B. Com Business Analytics

Syllabus

AFFILIATED COLLEGES

Program Code: *

2021 – 2022 onwards

BHARATHIAR UNIVERSITY

**(A State University, Accredited with "A" Grade by NAAC,
Ranked 13th among Indian Universities by MHRD-NIRF,
World Ranking : Times - 801-1000, Shanghai - 901-1000, URAP - 1047)**

Coimbatore - 641 046, Tamil Nadu, India

Program Educational Objectives (PEOs)	
The **B.Com (Business Analytics)** 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 different software 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 (Business Analytics)** program, the students are expected to	
PSO1	Hands-on learning of leading analytical tools.
PSO2	To acquire theoretical knowledge of data science tools, but will also gain exposure to business perspectives.
PSO3	The Career opportunities after completion of B.Com (BA) degree are 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 (Business Analytics)** program describe accomplishments that graduates are expected to attain within five to seven years after graduation	
PO1	Comprehensive knowledge about various tools and techniques of 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.

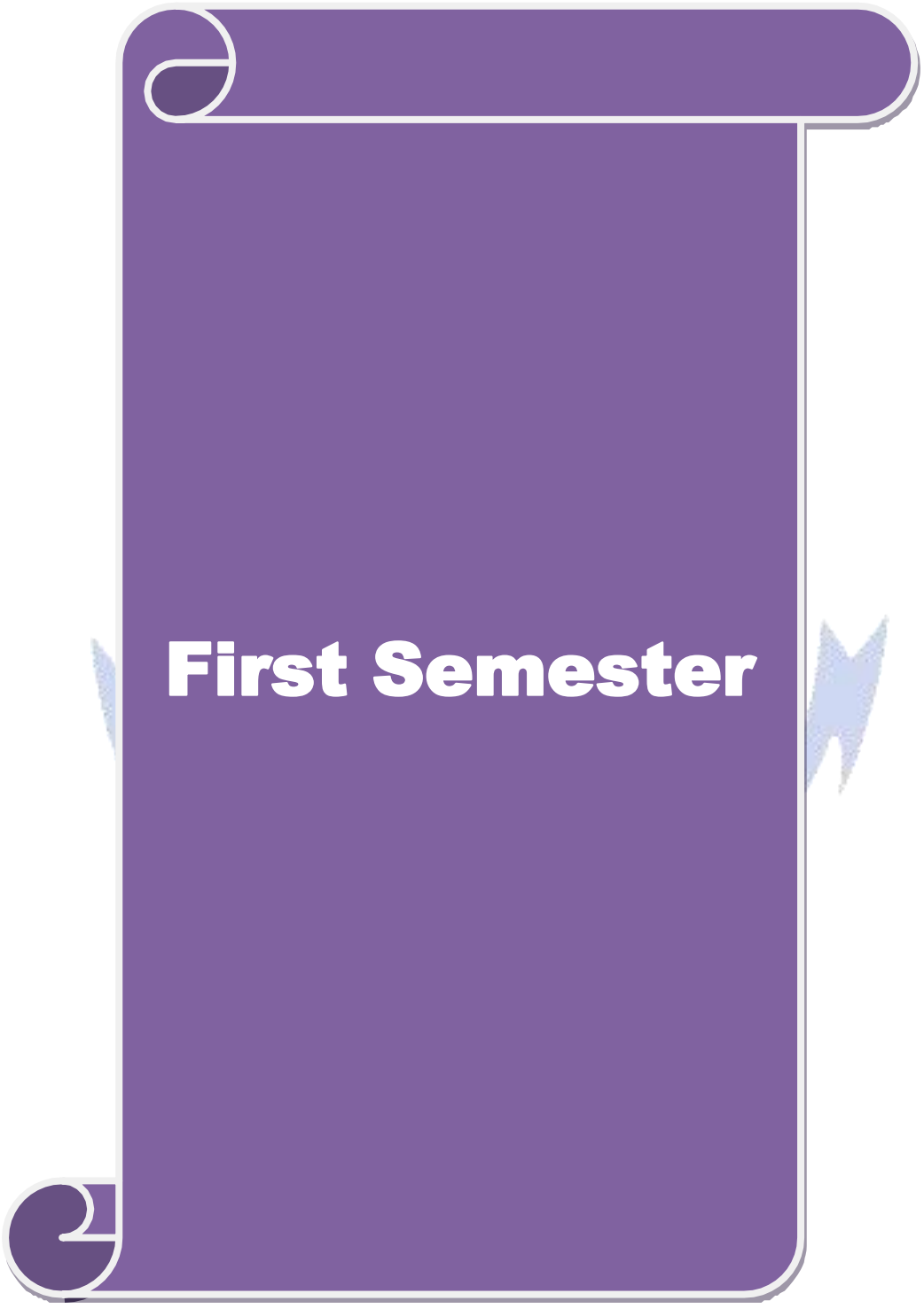
BHARATHIAR UNIVERSITY: COIMBATORE 641 046
B.Com (Business Analytics)
(For the students admitted during the academic year 2021– 22 onwards)

part	Title of the Course	Credits	Hours		Maximum Marks		
			Theory	Practical	CIA	ESE	Total
FIRST SEMESTER							
I	Language-I	4	6		50	50	100
II	English-I	4	6		50	50	100
III	Core I: Financial Accounting	4	4		50	50	100
III	Core II: II – Fundamentals of Business Analytics	4	4		50	50	100
III	Allied I– Business Statistics I	4	4		50	50	100
III	Core - III: Computer Applications Practical - I – Analysis with Excel	4	-	4	50	50	100
IV	Environmental Studies #	2	2		-	50	50
	Total	**26**	**26**	4	**300**	**350**	**650**
SECOND SEMESTER							
I	Language-II	4	6		50	50	100
II	English-II	4	6		50	50	100
III	Core IV – C++	4	6		50	50	100
III	Core V– Computer Application Practical II – C++	4	-	4	50	50	100
III	Allied II – Business Statistics II	4	6		50	50	100
IV	Value Education – Human Rights #	2	2		-	50	50
	Total	**22**	**26**	4	**250**	**300**	**550**
THIRD SEMESTER							
III	Core VI – Business Data Mining	4	6		50	50	100
III	Core VII – Security Analysis and Portfolio Management	3	5		50	50	100
III	Core VIII – Database Programming	4	5		50	50	100
III	Allied III: Operations and Strategic Management	4	5		50	50	100
III	Core-IX: Computer Applications Practical III – Database Programming	4	-	4	50	50	100
IV	Skilled Based Course 1– Technological Analytics – Java and Linux Fundamentals	3	3		30	45	75
IV	Tamil @ / Advanced Tamil # (or) Non- major Elective – I: Yoga for Human Excellence # / Women's Rights # Constitution of India	2	2			50	50
	Total	**24**	**26**	**4**	**280**	**345**	**625**

FOURTH SEMESTER							
III	Core X – R Programming	4	5		50	50	100
III	Core XI – Business Intelligence	4	5		50	50	100
III	Core XII – Principles of Financial Management	3	4		50	50	100
III	Allied IV: Principles of Marketing	3	4		30	45	75
III	Core XIII: Computer Application Practical IV – Analysis with SPSS & R	3	-	4	30	45	75
	Core XIV – PRACTICAL I - Technological Analytics – Java and Linux Fundamentals	3	3		30	45	75
IV	Skilled Based Course 2: **Naan Mudhalvan office Fundamentals** http://kb.naanmudhalvan.in/Bharathiar University_(BU)	2	-	3	25	25	50
IV	Tamil @ /Advanced Tamil # (or) Non-major elective - II: General Awareness #	2	2			50	50
Total		**24**	**23**	**7**	**265**	**360**	**625**
FIFTH SEMESTER							
III	Core XV – Python	4	6		50	50	100
III	Core XVI – Cost and Management Accounting	4	6		50	50	100
III	Core XVII – Income Tax	4	6		50	50	100
III	Core XVIII - Computer Applications:Python Practical-V	4	-	4	50	50	100
III	**Elective-I** A. Business Organisation and Models B. Brand Management C. Legal Aspects of Business	4	5		50	50	100
IV	Skill Based Course 3: SAS & SCILAB	3	3		30	45	75
Total		**23**	**26**	**4**	**280**	**295**	**575**
SIXTH SEMESTER							
III	Core XIX – Hadoop	4	7		50	50	100
III	Core XX – Computer Applications: Hadoop - Practicals VI	3	5		30	45	75
	Core XXI - Practical II – SAS SCILAB	3	4		30	45	75

III	**Elective II** A. Financial Markets and Institutions B. Cyber Law C. Goods and Service Tax	3	5		30	45	75
III	Project Viva Voce	4	6		50	50	100
IV	Skill based Subject- 4: Skill-based Subject-IV: **Naan Mudhalvan- Fintech Course (Capital Markets / Digital Marketing / Operational Logistics)** **http://kb.naanmudhalvan.in/Bharathiar_University_(BU**	2	3		25	25	50
V	Extension Activities @	2	-		-	50	50
TOTAL		**21**	**30**		**215**	**310**	**525**
GRAND TOTAL		**140**	**157**	**23**	**1590**	**1960**	**3550**
Online courses will be implemented from next academic year							

List of elective papers (College can choose any one of the paper as elective)		
Elective I	**A**	Business Organisation and Models
	B	Brand Management
	C	Legal Aspects of Business
Elective II	**A**	Financial Markets and Institutions
	B	Cyber Law
	C	Goods and Service Tax


First Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core 1		FINANCIAL ACCOUNTING	4	-	-	4
Pre-requisite		HIGHER SECONDARY :Basic concepts of Accounts	Syllabus version		2021-2022	

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 inculcate 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 accounts using AS1 & 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** - Undestand; **K3** - Apply; **K4** - Analyze; **K5** - Evaluate; **K6** - Create

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

Accounting Concepts and Accounting Conventions – Journal – Ledger – Trial Balance.

Unit:2	**FINAL ACCOUNTS**	**10-- hours**

Final Accounts – AS 1, 5.

Unit:3	**BANK RECONCILIATION STATEMENT**	**10-- hours**

Depreciation–AS 6-Bank Reconciliation Statement –AS 27.

Unit:4	**CONSIGNMENTS AND JOINT VENTURES**	**15-- hours**

Consignment–Joint Venture.

Unit:5	**PARTNERSHIP ACCOUNTS**	**8-- hours**

Partnership Accounts–Admission, Retirement and Death.

Unit 6	**Contemporary Issues**	**2 hours**

Expert seminars and lectures

	Total Lecture hours	**60-- hours**

Text Book(s)

1. Jain S P and Narang K L - Advanced Accountancy - Kalyani Publishers - Reprint 2016 & 18th Edition.
2. Reddy T S & Murthy – Financial Accounting – Margam Publications – 2016, 6th Edition.

Reference Books	
1	Nagarajan K.L., Vinayagam . N & P.L.Mani – Sultan Chand & Sons – 2010, 1st Edition
2	S.K.Maheswari, T.S.Reddy - Advanced Accountancy-Vikas publishers
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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 2		FUNDAMENTALS OF BUSINESS ANALYTICS	4			4
Pre-requisite		Basic In Business Analytics	Syllabus Version		2021-2022	

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	DATA INTEGRATION	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	**KPIs and PERFORMANCE MANAGEMENT**	**8-- hours**
Measures, Metrics, KPIs and 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.		
Unit 6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**60-- hours**

Text Book(s)	
1	RN Prasad, Seema Acharaya - Fundamentals of Business Analytics – Wiley – Revised Edition 2015.
2	Pang-Ning Tan, Michael Steinbach, Vipin Kumar – Introduction to Data Mining – Pearson Education - Revised Edition 2015.
Reference Books	
1	Haydn Thomas – Demonoid – Business Analysis Fundamentals – Pearson 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			4
Pre-requisite		ALLIED I: BUSINESS STATISTICS – I	Syllabus Version			2021-2022

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-Meaning of Data and information - Classification and Collection of Primary and Secondary Data-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, Standard deviation (Grouped and Ungrouped data) , Coefficient of Variation – 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.

Reference Books	
1	S.P. Gupta and M.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	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. Graybill F.A and Boes D.C, Introduction to the Theory of Statistics, Mcgraw Hill.
7	
8	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
4	
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 3		COMPUTER APPLICATION PRACTICALS I – ANALYSIS WITH EXCEL	-	-	4	4
Pre-requisite		Basics knowledge in MS-Office	Syllabus Version	2021-2022		

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

(60 MARKS)

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 May 2006 to May2011. 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:

Fiscal Year	2017	2016	2015	2014	2013
Total Revenue	1,98,198	1,71,636	2,64,958	2,20,904	2,04,892
Net Income	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
Total Revenue	10,991	10,416	11,142	8,871	7,526
Net Income	3,247	1,592	3,160	3,303	2,470

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

b) Which company was more profitable in 2010? Which was more profitable if you take a longer view? 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 Net Income	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 Paychex,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 part a, the ratio is 0.9607, 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 usingthe 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) foreach of the above items using the results that you calculated in part a. Be sure to subtract 1 from theresult of the**GEOMEAN** function to arrive at a percent change. These averagesare geometric averages.

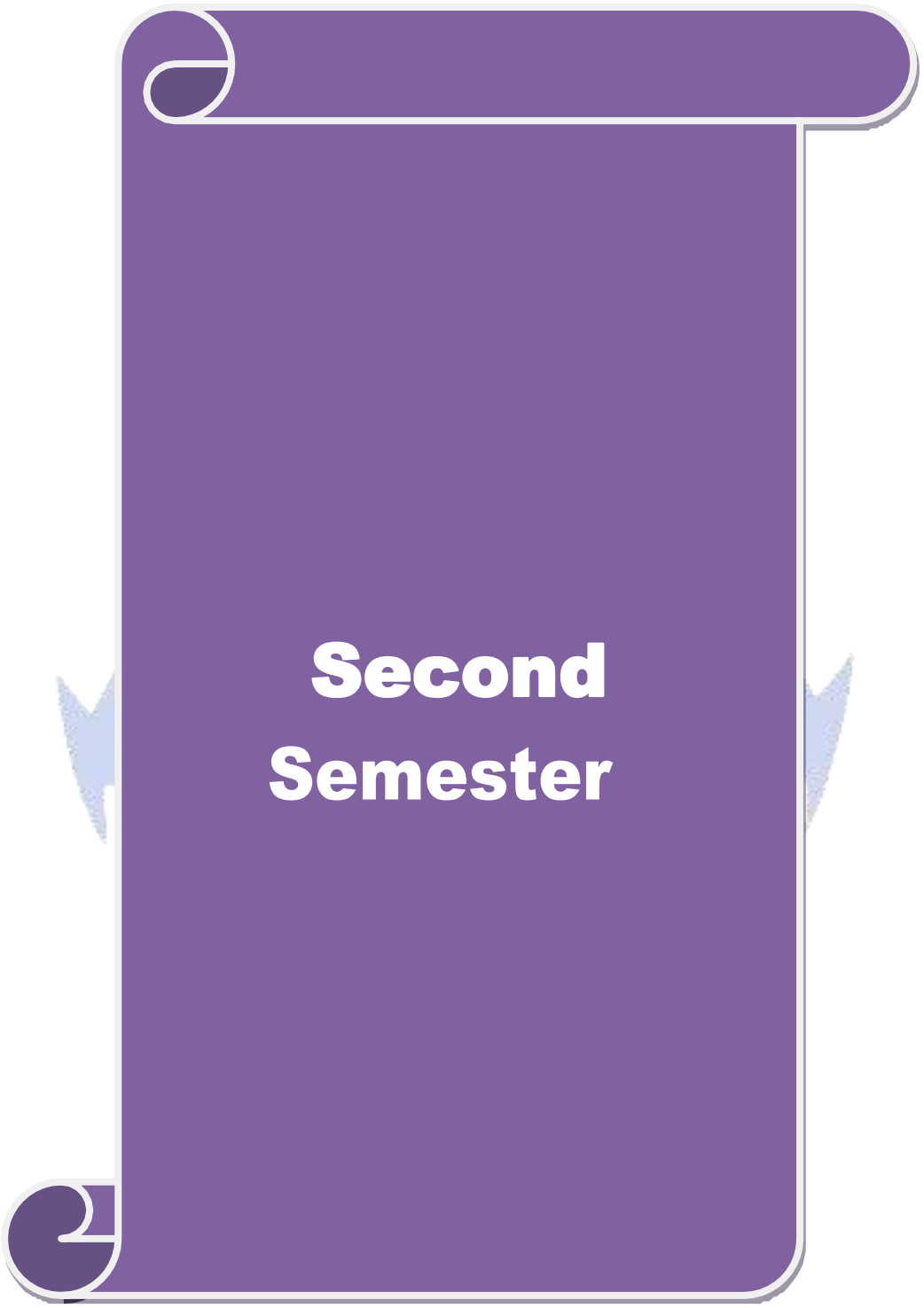
d) Compare the results from part c (arithmetic averages using the **AVERAGE** function) to those for part d (geometric averages using the **GEOMEAN** function) for each item. Is it true that the arithmetic average growth rate is always greater than or equal to the geometric average (CAGR)?

e) 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. Cash budget 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 Datasets with Tables and Pivot Tables.

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 4		C++	4			4
Pre-requisite		Basic knowledge in C	Syllabus Version		2021-2022	

Course Objectives:

The main objectives of this course are to:

- To understand the concepts of object oriented programming.
- To develop programming skills in 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++ prpgram	K2

K1 - Remember; **K2** - Undestand; **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	OPERATORS IN 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 – Call by 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.

Unit 6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**90-- hours**

Text Book(s)	
1	Balaguruswamy. E - Object Oriented Programming with C++, Tata McGraw Hill Publishing Co. Ltd, 4th edition, Reprint 2009.
2	Ravichandran.D - Programming with C++, Tata McGraw Hill Publishing Co. Ltd, 5th edition, Reprint 2009.
Reference Books	
1	Venugopal K.R., Rajkumar, Ravishankar T. - Mastering C++, Tata McGraw Hill Publishing Co. Ltd, 2nd edition, Reprint 2008.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
4	
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 5		COMPUTER APPLICATION PRACTICAL II – C++			4	4
Pre-requisite		Basic application knowledge in C	Syllabus Version		2021-2022	

Course Objectives:

The main objectives of this course are to:

- To inculcate C++ programming ability among the students.
- To provide knowledge about the implementation of C++ concepts in to 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** - Undestand; **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	4			4
Pre-requisite		Basic Knowledge In Arithmetic Calculation	Syllabus Version			2021-2022

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	REGRESSION ANALYSIS	Hours - 12

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 forecasting- Methods of estimating trend- Graphic, semi- average, Moving average and Method of Least squares- Different variation (Seasonal, cyclical, irregular).

UNIT – II	PROBABILITY	Hours - 12

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 - 12

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 - 12

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

UNIT - V	MULTIVARIATE STATISTICS	Hours – 12

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

Reference Books	
1	S.P. Gupta and 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. Graybill F.A and Boes D.C, Introduction to the Theory of Statistics, Mcgraw Hill.
7	Lee, Cheng. et.al, Statistics for Business and Financial Economics, New York: Wiley Heidelberg Dordrecht
8	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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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	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 6		BUSINESS DATA MINING	4			4
Pre-requisite		Basic knowledge in data mining	Syllabus Version	2021-2022		

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 prerequisite required

Expected Course Outcomes:

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

1	Define the concepts of data warehousing, data mining 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 data mining tool	K4

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

Unit:1	DATA WAREHOUSING	20-- 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 RULE MINING	18-- hours

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

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

Unit:3	CLASSIFICATION & PREDICTION	17-- 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	15-- 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	**DATA MINING TOOL**	**18-- 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) - Data mining in direct marketing (Simple) - Using Weka for stock value forecasting (Advanced).		
Unit 6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**90-- hours**

Text Book(s)

1	Jiawei Han and MichelineKamber – Data Mining Concepts and Techniques – Morgan Kaufman – 2011 3rd Edition.
2	Ian H. Witten and Eibe Frank – Data Mining Practical Machine Learning Tools and Techniques, Morgan Kaufmann Publication – 2016 4th Edition.
	M. H. Dunham – Data Mining Introductory and Advanced Topics, Imprint Pearson Education, 2011 4th Impression.

Reference Books

1	Arun K. Pujari – Data Mining Techniques, Universities Press (India) Pvt. Ltd., 2013 Kindle Edition.

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

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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 THE COURSE	L	T	P	C
Core 7		SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT	3			3
Pre-requisite		Basic knowledge in investment avenues	Syllabus version	2021-2022		

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	15-- 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-DEMAT-ing – Functions.

Unit:2	SECURITY VALUATION	15-- hours

Security Valuation: Elements of Investment–Approaches to Investment–Historical Developments of Investment Management–Basic Valuation Models–Bonds, Preference Shares, Common Stock. Returns: Measurement–Traditional Technique -Holding Period–Yield– Probability Distributions– Statistical Methods. Risk: Risk Classification–Systematic,
Unsystematic Risk Measurement–Standard Deviation and Variance–Regression Equation– Correlation Coefficient– Co-variance–Investor's Attitude towards Return and Risk.

Unit:3	FUNDAMENTAL ANALYSIS	15-- 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– Experiments and Analysis of Theory. Comparisons with Fundamental and Technical Analysis.

Unit:4	PORTFOLOIO ANALYSIS	15-- hours

Portfolio Analysis: Traditional Vs. Portfolio Analysis–Markowitz Theory–Efficient Frontier – Sharp ideal Index – Foreign Security Investment – Affecting the India Investor – Opportunities. Portfolio Selection and International Diversification: Types of Investors – Finding Cut off Rate – Internal Diversification.

Unit:5	TECHNIQUES OF PORTFOLOIO	13-- hours

Techniques of Portfolio Revision: Formula Plans – Constant Rupee Value – Constant Ratio –

Variable Ratio – Rupee Cost Averaging. Classification of Investment Companies - Management Performance evaluation – Sharp's Index – Treynor's Index – Jensen's Index – Empirical Tests.

Unit 6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	75-- 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 House Pvt. Ltd., 2012 2nd Edition.
3	Fransics – Investment, S.Chand & Co, 2015, 5th Edition.
Reference Books	
1	Bhalla V.K – Investment Management, S.Chand & Co, 2010, 10th Edition.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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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 8		DATABASE PROGRAMMING	4			4
Pre-requisite		Basic knowledge in SQL	Syllabus Version	2021-2022		

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
4	Explain the overview and history of SQL database	K4
5	Motivate the concepts of MongoDB	K4

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

Unit:1	INTRODUCTION TO DATABASE MANAGEMENT SYSTEM	15-- hours

Introduction to database management system-Data models-Database system architecture-The SQL Language-Relational database 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	15-- 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 GROUP FUNCTIONS	15-- 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, rollback, save point and auto commit-Introduction to PL/SQL-user defined functions-Triggers-Stored procedures.

Unit:4	OVERVIEW AND HISTORY OF NOSQL	15-- 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	13—hours

Introduction to MongoDB- Getting Started – Querying - Creating, Updating, and Deleting Documents – Querying - Designing Your Application: Indexing - Special Index and Collection Types – Aggregation.

Unit 6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	75-- hours

Text Book(s)	
1	Ramon A Mata-Toledo Pauline K Cushman – Database Management System, Tata McGrew-Hill Publishing Company Limited, New Delhi, 2010, 2nd Edition.
2	Pramod J. Sadalage & Martin Fowler - NoSql Distilled, Pearson Education Inc., 2013Edition.
3	Kristina Chodorow – MongoDB: The Definitive Guide, O'Reilly Media Inc., 2013 2nd Edition.
Reference Books	
1	Ramakrishnan & Gehrke – Database Management Systems, Tata Mc Graw Hill, 2009, 8th edition.
2	Nilesh Shah – Database System using Oracle, PHI learning Pvt. Ltd., 2014, 2nd edition.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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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	4			4
Pre-requisite			Syllabus Version			2021-2022

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 life cycle 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 - 12

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 - 15

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 - 12

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 life cycle – Gantt charts, PERT and CPM.

UNIT - IV	SPARES MANAGEMENT	Hours - 9

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

UNIT - V	STRATEGIC ANALYSIS AND STRATEGIC PLANNING	Hours - 12

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.

Reference Books	
1	Richard, B. Chase, F. Robert, Jacobs Nicholas, J. Aquilano and Nitin, K. Agarwal – Operations Management for Competitive Advantage, Tata McGraw-Hill Education, Reprint 2014, 11th Edition.
2	Arunkumar, B.K.Agnihotri, Operation Management and Information system, ShuchitaPrakashan (P) Ltd., 2016, 14th Edition.
3	
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Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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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 THE COURSE	L	T	P	C
Core 9		COMPUTER APPLICATION PRACTICAL III – DATABASE PROGRAMMING			4	4
Pre-requisite		Basic application knowledge in SQL	Syllabus Version	2021-2022		

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
   Regno number (5) primary key
   Studname varchar2 (15)
   Gender char (6)
   Deptname 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 truncate a table
   b) To insert values, retrieve records, update records, delete records
3. Create an Employee table with following field.
   Eno number (5) primary key
   Ename varchar2 (20) not null Deptno number (2) not

null Desig
char
(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 department 20
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

Stuno number (5) primary key
Stunm Varchar2 (20)
Age number (2)
Mark1 number (3)
Mark2 number (3)
Mar 3 number (3)

Queries:

a) Insert values and display the records
b) List the names and age of the student whose age is more than 12
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 names have exactly 5 characters

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

Emplno	number (8)
Emplname	varchar2 (8)
Dept	varchar2 (10)
Baspay	number (8, 2)
HRA	number (6, 2)
DA	number (6, 2)
Pf	number (6, 2)
Netpay	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>= 1000 and DA<=900.
e) Select the records in descending order.

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

Pubcode	Varchar2 (5)
Pubname	Varchar2 (10)
Pubcity	Varchar2 (12)

PubState Varchar2 (10)
Bookcode Varchar2 (5) Table: Book
Booktitle Varchar2 (15)
Bookcode Varchar2 (5)
Bookprice Varchar2 (5) Queries:

a) Insert the records into the table publisher and book.
b) Describe the structure of the tables.
c) Show the details of the book with the title "DBMS".
d) Show the details of the book with price>300.
e) Show the details of the book with publisher name "Kalyani".
f) Select the book code, book title; publisher city is "Delhi".
g) Select the book code, book title and sort by book price.
h) Count the number of books of publisher starts with "Sultan chand".
i) Find the name of the publisher starting with "S".

7. Create Orders table and customers table with following fields: Table: order

Orderid number (10)
Customerid number (5) Orderdate date
Table: customers
Customerid number (5)
Custname varchar2 (10)
Contactname varchar2 (10)
Country varchar2 (10)

a) Perform INNER JOIN, that selects records that have matching values in both tables
b) Perform LEFT JOIN, that selects records that have matching values in both tables
c) Perform RIGHT JOIN, that selects records that have matching values in both tables.

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

cusidnumber(10)
FirstName varchar2 (10)
LastName varchar2 (10)
City varchar2 (10)
Country varchar2 (10)
Phone number (10) Table: Supplier
Supid number (10)
CompanyName varchar2 (10)
ContactName 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 MongoDB using “use” Command.
10. Create program using crud operation using MongoDB.
11. Create program text search and indexes using MongoDB.
12. Create the replica set in the mongo shell and test the configuration

WEKA:

13. Demonstration of preprocessing on dataset student.arff
14. Demonstration of classification rule process on dataset employee.arff using id3 algorithm
15. Demonstration of clustering rule process on dataset student.arff using simple k-means
16. Demonstration of preprocessing on dataset 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-1		Basic knowledge in java	4	-	-	4
Pre-requisite			Syllabus Version		2021-2022	

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 to day 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		**8 hours**

C++ Vs JAVA,JAVA and Internet and WWW, JAVA support systems, JAVA environment. JAVA program structure,Tokens, Statements, JAVA virtual machine, Constant & Variables, Data Types, Declaration of 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, Nesting of if…else… statements, else…if Ladder, Switch, ? operators, **Loops –** While, Do, For, Jumps in Loops, LabeledLoops

Unit:2		**9 hours**

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing ClassMembers, 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		**8 hours**

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

Unit:4		**7 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		**11 hours**

Linux Basics: Introduction to Linux, **Managing Files and Directories:** File System ofthe 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

Unit 6	**Contemporary issues**	2 hours
	Expert lectures and seminars	

		Total Lecture hours	**hours**
Text Book(s)			
1	*E. Balaguruswamy,* **"Programming In Java",** *2nd Edition, TMH Publications*ISBN		
2	*Red Hat Enterprise Linux 4: System Administration Guide Copyright, 2005 Red Hat,Inc*		
Reference Books			
1	*Peter Norton,* **"Peter Norton Guide To Java Programming",** *Techmedia Publications*		
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]			
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


Fourth
Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core 10		R PROGRAMMING	4			4
Pre-requisite		Basic knowledge in Research	Syllabus version	2021-2022		

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 data sets	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 TO R**	**20-- 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**	**18-- hours**

Data Frames: Organizing values into 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**	**17-- hours**

Data manipulations: Overview of how to connect database 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**	**15-- 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 right y axis-histogram-Multivariate Statistical Techniques like Discriminant Analysis, Factor Analysis.

Unit:5	**COMPLEX STATISTICS**	**18-- 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.

Unit 6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**90-- hours**

Text Book(s)	
1	Beginning R: The Statistical Programming Language (Wrox) – Dr.Mark Gardener, John Wiley & Sons, Inc., 2016 Revised Edition.
2	The Art of R Programming – Norman Matloff, No Starch Press, 2011 Edition.
3	The R Book – Michael J. Crawle, Wiley, 2008 Edition
Reference Books	
1	Statistical Analysis with R – M.John, Tata Mcgraw Hill Publishing Co.Ltd., October 2010, Edition.
2	Learning R – Richard Cotton, O'Reilly Media, September 2013, Edition.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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	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 11		BUSINESS INTELLIGENCE	4			4
Pre-requisite		Basic knowledge in BI	Syllabus rsion		2021-2022	

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	Title of the Unit (Capitalize each Word)	18-- hours

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

Unit:2	Title of the Unit (Capitalize each Word)	20-- hours

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

Unit:3	Title of the Unit (Capitalize each Word)	17-- 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	Title of the Unit (Capitalize each Word)	15-- 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	Title of the Unit (Capitalize each Word)	18-- hours

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

Unit 6	Contemporary Issues	2 hours

Expert seminars and lectures

	Total Lecture hours	90-- hours

Text Book(s)

1	Efraim Turban, Ramesh Sharda, Dursun Delen and David King – Business Intelligence – A Managerial Approach, Pearson, 2012, 2nd Edition.
2	Stuart Russel and Peter Norvi, Artificial Intelligence: A Modern Approach, Prentice Hall, 2009, 3rd Edition.

Reference Books	
1	Galit Shmueli, Nitin R. Patel and Peter C. Bruce – Data Mining for Business Intelligence, Prentice Hall, 2009, 3rd Edition.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
4	
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 12		PRINCIPLES OF FINANCIAL MANAGEMENT	3			3
Pre-requisite		Basic knowledge in finance	Syllabus version		2021-2022	

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 cost of capital – 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 & DIVIDENDPOLICY	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**

Unit 6	**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, Sharma R.K – Financial Management, Kalyani Publishers, 2013, Reprint.	
2	Khan&Jain - Financial Management, Tata McGraw Hill, 2014, Reprint	
3	Maheshwari S.N - Financial Management, Sultan Chand & Sons, 2013 Reprint	
Reference Books		
1	Pandey I.M - Financial Management, Vikas Publishing House Ltd,q2013, Reprint.	
2	Prasanna Chandra - Financial Management, Tata McGraw Hill, 2014, Reprint.	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]		
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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	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	4			4
Pre-requisite		Basic Knowledge In Marketing Concepts	Syllabus Version			2021-2022

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-Definition of Market & Marketing–Classifications of Markets-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	MARKET MIX	Hours - 12

Market Mix-Product Mix- Price mix-Market Segmentation-Promotion Mix-Advertising and Personal Selling-Physical Distribution Mix-Functions-Types of Middlemen.

UNIT - IV	CONSUMER BEHAVIOR	Hours - 12

Consumer Behavior-Meaning - Need for Studying Consumer Behavior- Factors Influencing Consumer Behavior- Buyers Decision Making Process.

UNIT - V	CONSUMERISM & CONSUMER PROTECTION ACT	Hours - 12

Consumerism-Need for Consumer Protection-Consumer Protection Act-Features-Competition Act-Commission Act-RTI Act- Unfair and Restricted Trade Practices-New Approaches in Marketing-Web-Based Marketing-E-Marketing-E-Retailing- Multi Level Marketing- Tele Marketing – Plano gram.

Reference Books

1	Rajan N. Nair and Sanjith, Nair R – Marketing, Sultan Chand & Sons, 2012, 7th edition.
2	Chandrasekaran K.S – Marketing Management, The McGraw Hill Companies, 2010 1st
	Edition.
3	Pillai R.S.N and Bhagavathi – Modern Marketing Principles and Practice, Sultan Chand & Sons, 2010, 14th edition.

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

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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 13		COMPUTER APPLICATION PRACTICAL IV – ANALYSIS WITH SPSS & R			4	4
Pre-requisite		Basic application knowledge in research	Syllabus Version		2021-2022	

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 data sets	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 scatter plots
6. Logical statements, cbind/rbind command in R and Create dataset using dataframes and factors and plot a graph.

R and SPSS

7) Create an SPSS and R Dataset and determine the number of 18-22 year old population in 2000, 2004 and 2005

PARTICULARS	2000	2004	2005
UNIVERSITY STUDENT	47498	66309	70153
NUMBER OF TEACHERS	17302	19103	18098
NUMBER OF INSTITUTIONS	77	91	90
NUMBER OF STUDENTS IN THE % OF THE 18-22YEAR-OLD POPULATION	10.4	13.9	15

8) The data below are about the number of tourists in Hungary between 1988 and 1994.

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 the 2nd, 3rd and 4th quarter of 1993!

9) Open the Employee_data.sav 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 into a pie chart!
b) Create a scatter plot about month since hire and beginning salary if you set markers bygender! Embellish the graph!
c) Create a scatter plot about month since hire and previous experience if you set markersby employment category! Embellish the graph!
d) Define simple box plot about previous experience! Embellish the graph!
e) Define simple box plot about the month since hire categorized by theemployment category! Embellish the graph!
f) Define box plot 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 month since hire and previous experience of employees!

c) Define a 90% confidence interval for its b0 and b1 parameters!

d) Define a 90% confidence interval for the y variable!

e) Open the Cars.sav 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 have 4-6-8 cylinders?

10. Estimation and Hypothesis Testing

a) Define a 95% confidence interval for the vehicle weight!

b) Define a 90% confidence interval for the horsepower!

c) Define a 98% confidence interval for the time to accelerate!

d) Test the hypothesis that the average consumption of cars is 20 miles per gallon! (α = 5%)

e) Use One Sample T Test to determine whether or not the average miles per gallon significantly differ from 24 at 10% significance level!

f) Test the hypothesis that the average horsepower 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 Americancars is the same! (α = 10%)

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

Statistical Dependence

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

b) Create a crosstabs 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

Course code		Practical-Technological Analytics - Java & Linux Fundamentals	L	T	P	C
Skill based subject-2 practical		Basic knowledge in java	-	-	4	4
Pre-requisite			Syllabus Version		2021-2022	

Course Objectives:

1. To create a program with array
2. To create a Java program for the implementation of multiple inheritance
3. To Execute the various file/directory handling commands

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

		45 Hours

SYLLABUS

Java

a. Write a program to find the largest of n natural numbers.
b. Write a program to find whether a given number is prime or not.
c. Write program to display Fibonacciseries
d. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
e. Write java program for the following matrix operations:
    i. Addition of two matrices
    ii. Summation of two matrices
    iii. Transpose of a matrix
    iv. Input the elements of matrices from user.
f. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
g. Write a Java program for the implementation of multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
h. Write a program for the following string operations :a. Compare two strings b. Concatenate two strings c. Compute length of a string

Linux

a. Execution of various file/directory handling commands.
b. Simple shell script for basic arithmetic and logical calculations.
c. Shell scripts to perform various operations on given strings.
d. Shell scripts to explore system variables such as PATH, HOME etc.
e. Write a shell script to display list of users currently logged in.
f. Write a shell script to search an element from an array using binary searching.
g. Write a shell script to generate mark sheet of a student. Take 3 subjects, calculate and display total marks, percentage and Class obtained by the student

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


Fifth Semester

Course code		TITLE OF THE COURSE	L	T	P	C
Core 14		PYTHON	4			4
Pre-requisite		Basic knowledge in analytics	Syllabus version		2021-2022	

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 TO PYTHON	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 Dataframes – DataFrames and Data wrangling – **Visualisation – Plotting – Histograms – Grouping Data** – Time series and Statistics - Visualisation in Python- I Python – **NumPy 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 a string – Strings versus bytes – Charater encoding of python source code. 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 WEB SERVICES	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.

Unit 6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	90-- hours

Text Book(s)	
1	Mark Pilgrim - Dive into Python3, Apress, Revised Edition
2	Phuong Vo. T., H., Martin & Czygan, Getting started with Python Data Analysis, Packt Publishing, 2011.
3	
Reference Books	
1	Allen Downey - Think Python, Green Tea Press Needham, Massachusetts, Revised Edition.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
4	
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 15		COST AND MANAGEMENT ACCOUNTING	4			4
Pre-requisite		Basic knowledge in Accounting	Syllabus rsion		2021-2022	

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	INTRODUCTION TO COST ACCOUNTING	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.

Unit 6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	90-- hours

Text Book(s)	
1	Maheswari. S N - Principles of Cost Accounting, Sultan Chand & Sons, Reprint 2016.
2	Sharma R.K, Sashi K.Gupta & Neeti Gupta – Management Accounting, Kalyani Publishers, Reprinted 2016, IV edition.
3	Reddy T.S and Reddy H.P – Management Accounting, Margham Publications, 2013, VIII Edition.
Reference Books	
1	Jain and Narang - 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, Websites etc.]	
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4	
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 16		INCOME TAX	4			4
Pre-requisite		BASIC KNOWLEDGE IN TAX	Syllabus Version		2021-2022	

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 Act of 1961.
- To lay down 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 terminologies related to income tax	K1
2	Understand the method of calculating and levying 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 lieu of 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 CARRY FORWARD**	**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.

Unit 6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**90—hours**

Note: 20% theory and 80% problems

Text Book(s)	
1	Gaur V.P. and Narang D.B. - Income Tax and Practice, Kalyani Publishers, Current Edition.
2	Dinkar Pagare - Income Tax and Practice, Sultan chand & Sons, Current Edition.
Reference Books	
1	Mehrothra - Income Tax and Practice, Sultan chand & Sons, Current Edition.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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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 17		COMPUTER APPLICATIONS PRACTICAL V - PYTHON	4			4
Pre-requisite		BASIC APPLICATION KNOWLEDGE IN STATISTICAL CALCULATIONS	Syllabus Version		2021-2022	

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 information 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 times each 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.

Exercise 1.4. Modify the previous program to read a word list (see Section 9.1) 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 shouldbe in the word list, and how many of them are reallyobscure?

2. **Random numbers**

Exercise 2.1. Write a function named choose_from_hist 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**

Exercise 3.1.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**.**

Exercise 4.2. Prints the ten most common words**.**

5. **Optional parameters**

Exercise 5.1. Prints the most common words in a histogram**.**

6. **Dictionary subtraction**

Exercise 6.1. Python provides a data structure called set that provides many common set operations. Read the documentation at http: // docs. python. org/ 2/ library/ stdtypes. 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**

Exercise 7.2: 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 bisection 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:// thinkpython. 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. **docstrings 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 (or one of the other kinds). Solution: http:// thinkpython. 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 AND MODELS	4			4
Pre-requisite		Basic knowledge in organizational behavior	Syllabus version		2021-2022	

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-based enterprises, general trade (including shops), manufacturing products and 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; a small 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 capital cycle.

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.

Unit 6	**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, 2012 edition.
2. C.B. Gupta – Business Organisation and Management, Mayur Paperbacks, 2011 Edition.
3. S.A. Sherlekar – Modern Business Organisation and Management- A System Approach, Himalaya, 2010 edition.

Reference Books	
1	Rashmi Bansal - Take Me Home: The Inspiring Stories of 20 Entrepreneurs, Westlands, 2014 edition.
2	
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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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)		BRAND MANAGEMENT	4			4
Pre-requisite		Basic knowledge in branding	Syllabus version		2021-2022	

Course Objectives:

The main objectives of this course are to:

- To teach the importance of brand and its impacts among the customers

Expected Course Outcomes:

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

1	Recall the basic concepts of branding and related terms	K1
2	Compare brand image building and brand positioning strategies	K2
3	Analyze the impact of brand, brand loyalty and brand audit.	K4
4	Explain the brand rejuvenation and brand monitoring process	K4
5	Apply various strategies for brand building and monitoring	K3

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

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

Introduction- Basic understanding of brands – concepts and process – significance of a brand – brand mark and trade mark – different types of brands – family brand, individual brand, private brand – selecting a brand name – functions of a brand – branding decisions – influencing factors.

Unit:2	**BRAND ASSOCIATIONS**	**15-- hours**

Brand Associations: Brand vision – brand ambassadors – brand as a personality, as trading asset, Brand extension – brand positioning – brand image building.

Unit:3		**15-- hours**

Brand Impact: Branding impact on buyers – competitors, Brand loyalty – loyalty programmes – brand equity – role of brand manager – Relationship with manufacturing - marketing- finance - purchase and R & D – brand audit.

Unit:4	**BRAND REJUVENATION**	**15-- hours**

Brand Rejuvenation: Brand rejuvenation and re-launch, brand development through acquisition takes over and merger – Monitoring brand performance over the product life cycle. Co-branding.

Unit:5	**BRAND STRATEGIES**	**13-- hours**

Brand Strategies: Designing and implementing branding strategies – Case studies.

Unit 6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**75-- hours**

Text Book(s)

1	Kevin Lane Keller, “Strategic brand Management”, Person Education, New Delhi, 2003.
2	Lan Batey Asian Branding – “A great way to fly”, Prentice Hall of India, Singapore 2002.
3	Jean Noel, Kapferer, “Strategic brand Management”, The Free Press, New York, 1992.

Reference Books	
1	Paul Tmeporal, Branding in Asia, John Wiley & sons (P) Ltd., New York, 2000.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	
2	
4	
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	4			4
Pre-requisite		Basic knowledge of law related to business	Syllabus version		2021-2022	

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 – Free consent – 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. Fire insurance – 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 redressal – types of consumer redressal machinaries and forums – Competition Act 2002 – copy rights – trademarks, patent Act

Unit 6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**75-- hours**

Text Book(s)

1	N.D.Kapoor - Elements of Mercantile Law, Sultan Chand, 32nd Edition.
2	AkhileshwarPathak - Legal aspects of business, Tata McGraw Hill, 4th Edition

Reference Books	
1	Paul Tmeporal, Branding in Asia, John Wiley & sons (P) Ltd., New York, 2000.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	S.S.Gulshan - Business Law, Excel books, 4th Edition.
2	
4	
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 & SCILAB	L	T	P	C
Skill based subject-3		Basic knowledge in statistics	-	-	4	4
Pre-requisite			Syllabus Version		2021-2022	

Course Objectives:

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

Expected Course Outcomes:

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

1	Statistical Analytical Software	K_1
2	Analysis 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		8 hours

Accessing Data: Use FORMATTED, LIST and COLUMN input to read raw data files - UseINFILE 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 SASdate values - Control which observations and variables in a SAS data set are processed and output.

Unit:2		9 hours

Managing Data: Sortobservations 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		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		7 hours

Introduction To 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		**11hours**
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		
Unit 6	**Contemporary issues**	2 hours
	Expert lectures and seminars	
	Total Lecture hours	**hours**

Text Book(s)

1	Venkat Reddy Konasani, Shailendra Kadre, Practical Business Analytics Using SAS: A Hands-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

Course code		TITLE OF THE COURSE	L	T	P	C
Core 18		HADOOP	4			4
Pre-requisite		BASIC knowledge in computer	Syllabus version		2021-2022	

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 Hadoop concepts with Datasets	K1
2	Outline the use of Hadoop distribution file system	K2
3	Experiment with MacReduce 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 & MAP REDUCE	23-- 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 dataset – Scaling out - Hadoop streaming - Hadoop pipes.

Unit:2	HADOOP DISTRIBUTED FILESYSTEM	20-- hours

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

Unit:3	MAPREDUCE APPLICATION	20-- hours

Developing a MapReduce 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 workflows. **MapReduce Types and Formats:** MapReduce Types – Input Formats – Output Formats.

Unit:4	SETTING UP A HADOOP CLUSTER	20-- hours

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

Unit:5	PIG & HIVE	20-- 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 Quesry Languages – Database Operations – Tables – Joins – HIVE vs. PIG.

Unit 6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	105-- hours

Text Book(s)

1. Tom White - Hadoop: The Definitive Guide, O"Reilley, 4th Edition,2015.

Reference Books	
1	Mark Kerzner, Sujee Maniyam - Hadoop Illuminated, Git-Hub, 2016 Edition
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
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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	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 20		COMPUTER APPLICATIONS PRACTICALS VI – HADOOP	4			4
Pre-requisite		Basic application knowledge in computer	Syllabus Version		2021-2022	

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 PIG AND HIVE	K2
3	Relate analysis techniques to more complex data sets	K3

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

		90-- hours

Syllabus

1. Perform File Management in Hadoop.
2. Perform Health Care Analysis using Map Reduce.
3. Perform Word Count in Map Reduce using Politics dataset.
4. Find Maximum temperature using Map Reduce.
5. Perform Inner joins in PIG using Human Resource dataset.
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		TITLE OF THE COURSE	L	T	P	C
Elective II A)		FINANCIAL MARKETS AND INSTITUTIONS	4			4
Pre-requisite		Basic knowledge about financial institutions	Syllabus version		2021-2022	

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

Unit:1	INDIAN FINANCIAL SYSTEM	23-- 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	20-- 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	20-- hours

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	20-- hours

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	20-- hours

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

Unit 6	Contemporary Issues	2 hours
	Expert seminars and lectures	
	Total Lecture hours	105-- hours

Text Book(s)

1	Varshney P.N.& Mittal D. K. - Indian Financial System, Sultan Chand & Sons, 2014 edition.
2	Avadhani V.A - Marketing of Financial Services, Himalaya Publishing House, 3rd edition 2017.

Reference Books	
1	Gordan E, Natarajan K - Financial markets and services, Himalaya Publishing House, 10th edition2018
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	S.S.Gulshan - Business Law, Excel books, 4th Edition.
2	
4	
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	4			4
Pre-requisite		Basic knowledge in cyber securities	Syllabus Version			2021-2022

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 frame work 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**	**23-- hours**

Introduction- Concept of Cyberspace-E-Commerce in India-Privacy factors in ECommerce-cyber law in E-Commerce-Contract Aspects.

Unit:2	**INTELLECTUAL PROPERTY ASPECTS**	**20-- hours**

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

Unit:3	**EVIDENCE & CRIMINAL ASPECTS**	**20-- hours**

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 Penal code 1860.

Unit:4	**ELECTRONIC DATA INTERCHANGE**	**20-- hours**

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

Unit:5	**ELECTRONIC RECORDS**	**20-- hours**

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

Unit 6	**Contemporary Issues**	**2 hours**
	Expert seminars and lectures	
	Total Lecture hours	**105-- hours**

Text Book(s)

1	The Indian Cyber Law: Suresh T.Viswanathan, Bharat Law House, New Delhi.
2	

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

1	S.S.Gulshan - Business Law, Excel books, 4th Edition.
2	
4	

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)		GOODS AND SERVICE TAX	4			4
Pre-requisite		Basic knowledge in taxation	Syllabus version		2021-2022	

Course Objectives:

The main objectives of this course are to:

- To provide an in depth knowledge of the various provisions of indirect taxation
- To know the various types of indirect taxes like, excise duty, customs duty, production linked tax, and Value Added Tax
- To identify situations where input tax credit is available.

Expected Course Outcomes:

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

1	Relate the concepts of Indirect Taxes	K1
2	Understand the Levy and Collection of Cost of GST	K2
3	Explain the concepts relating to supply of goods and services	K3
4	Analyze the registration procedure under GST	K4
5	Outline the scope, objectives relates to customs law	K2

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

Unit:1	INTRODUCTION TO INDIRECT TAX	23-- hours

Indirect Taxes – Introductory Concept: Introduction -Importance -Meaning – Definition - Characteristics -Objectives -Canons of Taxation -Impact Shifting and Incidence of Tax - Classification of Taxes- Advalorem and Specific Duties - GST in India. Basics of Goods and Services Tax: Introduction - GST Law – GST Levy -Features of GST -Taxes Subsumed under Goods and Services -Benefits of Goods and Services Tax -GST Rate Structure -Types of Supplies under GST in India.

Unit:2	LEVY AND COLLECTION OF COST	20-- hours

Levy and Collection of Cost:-Introduction - GST – Supply - Levy and Collection – concept of supply - Composite and Mixed Supplies - Composition Levy-Reverse Charge Mechanism - Place of Supply of Goods and Services:-Introduction-Importance -Time of Supply of Goods And Services:-Introduction -Importance of time of supply in GST -Rules for Determination of Time of Supply -Time of Supply of goods -Time of Supply of services.

Unit:3	VALUATION OF SUPPLY OF GOODS AND SERVICES	20-- hours

Valuation of Supply of Goods and Services: Valuation of supply -Transaction value - Inclusion in value of supply -Elusive in value of supply -Valuation Rules. Input Tax Credit under GST: - Introduction -GST – Solution for Double Taxation and Cascading -Input Tax Credit– Salient Features of GST-Methods - Mechanism -Framework - Input Tax Credit in Special Circumstance-Documents Required For Claiming -Utilization - Recovering Input Credit Distributed In Excess. (Simple Problems only).

Unit:4	REGISTRATION UNDER GST	20-- hours

Procedures under GST - Introduction - Registration under GST -Tax Invoice, Credit and Debit Notes-Accounting and Records-Filling of Returns. Integrated Goods and Services Tax Act 2017 – Introduction – Scope – Levy and Collection – Powers to Grant Exemption – Determination of Nature of Supply – Inter State Supply – Intra State Supply – Place of Supply – Zero Rated Supply

Unit:5	**INTRODUCTION TO CUSTOMS LAW**	**20-- hours**
Introduction to Customs Law: -Introduction -Objectives - Scope. Customs Act 1962: Legal Structure – Definition - Prohibitions on Importation and Exportation of goods - Levy and Collection of Customs Duty -Taxable Event -Types of Customs Duty -Computation of Customs Duty- Classification and Valuation of Goods Under Customs Law: Classification of Goods - Customs Valuation.		
Distribution of Marks Theory 80%. and Problems 20%.		
Unit 6	**Contemporary Issues**	**2 hours**
Expert seminars and lectures		
	Total Lecture hours	**105-- hours**

Text Book(s)	
1	Dr. R.Parameswaran - Indirect Taxes GST and Customs Laws, Kavin Publications, 1st Edition, 2018.
2	V. S. Datey – GST, Taxman‟s Publications (P) Ltd., 2017 Edition
3	Radhakrishnan P - Indirect Taxation, Kalyani publishers, 2016, 4th Edition.
Reference Books	
1	CA. Kamal Garg, Neeraj Kumar &Sehrawat - Beginner‟s guide to Goods & Services Tax, Bharat Law House Pvt. Ltd., New Delhi, 2018.
Related Online Contents [MOOC, SWAYAM, NPTEL, Websites etc.]	
1	S.S.Gulshan - Business Law, Excel books, 4th Edition.
2	
4	
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	S	M	M

Course code		SAS & SCILAB	L	T	P	C
Skill based subject-4 PRACTICAL		Basic knowledge in statistics	-	-	4	4
Pre-requisite			Syllabus Version		2021-2022	

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

		45 hours

SAS

1. Student database:

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

. Car database:

Reading and Generating CSV Files Using Snippets & Using the Import Data Utility in SAS Studio
Import a car database from permanent database from sas 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:

Creating a New Column in SAS, Performing Conditional Logic in SAS

a) from permanent database take car dataset
b) Add new column called Markup by subtracting MDRP with Invoice

4. Heart Database:

a) Pick out heart dataset from permanent database
b) give appropriate values to filter a data and display the result
c) By using Air Dataset
d) Format the date column

Baseball Database:

a) Pick out Baseball dataset from permanent database
b) Select scatter plot and series plot
b) 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) Set required variable and give statistic measure to plot the graph

8. Class Database:
   a) Assign single variable to analyse.
   b) Apply necessary arguments for selected graph and display the result.
9. Cars Database:
   a) Perform Correlation Analysis, One-Way ANOVA
   b) Set required variable and give statistic measure to plot the graph
10. Fish Databse:

Analysis of Covariance & Forecasting Using SAS Studio

a) Assign single variable to analyse.
b) Apply necessary arguments for selected graph and display the result.

SciLab

11. Matrix manipulation using Scilab
12. Celsius temperatures can be converted to Fahrenheit by multiplying by 9, dividing by 5, and adding 32. Assign a variable called C the value 37, and implement this formula to assign a variable F the Fahrenheit equivalent of 37 Celsius.
13. Least Square Curve Fitting and plotting in scilab
14. Solve an ODE using Scilab
15. Write a program to input 2 strings from the user and to print out (i) the concatenation of the two strings with a space between them, (ii) a line of asterisks the same length as the concatenated strings, and (iii) the reversed concatenation. For example:

i. Enter string 1: Mark ii. Enter string 2: Huckvale iii. Mark Huckvale iv. elavkcuH kraM

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