion, difference between means, standard deviations and proportions-Power test–Neyman–Pearson lemma-Likelihood ratio tests–concept of most powerful test (statements and results only) -chi-Square test – Applications.

UNIT-IV	ANALYSIS OF VARIANCE	Hours- 18

Analysis of Variance: one way, two classifications-fundamental principles of experimentation-CRD, RBD and LSD, analysis of co-variance.

UNIT-V	MULTIVARIATE S TATISTICS	Hours– 18

Multivariate Statistics-validity, Reliability, Types-Multiple regression, Logistic regression- Factor analysis, conjoint analysis, cluster analysis, correspondence analysis, multivariate model building.

	Total Lecture hours	90--hours

Reference Books	
1	S.P.Guptaand M.P. Gupta, Business Statistics–Sultan Chand & Sons Educational Publishers–New Delhi., 18th Edition -2014
2	Anderson, David. R., Thomas A. Williams and Dennis J .Sweeney ,Statistics for Business and Economics, New Delhi: South Western.
3	J.K Sharma, Business Statistics, Pearson Education India,2007.
4	KVK Sharma, Statistics Made Simple :Do it Yourself on PC-PHI Publication
5	Gupta,S.C, and V.K Kapoor, Fundamentals of Mathematical Statistics – Cultan Chand & Sons – New Delhi. 2001
6	Mood A.M. Gray bill F.Aand Boes D.C, Introduction to the Theory of Statistics, Mcgraw Hill.
7	Lee, Cheng.et.al, Statistics for Business and Financial Economics, NewYork:Wiley Heidelberg Dordrecht
8	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
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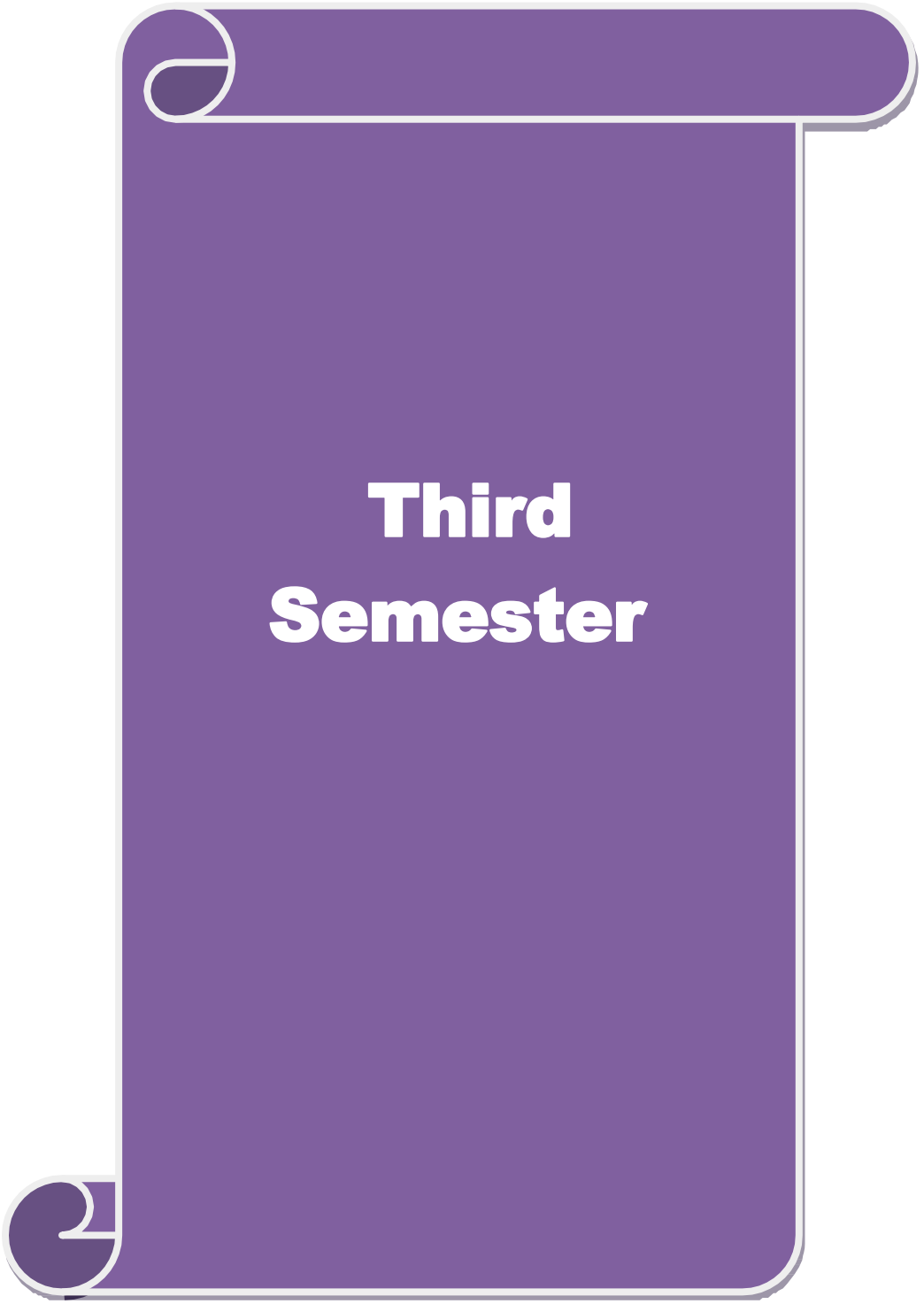
CourseDesignedBy:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M


Third
Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core VI		BUSINESS DATAMINING	4			3
Pre-requisite		Basic knowledge in data mining	Syllabus Version	2025-2026		

Course Objectives:

The main objectives of this course are to:

- To understand data mining techniques and algorithm in business analytics.
- To apply data preprocessing techniques and tools to solve business problems.
- No pre requisite required

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Define the concepts of data warehousing, datamining and data preprocessing	K1
2	Outline the concepts of association rule mining	K2
3	Define the concepts of classification of predication of data using c++	K1
4	Explain the methods of clustering using C++	K4
5	Analyze the datamining tool	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	DATA WAREHOUSING	10--hours

Data Warehousing - Operational Database Systems vs. Data Warehouses - Multidimensional Data Model - Schemas for Multidimensional Databases – OLAP Operations – Data Warehouse Architecture– Indexing – OLAP queries & Tools. **Datamining & Data Preprocessing**- Introduction to KDD process – Knowledge Discovery from Databases - Need for Data Preprocessing – Data Cleaning – Data Integration and Transformation – Data Reduction – Data Discretization and Concept Hierarchy Generation.

Unit:2	ASSOCIATION RULEMINING	12--hours

Association Rule Mining: Introduction-Data Mining Functionalities-Association Rule Mining-Mining Frequent Item sets with and without Candidate Generation - Mining Various Kinds of Association Rules - Constraint-Based Association Mining. **Data Mining:** Data mining tasks-Datamining vs KDD- Issues in data mining, Data Mining metrics, Data mining architecture -Data cleaning-Data transformation-Data reduction-Datamining primitives.

Association Rule Mining: Introduction Mining single dimensional Boolean association rules from transactional databases - Mining multi- dimensional association rules.

Unit:3	CLASSIFICATION & PREDICTION	12--hours

Classification & Prediction: Classification vs. Prediction – Data preparation for Classification and Prediction – Classification by Decision Tree Introduction – Bayesian Classification – Rule Based Classification – Classification by Back Propagation – Support Vector Machines – Associative Classification – Lazy Learners – Other Classification Methods – Prediction – Accuracy and Error Measures –Evaluating the Accuracy of a Classifier or Predictor – Ensemble Methods – Model Section.

Unit:4	CLUSTERING	13--hours

Clustering: Cluster Analysis: -Types of Data in Cluster Analysis–A Categorization of Major Clustering Methods–Partitioning Methods–Hierarchical methods–Density-Based Methods–Grid-Based Methods –Model-Based Clustering Methods–Clustering High- Dimensional Data – Constraint- Based Cluster Analysis – Outlier Analysis.

Unit:5	DATAMINING TOOL	11--hours
Data Mining Tool: Introduction to WEKA – Loading the data (Simple) - Filtering attributes (Simple)-Selecting attributes(Intermediate)–Training a classifier(Simple)-Building your own classifier (Advanced) - Tree visualization (Intermediate) - Testing and evaluating your models(Simple)Regression models(Simple)-Association rules(Intermediate)–Clustering(Simple)-Reusing models(Intermediate)-Datamining indirect marketing(Simple)Using Weka for stock value for e casting (Advanced).		
Unit6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**60--hours**

Text Book(s)

1	Jiawei Hanand Micheline Kamber–Data MiningConcepts and Techniques–Morgan Kaufman – 2011 3rd Edition.
2	IanH.WittenandEibeFrank–Data Mining Practical Machine Learning Tools and Techniques,Morgan Kaufmann Publication –20164thEdition.
	M.H.Dunham–Data Mining Introductory and Advanced Topics,Imprint Pearson Education,20114thImpression.

Reference Books

1	ArunK.Pujari–DataMiningTechniques,UniversitiesPress(India)Pvt.Ltd., 2013 Kindle Edition.

Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]

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Course Designed By:

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	M	S	S
CO3	M	S	S	S	M
CO4	S	S	S	M	M
CO5	S	S	S	M	M

Course code		TITLE OF THECOURSE	L	T	P	C
Core VII		SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT	3			3
Pre-requisite		Basic knowledge in investment avenues	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To familiarize the fundamental concept of Securities and Portfolio Management
- To provide knowledge of risk and return involved in the different types of Securities

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Outline the nature and scope of Investment management	K2
2	Explain the concepts of Security valuation using various techniques	K2
3	Demonstrate the fundamental analysis and its theories	K3
4	Examine the process of portfolio analysis and its relevant theories	K4
5	List the techniques of portfolio plans	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TO INVESTMENT MANAGEMENT	8--hours

Nature and scope of Investment management: Investment speculation and Gambling-Factors favorable for investment–Investment Media–Features of an investment Programme-
The investment Process– Stages in Investment–Structure of Financial Markets

Unit:2	SECURITY VALUATION	8--hours

Security Valuation: Elements of Investment–Approaches to Investment–Basic Valuation Models–Bonds, Preference Shares, Common Stock. Returns: Measurement– Statistical Methods. Risk: Risk Classification–Systematic,
Unsystematic Risk

Unit:3	FUNDAMENTAL ANALYSIS	8--hours

Fundamental Analysis: Economic Analysis–Industrial Analysis–Company Analysis. Technical Analysis: Assumptions–Dow Theory Charts and Signals–Technical Indicators. Efficient Market Theory: Weak Form–Semi-Strong Form–Strong Form of Market–.

Unit:4	PORTFOLOIO ANALYSIS	9--hours

Portfolio Analysis: Traditional Vs. Portfolio Analysis–Markowitz Theory–Efficient Frontier – Sharp ideal Index–Foreign Security Investment–Affecting the India Investor–Opportunities.

Unit:5	TECHNIQUES OF PORTFOLOIO	10--hours

Techniques of Portfolio Revision: Formula Plans–Constant Rupee Value–Constant Ratio–Variable Ratio–Rupee Cost Averaging. Classification of Investment Companies

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	45--hours

Text Book(s)	
1	Preeti Singh– Investment Management, Himalaya Publishing House,2011,1st Edition.
2	Punithavathi Pandian–Security Analysis and Portfolio Management, Vikas Publishing HousePvt.Ltd.,20122nd Edition.
3	Fransics–Investment,S.Chand&Co,2015,5th Edition.
Reference Books	
1	BhallaV.K–Investment Management,S.Chand&Co,2010,10th Edition.
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	
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Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	M	S	S
CO3	S	S	S	S	S
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core VIII		DATABASE PROGRAMMING	3			3
Pre-requisite		Basic knowledge in SQL	Syllabus Version	2025-2026		

Course Objectives:

The main objectives of this course are to:

- To provide comprehensive knowledge about relational and no sql database management system

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Interpret relational database management concepts	K1
2	Develop the tables using normalization	K2
3	Illustrate SQL operators and keys	K3
4	Explain the overview and history of SQL data base	K4
5	Motivate the concepts of Mongo DB	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TO DATABASE MANAGEMENT SYSTEM	12--hours

Introduction to database management system-Data models-Database system architecture-The SQL Language-Relational data base Management System-Candidate key, primary tables key, Foreign key-Relational operators-Attribute domains and their implementations-New conventions for Database object-Structure of SQL statements and SQL writing guidelines-Creating tables-Describing the structure of a table-Populating tables.

Unit:2	NORMALIZATION PROCESS	12--hours

Functional dependencies-Normalization process:1NF- 2NF-3NF-BCNF.The E-R model- Entities and attributes-Relationships-Normalizing the model-Table instance charts-Implementation of the selection operator-Using aliases to control column headings-Implementation of the projection and join operators-Creating foreign keys and primary keys and check constraints-adding and modifying columns-Removing constraints from a table.

Unit:3	INTRODUCTION TO GROUPFUNCTIONS	12--hours

Built in functions-Numeric-Character conversion functions-Introduction to group functions-sum, avg, max, min, count-combining single value and group functions- Displaying specific groups-Introduction to processing date and time-Arithmetic with dates-Date Functions-Formatting dates and time. Sub queries-Correlated queries-Using sub queries to create, update, insert and delete rows from a table-Transaction-Commit, roll back, save point and auto commit- Introduction to PL/SQL-user defined functions-Triggers-Stored procedures.

Unit:4	OVERVIEWANDHISTORY OF NOSQL	12--hours

Overview and History of NoSQL Databases Definition of the Four Types of NoSQL Database, The Value of Relational Databases, Getting at Persistent Data, Concurrency, Integration, Impedance Mismatch, Application and Integration Databases, Attack of the Clusters, The Emergence of NoSQL. Aggregate Data Models: Aggregates - Key-Value and Document Data Models - Column- Family Stores - Summarizing Aggregate-Oriented Databases - More Details on Data Models - Distribution Models - Consistency.

Unit:5	INTRODUCTION TO MONGODB	10—hours

Introduction to MongoDB- Getting Started – Querying - Creating, Updating, and Deleting Documents–Querying-DesigningYourApplication:Indexing-SpecialIndexandCollection Types – Aggregation.

Unit6	Contemporary Issues	2 hours

Expert seminars and lectures		
	Total Lecture hours	**60--hours**
Text Book(s)		
1	Ramon A Mata-ToledoPaulineKCushman–Database Management System,TataMcGrew- Hill Publishing Company Limited, New Delhi, 2010, 2nd Edition.	
2	PramodJ.Sadalage&MartinFowler-NoSql Distilled,Pearson Education Inc., 2013Edition.	
3	KristinaChodorow–MongoDB:The DefinitiveGuide,O'ReillyMediaInc.,20132ndEdition.	
Reference Books		
1	Ramakrishnan&Gehrke–DatabaseManagementSystems,TataMcGrawHill,2009,8th edition.	
2	NileshShah–Database Systemusing Oracle,PHIlearningPvt.Ltd.,2014,2 edition.	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]		
1		
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Course Designed By:		

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	M	S	S
CO3	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
ALLIED III		OPERATIONS AND STRATEGIC MANAGEMENT	2			2
Pre-requisite			Syllabus Version			2025-2026

Course Objectives:

The main objectives of this course are to:

- To provide an in-depth study of the various business processes.
- To analyze various operations of business system
- To enable the production and operation planning of different strategy.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Explain the modern operations functions and MRP in production.	K1
2	Understand product lifecycle and control measures of operational system.	K2
3	Apply the concepts of basic tools of quality measurement techniques.	K2
4	Understand the maintenance system of production	K4
5	Examine the SWOT analysis of different strategies.	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

UNIT–I	OPERATIONS MANAGEMENT	Hours- 9

Operations Management–Introduction–Scope characteristics of modern operations functions–recent trends in production / operations management. Operations planning: Demand forecasting – capacity planning - capacity requirement planning - facility location - facility layout – Resource aggregate planning – Material requirements planning – Manufacturing resource planning – Economic Batch quantity.

UNIT–II	OPERATIONAL SYSTEMS AND CONTROL	Hours- 9

Designing of operational systems and control: Product Design, Process design - Selection - Product Life Cycle – Process Planning – Process Selection. Production Planning and Control: Introduction – Control Measures – Time study, Work study, Method study, Job Evaluation, Job Allocation (Assignment Technique), Scheduling Queuing Models, Simulation and Line Balancing – Optimum Allocation of resources – Lean Operations – JIT – Transportation Model and Linear Programming Technique (Formulation of equations only).

UNIT–III	PRODUCTIVITY AND QUALITY MANAGEMENT	Hours- 10

Productivity Management and Quality Management: Measurement techniques of productivity index, productivity of employee, productivity of materials, productivity of management resources, productivity of other factors – productivity improving methods – TQM basic tools and certification –ISO standards basics. Project Management: Project planning–project lifecycle–Gantt charts, PERT and CPM.

UNIT-IV	SPARES MANAGEMENT	Hours- 7

Economics of Maintenance and spares Management: Breakdown Maintenance–Preventive Maintenance–Routine Maintenance–Replacement of Machine–Spare Parts Management.

UNIT-V	STRATEGIC ANALYSIS AND STRATEGIC PLANNING	Hours- 10

Strategic Analysis and strategic planning Situational Analysis –SWOT Analysis–Portfolio Analysis – BCG Matrices– Stages in Strategic Planning–Alternatives in Strategic Planning-Formulation and Implementation of strategy: Strategy formulation function wise(Production Strategy, Marketing Strategy, Man Power Strategy) – Structuring of Organisation for implementation of strategy– Strategic Business Unit – Business Process re-engineering.

	Total Lecture hours	45--hours

Reference Books	
1	Richard,B.Chase,F.Robert,JacobsNicholas,J.AquilanoandNitin,K.Agarwal–Operations Management for Competitive Advantage, Tata McGraw-Hill Education, Reprint 2014, 11thEdition.
2	Arunkumar,B.K.Agnihotri,OperationManagementandInformationsystem, Shuchita Prakashan (P) Ltd., 2016, 14th Edition.
3	
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Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
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Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	M
CO3	S	S	S	M	S
CO3	S	M	S	S	S
CO4	S	S	S	M	S
CO5	S	M	S	S	S

Course code		TITLE OF THECOURSE	L	T	P	C
Core IX		COMPUTER APPLICATION PRACTICAL III – DATABASE PROGRAMMING			4	3
Pre-requisite		Basic application knowledge in SQL	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To provide comprehensive knowledge about relational and nosql database management system

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Interpret relational database management concepts	K1
2	Develop the tables using normalization	K2
3	Illustrate SQL operators and keys	K3

K1-Remember;**K2**-Undestand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

60--hours

Syllabus

1. Normalize the following dataset:
   a) Employee database
   b) Students database
   c) Hospital database
2. Data Definition Language and Data manipulation Language Table:
   Student Reg no number(5) primary key
   Studt name varchar2(15)
   Gender char (6)
   Dept name char(15)
   Address char(25)
   Percentage number(4,
   2)Queries:
   a) To create a table, describe a table, alter a table, drop a table, and trun catea table
   b) To insert values, retrieve records, update records, delete records
3. Create an Employee table with following field.
   Eno number (5) primary key
   Enamevarchar2(20)not null Dept no
   number (2) not null

Desigchar(10)not null
Sal number(9, 2)not null

a) Insert values and display the records
b) Display sum, maximum amount of basic pay
c) List the name of the clerks working in the department20
d) Display name that begins with „G‟
e) List the names having„ I‟as the second character
f) List the names of employees whose designation are„ Analyst‟ and„ Salesman‟
g) List the different designation available in the Employee table without duplication (distinct)

4. Create a student table with the following fields S tuno number (5) primary key

StunmVarchar2(20)
Age number(2)
Mark1 number(3)
Mark2 number(3)
Mar 3 number
(3)Queries:

a) Insert values and display there cords
b) List the names and age of the student whose age is more than12
c) Display total and average of marks
d) Display the names of the maximum total &minimum total student
e) List the names of the student that ends with„ A‟
f) List the names of student whose name shave exactly 5 characters

5. Create the table PAYROLL with the following fields and insert the values:

Empl no	number(8)
Empl name	varchar2(8)
Dept	varchar2(10)
Bas pay	number(8,2)
HRA	number(6,2)
DA	number(6,2)
Pf	number(6,2)
Net pay	number(8,2)

Queries:

a) Update the records to calculate the net pay.
b) Arrange the records of the employees in ascending order of their net pay.
c) Display the details of the employees whose department is" Sales".
d) Select the details of employees whose HRA>=1000andDA<=900.
e) Select the records in descending order.

Create a Table Publisher and Book with the following fields:Table:publisher

Pub code	Varchar2 (5)
Pub name	Varchar2 (10)
Pub city	Varchar2 (12)

Pub State Varchar2 (10)
Bookcode Varchar2(5)Table:
Book BooktitleVarchar2(15)
Book code Varchar2(5)
Book price Varchar2(5)
Queries:

f) Insert the records into the table publisher and book.
g) Describe the structure of the tables.
h) Show the details of the book with the title "DBMS".
i) Show the details of the book with price>300.
j) Show the details of the book with publisher name "Kalyani".
k) Select the book code, book title; publisher city is"Delhi".
l) Select the book code, book title and sort by book price.
m) Count the number of books of publisher starts with "Sultanchand".
n) Find the name of the publisher starting with"S".

6. CreateOrderstableandcustomerstablewithfollowingfields:Table:order

Order id number (10)
Customer id number(5)
Order date date
Table: customers
Customer id number(5)
Cust name varchar2(10)
Contactname varchar2(10)
Country varchar2(10)

a) Perform INNERJOIN, that selects records that have matching values in both tables
b) Perform LEFTJOIN, that selects records that have matching values in both tables
c) Perform RIGHTJOIN, that selects records that have matching values in both tables.

7. Create Customer Table and supplier table with following fields:Table:Customer

Cus id number(10)
First Name varchar2(10)
Last Name varchar2(10)
City varchar2(10)
Country varchar2(10)
Phone number(10)Table:
Supplier Supid number(10)
Company Name varchar2(10)
Contact Name varchar2(10)
City varchar2(10)
Country varchar2(10)
Phone number(10)
Fax number(10)

a) Insert the records into the table customer and supplier.
b) Describe the structure of the tables.
c) List details of customer table and supplier table.
d) Perform full outer join from customer on supplier table order by country

MONGODB:

9. Create a Student Database in Mongo DB using “use” Command.
10. Create program using crud operation using MongoDB.
11. Create program text search and indexes using MongoDB.
12. Create the replicasetin the mongo shell and test the configuration

WEKA:

13. Demonstration of preprocessing on data set student .arff
14. Demonstration of classification rule process on dataset employee.arffusingid3 algorithm
15. Demonstration of clustering rule process on data set student.arffusing simplek- means
16. Demonstration of preprocessing on data set labor .arff.

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	M	S	S	S

Course code		Technological Analytics-Java &Linux Fundamentals	L	T	P	C
Skill based subject-2		Basic knowledge in java	2	-	-	3
Pre-requisite			Syllabus Version		2025-2026	

Course Objectives:

1. This course introduces various tools and techniques commonly used by Linux programmers,
2. System administrators and end users to achieve their day today work in Linux environment.
3. It is designed for computer students who have limited or no previous exposure to Linux

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the fundamental programming concepts of Java	K1
2	Clear Knowledge on Linux	K2
3	Relate analysis techniques to data sets	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	BASICSIN JAVA	5 hours

C++ Vs JAVA, JAVA and Internet and WWW, JAVA support systems, JAVA environment. JAVA programstructure,Tokens,Statements,JAVAvirtualmachine,Constant&Variables,DataTypes,Declarationof Variables, Scope of Variables, Symbolic Constants, Type Casting. **Operators :**Arithmetic, Relational, Logical Assignments, Increment and Decrement, Conditional, Bitwise, Special, Expressions & its evaluation. If statement,if…else…statement,Nestingofif…else…statements,else…ifLadder,Switch,?operators, **Loops**–While,Do,For, Jumps in Loops,Labeled Loops

Unit:2	CLASSES AND OBJECTS	6 hours

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Methods Overloading, Static Members, Nesting of Methods. **Inheritance:** Extending a Class, Overriding Methods, Final Variables and Methods, Final Classes, Finalize Methods, Abstract methods and Classes, Visibility Control.

Unit:3	ARRAYS	6 hours

Arrays: One Dimensional & two Dimensional, strings, Vectors, wrapper Classes, Defining Interface Extending Interface, Implementing Interface, Accessing Interface Variable, System Packages, Using System Package, Addinga Class to a Package, Hiding Classes.

Unit:4	PACKAGES IN JAVA	5 hours

Packages- Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface.

Unit:5	LINUX	6 hours

Linux Basics: Introduction to Linux, **Managing Files and Directories:** File System of the Linux, File Compression and Archiving. **Managing Directories**: Creating Directories, Deleting Directories, Dot Directories. General usage of Linux kernel & basic commands: Shell Prompt Terms, Opening and using a Shell Prompt ,pwd, ls, cp ,mv, head Command, tail Command, cat, grep, chmod		
Unit6	**Contemporary issues**	**2 hours**
	Expert lecture sand seminars	
	Total Lecture hours	**30hours**

Text Book(s)

1	*E.Balaguruswamy,***"ProgrammingInJava",***2ndEdition,TMHPublications*ISBN
2	*RedHatEnterpriseLinux4:SystemAdministration GuideCopyright,2005 Red Hat,Inc*

Reference Books

1	*PeterNorton,***"PeterNortonGuideToJavaProgramming",***TechmediaPublications*

Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]

1	-
2	

Mapping with Programme Outcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	L	M	M
CO2	S	M	M	S	M
CO3	S	M	L	M	S

S-Strong; M-Medium; L-Low

----23 – BB6*	HEALTH & WELLNESS	L	T	P	C**
AUDIT		0	0	2	1

'(First four digits in the subject code is branch code and Seventh digit is Semester)

** Health & Wellness has one credit for the third semester only and it has no credits for other semesters.

Skill Areas:

Physical Fitness, Nutrition, Mental Health. Awareness on Drug addiction and its effects

Purpose:

The Health & Wellness course focuses on teaching the elements of physical. Mental, Emotional, social, Intellectual, Environmental well-being which are essential for overall development of an individual. The course also addresses the dangers of substance abuse and online risks to promote emotional and mental health.

Learning Outcomes:

Upon completion of the Health & Wellness course, students will be able to:

1. Demonstrate proficiency in sports training and physical fitness practices.
2. Improve their mental and emotional well-being. Fostering a positive outlook on health and life.
3. Develop competence and commitment as professionals in the field of health wellness.
4. Awareness on drug addiction and its ill effects

Focus:

During the conduct of the Health & Wellness course, the students will benefit from the following focus areas:

1. Stress Management.
2. Breaking Bad Habits.
3. Improving Interpersonal Relationships.
4. Building Physical Strength & Inner Strength

Role of the Facilitator:

The faculty plays a crucial role in effectively engaging with students and towards achieving learning outcomes Faculty participation involves the following areas:

1. **Mentorship & Motivation:** The Facilitator mentors students in wellness and self -discipline while inspiring a positive outlook on health. Faculty teach stress management, fitness, and daily well-being.

2. **Promoting a safe and Inclusive Environment:** The facilitator ensures a safe, inclusive, and respectful learning environment for active student participation and benefit
3. **Individualised Support and Monitoring Progress:** The facilitator plays a crucial role in providing personalized support, monitoring and guidance to students.

Guided Activities:

In this course, several general guided activities have been suggested to facilitate the achievement of desired learning outcomes. They are as follows:

1. Introduction to Holistic Well-being.
2. Holistic Wellness Program- Nurturing Body and Mind
3. Breaking Bad Habits Workshop.
4. Improving the elements of physical, emotional, social, intellectual, environmental and mental well-being.
5. Creating situational awareness, digital awareness.
6. Understanding substance abuse, consequences and the way out.

Period Distribution

The following are the guided activities suggested for this Audit course.

The Physical Director should plan the activities by the students.

Arrange the suitable Mentor / Guide for the wellness activities.

Additional activities and programs can be planned for Health and Wellness.

S.NO	GUIDED ACTIVITIES	Period
1.	**Introduction to Holistic Well-being** 1. Introduce the core components of Health & Well-being namely Physical, mental and emotional well-being 2. Provide worksheets on all the four components individually and explain the interconnectedness to give an overall understanding.	
2.	**Wellness Wheel Exercise (Overall Analysis)** • Guide students to assess them well-being in various life dimensions through exercises on various aspects of well –being, and explain the benefits of applying wellness wheel. • Introduce Tech Tools: • Explore the use of technology to support well-being. • Introduce students to apps for meditation, sleep tracking, or healthy recipe inspiration.	
3	**Breaking Bad Habits (Overall Analysis)**	

	• Open a discussion on bad habits and their harmful effects. • Provide a worksheet to the students to identify their personal bad habits. • Discuss the trigger, cause, consequence and solution with examples. • Guide them to replace the bad habits with good ones through worksheets.	
4	**Physical Well-being** **1. Fitness** Introduce the different types of fitness activities such as basic exercises, cardiovascular exercises, strength training exercises, flexibility exercises, so on and so forth. (Include theoretical explanations and outdoor activity). **2. Nutrition** Facilitate students to reflect on their eating habits, their body type, and to test their knowledge on nutrition, its sources and the benefits. **3. Yoga & Meditation** Discuss the benefits of Yoga and Meditation for one's overall health. Demonstrate different yoga postures and their benefits on the body through visuals (pictures or videos) **4. Brain Health** Discuss the importance of bran health for daily life. Habits that affect brain health (irregular sleep. eating, screen time) Habits that help for healthy brains (reading, proper sleep, exercises). Benefits of breathing exercises and meditation for healthy lungs. **5. Healthy Lungs** Discuss the Importance of lung health for daily life. Habits that affect lung health (smoking, lack of exercises). Benefits of breathing exercises for healthy lungs. **6. Hygiene and Grooming** Discuss the importance of hygienic habits for good oral, vision, hearing and skin health Discuss the positive effects of grooming on one's confidence level and professional growth. **Suggested Activities (sample):** **Nutrition:** Invite a nutritionist to talk among the students on the importance of nutrition to the body or show similar videos shared by	

	experts on social media. Organize a 'Stove less/fireless cooking competition' for students where they are expected to prepare a nutritious dish and explain the nutritive values in parallel.	
5	**Emotional Well-being** **1. Stress Management** Trigger a conversation or provide self-reflective worksheets to identify the stress factors in daily life and their impact on students' performance. Introduce different relaxation techniques like deep breathing, progressive muscle relaxation, or guided imagery. (use audio recordings or visuals to guide them through these techniques). After practicing the techniques, have them reflect on how these methods can help manage stress in daily life. **2. Importance of saying 'NO'** Explain the students that saying NO' important for their Physical and mental wen-being. Performance Growth and Future. Confidence, Self-respect, Strong and Healthy Relationships, budding reputation for self and their family (avoid earning a bad name) Factors that prevent them from saying ' NO' How to practice saying"NO" **3. Body positivity and self- acceptance** Discuss the following with the students • What is body positivity and self- acceptance • Why is it important • Be kind to yourself • Understand that everyone's unique. **Suggested activities (sample)** (Importance of saying "NO") Provide worksheets to self- reflect on.., …how they feel when others say "no" to them …the situations where they should say "no" Challenge students to write a song or rap about the importance of saying no and how to do it effectively. Students can perform their creations for the class.	
6	**Social Well- Being** **1. Practicing gratitude**	

Discuss the importance of practicing gratitude for building relationships with family, friends, relatives, mentors and colleagues.

Discuss how one can show gratitude through words and deeds.

Explain how practicing gratitude can create "ripple effect".

2. Cultivating kindness and compassion

Define and differentiate between kindness and compassion.

Explore practices that cultivate these positive emotions.

Self- compassion as the foundation.

The power of small gestures.

Understanding another's perspective

The fruits of compassion

3. Practising Forgiveness

Discuss the concept of forgiveness and its benefits Forgiveness What is it? and What It isn't?

Benefits of forgiveness.

Finding forgiveness practices.

4. Celebrating Differences

Appreciate the value or individual differences and foster inclusivity The World A Tapestry of Differences (cultures. beliefs. abilities. and appearances)

Finding strength In differences (diverse perspectives and experiences lead to better problem-solving and innovation). Celebrating differences. not ignoring them (respecting and appreciating the unique qualities)

Activities for celebrating differences (share culture, learn about others, embrace new experiences)

5. Digital Detox

Introduce the students to:

The concept of a digital detox and its benefits for social well-being How to disconnect from devices more often to strengthen real-world connections

Suggested Activities (sample):

(Practicing Gratitude)

Provide worksheets to choose the right ways to express gratitude.

Celebrate 'gratitude day' in the college and encourage the students to honour the house keeping staff in some way to express gratitude for their service.

7	**Intellectual Well-being** **1. Being a lifelong Learner** Give students an understanding on: The relevance of intellectual well-being in this 21st — century to meet the expectations in personal and professional well-boing The Importance of enhancing skills. Cultivating habits to enhance the intellectual well-being (using the library extensively. participating in extra-curricular activities, reading newspaper etc.) **2. Digital Literacy** **Discuss:** The key aspect of digital literacy and its importance in today's world. It is more than just liking and sharing on social media. The four major components of digital literacy (critical thinking, communication, problem-solving, digital citizenship). Why is digital literacy Important? Boosting one's digital skills. **3. Transfer of Learning** **Connections between different subject- how knowledge gained in one area can be applied to others.** **Suggested Activities(sample):** Intellectual Well-being Provide worksheets to students for teaching them how to boost intellectual well-being. Ask the students to identify a long-standing problem in their locality, and come up with a solution and present it in the classroom. Also organize an event like 'Idea Expo' to display the designs, ideas, and suggestions. to motivate the students to improve their intellectual well- being.	
8	**Environmental Well-being** 1. The Importance of initiating a change in the environment. **The session could be around:** Defining Environmental well-being (physical, chemical, biological, social and psychosocial factors) — People's behaviour, crime, pollution, Political activities, infra-structure, family situation etc. Suggesting different ways of initiating changes in the environment responsibility, Creating, awareness, Volunteering. Approaching administration).	

	Suggested activities (sample). Providing worksheets to self-reflect on how the environment affects their life, and the ways to initiate a change. Dedicate a bulletin board or wall space (or chart work) in the classroom for students to share their ideas for improving environmental well-being Creating a volunteers' club in the college and carrying out monthly activities like campus cleaning, awareness campaigns against noise pollution, (loud speakers in public places), addressing antisocial behaviour on the campus or in their locality	
9	**Mental Well-being** **1.Importance of self-reflection** **Discuss:** Steps involved in achieving mental well-being (self-reflection, self- awareness, applying actions, achieving mental well-being). Different ways to achieve mental well-being (finding purpose, coping with stress, moral compass, connecting for a common cause). The role of journaling in mental well-being. **2. Mindfulness and Meditation Practices** Benefits of practicing mindful habits and meditation for overall wellbeing. 1. **Connecting with nature** Practising to be in the present moment — Nature walk, feeling the sun, listening to the natural sounds. Exploring with intention — Hiking, gardening to observe the nature. Reflecting on the emotions, and feeling kindled by nature. 2. **Serving people** Identifying the needs of others. Helping others. Volunteering your time, skills and listening ear. Finding joy in giving. 3. **Creative Expressions** Indulging in writing poems, stones, music making/listening. creating visual arts to connect With inner selves. **Suggested Activities(Sample):** (Mindfulness and Meditation) — Conducting guided meditation every day for 10 minutes and directing the students to record the changes they observe.	
10	**Situational Awareness (Developing Life skills)**	

	1. Being street smart **Discuss:** Who are street smarts? Why is it important to be street smart? Characteristics of a street smart person: Importance of acquiring life skills to become street smart - (General First-aid procedure, CPR Procedure. Handling emergency situations like fire, flood etc). **2. Digital Awareness** **Discuss:** Cyber Security Information Literacy Digital Privacy Fraud Detection **Suggested Activities (sample):** (Street Smart) Inviting professionals to demonstrate the CPR Procedure Conducting a quiz on Emergency Numbers.	
11	**Understating addiction** **Plan this session around:** Identifying the environmental cues, triggers that lead to picking up this habit. Knowing the impact of substance abuse- adverse health conditions, social isolation, ruined future, hidden financial loss and damaging the family reputation. Seeking help to get out of this addiction. **Suggested activities:** Provide Worksheets to check the students' level of understanding about substance addiction and their impacts. Share case studies with students from real-life. Play/share awareness videos on addiction/de-addiction, experts talk *Conduct awareness programmes on Drugs and its ill effects. (Arrange Experts from the concerned government departments and NGOs working in drug addiction issues) and maintain the documents of the program.	

Closure:

Each student should submit a Handwritten Summary of their Learnings & Action Plan for the future.

Assessments:

- Use Self-reflective worksheets to assess their understanding
- Submit the worksheets to internal audit/external audit.
- Every student's activities report should be documented and the same have to be assessed by the Physical Director with the mentor. The evaluation should be for 100 marks. No examination is required.

Part	Description	Marks
A	Report	40
B	Attendance	20
C	Activities (Observation During Practice)	40
	Total	100

References/Resource Materials:

The course acknowledges that individual needs and resources may vary However, here are some general that may be helpful,

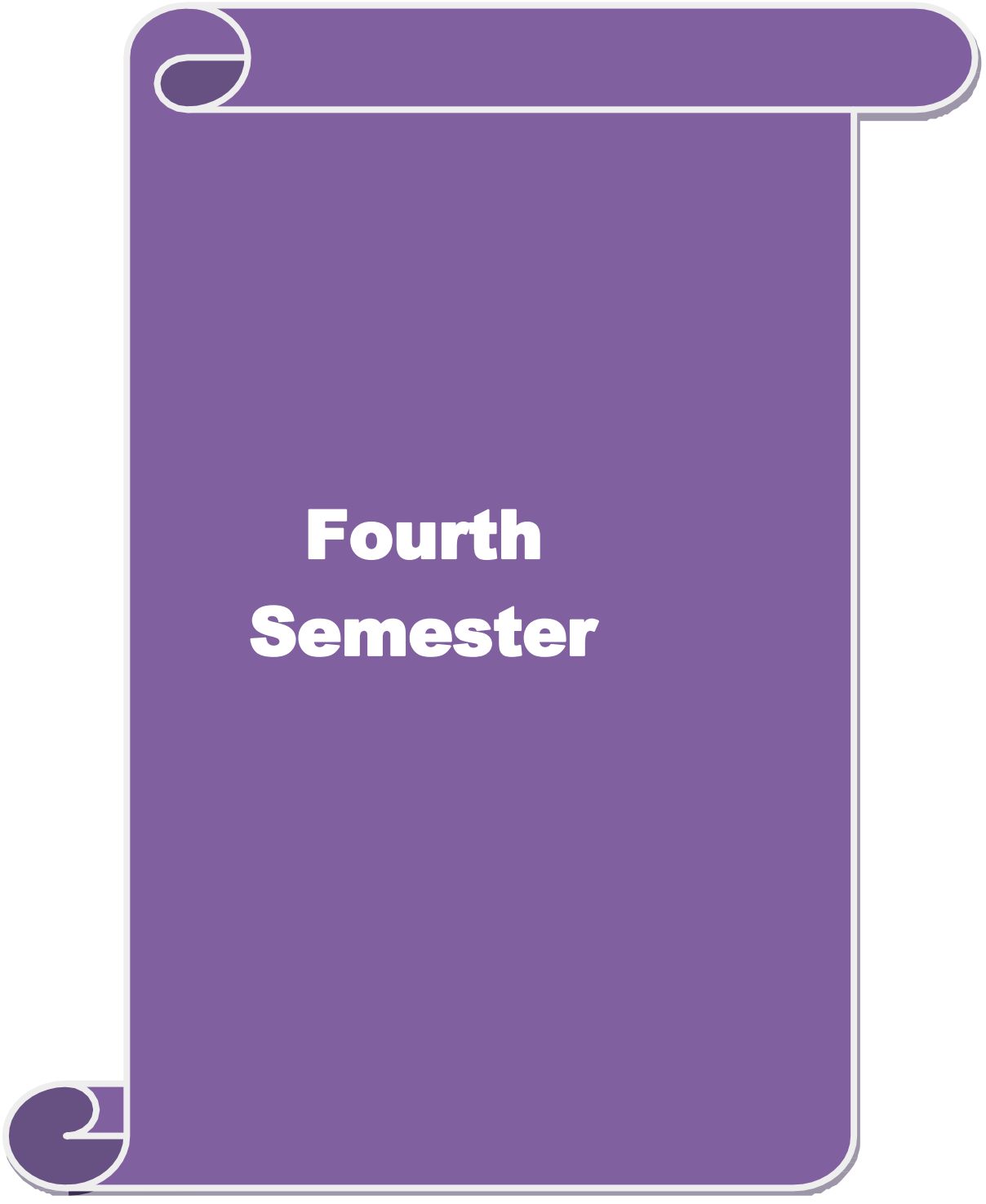
1. The Well-Being Wheel

2. Facilities & Spaces: Some activities may require access to specific facilities, resources or spaces. Students may need to coordinate with the college administration to reserve these as required.

3. Online Resources:

1. United Nations Sustainable Development Goals - Goal 3 - Good Health &Well Being: https://www.un.org/sustainabledevelopment/health/
2. Mindfulness and Meditation: Stanford Health Library offers mindfulness and meditation resources:

   https://healthlibrary stanford.edu/books-resources/mindfulness• meditation.html
3. Breaking Bad Habits; James Clear and break bad ones, https W james clear com/huts
4. 6 Ways to Keep Your Brain Sharp https.//www.lorman.com/blog/post/how•to-keep-yout-btan-ov.arp
5. What Is Social Wellbeing? 12+ Activities for Social/ httpsflpositivepsychology.com/social wellbeing/
6. How Does Your Environment Affect Your Mental Health? https ://www.verywellmind. health-5093687
7. How to say no to others (and why you shouldn't feel guilty) httpsflwww.betterup.com/blog/how-to-say-no


Fourth
Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core X		R PROGRAMMING	3			3
Pre-requisite		Basic knowledge in Research	Syllabus version	2025-2026		

Course Objectives:

The main objectives of this course are to:

- To introduce R Programming concepts and to develop programming skills in R Programming

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Relate R Programming concepts with Datasets	K1
2	Explain data frames using datasets	K2
3	Outline the data manipulating using SQL for data analyse	K2
4	Demonstrate the reading and writing of CSV file	K2
5	Applying statistical tools for complex data analyze	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TOR	11- hours

An overview of R:Introduction to R expressions, variables, and functions -Vectors: Grouping values into vectors, then doing arithmetic and graphs with them- Matrices: Creating and graphing two- dimensional data sets- Calculating and plotting some basic statistics: mean, median, and standard deviation- Factors: Creating and plotting categorized data.

Unit:2	DATA FRAMES&WORLD DATA	12- hours

Data Frames: Organizing values in to data frames, loading frames from files and merging them- Working With Real-World Data: Testing for correlation between data sets, linear models and installing additional packages.

Unit:3	DATA MANIPULATIONS	11- hours

Data manipulations: Overview of how to connect data base from R- How to run SQL queries from R to fetch data- Data manipulation using SQL to prepare data for analysis.

Unit:4	READING AND WRITING OF CSV FILE	12- hours

Reading and writing of csv file-Importing and exporting of data set-Merging of file having same or different number of column-Reading a file involving date and converting this date into different format-Plotting two series on one graph-one with a left y axis and another with a righty axis- histogram-Multivariate Statistical Techniques like Discriminant Analysis, Factor Analysis.

Unit:5	COMPLEX STATISTICS	12- hours

Formula notation and complex statistics: Analysis of Variance (ANOVA) – Manipulating Data and Extracting Components: Creating data for complex analysis–summarizing data Regression – Simple Linear Regression –Multiple Regression – Curvilinear Regression.

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	60- hours

Text Book(s)	
1	Beginning R:The Statistical Programming Language (Wrox)–Dr.MarkGardener,John Wiley & Sons, Inc., 2016 Revised Edition.
2	The Art of RProgramming –Norman Matl off,No Starch Press, 2011 Edition.
3	The R Book–MichaelJ.Crawle,Wiley, 2008Edition
Reference Books	
1	StatisticalAnalysiswithR–M.John,TataMcgrawHillPublishingCo.Ltd.,October2010, Edition.
2	Learning R–Richard Cotton,O'ReillyMedia,September2013, Edition.
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	
2	
3	
Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	M	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core XI		BUSINESS INTELLIGENCE	4			3
Pre-requisite		Basic knowledge in BI	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

To equip knowledge on technical components of Business Intelligence.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Outline the framework of business intelligence	K2
2	Explain the concepts of Business performance management	K2
3	Illustrate the method of text and web mining	K2
4	Examine the business integration and implementation in business	K4
5	Outline the Legal, ethical and privacy issues in Business Intelligence	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TO BUSINESS INTELLIGENCE	12--hours

Introduction to Business Intelligence: Framework for Business Intelligence–Intelligence Creation–Transaction Processing Versus Analytic Processing–Major Tools and Techniques of BI.

Unit:2	BUSINESS PERFORMANCE MANAGEMENT	12--hours

Business Performance Management–Strategize–Plan–Monitor–Performance Measurement–BPM Methodologies–Performance Dashboards and Scorecards.

Unit:3	TEXT AND WEB MINING	12--hours

Text and web mining–text mining concepts and definitions–natural language processing–text mining applications – text mining process – text mining tools – web mining overview – web content mining and web structure mining – web usage mining – web mining success stories.

Unit:4	BUSINESS INTELLIGENCE IMPLEMENTATION	10--hours

Business Intelligence Implementation: Integration and Emerging Trends–Implement BI–BI and Integration implementation –Connecting BI systems to Databases and other enterprise systems.

Unit:5	ON-DEMANDBI	12--hours

On-Demand BI–Issues of Legality, Privacy and Ethics–Emerging Topics in BI–the web2.0revolution –online social networking–virtual worlds–social net works and BI: collaborative decision making–RFID and new BI application opportunities –reality mining.

Unit6	Contemporary Issues	2 hours

Expert seminars and lectures

	Total Lecture hours	60--hours

Text Book(s)

1	E fraim Turban,RameshSharda,Dursun Delenand DavidKing–BusinessIntelligence–A Managerial Approach, Pearson, 2012, 2nd Edition.
2	Stuart Russel and PeterNorvi,Artificial Intelligence:A ModernApproach,PrenticeHall, 2009, 3rd Edition.

Reference Books	
1	GalitShmueli,NitinR.PatelandPeterC.Bruce– Data Mining for Business Intelligence, Prentice Hall, 2009, 3rd Edition.
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	
2	
3	
Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	M	M	S	S
CO3	S	S	S	S	S
CO4	S	S	S	M	M
CO5	S	S	M	M	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core XII		PRINCIPLES OF FINANCIAL MANAGEMENT	4			4
Pre-requisite		Basic knowledge in finance	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To familiarize the students with the principles and practices of financial management.
- To understand the concepts of Financial Management and their application for managerial decision making

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Define and identify the concepts of Financial Management	K1
2	Understand Capital Structure and leverage for strategic Financial Decision Making	K2
3	Apply the concept of cost of capital and techniques of capital budgeting to enhance the investment proposal.	K3
4	Illustrate the importance and estimation of working capital in the organization	K2
5	Outline the concepts of dividend policy	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TO FINANCIAL MANAGEMENT	15--hours

Business Finance – Meaning, Definition, Scope, Importance, Finance Functions, Fixed and variable objectives of Financial Management–Factors influencing Financial Decisions–Source Of Capital –Financial Planning–Capitalisation –Time Value of Money.

Unit:2	CAPITAL STRUCTURE	10--hours

Capital Structure–Introduction–Importance–Financial Break Even Point–Point of Indifference – Optimal Capital Structure–Risk Return Trade off –Theories of Capital Structure, NI,NOI,MM, Arbitrage process–Factors Determining Capital Structure–Capital Gearing .Leverage–Meaning, Types, Impacts, Significance and Limitation.

Unit:3	COST OF CAPITAL&CAPITAL BUDGETING	10--hours

Cost of Capital–Meaning–Significance–Classification of cost–Computation of cos to fcapital – Cost of debt, Preference, Equity and Weighted average Cost of Capital. Capital Budgeting – Meaning– Need – Importance – Kinds and process of Capital Budgeting Techniques of Appraisal of Investment Proposal.

Unit:4	WORKING CAPITAL MANAGEMENT	15--hours

Working Capital Management – Meaning, Concepts, Classification, Importance, Objects of working Capital – Factors determining the Working Capital Requirements – Management of working capital–Methods of Estimating Working Capital Requirements. Cash Management– Determining optimum cash balance.

Unit:5	RECEIVABLES MANAGEMENT& DIVIDEND POLICY	8--hours

*Receivables Management–Forming of credit policy. Inventory Management–Tools and Techniques of Inventory Management.*Dividend Policy-Factors Affecting Dividend–Types Of Dividend–Advantages and disadvantages of stable dividend policy–Theory of Relevance and Irrelevance–Bonus Issue–Rights Issue.***Theory Only**

Unit6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**60--hours**
Distribution of marks Theory 40%Problems 60%.		
Text Book(s)		
1	Shashi.K.Gupta, SharmaR.K–Financial Management, Kalyani Publishers,2013,Reprint.	
2	Khan&Jain-Financial Management,Tata McGrawHill, 2014,Reprint	
3	MaheshwariS.N-Financial Management,Sultan Chand&Sons,2013Reprint	
Reference Books		
1	PandeyI.M-Financial Management,Vikas PublishingHouseLtd,q2013,Reprint.	
2	PrasannaChandra-Financial Management,TataMcGrawHill,2014,Reprint.	
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]		
1		
2		
3		
Course Designed By:		

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	S
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	M	M

Course code		TITLE OF THE COURSE	L	T	P	C
Allied IV		PRINCIPLES OF MARKETING	3			3
Pre-requisite		Basic Knowledge In Marketing Concepts	Syllabus Version			2025-2026

Course Objectives:

The main objectives of this course are to:

- To emphasize on the importance of marketing as a strategy for market segmentation and for establishing a market share.
- To highlight the role of advertising and personal selling for increased turnover and profitability.
- To enable the students to learn the consumer protection act and new marketing approaches.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Explain the modern marketing concepts.	K2
2	Understand functions of marketing and standardization systems.	K2
3	Understand the concepts of marketing promotional strategy.	K3
4	Understand the consumer behavior needs and factors of buying behavior.	K4
5	Examine the needs of consumer protection act and new approaches of marketing.	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

UNIT–I	**INTRODUCTION TO MARKETING**	**Hours- 12**

Marketing-DefinitionofMarket&Marketing–ClassificationsofMarkets-Marketing&Selling- Objectives & Importance of Marketing – Modern Marketing Concept.

UNIT–II	**MARKETING FUNCTIONS**	**Hours- 12**

Marketing Functions-Marketing Process-Classification-Functions of Exchange-Physical Supply-Facilitating Functions-Standardization and Grading -AGMARK-BIS/ISI.

UNIT–III	**MARKETMIX**	**Hours- 12**

MarketMix-ProductMix-Pricemix-MarketSegmentation-PromotionMix-Advertisingand Personal Selling-Physical Distribution Mix-Functions-Types of Middlemen.

UNIT-IV	**CONSUMER BEHAVIOR**	**Hours- 12**

ConsumerBehavior-Meaning-NeedforStudyingConsumerBehavior-FactorsInfluencing Consumer Behavior- Buyers Decision Making Process.

UNIT-V	**CONSUMERISM&CONSUMER PROTECTIONACT**	**Hours- 12**

Consumerism-NeedforConsumerProtection-ConsumerProtectionAct-Features-CompetitionAct-Commission Act-RTI Act- Unfair and Restricted Trade Practices-New Approaches in Marketing-Web-BasedMarketing-E-Marketing-E-Retailing-MultiLevelMarketing-TeleMarketing–Plano gram.

	Total Lecture hours	**60--hours**

Reference Books

1. RajanN.NairandSanjith,NairR–Marketing,SultanChand&Sons,2012,7thedition.
2. ChandrasekaranK.S–MarketingManagement,TheMcGrawHillCcompanies,20101st Edition.
3. PillaiR.S.NandBhagavathi–ModernMarketingPrinciplesandPractice,SultanChand& Sons, 2010, 14th edition.

Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]

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Course Designed By:

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	M	S	S
CO3	S	S	S	S	S
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core XIII		COMPUTER APPLICATION PRACTICAL IV – ANALYSIS WITH SPSS & R			4	3
Pre-requisite		Basic application knowledge in research	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To explore and acquire skills in SPSS and R Programming.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the fundamental programming concepts of R	K1
2	Application of SPSS and R Statistical tools to problems	K2
3	Relate analysis techniques to datasets	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

		60--hours

Syllabus

1. Find Factorial of a number using recursion
2. Write program to calculate Multiplication Table using R
3. Check If a Number is Positive, Negative or Zero
4. Creating vector and matrices using R program.
5. Import and Visualize data using scatterplots
6. Logical statements, c bind/r bind command in R and Create data set using data frames and factors and plot a graph.

Rand SPSS

7) Create an SPSS and R Dataset and determine the number of 18-22 year old population in 2000, 2004 and2005

PARTICULARS	2000	2004	2005
UNIVERSITY STUDENT	47498	66309	70153
NUMBEROF TEACHERS	17302	19103	18098
NUMBEROF INSTITUTIONS	77	91	90
NUMBEROF STUDENTSINTHE%OFTHE 18-22YEAR-OLDPOPULATION	10.4	13.9	15

8) The data below are about the number of tourists in Hungary between 1988and1994.

Year	Quarters	Number of tourists (thousand persons)	Year	Quarters	Number of tourists (thousand persons)
1988	1	687.5	1990	4	1061.2
1988	2	944.7	1991	1	839
1988	3	1212.8	1991	2	1446
1988	4	999.4	1991	3	2274.7
1989	1	839.8	1991	4	1281.5
1989	2	1126.6	1992	1	868.1
1989	3	1423.4	1992	2	1374
1989	4	1164.8	1992	3	1823.9
1990	1	896.2	1992	4	1319.3
1990	2	1307.8	1993	1	854
1990	3	1887.8			

a) Is there any trend in this model? (Normality test)
b) Create a graph from the time series!
c) Which seasonal decomposition should you use? Why?
d) Do a seasonal decomposition! Analyze the parameters and the seasonal factors!
e) Create graphs from the seasonal factors(saf_1,sas_1,stc_1)!
f) Determine the number of tourists for the2nd,3rd and 4th quarter of1993!

9)Open the Employee _data .save file! and analyse the following in SPSS and R Transform/Select Data

g) What is the proportion of custodials?
h) What is the proportion of women within managers?

Graphs

Create a column diagram about the proportion of employees grouped by gender! Embellish the graph! Put the value of proportions into the chart!

a) Transform this column diagram in to a pie chart!
b) Create as catter plot about month since hire and beginning salary if you set markers by gender! Embellish the graph!
c) Create as catter plot about months incehire and previous experience if you set markers by employment category! Embellish the graph!
d) Define simple box plot about previous experience! Embellish the graph!
e) Defines imple box plot about the month since hire categorized by the employment category! Embellish the graph!
f) Define boxplot about the previous experience categorized by the employment category clustered by gender! Embellish the graph!
g) Create a graph to test the normal distribution of beginning salary!

Central Tendencies, Measures of Distribution, Measures of Asymmetry

a) Define the central tendencies of month since hire!
b) Define the characteristics of distribution of previous experience!
c) What is the average salary of employees belonging to the minority?

Correlation and Linear Regression

Is there any relation between previous experience and month since hire?

b) Determine a linear relation between the months in hire and previous experience of employees!

c) Definea90%confidence interval for its b0 and b1parameters!

d) Definea90%confidence interval for they variable!

e) Open the Cars. Save file!

Transform/Select Data

a) How old are the cars? Create a new variable as age!

b) What is the ratio of American ,European and Japanese cars within cars with higher consumption than 20 miles per gallon?

c) What is the ratio of those American cars which have4-6-8cylinders?

10. Estimation and Hypothesis Testing

a) Definea95% confidence interval for the vehicle weight!

b) Definea90% confidence interval for the horse power!

c) Definea98% confidence interval for the time to accelerate!

d) Test the hypothesis that the average consumption of carsis20miles per gallon!(α =5%)

e) Use One Sample T Test to determine whether or not the average miles per gallon significantly differ from 24 at10%significance level!

f) Test the hypothesis that the average horse power of cars is 100!(α=5%)

g) Test the hypothesis that the average consumption of Japanese and American cars is the same! (α =5%)

h) Test the hypothesis that the average consumption of European and American cars is the same! (α = 10%)

i) Check if the horsepower follows a normal distribution or not!

Statistical Dependence

a) Create across tabs from the model year and the country of origin!

b) Create acros stabs from the number of cylinders and the country of origin!

c) Is there any relationship between the country of origin and engine displacement?

d) Is there any relationship between the country of origin and horsepower?

e) Is there any relationship between the country of origin and vehicle weight?

COs	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO3	M	S	S	S	M
CO3	S	S	M	S	S


Fifth
Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core XIV		PYTHON	6			4
Pre-requisite		Basic knowledge in analytics	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To introduce Python concepts and to develop programming skills in Python Programming.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Understand the Python concepts with Datasets	K2
2	Outline the concepts of data frames, data wrangling, plotting and vectorized computation	K2
3	Explain the application of strings	K2
4	Illustrate the unit test using refactoring and generation of XML files	K2
5	Experiment with serializing python objects and packaging python libraries	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTION TOPYTHON	20--hours

Installing Python-Your First Python Program – **Native Data Types: Boolean-Numbers-Lists-Tuples-Sets- Dictionaries.** Comprehension: Working with files and dictionaries-List Comprehensions-Dictionary Comprehensions- Set Comprehension.

Unit:2	VISUALISATION	18--hours

Pandas– Series and Data frames–Data Frames and Data wrangling – **Visualisation–Plotting–Histograms–Grouping Data**–Time series and Statistics-Visualisation in Python-I Python– **Num Py Basics: Arrays-Vectorized Computation.**

Unit:3	STRINGS	17--hours

Strings: Unicode– Diving in – Formatting Strings – Compound Field Names – Format Specifier –Other common string methods–**Slicing astring –Strings versus bytes –Charater encoding Of python sourcecode. Regular expression-closure and generators–classes and iterators– Advanced iterators.**

Unit:4	REFACTORING & FILES	15--hours

Unit test-Refactoring: Handling changing requirements –Refactoring. **Files:** Reading from text files–Writing to text files–Binary files–Streams objects from non file sources–standard input, output and error. **XML**: Parsing XML, Elements are lists, attributes are dictionaries. **Generating XML, Parsing broke XML.**

Unit:5	HTTP WEBSERVICES	18--hours

Serializing Python Objects- HTTP web services: Features of HTTP, How not to fetch data over HTTP, Beyond HTTP GET, Beyond HTTP POST. Packaging python libraries: Dictionary Structures – Classifying your package – Checking your setup script from error –creating a source distribution – creating a graphical installer.

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	90--hours

Text Book(s)	
1	Mark Pilgrim-Diveinto Python3,Apress, Revised Edition
2	PhuongVo.T.,H.,Martin&Czygan, Getting started with Python Data Analysis, Pack t Publishing,2011.
3	
Reference Books	
1	Allen Downey-Think Python,Green Tea Press Needham,Massachusetts, Revised Edition.
Related Online Contents[MOOC,SWAYAM, NPTEL, Websitesetc.]	
1	
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Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	M	S	S	M
CO3	S	S	S	S	M
CO4	S	S	S	S	M
CO5	S	S	S	M	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core XV		COST AND MANAGEMENT ACCOUNTING	6			4
Pre-requisite		Basic knowledge in Accounting	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- Knowledge on Classification of Material, Labour and Overheads.
- To provide the fundamental knowledge and techniques in Management Accounting
- To apply the tools and techniques used to plan, control and make decisions

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Recall various concepts of costing and costing methods	K1
2	Analyze the material costing with various methods	K4
3	Explain the labour wage payment system	K2
4	Outline the various concepts relating to management accounting	K2
5	Analyze financial statements using ratio analysis	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	INTRODUCTIONTOCOSTACCOUNTING	18--hours

Cost Accounting – Definition, Meaning & Scope – Relationship of Cost Accounting with Financial Accounting and Management Accounting – Methods of Costing – Cost Analysis, Concepts and Classifications–Elements of Cost, Preparation of Cost Sheet and Tender– Costing as an Aid to Management–Limitations and Objections Against Cost Accounting- Reconciliation of Costs and Financial Accounts.

Unit:2	MATERIAL ISSUES	20--hours

Materials – Purchasing of Materials, Procedure and Documentation Involved in Purchasing – Requisitioning for Stores – Methods of Valuing Material Issues – Maximum, Minimum & Re-ordering Levels – EOQ – Perpetual Inventory.

Unit:3	LABOUR	17--hours

Labour – Systems of Wage Payment ,Idle Time, Control Over Idle Time–Labour Turnover. Overhead – Classification of Overhead – Allocation and Absorption of Overheads. Activity Based Costing.

Unit:4	INTRODUCTION TO MANAGEMENT ACCOUNTING	15--hours

Management Accounting- Meaning, Objectives & Scope - Need and Significance - Relationship between Management Accounting, Cost Accounting & Financial Accounting. Financial Statement and their importance-Tools for Analysis and Interpretation-Common Size Statements, Comparative statement and Trend Analysis.

Unit:5	RATIO ANALYSIS	18--hours

Ratio Analysis-Significance of Ratios-Ratios for Long term and Short term-Financial Position– Profitability, Liquidity -Uses and Limitations of Ratios. Fund Flow & Cash Flow Analysis.

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	90--hours

Text Book(s)	
1	Maheswari.SN-Principles of Cost Accounting, Sultan Chand&Sons, Reprint 2016.
2	SharmaR.K, SashiK. Gupta & NeetiGupta–Management Accounting,Kalyani Publishers,Reprinted 2016, IV edition.
3	ReddyT.SandReddyH.P–Management Accounting,Margham Publications,2013,VIII Edition.
Reference Books	
1	JainandNarang-Cost and Management Accounting, Kalyani Publishers,2013,21st Edition. Maheswari S.N - Management Accounting, Sultan Chand and Sons, 2013,Reprint.
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	
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Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core XVI		INCOME TAX	6			4
Pre-requisite		BASIC KNOWLEDGE IN TAX	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To state the laws relating to income tax and procedures.
- To equip the students with revised provisions of The Income Tax Actof1961.
- To laydown a foundation for computing gross total income, rebate and the total tax liability of an individual.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Outline the various term in logies related to income tax	K1
2	Understand the method of calculating and levy in tax	K2
3	Apply the various tax laws and available provisions in tax computations	K3
4	Evaluate the set off and carry forward of losses while calculating personal income	K5
5	Analyze self-assessment of income and tax computation	K4

K1-Remember;**K2**-Undestand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	INTRODUCTION TO TAX	20--hours

The Income Tax Act-Definition of Income-Assessment Year –Previous Year -Assessee– Types of Assessee-Scope of Income-Charge of Tax-Residential Status–Exempted Incomes-Incomes which do not Form Part of Total Income - Tax Rates.

Unit:2	SALARIES	18--hours

Computation of Income from salaries–annual accretion–allowances, perquisites And their types and treatment–Profits in lieuof salary and exempted profits– Deductions U/S 16

Unit:3	INCOME FROM HOUSE PROPERTY & PROFITS AND GAINS OF BUSINESS	17--hours

Income from House property–Determination of Annual value–Deductions out of annual value-Profits and Gains of Business or Profession - Meaning of Business or Profession – Computation of Profits and Gains of Business or Profession of an Individual- Expenses Expressly Allowed - Expenses Expressly Disallowed.

Unit:4	INCOME FROM CAPITAL GAINS	15--hours

Income from Capital Gains-Computation of Capital Gains-Income from Other Sources-Computation of Income from Other Sources.

Unit:5	SET OFF AND CARRYFORWARD	18--hours

Set off and Carry Forward Set off losses – Deductions to be made in computing Total Income–Computation of Gross Total Income-Assessment of Individuals. Introduction to e-Filing.

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	90—hours

Note:20%theoryand 80%problems

Text Book(s)	
1	GaurV.P.andNarangD.B.-IncomeTaxandPractice,KalyaniPublishers,Current Edition.
2	Dinkar Pagare- Income Tax and Practice, Sultanchand & Sons, Current Edition.
Reference Books	
1	Mehrothra-Income Tax and Practice, Sultanchand &Sons,Current Edition.
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
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Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core XVII		COMPUTER APPLICATIONS PRACTICAL V - PYTHON			4	4
Pre-requisite		BASIC APPLICATION KNOWLEDGE IN STATISTICAL CALCULATIONS	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To explore and acquire skills in Python Programming

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Relate statistical calculations	K1
2	Describe pandas	K2
3	Apply plotting graphs	K3

K1-Remember;**K2**-Undestand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate; **K6**-Create

60--hours

1. **Word frequency analysis**

Exercise 1.1. Write a program that reads a file, breaks each line into words, strips whitespace and punctuation from the words, and converts them to lowercase.

Exercise 1.2. Go to Project Gutenberg (http: // gutenberg. org) and download your favorite out-of-copyright book in plain text format. Modify your program from the previous exercise to read the book you downloaded, skip over the header in formation at the beginning of the file,and process the rest of the words as before.

Then modify the program to count the total number of words in the book, and the number of time seach word is used.Print the number of different words used in the book. Compare different books by different authors, written in different eras. Which author uses the most extensive vocabulary?

Exercise 1.3. Modify the program from the previous exercise to print the 20 most frequently- used words in the book.

Exercise1.4. Modify the previous program to read a word list (seeSection9.1) and then print all the words in the book that are not in the word list. How many of them are typos? How many of them are common words that should be in the word list, and how many of them are really obscure?

2. **Random numbers**

Exercise 2.1. Write a function named choose_ from_ his that takes a histogram as defined in and returns a random value from the histogram, chosen with probability in proportion to frequency.

3. **Word histogram**

Exercise3.1.reads a file and builds a histogram of the words in the file **Exercise 3.2.**reads emma.txt, which contains the text of Emma by Jane Austen.

Exercise 3.3.updates the histogram by creating a new item or incrementing an existing one. **Exercise 3.4.**count the total number of words in the file by add up the frequencies in the histogram.

4. **Most common words**

Exercise 4.1. Find the most common words by applying the DSU pattern; most _common takes a histogram and returns a list of word- frequency tuples, sorted in reverse order by frequency**.**

Exercise4.2. Prints the ten most common words**.**

5. **Optional parameters**

Exercise5.1. Prints the most common words in a histogram**.**

6. **Dictionary subtraction**

Exercise6.1. Python provides a data structure called set that provides many common set operations. Read the documentation at http: // docs. python. org/ 2/ library/ std types. html#types -set and

Exercise 6.2. Write a program that uses set subtraction to find words in the book that are not in the word list.

Solution:http://thinkpython.com/code/analyze_book2.py.

7. **Random words**

Exercise7.2: Use keys to get a list of the words in the book, Build a list that contains the cumulative sum of the word frequencies. The last item in this list is the total number of words in the book, n, Choose a random number from 1 to n. Use a bi section search to find the index where the random number would be inserted in the cumulative sum, Use the index to find the corresponding word in the word list.

Exercise 7.2. Write a program that uses this algorithm to choose a random word from the book. Solution: http:// think python. com/ code/ analyze_ book3. py .

8. **Markov analysis**

Read a text from a file and perform Markov analysis

Add a function to the previous program to generate random text based on the Markov analysis. Finally mashup:

Solution: http://thinkpython.com/code/markov.py. You will also need http://thinkpython.com/code/emma.txt.

9. **Doc strings for polygon, arc and circle.**

Draw a stack diagram that shows the state of the program while executing circle(bob,radius). Solution: http: // thinkpython. com/ code/polygon. py.

10. **Draws an Archimedian spiral.**

Read about spirals at http://en.wikipedia.org/wiki/Spiral,then(orone of the other kinds).Solution: http:// think python. com/ code/ spiral. py.

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	M	S	S	S

Course code		TITLE OF THE COURSE	L	T	P	C
Elective I (A)		BUSINESS ORGANISATION AN DMODELS	5			3
Pre-requisite		Basic knowledge in organizational behavior	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To enable the students to learn principles and concepts of Business.
- To provide a theoretical knowledge about the process of decision making with models of business.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Classify the basic ideas of Business	K2
2	Indicate the Preparation method of business models.	K2
3	Outline the financial models of business	K2
4	Illustrate the marketing and selling models to promote business	K2
5	Explain the models of HR in business	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	**INTRODUCTION TO BUSINESS**	**15--hours**

Meaning of Business – Entrepreneur (Meaning, Characteristics of an entrepreneur)- Enterprise- a business venture- Business idea and opportunity- Examining some business ideas in agriculture, agro-basedenterprises,generaltrade(includingshops),manufacturingproductsand services (including hotels) and their unique features by incorporating outsourcing.

Unit:2	**BUSINESS PLAN**	**15--hours**

Preparing a Business Plan – Retail selling grocery shop; a textiles selling shop; any other consumer goods selling business; asmall scale manufacturing unit –Printing Press- Electrical and Electronic goods dealership. Contract works as business - Estimating the returns or profits- Preparing a conceptual and graphic model.

Unit:3	**FINANCING MODEL**	**15--hours**

Financing model for a business: Sources for a small business- owned capital, friends and relatives; banks; government sources; suppliers and customers; interest and other costs and the terms and Conditions attached to such sources and investing the finance in assets-The working capitalcycle.

Unit:4	**MARKETING AND SELLING MODELS**	**15--hours**

Marketing and Selling models-Advertising and soliciting customers, customer relationship; Quality assurance; Pricing Methods; Competition and strategies in facing the competition.

Unit:5	**HUMAN RESOURCES IN THE BUSINESS**	**13--hours**

Models for managing the human resources in the business- recruitment, training, employee productivity and compensation; Building up organizational procedures and commitment, loyalty.

Unit6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**75--hours**

Text Book(s)

1	Y.K.Bhushan – Business Organisation and Management,Sultanchand&Sons,2012edition.
2	C.B.Gupta–Business Organisation and Management,MayurPaperbacks,2011Edition.

3	S.A.Sherlekar–Modern Business Organisation and Management-A System Approach, Himalaya, 2010 edition.
Reference Books	
1	RashmiBansal – Take MeHome:TheInspiringStoriesof20Entrepreneurs, West lands, 2014 edition.
2	
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
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Course Designed By:	

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Elective I (B)		Marketing Analytics	5			5
Pre-requisite		Basic knowledge in Marketing Analytics				

Course Objectives:

The main objectives of this course are

To explore awareness about the relevance of Marketing Analytics

- Pricing, promotion and sales analytics.

Expected course Outcomes:

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

1	Understand the fundamentals of marketing analytics.	K1
2	Evaluate and develop business strategies.	K2
3	Apply differential product and price analytics.	K2
4	Compare and implement distribution analytics.	K3
5	Implement proper sales analytics.	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	Marketing Analytics Framework	15-hours

Marketing Analytics Framework: Introduction to Marketing Analytics and Models. Market Insight - Market Data Source – Treatment of outliers, Market sizing, PESTLE Market analysis, Porter Five Force Analysis Market segment identification, targeting and positioning - Tools and Techniques: Regression, Cluster Analysis, and Perceptual Mapping Techniques..

Unit:2	Business Strategy and Operations	15-hours

Business Strategy and Operations: Analytics based strategy selection with strategic models - Strategic Scenarios, Strategic Decision Models, and Strategic Metrics. Business Operations: Forecasting - Predictive Analytics - Data Mining - Balanced Scorecard - Critical Success Factors.

Unit:3	Product and Price Analytics	15-hours

Product and Price Analytics: Product analytics: Conjoint Analysis model - Decision Tree Model - Portfolio Resource Allocation - Product/ service Metrics, Attribute Preference testing. Price Analytics: Pricing Techniques - Pricing Assessment - Profitable pricing - Pricing for Business Markets - Price Discrimination

Unit:4	Distribution and Promotions Analytics	15-hours

Distribution and Promotions Analytics: Distribution Analytics: Distribution Channel Characteristics - Retail Location selection, Channel Evaluation and Selection - Multi-channel Distribution. Promotion Analytics: Promotion Budget estimation - Promotion Budget Allocation – Ad value equivalence model - Promotion Metrics for traditional Media - Promotion Metrics for social media

Unit:5	Sales Analytics:	13-hours

Sales Analytics: E commerce sales model, sales metrics, profitability metrics and support metrics - Rapid decision models - data driven presentations - contemporary issues and opportunities in application of marketing analytics in different sectors.

Unit:6	Contemporary Issues	
	Expert seminars and lectures	
	Total Lecture hours	75-hours

Text Book(s)

1. Stephen Sorger, (2013), MARKETING ANALYTICS, Strategic Models and Metrics, First Edition, Admiral Press.
2. Gary L. Lilien and Arvind Rangaswamy (2014), Marketing Engineering: Computer Assisted Marketing Analysis and Planning, 2nd edition, Trafford Publishing UK.
3. Wayne L. Winston (2014), Marketing Analytics: Data-Driven Techniques with Microsoft Excel, First Edition, Wiley, Indianapolis.

Reference Books	
Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]	
1	
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Course Designed By:	

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Elective I (C)		LEGAL ASPECTS OF BUSINESS	5			3
Pre-requisite		Basic knowledge of law related to business	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To acquaint the student with the knowledge of basic legal aspects under various laws.
- To provide knowledge of the various rights and liabilities under the various laws.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Outline the essential elements of Indian Contract Act	K2
2	Understand the sale of goods act	K2
3	Inspects the nature and registration process in partnership act	K4
4	Explain the importance, types and claim settlement of insurance	K4
5	Examine the need for consumer protection act,its procedures for consumer grievances	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**-Create

Unit:1	LEGAL RULES	15--hours

Indian Contract Act–Classification of contracts–Essential elements of contract–Legal rules as to Offer–Acceptance–Consideration.Capacity–Competent parties to a contract–Freeconsent – Flaw in consent–Legality of object. Performance of contract–Discharge of contract – Remedies for breach of contract.

Unit:2	NEGOTIABLE INSTRUMENTS ACT	15--hours

Sale of Goods Act–Formation –Conditions and Warranties –Transfer of property–Performance of contract-Negotiable Instruments Act–Nature–Types-Liabilities of parties–special rules for cheque and drafts- Discharge of negotiable instruments.

Unit:3	LAW OF PARTNERSHIP	15--hours

Law of Partnership–Introduction, meaning and nature of partnerships –Registration of firms – Partnership Deed–Relations of partners to one another and third parties –changes in a firm-dissolution

Unit:4	INSURANCE	15--hours

Insurance – Definition – Functions – Types of insurance – Principles – Importance to business. Fireinsurance–Kinds–Procedure for effecting fire insurance–Policy conditions–Settlement of claims. Marine Insurance – Kinds – Procedure for taking a marine insurance policy– Policy conditions–Settlement of claims.

Unit:5	CONSUMER PROTECTION ACT	13--hours

Consumer Protection Act–consumer rights, procedures for consumer grievances red ressal–types Of consumer red ressal machinaries and forums–Competition Act 2002–copyrights–trademarks, patent Act

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	75--hours

Text Book(s)

1	N.D.Kapoor-Elements of Mercantile Law,SultanChand,32nd Edition.
2	Akhileshwar Pathak –Legal aspects of business,TataMcGrawHill,4th Edition

Reference Books	
1	Paul Tmeporal, Brandingin Asia,JohnWiley&sons(P)Ltd.,NewYork,2000.
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	S.S.Gulshan-BusinessLaw,Excelbooks,4th Edition.
2	
3	
Course Designed By:	

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		SAS & SCI LAB	L	T	P	C
Skill based subject-IV		Basic knowledge in statistics	3	-		3
Pre-requisite			Syllabus Version		2025-2026	

Course Objectives:

1. To understand and analyse using tools in business analytics.
2. To enlighten Programming and graphing capabilities to solve business problem

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Statistical Analytical Software	K_1
2	Analys is using Dataset	K_2
3	Numerical Computational Package	K_3
4	Programming in SAS, using Procedures within SAS and Data Visualization	K_4

K1-Remember;**K2**-Understand; **K3**-Apply;**K4**-Analyze;**K5**-Evaluate; **K6**-Create

Unit:1	ACCESSING DATA	8 hours

Accessing Data: Use FORMATTED, LIST and COLUMN input to read raw data files – Use INFILE statement options to control processing when reading raw data files- Use various components of an INPUT statement to process raw data files including column and line pointer controls, and trailing @ controls - Combine SAS data sets using the DATA step. **Creating Data Structures:** Create temporary and permanent SAS data sets - Create and manipulate SAS date values - Control which observations and variables in a SAS data set are processed and output.

Unit:2	MANAGING DATA	9 hours

Managing Data: Sort observations in a SAS data set - Conditionally execute SAS statements - Use assignment statements in the DATA step - Modify variable attributes using options and statements in the DATA step - Accumulate sub-totals and totals using DATA step statements.

Unit:3	SAS FUNCTIONS	8 hours

Use SAS functions to manipulate character data, numeric data, and SAS date values - Process data using DO LOOPS - Process data using SAS arrays. **Generating Reports:** Generate list reports using the PRINT and REPORT procedures - Generate summary reports and frequency tables using base SAS procedures. Enhance reports through the use of labels, SAS formats, user-defined formats, titles, footnotes and SAS System reporting options –Generate HTML reports using ODS statements. **Handling Errors:** Identify and resolve programming logic errors.

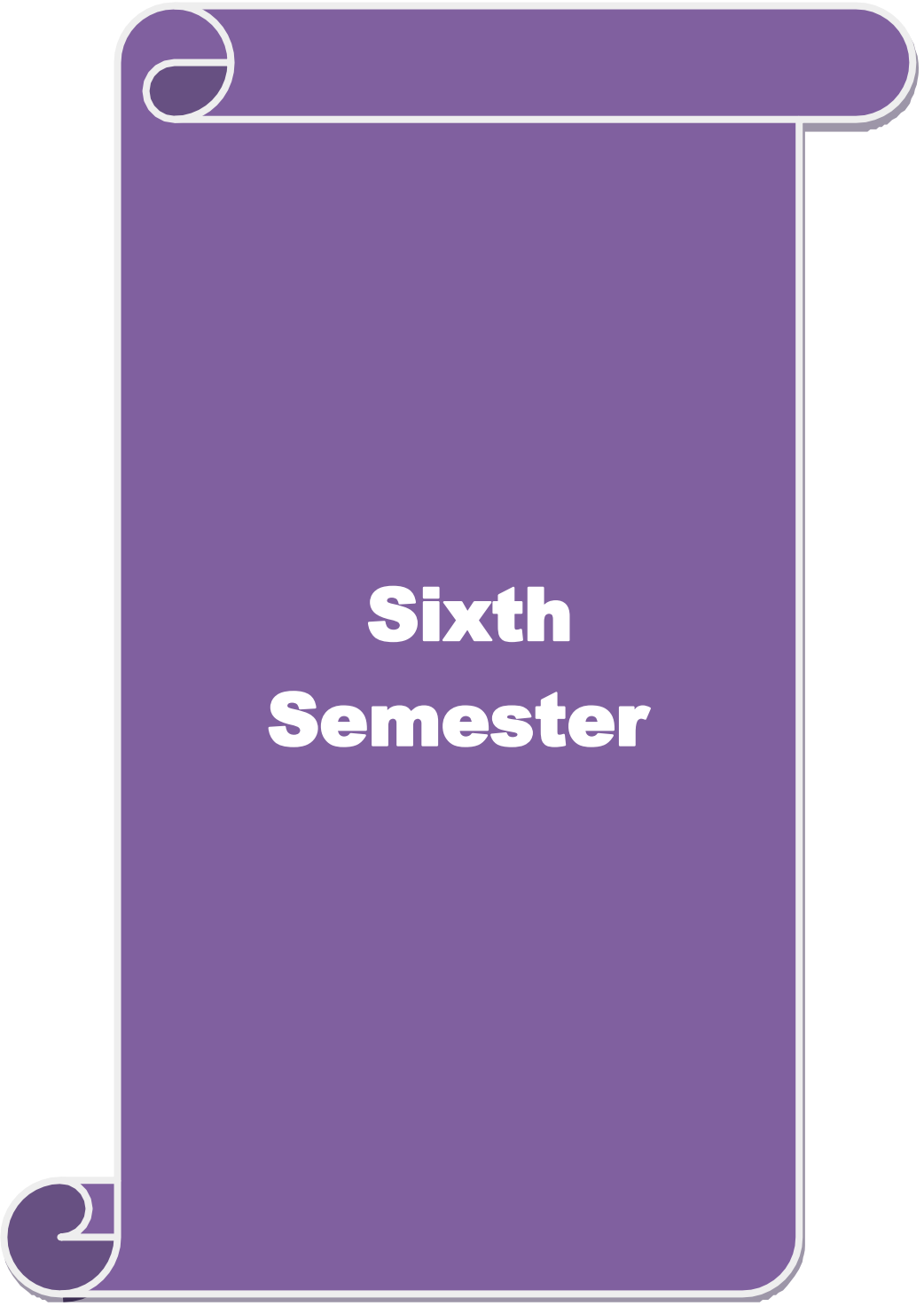
Unit:4	INTRODUCTION TO SCILAB	7 hours

IntroductionTo Scilab-How to get and install Scilab –Programming: Variables, assignment and display– Loops – Tests - 2 and 3D plots - Supplements on matrices and vectors - Calculation accuracy - Solving differential equations-Scilab functions:Analysis-probability and statistics-To display and plot–Utilities.

Unit:5	INPUT/OUTPUT IN SCILAB	11 hours
INPUT/OUTPUT in Scilab–savind and loading variables–unformatted output to screen -unformatted output to file – working with files – writing to files – reading from keyboard – reading from files – **Manipulating strings in Scilab:** string concatenation – string function – converting numerical values to strings – string concatenation for a vector of a strings - converting strings to numbers – executing Scilab statements represented by strings – producing labeled output – using disp function		
Unit6	**Contemporary issues**	2 hours
	Expert lectures and seminars	
	Total Lecture hours	**45 hours**
Text Book(s)		
1	VenkatReddyKonasani, Shailendra Kadre, Practical Business Analytics Using SAS:AHands-on Guide, Apress, 2015,1st Kindle Edition	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	L	L	L	M
CO2	S	L	L	M	M
CO3	S	L	L	L	M
C04	M	L	S	L	L

S-Strong; M-Medium; L-Low


Sixth
Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core XVIII		HADOOP	5	-	-	3
Pre-requisite		BASIC knowledge in computer	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To explore and acquire skills in Hadoop, Pig and Hive.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Relate Had oop concepts with Data sets	K1
2	Outline the use of Hadoop distribution file system	K2
3	Experiment with Mac Reduce application for development	K3
4	List the features of MacReduce applications	K2
5	Apply PIG and Hive concepts to integrate	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit 1	MEET HADOOP & MAPREDUCE	15 hours

Meet Hadoop: Data – Data Storage and Analysis – Comparison with other systems – A brief history of Hadoop–The Apache Hadoop Project –**Map Reduce:** A weather data set–Scaling out - Hadoop streaming - Hadoop pipes.

Unit 2	HAD OOP DISTRIBUTED FILE SYSTEM	15hours

The Hadoop Distributed File system: The design of HDFS – HDFS concepts – The Command Line interface – Hadoop File Systems – The Java Interface – Data Flow – Parallel copying with distcp–Had oop archives. **Hadoopi/o:** Data Integrity–Compression –Serialization –File based Data structure.

Unit 3	MAP REDUCE APPLICATION	15 hours

Developing a Map Reduce Application: The Configuration API– Configuring the development environment–Writing a Unit Test–Running locally on test data–Running on a cluster– Tuning a job– Map Reduce work flows. **Map Reduce Types and Formats:** Map Reduce Types – Input Formats – Output Formats.

Unit 4	SETTING UPA HADOOP CLUSTER	15 hours

Map Reduce Features: Counters–Sorting–Joins–Side Data Distribution–Map Reduce library classes. **Setting up a Hadoop Cluster:** Hadoop Specification – Cluster setup and installation–SSH Configuration–Had oop Configuration–Post Installation–Benchmarking a Hadoop Cluster – Hadoop in the cloud.

Unit 5	PIG & HIVE	13 hours

PIG: Features –modes–modes–PIG Latin –Dataset –Commands and Functions –Operators–Evaluation Functions – Batch Mode – Embedded Mode – PIG vs. SQL. **HIVE:** Features – Architecture – Data Units – HIVE Query Languages – Database Operations – Tables – Joins – HIVE vs. PIG.

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	75 hours

Text Book(s)	
1	TomWhite-Hadoop:The Definitive Guide,O"Reilley,4th Edition,2015.
Reference Books	
1	MarkKerzner,SujeeManiyam –Had oop Illuminated,Git-Hub,2016 Edition
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	
2	
Course Designed By:	

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	M	M
CO3	S	M	S	S	S
CO4	S	S	S	M	M
CO5	S	S	S	M	M

Course code		TITLE OF THE COURSE	L	T	P	C
Core XIX		COMPUTER APPLICATIONS PRACTICAL VI – HADOOP	-	-	5	2
Pre-requisite		Basic application knowledge in computer	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:

- To explore and acquire skills in Hadoop Programming.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Relate data as data sets	K1
2	Describe PIGAND HIVE	K2
3	Relate analysis techniques to more complex datasets	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

	Total Hours	**75hours**

Syllabus

1. Perform File Management in Hadoop.
2. Perform Health Care Analysis using Map Reduce.
3. Perform Word Count in Map Reduce using Politics data set.
4. Find Maximum temperature using Map Reduce.
5. Perform Inner joins in PIG using Human Resource data set.
6. Program to perform job tracker, word count using Travel dataset.
7. Perform PIG operations using Telecom dataset.
8. Perform HIVE operations using Politics dataset.
9. Cross Operation in PIG using Logistics dataset.
10. Order the data by Ascending and Descending operations Retail Dataset.

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	M	S	S	M
CO3	S	S	M	S	S

Course code		SAS & SCILAB	L	T	P	C
Core XX -SAS& SCILAB-Practical VII		Basic knowledge in statistics	-	-	4	2
Pre-requisite			Syllabus Version		2025-2026	

Course Objectives:

- To understand and analyse using tools in business analytics.
- To enlighten Programming and graphing capabilities to solve business problems.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Statistical Analytical Software	K_1
2	Import and generate CSV files	K_2
3	Analyze the data with different statical measures	K_3
4	Perform conditional and logical operations	K_4

K1-Remember;**K2**-Understand; **K3**-Apply;**K4**-Analyze;**K5**-Evaluate; **K6**–Create

		60hours

SAS

1.Student database:

Writing a Basic SAS Program Accessing Data in SAS Libraries
Create as a program by getting input from user for name, age, phone,
address .Give datelines with required variables.
Enter print command to display result of student.

2.Cardatabase:

Reading and Generating CSV Files Using Snippets & Using the Import Data Utility in SAS Studio
Import a car database from permanent database from using snippets
Rename the file name and generate same csv file.
By using import utility option, import an excel file into sas and display the result.

3. Car Database:
   a) Creating a New Column in SAS, Performing Conditional Log icin SAS from permanent database take car dataset
   b) Add new column called Mark up by subtracting MDRP with Invoice
4. Heart Database:
   a) Pickout heart dataset from permanent database
   b) Give appropriate values to filterad at a and display the result
   c) By using Air Dataset
   d) Format the date column
5. Baseball Database:
   a) Pickout Baseball dataset from permanent database
   b) Select scatter plot and series plot
   c) Change the settings in tab, option with necessary arguments
6. Iris Database:
   a) Transform the dataset and set analysis variable, categorical variable.
   b) Apply necessary arguments for selected graph and display the result.

7. Fish Dataset:
   Summary Statistics, Distribution Analysis Using SAS Studio
   a) Perform summary & distribution analysis on fish dataset.
   b) Setrequired variable and give statistic measure top lot the graph
8. Class Database:
   a) Assignsing le variable to analyse.
   b) Apply necessary arguments for selected graph and display the result. Cars Database:
   c) Perform Correlation Analysis ,One-Way ANOVA
   d) Setrequired variable and give statistic measure top lot the graph
9. Fish Databse:
   Analysis of Covariance & Forecasting Using SAS Studio
   a) Assignsing le variable to analyse.
   b) Apply necessary arguments for selected graph and display the result.

SciLab

10. Matrix manipulation using Scilab
11. Celsius temperatures can be converted to Fahrenheit by multiplying by9, dividing by 5,and adding 32.Assign a variable called C the value37,and implement this formul at oassign a variable F the Fahrenheit equivalent of 37 Celsius.
12. Least Square Curve Fitting and plotting in scilab
13. Solvean ODE using Scilab
14. Write a program to input2 strings from the user and to printout (i)the concatenation of the two strings with a space between them, (ii) a line of aste risks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:
    i.Enterstring1:Markii.Enterstring2: Huckvaleiii. MarkHuckvale iv. elavkcuHkraM

Mapping with Programme Outcomes					
COs	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	L	L	L	M
CO2	S	L	L	M	M
CO3	S	L	L	L	M
C04	M	L	S	L	L

S-Strong; M-Medium; L-Low

Course code		TITLE OF THE COURSE	L	T	P	C
Elective II (A)		FINANCIAL MARKETS AND INSTITUTIONS	5			3
Pre-requisite		Basic knowledge about financial institutions	Syllabus version		2025-2026	

Course Objectives:

The main objectives of this course are to:

To enable the students to know the functioning of Indian financial markets and institutions.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Relate the concepts of Indian financial system	K1
2	Outline the concepts of new issue market	K2
3	Examine the role and functions of Investment Institutions in India	K4
4	List the types, role and performance of Mutual funds and its regulations	K4
5	Identify the importance and kinds of derivatives	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	INDIAN FINANCIAL SYSTEM	15 hours

Indian Financial System: Financial Market - Meaning - Need and Objectives. Functions-Classifications of Financial Market. Capital Market: Role of Capital Markets - Functions – Capital market instruments-Recent Trends in capital market in India–Money Market: Money market instruments.

Unit:2	NEW ISSUE MARKET	15 hours

New issue market-Secondary market. Stock Exchange- Objectives- Functions. SEBI: Role and Powers of SEBI. Recent Trends and developments in Security Market - OTCEI - NSE - BSE - Achievements - Guidelines - DEMAT - Objectives – Importance.

Unit:3	INVESTMENT INSTITUTIONS IN INDIA	15hours

Investment Institutions in India: UTI-ICICI- IDBI-IFCI-SFC. Commercial Banks-Role and functions - Central Bank - Objectives and Functions - Insurance Companies –History and Development of Insurance Companies –kinds of Insurance-IRDA-Powers and Functions – Debt Market - Types of Bonds.

Unit:4	MUTUAL FUND	15hours

Mutual Fund-Meaning, Definition–Advantages–Types-Mutual Fund Products-Performance of Mutual Fund - Role of Mutual Fund Sector - SEBI Regulations on Issue of Mutual Fund - Recent Developments in Mutual Fund. Credit Rating - Features – Advantages - CRISIL & ICRA - Domestic and Global Credit Rating Agencies.

Unit:5	DERIVATIVES	13hours

Derivatives –Meaning–Definition–Importance - Kinds of Financial Derivatives– Forwards – Features-financialforward-Futures-TypesofFutures–Options–Types–Benefits–Swap– Kinds - Derivatives in India – Securitization – Definition - Mechanism of Securitization – Securitization in India.

Unit6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	75 hours

Text Book(s)	
1	VarshneyP.N.&MittalD.K.-Indian Financial System,Sultan Chand&Sons,2014 edition.
2	AvadhaniV.A-Marketing ofF inancial Services, Himalaya Publishing House,3rdedition 2017.
Reference Books	
1	GordanE,NatarajanK-Financial markets and services, Himalaya Publishing House, 10thedition2018
Related Online Contents[MOOC,SWAYAM, NPTEL,Websitesetc.]	
1	S.S.Gulshan-BusinessLaw,Excelbooks,4thEdition.
Course Designed By:	

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	S	M
CO5	S	S	S	S	M

Course code		TITLE OF THE COURSE	L	T	P	C
Elective II (B)		CYBER LAW	5			3
Pre-requisite		Basic knowledge in cyber securities	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:
After the successful completion of the course the student should have a thorough knowledge on the basic concepts which lead to the formation and execution of electronic contracts

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Relate the concepts of Cyberspace	K1
2	Outline the technical aspects of encryption	K2
3	Analyze the law of procedures and factors influencing computer crime	K4
4	Interpret and Analyze the Legal framework for Electronic Data Interchange	K2
5	Examine the authentication of electronic records	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	**INTRODUCTION TO E-COMMERCE**	**13hours**

Introduction-Concep to Cyberspace-E-Commerce in India-Privacy factors in ECommerce-cyber law in E-Commerce-Contract Aspects.

Unit:2	**INTELLECTUAL PROPERTY ASPECTS**	**15hours**

Introduction-Technical aspects of Encryption-Digital Signature-Data Security. Intellectual Property Aspects: WIPO-GII-ECMS-Indian Copy rights act on soft proprietyworks- Indian Patents act on soft propriety works.

Unit:3	**EVIDENCE&CRIMINAL ASPECTS**	**15hours**

Evidence as part of the law of procedures –Applicability of the law of Evidence on Electronic Records-The Indian Evidence Act1872. Criminal aspect: Computer Crime-Factors influencing Computer Crime- Strategy for prevention of computer crime Amendments to Indian Penalcode 1860.

Unit:4	**ELECTRONIC DATAINTERCHANGE**	**15hours**

Legal framework for Electronic Data Interchange: EDI Mechanism-Electronic Data Interchange Scenario in India.

Unit:5	**ELECTRONICRECORDS**	**15hours**

Definitions-Authentication of Electronic Records Electronic Governance-Digital Signature Certificates.

Unit6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**75 hours**

Text Book(s)

1	TheIndianCyber Law:SureshT.Viswanathan,BharatLawHouse,NewDelhi.
2	

Related Online Contents[MOOC,SWAYAM,NPTEL,Websitesetc.]

1	S.S.Gulshan-BusinessLaw,Excelbooks,4th Edition.

Course Designed By:

Mapping with Programme Outcomes					
Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	S	S	M	M
CO4	S	S	S	S	M
CO5	S	S	S	M	M

Course code		TITLE OF THE COURSE	L	T	P	C
Elective II (C)		Social Media Analytics	6			3
Pre-requisite		Basic knowledge in Social Media Analytics	Syllabus version		2025-2026	

Course Objectives:

To provide an overview of common text mining and social media data analytic activities

Expected Course Outcomes:

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

1	Recall the various concepts of data analytics.	K1
2	Summarise the terminologies,metaphors and perspectives of socialmedia analytics	K2
3	Classify the web mining tools and libraries on realistic data sets as a basis for business decisions and applications	K3
4	Interpret the solutions to the emerging problems with socialmedia such as behavior analytics and Recommendation systems	K3
5	Identify ontology-based solutions for opinion extraction, sentiment classification and data summarization problems.	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	FOUNDATION FOR SOCIAL MEDIA ANALYTICS:	15 hours

Foundation for Social Media Analytics: Foundation for Analytics: – Digital Gap – Social Media Data Sources – Defining Social Media Data –Data Sources – Estimated vs. Factual Data Sources – Data Gathering in Social Media Analytics. From Data to Insights: Actionable Analytics – Focus on objective – –Choosing a good analytics tool – Data Aggregation

Unit:2	Social Media Analytics Types, Tools and Social Network Landscape:	15hours

Social Media Analytics Types, Tools and Social Network Landscape: Analytics in social media: Types of analytics. Dedicated Vs. Hybrid Tools –Dedicated tools–Hybrid tools–Social Network Landscape: Concept and UX on social networks–Interactivity of social network–Content flow

on social network– Interaction Pattern between users

Unit:3	Analytic Process and Metrics:	15hours

Analytic Process and Metrics: Analytics Process: Analysis –Insight–Investigation beyond social analytics – Shaping a method –analysis cycle – Community Activity –Resources – Attention span – Dynamic cycles – Short Periods –Long Periods –AnalystMindset– InstinctiveAnalyst.Metrics:Introduction–Defaultandcustom
metrics – Metrics Categories – Graph Types – Metric Capabilities – Metrics and Strategy

Unit:4	Semantic Web and Social Network Analysis	15hours

Semantic Web and Social Network Analysis: Introduction to Semantic Web: Limitations of current Web, Development of Semantic Web, And Emergence of the Social Web. Social Network analysis: Development of Social Network Analysis –Key concepts and measures in network analysis. Electronic sources for network
analysis: Electronic discussion networks, Blogs and online communities - Web-based networks.

Unit:5	Semantic Web and Ontology	13hours
Semantic Web and Ontology : Knowledge representation on the Semantic web: Ontology and their role in the Semantic Web :Ontology-based knowledge Representation – Ontology languages for the Semantic Web: Resource Description Framework		
Distribution of Marks Theory 80%. and Problems 20%.		
Unit6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**75 hours**

Text Book (s)

1	Ganis,Kohirkar(2016).SocialmediaAnalytics,IBMPressPTG,1stEdition.
2	Peter Mika.(2007).Social Networks and the Semantic Web, First Edition, Springer

Reference Books

1. Ganis, Kohirkar (2016).Social media Analytics, IBM Press PTG,1st Edition.
2. Nancy Flynn(2012).The Social Media Handbook Policies, and Best Practices, Wiley.
3. Guandong Xu,Yanchun Zhang and LinLi, (2011).Web Mining and Social Networking– Techniques and applications, First Edition Springer.

Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]

1	
2	
3	

CourseDesignedBy:

MappingwithProgrammeOutcomes

Cos	PO1	PO2	PO3	PO4	PO5
CO1	S	S	S	S	S
CO3	S	S	S	S	M
CO3	S	S	S	S	S
CO4	S	S	S	M	M
CO5	S	S	S	M	M

Course code	TITLE OFTHE COURSE	L	T	P	C
Elective III(A)	HR Analytics	5	-	-	3
Pre-requisite	Basic knowledge in HR & Analytics		Syllabus Version	2025-2026	

Course Objectives:

The main objectives of this course is to:

1. Understand the fundamentals of HR analytics
2. Understand the process of recruitment analysis

Expected Course Outcomes:

On the successful completion of the course, student will be able:

1	Understand of the role and importance of HR analytics.	K2
2	Explain the strategies to track, store, retrieve, analyse and interpret HR data to support decision making.	K3
3	Apply appropriates of twareto record, maintain, retrieve and analyses human resources information.	K3
4	Apply quantitative and qualitative analysis to understand trends and indicators in human resource data.	K3
5	Demonstrate how to connect HR results to business results.	K4

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit:1	**INTRODUCTION TO HR ANALYTICS**	**15 hours**

Evolution of HR Analytics, HR information systems and data sources, HR Metric and HR Analytics, Evolution of HR Analytics; HR Metrics and HR Analytics; Intuition versus analytical thinking; HRMS/HRIS and data sources

Unit:2	**DIVERSITY ANALYSIS**	**15 hours**

Equality, diversity and inclusion, measuring diversity and inclusion, Testing the impact Of diversity, Work force segmentation and search for critical job roles.

Unit:3	**RECRUITMENT AND SELECTION ANALYTICS**	**13 hours**

Evaluating Reliability and validity of selection models, finding out selection bias, Predicting The performance and turnover.

Unit:4	**PERFORMANCE ANALYSIS**	**15 hours**

Predicting employee performance, training requirements, evaluating training and development, Optimizing selection and promotion decisions

Unit:5	**MONITORING IMPACT OF INTERVENTIONS**	**15hours**

Tracking impact interventions, Evaluating stress levels and value-change. Formulating evidence- based practices and responsible investment. Evaluation mediation process, moderation, and interaction analysis

Unit:6	**Contemporary Issues**	**2 hours**
	Expert lectures, online seminars –webinars	
	Total Lecture hours	**75 hours**

	Text Book(s)
1	Edwards MartinR, Edwards Kirsten(2016), "Predictive HR Analytics: Mastering the HR Metric", Kogan Page Publishers, ISBN-0749473924
2	Fitz-enz Jac (2010),"The new HR analytics: predicting the economic value of your company's human capital investments",AMACOM,ISBN-13:978-0-8144-1643-3
3	Fitz – enz Jac, Mattox II John (2014),"Predictive Analytics for Human Resources", Wiley,ISBN-1118940709

	PO1	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	M	L
CO2	S	S	M	M	L
CO3	S	M	M	M	L
CO4	M	M	M	M	L
CO5	M	M	M	M	L

*S-Strong;M-Medium;L-Low

Course code	TITLE OFTHE COURSE	L	T	P	C
Elective III(B)	DIGITAL MARKETING	5	-	-	3
Pre-requisite	Basic knowledge in Digital Marketing		Syllabus Version	2025-2026	

Course Objectives:

The main objectives of this course are to:

1. Understand the major digital marketing concepts, channels, key factors and methods.
2. Learn and develop, digital marketing process, digital/online visibility and various types and process of conversion.
3. Learn how to measure various digital marketing tools and combining digital and traditional marketing.
4. Explore the SEO & SEM, Links and link quality factors.
5. Analyze the SMM, Measures, Metrics and Campaign.

Expected Course Outcomes:

On the successful completion of the course, student will be able:

1	Define and explain various channels associated with Digital Marketing.	K1
2	Apply the knowledge of Digital marketing process and conversion.	K2
3	Construct an appropriate digital marketing tools and combining traditional marketing.	K3
4	Analyze role and importance of SEO,SEM and link quality factors	K4
5	Implement the key elements of SMM, Measures, Metrics and Campaign.	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate; **K6**–Create

Unit:1	**INTRODUCTION TO DIGITAL MARKETING**	**13 hours**

Marketing–Four Ps of Marketing– Digital Marketing–History-Benefits–Advantages–Disadvantages -Key Factors - Methods – Types / Channels of Digital Marketing.

Unit:2	**FUNDAMENTALS TO DIGITAL MARKETING**	**15 hours**

Digital Marketing Process – Digital / Online Visibility – Increasing Online Visibility – Engagement Marketing – Visitors Engagement – Increasing Visitors Engagement – Website Traffic–Out bound & Inbound Marketing–Difference Between Out bound & Inbound Marketing – Conversion – Types of Conversion –Conversion Process.

Unit:3	**DIGITAL MARKETING VS TRADITIONAL MARKETING**	**15 hours**

Digital Marketing – Traditional Marketing – Benefits – Advantages – Disadvantages – Digital Marketing over Traditional Marketing–Digital Marketing Tools-Benefits of Combining Digital with Traditional Marketing - Making Digital and Traditional Marketing Work Together

Unit:4	**SEARCH ENGINE OPTIMIZATION (SEO) AND SEARCH ENGINE MARKETING (SEM)**	**15 hours**

Search Engine Optimization (SEO)–Three Core Components of a SEOS trategy-Technical Setup – Content–Links–Back link-Links Quality Factors-Link Building-Monitoring & Tracking of SEO Results – Search Engine Marketing (SEM) – Search Engine Marketing (SEM) Tools-Functions of Ad Auction - Difference Between SEO and SEM - Marketing Tactic

Unit:5	**SOCIAL MEDIA MARKETING (SMM)**	**15 hours**

Social Media Marketing – Benefits – Components / Elements of Social Media Marketing - Creating Social Media Marketing Strategy – Social Media Metrics – Measures of Social Media Metrics–Social Media Marketing Resources-Social Media Marketing Campaign–Setting of SMM Campaign–Creating of SMM Campaign.

Unit:6	**CONTEMPORARY ISSUES**	**2 hours**
	Expert lectures, online seminars –webinars	
	Total Lecture hours	**75 hours**

Text Book(s)	
1	Ryan Deiss and Russ Hennes berry,"Digital Marketing for Dummies",2017
2	Puneet Singh Bhatia, "Fundamentals of Digital Marketing",2017
3	Dr.G.VengatesanandV.P.Karthikeyan,"Fundamentals of Digital Marketing",2025
ReferenceBooks	
1	Introduction to Programmatic Advertising Dominik Kosor in, 2016
2	Blogging: A Practical Guide to Plan Your Blog: Start Your Profitable Home-Based Business With a Successful Blog by Jo and Dale Reardon,2015
3	Email Persuasion: Captivate and Engage Your Audience, Build Authority and Generate More Sales with Email Marketing by I an Brodie, 2013
4	Social Media Marketing All – In –One for Dummies by Jan Zimmer man and Deborah Ng ,2017

Mapping Course objectives and course out comes					
	PO1	**PO2**	**PO3**	**PO4**	**PO5**
CO1	M	S	M	S	S
CO2	S	S	S	S	S
CO3	S	S	S	M	S
CO4	S	S	S	S	S
CO5	S	S	S	M	M

*S-Strong;M-Medium;L-Low

Course code	TITLE OF THE COURSE	L	T	P	C
Elective III (C)	Supply Chain and Logistics Analytics	5	-	-	3
Pre-requisite	Basic knowledge in supply chain & logistics		Syllabus Version	2025-2026	

Course Objectives:

The main objective is

1) To develop conceptual knowledge on the over view of dynamic aspects of marketing namely Logistics & Supply Chain Management.
2) To focus on fundamentals of Logistics & Supply Chain Management, Physical distribution, Procurement and Recent trends in Business.

Expected Course Outcomes:

On the successful completion of the course, student will be able:

1	Understand of the role and importance of Supply chain management.	K2
2	Understand the concepts of planning systems	K2
3	Understand the concepts of Logistics management	K2
4	Analyze the role and importance logistic management	K4
5	Implement the key elements of supply chain project.	K2

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyze;**K5**-Evaluate;**K6**–Create

Unit1	**INTRODUCTION**	**15 hours**

Basics of Supply Chain Management Supply Chain Management–An Over view Supply Chain Analysis Types of Supply Chains Advanced Planning

Unit2	**CONCEPTS OF ADVANCED PLANNING SYSTEMS**	**15 hours**

Structure of Advanced Planning Systems, Strategic Network Planning, Demand Planning, Master Planning, Demand Fulfilment, Transport Planning Coordination, and Integration Collaborative Planning

Unit3	**IMPLEMENTING SUPPLY CHAIN PROJECT**	**15 hours**

Implementing Advanced Planning Systems, The Definition of a Supply Chain Project, The Implementation Process

Unit4	**LOGISTICS MANAGEMENT**	**15 hours**

Definition and Evolution-Achievement of competitive advantage through logistics Frame work-Role of Logistics Management-Integrated Logistics Management-Model–Flow of process activities

Unit5	**LOGISTICS STRATEGY**	**13 hours**

Strategic role of logistics–Definition-role of logistics managers in strategic decisions: Strategy options, Lean Strategy, Agile Strategies & Other strategies: Designing & Implementing logistical strategy.

Unit6	**Contemporary Issues**	**2 hours**
	Expert lectures, online seminars –webinars	
	Total Lecture hours	**75 hours**

	Text Book(s)
1	Stadler Hartmut and Kilger Christoph (2005), "Supply Chain Management and Advanced Planning: Concepts, Models, Software and Case Studies", Third Edition, Springer, ISBN-3- 540-22065-8.
2	Márquez Adolfo Crespo (2010) "Dynamic Modelling for Supply Chain Management: Dealing with Front-end, Back-end and Integration Issues", Springer
3	Simchi-Levi,David,Chen,Xin,Bramel,Julien(2014),"TheLogicofLogisticsTheory, Algorithms, and Applications for Logistics Management", Third Edition, Springer, ISBN-978-1-4614-9149-1
4	Tang Christopher S, Teo Chung – Piaw and Wei Kwok- Kee (Eds) (2008),"Supply Chain Analysis: A Handbook on the Interaction of Information, System and Optimization", Springer, ISBN-13: 978-0- 387-75239-6

	PO1	**PO2**	**PO3**	**PO4**	**PO5**
CO1	S	S	S	M	M
CO2	S	S	S	M	M
CO3	S	S	S	M	M
CO4	S	S	S	S	S
CO5	S	S	S	M	M

*S-Strong;M-Medium;L-Low

Course code	-	TITLE OFTHE COURSE	L	T	P	C
Core		PROJECT AND VIVA VOCE	6			4
Pre-requisite		Knowledge in Core, Research Methods and Analytical Tools	Syllabus Version		2025-2026	

Course Objectives:

The main objectives of this course are to:
1. The students will get on-the-job training and experience.
2. The students will gain knowledge on problem identification and solutions.
3. The students will gain a complete knowledge on the program and the course outcome.

Expected Course Outcomes:

On the successful completion of the course, student will be able to:

1	Explain about how to collect literature.	K2
2	Implement problem identification and will frame tool for collecting data	K3
3	Evaluate and get practical exposure on the framed objective.	K5
4	Execute and generate the procedure of compiling the collected data by using Analysis	K5
5	Summarize and execute report writing, and will get complete knowledge of the course.	K3

K1-Remember;**K2**-Understand;**K3**-Apply;**K4**-Analyse;**K5**-Evaluate;**K6**–Create

Textbook(s)

1	C.R.Kothari,"ResearchMethodologyMethodsandTechniques",SecondEdition,New Delhi: New Age International publisher, 2004

Reference Books

1	Ranjit Kumar, Research Methodology: A Step-by-Step Guide for Beginners, SAGE Publications, 2014
2	Robert B Burns, Introduction to Research Methods, SAGE Publications

Mapping with Programme Outcomes

COs	PO1	PO2	PO3	PO4	PO5
CO1	M	S	M	S	S
CO2	S	S	S	S	S
CO3	S	S	S	S	S
CO4	S	S	S	S	S
CO5	S	S	S	S	M

*S-Strong; M-Medium; L-Low