B.Com.,

Allied 2023-24
FIRST YEAR – SEMESTER – I

PROGRAMMING IN C AND LAB									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA1		**2**	**2**		**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	Describe the core syntax and semantics of C programming language.
LO2	Discover the need for working with the strings and functions.
LO3	Illustrate the process of structuring the data using matrix, struct .

Prerequisites: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	Introduction to C Language:C Language Introduction-Features of C Language-Benefits of C over other languages-Compilation of C Program-First Program in CPre-processor in CPre-processor directives	
Unit II	Variables, Data Types & Operators:Variables and Keywords in C-Scope rules in C-Data Types in C-Operators & Its Types-Typecasting in C	
Unit III	Control Flow Statements:Decision Making Statements-Switch Statement in C-C Loops & Control Structure Practice problems-Continue Statement , Break Statement Array & String Handling in C:Arrays in C-Strings in C	
Unit IV	Multidimensional Arrays in C-String functions in C- Practice problems Functions in C:Function Prototype-Parameter Passing Techniques in C-Storage Classes in C-Recursion Concept - Functions in CPractice problems	
Unit V	Pointers, Structures, and Unions:Pointers in C-Structures- Union - Enumeration (or enum) in C- Pointer vs Array in C – C application programs (Sorting, Matrix manipulations, student's mark list preparation)	
	Total	

Course Outcomes	
CO1	Apply the concept of Control Structures to solve any given problem.
CO2	Apply the concept of single and multi-dimensional arrays to solve problems related to searching, sorting and matrix operations.
CO3	Apply the concept of Strings for writing programs related to character array.
CO4	Write programs using concept of user defined and recursive functions.
CO5	Apply concept of structures to write programs.

Textbooks	
1	E. Balaguruswamy, "Programming in ANSI C", 8th Edition, 2019, McGraw Hill Education, ISBN:978-93-5316-513-0.

2	Pradip Dey, Manas Ghosh, “Programming in C”, 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
3	Kernighan B.W and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
Reference Books	
1	Yashavant P. Kanetkar, “Let Us C”, 16th Edition, 2019, BPB Publications, ISBN: 978- 93-8728-449-4.
2	Jacqueline A Jones and Keith Harrow, “Problem Solving with C”, Pearson Education. ISBN: 978-93-325-3800-9.
3	Dr. Guruprasad Nagraj, “C Programming for Problem Solving”, Himalaya Publishing House. ISBN-978-93-5299-361-1.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	http://elearning.vtu.ac.in/econtent/courses/video/BS/14CPL16.html
2	https://nptel.ac.in/courses/106/105/106105171/

FIRST YEAR – SEMESTER – I

C Programming Lab	

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- Understand problem statements and identify appropriate solutions.
- Demonstrate the use of IDE and C Compiler.
- Develop programs using C Programming Language.

Course Outcomes: (for students: To know what they are going to learn)

CO1: Apply the concept of Control Structures to solve any given problem.

CO2: Apply the concept of single and multi-dimensional arrays to solve problems related to searching, sorting and matrix operations.

CO3: Apply the concept of Strings for writing programs related to character array.

CO4: Write programs using concept of user defined and recursive functions.

CO5: Apply concept of structures to write programs.

List of Programs

1. Write a C program to find roots of a Quadratic equation.
2. Write a C program to find the total no. of digits and the sum of individual digits of a positive integer.
3. Write a C program to generate the Fibonacci sequence of first N numbers.
4. Write a C program to sum the series S=1 – x + (x^2/2!) - (x^3/3!) + ---- - (x^n/n!)
5. Write a C program to arrange the elements of an integer array using Bubble Sort algorithm.
6. Write a C program to input two matrices and perform matrix multiplication on them
7. Write a C program to check whether the given string is palindrome or not without using Library functions.
8. Write a C program to count the number of lines, words and characters in a given text.
9. Write a C program to generate Prime numbers in a given range using user defined function.
10. Write a C program to find factorial of a given number using recursive function.
11. Write a C program to maintain a record of n student details using an array of structures with four fields - Roll number, Name, Marks and Grade. Calculate the Grade according to the following conditions.

    Marks Grade
    >=80 A
    >=60 B
    >=50 C
    >=40 D
    <40 E

    Print the details of the student, given the student Roll number as input.

Extended Professional Component	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC –CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)

Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Text Books:

E. Balaguruswamy, “Programming in ANSI C”, 8th Edition, 2019, McGraw Hill Education, ISBN:978-93-5316-513-0.

Reference Books:

1. Pradip Dey, Manas Ghosh, “Programming in C”, 2nd Edition, 2018, Oxford University Press, ISBN: 978-01-9949-147-6.
2. Kernighan B.W and Dennis M. Ritchie, “The C Programming Language”, 2nd Edition, 2015, Pearson Education India, ISBN: 978-93-3254-944-9.
3. Yashavant P. Kanetkar, “Let Us C”, 16th Edition, 2019, BPB Publications, ISBN: 978- 93-8728-449-4.
4. Jacqueline A Jones and Keith Harrow, “Problem Solving with C”, Pearson Education. ISBN: 978-93-325-3800-9.
5. Dr. Guruprasad Nagraj, “C Programming for Problem Solving”, Himalaya Publishing House. ISBN-978-93-5299-361-1.

Weblinks and Video Lectures (e-Resources):

1. http://elearning.vtu.ac.in/econtent/courses/video/BS/14CPL16.html
2. https://nptel.ac.in/courses/106/105/106105171/

FIRST YEAR – SEMESTER – I

BUSINESS ECONOMICS									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA2		**T**			**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	To understand the approaches to economic analysis
LO2	To know the various determinants of demand
LO3	To gain knowledge on concept and features of consumer behaviour
LO4	To learn the laws of variable proportions
LO5	To enable the students to understand the objectives and importance of pricing policy

Prerequisites: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	**Introduction to Economics** Introduction to Economics – Wealth, Welfare and Scarcity Views on Economics – Positive and Normative Economics - Definition – Scope and Importance of Business Economics - Concepts: Production Possibility frontiers – Opportunity Cost – Accounting Profit and Economic Profit – Incremental and Marginal Concepts – Time and Discounting Principles – Concept of Efficiency- Business Cycle:- Theory, Inflation, Depression, Recession, Recovery, Reflation and Deflation,	**12**
Unit II	**Demand & Supply Functions** Meaning of Demand - Demand Analysis: Demand Determinants, Law of Demand and its Exceptions. Elasticity of Demand: Definition, Types, Measurement and Significance. Demand Forecasting - Factors Governing Demand Forecasting - Methods of Demand Forecasting, Law of Supply and Determinants.	**12**
Unit III	**Consumer Behaviour** Consumer Behaviour – Meaning, Concepts and Features – Law of Diminishing Marginal Utility – Equi-Marginal Utility – Coordinal and Ordinal concepts of Utility - Indifference Curve: Meaning, Definition, Assumptions, Significance and Properties – Consumer's Equilibrium. Price, Income and Substitution Effects. Types of Goods: Normal, Inferior and Giffen Goods - Derivation of Individual Demand Curve and Market Demand Curve with the help of Indifference Curve.	**12**
Unit IV	**Theory of Production** Concept of Production - Production Functions: Linear and Non – Linear Homogeneous Production Functions - Law of Variable Proportion – Laws of Returns to Scale - Difference between Laws of variable proportion and returns to scale – Economies of Scale – Internal and External Economies – Internal and External Diseconomies - Producer's equilibrium	**12**

Unit V	**Market Structure** Price and Output Determination under Perfect Competition, Short Period and Long Period Price Determination, Objectives of Pricing Policy, its importance, Pricing Methods and Objectives – Price Determination under Monopoly, kinds of Monopoly, Price Discrimination, Determination of Price in Monopoly –Monopolistic Competition – Price Discrimination, Equilibrium of Firm in Monopolistic Competition–Oligopoly – Meaning – features, "Kinked Demand" Curve	**12**
	TOTAL	**60**

Course Outcomes	
CO1	Explain the positive and negative approaches in economic analysis
CO2	Understood the factors of demand forecasting
CO3	Know the assumptions and significance of indifference curve
CO4	Outline the internal and external economies of scale
CO5	Relate and apply the various methods of pricing
Textbooks	
1	H.L. Ahuja, Business Economics–Micro & Macro - Sultan Chand & Sons, New Delhi.
2	C.M. Chaudhary, Business Economics-RBSA Publishers - Jaipur-03.
3	Aryamala.T, Business Economics, Vijay Nocole, Chennai.
4	T.P Jain, Business Economics, Global Publication Pvt. Ltd, Chennai.
5	D.M. Mithani, Business Economics, Himalaya Publishing House, Mumbai.
Reference Books	
1	S.Shankaran, Business Economics-Margham Publications, Chennai.
2	P.L.Mehta, Managerial Economics–Analysis, Problems & Cases, Sultan Chand & Sons, New Delhi.
3	Peter Mitchelson and Andrew Mann, Economics for Business-Thomas Nelson Australia
4	Ram singh and Vinaykumar, Business Economics, Thakur Publication Pvt. Ltd, Chennai.
5	Saluram and Priyanka Jindal, Business Economics, CA Foundation Study material, Chennai.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	https://youtube.com/channel/UC69_-P77nf5-rKrjcpVEsqQ
2	https://www.icsi.edu/
3	https://www.yourarticlelibrary.com/marketing/pricing/product-pricing-objectives-basis-and-factors/74160

MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES

	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PSO1**	**PSO2**	**PSO3**
CO1	3	2	2	2	2	2	2	2	1	2	2
CO2	3	2	3	3	2	2	2	2	2	2	2
CO3	3	2	3	3	2	2	2	2	2	2	2
CO4	3	2	2	3	2	2	2	2	2	2	2
CO5	3	2	3	3	2	2	2	2	2	2	2
TOTAL	15	10	13	14	11	10	10	10	10	10	10
AVERAGE	3	2	2.6	2.8	2.2	2	2	2	2	2	2

3 – Strong, 2- Medium, 1- Low

FIRST YEAR – SEMESTER – II

INTERNATIONAL TRADE									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA3		**T**			**3**	**4**	**25**	**75**	**100**

Course Objectives	
CO1	To enable students familiarise with the basics of International Trade.
CO2	To know the various theories of international trade.
CO3	To impart knowledge about balance of trades and exchange rates.
CO4	To gain knowledge about international institutions.
CO5	To gain insights on World Trade Organisation

	Contents	**No. of Hours**
Unit I	Introduction to International Trade – Meaning – Definition - Difference between Internal and International Trade – Importance of International Trade in the Global context	12
Unit II	Theories of International trade: Classical theories - Adam smith's theory of Absolute Advantage – Ricardo's Comparative cost theory - Modern theories of International Trade - Haberler's Opportunity Cost theory – Heckscher –Ohlin's Modern theory – International trade and Factor Mobility Theory – Leontiff's Paradox - International trade and economic growth theory - Immiserating growth theory.	12
Unit III	Balance of Payments – Components of Balance of Payments - Current account, Capital account & Official settlement accounts - Disequilibrium in BOP -Methods of correcting Disequilibrium - Balance of Payment adjustment Theories - Marshall Lerner mechanism. Balance of Trade – Terms of Trade – Meaning – Definition – Difference between BOP and BOT.	12
Unit IV	International Economic Institutions - International Monetary System - Bretton Woods Conference – IMF - Objectives, Organizational structure – Membership – Quotas – Borrowing and Lending Programme of IMF – SDRs – India and IMF -World Bank and UNCTAD.	12
Unit V	World Trade Organisation (WTO) – Functions and Objectives – Agricultural Agreements – GATS - TRIPS – TRIMS.	12
	TOTAL	**60**

Course Outcomes	
CO1	Distinguish between the concept of internal and international trade.
CO2	Define the various theories of international trade.
CO3	Examine the balance of trade and exchange rates
CO4	Appraise the role of IMF and IBRD.
CO5	Define the workings of WTO and with special reference to India.

Textbooks	
1	Francis Cherunilam, International Trade and Export Management – Himalaya Publishing House - Mumbai –04.

2	Paul.R.Krugman and Maurice Obstfeld, International Economics (Theory and Policy) -Pearson Education Asia - Addison Wesley Longman (P) Ltd. - Delhi – 92.
3	Robert J.Carbaugh, International Economics - Thomson Information Publishing Group -Wadsworth Publishing Company -California.
4	H.G. Mannur, International Economics – Vikas Publishing House (P) Ltd – New Delhi-14.
5	BimalJaiswal&Richa Banerjee, Introduction To International Business, Himalaya Publication, Mumbai
Reference Books	
1	Dr. T. Aryamala,Vijay Nicole, International Trade, Chennai
2	Avadhani, V.A. International Financial Management, Himalaya Publications, Mumbai
3	Punam Agarwal and Jatinder Kaur, International Business, Kalyani Publications, New Delhi
4	S Sankaran , International Trade, Margham Publication, Chennai
5	C B Gupta, International Business, S Chand Publishing, New Delhi
Web Resources	
1	https://opentext.wsu.edu/cpim/chapter/2-1-international-trade/
2	https://www.economicsdiscussion.net/balance-of-payment/balance-of-payments-international-trade-economics/30644
3	https://www.wto.org/english/thewto_e/countries_e/india_e.htm

FIRST YEAR – SEMESTER – II

OFFICE AUTOMATION AND LAB									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA4		**T**	**P**		**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	The major objective in introducing the Computer Skills course is to impart training for students in Microsoft Office which has different components like MS Word, MS Excel and Power point.
LO2	The course is highly practice oriented rather than regular class room teaching.
LO3	To acquire knowledge on editor, spread sheet and presentation software.

Prerequisites: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	Introductory concepts: Hardware and Software - Memory unit – CPU-Input Devices: Key board, Mouse and Scanner. Output devices: Monitor, Printer. Introduction to Operating systems - Introduction to Programming Languages.	
Unit II	Word Processing: File menu operations - Editing text – tools, formatting, bullets and numbering - Spell Checker - Document formatting – Paragraph alignment, indentation, headers and footers, printing – Preview, options, merge.	
Unit III	Spreadsheets: Excel – opening, entering text and data, formatting, navigating; Formulas – entering, handling and copying	
Unit IV	Charts – creating, formatting and printing, analysis tables, preparation of financial statements, introduction to data analytics.	
Unit V	Power point: Introduction to Power point - Features – Understanding slide typecasting & viewing slides – creating slide shows. Applying special object – including objects & pictures – Slide transition – Animation effects, audio inclusion, timers.	
	Total	

Course Outcomes	
CO1	Understand the basics of computer systems and its components.
CO2	Understand and apply the basic concepts of a word processing package.
CO3	Understand and apply the basic concepts of electronic spreadsheet software.
CO4	Understand and apply the basic concepts of database management system.
CO5	Understand and create a presentation using PowerPoint tool.

Textbooks	
1	Peter Norton, “Introduction to Computers” –Tata McGraw-Hill.

Reference Books	
1	Jennifer Ackerman Kettel, Guy Hat-Davis, Curt Simmons, “Microsoft 2003”, Tata McGraw- Hill.

NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	Web content from NDL / SWAYAM or opensource web resources

Office Automation Lab

Learning Objectives: (for teachers: what they have to do in the class/lab/field)
Office tools course would enable the students in crafting professional word documents, excel spread sheets, power point presentations using the Microsoft suite of office tools.
To familiarize the students in preparation of documents and presentations with office automation tools.

Course Outcomes: (for students: To know what they are going to learn)
CO1: to perform documentation
CO2: to perform accounting operations
CO3: to perform presentation skills

List of Programs

Word

Word Orientation : The instructor needs to give an overview of Microsoft word & Importance of MS Word as word Processor, Details of the four tasks and features that would be covered Using word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1 : Using word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in Word.

Task 2 : Creating project abstract Features to be covered:-Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check , Track Changes.

Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs

Excel

Excel Orientation : The instructor needs to tell the importance of MS Excel as a Spreadsheet tool, give the details of the four tasks and features that would be covered Excel – Accessing, overview of toolbars, saving excel files, Using help and resources {Comdex Information Technology course tool kit Vikas }

Task1: Creating a Scheduler - Features to be covered: Gridlines, Format Cells, Summation, auto fill, Formatting Text

Task 2 : Calculations - Features to be covered:- Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP

Task 3 : Performance Analysis - Features to be covered:- Split cells, freeze panes, group and outline, Sorting, Boolean and logical operators, Conditional formatting

MS Power Point

Task1 : Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and Arrows

Task 2 : This session helps students in making their presentations interactive. Topics covered includes: Hyperlinks, Inserting –Images, Clip Art, Audio, Video, Objects, Tables and

Charts **Task 3 :**Concentrating on the in and out of Microsoft power point. Helps them learn best practices in designing and preparing power point presentation. Topics covered includes :- Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.Auto content wizard, Slide Transition, Custom Animation, Auto Rehearsing	
Extended Professional Component	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC –CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

1. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech,2005 2. The Complete Computer upgrade and repair book,3rd edition Cheryl A Schmidt, WILEY Dreamtech
. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
4. PC Hardware and A + Handbook – Kate J. Chas PHI (Microsoft)

FIRST YEAR – SEMESTER – II

PROGRAMMING IN C++ AND LAB									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA5		**T**	**P**		**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	To engender an appreciation for the need and characteristics of Object-orientation.
LO2	To impart knowledge of the C++ language grammar in order to design and implement programming solutions to simple problems by applying Object-oriented thinking.

Prerequisites: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	Object Oriented Programming Concepts: Complexity in software - The need for object-orientation – Abstraction – Encapsulation – Modularity – Hierarchy. Basic Elements of C++: Classes – Objects – Data members and member functions – private and public access specifiers - Static members - Constructors – Singleton class - Destructors	
Unit II	Friend Functions and Friend Classes - Array of objects – Pointer to objects - this pointer – References – Dynamic memory allocation - Namespaces. Function Overloading: Overloading a function - Default arguments – Overloading Constructors. Operator Overloading: Overloading an operator as a member function – Overloading an operator as a friend function	
Unit III	Overloading the operators [], (), -> and comma operators – Conversion Functions.Inheritance: Types of inheritance – protected access specifier –Virtual Base Class – Base class and derived class constructors. Run-time Polymorphism: Virtual Functions	
Unit IV	Function overriding - Pure virtual function – Abstract base class. Templates: Function templates – Overloading a function template – Class templates.	
Unit V	Exception Handling: Exceptions – try, catch, throw – Rethrowing an exception – Restricting exceptions - Handling exceptions in derived classes - terminate(), abort(), unexpected(), set_terminate(). I/O Streams: Formatted I/O with ios class functions - Manipulators – Creating own manipulator – Overloading << and >> operators.	
	Total	

Course Outcomes	
CO1	Explain the various basic concepts of Object-orientation.
CO2	Write programs to implement static binding

CO3	Write programs to implement inheritance and dynamic binding
CO4	Write programs to implement templates and exception handling and learn how to use STL class library.
CO5	Write programs implementing File and Stream I/O.
Textbooks	
1	Herbert Schildt, *C++ - The Complete Reference*, Third Edition, TMH, 1999.
2	Grady Booch, *Object Oriented Analysis and Design*, Pearson Education, 2008. (For Unit I)
Reference Books	
1	Bjarne Strousstrup, *The C++ Programming Language*, Addison Wesley, 2000.
2	J. P. Cohoon and J. W. Davidson, *C++ Program Design – An Introduction to Programming and Object-Oriented Design*, Second Edition, McGraw Hill, 1999.
3	C. J. Lippman, *C++ Primer*, Third Edition, Addison Wesley, 2000.
NOTE: Latest Edition of Textbooks May be Used	

FIRST YEAR – SEMESTER - II

Object Oriented Programming with C++	

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- Design classes for the given problems.
- Write programs in C++.
- Code, debug and execute a C++ program to solve the given problems using an IDE.

Course Outcomes: (for students: To know what they are going to learn)

CO1: Design and create classes.Implement Stream I/O as appropriate.
CO2: Design appropriate data members and member functions.
CO3: Implement functions, friend functions, static members, constructors and compile-time polymorphism.
CO4: Implement inheritance, run-time polymorphism and destructors.
CO5: Implement templates and exceptions. Use STL class library.Implement File I/O.

List of Programs

1. Write a class to represent a complex number which has member functions to do the following
   a. Set and show the value of the complex number
   b. Add, subtract and multiply two complex numbers
   c. Multiplying the complex number with a scalar value
2. Write a Point class that represents a 2-d point in a plane. Write member functions to
   a. Set and show the value of a point
   b. Find the distance between two points
   c. Check whether two points are equal or not

4. Design and implement a class to represent a Solid object.
   a. Apart from data members to represent dimensions, use a data member to specify the type of solid.
   b. Use functions to calculate volume and surface area for different solids.
5. Design a class representing time in hh:mm:ss. Write functions to
   a. Set and show the time
   b. Find the difference between two time objects
   c. Adding a given duration to a time
   d. Conversion of the time object to seconds
6. Design a 3x3 matrix class and demonstrate the following:
   a. Addition and multiplication of two matrices using operator overloading
   b. Maintaining a count of the number of matrix object created
7. Design a class called cString to represent a string data type. Create a data member in the class to represent a string using an array of size 100. Write the following functionality as member functions:
   a. Copy Constructor
   b. Concatenate two strings
   c. Find the length of the string
   d. Reversing a string
   e. Comparing two strings
8. Design a class called cString to represent a string data type. Create a data member in the class to represent a string whose size is dynamically allocated. Write the following as

member functions:

a. Copy Constructor
b. Destructor
c. Concatenate two strings
d. Find the length of the string
e. Reversing a string
f. Comparing two strings

Extended Professional Component	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC –CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from the Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Learning Resources:

Learning Resources:

Recommended Texts

1. Herbert Schildt, *C++ - The Complete Reference*, Third Edition, TMH, 1999.
2. Grady Booch, *Object Oriented Analysis and Design*, Pearson Education, 2008. (For Unit I)

Reference Books

1. Bjarne Strousstrup, *The C++ Programming Language*, Addison Wesley, 2000.
2. J. P. Cohoon and J. W. Davidson, *C++ Program Design – An Introduction to Programming and Object-Oriented Design*, Second Edition, McGraw Hill, 1999.

C. J. Lippman, *C++ Primer*, Third Edition, Addison Wesley, 2000.

SECOND YEAR – SEMESTER – III

BUSINESS LEGISLATION									
Subject Code	L	T	P	S	Credits	Inst. Hours	Marks		
							CIA	External	Total
23BCOA6		T			3	4	25	75	100

Course Objectives	
CO1	To impart knowledge on the Factories Act, 1948
CO2	To provide insights on the Foreign Exchange Management Act, 1999
CO3	To inculcate knowledge about the Prevention of Money Laundering Act, 2002
CO4	To enable the students to learn about the Competition Act 2002
CO5	To familiarise the students about the existence of Intellectual Property Rights

	Contents	No. of Hours
Unit I	**Factories Act 1948** Definitions - Objects –Scope – Approval – Licensing – Registration of Factories – Notice by Occupier – General Duties of Occupier and Manufacturer – Measures to be Taken by Factories for Health, Safety and Welfare of Workers – Measures – Special Provisions Relating to Hazardous Processes – Working Hours of Adults – Additional Provisions Regulating Employment of Women in a Factory – Employment of Young Person and Children – Annual Leave with Wages – Penalties and Procedures.	9
Unit II	**Foreign Exchange Management Act, 1999** Introduction - Board Structure of FEMA – Definitions - Regulation & Management of Foreign Exchange - Contraventions & Penalties – Procedure for Compliance.	9
Unit III	**Prevention of Money Laundering Act, 2002** Definitions – Punishment for the Offence of Money Laundering - Obligations of Banking Companies - Financial Institutions and Intermediaries or a Person Carrying on a Designated Business or Profession - Adjudication Authorities & Procedures.	9
Unit IV	**Competition Act, 2002** Definitions - Prohibition of Agreements- Prohibition of Abuse of Dominant Position – Competition Commission of India - Establishment, Administration & Duties Powers – Competition Advocacy - Adjudication Authorities – Penalties & Prosecution.	9
Unit V	**Intellectual Property Rights** Intellectual property rights (IPR) – An Introduction - Kinds of Intellectual Property Rights - Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design Genetic Resources and Traditional Knowledge – Trade Secret - IPR in India: Genesis and development.	9
	TOTAL	45

Course Outcomes	
CO1	Acquire knowledge on Factories Act, 1948
CO2	Analyse the role of Foreign Exchange Management Act, 1999

CO3	Understand the practical implications of Prevention of Money Laundering Act, 2002
CO4	Evaluate the importance of Competition Act, 2002
CO5	Gain knowledge on Intelligence Property Rights
Textbooks	
1	Akhilleshwar Pathak, Legal aspects of business, McGraw Hill Education, Noida
2	R.S.N. Pillai & Bagavathi, Legal aspects of business, S.Chand, New Delhi
3	Rashmi Aggarwal, Rajinder Kaur, Legal aspects of business, Pearson Education Limited, New Delhi
4	P.K. Padhi, Legal aspects of business, PHI Learning, New Delhi
Reference Books	
1	Ravinder Kumar, Legal aspects of business, Cengage Learning, Nioda
2	Shawn Kopel, Guide to business law, Oxford University Press, England
3	M.C. Kuchhal, Vive kKuchhal, Business Law, S Chand Publishers, New Delhi
4	C.L. Bansal. Business law, Taxmann, New Delhi
Web Resources	
1	https://labour.gov.in/sites/default/files/Factories_Act_1948.pdf
2	https://legislative.gov.in/sites/default/files/A1999-42_0.pdf
3	https://stfrancislaw.com/blog/intellectual-property-rights/

SECOND YEAR – SEMESTER – III

PROGRAMMING IN JAVA AND LAB									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA7		**T**	**P**		**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	To provide fundamental knowledge of object-oriented programming.
LO2	To equip the student with programming knowledge in Core Java from the basics up.
LO3	To enable the students to use AWT controls, Event Handling and Swing for GUI.

Prerequisite: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	Introduction: Review of Object-Oriented concepts - Java buzzwords (Platform independence, Portability, Threads)- JVM architecture –Java Program structure - –Java main method - Java Console output(System.out) - simple java program - Data types - Variables - type conversion and casting- Java Console input: Buffered input - operators - control statements - Static Data - Static Method - String and String Buffer Classes	
Unit II	Java user defined Classes and Objects – Arrays – constructors - Inheritance: Basic concepts - Types of inheritance - Member access rules - Usage of this and Super key word - Method Overloading - Method overriding - Abstract classes - Dynamic method dispatch - Usage of final keyword	
Unit III	Packages: Definition - Access Protection - Importing Packages - Interfaces: Definition – Implementation – Extending InterfacesException Handling: try – catch - throw - throws –- finally – Built-in exceptions - Creating own Exception classes - garbage collection, finalise -	
Unit IV	Multithreaded Programming: Thread Class - Runnable interface – Synchronization – Using synchronized methods – Using synchronized statement - Interthread Communication – Deadlock.	
Unit V	Adapter classes - Inner classes -Java Util Package / Collections Framework:Collection & Iterator Interface- Enumeration- List and ArrayList- Vector- Comparator	
	TOTAL	

Course Outcomes	
CO1	Understand the basic Object-oriented concepts.Implement the basic constructs of Core Java
CO2	Implement inheritance, packages, interfaces and exception handling of Core Java.
CO3	Implement multi-threading and I/O Streams of Core Java

Textbooks	
1	Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.
2	Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.

Reference Books	
1	Head First Java, O'Rielly Publications, Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.

Java Programming Lab	Core -S2EC1L

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- To gain practical expertise in coding Core Java programs
- To become proficient in the use of AWT, Event Handling and Swing.

Course Outcomes: (for students: To know what they are going to learn)
CO1: Code, debug and execute Java programs to solve the given problems
CO2: Implement multi-threading and exception-handling
CO3: Implement functionality using String and StringBuffer classes

List of Programs

1. Write a Java program that prompts the user for an integer and then prints out all the prime numbers up to that Integer?
2. Write a Java program to multiply two given matrices.
3. Write a Java program that displays the number of characters, lines and words in a text?
4. Generate random numbers between two given limits using Random class and print messages according to the range of the value generated.
5. Write a program to do String Manipulation using Character Array and perform the following string operations:
   a) String length
   b) Finding a character at a particular position
   c) Concatenating two strings
6. Write a program to perform the following string operations using String class:
   a) String Concatenation
   b) Search a substring
   c) To extract substring from given string
7. Write a program to perform string operations using StringBuffer class:
   a) Length of a string
   b) Reverse a string
   c) Delete a substring from the given string
8. Write a java program that implements a multi-thread application that has three threads. First thread generates random integer every 1 second and if the value is even, second thread computes the square of the number and prints. If the value is odd, the third thread will print the value of cube of the number.
9. Write a threading program which uses the same method asynchronously to print the numbers 1 to 10 using Thread1 and to print 90 to 100 using Thread2.
10. Write a program to demonstrate the use of following exceptions.
    a) Arithmetic Exception
    b) Number Format Exception
    c) Array Index Out of Bound Exception
    d) Negative Array Size Exception

Extended Professional Component	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC –CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)

Skills acquired from the course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

Learning Resources:
Recommended Texts
Herbert Schildt, The Complete Reference, Tata McGraw Hill, New Delhi, 7th Edition, 2010.
Gary Cornell, Core Java 2 Volume I – Fundamentals, Addison Wesley, 1999.
Reference Books
Head First Java, O'Rielly Publications, Y. Daniel Liang, Introduction to Java Programming, 7th Edition, Pearson Education India, 2010.
Web resources: Web resources from NDL Library, E-content from open-source libraries

SECOND YEAR – SEMESTER – III

Web Technology(PHP) and Lab									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA8		**T**	**P**		**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	To use PHP and MySQL to develop dynamic web sites for user on the Internet
LO2	To develop web sites ranging from simple online information forms to complex e-commerce sites with MySQL database, building, connectivity, and maintenance

Prerequisite: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	Introducing PHP – Basic development Concepts – Creating first PHP Scripts – Using Variableand Operators – Storing Data in variable – Understanding Data types – Setting and Checkingvariables Data types – Using Constants – Manipulating Variables with Operators.	
Unit II	Controlling Program Flow: Writing Simple Conditional Statements - Writing More ComplexConditional Statements – Repeating Action with Loops – Working with String and NumericFunctions.	
Unit III	Working with Arrays: Storing Data in Arrays – Processing Arrays with Loops and Iterations –Using Arrays with Forms - Working with Array Functions – Working with Dates and Times.	
Unit IV	Using Functions and Classes: Creating User-Defined Functions - Creating Classes – UsingAdvanced OOP Concepts.	
Unit V	Working with Database and SQL : Introducing Database and SQL- Using MySQL-Adding andmodifying Data-Handling Errors – Using SQLite Extension and PDO Extension. IntroductionXML - Simple XML and DOM Extension.	
	TOTAL	

CO	**Course Outcomes**
CO1	Understand the general concepts of PHP scripting language for the development of Internetwebsites.
CO2	Understand the basic functions of MySQL database program and XML concepts
CO3	Learn the relationship between the client side and the server side scripts.

Textbooks	
1	VikramVaswani, “PHP A Beginner's Guide”, Tata McGraw Hill 2008.

Reference Books	
1	Steven Holzner , “The PHP Complete Reference”, Tata McGraw Hill, 2007.
2	Steven Holzer , “Spring into PHP”, Tata McGraw Hill 2011, 5thEdition.

NOTE: Latest Edition of Textbooks May be Used

Web Resources	
1	https://www.w3schools.com/php/
2	https://www.phptpoint.com/php-tutorial-pdf/
3	http://www.xmlsoftware.com/

SECOND YEAR – SEMESTER – III

WEB TECHNOLOGY LAB	

Learning Objectives: (for teachers: what they have to do in the class/lab/field)

- The objectives of this course are to have a practical understanding about how to writePHP code to solve problems.
- Display and insert data using PHP and MySQL.
- Test, debug, and deploy web pages containing PHP and MySQL.
- It also aims to introduce practical session to develop simple applications using PHP andMySQL.

Course Outcomes: (for students: To know what they are going to learn)

1. On the completion of this laboratory course the students ought to
2. Obtain knowledge and develop application programs using Python.
3. Create dynamic Web applications such as content management, user registration, and ecommerce using PHP and to understand the ability to post and publish a PHP website.
4. Develop a MySQL database and establish connectivity using MySQL.

LIST OF PRACTICALS

1. Write a PHP program which adds up columns and rows of given table
2. Write a PHP program to compute the sum of first n given prime numbers
3. Write a PHP program to find valid an email address
4. Write a PHP program to convert a number written in words to digit.
5. Write a PHP script to delay the program execution for the given number of seconds.
6. Write a PHP script, which changes the colour of the first character of a word
7. Write a PHP program to find multiplication table of a number.
8. Write a PHP program to calculate Factorial of a number.
9. Write a PHP code to create a student mark sheet table. Insert, delete and modify records.
10. From a XML document (email.xml), write a program to retrieve and print all the e-mailaddresses from the document using XML
11. From a XML document (tree.xml), suggest three different ways to retrieve the text value'John' using the DOM:
12. Write a program that connects to a MySQL database and retrieves the contents of any oneof its tables as an XML file. Use the DOM.

Extended Professional Component	Questions related to the above topics, from various competitive examinations UPSC / TRB / NET / UGC – CSIR / GATE / TNPSC / others to be solved (To be discussed during the Tutorial hour)
Skills acquired from the Course	Knowledge, Problem Solving, Analytical ability, Professional Competency, Professional Communication and Transferrable Skill

SECOND YEAR – SEMESTER – IV

EXIM PROCEDURES AND DOCUMENTATION									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA9		**T**			**3**	**4**	**25**	**75**	**100**

Course Objectives	
CO1	To impart knowledge on Export-Import Procedure
CO2	To understand export documentation procedure.
CO3	To understand import documentation procedure.
CO4	To acquire knowledge about various incentives available for export.
CO5	To be acquainted with the various institutional support systems

	Contents	**No. of Hours**
Unit I	**Export-Import Procedure** Procurement for Export–Planning and Methods of Procurement for Exports -Procurement Through Imports, Financing Import – Instruments and Related Procedures and Documentation; Custom Clearance of Import–Regulations, Procedure and Documentation.	**12**
Unit II	**Export Documentation** Types of Documents – Characteristics and Relevance. An Introduction to Online Documentation. Getting Ready for Export Contract and Incoterms. Procuring and Processing of an Export Order. Methods and Terms of Payments for Exports–Documentary Credit and Collection Financing for Export Pre- and Post-Shipment Credit.	**12**
Unit III	**Import Documentation** Duty Exemption Schemes -Objectives, Benefits, Procedures and Documentation –Schemes for Import of Capital Goods–Procedures and Documentation for New/ Second-Hand Capital Goods.	**12**
Unit IV	**Export Incentive and cargo handling: Foreign Exchange Risks** Nature of Risks, Cargo Insurance - Contract of Cargo Insurance, Procedures and Documentation for Cargo Loss Claims–Role and Schemes of ECGC of India and Commercial Banks, Quality Control and Pre-Shipment Inspection: Schemes Excise and Custom Clearance Regulations, Procedures and Documentation –Export Incentives.	**12**
Unit V	**Institutional Support** Export/Trading/Star Trading/Superstar Houses - Objective Criteria and Benefits - Procedures and Documentation –Special Economic Zones: Objectives and Benefits – Introduction to Export Promotion Council (EPC) –Indian Trade Promotion Organization (ITPO).	**12**
	TOTAL	**60**

Course Outcomes	
CO1	Acquainted with the knowledge on Export-Import Procedure
CO2	Identify export documentation procedure.

CO3	Identify import documentation procedure.
CO4	Familiarised with various incentives available for export.
CO5	Evaluate the various institutional support systems
Textbooks	
1	Dr.Swapna Pillai, EXIM Procedures And Documentation, Shashi Bhawan Publishing House, Chennai
2	C. Rama Gopal, EXIM Procedures, Documentation And Logistics, New Age International Publishers, New Delhi.
3	Jain Khushpat.S, EXIM Procedures and Documentation, Himalaya Publishing House, Mumbai
4	Dr.Manisha Paliwal, EXIM Procedures, Niraliprakashan Publishing, Pune.
5	Dr.Khushpat S. Jain, Dr. Apexa V. Jain, EXIM Procedures and Documentation, Himalaya Publishing House, Mumbai
Reference Books	
1	Thomas E. Johnson, EXIM Procedures And Documentation, AMACOM, United States
2	P. Veera Reddy & P. Mamatha , Export Documentation, Commercial Law Publishers, New Delhi
3	Rakesh Mohan Joshi, International Marketing, Oxford University Press, New Delhi.
4	T.A.S Balagopal, Export Management, Himalaya Publishing House, Mumbai.
5	P.K. Khurana, Export Management, Galgotia Publishing Company, New Delhi.
Web Resources	
1	https://www.economicsdiscussion.net/international-economics/export-documentation-and-its-types-with-specimens/4273
2	https://www.freightpros.com/blog/cargo-insurance/
3	https://www.investopedia.com/terms/s/sez.asp

SECOND YEAR – SEMESTER – IV

RELATIONAL DATABASE MANAGEMENT SYSTEM									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA10		**T**			**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	Gain a good understanding of the architecture and functioning of Database Management Systems
LO2	Understand the use of Structured Query Language (SQL) and its syntax.
LO3	Apply Normalization techniques to normalize a database.
LO4	Understand the need of transaction processing and learn techniques for controlling theconsequences of concurrent data access.

Prerequisite: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	Introduction to DBMS– Data and Information - Database – Database Management System – Objectives- Advantages – Components - Architecture. ER Model: Building blocks of ER Diagram –	
Unit II	Relationship Degree – Classification – ER diagram to Tables – ISA relationship – Constraints –Aggregation and Composition – Advantages Structure of Relational Database. Introduction to Relational Database Design - Objectives – Tools –Redundancy and Data Anomaly	
Unit III	– Functional Dependency - Normalization – 1NF – 2NF – 3NF – BCNF. Transaction Processing – Database Security.	
Unit IV	Introduction to SQL: Data Definition Commands – Data Manipulation Commands – SELECT Queries – Additional Data Definition Commands – Additional SELECT Query Keywords – Joining Database Tables.Advanced SQL:Relational SET Operators: UNION – UNION ALL – INTERSECT - MINUS.	
Unit V	SQL Join Operators: Cross Join – Natural Join – Join USING Clause – JOIN ON Clause – Outer Join. Sub Queries and Correlated Queries: WHERE – IN – HAVING – ANY and ALL – FROM. SQL Functions: Date and Time Function – Numeric Function – String Function – Conversion Function	
	TOTAL	

Course Outcomes	
CO1	Describe basic concepts of database system
CO2	Design a Data model and Schemas in RDBMS
CO3	Competent in use of SQL
CO4	Analyse functional dependencies for designing robust Database

Textbooks	
1	S. Sumathi, S. Esakkirajan, “Fundamentals of Relational Database Management System”,Springer International Edition 2007.
Reference Books	
1	Abraham Silberchatz, Henry F. Korth, S. Sudarshan, “Database System Concepts”,McGrawHill2019, 7th Edition.
2	Alexis Leon & Mathews Leon, “Fundamentals of DBMS”, Vijay Nicole Publications 2014, 2nd Edition.
NOTE: Latest Edition of Textbooks May be Used	
Web Resources	
1	https://nptel.ac.in/courses/106106093/
2	https://nptel.ac.in/courses/106106095/
3	NPTEL & MOOC courses titled Relational Database Management Systems

SECOND YEAR – SEMESTER – IV

INTRODUCTION TO DATA SCIENCE									
Subject Code	**L**	**T**	**P**	**S**	**Credits**	**Inst. Hours**	**Marks**		
							CIA	**External**	**Total**
23BCOA11		**T**			**3**	**4**	**25**	**75**	**100**

Learning Objectives	
LO1	To introduce the concepts, techniques and tools in Data Science
LO2	To understand the various facets of data science practice, including data collection and integration, exploratory data analysis, predictive modelling, descriptive modelling and effective communication.

Prerequisite: Should have studied Commerce in XII Std

	Contents	**No. of Hours**
Unit I	**Introduction:** Benefits and uses – Facets of data – Data science process – Big data ecosystem and data science	
Unit II	**The Data science process:** Overview – research goals - retrieving data - transformation – Exploratory Data Analysis – Model building - Data Visualization	
Unit III	**Algorithms:** Machine learning algorithms – Modelling process – Types – Supervised – Unsupervised - Semi-supervised	
Unit IV	**Introduction to Hadoop:** Hadoop framework – Spark – replacing MapReduce– NoSQL – ACID – CAP – BASE – types	
Unit V	**Case Study:** Prediction of Disease - Setting research goals - Data retrieval – preparation - exploration - Disease profiling - presentation and automation	
	TOTAL	

Course Outcomes	
CO1	To describe what Data Science is, what Statistical Inference means, identify probability distributions, fit a model to data and use tools for basic analysis and communication
CO2	To describe what Data Science is, what Statistical Inference means, identify probability distributions, fit a model to data and use tools for basic analysis and communication
CO3	To describe what Data Science is, what Statistical Inference means, identify probability distributions, fit a model to data and use tools for basic analysis and communication
CO4	To describe what Data Science is, what Statistical Inference means, identify probability distributions, fit a model to data and use tools for basic analysis and communication
CO5	To describe what Data Science is, what Statistical Inference means, identify probability distributions, fit a model to data and use tools for basic analysis and communication

Textbooks	
1	Davy Cielen, Arno D. B. Meysman, Mohamed Ali, “Introducing Data Science”, manning publications 2016
	Roger Peng, “The Art of Data Science”, lulu.com 2016.
	MurtazaHaider, “Getting Started with Data Science – Making Sense of Data with Analytics”, IBM press, E-book.
Reference Books	
1	Davy Cielen, Arno D.B. Meysman, Mohamed Ali,“Introducing Data Science: Big Data, Machine Learning, and More, Using Python Tools”, Dreamtech Press 2016.
2	Annalyn Ng, Kenneth Soo, “Numsense! Data Science for the Layman: No Math Added”, 2015,1st Edition.
3	Cathy O'Neil, Rachel Schutt, “Doing Data Science Straight Talk from the Frontline”, O'Reilly Media 2013.
4	Lillian Pierson, “Data Science for Dummies”, 2015 II Edition
NOTE: Latest Edition of Textbooks May be Used	