DEPARTMENT OF BCA

PROGRAM /COURSE FRAME FOR BCA

Self Financed Programme

W.e.f. 2018-2019

Sem	Part	Course Code	Course Title	Hrs	Credit	Marks
I	I	TAS/HIS/FRS	Part I	3	2	30
	II	ENS 1201	Conversational Skill	3	2	30
	III	BCA 1441	Computer Fundamentals& Applications	4	4	60
	III	BCA 1543	Programming in C	5	5	75
	III	BCA 1445	C Laboratory	4	4	60
	IIIS	MAS XXXX	Discrete Mathematics	5	4	60
	IV-NME	BCA 1241	Office automation	3	2	30
	IV-LS	BCA 1243	Digital Marketing	3	2	30
Total				30	25	**375**
II	I	TAS/HIS/FRS	Part I	3	2	30
	II	ENS 1202	Reading and Writing Skills	3	2	30
	III	BCA 1442	Operating System with Unix	4	4	60
	III	BCA 1544	Object Oriented Programming using C++	5	5	75
	III	BCA 1446	C++ Laboratory	4	4	60
	III-S	CMC XXXX	Accounting for Managers	5	4	60
	IV-NME	BCA 1242	Web Designing	3	2	30
	IV-LS	BCA 1244	Multimedia Technology and Applications	3	2	30
	V	XXXX	Ext. activity NSS/PED/SLP		1	
Total				**30+1**	**25+1**	**375**
III	I	TAS/HIS/FRS	Part I	3	2	30
	II	ENS 2201	Study Skills	3	2	30
	III	BCA 2541	Data Structure using C++	5	5	75
	III	BCA 2543	Dot net Programming	5	5	75
	III	BCA 2545	Database Management System	5	5	75
	III	BCA 2447	Dot Net Laboratory	4	4	60
	III-S	PHS XXXX	Micro Controller Programming	5	4	60
Total				30	27	**405**
IV	I	TAS/HIS/FRS	Part I	3	2	30
	II	ENS 2202	Career Skills	3	2	30
	III	BCA 2542	Software Engineering	5	5	75
	III	BCA 2544	Computer Graphics	5	5	75
	III	BCA 2546	Java programming	5	5	75
	III	BCA 2448	Java Laboratory	4	4	60
	III-S	MAS XXXX	Operation Research	5	4	60
	V	XXX 0000	Ext. activity NSS/PED/SLP		1	
Total				**30+1**	**27+1**	**405**

Sem	Part	Course Code	Course Title	Hrs	Credit	Marks
V	III	BCA 3641	Computer Networks	6	6	90
	III	BCA 3643	Python Programming	6	6	90
	III	BCA 3645	Internet Technology	6	6	90
	III	BCA 3547	Internet Technology Laboratory	5	5	75
	IV	BCA 3200	Environmental Studies	4	2	30
	IV LS	BCA 3243	Cyber Security	3	2	45
			Total	**30**	**27**	**405**
VI	III	BCA 3642	Big Data Analytics	6	6	90
	III	BCA 3644	Fundamentals of Linux	6	6	90
	III	BCA 3646	Fundamentals of mobile computing	6	6	90
	III	BCA 3548	Project	5	5	75
	IV	HVS 3200	Human Values	4	2	30
	IV LS	BCA 3244	Advanced Excel	3	2	30
			Total	**30**	**27**	**405**
			Grand Total (Sem I –VI)	**180+2**	**158+2**	**2370**

S   MAJOR SUPPORTIVE
NME NONMAJOR ELECTIVE
LS   LIFESKILL
EVS   ENVIRONMENTAL STUDIES
VAL   VALUE EDUCATION

Supportive course from Other Departments

Semester	Course Code	Course Title	Hrs	Credit	Marks
I	MAS XXXX	Discrete Mathematics	5	4	60
II	CMC XXXX	Accounting for Managers	5	4	60
III	PHS XXXX	Embedded Systems and Micro Controller	5	4	60
IV	MAS XXXX	Operation Research	5	4	60

Non Major Electives

Semester	Course Code	Course Title	Hrs	Credit	Marks
I	BCA 1241	Office Automation	3	2	30
II	BCA 1242	Web Designing	3	2	30

Life Skill

Semester	Course Code	Course Title	Hrs	Credit	Marks
I	BCA 1243	Digital Marketing	3	2	30
II	BCA 1244	Multimedia Technology and Applications	3	2	30
V	BCA 3243	Cyber Security	3	2	30
VI	BCA 3244	Advanced Excel	3	2	30

Programme Specific Outcomes (PSOs) for BCA
(BACHELOR OF COMUPTER APPLICATION)

Upon completion of the program, graduates will be able to

1. Explore technical knowledge in diverse areas of Computer Applications and experience an environment conducive in cultivating skills for successful career, entrepreneurship and higher studies.

2. Attain the ability to design and develop computer applications, evaluate and recognize potential risks and provide innovative solutions.

3. Understand standard software engineering and project management concepts in software project development using visual programming environment for computer technology oriented business applications

4. Understand the concepts and applications in the field of Computing Sciences like Web designing and development, Mobile application development, and Network and communication technologies.

5. Be acquainted with the contemporary issues, latest trends in technological development and thereby innovate new ideas and solutions to existing problems.

6. Generate creativity and apply the programming knowledge to solve the complex problems.

7. Provide framework for Information Technology users with tools that will assist them in their decision-making when faced with Information Technology ethical dilemmas.

8. Meet the programming skills and technical skills which is the requirements of the IT based industries

9. Adapting to new technologies and constantly upgrade their skills with an attitude towards independent and lifelong learning.

10. Understand the basic concepts of digital fundamentals, OOP concepts, Databases, Microprocessor and assembly languages, web applications and, hardware related applications.

Mapping of Course Outcomes (COs) with Programme Specific Outcomes (PSOs)

Courses	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6	PSO 7	PSO 8	PSO 9	PSO 10
BCA 1441	✓	✓	✓				✓	✓		✓
BCA 1543		✓	✓	✓			✓	✓	✓	✓
BCA 1445		✓			✓		✓	✓	✓	✓
BCA 1241		✓	✓		✓		✓		✓	✓
BCA 1243	✓		✓	✓			✓	✓	✓	
BCA 1442		✓		✓			✓	✓	✓	✓
BCA 1544		✓	✓	✓			✓	✓		✓
BCA 1446		✓	✓		✓		✓		✓	✓
BCA 1242		✓		✓	✓	✓	✓	✓		
BCA 1244	✓		✓	✓			✓	✓		✓
BCA 2541				✓	✓	✓		✓	✓	✓
BCA 2543			✓	✓	✓			✓	✓	✓
BCA 2545		✓	✓	✓				✓	✓	✓
BCA 2447			✓		✓	✓	✓		✓	✓
BCA 2542	✓		✓	✓	✓				✓	✓
BCA 2544		✓		✓	✓		✓		✓	✓
BCA 2546			✓		✓		✓	✓	✓	✓
BCA 2448			✓		✓		✓	✓	✓	✓
BCA 3641	✓	✓	✓	✓		✓	✓		✓	
BCA 3643				✓	✓		✓	✓	✓	✓
BCA 3645				✓	✓		✓	✓	✓	✓
BCA 3547				✓		✓	✓	✓	✓	✓
BCA 3200	✓	✓			✓	✓	✓		✓	
BCA 3243	✓	✓			✓	✓	✓		✓	
BCA 3642			✓	✓	✓		✓	✓	✓	✓
BCA 3644			✓	✓	✓			✓	✓	✓
BCA 3646				✓	✓		✓	✓	✓	✓
BCA 3548	✓	✓	✓		✓		✓		✓	
BCA 3244			✓	✓	✓		✓		✓	✓

Programme Outcomes (Pos) for Undergraduates

Undergraduate programmes are expected to have developed in undergraduates the following graduate attributes:

1. *Cognitive Ability*: Capacity to register, remember and recall ideas and add knowledge in the relevant discipline.

2. *Reflective Skills*: Ability to apply knowledge and solve problems in similar but unknown disciplinary contexts.

3. *Communicative Competence*: Ability to communicate in one's mother tongue and in English discipline-specific complex ideas and life experiences.

4. *Aptitude for Higher Studies*: To be proactive in demonstrating general aptitude to evaluate the circumstances and come up with an interest to progress further in career by opting for post studies or through entrepreneurial initiatives at offing in the multidisciplinary and trans-disciplinary contexts.

5. *Employability Capacity*: Ability to serve the nation as school teachers, responsible staff and officers in various private and public sectors to find suitable meaning for the education they have pursued here.

6. *Action Research Aptitude*: Skills to undertake action research as independent projects on the themes and issues concerning life and work moving ahead with techno-savvy and eco-friendly approaches.

7. *Quest for Lifelong Learning*: Skills to learn lifelong independent of academia transcending the space and time barriers.

8. *Study Abroad*: Ability to pursue higher studies in a global context of multilingual, multicultural, multiethnic and multiracial communities without compromising the values and ethos cherished and nurtured in love with the motherland.

9. *Citizenry Attributes*: Be responsible citizens with democratic bent of mind, probity in public life, moral uprightness, and commitment for social uplift of the marginalised, the poor, the destitute, and the needy.

10. *Civic Responsibility*: Capacity to respect human values, to exhibit religious tolerance, and to practise politics of difference and dissent.

Mapping of PSOs with POs

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
PSO1	✓	✓		✓	✓		✓	✓		
PSO2	✓	✓		✓	✓	✓	✓			
PSO3	✓	✓		✓	✓	✓	✓			
PSO4	✓	✓		✓		✓	✓		✓	
PSO5	✓	✓		✓	✓	✓			✓	
PSO6	✓	✓		✓		✓	✓	✓		
PSO7	✓	✓		✓	✓	✓	✓			
PSO8	✓	✓		✓	✓	✓	✓			
PSO9	✓	✓		✓	✓		✓	✓		
PSO10	✓	✓		✓		✓	✓	✓		

BCA 1441   Computer Fundamentals and Applications   4hrs/4cr

This course provides foundational understanding of Computer Hardware, Software, Operating System, and Peripherals along with how to get the most value and impact from Computer Technology.

Upon successful completion of the course the students will be able to

> ➢ Understand the basic operations of the computer
> ➢ Discuss the process of the system
> ➢ Classify the peripheral devices
> ➢ Identify the process of programming
> ➢ Evaluated the security measures for protecting data

Unit I :
Introducing Computer Systems, Exploring Computers and their uses, interacting with the Computer System- Using Keyboard and Mouse, Seeing Hearing and Printing Data - Introduction to number system and number conversions.

Unit II :
Processing Data – Transforming Data into Information, Modern CPUs, Storing Data – Types of Storage Device- Using Operating System– Operating System Basics- Networks –Data Communications, Presenting the Internet – The internet and the world, Email.

Unit III :
Working with Application Software – Productivity Software, Graphics and Multimedia- Database Management – Database Management Systems, Survey of Database Systems.

Unit IV :
Software Programming and Development, Creating Computer Programs, Programming Languages and the Programming Process.

Unit V:
Protecting Computer and Data – Understanding the need for security Measures and taking protecting measures, Case Study – MS Office, Star Office, Open Office.

Text book:
1. Introduction to Computers, Peter Norton, McGraw-Hill Education, 7th edition, 2013.

Reference Books:
1. Computer Fundamentals, Anita Goel, Pearson Education India 2010.
2. Using Information Technology : A Practical Introduction to Computers & Communication, Brian Williams, StaceySawyer,2005
3. Fundamentals of Computers, E Balagurusamy, McGrawHill Education India 2014.
4. Digital Computer Fundamentals, Thomas C.Bartee, 6th Edition, Tata McGraw Hill Publishers. 2014.
5. Discovering Computers, Fundamentals, Gary Shelly, Misty Vermaat, 2011, Cengage Learning.

Websites:

1. www.tutorialspoint.com/computer_fundamentals.
2. www.w3schools.com.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1		2				
CO2		2				
CO3			3			
CO4				4		
CO5					5	

BCA 1543   **Programming in C**   **5hrs/5cr**

This course is designed to provide a comprehensive study of the C programming language. It stresses the strengths of C, which provide students with the means of writing efficient, maintainable, and portable code and how to choose Programming language for solving a problem.

Upon successful completion of the course the students will be able to

> ➢ Identify the basic terminology using in computer programming.
> ➢ Describe the reason for iteration and understand loops
> ➢ Design and Develop C programs using array and function
> ➢ Determine Pre-processor commands and functions.
> ➢ Illustrate the file, file modes and command line arguments

Unit I:
Introduction to Problem Solving- Flow charts- Tracing flow charts, Problem solving methods- Need for computer Languages- History of c – c program syntax-C character set-Identifiers and keywords- Data types-Declarations – Expressions- statements- symbolic constants

Unit II:
Input-Output Statements – formatted input and output statements – unformatted input and output statements -Operators – control statements – if –if else – nested if – switch - looping statements – while – for – do while - break statement – continue statement

Unit III:
Arrays –single dimension array – multi dimension array- character arrays- structures –union-pointers – function – declaration – definition – function call - call by value – call by reference – void function – recursive function – String function – math function

Unit IV:
Pre-processor commands- #include - #define - #ifdef – graphics in c – graph mode initialization -circle –line- ellipse – sector – polygon – text output – text style -color function.

Unit V:
File Handling – file open – file mode - read and write operation –file close- text file manipulation – binary fine manipulation – command line arguments - storage classes – static - auto - extern – register.

Text book:
1. Programming using C, Pandiaraja,Cijay Nicholas publications, 2005.

Reference books:
1. Let us C :Y.P.Kanetkar, Bpb publication, 15th edition, 2016.
2. Schaum's Outline of Programming with C,Byron S. Gottfried, 3rd edition, McGraw Hill Professional, 2017.
   Programming in Ansi C, E. Balaguruswamy, 7th Edition, Tata McGraw Hill Publishing, 2017.

Web Sites:
1. www.cprogramming.com/tutorial.html.
2. www.tutorialspoint.com/cplusplus.
3. cforbeginners.com.

Blooms Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3						6
CO4					5	
CO5				4		

BCA 1445   **C Programming Laboratory**   **4hrs/4cr**

This course use to train the student learns a programming language and learns problem solving techniques.

Upon successful completion of this lab Course, student will be able to

- ➢ Understand the basic concept of C Programming, and its different modules
- ➢ Evaluate constants, variables, identifiers, operators, type conversion and other building blocks of C Language
- ➢ Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
- ➢ Design and develop the concept of Strings
- ➢ Demonstrate the file, file modes and command line arguments

PROGRAMS
1. To demonstrate use of data types, simple operators (expressions)
2. To demonstrate decision making statements (if and if-else, nested structures)
3. To demonstrate decision making statements (switch case)
4. To demonstrate use of looping statements.
5. To demonstrate recursive functions.
6. To demonstrate use of arrays (1-d arrays) and functions
7. To demonstrate use of multidimensional array(2-d arrays) and functions
8. To demonstrate use of pointers
9. To demonstrate concept of strings (strings and pointers)
10. To demonstrate array of strings.
11. To demonstrate nested structures and Unions
12. To demonstrate file handling (text files)

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1		2				
CO2					5	
CO3			3			
CO4						6
CO5			3			

BCA 1241   **Office Automation (2T+1L)**   **3Hrs/2cr**

This course is use to understand the theory and to get hands-on experience in MS-Word, MS-PowerPoint and MS-Excel.

Upon successful completion of the course the students will be able to

➢ Recognize to use each of the Microsoft office program to create professional and academic documents.
➢ Understand the various ways of edit basic excel spreadsheets
➢ Classify the concept of working with workbooks using formulas and charts
➢ Use Power point for creating animations and preparing presentation
➢ Choose appropriate images, graphs and other objects for the presentation

Unit I :
Microsoft office basics-Microsoft word: Working with word documents-Word Editing techniques-Finding and replacing-spelling and Grammar-Formatting: Making titles and stand out-adding borders and shading-setting up multiple columns-creating lists-adding headers and footers-Formatting with styles: predefined styles-custom styles-Creating tables-Working with mail merge.

Unit II:
Microsoft Excel: Excel Basics-Working with excel spreadsheets-Manipulating data- selecting ranges-editing entries-formatting entries-simple calculations-naming cells and Ranges-Efficient data display-printing worksheets.

Unit III:
Working with workbooks-formulas-linking worksheets: testing links-Creating charts: sizing and moving charts- updating charts- changing the type-custom chart types.

Unit IV:
Microsoft PowerPoint: Working with PowerPoint presentation-Creating a presentation-Editing slides in slide view-organizing slides in outline view- using design template- merging presentations in slide sorter view.

Unit V:
Adding clip art to slides- adding graphs- adding special effects- running an electronic slide show. Presentation with multimedia effects: Adding image-animating text and objects- insert sounds and movies- recording sound slide by slide.

Text book:
1. Comprehensive computer learning: Microsoft office 2010, Bittu Kumar, V&S publishers, 2015.

Reference books:
1. Quick course in Microsoft office 2000, Joyce Cox, Polly urban, Christian Dudley, and Online press Inc.
2. The complete Reference – Office 2000, Stephen L.Nelson, Tata McGraw Hill publishing Company Limited.
3. Window and MS Office 2000 with Database Concepts, N.Krishnan, SciTech publications(India) Pvt Ltd., Chennai.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4				4		
CO5					5	

BCA 1243   **Digital marketing**   **3hrs/2cr**

This course is to enable the students to learn about digital marketing world, as it available for advertising, planning for online marketing that help them to plan.

Upon successful completion of the course the students will be able to

- ➢ Recite the evolution and technology in digital marketing
- ➢ Learn and create the domain name, hosting, e-mail marketing and social media
- ➢ Understand the power of digital marketing
- ➢ Compare and contrast the email marketing
- ➢ Applying digital marketing in various fields

Unit I:
The evolution of digital marketing - technology behind digital marketing – the need for digital marketing strategy, business and digital marketing, defining digital marketing strategy - Understanding the digital consumer- The website – the hub of the digital marketing world - Building an effective website - the main steps of building a website - choosing the domain name.

Unit II:
Hosting – the website's home on the internet -Arranging the information- writing effective web content- The online marketer - about the engines - Optimizing the site for the engines - Advertising on the search engines - Black Hat, the darker side of search - Bringing in the pros -Universal search – more opportunities to rank - Website intelligence and return on investment.

Unit III:
Measuring the way to digital marketing success - How information is measured - Measuring what's important, Testing, investing, tweaking, reinvesting - Action stations -Harness the power of online data, and watch the ROI take off.

Unit IV:
E-mail marketing - the new direct mail–Concept of e-mail marketing - Planning the campaign - Dos and don'ts of an e-mail marketing campaign- Measuring the success - a vital component of digital marketing.

Unit V:
Social media and online consumer engagement–Introduction to social media - The different forms of social media - the rules of engagement - Adding social media to the own site - Online PR and reputation management - fostering a positive online image - promoting the business through online channels –Introduction to affiliate marketing - game advertising.

Text book:
1. Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Damian Ryan, Calvin Jones,Kogan Page, 4th edition, 2016.

Reference Books:
1. Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Damian Ryan, Calvin Jones,Kogan Page, 1st edition, 2008.
2. Internet Marketing for your Tourism, Susan Sweeney, CA, New age International (P) Limited Publishers, New Delhi, 2005.

Websites:

1. www.coursera.org/specialization/digitalmarketing
2. www.digitalvidya.com
3. www.marketingsay.com

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2						6
CO3		2				
CO4				4		
CO5			3			

BCA 1442 **Operating System with UNIX** **4hrs/4cr**

This course facilitates to learn fundamental concepts and algorithms that are used in the existing operating systems.

Upon successful completion of the course the students will be able to

  ➢ Recongize the basic concepts of Operating System.
  ➢ Understand the importance of Process and Threads
  ➢ Apply and solve deadlock problems using algorithms
  ➢ Differentiate between physical and virtual memory management
  ➢ Evaluate the Unix commands

Unit I :
Introduction – History – Operating System Environment – Components and Goals –Input and output devices – Process Concepts - Definition of Process- Process States: Life Cycle of a Process - Process Management - Process States and State Transitions – Process Control Blocks – Process Operations – Suspend and Resume-Inter process Communication- Signals – Message Passing.

Unit II:
Thread Concept - Introduction - Definition of Thread – Thread States - Life Cycle of a Thread - Thread Operations - Threading Models –Thread Implementation - Introduction Mutual Exclusion- Implementing Mutual Exclusion Software Solutions to the Mutual Exclusion Problem- Hardware Solutions to the Mutual Exclusion Problem– Semaphores.

Unit III:
Monitors–Information Hiding- Monitor Example - Deadlock - Introduction- Examples of Deadlock- Deadlock Prevention- Deadlock Avoidance with Dijkstra's Banker's Algorithm-Deadlock Recovery Deadlock Strategies. Processor Scheduling – Introduction – Scheduling Levels – Pre emptive and Non Pre emptive Scheduling Algorithms.

Unit IV:
Physical and Virtual Memory – Memory Organization – Management – Hierarchy – Memory Management Strategies. Fixed Partition and Variable Partition Multiprogramming – Virtual Memory Organization – Paging and Segmentation - Demand Paging and Page Replacement Strategies.

Unit V:
Disk Performance Optimization – Disk Scheduling Strategies. Introduction to Unix – Listing Files and Directories Commands – Making ,Changing, Removing Directories Commands- File Management Commands – Pipes and Filters – Case studies.

Text book:
  1. Operating System concepts, Abraham Silberschatz, Peter B Galvin, Gerg Gagne, 9th Edition, Wiley, 2016.

Reference books:
 1. Operating Systems, H.M. Deitaland P.J. Deital, D.R. Choffnes, 3rd Edition, Pearson Prentice Hall. 2004.
 2. Mastering unix Shell Scripting: Bash, Bourne, and Korn Shell Scripting for Programmers, System Administrators, and UNIX Gurus, Randal K. Michael, John Wiley & Sons, 2011.
 3. UNIX and SHELL Programming –simpleNeasyBook by WAGmob , 2014.
 4. Operating System Concepts, Silberschatz, Galvin and Gagne, Wiley India Pvt Ltd, 9th Edition, 2013.

5. Operating Systems: Internals and Design Principles, William Stallings, Pearson Education, 2014.

Web Sites:
1. www.tutorialspoint.com/operating_system.os-book.com
2. www.computerhope.com/jargon/o/os.html.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4				4		
CO5					5	

BCA 1544   Object Oriented Programming using C++   5hrs/5cr

The aim of this course is to enable the students to get understanding of the OOP Concepts, and to write, debug and run complete console applications and ultimately, become proficient.

Upon successful completion of the course the students will be able to

> ➢ Understand the programming concept to develop applications.
> ➢ Develop programs using different types of functions, string and math functions
> ➢ Analyze and develop C++ programs using Class and object, friend and inline function.
> ➢ Apply the concept of Constructor, destructor, Function Overloading and operator overloading
> ➢ Identify the file, file modes and command line arguments

Unit I:
Introduction to Object Oriented Programming (OOP) and its basic features, namespace-Basic component of C++ program and program structure, Data types: Primitive, Derived, User Defined Data types – Operators - control and Loops.

Unit II:
Function: simple functions, passing argument to functions, returning values from functions, reference arguments-recursive functions-String and String related Library function – mathematical functions.

Unit III:
Objects and classes: Classes and Objects, Data Members, Member function – Object array, Object Pointer, this Pointer- Static Data Members and Static Functions – friend function – inline function.

Unit IV:
Constructor - Characteristics of constructors – types of constructors - destructor – Inheritance – type of inheritance and its implementations – Polymorphism – compile time polymorphism –constructor overloading , function overloading, operator overloading – dynamic polymorphism – overriding – virtual function.

Unit V:
Files and Stream: String I/O, Object I/O with multiple objects, file pointer, disk I/O with member functions – Templates – Template Methods – Template Classes – Exception Handling.

Text book:
1. Object Oriented Programming in C++, E. Balaguruswamy, TMH Publishing Co. Ltd., 7th Edition, 2017.

Reference Books:
1. The C++ Programming Language, BjarneStroustrup, Addison Wesley,3rd edition 2014.
2. Principles and Practice Using C++, BjarneStroustrup, Addison-Wesley Professional,2014.
3. C++: The Complete Reference, Herbert Schildt McGraw Hill Education; 4th edition, 2017.

Web Sites:
1. www.cprogramming.com/tutorial/c++-tutorial.html
2. www.tutorialspoint.com/object_oriented_analysis_design/index.html.
3. ooadonline.hpage.com.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4				4		
CO5					5	

BCA 1446   **C++ Laboratory**   **4hrs/4cr**

This course is used to train the student to learn OOP Concept and problem solving techniques using C++.

Upon successful completion of this lab course, students will be able to

- ➤ Understand object-oriented concepts and how they are supported by C++
- ➤ Demonstrate the ability to analyze, use, and create functions, classes, to overload operators
- ➤ Evaluate the concept of constructors, destructors
- ➤ Use of inheritance and Pointers when creating or using classes and create templates
- ➤ Understand the basic file operations

PROGRAMS

1. Programs using Control Structures
2. Programs using Functions
3. Programs using Arrays
4. Programs using Inline Functions
5. Programs using Classes
6. Programs using Constructors and Destructors
7. Programs using Friend Functions
8. Programs using Operator Overloading
9. Programs using Inheritance
10. Programs using Virtual Functions
11. Programs using Files

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2				4		
CO3					5	
CO4				4		
CO5	1					

BCA 1242   **Web Designing (2T+1L)**   **3hrs/2cr**

This course deals with web page designing by using the techniques in web designing. It contains HTML, Java Script, and Dream weaver. Students will be able to design their web pages and place them in the web.

Upon successful completion of the course the students will be able to

- ➢ Recognize about the basic concepts of Internet and its services
- ➢ Understand the concepts of HTML and CSS
- ➢ Analyzing the javascript statements.
- ➢ Apply Javascript in the HTML pages and validating the forms
- ➢ Design website using Dreamweaver**.**

Unit I:
Introduction to internet: Internet architecture - Basic concepts - Web server- Web client - Internet Services- Internet protocol-Remote Access and Transactions-Electronic Mail.

Unit II:
Introduction to HTML: Mark-up languages - Basic tags – Formatting –images – lists – Tables – Frames – Links – Forms. Style Sheets: CSS-Introduction to Cascading Style Sheets-Features-Core Syntax-Style Sheets and HTML Style Rule Cascading and Inheritance-Text Properties

Unit III:
Dynamic HTML - Introduction to Java script: Variables – Data types – Statements-Operators - Control statements - Object based programming - Java script with HTML.

Unit IV:
Java script objects - DOM - JS Browser detection – JS Cookies - JS Validation - JS Animation - JS image maps - JS Timing – JS create Objects - creating menu and slideshow using

Unit V:
Dream weaver Concepts – designing Web Page with Dream Weaver. Website maintenance - types of service providers - web hosting - maintenance and other commercial issues.

Text book:
1. Ivan Bayross, Web Enabled Commercial Application Development using HTML, JAVASCRIPT, DHTML and PHP, BPB Publications, 4th Edition 2010.

Reference books:
1. Html5 Black Book by Kogent Learning Solutions Inc. Released 2011.
2. Jennifer Robbins, Learning Web Design, 4th Edition, O'Reilly Media, 2012
3. Robert. W. Sebesta, "Programming the World Wide Web", fourth Edition, Pearson Education, 2007.

Web Sites:
1. www.w3schools.com
2. www.tutorialspoint.com
3. www.teacherclick.com

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3				4		
CO4			3			
CO5						6

BCA 1244   Multimedia Technology and Applications (2T+1L)   3Hrs/2cr

The aim of this course is to enable the students to learn multimedia concepts, audio and video with text, image, graphics and animation.

Upon successful completion of the course the students will be able to

 ➢ Identify the multimedia concepts and applications.
 ➢ Understand digital audio and video concepts.
 ➢ Applying the working techniques using Photoshop.
 ➢ Analyze the flash tool box and drawing characters.
 ➢ Evaluate the different animation methods.

Unit I :
Introduction to Multimedia - products and evaluation -computer architecture standards-operating systems and software - Text - Graphics.

Unit II:
Introduction to Digital audio and video –characteristics of sound and digital audio and video-digital audio systems-MIDI_audio file formats-using audio in multimedia applications.

Unit III:
Introduction to Photoshop – working with Photoshop – processing the image using Photoshop techniques-layers-filter.

Unit IV:
Introduction To Animation- How flash works- Flash tool box – creating objects – drawing characters for cartooning editing objects – Colors and text- symbols and instances – bitmaps.

Unit V:
Flash And Layers- Animation in flash key frame animation,tweened animation - Motion tween, shape tween-guide layers- Masking-Publishing in flash- action Script.

Text book:
1. Introduction to Multimedia and its applications, V.K. Jain, 1st Edition , 2012

Reference books:
1. Multimedia technology and applications, Hillman, David -Galgotia publications pvt ltd-2001
2. Multimedia in action, Shuman,J.E -Thomson Asia pvt ltd-2001.
3. Multimedia communications, Halsal,fredl-Pearson education pvt ltd-2003.
4. Michelle Perkins, Beginner's Guide to Adobe Photoshop, Amherst Media, Inc., 2006
5. Andrew Rapo, Understanding Macromedia Flash 8 ActionScript 2, Focal press, 2013

Web Sites:
1. www.insidegraphics.com
2. www.entheosweb.com/Flash/motion_tween.asp

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4				4		
CO5					5	

BCA 2541   **Data Structure using C++ (3T+2L)**   **5hrs/5cr**

This course enables the students to be familiar with problem solving approaches, algorithm analysis, stacks and queues and implement various sorting and searching algorithms.

Upon completion of the course the students will be able to

- ➢ Recall the fundamental of data structures and summarizes their uses.
- ➢ Apply the concept of stack and queue in data structures
- ➢ Understand the various types of linked lists.
- ➢ Create binary representation of data structure and its operations
- ➢ Determine the concept of searching and sorting techniques.

Unit I:
Introduction to Data structures: Definition- Classification of data structures: primitive and non-primitive- Operations on data structures-Dynamic memory allocation and pointers: Definition- Declaring and initializing pointers- Memory allocation functions: malloc, calloc, free and realloc-Arrays-Structures- Assumption Notation – complexity.

Unit II:
Stack: Implementation-stack operations-Applications of a stack: Polish notations –Infix, Postfix and Prefix notations- Conversion of an arithmetic expression from Infix to postfix Recursion. Queue: Definition-Implementation -Types of queue simple queue, circular queue, double ended queue-operations on queue-applications of a queue.

Unit III:
Linked list: Definition – Advantages and Disadvantages of linked list –Singly Linked List-Doubly linked list-circularly linked list-Doubly circular Linked List-Operations on Singly Linked List-Applications of linked list- Basic Graphs- shortest path-spanning tree-Searching.

Unit IV:
Trees: Definition- Types of Trees- Binary tree: Creation of binary tree- Representation-Traversal of Binary Tree : Preorder, Inorder andPostorder-applications of tree.

Unit V:
Binary Search Tree: Definition-Operations on BST-Application of BST - Sorting: Searching techniques: sequential search, Binary search –Sort: Bubble sort, Selection sort, Merge sort, insertion sort, Quick sort.

Text book:
1. Data Structures Using C++, D.S. Malik, Second Edition, 2010

Reference Books:
1. Data structures, A.Chitra, P.T Rajan, Tata McGraw Hill Education[India] Pvt.,Ltd 2006
2. Data structures with C,SeymourLipschutz,Tata McGraw Hill publishing 2011.
3. Data Structures Using C++ ,Varsha H. Patil,2012
4. Data Structures and Algorithms in C++,Joshi, Tata McGraw-Hill Education, 2010.

Web Sites:
1. www.cprogramming.com/algorithms-and-data-structures.html
2. freevideolectures.com/Course/2279/Data-Structures-And-Algorithms

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2			3			
CO3		2				
CO4						6
CO5					5	

BCA 2543 **Dot Net Programming** **5hrs/5cr**

This course enables the students to gain depth knowledge and acquire skills to develop window based application and Rich Internet Web applications and also provides a deep exploration of Dot Net development philosophy and practical advice.

Upon completion of the course the students will be able to

- ➢ Recognize the dot net framework and its features
- ➢ Understand vb.net and write programs including oops concepts
- ➢ Apply exceptions and create menus in vb.net
- ➢ Analyze the features of ADO.NET and handle sql commands for data manipulation
- ➢ Create dynamic websites using ASP.NET.

Unit I:
Introduction to Dot Net platform-advantages of Dot Net-working of Dot Net- .basic architecture of net frame work-common language run time-common language specification-unified programming classes-security in Dot Net-CLR: Meta data –assembly-MSIL-Just in Time compiler-class loader-verifier-architecture of CLR-features of CLR.

Unit II:
VB.NET: Visual studio .net IDE-Programming concepts- operators – control and looping statements - arrays - writing procedures-sub procedure – function procedure – property procedure – operator procedure - OOPs in VB.net: class-object-inheritance-polymorphism-inheritance-my base class keyword-my class keyword-abstract base class

Unit III:
Exception handling-working with forms-Advanced window application: basic controls and methods – advanced controls – menustrip - context menu strip – status bar – rich text box – web browser - graphical application-custom window controls. Data access using ADO.NET: Overview of ODBC-UDA-ADO.NET Component model.

Unit IV:
SQL Commands –Data Definition Language – Data Manipulation Language – Data Control Language - ADO.NET object model- managed provider in ADO.net –ADO.net name spaces and classes-Connection –Command – dataadapter – dataset –data reader - error – datagridview - advantages of using ADO.net-data access using ADO-using ADO.net data form wizard.

Unit V:
ASP.NET: Features of ASP.net-structure of an ASP.net page-creating simple web application-using common web control-ASP.net Objects – request – response – server – session – application – error – Master page – validation controls- ASP.net State Management – web configuration -create web application using data base connectivity-web services.

Reference books:
1. Professional Visual Studio 2015 (WROX) ,Wiley ,2015
2. Microsoft Visual Basic 2013 , Microsoft Press US ,1st edition, 2013
3. Mastering Microsoft Visual Basic 2010 , Sybex , 1 st edition , 2010
4. .Net Programming Black Book, Kogent Solutions Inc, Published by Dreamtech Press, New Edition, 2005.

Web Sites:

1. wisentechnologies.com/it-courses/.net-training.aspx
2. codemyne.net/articles/DotNet-framework-main-objectives.aspx
3. www.ajr2training.com/dot-net-training

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4				4		
CO5						6

BCA 2545   Data Base Management System (3T+2L)   5hrs/5cr

This course helps the student learn the concept of data structure of a database model in detail and also extensively covers the normalization process, overview of the database systems, Relational model, SQL, Data mining and Data warehousing.

Upon successful completion of the course the students will be able to

- Remember the basic database concepts and E-R models.
- Apply the importance of various relational operations such as Join, etc.,
- Understand the concept of Normalization of data using various normal forms.
- Create and learn the concepts of data mining system
- Evaluate the concept of data warehousing and its operations

Unit I:
Introduction: Purpose of database systems - view of data - data models – database languages - transaction management - storage manager - database administrator and database users - overall system structure. E-R model: E-R diagram – constraints – keys - Extended E-R features - Relational model: structure of relational databases - the relational algebra – Extended Relational algebra operations.

Unit II:
Relational commercial languages: SQL- Basic structures,joins, set operations, aggregate functions, null values - query-by-example – domain constraints, referential integrity - assertions – triggers -view– exception- cursor-procedures.

Unit III:
Relational database design: First normal form - pitfalls in relational database design - functional dependencies – Decomposition - Boyce–codd normal form, third normal form, and fourth normal form – de normalization.

Unit IV:
Introduction to Data mining-Types of Data – Data Mining Functionalities – Classification of Data Mining Systems – Data Mining Task Primitives – Integration of a Data Mining System with a Data Warehouse.

Unit V:
Introduction to Data WareHousing - Data warehousing Components –Building a Data warehouse – DBMS Schemas for Decision Support – Data Extraction, Cleanup, and Transformation Tools –Metadata.

Text book:
1. Database System Concepts, AviSilberschatz, Henry F. Korth, S. Sudarshan, McGraw Hill, 6th Edition,2010.

Reference Books:

1. Database Management System Concepts, N.F.Korth and A.Silberschatz, S.Sudarshan, 4/e, McGraw Hill Inc., 2002.
2. An Introduction to Database Systems, B.C. Desai, Galgotia Publications, New Delhi, 1995.
3. Fundamentals of Database Systems, R.Elmasri and S.B. Navathe Benjamin Cummings, Redwood City, 1994.
4. Database Management, Gordon C.Everest, TataMcGraw-Hill, NewDelhi, 2001.
5. Database Principles, Programme & performance – Patrick O'Neil, Elizebeth O'Neil, A hartcourt, 2006.

Web Sites:

1. rdbms.ca/database/introduction.html.
2. www.w3schools.com/sql/sql_intro.asp.
3. www.cramerz.com/database_concepts/dbms_and_rdbm.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4						6
CO5					5	

BCA 2447   **Dot Net Laboratory**   **4hrs/4cr**

Train the student to gain knowledge about the methodologies behind VB.Net and ASP.Net and helps the students to develop Dot Net based application using ADO.NET and SQL Managed Provider-OLEDB Managed Provider

Upon successful completion of this lab course, students will be able to
   ➢ Understand the concepts of Looping and conditional statements
   ➢ Create web pages using Controls
   ➢ Judge the data using Validation controls
   ➢ Evaluate the concept of ADO.NET with SQL commands
   ➢ Design websites using ASP.NET

Programs:
   1. NET (vb.net or c#) program for Feedback form
   2. Create a DOT NET for displaying the images with clear option
   3. Write Web Controls to display in Web form
   4. Prepare a button-click option to display a label3.
   5. Write mouse move over to change button color
   6. Create list box to display the selected item cost in web form. Create another label to display the total cost. Write a program to display a calendar.
   7. Write a DOT NET program to calculate Boiling point of water using Compare Validate
   8. Create a DOT NET program for User input name validation using Required Field Validate
   9. Write a DOT NET program Checking the appropriate values using Validation button
   10. Create a form to validate the controls getting user inputs
   11. Create an application with content buffered
   12. Creating a file holding variables, hyperlinks with lock & unlock methods
   13. Display a message when connection established with Database
   14. Write a Program to create a table in Master Database
   15. Updating the fields of a table in Database
   16. Selecting the rows from a table in Database
   17. Retrieving the Result in Dataset & Checkbox List by selecting a field
   18. Bind the dataset to a Radio button list with different forms
   19. Create a Table header fields in the form of drop down list

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1			3			
CO2						6
CO3					5	
CO4					5	
CO5						6

BCA 2542   **Software Engineering**   **5hrs/5cr**

This course enables the students to understand Software requirements, specification, Software design techniques for developing large software systems, Software testing, documentation and maintenance.

Upon successful completion of the course the students will be able to

- ➢ Remember the various software process models
- ➢ Apply the working environment on requirement engineering
- ➢ Understand and analysis the design of various modelling
- ➢ Create and manage the software testing concept
- ➢ Evaluate the software quality and maintenance concept

Unit I:
Software Characteristics – Introduction to Software Engineering – Factors influencing quality and productivity – Software Process CMM – PSP – TSP – Software Engineering Models – Cost Estimation – Feasibility Analysis – Software Project management.

Unit II:
Requirement Engineering – Requirements - Documents – Requirements Elicitation – Requirements Analysis and Negotiation – Requirements Validation – Requirements Management.

Unit III:
Analysis and Design – Information Flow Analysis – DSSD-OOA- Use Case Modeling – Class Modeling – Dynamic Modeling – Design Engineering – Creating Architectural Design – Modeling Component level design – User Interface design – Transform and Transaction Analysis – OOD.

Unit IV:
Testing Principles – Testing Strategies – Unit Testing – Integration Testing – White Box Testing -Black Box Testing – OOTM – Domain Testing -Implementation.

Unit V:
Software Maintenance – Issues in Maintenance – Change Management – Software Quality and Quality Assurance – Human Factors in Software Engineering – Introduction to Web Engineering, Case studies.

Text book:
1. Software Engineering: A Practisener Approach, Roger S Pressman, McGrawHill, 8th Edition, 2015.

Reference books:
1. Requirements Engineering, Ian Somerville, Johnwilley, 1998.
2. Object Oriented and Classical Software Engineering, Stephen R. Schach, TataMcgrawHill, 5th Edition, 2006.
3. A Discipline for Software Engineering,Watts S. Humphrey, Pearson Education, 2001.
4. Software Engineering,K.K. Agarwal and Y. Singh, revised 2nd edition, New AgeInternational Publishers, 2006.

Web Sites:
1. www.tutorialspoint.com/software_engineering.
2. www.jkinfoline.com/software-engineering.html.
3. www.wiziq.com/tutorials/software-engineering.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4						6
CO5					5	

BCA 2544   **Computer graphics (3T+2L)**   **5hrs/5cr**

This course facilitates the students to learn the basic principles and techniques of graphics, applications and to implement graphics program using two dimensional and three dimensional concepts.

Upon successful completion of the course the students will be able to

- ➢ Recognize the graphics, design and the primitives.
- ➢ Understand the basic principles and techniques of graphics.
- ➢ Classify the concept of working with graphics program using 2D and 3D.
- ➢ Determine the fundamentals of transformations, clipping and projections.
- ➢ Analyze the ray tracing process and apply on case studies**.**

Unit I:
Overview of computer graphics – Display devices – Output Primitives – Points and Lines – Line drawing algorithms – Circles and ellipse generating algorithm- Other Curves.

Unit II:
Introduction to attributes - Attributes of output primitives- line – curve – area – character attributes - Color filling – filled area primitives – fill area functions - Character Generation.

Unit III:
Introduction to Transformations-2D affine Transformations-Two-Dimensional Transformation-Transformation-Matrix representation and homogeneous co-ordinates

Unit IV:
3 D Concepts – 3 D co-ordinates systems – 3D display techniques – 3D transformations – 3D viewing – Windowing and Clipping – Projection

Unit V:
Introduction to Ray Tracing-Ray tracing process-Ray tracer Application-Antialiasing Ray Tracing-reflections and transparency- case studies.

Text book:
1. Computer Graphics, Rajiv Chopra, S. Chand, 4th edition, 2011.

Reference books:
1. Computer Graphics, Donald Hearl, Pauline Baker M., Prentice Hall of India, New Delhi, 2nd edition, 2005.
2. William Newman, Sproul F, Principles of Interactive Computer Graphics Prentice Hall of India,2003.
3. John F Koegel Buford – Multimedia Systems – Pearson Education 2001.
4. Computer Graphics, ShaliniGovil-Pai, Springer (India) Private Limited, 2007.

Web Sites:
1. www.4twk.com/shill/3rd-edition.html.
2. www.tutorialspoint.com/computer_graphics.
3. www.inf.ed.ac.uk/teaching/courses/cg/Web/intro_graphics.pdf.
4. www.coursera.org/learn/interactive-computer-graphics.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					6
CO2		2				
CO3			3			
CO4				4		
CO5					5	

BCA 2546   **Java Programming**   **5hrs/5cr**

The Objective of this course is to introduce the programming techniques in Java, java applet, awt, multithreading, io streams, database connectivity and swing components also to enrich the creativity of GUI applications using java.

Upon completion of the course the students will be able to

  ➢ Identify the structure and fundamentals of the Java programming language
  ➢ Apply the concepts of Class, packages and exceptions in Java
  ➢ Understand the Java IO Streams and thread concept.
  ➢ Analyze the awt concept, applets in Java program.
  ➢ Construct a swing and jdbc concepts to demonstrate it.

Unit I:
Java Fundamentals -Features of Java-OOPs concepts-Java virtual machine-Reflection byte codes -Byte code interpretation-Data types, variable, arrays, expressions, operators, and control structures Objects and classes.

Unit II:
Java Classes-Abstract classes-Static classes-Inner classes-Packages-Wrapper classes-Interfaces-This –Super-Access control - Exception handling - Exception as objects-Exception hierarchy- Try catch finally- Throw, throws.

Unit III:
IO package -Input streams-Output streams-Object serialization-Deserialization-Sample programs on IO files-Filter and pipe streams - Multi threading- Thread Life cycle-Multi threading advantages and issues-Simple thread program-Thread synchronization-Inter Thread Communication.

Unit IV:
GUI-Introduction to AWT programming -Layout and component managers-Event handling-Applet class- Applet life-cycle-Passing parameters embedding in HTML.

Unit V:
Swing components – JApplet, JButton, JFrame, etc.Database Connectivity-JDBC architecture-Establishing connectivity and working with connection Interface-Working with statements-Creating and executing SQL statements-Working with Result Set.

Text book:
   1. Programming with Java A Primer, E. Balaguruswamy Tata McGraw Hill,5th Edition , 2017

Reference books:
   1. Java - The Complete Reference ,Herbert Schildt , McGraw Hill Education; Tenth edition,2017
   2. Core Java: An Integrated Approach, New: Includes All Versions upto Java 8 ,R. NageswaraRao,Dreamtech Press ,2016
   3. Java Programming: A Beginners Guide to Learning Java, Troy Dimes, Create Space Independent Publishing Platform,2015.

Web Sites:
1. www.tutorialspoint.com/javaexamples.
2. www.vogella.com/tutorials/JavaIntroduction/article.html.
3. www.udemy.com/java-tutorial.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2			3			
CO3		2				
CO4				4		
CO5						6

BCA 2448   **Java Laboratory**   **4hrs/4cr**

To be knowledgeable enough about basic Java language syntax and to be able to
Successfully read and write Java computer programs.

Upon successful completion of this lab course, students will be able to

➢ Recall the basic concept of Java programming
➢ Understand Java classes from specifications and effectively create and use objects
   from predefined class libraries
➢ Apply decision and iteration control structures to implement algorithms
➢ Evaluate interfaces, inheritance, packages, exceptions
➢ Creating java database connectivity program using applet and swing concept

PROGRAMS:

1. Programs using constructor and destructor.
2. Creation of classes and use of different types of functions.
3. Count the number of objects created for a class using static member function.
4. Concept of interface.
5. Concept of package.
6. Function overloading.
7. Concept of inheritance.
8. IO streams & Files.
9. Exception handling mechanism.
10. AWT
11. Swing.
12. Event handling.
13. JDBC.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4					5	
CO5						6

BCA 3641   **Computer Networks**   **6hrs/6cr**

This course is to impart a basic understanding of how computers communicate using different devices and protocols.

Upon completion of the course the students will be able to

- ➢ Recall the basic of networks, internal components and its functionality
- ➢ Understand the transmission of data through wired and wireless mediums
- ➢ Illustrate the IP datagrams, address and Protocol mapping
- ➢ Compare and contrast the concept of TCP , UDP protocols
- ➢ Classify the working of real time applications of networking such as email, DNS, File transfer etc

Unit I:
Network Fundamentals: Uses of Computer networks Transmission Media - Classification of Networks - Network Topology - Transmission technology-Transmission Modes – Network models- OSI Reference model –TCP / IP model.

Unit II:
Physical layer: Data and Signals- Data Encoding – Multiplexing and Switching- Data link layer – Data link control- Error detection and correction – Block coding - wired LANs-Wireless LANs – IEEE 802.11 – Bluetooth-Wireless WANs.

Unit III:
Network Layer: IP Datagrams-IP address- IPV4 Addresses – IPV6 Addresses - Internet Protocol- Address Mapping - ICMP- IGMP – Delivery, Forwarding and Routing.

Unit IV:
Transport Layer: Process to Process delivery - Connection establishment -User Datagram Protocol –Transmission control protocol -Congestion Control – Flow Control.

Unit V:
Application Layer – Domain Name System Remote Logging, Electronic Mail and File Transfer- WWW and HTTP-Network Management: SNMP – Multimedia.

Text book:
1. Computer Networks Hardcover, Andrew S. Tanenbaum , David J.Wetherall 2010.

Reference books:
1. Data communication and Networking, Behrouz A Forouzan, 2nd Edition 2014.
2. Computer Networks, 5th Edition, A Systems Approach, Peterson & Davie, 2011
3. Computer Networking: Principles, Protocols and Practice Release 0.25, Olivier Bonaventure, the Saylor Foundation, 2011.
4. Internetworking with TCP/IP Volume One, 6/E, Douglas E. Comer, 2014.

Web Sites:
1. www.elsevier.com /Browse journals/Computer Networks
2. en.wikipedia.org/wiki/Computer_network
3. www.techtutorials.net

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4					5	
CO5				4		

BCA 3643 **Python Programming (4T+2L)** **6hrs/6cr**

This course is to enable the students to learn program and concepts acquiring programming skills in python. It covers expressions, variables, functions, logic, and conditionals, which are foundational concepts, File Handling and Regular Expressions.

Upon successful completion of the course the students will be able to

- ➢ Remember the basic concepts of Python scripting language for developers
- ➢ Apply the basics of python programming such as datatypes, variables, control statements
- ➢ Understand functions in Python Language
- ➢ Create and learn how to use files in Python applications
- ➢ Evaluate implementation of oops concepts and GUI programming

Unit I:
History of Python–Features of Python – working with Python – Basic Syntax – input / output functions - Variables and data types – operators- conditional and control statements – looping statements.

Unit II:
String Manipulations – Access Strings – Basic Strings – String Slices – Functions and Methods-List, Tuples, Dictionaries – Operations – working with list- functions and methods.

Unit III:
User Defined function – defining function-calling function-types of functions – arguments – anonymous functions – global and local variables- modules- importing module -Math module - Random module -   Packages - Composition

Unit IV: File handling - Opening and closing file -Reading and writing files – file handling functions - Exception Handling -   Except clause -Try finally clause -User Defined Exceptions

Unit V:
Oops concept - class and object – attributes – Inheritance – Overloading – Overriding – Data hiding - Regular expressions-Match function-Search function - Matching VS Searching – Database – GUI Programming

Text Book:
1. Introduction   to   Computing   and   Problem   Solving   Using   Python, Balagurusamy,McGraw Hill Education India Private Limited; First edition ,2017

Reference books:
1. Think Python: How to Think Like a Computer Scientist, Allen B. Downey, Updated for Python 3, Shroff/O'Reilly Publishers,2nd edition, 2016.
2. Core Python Programming , R. NageswaraRao ,Dreamtech Press,2016
3. An Introduction to Python – Revised and updated for Python 3.2, Guido van Rossum and Fred L. Drake Jr, Network Theory Ltd., 2011

Websites:
1. www.learnpython.org
2. www.codecademy.com/learn/learn-python

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4						6
CO5					5	

BCA 3645   **Internet Technology**   **6hrs/6cr**

This course will make the students to understand surfing the web and trying to figure out how specific functionality is brought to a website and molds the student to learn and develop various PHP technology applications which definitely will meet the current industry need.

Upon successful completion of the course the students will be able to

> ➢ Analyse a web page and identify its elements and attributes.
> ➢ Apply mark-up languages for processing, identifying and presenting, also to use scripting languages to add interactive components to web pages
> ➢ Evaluate the concept of JSON and PHP basics
> ➢ Create mysql database using PHP programs.
> ➢ Understand the XML syntax, attributes etc.,

Unit I:
Introduction to HTML - Basic tags- Formatting: images, lists, Tables, Frames, Links, Form. Styling with Classes- Styling with IDs.CSS - The Presentation Semantics- CSS Properties- Types of Style Sheets

Unit II:
JavaScript with HTML- Variables, Operators, Expressions, Arrays - Handling Loops & Decision structures - Understanding jQuery-Selectors- Event Manipulation Methods- Sliding, Easing, Fading, Toggling - jQuery and AJAX calls.

Unit III:
Introduction to JSON- Overview of PHP –Data types –Variables –Expressions –control and Structure – functions –classes and objects –arrays –simple and multiple Dimensional arrays.

Unit IV:
Using Mysql in PHP- Connection to a Data base – Listing DB –Displaying DB Tables – inserting a row of data using forms in PHP – Using Images –Mail management – File management.

Unit V:
Introduction to XML – How to use XML –XML syntax –XML elements- XML attributes – Displaying XML Files – Working with XSL –Web Application Development using WordPress - Working with Code Igniter Framework.

Text book:
1. Web Technologies--A Computer Science Perspective, Jeffrey C. Jackson, Pearson Education, 2011.

Reference books:
1. Web design with HTML, CSS, JavaScript and jQuery set, John Duckett, Wiley, 2014.
2. HTML Complete reference,Powell A.T., TataMcgrawHillPublications , 3rdedition(2000).
3. The complete Reference Java Script,PowellA.T.TataMcgrawHill Publications 2nd edition,2004.
4. PHP and MySql web Development, Luke Welling, Laura Thomson, 5th edition, publisher: addison – Wesley professional, 2016.
5. HTML, XHTML and CSS Bible, Steven M.Schafer, 5th edition, Wiley –Eastern publishing Inc., 2011.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3					5	
CO4						6
CO5			3			

BCA 3547 **Internet Technology Laboratory** **5hrs/5cr**

To make the student learn a programming language and learn problem solving techniques.

Upon completion of the course, the students will be able to

- Identify the basic tags in HTML
- Design their own website using PHP, MySQL
- Discuss the XML syntax, attributes etc
- Evaluate the form validation
- Compare and contrast the concept of JSON and PHP

PROGRAMS:

1. HTML Basic Tags.
2. Example for Table Tag.
3. HTML Formatting Tags.
4. HTML Frame.
5. HTML Input Tags.
6. Image Map.
7. Style Sheet-XSL,CSS.
8. Form Validation.
9. MYSQL Commands (DDL, DML, TCL, DCL).
10. PHP Program with Data base Connectivity.
11. Cookies.
12. Session Object.
13. Error Object.
14. XML

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1				5	
CO2		2				6
CO3			3			
CO4				4		
CO5				4		

BCA 3200   **Environmental Studies**   **3hrs/2cr**

Creating awareness among the students about the importance of environment, the
Effect of technology on the environment and ecological balance is the prime aim of the
course

Upon successful completion of the course the students will be able to

➢ Recall the environmental system its issues and awareness
➢ Understand ecosystem, biodiversity, pollution
➢ Classify the energy sources
➢ Compare and contrast types of pollution
➢ Illustrate about the e-waste management

Unit I :
Introduction – Terms and Definitions – Scope and history of Ecology - Ecosystem – Types
and functions of structural components (i) A-biotic-atmosphere-lithosphere-hydrosphere –
light and temperature (ii) Biotic-Organisms –tropic levels – and interactions among
organisms -food chains – food-web-ecological pyramids and energy flow.

Unit II:
Bio diversity: definition –genetics-species and ecosystem diversity-biodiversity at global
national and local levels- conversation methods (in situ and ex situ)-patents-bio safety
protocol- Role of technology in environmental protection.

Unit III:
Energy sources: renewable and non-renewable energy sources. Renewable: energy from
biomass-gobar glass plant-solar-wind-water-tidal energy. On-renewable energy: fossil fuels-
coal-crude oil and natural gas-oil (shale –tar –sands)-nuclear energy-geothermal energy ocean
thermal energy-bio fuels.

Unit IV:
Environmental surveillance: pollution types -air pollution: global warming-ozone hole –
smog and CFC –water pollution: BOD-COD-eutrophication-thermal pollution -noise
pollution-nuclear pollution- sources of radiation- solid waste pollution- pollution control-
water treatment and waste management - remote sensing.

Unit V:
e-waste – toxic constituents – pollution problems – health impact of hazardous waste – reuse
and recycling – collection process - separation process - e-waste recycling act – e-waste
policy for India – Computer uses and impact on Health.

Text book:
1. Environmental Studies from crisis to cure, R. Rajagopalan, 3rd edition, 2015.

Reference books:
1. Environmental bio technology- industrial pollution management Enger, ED and
    ROSS, Tata McGraw hill Publishing, 2000.
2. Essentials of ecology and environmental sciences, Jogdand.N, Himalaya publishing
    house, Bombay, Rana, SVS Prentice Hall of India Pvt.Ltd, 2003.

3. Enger, ED and ROSS, concepts in biology, Tata McGraw hill Publishing, 2000.
4. Environmental bio technology- industrial pollution management,Jogdand. N, Himalaya publishing house, Bombay, 2000.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3			3			
CO4					5	
CO5				4		

BCA 3243   **Cyber Security (4T+2L)**   **3hrs/2cr**

This course is to familiarize students with the basic problems of information systems security, various categories and kinds of cyber-crimes. It includes the risks of information systems in the context of confidentiality, integrity and availability of information security policy development and issues system

Upon successful completion of the course the students will be able to

> ➢ Define computer network and information security needs of an organization
> ➢ Understand the information systems security, various categories and kinds of cyber-crimes
> ➢ Analyze on cyber terrorism and the challenges in our nation
> ➢ Illustrate the cyber security risk management policies
> ➢ Describe the intellectual property and their issues

Unit I:
History of Internet -Internet Addresses   - DNS   - Internet Infrastructure   -   World Wide Web - Classification of Cyber Crimes - Reasons for Commission of Cyber Crimes Management of Cyber security Risks, Threats – Vulnerabilities – Impacts, Federal Role - Federal Spending Legislative Proposals and Actions

Unit II:
Cyber-attacks: the evolution of modern warfare - malware And Its Type - Kinds of Cyber Crime - Authentication - Encryption - Digital Signatures   - Antivirus - Firewall - Steganography   - Computer Forensics

Unit III:
Cyber terrorism – Method of attack – tools for Terrorism – Challenges to India's National security – existing cyber security initiatives - challenges and concerns

Unit IV:
Cyber security in India present status – national cyber security policy – Indian cyber space – private public partnership – R & D in the field of Cyber Security.

Unit V:
Intellectual property issue areas – cyber law issue – practice settings – career narratives – preparing for a career in Intellectual property or cyber law – fellowship & other Opportunities.

Text Book:
1. AvantikaYadav, "Cyber Security", Narosa publishing House Pvt., Ltd., New Delhi, 2017

Reference books:
1. Introduction to Cyber Security, JeetendraPande, Dr. JeetendraPande, Assistant Professor- School of CS & IT, Uttarakhand Open University, Haldwani, 2015
2. Cyber security Issues and Challenges: In Brief Eric A. Fischer Senior Specialist in Science and Technology August 12, 2016.
3. Intellectual property and cyberlaw, Joan Ruttenberg, 2013
4. James Graham, Cyber Security Essentials, Taylor and Francis Group, LLC, 2011

Websites:
1. www.tutorialspoint.com/information_security_cyber_law/information_security_cyber _law_tutorial.pdf

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3				4		
CO4			3			
CO5		2				

BCA 3642   **Big Data Analytics (4T+2L)**   **6hrs/6cr**

This course Big Data Analytics largely involves collecting data from different sources, Optimize business decisions and creates competitive advantage with Big Data analytics, Preparing for data summarization, query, and analysis. Applying data modeling techniques to large data sets, creating applications for Big Data analytics, Building a complete business data analytic solution

Upon successful completion of the course the students will be able to

- ➢ Recite the knowledge of big data analytics
- ➢ Classify the problem definition based on data and deep analytics
- ➢ Understand R Language for handling Big data
- ➢ Apply technical skills in R for predicative and prescriptive modelling
- ➢ Develop various graphic tools for data representation

Unit I:
Introduction to Big Data Analytics- Overview - State of the Practice in Analytics - Data Analytics Lifecycle – Discovery - Data Preparation - Model Planning - Model Building.– Communicate results – Operationalize.

Unit II:
Big Data Analytics – Problem definition – Data Collection – Cleansing Data – Summarizing Data – Data Exploration – Data Visualization, Sources of Big Data , Big Data Analytics Tools - open source big data analysis tools

Unit III:
Introduction to R- R Graphical User Interface – Features of R – Basic Syntax – data types – variables – Operators - Decision Making – Loops – Function - Strings

Unit IV:
R Vectors – Lists – Matrices – Arrays – Factors – Data Frames, Importing csv files, Excel files, Binary files, xml file

Unit V:
An Introduction to Graphics - Basic Plotting Tools - Plot Function, par Function, Pie Chart ,Bar Chart, Box plots, Histograms, Line Graphs, Scatter plots.

Text Book:
1. Big Data and Analytics, SeemaAcharya, Wiley India Pvt.Ltc. New Delhi, 2015

Reference Books:
1. DT Editorial Services, "Black Book- Big Data (Covers Hadoop 2, MapReduce, Hive, Yarn, PIG, R, Data visualization)", Dream tech Press edition 2016.
2. Data Science & Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data Published by John Wiley & Sons, Inc.2015.
3. Garrett Grolemund, Hands – On Programming with R, O'Reilly Media Inc., 2014
4. SudhaG.Purohit, "Statistics using R", Narosa publishing House Pvt., Ltd., New Delhi, 2015

Web Sites:
1. www.tutorialspoint.com/big_data_analytics/index.htm
2. www.tutorialspoint.com/r/r_tutorial.pdf
3. pig.apache.org/docs/r0.7.0/tutorial.html

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2				4		
CO3		2				
CO4			3			
CO5						6

BCA 3644   **Fundamentals of Linux (4T+2L)**   **6hrs/6cr**

This course is to provide Students a comprehensive overview of the Linux operating system along with Shell commands and shell scripting, Implementation of Linux System programs through GCC compiler, Understanding of basic concept of Socket programming (TCP and UDP).

Upon successful completion of the course the students will be able to

- Recall the features and administration of Linux
- Understand the Linux commands and KDE desktop
- Illustrate the common applications in Linux
- Describe the resource management and system calls
- Use GTK tools and to perform programs using awk commands

Unit I:
Linux – The Operating System: Linux history, Linux features, Linux distributions, Linux's relationship to UNIX, Overview of Linux architecture, Installation, Startup scripts, system processes - Linux Security - File systems: General Characteristics of File system, file permissions. User Management: Types of users, The powers of Root, managing users (adding and deleting): using the command line & GUI tools.

Unit II:
Getting started with the desktop-logging in to linux getting familiar with the desktop-using the KDE desktop -using linux commands-the shell interface-understanding the linuxshell – using the shell in linux –working with the linux file system.

Unit III:
Accessing and publishing in linux –finding common application in linux – other word processors –working with graphics -Multimedia in linux –Tools for using internet and the web –browsing the web –instant messaging with gain.

Unit IV:
Resource Management in Linux: file and directory management, system calls for files Process Management, Signals, IPC: Pipes, FIFOs, System V IPC, Message Queues, system calls for processes, Memory Management, library and system calls for memory. Red hat package manager, RPM commands.

Unit V:
Introduction to GTK – tools – commands – GTK basic programming – awk programming - Networking in LINUX: Socket Introduction, Elementary TCP Sockets (Socket Function, Connect Function, Bind, Listen, Accept, Fork and Exec), TCP Client server Example, Elementary UDP Sockets.

Text Book:
1. Linux Bible, Christopher Negus, 9th Edition,2015.

Reference books:
1. Linux Programming by Examples of the Fundamentals, Arnold Robbins, Pearson Education, 2nd Edition, 2008.
2. Red Hat Linux Administrator's Guide, Cox K, PHI, 2009.
3. UNIX Network Programming, R. Stevens, PHI, 3rd Edition, 2008.
4. Beginning Linux Programming, Neil Mathew & Richard Stones, Wiley Dreamtech India,4th Edition,2008.

Web Sites:
1. www.linuxtopia.org
2. www.advancedlinuxprogramming.com
3. how-to.linuxcareer.com/c-development-on-linux-introduction.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2		2				
CO3				4		
CO4		2				
CO5			3			

BCA 3646   Fundamentals of mobile computing (4T+2L)   6hrs/6cr

The course facilitates to understand the theory as well as practical knowledge of mobile computing using android.

Upon successful completion of the course the students will be able to

> ➢ Remember the basic concepts of mobile communications and the devices
> ➢ Understand the architecture and the features of android OS
> ➢ Create applications using android
> ➢ Applying suitable layout and managing layouts
> ➢ Compare and contrast on the various views

Unit I:
Introduction to mobile computing – wireless transmission – signals – antennas –cellular wireless networks - Devices: Information Access Devices – Smart Identification – Smart Cards, Labels, Tokens, Smart Sensors and Actuators – Smart Appliances and Home Networking.

Unit II:
Introduction to mobile generations -Android-Android architecture -Features -Applications -Versions -Flavors-Building the project.

Unit III:
User Interface Architecture -Activity life cycle - Intents – Services – Content providers - UI Widgets – Text controls –Button controls – Toggle buttons – Menus – Options menu – Context menu – popup menu.

Unit IV:
Layout manager – Relative layout – Linear layout - Table layout – Grid layout – Adaptor – Array adaptor – ArrayList adaptor – Base adaptor – Lists.

Unit V:
View – Grid view – Web view – Scroll view – Search view – Dynamic list view – Expanded list view – Working with data storage – Shared preferences – Preferences activity – Files access – database connectivity using SQLite.

Text book:
1. Learning Android, Marko Gargenta, Masumi Nakamura, O'Reilly, 2nd edition, 2014.

Reference books:
1. Principles of Mobile Computing, UweHansmann, LotharMerk, Martin S.Nicklous and Thomas Stober , Springer Professional Computing, 2nd Edition, 2008.
2. Mobile Computing Theory and Practice, KumKumGarg, Pearson Education, illustrated edition, 2010.
3. Mobile Computing and Wireless Communications, Amjad Umar, NGE Solutions, 2004.

Web Sites:

1. www.edunotes.in/mobile-computing
2. www.tutorialspoint.com/android.
3. www.javapoint.com/android.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					6
CO2		2				
CO3			3			
CO4				4		
CO5					5	

BCA 3548   **Project**   **5hrs/5cr**

This course is to encourage the students to develop a Real Time Application for client with the guidance of internal and external faculty.

Upon successful completion of the course the students will be able to

- ➢ Identify the company's software technology and methodologies
- ➢ Develop the software projects by understanding the client requirement
- ➢ Evaluate and analyze the SDLC, understand software design, coding techniques and software testing principle
- ➢ Analyze a given problem and develop an algorithm to solve the problem
- ➢ Implement the various programming languages like C, C++, VB. Net, Java Construct in the right way

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2						6
CO3					5	
CO4			3			
CO5						6

Evaluation Pattern:
Internal (3 Presentations)   - 75 marks
External (Final Presentation and Viva Voce) - 25 marks

BCA 3244 **Advanced Excel (2T+1L)** **3hrs/2cr**

This course is designed to provide the use of advanced graphs and presentation techniques to maximize impact, use macros and VBA automate your spreadsheets and increase interactivity, Using PivotTables and Power Pivots to turn raw data into clear information that supports key decisions.

Upon successful completion of the course the students will be able to

- ➢ Identify the different windows of the spread sheet program
- ➢ Classify the sort, filter and pivot table
- ➢ Compare and contrast the data tab in worksheet
- ➢ Develop macros and understand importance of it
- ➢ Understand the various ways of customizing ribbon in excel

Unit I:
Introduction to Excel - Formulas with Multiple Operators - Inserting and Editing a Function - Auto Calculate and Manual – Calculation - Defining Names - Using and Managing Defined Names - Displaying and Tracing Formulas – Database Functions - Using Lookup Functions (VLOOKUP) - User Defined and Compatibility Functions – Financial - Date & Time - Math & Trig - Statistical.

Unit II:
Sorting by One Column, Colors or Icons - Multiple Columns - a Custom List - Filtering Data - Creating a Custom AutoFilter - Using an Advanced Filter - Creating a PivotTable - Specifying PivotTable Data   Changing a PivotTable's Calculation -   Filtering and Sorting a PivotTable -   Working with PivotTable Layout - Updating a PivotTable -   Formatting a PivotTable -   Creating a PivotChart.

Unit III:
Working with Data Tables -   Using Goal Seek – Text to Columns -   Grouping and Outlining Data - Using Subtotals - Consolidating Data by Position or Category - Consolidating Data Using Formulas - Working with the Web and External Data - Inserting a Hyperlink -   Importing Data from an Access Database or Text File -   Importing Data from the Web and Other Sources.

Unit IV:
Working with Macros - Recording a Macro - Playing and Deleting a Macro - Adding a Macro to the Quick Access Toolbar - Editing a Macro's Visual Basic Code - Inserting Copied Code in a Macro - Declaring Variables and Adding Remarks to VBA Code - Prompting for User Input - Using the If…Then…Else Statement.

Unit V:
Customizing the Ribbon - Customizing the Quick Access Toolbar - Using and Customizing AutoCorrect - Changing Excel's Default Options - Creating a Custom AutoFill List - Creating a Custom Number Format.

Text book:
1. Excel 2013 Bible, Walkenbach, Illustrated, John Wiley & Sons, 2013

Reference Books:
1. Excel 2013 Formulas, Walkenbach, John Wiley sons, 2013
2. Business Math Using Excel, Sharon Burton, Nelda Shelton, Cengage Learning, 2011.
3. Excel Dashboards and Reports, Michael Alexander, Walkenbach, John Wiley & sons, 2013

4. Advanced Regression in Excel – The Excel Statistical Master, Mark Harmon, 2011.

Web Sites:
      1.   chandoo.org/wp/excel-basics
      2.   www.gcflearnfree.org
      3.   support.office.com/.../Excel-2013-training-courses.

Bloom's Taxonomy	K1	K2	K3	K4	K5	K6
CO1	1					
CO2				4		
CO3					5	
CO4						6
CO5		2				