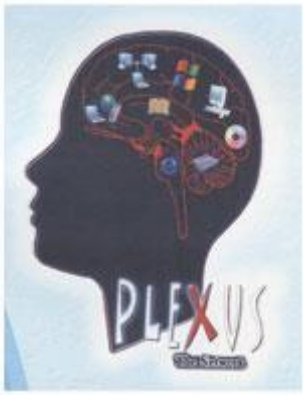
NALLAMUTHU GOUNDER MAHALINGAM COLLEGE (AUTONOMOUS)

U.G.DEPARTMENT OF COMPUTER APPLICATIONS

(B.C.A)



SCHEME OF EXAMINATIONS

(With effect from 2017-2020 Batch and onwards)

NALLAMUTHU GOUNDER MAHALINGAM COLLEGE (AUTONOMOUS)

U.G. DEPARTMENT OF COMPUTER APPLICATIONS (B.C.A)

SCHEME OF EXAMINATIONS

(With effect from 2017 - 2020 Batch and onwards)

Part	Subject Code	Subject	Ins. Hours Per Week	Exam				Credit
				Hours	CIA	ESE	Total	
Semester - I								
I	17 UTL 101/ 17UHN101/ 17 UFR 101	Tamil Paper - I / Hindi Paper-I/ French Paper - I	6	3	25	75	100	3
II	17 UEN 101	English for Enrichment - I	6	3	25	75	100	3
III	17 UBC 101	CORE I : Programming in C	4	3	25	75	100	4
	17 UBC 102	CORE II : Fundamentals of Digtal Computer	4	3	25	75	100	3
	17 UBC 1A1	ALLIED I : Mathematics I - Computer Oriented Numerical and Statistical Methods	4	3	25	75	100	4
	17 UBC 103	CORE III : Programming Lab - I : C Programming	4	3	20	30	50	2
IV	17 UHR 101	Human Rights in India	1	2	-	50	50	2
	17 HEC 101	Human Excellence: Personal values & Sky Yoga Practice - I	1	2	25	25	50	1
V		Extension Activities(NSS, NCC, Sports & Games)						
Total			**30**	**-**	**170**	**480**	**650**	**22**
Semester - II								
I	17 UTL 202/ 17 UHN 202 17 UFR 202	Tamil Paper - II / Hindi Paper - II/ French Paper - II	6	3	25	75	100	3
II	17 UEN 202	English for Enrichment - II	5	3	25	75	100	3
III	17 UBC 204	CORE IV : Object Oriented Programming with C++	4	3	25	75	100	4
	17 UBC 205	CORE V : Computer System Architecture	3	3	25	75	100	3
	17 UBC 2A2	ALLIED II : Marketing and HR Management	4	3	25	75	100	4
	17 UBC 206	CORE VI : Programming Lab - II : C++ Programming	4	3	20	30	50	2

IV	17 EVS 201	Environmental Studies	2	2	-	50	50	2
	17 HEC 202	Human Excellence: Family values & Sky Yoga Practice - II	2	2	25	25	50	1
V		Extension Activities(NSS, NCC, Sports & Games)						
Total			**30**	**-**	**170**	**480**	**650**	**22**

Part	**Subject Code**	**Subject**	**Ins. Hours Per Week**	**Exam**				**Credit**
				Hours	**CIA**	**ESE**	**Total**	
Semester - III								
III	17 UBC 307	CORE VII : RDBMS and Visual Programming	5	3	25	75	100	4
	17 UBC 308	CORE VIII : Shell Programming in Operating Systems	5	3	25	75	100	4
	17 UBC 309	CORE IX : Data structures and Algorithms	5	3	25	75	100	3
	17 UBC 3A3	ALLIED III : Accounting and Financial Management	4	3	25	75	100	4
	17 UBC 310	CORE X : Programming Lab - III : RDBMS&Visual Programming Lab	4	3	20	30	50	2
	17 UBC 311	CORE XI : Programming Lab - IV : OS -Commands and Shell Script Programming Lab	4	3	20	30	50	2
	17 UBC 312	CORE XII: Programming Lab - V: Office Automation	1	2	20	30	50	1
IV	17 HEC 303	Human Excellence: Professional values & Sky Yoga Practice - III	1	2	25	25	50	1
	17 UBC 3N1/	NME : Web Designing	1	2	-	50	50	2
	17 UBC 3N2	NME : Office Automation						
V		Extension Activities(NSS, NCC, Sports & Games)						
Total			**30**	**-**	**175**	**485**	**650**	**23**
Semester - IV								
III	17 UBC 413	CORE XIII : Programming in Java	5	3	25	75	100	4
	17 UBC 414	CORE XIV : An Introduction to Web Designing and Programming	5	3	25	75	100	4
	17 UBC 415	CORE XV : Software Engineering	5	3	25	75	100	3
	17 UBC 4A4	ALLIED IV : Mathematics-II: Computer Based Optimization Techniques	4	3	25	75	100	4
	17 UBC 417	CORE XVI : Programming Lab - VI : JAVA Programming	4	3	20	30	50	2
	17 UBC 417	CORE XVII: Programming Lab - VII : Web Designing	4	3	20	30	50	2

	17 UBC 418	CORE XVIII:Programming Lab - VIII : DTP Programming	1	2	20	30	50	1
IV	17 HEC 404	Human Excellence: Social values & Sky Yoga Practice - IV	1	2	25	25	50	1
	17 UBC 4N3/	NME : GIMP software	1	2	-	50	50	2
	17 UBC 4N4	NME : 2-D Animation						
V	17 UNC 401/ 17 UNS 402/ 17 USG 403	Extension Activities(NSS, NCC, Sports & Games)	-	-	-	50	50	1
Total			**30**	**-**	**175**	**535**	**700**	**24**

Part	**Subject Code**	**Subject**	**Ins. Hours Per Week**	**Exam**				**Credit**
				Hours	**CIA**	**ESE**	**Total**	
Semester - V								
III	17 UBC 519	CORE XIX: Framework Technologies	4	3	25	75	100	4
	17 UBC 520	CORE XX : Software Testing	4	3	25	75	100	4
	17 UBC 521	MAJOR ELECTIVE- I:Computer Networks	5	3	25	75	100	5
	17 UBC 522	MAJOR ELECTIVE-II:Organizational behaviour	5	3	25	75	100	5
	17 UBC 523	CORE XXI : Programming Lab - IX : Framework Technologies	5	3	20	30	50	2
	17 UBC 524	CORE XXII : Programming Lab - X : Software Testing	5	3	20	30	50	2
IV	17 HEC 505	Human Excellence: National values & Sky Yoga Practice - V	1	2	25	25	50	1
	17 UBC 5S1/	*SBE (Major): Software Analysis and Design	1	2	-	50	50	2
	17 UBC 5S2/	*SBE (Major): E-Commerce						
	17 UBC 5S3	*SBE (Major): Aptitude						
	17 GKL 501	General knowledge and general awarness(SBE)	*SS	2	-	50	50	2
Total			**30**	**-**	**175**	**485**	**650**	**27**
Semester - VI								
III	17 UBC 625	CORE XXIII : Advanced Java programming	5	3	25	75	100	4

	17 UBC 626	CORE XXIV : Data Mining and Warehousing	4	3	25	75	100	3
	17 UBC 627	CORE XXV : Information Security	4	3	25	75	100	3
	17 UBC 628	MAJOR ELECTIVE-III: Current Trends and Technologies	5	3	25	75	100	5
	17 UBC 629	CORE XXVI : Programming Lab - XI :Advanced Java Programming lab	5	3	20	30	50	2
	17 UBC 630	CORE XXVII : Programming Lab - XII : Graphics and Multimedia	5	3	20	30	50	2
IV	17 HEC 606	Human Excellence: Global values & Sky Yoga Practice - VI	1	2	25	25	50	1
	17 UBC 6S4/	*SBE (Major): Software Industry Domains	1	2	-	50	50	2
	17 UBC 6S5/	*SBE (Major): Multimedia and Animation						
	17 UBC 6S6	*SBE (Major): Soft Skills						
Total			**30**	**-**	**175**	**435**	**600**	**22**
Grand Total			**180**	**-**	**1000**	**2900**	**3900**	**140**

Add -on Course : Mini Project	**-**	**-**	**20**	**80**	**100**	**2**

*** The subject is handled fully internally**

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 101	Title : PROGRAMMING IN C	Semester: I	
Hrs/Week:	4	Credit: 4	
Objectives	To understand basic concepts of programming language and develop well-Structured programs using 'C' language.		
Units	Content		Hrs
Unit I	Overview of C-Introduction-Importance of C-Basic Structure of C Program- Constants-Variables, Data Types, Character Set- Tokens-Keywords and Identifiers-Constants-Variables—Data Types-Declaration of Variables-Assigning Values to Variables-Defining Symbolic Constants-Operations & Expressions-Arithmetic Operators-Relational – Logical-Assignment- Increment & Decrement- Conditional Operator-Bitwise and Special Operator-Arithmetic Expressions-Evaluation of Expressions-Precedence of Arithmetic Operators-Type Conversions in Expressions-Operator Precedence and Associativity- Mathematical Functions.		10
Unit II	Managing I/O operations-Reading a character-Writing a Character-Formatted Input-Formatted Output-Decision Making and Branching-Decision Making with IF Statement-Simple IF Statement-IF…….ELSE-Nesting of IF……ELSE Statements-ELSE……IF LADDER-Switch Statement-?:- GOTO Statement-Decision Making and Looping-WHILE Statement-DO Statement-FOR Statement-JUMP IN LOOPS.		10
Unit III	Arrays-One Dimensional Array-Two Dimensional Arrays-Initializing Two Dimensional Arrays-Multi Dimensional Arrays-Handling of Character Strings-Declaring and Initializing String Variables- Reading Strings from terminal-Writing Strings to Screen-Arithmetic Operations on Characters-Putting Strings Together-Comparison of Two strings-String Handling Functions-Table of Strings-User Defined Functions- Need for User Defined Functions-Form of C Functions- Return Values and their Types-Calling a Function-Category of Functions-No Arguments and No Return Types-Argument but No Return Types-Arguments with Return Values-Handling of Non-Integer-Functions- Nesting of Functions-Recursion-Function with Arrays-Scope and Life Time of Variables in Functions-*ANSI C Functions.*		12

Unit IV	Structures and Unions-Structure Definition-Giving Values to members-Structure Initialization- Comparison of Structure Variables-Arrays of Structures-Arrays with Structures-Structures-Structures and Functions-Unions-Size of Structures-Bitwise Fields-Pointers-Understanding Pointers-Accessing the Address of Variables-Declaring and Initializing Pointers-Increments and Scale Factor-Pointer and Arrays-Pointer and Character Strings- Pointers and Functions- Pointers and Structures-Points on Pointers.	10
Unit V	File Management in C-Defining and Opening a File-Closing a File-I/O Operation on Files-Error Handling during I/O Operations-Random Access Files-File Inclusion- *Compiler Control Directives*.	10
	Total Contact Hrs	**52**
Text Books:	1.E.Balagurusamy, *Programming in ANSI C,* Tata McGraw-Hill publications, Fourth Edition, 2007(Unit 1 to 5).	
Reference Books:	1. Yashavant Kanetkar, *Let Us C,* BPB Publications, *3rd Edition, 1999* 2. Yashavant P. Kanetkar, *Test Your C Skills,* BPB Publications, First Indian Edition, 1997.	

- The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 102	Title : FUNDAMENTALS OF DIGITAL COMPUTER	Semester: I	
Hrs/Week:	4	Credit: 3	
Objectives	To acquire the fundamental knowledge of digital logics, digital computer design principles and digital electronic applications.		
Units	Content		Hrs
Unit I	Flowchart and Number Systems: Logic and Flowcharting - Flowcharting-Flowcharting Symbols-Program Specification Analysis - Program Specification - Introduction- Input-Output - Throughput. Number system – Digital Computers and Digital Systems – Binary Numbers – Number Based Conversions – Octal and Hexadecimal Numbers – Complements – Binary Codes.		10
Unit II	Boolean Algebra: Boolean Algebra and Logic Gates-Basic Definition – Axiomatic Definition of Boolean Algebra – Basic Theorems and Properties of Boolean Algebra – Boolean Functions – Other Logic Operations – Digital Logic Gates – IC Digital Logic Families – Semiconductor Memory – Bipolar MDS – ROM – RAM – PROM – EPROM.		10
Unit III	Combinational Logic: Introduction – Adders – Full Adder – Half Adder- Subtractor – Half Subtractor - Full Subtractor – Multilevel NAND circuits – Multilevel NOR Circuits – Binary Parallel Adder – Decimal Adder – *BCD Adder* – Decoders – Encoder – Multiplexers – De Multiplexers.		12
Unit IV	Introduction – Flip Flops – Triggers of Flip Flops – Flip Flops Excitation Table – Design Procedure – Design Counters – Registers, Counters and Memory Unit. Registers – Shift Registers – Ripple Counters – Synchronous Counters – Timing Sequence.		10
Unit V	Input-Output Devices**:** Punched Tape, Tape Readers – Punched Cards – Card Readers – Alphanumeric Codes – Character Recognition – MICR – OCR –Output Equipment - Printers – CRT Output Devices – Output Offline Operation – Error Detecting and Error Correcting Codes – Keyboards – Terminals – Floppy Disks – Magnetic tape – *Tape Cassettes & Cartridges.*		10

	Total Contact Hrs	**52**
Text Books	1. M.Morris Mano – *Digital Logic and Computer Design* – Prentice Hall Of India, 1998. (I, II, III, IV). 2. Thomas C.Bartee- *Digital Computer Fundamentals*, Tata McGraw-Hill, Sixth Edition, 1991 3. J. Maynard, *Computer Programming*, International Edition(Unit 1).	
Reference Books	1. Donald P Leach, Albert Paul Malvino, Goutam Saha, *Digital Principles and Applications*, Tata McGraw-Hill, Sixth Edition, 2006	

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Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code:	Title : MATHEMATICS-I:	Semester: I	
17 UBC 1A1	COMPUTER ORIENTED NUMERICAL AND STATISTICAL METHODS		
Hrs/Week:	4	Credit: 4	
Objectives	To equip the students with numerical skills this helps in solving aptitude.		
Units	Content		Hrs
Unit I	Introduction - Bisection Method – Method of Successive Approximations or the Iteration Method- Method of False Position- Newton Raphson Method –Horner's Method		10
Unit II	System of Linear Algebraic Equations- Gauss Elimination- Inverse of Matrix using Gauss Elimination- Gauss Jordan – Triangularization-Gauss Jacobi and Gauss Seidal Method		11
Unit III	Interpolation and Approximation – Newton, Lagrange's Method- Numerical Differentiation and Integration- Method's Based on Interpolation-Trapezoidal Rule- *Simpson's 1/3 and 3/8th rule*.		10
Unit IV	Correlation Analysis-Meaning-*Types*-Degrees of Correlating-Scatter Diagram-Correlation Graph-Karl Pearson's Coefficient of Correlation- Rank Correlation- Coefficient of Concurrent Deviations-Methods of Least Squares.		11
Unit V	Regression Analysis-Meaning- *Types of Regression* –Regression Equations-Regression Equations from Mean-Regression Coefficients-Properties of Regression Coefficients-Correlation and Regression, a Comparison.		10
	Total Contact Hrs		**52**
Text Books:	1. P.Kandasamy, K.Thilagavathy,K.Gunavathi, Numerical Methods, S.Chand & Company Ltd, First Edition 1999 (Unit 1,2,3). 2. S.P Gupta, *Statistical Methods, Sultana* Chand & Sons , Thirty-Fourth Edition, 2004 (Unit 4,5).		

Department	**UG Department of Computer Applications**	
Course	**BCA**	**BCA**
Subject Code:	**Title : PROGRAMMING LAB-**	**Semester: I**
17 UBC 103	**I: C PROGRAMMING**	
Hrs/Week:	**4**	**Credit: 2**
Objectives	To understand the programming logic and problem solving methods using 'C' Programming.	

1. Write a C program to check to whether the given number is Armstrong number or not.
2. Write a C program to find whether the given number is prime or not.
3. Write a C program to check the greatest among three numbers using the conditional operator.
4. Write a C program to count the number of words, characters and lines in a given text.
5. Write a C program to calculate the NCR value of the given number using functions.
6. Write a C program to sort the numbers in ascending order using arrays.
7. Write a C program to generate the Fibonacci series for the given number.
8. Write a C program to calculate the factorial value for the given number using recursion.
9. Write a C program using switch statement for the arithmetic operations.
10. Write a C program to find the roots of Quadratic equation.
11. Write a C program to find the median of n numbers.
12. Write a C program to print the Floyd's triangle.
13. Write a C program to print the following

    1
    0 1
    1 0 1
14. Write a C program to find the reverse of a given number.
15. Write a C program to find the given string is palindrome or not.
16. Write a C program to find the addition of matrix.
17. Write a C program to find the matrix multiplication of the given number.
18. Write a C program to sort the strings in alphabetical order.
19. Write a C program to count the number of vowels in a given string.
20. Write a C program to convert upper case to lower case and lower case to upper case.
21. Write a C program to create a student file.
22. Write a C program to create a railway reservation details with trainno, train name, Source, destination, date, class.
23. Write a C program to create a student file with regno,name,mark1,mark2..
24. Write a C program to create an employee file with the fields empno ,empname, basic Salary, designation.
25. Write a C program to process a student detail using structures
26. Write a C program to count the number of words, characters and lines in a text.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 204	Title: OBJECT ORIENTED PROGRAMMING WITH C++	Semester: II	
Hrs/Week:	4	Credit: 4	
Objectives	To understand the object oriented concepts and to develop well structures object oriented programming using C++ language.		
Units	Content		Hrs
Unit I	Procedure Oriented Programming-Object Oriented Programming Paradigm-Basic Concepts of Object -Oriented Programming-Benefits of OOP-Object Oriented Languages-Applications of OOP-Steps in Object Oriented Analysis- Steps in Object Oriented Design		10
Unit II	Tokens-Keywords-Identifiers and Constants-Data Types-Reference Variables-Operators in C++-Scope Resolution Operator-Member Dereferencing Operator-Memory Management Operators-Manipulators-Type Cast Operators-Expression and their Types-Control Structure		10
Unit III	Functions: Function Prototype-Call By Reference-Return By Reference-Inline Functions-Default and Constant Arguments-Function Overloading-Friend and Virtual Functions-*Classes and Objects*.		12
Unit IV	Constructors and Destructors-Operator Overloading-Inheritance-Pointers-Virtual Functions and Polymorphism.		10
Unit V	Managing Console Input/Output operations: C++ Streams-C++ Stream Classes-Formatted and Unformatted I/O Operations-Managing Output Manipulations-*Working Files.*		10
	Total Contact Hrs		**52**
Text Books:	1. E.Balagurusamy, *Object Oriented Programming with C++*, Tata McGrawHill Publications Ltd, Second Edition, 1999(Unit 1 to 5)		
Reference Books:	1. C.Ravichandran, *Programming in C++*, Tata McGraw Hill Publications, Fourteenth Edition, 2001. 2. K.R Venugopal, Rajkumar Buyya, T Ravishankar, *Mastering C++*, Muhammadali Shaduli Publisher,1997		

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Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 205	Title: COMPUTER SYSTEM ARCHITECTURE	Semester: II	
Hrs/Week:	3	Credit: 3	
Objectives	To understand the basic knowledge of the memory organization, construction, data transfer and system architecture of computer with low-level programming skills.		
Units	Content		Hrs
Unit I	Basic Computer Organization- Instruction Codes-Computer Registers-Computer Instructions-Timing and Control-Instruction Cycle-Memory Reference Instructions-Input-Output Interrupts.		8
Unit II	CPU-General Register Organization-Control Word-Examples of Micro Operations-Stack Organization-Instruction Formats-Addressing Modes-Data Transfer and Manipulation-Program Control-RISC.		8
Unit III	Computer Arithmetic-Addition & Subtraction-Multiplication Algorithm-Division Algorithm-Floating Point Arithmetic Operations-*Register Configurations*-Addition & Subtractions- Decimal Arithmetic - Decimal Arithmetic Operation.		8
Unit IV	I/O Organization- Peripheral devices-I/O Interface-Synchronous and Asynchronous Data Transfer-Modes of Transfer-Priority Interrupt-DMA-IOP		8
Unit V	Memory Organization-Memory Hierarchy-*Main Memory*-Auxiliary Memory-Associative Memory-Cache Memory –Virtual Memory- Memory Management Hardware.		7
	Total Contact Hrs		**39**
Text Books:	1. Morris Mano, *Computer System Architecture* , Prentice Hall Of India, Third Edition , 1994(Unit 1 to 5).		
Reference Books:	1. David A. Patterson and John L.Hennessy, *Computer Organisation and Design,* Harcourt Asia Pvt Ltd, Second Edition, 1999. 2. William Stallings,*Computer Organization & Architecture* , *Designing for Performance,* Pearson Education, Sixth Edition.		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 2A2	Title: MARKETING AND HR MANAGEMENT	Semester: II	
Hrs/Week:	4	Credit: 4	
Objectives	To create awareness about the comprises marketing management and the principles of Management		
Units	Content		Hrs
Unit I	Marketing Definition: Marketing-Fundamentals of Marketing-Scope of Marketing Product Definition: Types of Products-Product Life Cycle- Introduction Stage-Growth Stage-Maturity Stage-Decline Stage-Brand.		10
Unit II	Promotion: Promotion Mix-Factors Influencing Promoting Mix-Advertising- Advantages- Advertisement Copy-Media Selection-Advertising Agencies.		9
Unit III	Concept, Nature and Scope of Management-Concept of Management-Definitions of Management-Nature and Features of Management-Management VS Administration-Levels of Management-Skills of a Manager-*Roles of a Manager*-Importance of Management-Scope of Management-Management process-Fundamentals & Principles-Nature of Management process-Classification of Managerial functions-Managerial functions & levels-Description-Principles of Management.		11
Unit IV	Management by Objectives-Meaning-Objectives-Features-Steps-Advantages-Limitations. DecisionMaking:Meaning-Nature-Role-Types-Bases-Approaches-Styles-Principles-Line & Staff Relations- Theories of Organization.		11
Unit V	Human Resource-Appraisal & Accounting-Concept of Performance Appraisal-Appraisal of Managers-Significance-Objectives-Obstacles-Essentials-Methods-Human Resource Accounting-Meaning-Objective-Benefits-Problems &Limitations-Methods-Leadership-Meaning-Nature-Importance-Styles-Theories-Trait-*Behavioural Theory*-Managerial Grid-Team Building-Concept-Process-Essentials.		11
	Total Contact Hrs		**52**

Text Books:	1. Phlip Kotler, *Marketing Management,Analysis, Planning, and Control*, Prentice Hall of India,1997(Unit 1,2) 2. Koontz, Heinz Weinrich, *Essential of management* ,Tata McGraw Hill, Fifth Edition, 1990. (Unit 3) *3.* C.B.Gupta, *Human Resource Management*, Sultan Chand & Sons, 15th Thoroughly Revised Edition Reprint 2014. (Unit 4,5)
Reference Books:	1. S.A.Sherlekar, *Marketing Management*, Himalaya Publishing House Pvt., Ltd., Fourteenth Edition, 2008. 2. S.Kathiresan and Dr. V. Radha, *Marketing*, Prasanna & Co Ltd , Revised Edition, 2006.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code: **17 UBC 206**	**Title: PROGRAMMING LAB –II:** **: C++ PROGRAMMING**	**Semester: II**
Hrs/Week:	**4**	**Credit: 2**
objectives	To understand the object oriented concepts and problem solving methods using 'C++' Programming.	

1. Write a C++ Program to find Factorial of a given number.
2. Write a C++ Program to find Fibonacci series for user-defined limit.
3. Write a C++ Program to find whether the given number is prime or not.
4. Write a C++ Program to find whether the given number is odd or even.
5. Write a C++ Program to swap the two given numbers.
6. Write a C++ Program to find whether the given number is Armstrong or not.
7. Write a C++ Program to print the Student Details.
8. Write a C++ Program to calculate simple interest using default arguments.
9. Write a C++ Program to find the greatest of two numbers using nested functions.
10. Write a C++ Program to perform arithmetic operations using inline functions.
11. Write a C++ Program to find the greatest of two numbers and three numbers using Friend function.
12. Write a C++ Program to print the Student Details using Single Inheritance.
13. Write a C++ Program to print the Student Details using Multiple Inheritance.
14. Write a C++ Program to print the Student Details using Multilevel Inheritance.

15. Write a C++ Program to print the Student Details using Hybrid Inheritance.
16. Write a C++ Program to calculate the sum of two numbers using Constructors.
17. Write a C++ Program to destroy the objects using Destructors.
18. Write a C++ Program to change the sign value of the inputs by overloaded unary operator.
19. Write a C++ Program to add input values by overloading binary operator.
20. Write a C++ Program to calculate the area using Function Overloading.
21. Write a C++ Program to find the inverse of the given number using formatted I/O operations.
22. Write a C++ Program to perform string operations using unformatted I/O operations.
23. Write a C++ Program to open and close multiple files.
24. Write a C++ Program to arrange the even and odd numbers in separate files using command line arguments

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 307	Title: RDBMS AND VISUAL PROGRAMMING	Semester: III	
Hrs/Week:	5	Credit: 4	
Objectives	To learn the fundamental concepts of RDBMS and to apply these concepts in practice using Visual Basic programming.		
Units	Content		Hrs
Unit I	Introduction to Visual Basic Steps in VB Application Integrated Development Environment (IDE) – Menu Bar – Tools Bar – Project Explorer Window Property Window Form Layout Window Code Window Properties , Methods and Events-Event Driven Programming – Working with Forms- Variables – Scope of Variables- Constants – Data Types – Functions – Procedures – Control Structures – Arrays – User Defined Data Types – Operators- String, Date and Time Function.		13
Unit II	Creating and Using Standard Controls- Text Box, Command Button, Check Box, Combo Box, List Box, Option Box, Timer, Frame, Label, Shape & Line Control, Picture Box, Image Control, Scroll Bar Controls - DB Grids – Dialog Boxes – Control Arrays - Single Document Interface(SDI) – Multiple Document Interface(MDI) – Menus. DAO – RDO-ADO		13
Unit III	Introduction- *Database System Applications*- Database System Versus File Systems- View of Data- Data Models- Entity-Relationship Model: Basic Concepts- Constraints- Keys- Design Issues- ER Diagram Weak Entity Sets- Extended ER Features- Design of an ER Schema to Tables. Relational Model- Structure of Relational Databases- The Relational Algebra- Extended Relational Algebra Operation - Relational Database Design: First Normal Form- Pitfalls in Relational Database Design - Functional Dependencies- Decomposition- Desirable Properties of Decomposition- BCNF- Third Normal Form- Fourth Normal Form- More Normal Forms.		14
Unit IV	ORACLE: Introduction- CODD's Rule- Tools of ORACLE- Introduction to SQL- Benefits of SQL- Data Types- DDL- DML- DCL- TCL- Data Constraints. ORACLE SQL Functions- Single Row Functions- Date, Number, Miscellaneous, Conversion, Character Functions- Group Functions- SQL Operators- Arithmetic, Comparison and Logical Operators- Set Operators- Joins- Sub Queries- Views.		12

Unit V	PL/SQL Introduction- Advantages of PL/SQL- Architecture of PL/SQL- Introduction to PL/SQL Block- Data Types- Control Structure- Concept Of Error Handling- Cursors Procedures Functions- Triggers- Types of Triggers. SQL * Forms- Basic concepts- Components of ORACLE Form- SQL * Forms System Variables- Creating a Form- *Generating and Running a Form*- Reports.	13
	Total Contact Hrs	**65**
Text Books:	1. Steven Holzner, *Visual Basic 6 programming black book,* Dreamtech Press, First Edition, 2007 (Unit 1 & 2). 2. Abraham Silberschatz, Henry F. Korth, S. Sudarshan, *Database System Concepts,* Tata McGraw- Hill, Fourth Edition(Unit 3). 3. Ivan Bayross, *ORACLE- 7 The Complete Reference* , BPB Publications, Revised Edition(Unit 4 & 5).	
Reference Books:	1. C.J. Date, A. Kannan, S. Swamynathan, *An Introduction to Database* , Pearsons Education, Eighth Edition,2004. 2. Ivan Bayross, *SQL, PL/SQL-The Programming Language of ORACLE,* BPB Publications, Third Revised Edition.	

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Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 308	Title: OPERATING SYSTEMS	Semester: III	
Hrs/Week:	5	Credit: 4	
Objectives	To learn the fundamental concepts of operating system which includes storage management and dead lock detection and to experienced the concepts of shell and kernel programs using Linux operating system.		
Units	Content		Hrs
Unit I	Introduction to OS – Early History – Hardware: Interrupts and Polling, Buffering, Storage Protection, Online – Offline Operation-Cycle Stealing- Processing-Storage Hierarchy- Reduced Instruction Set Computing (RISC). Semaphores – Process Synchronization with Semaphores – Counting Semaphores. Storage Management: Real Storage – Storage Organization – Storage Management Storage Hierarchy – Swapping – Virtual Storage – Basic Concepts.		13
Unit II	PAGING: Basic Concepts – Segmentation. Dead Lock: Examples – Dead Lock Preventions – Dead Lock Avoidance – Bankers Algorithms Only – Dead Lock Detection – Dead Lock Recovery. Processor Management: Job and Processor Scheduling – Introduction – Scheduling Levels – Scheduling Objectives – Preemptive Vs Non preemptive Scheduling – Priorities – FIFO Scheduling – Round Robin Scheduling – Quantum Size Shortest Job First Scheduling – Shortest Remaining Time Scheduling – Highest Response Ratio Next Scheduling.		13
Unit III	Auxiliary Storage Management: Disk Performance Optimization – Why Disk – Scheduling is Necessary – Desirable Characteristics of Disk Scheduling Policies – Seek Optimization – Disk Caching – RAM Disks. FILE Database System: Introduction – The File System – File System Functions – Blocking and Buffering – File Organization – Allocating and Freeing Space – File Description – Access Control Matrix – Access Control by User Classes – *Backup Recovery*.		13
Unit IV	Linux: Introduction – File structure of Linux – Directory hierarchy – Environmental variables –file access permissions –utility commands- files – print – login details. VI-editors - three modes. File splitting – pipes and filters – paginating files – head – tail – grep – process termination – timing process.		13

Unit V	Shell Programming: Creation and execution – command line arguments – logical operations – condition statements – System administration – Booting and shutting down – super user status – Disk management – security – user services – mount – unmount- *installing and managing printers.*	13
	Total Contact Hrs	**65**
Text Books:	1. H. M. Deitel, *Operating Systems*, Addison Wesley Publication, Second Edition. (Unit 1, 2 & 3). 2. Sumitabha Das, "Unix system Concepts and applications" Tata McGraw Hill,1995 (Unit 4 & 5).	
Reference Books:	1. Stewart E. Madnick, John J.Donovan, *Operating Systems*, , Tata McGraw Hill, Sixth Edition, 2008. 2. Williams Stallings, *Operating Systems- Internals and Design Principles*, Prentice hall of India, Fifth Edition, 2005. 3. Mark.G.Gobell " Red Hat Linux" – reference, manual, Pearson edition, first edition,2003.	

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 309	Title: DATA STRUCTURES AND ALGORITHMS	Semester: III	
Hrs/Week:	5	Credit: 3	
Objectives	To understand the fundamental definitions of static and dynamic data structures and relevant standard algorithms.		
Units	Content		Hrs
Unit I	Introduction-How to Create Program – How to Analysis Program-Sparse Matrices - Representation of Arrays - Stacks and Queues - Evaluation of Expressions - Multiple Stacks and Queues.		13
Unit II	Linked Lists-Singly Linked Lists - Linked Stacks-and Queues-Polynomial Addition - Doubly Linked Lists and Dynamic Storage Management - Strings		12
Unit III	Trees-Basic Terminology – Binary Trees - Binary Tree Representations - Binary Tree Traversal - More on Binary Trees - Threaded Binary Trees - *Counting Binary Trees*.		13
Unit IV	Graphs – Terminology and Representation - Traversals Connected Components and Spanning Trees - Shortest Paths - Topological Sorts.		13
Unit V	Internal Sorting: Insertion Sort - Quick Sort - 2 Way Merge Sort - Heap Sort. External Sorting**:** Storage Devices-Sorting with Disks - *Sorting with Tapes*		14
	Total Contact Hrs		**65**
Text Books:	1. Elliz Horowitz, Sartaj Sahani, *Fundamentals of Data Structures*, Galgotia Publishers, 1984 (Unit 1 to 5).		
Reference Books:	1. Seymour Lipschutz, *Data Structures*, Mc - Graw- Hill, Indian Adapted Edition, 2006. 2. Jean- Paul Trembly, Paul G.Sorenson, *An Introduction to data structures with application*, Mc - Graw- Hill, Second Edition, 1991.		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 3A3	Title: ACCOUNTING AND FINANCIAL MANAGEMENT	Semester: III	
Hrs/Week:	4	Credit: 4	
Objectives	To impart knowledge on the accounting concepts.		
Units	Content		Hrs
Unit I	Accounting Concepts – Conventions – Journal – Ledger - Subsidiary Books– Trial Balance.		10
Unit II	Depreciation – Meaning – Definition – Straight line method – Written down value method – Annuity method – Preparation of Final Accounts with Standard Adjustments		10
Unit III	Costing – Meaning – Definition – Elements objectives – Cost Accounting Vs Financial Accounting – Preparation of Cost Sheet – *Tenders and Quotations [simple problems only]*		12
Unit IV	Fund Flow Statement & Cash Flow Statement [Simple problems only]		10
Unit V	Budgets – Budgetary Control – Objectives – Advantages and Limitations – Preparation of Cash Budget – Flexible Budget – Production Budget – *Sales Budget[Simple problems only]*		10
	Total Contact Hrs		**52**
Text Books	1. N. Vinayagam, *Introduction to Accountancy*, Eurasia Publishing House(P) Ltd., 2004(unit 1 to 5).		
Reference Books	1. S.P.Jain & K.L.Narang, *Advanced Accountancy*, Kalyani Publishers, 2008.		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications	
Course	BCA	Effective from the year: 2017-2018
Subject Code:	Title: PROGRAMMING LAB – IV: RDBMS AND VISUAL PROGRAMMING	Semester: III
17 UBC 310		
Hrs/Week:	4	Credit: 2
Objectives	To familiarize with the basic SQL Queries, Functions, Join operations and PL/SQL program in RDBMS with GUI environment.	

1. Write Oracle Queries in Data Definition Language.
2. Write Oracle Queries in Data Manipulation Language.
3. Write Oracle Queries in Transaction Control Language.
4. Write Oracle Queries in Data Control Language.
5. Write Oracle Queries using Data Constraints.
6. Manipulate Single Row Function.
7. Manipulate Function – Group function.
8. Generate Operators in SQL plus.
9. Manipulate SET Operators.
10. Generate View.
11. Generate Index functions.
12. Generate Join functions.
13. Write PL/SQL to find whether the given number is Even or Odd.
14. Write PL/SQL to find whether the given number is Armstrong or Not.
15. Write PL/SQL to Display ten numbers.
16. Write PL/SQL to reverse of given number.
17. Write PL/SQL to find whether the given number is Prime number or not.
18. Write Oracle Query to Update Trigger.
19. Write PL/SQL to Access Restriction Trigger.
20. Write Oracle Queries to Display Department Name.
21. Develop a VB program to process the Arithmetic Operation.
22. Develop a VB program to generate timer control.
23. Develop a VB program to design a scientific calculator.
24. Develop a VB program for Railway Reservation using menus.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: PROGRAMMING LAB – IV: OS –COMMANDS AND SHELL SCRIPT PROGRAMMING LAB**	**Semester: III**
17 UBC 311		
Hrs/Week:	**4**	**Credit: 2**
Objectives	To familiarize with the OS environment, fundamentals of shell script programming and basic administration commands.	

1. Work with utility commands.
2. Work with directory commands.
3. Work with handling file commands.
4. Work with file access commands.
5. Work with pipes and filters.
6. Work with VI editors.
7. Create a program to find simple interest
8. Create a program to find factorial value
9. Create a program to find Fibonacci series.
10. Create a program to find sum of N numbers.
11. Write a program with case condition.
12. Create a program to find divisibility of numbers.
13. Create a program to find greatest of three numbers.
14. Create a program to find Armstrong number.
15. Create a program to find prime or not.
16. Create a program to find reverse the digit.
17. Create a program to find sum of individual digit.
18. Create a program to find odd or even.
19. Create a program to swap any two numbers.
20. Create a program for sorting of N numbers.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2016-2017**
Subject Code:	**Title: PROGRAMMING LAB :**	**Semester: III**
17 UBC 312	**OFFICE AUTOMATION**	
Hrs/Week:	**1**	**Credit: 1**
Objectives	To learn how to prepare office documents using Word, Power Point, Excel and Access Database.	

MS-WORD

1. Create a Resume in a neat format.
2. Create the front page of a newspaper.
3. Create their class time table.
4. Mail merge an application letter.

MS-EXCEL

5. Create students's marksheet.
6. Draw chart and apply filter.

MS-ACCESS

7. Create a Table.
8. Create a Query.
9. Create a Form.
10. Generate a Report**.**

MS-POWER

11. Prepare a presentation with various slide transitions.
12. Prepare a presentation with various animations

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: NME: PROGRAMMING**	**Semester: III**
17 UBC 3N1	**LAB –WEB DESIGNING**	
Hrs/Week:	**1**	**Credit: 2**
objectives	To became familiar with graphic principles that relate to web design and learn basically how to implement.	

1. Write HTML code to develop a web page for giving details of your name, age, address. It contains the different background and foreground color, with different attributes of Font tags like italic, bold, underline etc. and give suitable heading style

2. Create a Web Page using HREF tag having the attribute ALINK, VLINK etc.

3. Create a Web Page, when user clicks on the link it should go to the bottom of the page.

4. Write a HTML code to create a Web Page of pink color and display moving message in red color.

5. Create a Web Page, showing an ordered list of name of your five friends and unordered list of any five your hobbies.

6. Create a HTML document containing a nested list showing the content page of any book.

7. Write a HTML program to reload the page which contains an image that should reload automatically for every 5 seconds.

8. Create the following table in HTML with Dummy Data

Name of the train	Place	Destination	Train No	Time		Fare
				Arrival	Departure	

9. Design a form using all input types.

10. Create a simple form for accepting –Name, Register No, and use Submit Button.

Department	UG Department of Computer Applications	
Course	BCA	Effective from the year: 2017-2018
Subject Code:	Title: NME:PROGRAMMING	Semester: III
17 UBC 3N2	LAB : OFFICEAUTOMATION	
Hrs/Week:	1	Credit: 1
Objectives	To learn how to prepare office documents using Word, Power Point, Excel and Access Database.	

MS-WORD

1. Create a Resume in a neat format.
2. Create the front page of a newspaper.
3. Create their class time table.
4. Mail merge an application letter.

MS-EXCEL

5. Create students's marksheet.
6. Draw chart and apply filter.

MS-ACCESS

7. Create a Table.
8. Create a Query.
9. Create a Form.
10. Generate a Report**.**

MS-POWER

11. Prepare a presentation with various slide transitions.
12. Prepare a presentation with various animation.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2016-2017	
Subject Code: 17 UBC 413	Title: OBJECT ORIENTED PROGRAMMING USING JAVA LANGUAGE	Semester: IV	
Hrs/Week:	5	Credit: 4	
Objectives	To understand pure object oriented programming in JAVA included defining classes, invoking methods, interfaces, exception handling and file concepts.		
Units	Content		Hrs
Unit I	Java Evolution – Overview of Java language, Constants, Variables and Data types – Operators and Expressions.		13
Unit II	Decision Making and Branching – Decision Making and Looping – Classes, Objects and Methods – Arrays, Strings and Vectors.		13
Unit III	Interfaces – Multiple Inheritance – Packages: Putting Classes Together- *Introduction to Utility Packages* – Java Collections – Overview of Interfaces – Overview of classes - Multi-Thread Programming.		13
Unit IV	Managing Errors and Exceptions – Applets Programming – Graphics Programming – The Graphics Class – Lines and Rectangles – Circles and Ellipses – Drawing Arcs – Drawing Polygons.		13
Unit V	Managing Input /Output Files in Java – Concepts of Streams – Stream Classes – Byte Stream Classes – Stream Classes – Character Stream Classes – Useful I/O Classes – Characters – Reading / Writing Bytes – Handling Primitive Data Types – Concatenating and Buffering Files – *Random Access Files*.		13
	Total Contact Hrs		**65**
Text Books:	1. E.Balagurusamy, *Programming With Java* , Tata McGraw Hill , Second Edition, 2005(unit 1 to 5).		
Reference Books:	1. ISRD Group, *Introduction to Object Oriented Programming through Java*,Tata Mc-GrawHill Publishing Company Limited, 2007. 2. Patrick Naughton Herbert Schildt Java2, The *Complete Reference*, Tata Mc-Graw Hill, 1999. 3. John R. Hubbard, *Schaum's Outline of Programming with Java*, Tata Mc-Graw-Hill Publishing Company Limited, Second Edition, 2007.		

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Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC414	Title: INTRODUCTION TO WEB DESIGNING & PRORAMMING	Semester: IV	
Hrs/Week:	5	Credit: 4	
Objectives	To know the fundamentals of web site design and to learn the language of the web such as HTML, Java Script and server side programming language ASP.		
Units	Content		Hrs
Unit I	INTERNET: Introduction to Internet – Resources of Internet –- Internet Services-Protocol Concepts – Internet Addressing. HTML : Introduction to HTML – Functions of HTML in Web Publishing – basic Structural elements and their usage – Traditional text and formatting – Style Sheets formatting – using tables for organizing and layout – Forms – Frame sets.		13
Unit II	Java Script : Introduction – Language Elements : Identifiers – Expressions – JavaScript Keywords – Operators – Statements _ Functions – Objects of JavaScript : The Window Object – The Document Object – Forms Object – Text boxes and Text areas – Buttons, Radio buttons and Checkboxes – The Select Object – Other Objects – Arrays.		13
Unit III	VB Script: Introduction – Embedding VBScript Code in an HTML Document – Comments – Variables – Operators – *Procedures* – Conditional Statements – Looping Constructs.		13
Unit IV	Active Server Pages (ASP) - Introduction – Advantages of using ASP – First ASP Script – Processing of ASP Scripts with Forms – Variables and Constructs – ASP Cookies – ASP Objects – Connecting to Data with ASP.		13
Unit V	XML - XML Basics - What is XML? - XML Tags and Conventions - More on Elements - XML Schema - *XML Attributes* - Introduction to DTD - DTD - *XML* building blocks - Elements - Attributes - Entities.		13
	Total Contact Hrs		**65**

Text Books:	1. Harley Hahn, *The Internet Complete Reference*, Tata McGraw-Hill Publishers, Second Edition, 2001. (Unit 1) 2. N.P.Gopalan and J.Akilandeswari, "Web Technology – A Developer's Perspective", PHI Learning Private Limited, Delhi, Seventh Edition, 2013. (Unit 1To 5)
Reference Books:	1. Thomas A.Powell, *HTML- The Complete Reference*, Tata Mc-Graw Hill Edition.1998. 2. Shelly Powers et al, "Dynamics Web Publishing", Techmedia, 1998. 3. Scot Johnson, *Using Active Server Pages*, Prentice Hall of India Pvt. Ltd, Special Edition, 1997

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 415	Title: SOFTWARE ENGINEERING	Semester: IV	
Hrs/Week:	5	Credit: 3	
Objectives	To understand the basic methods and practices in software life cycle model including software requirements, software architectural designs, software process model and implementation tools.		
Units	Content		Hrs
Unit I	System Concepts and the Information Systems Environment: System Definition-Characteristics of System-Elements of a System-Types of System- The System Development Life Cycle: Recognition of Need - Feasibility Study – Analysis – Design – Implementation - Post implementation and Maintenance- Consideration for Candidate System.		13
Unit II	Software-Software Characteristics-Software Components-Software Applications-The Process-Software Engineering a Layered Technology-The Process, Methods, Tools-A Generic View of Software Engineering- The Software Process- Software Process Models-Linear Sequential Models-Prototyping Model-RAD Model-Evolutionary Software Model-The Incremental Model-Spiral Model-Component Assembly Model-Concurrent Model.		13
Unit III	An Agile view of Process-Agility-Agility Process-The Politics of Agile Development-Human Factors-Agile Process Models-Extreme Programming-Adoptive Software Development –Dynamic System Development Method-Scrum-Crystal-Feature Driven Development-Agile Modeling. Analysis Concepts and Principles-Requirement Analysis-Communication Techniques-Iniating the Process-FAST-QFD-Analysis Principles-Information Domain-Modeling-Partitioning-Essential and Implementation Views- Analysis Modeling-Elements of Analysis Model-Data Modeling-Data Objects, Attributes and Relationship Diagram-Function Modeling-Data Flow Diagram, Extensions- *Behavioral Modeling.*		13
Unit IV	Design Concepts and Principles-The Design Process-Design Principles-Design Concepts-Abstraction, Refinement, Modularity, Software Architecture, Control Hierarchy, Structured Partitioning, Software Procedure, Information Hiding-Effective Modular Design-Functional Independence-Cohesion-Coupling-Design Documentation.		13

Unit V	Design Method-Data Design-Architectural Design- Architectural Design Process-Transform Mapping-Transaction Mapping- Interface Design -Human Computer Interface Design –Interface Design Models-Task Analysis and Models-Design Issues-Implementation Tools-Design Evaluation-Tabular Design Notation-Program Design Notation-*Program Design Languages*.	13
	Total Contact Hrs	**65**
Text Books	1. Elias M.Award, *System Analysis and Design* , Galgotia Publications (P) Ltd, Second Edition, 1996 (Unit 1). 2. Roger Pressman, *Software Engineering*, A Practioner's Approach, Fourth Edition, 1997(Unit 2, 3 ,4 &5). 3. Roger Pressman, *Software Engineering*, A Practioner's Approach, Sixth Edition, 2005(Unit 3).	
Reference Books	1. Sommerville, *Software Engineering*, Pearson education, Sixth Edition.	

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 4A4	Title: MATHEMATICS-II COMPUTER BASED OPTIMIZATION TECHNIQUES	Semester: IV	
Hrs/Week:	4	Credit: 4	
Objectives	To impact knowledge on the ways of determining the optimal usage of resources and thereby increasing the efficiency**.**		
Units	**Content**		**Hrs**
Unit I	Linear Programming Problem: Graphical Solution Method- General Linear Programming Problem (Definition alone) - Canonical and Standard forms of LPP. Simplex Method: Basic Solution and Degenerate Solutions to Linear Equation- Simplex Method- Big M Method (Only Simple Problems).		10
Unit II	Transportation Problem: North West Corner Method- Least Cost Method- Vogel's Approximation Method- Moving towards optimality UV Method. Assignment Problem: Definition- Assignment Algorithm- Hungarian Assignment Method- Unbalanced AP.		10
Unit III	Inventory Control: Introduction- *Types of Inventory*- Inventory Decision- Economical Order Quantity (EOQ) - Deterministic Inventory Problems.		10
Unit IV	Sequencing Problems: Introduction- Problems with n Jobs and 2 Machines- Problems with n Jobs and k Machines- Problems with 2 Jobs and k Machines (Simple Problems).		11
Unit V	Network Scheduling: Introduction- Network and Basic Components- *Rules of Network Construction*- Time calculation in Networks-CPM-PERT-PERT Calculations- Difference between CPM and Pert Network.		11
	Total Contact Hrs		**52**
Text Books:	1. Kanti Swarup, P.K.Gupta, Man Mohan *Operations Research,* Sultan Chand & Sons, Seventh Edition, 1996(Unit 1 to 5).		
Reference Books:	1. R. Paneer Selvam, *Operation Research,* Prentice Hall of India Pvt Ltd, Second Edition.		

The topics given in **Italics** are noted as Self-Study topics.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: PROGRAMMING LAB – V: JAVA PROGRAMMING**	**Semester: IV**
17 UBC 416		
Hrs/Week:	**4**	**Credit: 2**
objectives	To develop the solution for mathematical problems and file operation using Java Programming Language.	

1.Write a java program to check the Amstrong number
2. Write a java program to generate fibonacci series
3. Write a java program to print the floyds triangle using for loops.
4. Write a program in java using multiple catch statements.
5. Write a program in java for method overloading to draw circle, triangle, rectangle..
6. Write a java program to sort the given numbers in ascending order.
7. Write a java program to find the prime numbers between 1 to 200.
8. Write a program in java for method overriding.
9. Write a program in java to sort the strings in alphabetical order.
10. Write a java program for employee details using single inheritance concept.
11. Write a java program to check the given string is palindrome or not.
12. Write a program to find the roots of a quadratic equation.
13. Write a java program for multithreading concept.
14. Write a program in java to read and write using random access file.
15. Write a java program to draw lines and rectangles using applets
16. Write a java program to draw ellipses and circles using applets
17. Write a program in java for method overriding.
18. Write a program in java to copy bytes from one file to another.
19. Write a program in java to copy characters from one file to another.
20. Write a program in Java using the concept of interface.
21. Write a program in java to multiply two matrices.
22. Write a program to add two numbers using applets
23 Write a program to reverse a number using applets
24 Write a program in java to find the trace of matrix.
25. Write a program to create two packages and implement it.
26. Write a program for package implementation.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: PROGRAMMING**	**Semester: IV**
17 UBC 417	**LAB –VI: WEB DESIGNING**	
Hrs/Week:	**4**	**Credit: 2**
objectives	To became familiar with graphic principles that relate to web design and learn how to implement these theories into practice.	

1. Write a program to create Student timetable
2. Write a program to create External style sheet
3. Write a program to create Embedded style sheet
4. Write a program to create Inline style sheet
5. Write a program to create Horizontal frames
6. Write a program to create Vertical frames
7. Write a program to create Horizontal and vertical frames
8. Write a program to create Frameset
9. Write a program to create I Frame
10. Write a program to create Image positioning
11. Write a program to create Z-Index
12. Write a program to create Webpage
13. Write a program to create Submit and reset button
14. Write a program to create Password control
15. Write a program to create Confirmation dialogue box
16. Write a program to create Date and time
17. Write a program to create Changing the text in status bar
18. Write a program to create Scrolling the text

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2015-2016**
Subject Code:	**Title: PROGRAMMING LAB**	**Semester: IV**
17 UBC 418	**VIII: DTP PROGRAMMING**	
Hrs/Week:	**1**	**Credit: 2**
Objective		

1. Design the Wedding Invitation using the associated tools in Photoshop.
2. Apply special art effects for the image using various options from the Filter Gallery.
3. Design the Banner.
4. Implement the Usage of different modes in a Single Image.
5. Design the College Profile.
6. Work with different images to implement Sharpen tool and Smudge Tool
7. Design the Calendar.
8. Edit the image using Blur tool.
9. Design the Visiting Card.
10 Edit the image using Burn and Sponge tool.
11. Edit the image using Clone tool.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: NME: PROGRAMMING**	**Semester: IV**
17 UBC 4N3	**LAB –OPEN SOURCE SOFTWARE**	
Hrs/Week:	**1**	**Credit: 2**
objectives	To create an awareness about the graphic design using Open Source Software.	

1. Create a Business Card.
2. Create a Monthly Calendar.
3. Change the Background Transparent and Save it in Transparent Image.
4. Create a Poster with a Fancy Font.
5. Convert Blur Image into Correct Image.
6. Changing Hair Color into Simply Fix Grey Hair.
7. Convert an Image into Blend Images using Layer Masking.
8. Create a 3D Text.
9. Create an Outline using a Brush Strokes.
10. Create a Photo Manipulation.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2016-2017**
Subject Code:	**Title: NME:PROGRAMMING**	**Semester: IV**
17 UBC 4N4	**LAB : 2D ANIMATION**	
Hrs/Week:	**1**	**Credit: 2**
objectives	To improve the student's creativity in 2D animation.	

1. Setting Motion for a Butterfly.

2. Create a Rain Effect.

3. Create a masking.

4. Create a Basket Ball.

5. Create a Text Animation.

6. Design a Cartoon Background.

7. Create a Water Effect.

8. Create a flash website.

9. Create a Lightening Effect for Text.

10. Create an Image Gallery using Buttons.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 519	Title: FRAMEWORK TECHNOLOGIES	Semester: V	
Hrs/Week:	4	Credit: 4	
Objectives	To understand the .NET framework and to develop small applications using .NET technologies in the area of web designing.		
Units	Content		Hrs
Unit I	Introduction to .Net: .net framework- difference between VB6 and VB.Net-Object-Oriented programming and VB.Net-Data types-Variables-Operators-Arrays-Conditional logic.		10
Unit II	Procedures- Dialog boxes- File IO and System objects- Error handling- Namespaces-Classes and Objects- Multithreading-Message Queue.		10
Unit III	VB.Net IDE-Compiling and Debugging-Customizing- Data access: ADO.Net- Visual studio .Net and ADO.Net. Windows Forms: Controls-Specific controls- *Irregular forms*.		12
Unit IV	VB.Net and web: Introduction to ASP.Net page framework-HTML server controls- Web controls- Validation controls- Events-CSS- State management- Tracing- Security.		10
Unit V	Web Services: Introduction- Infrastructure- SOAP-*Building web services*- Deploying and publishing web services- Finding and consuming web services- REST- why use REST over SOAP- SOAP vs REST.		10
	Total Contact Hrs		**52**
Text Books:	Bill Evjen, Jason Beres, et.al, ―Visual Basic .Net programming‖, Wiley Dreamtech India (p) Ltd. ISBN 81-265-0254-1(Unit 1 to 5).		
Reference Books:	1. Fergal Grimes, ―Microsoft .NET for programmers‖, shroff publishers & distributors (p) Ltd. ISBN 81-7366-540-0. 2. Thuan Thai & Hoang Q.Lam, ―.NET Framework essentials‖, shroff publishers & distributors (p) Ltd. ISBN 81-7366-654-7 .		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 520	Title: SOFTWARE TESTING	Semester: V	
Hrs/Week:	4	Credit: 4	
Objectives	To learn the comprehensive study of software testing and quality control concepts, principles, and methodologies and implemented these concepts in the Win Runner tool.		
Units	Content		Hrs
Unit I	Software Quality Assurance (SQA), Quality Control (QC), Comparison between QA & QC. Introduction to Testing, Black Box Testing: Equivalence Partitioning- Boundary Value Analysis-Error Guessing- White Box Testing: Statement Coverage-Decision Coverage-Path Coverage- Test Case- Levels of Testing: Unit Testing-Integration Testing- Sub System Testing-System Testing- Acceptance Testing.		10
Unit II	Software Testing Life Cycle-Special Types of Testing: Documentation Testing- Smoke Testing- Sanitary Testing- Compatibility Testing- Usability Testing- Configuration Testing- Disaster Testing-Interoperability Testing- Acceptance Testing- Load Testing-Stress Testing- Recovery Testing-Regression Testing- Security Testing, Client/Server Testing- Web Testing.		10
Unit III	Test Plan- Phases of Test Plan-*Hierarchy of Test Plan*-Hierarchy of Test Document-Test Plan Process-Components of a Test Plan.- Verification and Validation- Audits-Reviews- Software Metrics- Process Metrics- Project Metrics-Product Metrics- Testing Metrics.		10
Unit IV	Introduction to Automation Test Tools- Automation Process-Features of Automation Tools: Record and Playback- Integration-Environment Support- Database Test- Data Function- Object Mapping-Image Testing- Object Name-Map-Object Identity Tool- Test/Error Recover-Web Testing- Extensible Language- Mercury Interactive-Quality Standards		10
Unit V	Introduction to WINRUNNER- *Two Models for Recording Test:* Context Sensitive- Analog Model-Six Main Stages of Testing Process in Win runner- Starting Win runner- Main Win runner-Window- Text Window-User Tool Bar- Executing Commands using Soft Keys-Understanding GUI Map- Viewing GUI Object Properties-Saving the GUI Map.		12
	Total Contact Hrs		**52**

Text Books:	1. Course Material prepared by the Department of Computer Science based on the above web references (Unit 1 to 5).
Reference Books:	1.Srinivasan Desikan & Gopalswamy Ramesh, Software Testing, Pearson Edition ,2007.

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 521	Title: COMPUTER NETWORKS	Semester: V	
Hrs/Week:	5	Credit: 5	
Objectives	To introduce the students to the major concepts involved in Wide-Area Networks (WAN), Local Area Networks (LAN) and OSI reference models.		
Units	Content		Hrs
Unit I	Introduction: Uses of Computer Network-Network Hardware: LAN, MAN, WAN, Inter Networks-Network Software: Protocol Hierarchies-Design Issues for the Layers-Interfaces & Services, Connection –Oriented and Connectionless Services – Reference Models: OSI Reference Model.		13
Unit II	Data link Layer: Design Issues- Framing- Error Control- Flow Control- Error Detection & Correction – Protocol Specification and Verification: Finite State Machine Model-PetriNet Models.		13
Unit III	Network Layer: Routing Algorithms – Optimality Principles – Shortest Path Routing – Congestion Control Algorithm: General Principles of Congestion Control-Congestion Prevention Policies. Internetworking: How Networks Differ- Concatenated Virtual Circuits-Connectionless Internetworking-Internetwork Routing – *Fragmentation*.		13
Unit IV	Transport Layer: The Transport Service – Services Provided to the Upper Layers- Quality of Service – Transport Service Primitives. Elements of Transport Protocols: Addressing – Establishing a Connection – Releasing a Connection – Crash Recovery		13
Unit V	Application Layer: Electronic Mail: User Agent (Sending and Receiving E-mail)- Message Formats- MIME- Message Transfer – SMTP – E-mail Gateways.WWW: Client side-Server side- *HTTP*.		13
	Total Contact Hrs		**65**
Text Books:	1. Andrew S. Tannenbaum , *Computer Networks* , Prentice Hall of India, Third Edition, 1997(Unit 1 to 5).		
Reference Books:	1.W.Stallings , *Data and Computer Communication*, Prentice Hall of India, Fourth Edition, 1996. *2.F.Halsai Data Communication, Computer Networks and Operating System*, Wesley, Third Edition, 1994.		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 522	Title: ORGANIZATIONAL BEHAVIOUR	Semester: V	
Hrs/Week:	5	Credit: 5	
Objectives	1. To develop the knowledge in personality, perception, attitudes and motivation. 2. To learn about stress management, communication, leadership, organization structure and organization culture.		
Units	Content		Hrs
Unit I	Introduction: Elements of OB – Nature and Scope of OB - Contributing Disciplines to OB. Organisational Behaviour in Historical Perspective - Foundations of Individual Behaviour: Introduction – The Individual and Individual Differences – Human Behaviour and its Causation.		13
Unit II	Personality – Perception - Attitudes: Concept of Attitudes – Formation of Attitudes – Types of Attitudes – Measurement of Attitude – Change of Attitude. Values: Concept of Value – Types of Values – Formation of Values – Values and Behaviour. Job Satisfaction.		13
Unit III	Learning: Meaning and Definition – Determinants of Learning – Learning Theories – Learning Principles – Reinforcement – Punishment – Learning and Behaviour. Motivation: Concepts – Meaning of Motivation – Nature of Motivation – Motivation Cycle or Process – Need for Motivation – Theories of Motivation – Motivation and morale. *Group Behaviour.*		13
Unit IV	Organisational Conflicts: Definition of Conflict – Sources of Conflict – Types of Conflicts – Aspects of Conflicts – Functional Conflict – Dysfunctional Conflict – Conflict Process – Conflict Management. Job Frustration - Stress Management.		13
Unit V	Communication: Nature and Need for Communication – Communication Process –Communication Channel – Communication Networks – Communication Barriers – Effective Communication. Leadership - Organisational Structure - *Organisational Culture.*		13
	Total Contact Hrs		**65**

Text Books:	1. S.S Khanka, *"**Organizational Behaviour**",* S.Chand & Company Ltd, 2002 (Unit 1 to 5).
Reference Books:	1. John W Newstorm and Keith Davis – *"Organizational Behaviour"* – TMH, 2001. 2. Hugh J Arnold and Daniel C Fieldman – *"Organizational Behaviour"* – MC Graw Hill, 1996.

The topics given in **Italics** are noted as Self-Study topics.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: PROGRAMMING LAB VII:FRAMEWORK TECHNOLOGIES**	**Semester: V**
17 UBC 523		
Hrs/Week:	**5**	**Credit: 2**
objectives	To learn how to implement Object Oriented Concepts in Console Application Environment and program, practices in Window Applications.	

Console Applications

- Create a Program to implement the concepts of Object oriented programming techniques.
- Create a program to implement multiple inheritances using interface.
- Create a program to validate the data members in the class using property.
- Create a program to catch the exceptions.
- Create a program to implement multithreading.
- Write a program to implement stack operations using array.
- Write a program to implement Queue using array.
- Write a program to perform file operations.

Windows Applications

- Create a directory list using tree view control.
- Create a calculator using basic controls.
- Create a notepad editor using Context menu strip and menu controls.
- Create an application to illustrate the use of dialog boxes.
- Create an application for students Proctorial report.
- Create an application for library management system.
- Create an application for Pay roll processing system.
- Create a program to generate electricity Bill.

Web Applications

- Create a web page to generate a photo gallery.
- Create an application for encryption and decryption.
- Create an Alumni registration form.
- Create a website for online Quiz.
- Create your own portal which describes yourself and your skills.
- Create a portal for online purchasing system.
- Create a portal and validate the web page using validation controls.
- Create a web page and validate that page using client side scripting.
- Create a crystal report for Alumni registration portal.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: PROGRAMMING**	**Semester: V**
17 UBC 524	**LAB –VIII:SOFTWARE TESTING**	
Hrs/Week:	**5**	**Credit: 2**
Objectives	To learn how to write test cases in programming languages and to practice different testing methodologies in software engineering.	

1. To perform some basic operation on calculator in context sensitive mode.
2. To perform some basic operation in paint using Win Runner Analog Mode.
3. To create a GUI checkpoint for single Property using Win Runner.
4. To create a GUI checkpoint for object property using Win Runner.
5. To create a GUI checkpoint for multiple object using Win Runner.
6. To work with the BITMAP checkpoint for object/window property using Win Runner.
7. To check the database checkpoint for default check using Win Runner.
8. To check the database checkpoint for custom check using Win Runner.
9. To create a GUI-SPY using Win Runner.
10. To perform an operation in data driver wizard using Win Runner.
11. To develop a test script to test addition of two numbers in VB using GUI checkpoint.
12. To develop a test script for testing calculator using GUI checkpoint.
13. To develop a test script for testing Flight Reservation using GUI checkpoint.
14. To develop a test script to test the Timer control application and adding GUI checkpoint.
15. To develop a test script for List box application developed in VB.
16. To develop a test script for student details using GUI in database checkpoint.
17. To develop a test script for testing Railway Reservation using synchronization point.
18. To develop a test script for testing bank details application developed in VB using insert function.
19. To develop a test script for testing Hotel Management application using insert function and data driver Wizard.
20. To work with insert function for object window in Win Runner

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 5S1	Title: SOFTWARE ANALYSIS AND DESIGN	Semester: V	
Hrs/Week:	1	Credit: 2	
Objectives	To impart knowledge about the process of analysis, design and object orientation through providing a framework of the activities involved in designing software.		
Units	Content		Hrs
Unit I	**Data and Information** Information: - kinds of information-firm-user staff-work flow-origin of information-information gathering tools- review-onsite-observation-interviews and questionnaires. **System Analysis and Analyst** System development life cycle:-recognition-feasibility study-analysis-design-implementation-maintenance- Role of systems analyst – qualification-multifaceted role of the analyst- analyst interface:-behavioral issues-conflict resolution.		3
Unit II	**Feasibility Analysis** System performance definition: statement of constraints-identification of specific system objectives-description of outputs-feasibility study-considerations-steps in feasibility analysis-feasibility report-oral presentation.		2
Unit III	**Input output and forms design** Input design-Input data-input media and devices-output design-forms design-classification of forms-requirements of forms design-types of forms-layout considerations-*forms control*.		2
Unit IV	**Object oriented systems modeling** Object oriented concepts-:-classes and objects-attributes-operations-, methods and services-messages-design for object oriented systems:-conventional vs. OO approaches – design issues-object design process –design patterns - object oriented testing:-unit-integration-validation testing in the OO context.		3
Unit V	**Security system:** security definition- Threat to system security:-personal computer and system integrity-risk analysis -Control Measures:-identification – access controls-encryption-audit controls-system integrity-recovery requirements-failures-Disaster planning:-plan-*ethics in system development.*		3
	Total Contact Hrs		**13**

Text Books:	1. Elias M.Award, *System Analysis and Design* , Galgotia Publications (P) Ltd, Sec**o**nd Edition, 1996 (Unit 1 to 5).
Reference Books:	1. Sommerville, *Software Engineering*, Pearson education, Sixth Edition. 2. Roger Pressman, *Software Engineering*, A Practioner's Approach, Fourth Edition, 1997.

- The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2016-2017	
Subject Code: 17 UBC 5S2	Title: E-COMMERCE	Semester: V	
Hrs/Week:	1	Credit: 2	
Objectives	To enable the students to acquire knowledge on electronic commerce.		
Units	Content		Hrs
Unit I	Introduction to E-Commerce-Nature of E-Commerce-Features-Need for E-Commerce-Objectives-Types of E-commerce-Advantages and disadvantages-Framework of E-Commerce.		3
Unit II	E-Commerce and Business-Business Models of E-Commerce-B2B-B2C-B2C-C2B-C2C-B2E-G2B.Business applications of E-Commerce-Mobile Commerce-Applications.		3
Unit III	Electronic Data Interchange-Definitions-Evolution of EDI-Objectives-Advantages-Bottlenecks of EDI-Components of EDI-*Electronic Payment Systems*.		2
Unit IV	E-Online Banking-Electronic Delivery Channels-ATM-Telebanking-Electronic Money Transfer (EMT)-E Cheque-E-Banking-Components-Advantages and Limitations of Online Banking.		3
Unit V	Security Issues in E-Commerce-Risks involved- E-Commerce security tools-Biometric-Client Server Network Security-Data and Message Security-Legal and Ethical Issues-Cyber Law-Aims-*Salient Provisions*.		2
	Total Contact Hrs		**13**
Text Books:	1. E-Commerce,E-Business-Dr.C.S Rayuda,Himalaya Publishing house,Reprint Editions 2008(Unit 1 to 5).		
Reference Books:	1. E-Commerce,Kamalesh,K.Bajaj and Debjani Nag,TATA MC Grew Hill Publications,New Delhi. 2. Marketing and E-Commerce,Roger Leroy Miller,West Thomson Learning Australia		

The topics given in **Italics** are noted as Self-Study.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 5S3	Title: APTITUDE	Semester: V	
Hrs/Week:	1	Credit: 2	
Objectives	To equip the students with Numerical skills to develop their aptitude ability.		
Units	Content		Hrs
Unit I	**Number System:** Prime numbers- Divisibility of numbers – Factors and multiples – HCF & LCM – **Average:** Average of different groups – Addition and removal of items and change in average –**Profit and Loss:** Relation among Cost price, selling price, gain/loss and its percentage.		3
Unit II	**Simple and Compound Interest:** Fundamentals of Interest & its understanding –Difference between Compound Interest and Simple Interest – **Ratio and Proportion:** Ratio application problems – proportion application problems – **Time and Work:** Individual efficiency – Group efficiency – Pipes and cistern.		3
Unit III	**Time, Speed and Distance:** Average speed – Early - late problem – Relative speed – effective speed - **Mensuration & Geometry:** Area – Volume - Heights & Distance – ***Data Interpretation:*** Table - Bar chart - Pie chart - *Line graph.*		3
Unit IV	**Logical Reasoning:** Coding & Decoding – Seating Arrangement – Blood relation – Cubes – Venn diagram – Number series – odd man out – Data sufficiency.		2
Unit V	**Verbal Ability:** Reading Comprehension – Error spotting – Sentence correction – Para Jumbles – Cloze test – Vocabulary – *fill in the blanks.*		2
	Total Contact Hrs		**13**
Text Books	1. Dr.R.S.Aggarwal, *Quantitative Aptitude,* S.Chand Publication, 20 th Edition, (Unit 1 to 3). 2. Dr.R.S.Aggarwal, *A Modern Approach to Verbal and Non- Verbal,* Reasoning,S.Chand Publication, Old Edition, (Unit 4 to 5)		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 625	Title : ADVANCED JAVA PROGRAMMING	Semester: VI	
Hrs/Week:	5	Credit: 4	
Objectives	To provide the ability to design console based, GUI based and web based applications and also be able to understand integrated development environment to create, debug and run multi-tier and enterprise-level applications.		
Units	**Content**		**Hrs**
Unit I	A Tour of Swing**:** JApplet-Icons and Labels-Text Fields-Buttons-The JButton Class-Check Boxes-Radio Button-Combo Boxes-TabbedPane-Scroll Panes-Tree-JMenus.		13
Unit II	Servlet Overview and Architecture**:** Movement to Server Side Java-What is Java Servlet-Practical Applications for Java Servlet-Java Servlet Alternatives-Reasons to use Java Servlets-Java Servlet Architecture. Servlet Basics**:** Life cycle of a Servlet- A Basic Servlet-Basic Servlet Source-Building and Installing the Basic Servlet- The HTML Required to Invoke the Servlet- Dissecting the Basic Servlet.		13
Unit III	Servlet chaining**:** What is Servlet Chains-Invoking a Servlet Chain-Servlet Alias-HTTP Request- A Practical Example using Servlet Chaining Servlets and JDBC**:** What is JDBC-Two and Three Tier Database Access Models- JDBC Driver Types-*JDBC Basics*- A Basic JDBC Servlet.		13
Unit IV	JSP**:** What are JSP-User Defined Java Beans- Implicit Java Beans-Conditions-Directives-Declarations-Implicit Variables-Scriptlets-Expressions.		13
Unit V	EJB**:** EJB Architecture-Overview of EJB-*Software Architecture*-View if EJB-Conversation-Building and Deploying EJB's-Roles in EJB.		13
	Total Contact Hrs		**65**
Text Books	1. Herbert Schildt, *The Complete Reference*, Tata McGraw-Hill, Fifth Edition, 2002 (Unit 1). 2. James Goodwill, *Developing Java Servlet*, Techmedia, First Edition, 1999 (Unit 2, 3 &4). 3. Tom Valesky, "*Enterprise Java Beans*", Pearson Education,2002 (Unit 5).		
Reference Books	1. James Keogh, Jim Keogh, *J2EE: The Complete Reference*, McGraw-Hill/Osborne, Seventh Edition ,2002. 2. Bruce W.Perry, *Java Servlet and JSP Cookbook*, O'Reilly, First Edition, 2004.		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 626	Title : DATA MINING AND WAREHOUSING	Semester: VI	
Hrs/Week:	4	Credit: 3	
Objectives	To introduce the basic concepts of Data Warehouses and Data Mining techniques and also examine the types of the data to be mined and apply preprocessing methods on data with data mining algorithm.		
Units	Content		Hrs
Unit I	Introduction to Data Mining: Definition-Information as a Production Factor- Data Mining Vs Query Tools-Data Mining in Marketing-Practical Applications of Data Mining- Learning, Self-Learning, Computer Systems, Machine Learning and Methodologies of Science- Concept Learning-Issues of Learning Algorithm.		10
Unit II	Data Mining and Data Warehousing: Data Warehouse-Need-Designing Decision Support Systems-Integration with Data Mining-Client Server and Data Warehousing- Multiprocessing Machines- Cost Justification.		10
Unit III	Knowledge Discovery Process: Data Selection-Cleaning-Enrichment-Coding-Data Mining-Preliminary Analysis of Data Set Using Relational *Query Tools*-Visualization Techniques-Likelyhood and Distance-OLAP Tools-K-Nearest Neighbour-Decision Trees-Association Rules-Neural Networks-Genetic Algorithms-Reporting.		10
Unit IV	Setting Up KDD Environment: Introduction-Different forms of Knowledge-Getting Started-Data Selection-Cleaning-Enrichment-Coding-Reporting-10 Golden Rules.		10
Unit V	Some Formal aspects of Learning: Learning of Comprehension of Data Sets-Contents of a Message-Noise and Redundancy-Significance of Noise-Fuzzy Database-Traditional Theory of Relational Database from Relations of Tables- From Keys of Statistical Dependencies-Demoralization- *Data Mining Primitives*.		12
	Total Contact Hrs		**52**
Text Books:	1. Peter Andriaans Dolf Zantinge, *Data Mining,*Addison Wesley Publications, Second Edition, 2000(Unit 1 to 5).		
Reference Books:	1. Ian H. Witten & Edile Frank, *Data Mining- Practical Machine Learning Tools & Techniques*, Second Edition.2005. 2. Daniel T. Larose, *Data Mining Methods and Models*, John Weiley & Sons, Student Edition, 2006.		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 627	Title : INFORMATION SECURITY	Semester: VI	
Hrs/Week:	4	Credit: 3	
Objectives	To understand the information of assurance as practiced in computer operating systems using cryptographic techniques and representative applications such as software, network and language based security.		
Units	Content		Hrs
Unit I	**Introduction to Computer Security:** Basic Concepts –Security Trends – OSI Security Architecture – Security Attacks – Security Services – Security Mechanisms - Threat models - Common Security Goals - Memory protection - Access control – Authorization - Authentication- Enforcement of security - Security Evaluation.		11
Unit II	**Cryptography:** Cryptographic Protocols - Including Encryption – Message Authentication Goals – DES - Hash Functions - Public-key Cryptography - Secure channels - Cryptographic Protocols and their Integration into Distributed Systems and other applications.		10
Unit III	**Network Security:** Intruders – Intrusion Detection – Password Management – *Malicious Software* – Viruses and Related Threats – Countermeasures – Distributed Denial of Service Attacks – Firewalls – Design Principles – Trusted Systems.		10
Unit IV	**Software Security:** Secure software engineering – Hackers, Crackers, and Attackers – Security Failures – Technical Trends affecting Software Security - Defensive programming and its Techniques- Buffer overruns and other implementation flaws.		10
Unit V	**Language-based security:** Analysis of code for Security errors - Safe languages and Sandboxing Techniques. **Case Studies:** Privacy - Mobile code - Digital rights management and copy protection - Trusted devices - Denial of Service and Availability - Network based Attacks - Security and the Law - *Electronic Voting*.		11
	Total Contact Hrs		52

Text Books	1. William Stallings, "Cryptography and Network Security", 4th Edition, Prentice Hall, 2008(Unit 1, 2 & 3). 2. Debby Russell and Sr. G.T.Gangemi, "Computer Security Basics (Paperback)", 2nd Edition, O'Reilly Media, 2006(Unit 4). 3. Behrouz A. Forouzan, "Cryptography and Network Security", Special Indian Edition, Tata Mc-Graw Hill Publications, 2007(Unit 3, 4 &5)
Reference Books	1. Charles P pfleeger and Shai Lawrence pfleeger, "Security in Computing", Fourth Edition, Prentice Hall, 2007. 2. Ross J.Anderson and Ross Anderson, "Security Engineering: A Guide to Building Dependable Distributed Systems", Wiley, 2001. 3. Thomas R. Peltier, Justin Peltier and John Blackley, "Information Security Fundamentals", 2nd Edition, Prentice Hall, 1996.

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 628	Title: CURRENT TRENDS AND TECHNOLOGIES	Semester: VI	
Hrs/Week:	5	Credit: 5	
Objectives	To know about the features and applications of Mobile Application Development, Internet of things, SAP and Big Data.		
Units	Content		Hrs
Unit I	MOBILE APPLICATION DEVELOPMENT: History of mobile application frameworks- overview of the Android frameworks- Application models of mobile application frameworks- User-interface design for mobile applications.		13
Unit II	Managing application data- Integrating with cloud services- Integrating networking, the OS and Hardware into mobile application. Address enterprise requirements in mobile application: Performance, Modifiability, Availability, and Security. Testing methodology for mobile applications: Publishing, Maintenance and Management.		13
Unit III	IOT ARCHITECTURE: History of IOT- *Machine to machine*- Web of things- IOT protocols APPLICATIONS: Remote monitoring and sensing- Remote controlling- Performance analysis- The layering concepts- IOT communication pattern- IOT protocol Architecture- The 6LoWPAN- Security aspect in IOT.		13
Unit IV	SAP: SAP System Overview: SAP System Architecture- Environment for Programs-First look at the ABAP Workbench. DATA DICTIONARY: Introduction-Creating a table-Technical settings-Entering records into a table-Viewing the data in a table.		13
Unit V	BIG DATA NOW: Introduction - *Evolving tools and techniques*- Data Analysis-Big data and advertising-Tightly integrated engines streamline big data analysis -Data scientists tackle the analytic lifecycle- Pattern Detection and Twitter's Streaming API.		13
	Total Contact Hrs		**65**

Text Books	1. 6LoWPAN: The Wireless Embedded Internet, zach Shelby, carsten Bormann, Wiley.(Unit 1 & 2) 2. Internet of Things: Converging Technologies for smart Environments and Integrated Ecosystems, Dr.ovidiu vermensan, Dr.peter Friess, River publishers(Unit 2). 3. Rajiv Ramnath, Roger Crawfis, and paolo sivilotti, Android SDK3 for Dummies, wiley2011 (Unit 3). 4.BEGINNER'S GUIDE TO SAP ABAP- Peter Moxon, Sapprouk Limited 2012 (Unit 4). 5.Big Data Now 2013 Edition- O'Reilly Media, Inc.(Unit 5).
Reference Books	1.Brain fling, Moble Design and Development O'Reily media, 2009 2.Maximiliano Firtman, Programming the mobile web, O'Reily media 2010

The topics given in **Italics** are noted as Self-Study topics.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: PROGRAMMING LAB – IX: ADVANCED JAVA PROGRAMMING LAB**	**Semester: VI**
17 UBC 629		
Hrs/Week:	**5**	**Credit: 2**
Objectives	To design and develop GUI applications using AWT, Swing and Event Handling in addition with to develop web applications	

1.Write a program to implement the concept of JTextField.
2. Write a program to implement the concept of JLabel.
3. Write a program to implement the concept of JCheckBox.
4. Write a program to implement the concept of JRadioButton.
5. Write a program to implement the concept of JcomboBox.
6. Write a program to implement the concept of JMenu, JMenuBar.JMenuItem.
7. Write a program to implement the concept of JTabbedPane.
8. Write a program to implement the concept of JTree.
9. Write a program to make use of Generic Servlet.
10. Write a program to find the request method that is fetched using Servlet.
11. Write a program to develop simple servlet using Generic servlet.
12. Write a program to display the employee details using servlets.
13. Write a program to illustrate servlet chaining.
14. Write a program to develop simple servlet using HTTP tags.
15. Write a program to develop simple servlet to count the number of times an applet being accessed.
16. Write a program to implement the concept of JDBC-ODBC Connectivity.
17. Write a program to to count the number of times an JSP is accessed.
18. Write a program to generate Fibonacci series using JSP.
19. Write a program to create java beans to make use of juggler beans.
20. Write a program to create java beans to make use of molecular beans.
21. Write a program to create java beans to make use of sorter beans.
22. Write a program to implement the concept of simple property.
23. Write an EJB Stateless Program to create bonus of an employee.

Department	**UG Department of Computer Applications**	
Course	**BCA**	**Effective from the year: 2017-2018**
Subject Code:	**Title: PROGRAMMING LAB – IX:GRAPHICS AND MULTIMEDIA**	**Semester: VI**
17 UBC 630		
Hrs/Week:	**5**	**Credit: 2**
Objectives	To understand the need of developing graphics application and to learn multimedia animation tools such as Photoshop, Flash and Graphics in C programming.	

PHOTOSHOP

1. Designing a Visiting card using needed tools in Photoshop
2. Designing an Invitation card using needed tools in Photoshop
3. Creating a Magic light effect using needed tools, filters, and effects.
4. Converting a damaged skin of a girl to a beautiful skin using needed tools and effects in Photoshop
5. Converting a black and white image to new coloured image
6. Creating a Wallpaper using all the tools, filters, styles, and effects

FLASH

7. Setting motion for a butterfly
8. Digital clock
9. Rain effect
10. Create a solar eclipse using masking and motion effect
11. Creating a Race of Tortoise and Rabbit

GRPAHICS UNING C

12. Project an image in 3d using C
13. Adjust the RGB values of an image with key control
14. Demonstrate Bresenhan's line drawing algorithm.
15. Create a game using key control.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 6S4	Title: SOFTWARE INDUSTRY DOMAINS	Semester: VI	
Hrs/Week:	1	Credit: 2	
objectives			
Objectives	To make the students familiarize with ▶ Real time applications in banks and the operations of banks. ▶ Basic strategies of Insurance and some applications related to that. ▶ Core concepts of Textile industry & Computer Integrated manufacturing		
Units	Content		Hrs
Unit I	Computerization in Banking – Need – Account related functions – ATM Banking – Internet Banking – Security and controls in computerized Banking.		3
Unit II	Banking – BFS Standards- Commercial Banking Software Application – Iflex		3
Unit III	Application in Insurance – Underwriting, *Claims and Transactions*		3
Unit IV	Computer in Textiles – Fabric Design – Woven, Knitted and Embroidery – Texture mapping – Shop Floor Applications for production, Maintenance and Quality Control.		2
Unit V	Computer Integrated Manufacturing – Order processing, Machinery Planning, Manufacturing- Quality Integration, MIS reporting, *Online Monitoring in Spinning and Weaving*.		2
	Total Contact Hrs		**13**
Text Books	1. Course Material prepared by the Department of Computer Science based on the below web references (Unit 1 to 5).		
Reference Books	**Websites for Reference:** www.inventors.about.com www.economywatch.com www.scribd.com www.indiantextilejournal.com www.atmbanking.net www.apparelsearch.com www.banknetindia.com www.itaaonline.org		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 6S5	Title: MULTIMEDIA AND ANIMATION	Semester: VI	
Hrs/Week:	1	Credit: 2	
Objectives	To learn the basic elements in Multimedia and to implement it in the real time environment.		
Units	Content		Hrs
Unit I	Introduction : MM presentation and production – Characteristics of MM presentation – h/w and s/w requirements- Uses of MM – Steps for creating MM presentation. Visual display systems: LCD, PDP. Text, Introduction: Types of text – Unicode standard – Font – Insertion of text – Text Compression – File formats.		3
Unit II	Image: Image types – Seeing color – Color models – Basic steps for image processing – Scanner– Digital Camera – Specification of Digital Images – Device independent Color Models – Image processing s/w – File formats.		3
Unit III	Audio: Acoustics – Fundamental characteristics of sound – Decibel – Audio mixer – Digital audio– Synthesiser – What is MIDI – Sound card. Audio transmission: Digital Data Storage. Audio File Formats: WMA, Real Audio. Software Audio Players: Window Media players, Real players, i- tunes. Audio Recording System: Dolby digital – Dolby stereo – Dolby prologic – Dolby prologic II – Dolby surround. DTS Audio and MM – *Audio processing software*.		3
Unit IV	Video: Analog – Video Camera – Transmission of video signals – Video signal formats – Digital video – Standards – PC video – Video editing – Video editing software. Video format – Real video, DIVX.		2
Unit V	Introduction – Uses of animation – Key frames and tweening – Types of animation – Creating movement – Principles of animation – Techniques of animation – Special effects Rendering Algorithms – Animation Software. 3D Animation - Introduction forms of virtual reality – VR Applications – s/w requirements – Peripheral – Devices – *VRML*.		2
	Total Contact Hrs		**13**
Text Books:	1. Principles of Multimedia – Ranjan Parekh – Tata McGraw-Hill publishing Company Limited, New Delhi,2007 (Unit 1 to 5).		

The topics given in **Italics** are noted as Self-Study topics.

Department	UG Department of Computer Applications		
Course	BCA	Effective from the year: 2017-2018	
Subject Code: 17 UBC 6S6	Title: SOFT SKILLS	Semester: VI	
Hrs/Week:	1	Credit: 2	
Objectives	To equip the students with skills this helps in their personality development.		
Units	Content		Hrs
Unit I	Introduction – Soft and Hard skills – Communication Skills – Improving Body Language – Interpersonal Skills – Enhancing listening skills – Sharpening writing Skills – Presentation skills.		3
Unit II	Conflict management skills – resolving conflicts – Change management - Stress management – Excelling as a leader – Building Successful Teams – Motivating ourselves.		3
Unit III	Challenges in Indian Educational System- Soft skills at workplace- Soft skills for managers – Challenges in Management Education – *Blending Art and Craft for effective management education.*		3
Unit IV	Employability Skills – Enhancing Employability Skills – Improving Soft skills – Training and Grooming – Teaching Vs Training.		2
Unit V	Soft skills training – Resume Writing – Interview Tips – Common Interview Questions – Group Discussions – *Enhancing employability in management.*		2
	Total Contact Hrs		**13**
Text Books	1. Barun K.Mitra, *Personality Development and soft skills*, Oxford University Press, 2011. (Unit 1 to 5).		

The topics given in **Italics** are noted as Self-Study topics.