SYLLABUS FOR B.Sc. COMPUTER SCIENCE UNDER NEP w.e.f. 2023-24

MINOR

Sl. No.	Paper Code	Semester	Title	No. Of Credits.
1	CSC-112	I	Computer Software Fundamentals	4
2	CSA-111	2	Computer System Fundamentals	4

Skilled Enhancement Courses (SEC)

Sl. No.	Paper Code	Semester	Title	No. Of Credits.
1	CSC-143 CSC-148	I-B.Com II-B.Com	1) Data analytics using Spreadsheets I 2) Data analytics using Spreadsheets II	3+1
2.	CSC-145 CSC-149	I-B.A II-BA	1) Basic Computer Applications 2) Data and Business Analytics	3+1

SYLLABUS

Semester 1 – B.Sc (Minor)

Name of the Programme : B.Sc. Computer Science
Course Code : CSC-112
Title of the Course : Computer Software Fundamentals
Number of Credits : 4T
Effective from AY : 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	This course will enable the student to learn 1. To understand the fundamentals of IT, software and Networking 2. To learn the usage of IT, software and networking 3. To familiarize with latest trends in IT	
		No. of Hours

Content:	**Unit I: Introduction of IT** • **Data:** Definition, Types of data. Data Representation: Character formats-ASCII, Unicode (Definition, Adding regional languages, Phonetic keyboards. • Number system: Binary, decimal, Conversion. Data Organization Directory structure, File formats and Compression (Text, Audio, Image, Video). Data Backup: Techniques, Scheduler, Online backup, Advantages. Device Interfaces and Data Storage: Data device Interface access methods (USB, IDE /SATA). Optical memory (Blue ray), Flash memory (USB Sticks, Memory Cards, SD, MMC, Micro SD), Magnetic Memory (External disks), New Devices (Solid state drives) • **Information**: Prerequisites of Information, Need for Information Technology and its advantages, Qualities of Information • **Information Technology:** Definition and components. Basic computer Organization Application of IT (Science and Engineering, Business & Commerce, Education, Governance, Medicine, Entertainment)	**15**
	Unit II: Software: System and Applications • Relationship between Hardware and Software • Programming Languages: Low level, High level, Translators • System Programs: Operating systems: Operating systems • Definition and functions of operating system, Examples of operating System (Windows, Linux, Online OS, Virtual OS, Comparison), Multi boot systems (disk partitions and logical drives) Directory Structure: System directories, Users (administrator, limited rights user and guest), User directories (directory permission) • Services, drives and hardware interfaces • Application Programs: Definition, Examples Introduction to Mathematical Computation Packages Human computer interaction (HCI)	**15**

	Unit III: Basics of Computer Networking and data communication • Networking basics, why networking of computers is needed, • Types of networks-LAN, MAN, WAN, • Network Components – H/W, Software, Network Devices, Network topologies. • Communication channels, Communication Process, Data Transmission speed, Communication Types (modes) • Internet – role and importance, IP Addressing – public Vs Private, Static Vs Dynamic; WWW & related protocols;	**15**
	Unit IV: Future IT trends • Artificial Intelligence (AI) and Automation (Definition, Applications) • IoT and Edge Computing • Cloud Infrastructure • Virtual Reality & Augmented Reality • Business Intelligence	**15**
Pedagogy:	Lecture method using ICT tools	
References/ Readings:	Main Reading: 1. Anita Goel (2010), "*Computer Fundamentals*", Pearson Education. Additional Reading: 1. P.Aksoy, L.DeNardis(2006), "*Introduction to Information Technology*", Cengage Learning, 2006 2. Pradeep K.Sinha, Priti Sinha(2007), "*Computers Fundamentals*", BPB Publishers	
Course Outcomes:	At the end of the course, learner will be able to: 1. Remember basics of IT, software, networking, trends in IT 2. Understand various I/O devices, systems, networking devices, IT uses 3. Apply the concepts in systems, devices, networking for IT 4. Analyse the applications of IT, Software, Networking and trends in IT	

Sem II – B.Sc (Minor)

Code: CSA-111
Title of the Course: Computer System Fundamentals
Number of Credits: 4T
Effective from AY: 2024-25

Prerequisites for the Course:	Nil
Course Objectives:	1. To remember the basics of computers, Computer Organization, Number Systems, process management, memory management, I/O Management, and File management concepts. 2. To understand the concepts of process management, memory systems, I/O devices, and File Management Systems 3. To apply the concepts of process management in handling deadlock situations. 4. To analyze the appropriate type of memory for a given scenario.

Units	Content	No of hours 60
I	**Fundamentals of Computer** ● **Evolution of Computer** Operating Systems – Definition, Introduction to Major Functions/Services, OS Structure, Relationship between Kernel, OS, Hardware, Block Diagram of computer, Evolution of Computers - Computer Generations ● **Computer Organization**: Input Unit, Output Unit, Structure and functions of Central Processing Unit, Arithmetic Logic Unit, and Control Unit, Von Neumann Machine Architecture, Computer Function – Top Level View, Instruction Cycle with and without interrupts (State diagram), Classes of Interrupts, Multiple interrupts, Interconnection structures, Bus Interconnection. ● **Number System** Conversion(Binary, Decimal, Octal, Hexa-Decimal), Data Representation, Binary Arithmetic, One's and Two's Complement.	**15**
II	**Processes & Process Management** ● **Process** Definition, Process Control Block, Process States, Operations on Process. ● **Threads** Processes and Threads, Multithreading, Types of Threads. ● **Process Scheduling**	**15**

	Introduction, Scheduling Criteria, Scheduling Algorithms. ● **Concurrency/Process Coordination** Synchronization Principles, Mutual Exclusion, The Critical-Section Problem, Peterson's Solution ● **Deadlock** Principles, Deadlock Handling Methods, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock	
III	**Memory Management** ● **Memory Management Concepts** Memory Partitioning (Fixed and dynamic), Swapping, Paging, and Segmentation. ● **Virtual Memory** Introduction, Demand Paging, Page Replacement- Algorithms, Thrashing. ● **Cache Memory** Characteristics of Memory Systems, Memory Hierarchy, Cache Memory Principles. ● **Internal Memory** Semiconductor main memory–SRAM, DRAM, Types of ROM. ● **External Memory** Magnetic Disk, SSD, Optical memory, Magnetic Tape	**15**
IV	**Input/Output and File Management** ● **I/O Management** I/O devices, Organization of I/O (programmed, interrupt driven and DMA), I/O Buffering, Disk Scheduling- Algorithms, RAID. ● **File Management** Overview–File and File Systems, File Structure, File Management System, File Organization and Access, File Directories, Directory Structure, File Sharing,	**15**

Pedagogy:	**Suggested strategies for use to accelerate the attainment of the various course outcomes.** 1. The lecture method need not be only a traditional lecture method, but alternative effective teaching methods could be adopted to attain the outcomes. You may use a. Video/Animation to explain various concepts. b. Collaborative, Peer, Flipped Learning, etc. 2. Ask at least three HOT(Higher-Order Thinking) questions in class, which promotes critical thinking. 3. Adopt Problem Based Learning (PBL), which fosters students' Analytical skills, and develops design thinking skills such as the ability to design, evaluate, generalize, and analyze information rather than simply recall it. 4. Introduce Topics in manifold representations. 5. Show the different ways to solve the same problem and encourage the

	students to come up with their own creative ways to solve them. 6. Discuss how every concept can be applied to the real world - and when that's possible, it helps improve the students' understanding 7. To promote self-learning, give at least one assignment where they can complete one MOOCs (certificate or equivalent) course out of lecture hour. Test their understanding through quizzes or presentations.
References / Readings:	**Main Reading:** 1. Stallings, W.(2012). *Operating Systems: Internals and Design Principles*. Pearson Education. 2. Stallings, W.(2013). *Computer Organization and Architecture: Designing for Performance*. Pearson Education. **Additional Reading:** 1. Sinha, P. ,& Sinha, P.(2016). *Computer Fundamentals*. BPB Publications. 2. Silberschatz, A., Galvin, P.B., & Gagne, G. (2006). *Operating System Principles*. Wiley India.
Course Outcomes:	On completion of the course, students will be able to: **CO1.** Remember the basics of computers, Computer Organization, Number Systems, process management, memory management, I/O Management, and File management concepts. **CO2.** Understand the concepts of process management, memory systems, I/O devices, and File Management Systems **CO3.** Apply the concepts of process management in handling deadlock situations. **CO4.** Analyse an Appropriate type of memory for a given scenario.

B.Com Sem 1

Name of the Programme : B.Sc. Computer Science

Course Code : CSC-143
Title of the Course : Data analytics using Spreadsheets I
Number of Credits : 03 (1 T + 2 P)
Effective from AY : 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	Introduce the basic concepts of data analytics; develop proficiency in students in using spreadsheets to format data, manipulate data using appropriate basic function and formulas; visualize data; filter data and generate basic reports using Pivot tables.	
Content **Content**		**No of Hours**
	Unit I: Introduction to Data Analytics and Spreadsheet Basics Definition of Data Analysis and Data Analytics Phases of Data Analysis. Methods of Data Analysis in Spreadsheets. Understanding Data: Data and types of data. Quantitative data – discrete data, continuous data. Qualitative data - categorical data, ordinal data. Understanding operators and functions essential for data analytics. Arithmetic operators and order of operations. Functions: Parts of a function, arguments to a function, function library and types of functions.	**5**
	Unit II: Data Collection and Manipulation. Data Collection using online data collection tools. Creating Spreadsheets online and collaboration. Introduction to data cleansing, data modification using data analysis functions. Sorting criteria and types of sorting, Filters and types of filters, Guidelines and examples for sorting and filtering data by colour: Overview of sorting and filtering data by colour and icon set, using colour effectively when analysing data, choosing the best colours.	**5**
	Unit III: Data Visualization and Summarization Visualizing data: Principles of charting, types of basic charts, Some practicalities in preparing charts. Conditional Formatting and its types. Functions used for data summarization. Pivot tables and its applications.	**5**
	Practical	
	Unit I: Spreadsheet Basics: ● Formatting Cells with font formats, alignment, borders etc. ● Number formats, currency formats, formatting dates, custom and special formats. ● Format painter ● Selection techniques ● Advanced paste special techniques: paste value, paste formulas, paste formats, paste validations, transpose tables	**20**

	● Formulas and Functions: ● Complex Formulas with arithmetic operators ● Relative, mixed and absolute cell reference ● Basic Functions such as sum, average, max, min, count, counta. ● Customization, Formatting and Protection: ● Customizing the ribbon, Using and customizing autocorrect ● Changing Excel default options ● Page Layout and printing options: Setting up print area, customizing headers and footer, print titles. ● File level protection, workbook, worksheet protection ● Working with named ranges, ● Commonly used shortcut keys **Essential Data Analysis Functions and Methods:** ● Text Functions: Upper, Lower, Proper, Left, Mid, Right, Trim, Len, Exact, Concatenate, Find, Search, Substitute ● Date and time Functions: today, now, day, month, year, date, date if, dateadd, EOMonth, weekday, days, networkdays ● Logical functions: TRUE, FALSE,IF, AND, OR ● Nested if, IF function together with AND, OR function ● Data cleaning and preparation using text functions and text to column.	
	Unit II **Data collection using online data collection tools such as Google Forms:** ● Creating data forms to collect data for different types of scenarios such as surveys, event registration, feedback etc. ● Creating forms with conditional data input workflows based on user choice. ● Online storage of spreadsheets: ● Creating online spreadsheets such as google sheets and online collaboration of the same. ● Working with multiple worksheets & spreadsheets: ● Scenarios which require creating a workbook with multiple sheets and cross referencing. ● Scenarios which require creating multiple workbooks with multiple sheets and cross referencing across workbooks. ● Methods used in data analytics: ● Freezing Rows and Columns ● Sorting Data ● Filtering Data ● Summarizing Data ● Formatting Data as Table	**20**
	Unit III **Data Analytics Methods:** ● Visualizing data with charts. ● Adding Conditional Formatting. ● Essential advanced Data Analysis Functions: sumif, sumifs, countif, countifs, averageif, averageifs, nested if, iferror statement, and, or, not	**20**

	● Introduction to simple pivot tables. ● Solving real life problems/scenarios in spreadsheets.	
Pedagogy:	● Blended learning: Concept learning through Lab assignments and online video resources followed by application of concept learnt to real life scenario provided. ● Practical skill development through Lab assignments.	
References/ Readings:	Main Reading: 1. DavidWhigham(2007), "*Business Data Analysis using Excel*", Oxford University Press Additional Reading: 1. Wayne Winston(2019), "*Microsoft Excel 2019 – Data Analysis and Business Modelling*", PHI Learning Pvt. Ltd.	
Course Outcomes:	**At the end of the course, learner will be able to:** 1. Format a given spreadsheet with various formatting features and use appropriate functions given relevant description of desired output. 2. Sort, filter, summarize data given in a spreadsheet as per given instructions 3. Visualize data using appropriate charts and conditional formatting. 4. Solve basic queries on a given data set by preparing basic pivot tables for a given data set.	

B.Com Sem II

Name of the Programme : B.Sc. Computer Science
Course Code : CSC-148
Title of the Course : Data analytics using Spreadsheets II
Number of Credits : 03 (1 T + 2 P)
Effective from AY : 2023-24

Pre-requisites for the Course:	Basic knowledge of Spreadsheets.	
Course Objectives:	Develop ability to use spreadsheets for conditional data summarization, financial calculations, advanced data visualization. Work with pivot tables and charts to obtain insights, use lookup functions for data manipulation, perform what-if analysis. Create a dashboard in Excel. Obtain basic descriptive statistics using analysis tools.	
	Theory	**No of hours**

Content:	**Unit I : Financial Data Analysis and Advanced data Visualization:** Data Analysis financial functions • Financial arithmetic basics and Investment Appraisal functions- modeling financial data in Spreadsheets. • Data Analytics advanced visualization methods • Data Visualization with charts such as tree map, waterfall, sunburst, box and whisker, power maps.	**5**
	Unit II: Steps in data analytics: ● Preparation of data: Data collection, data cleansing and data validation ● Elementary data modeling – linear functions in business, expressions and functions involving logical tests, vertical lookup functions, combining conditional statements with lookup functions.	**5**
	Unit III: Statistical analysis of data using Spreadsheets: ● Collating and categorizing data, data description-central tendency and dispersion, descriptive statistics using Analysis Tool Pak.	**5**
	Practical **Unit I:Data Analysis advanced functions and methods** ● Financial Functions: FV, PV, NPV, IRR, PMT (loan amortization schedule) ● Scenarios for visualizing data using charts such as tree map, waterfall, sunburst, box and whisker, combo charts, power maps and 3D Maps ● Advanced Sorting option and Advanced Filters	**20**
	Unit II ● Data Validation: Number, Date and Time Validation, Text and List Validation, Custom validation based on formula for a cell, Dynamic dropdown list creation using data validation-dependency list.	**20**

	● What-if Analysis: Goal Seek, scenario analysis, data tables using PMT function, Solver tool ● Lookup Functions: Vlookup and Hlookup functions, Index and Match, Reverse Lookup using choose function.	
	Unit III ● Pivot Tables and Pivot Charts: Creating advanced pivot tables with advanced value field settings, filtering pivot tables, modifying pivot table data, grouping based, Pivot Charts and Slicers. Filter data with slicers, manage primary and secondary axis ● Creating Interactive Dashboard: Planning a Dashboard, Adding Tables and charts to dashboard, adding dynamic content to dashboard. ● Descriptive statistics using Analysis ToolPak. ● Introduction to Excel macros and VBA Basics.	**20**
Pedagogy:	Blended learning: Concept learning through Lab assignments and online video resources followed by application of concept learnt to real life scenario provided. Practical skill development through Lab assignments.	
References/ Readings:	Main Reading: 1. DavidWhigham(2007), "*Business Data Analysis using Excel*", Oxford University Press Additional Reading: 1. Wayne Winston(2019), "*Microsoft Excel 2019 – Data Analysis and Business Modelling*", PHI Learning Pvt. Ltd.	
Course Outcomes:	At the end of the course, learner will be able to: 1. Use conditional arithmetic functions to summarize data and use financial functions, given a spreadsheet with data and relevant description of desired output. 2. Perform what-if analysis and data validation on given data for a given scenario. 3. Summarize and analyze data using Pivot Tables and Pivot Charts. 4. Apply and visualize data using Dashboard and descriptive statistics using Analysis ToolPak.	

BA SEM 1

Name of the Programme : B.Sc. Computer Science
Course Code : CSC-145

Title of the Course : Basic Computer Applications
Number of Credits : 3(1T+2P)
Effective from AY : 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	To Provide an Understanding of Essentials of Information Technology, Internet Applications and Emerging Technologies. Includes practical skills in data capture, presentation, report formatting, efficient search techniques and online collaboration tools.	
Content:		**No. of Hours**
	Unit I: Information Technology Basics Information : Prerequisites of Information, Need for Information Technology and its advantages; Information Technology: Definition and components; Data: Definition, Types, Data Representation, Number system and Coding Schemes (ASCII and UNICODE); Parts of a Computer: CPU, Memory, Input/ Output Devices, Auxiliary Memory; Software– Definition, Relationship between Hardware and Software, Categories of Software, OS - definition & functions Role of Information Technology in: Business, Mobile Computing, Health Services, Public Sector, Media, Defense Services, Education and Publication.	**10**
	Unit II: Internet Applications and Emerging Technologies Internet – role and importance, Web Browser, IP Addressing– Public Vs Private, Static Vs Dynamic; WWW & related protocols; Internet Applications. Cloud Computing: Meaning, Features, & Service models, Advantages and disadvantages, Mobile Computing: Meaning, Business Applications of Mobile computing, Virtual reality & Augmented Reality: Meaning and applications, IoT - Internetof Things: Meaning& Applications.	**5**
	Practicals	

	Lab1: Basic Computer Skills Surfing the Internet, Use of Email and Search Engines Securing your device Installation and Configuration of any free Antivirus Package eg. AVG/Avast etc., **Online Sharing and Collaboration** Create documents, spreadsheets and presentations online, Share and collaborate in real time, Safely store and organize your work, Control who can see your documents **Data capture using Google Forms** Create data forms to capture data for Event Registration, Event Feedback, Customer feedback/satisfaction on a product or service and Order Request **OS Basic** Installation of Operating System, Demonstrate features of any MS Windows based OS or any of the Linux flavor , Identification of Directories , Setting up computer, Add a printer, Check device drivers, Installation of software, Users and administrative rights for installation	**10**
	Lab2: Report Formatting using Word Processing (MS Word or any similar Open Source software) Draft an official letter for job interview invitation/ job appointment/ invitation to a business trade show event, use mail merge to input the recipients list linking with database. Given a project report in PDF format transfer to word processor software and format to include title page, specified Paragraph and Page Formatting (page size, orientation, line spacing, font type and font size, Indent, bullets, paragraph formatting) details, Acknowledgement page, Table of contents page, List of figures page, List of Tables page, bibliography, references, distinct headers for each chapter, page numbering in roman for initial pages and normal from first chapter. The document should be checked for spelling errors and corrected appropriately. Create / Upload a document in a collaboration software like Google docs. Share and collaborate in real time, Safely store and organize your work, Control who can see your documents.	**30**
	Lab 3: Presentation Software (MS- Powerpoint or any similar Open Source software) Preparing presentation in areas such as Customer satisfaction/ feedback, product analysis, job satisfaction using the data obtained through data capture tool, including appropriate slide animation, sound recording, slide timings, customer feedback video. Export the presentation as video or save as slide show. Prepare handouts for audience.	**20**
Pedagogy:	MS-Word, MS-Powerpoint or any similar open source software may be used	
References/ Readings:	Main Reading: 1. Pradeep K. Sinha and Priti Sinha(2022), "*Computer Fundamentals*", BPB	

	Publications 2. ITL Education Solutions Limited(2005), "*Introduction to Information Technology*", Pearson Education Additional Reading: 1. M. Arvind Babu, Dr. S. Anandamurugan, T. Priyaa(2016), "*Cloud Computing*", First Edition,Laxmi Publications Pvt Ltd 2. ArshdeepBahga, Vijay Madisetti (2014), "*Internet of Things: A Hands- On Approach*", Vijay Madisetti Publications
Course Outcomes:	At the end of the course, learner will be able to: 1. Explain the basic Knowledge and Understanding of Information Technology, Internet Applications and Emerging Technologies. 2. Understand future technologies through foundational skills learnt. 3. Develop practical skills in Application software. 4. Apply technology and professional development in IT.

BA SEM II

Name of the Programme : B.Sc. Computer Science
Course Code : CSC-149
Title of the Course : Data and Business Analytics
Number of Credits : 3(1L+2P)
Effective from AY : 2023-24

Pre-requisites for the Course:	Nil	
Course Objectives:	To understand data processing, data analysis, business analytics concepts, computer networking basics, e-commerce technology and business applications; To develop practical skills in data analytics and business analytics.	
		No of hours
	Unit I: Data processing, Data Analysis and Business Analytics Data Processing – Steps involved in data processing, advantages of computers in data processing Data analysis and forecasting - importance of data analysis in business, Data forecasting, its need, benefits of data forecasting, Data Integration: concept and how it works Introduction to Business analytics – meaning and basic concepts, Visualization/ Data Issues: Organization/sources of data, Importance of data quality, Dealing with missing or incomplete data, Data Classification	**4**

Content:	**Unit II:E-Commerce** Definition, E-commerce and Trade Cycle, Electronic Markets, Electronic Data Interchange and Internet Commerce,Types of E- commerce: Business to BusinessE- Commerce, Business to Consumer E- Commerce. Consumer to Consumer, Government to Consumer, Business to Government, Electronic Payment Systems: Smart Cards– Credit Cards – Wallets, Safe practices, Risks, E-Retail, Concept and Examples, Online shopping– Introduction, Safety measures (Encryption of data authentication, SSL, Digital signatures, Digital Certificates),E-Banking, Features and services, M- Commerce, Productsand services	**5**
	Unit III : Basics of Computer Networking Networking basics, Need for computer networks, Types of networks-LAN, MAN, WAN, Network Components–H/W, Software, Communication channels, Network Devices, Network topologies.	**6**
	Practicals	
	Lab1: Spreadsheet (MS-Excel or any similar open source software) ● Working with worksheets -Entering data, Formatting, Editing, and Printing a worksheet,	**36**

	● Formulas and Functions in Excel, operators in formula ● Generally used Spreadsheet functions - Mathematical, Statistical, Financial, Logical, Date and Time, Database and Text functions ● Introduction to some more useful functions such as the IF, nested IF, VLOOKUP and HLOOKUP ● Data Sorting and Filtering ● Result representation of data using spreadsheet ● What-if analysis, Logical tests(nested if functions), Goal seek, ● Representing results graphically ● Filtering, advanced filters, sorting and conditional formatting data ● Data validation techniques, Hyperlinks ● Pivot table, Scenarios ● Summing through the sheets ● Getting external data files into Excel ● Macros - creation, editing and deletion of macros Assignments to be given on the following topics: to prepare and analyse Loan and Lease statement; Ratio Analysis; Payroll statements; Capital Budgeting; Depreciation Accounting; Graphical representation of data; Frequency distribution and its statistical parameters; Correlation and Regression	
	Lab2: Data Analytics ● Assignments to analyse data available from IndiaStat.com such as Analysis of demographic data, environment data, public expenditure ● Analyse data from annual reports of Companies and banks	**8**
	Lab3: E-commerce Website review Write a review of an E-Commerce Site visited include: Site description, Site Design, ease in navigation , process for purchasing items, security, privacy, customer service, best features of site, Target Audience, Revenue model, Marketing Strategies	**8**
	Lab4: Computer Networking Basic Networking Setup of PC, Network commands like ipconfig, ping, traceroute, nslookupetc, Setup of Home Router / Wifi Hotspot, Understanding of Firewall and Basic Firewall Setup, File and Printer Sharing, connecting to share, Finding out public address, connection speeds etc.	**8**
Pedagogy:	MS-Excel or any similar open source software may be used Field visits may be conducted to banks, corporate offices employing relevant software for business applications.	
References/ Readings:	Main Reading: 1. ITL Education Solutions Limited(2005), "*Introduction to Information Technology*", Pearson Education 2. Ravi Kalakota& Andrew B. Whinston(2009), "*Frontiers of Electronic Commerce*", Ninth Impression, Pearson Education. Additional Reading:	

	1. David Whiteley(2000), "*E-Commerce: Strategy, Technologies And Applications*", McGraw-Hill Education, ISBN-10 : 0077095529 2. Thomas H. Davenport, Jeanne G. Harris(2010), "*Competing on Analytics- The New Science of Winning*", Harvard Business Review Press. 3. LaValle et al.(2005), "*Analytics: The New Path to Value*", Taxmann Publishers. 4. Davenport and Harris(2007), "*The Dark Side of Customer Analytics*", Harvard Business Review Press. 5. Bartlett, R.(2013) , "*A Practitioner's Guide to Business Analytics*", McGraw-Hill, New York. 6. Bruice Schneier, "*Applied Cryptography-Protocols, Algorithms and Source code in C",* Second Edition, Wiley India Pvt Ltd, ISBN 978-81- 265-1368-0
Course Outcomes:	At the end of the course, learner will be able to: 1. Explain the concepts of data processing, data analysis, business analytics, computer networking, e-commerce technology and its applications in business. 2. Develop skills of data analysis and business analytics using relevant Application software. 3. Apply the Spreadsheet tools to solve business problems. 4. Review an E-commerce Website