

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	18UCS518	Title:	Batch :	2018-2021
		Core XII: Kotlin	Semester:	V
Hrs/Week:	4	programming	Credits:	03

Course Objective

On successful completion of this course, the students will be able to understand the kotlin programming concepts, to develop multi- platform applications and hands on practices by applying these concepts to implement in both mobile and web based applications.

Course Outcomes (CO)

K1	CO1	To remember the coding conventions used for kotlin programming.
K2	CO2	To get an idea about classes, objects, properties, fields and interfaces of kotlin.
K3	CO3	To deploy multi-platform mobile and web based applications.
K4	CO4	To analyze the composition of suspending functions.
K5	CO5	To validate the execution of applications on various platforms.

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Overview-Using Kotlin for Server-side Development - Using Kotlin for Android Development - Kotlin JavaScript Overview - Kotlin/Native for Native - Kotlin for Data Science - Coroutines for asynchronous programming and more - Multiplatform Programming. Getting Started : Basic Syntax – Idioms - Coding Conventions. Basics: Basic Types – Packages - Control Flow: if, when, for, while - Returns and Jumps.	13
Unit II	Classes and Objects : Classes and Inheritance - Properties and Fields – Interfaces – Visibility Modifiers – Extensions - Data Classes - Sealed Classes – Generics - Nested and Inner Classes - Enum Classes - Object Expressions and Declarations - Inline classes – Delegation - Delegated Properties. Functions and Lambdas : Functions - Higher-Order Functions and Lambdas - Inline Functions.	13
Unit III	Collections : Kotlin Collections Overview - Constructing Collections – Iterators - Ranges and Progressions – Sequences - Collection Operations Overview - Collection Transformations – Filtering - plus and minus Operators – Grouping - Retrieving Collection Parts - Retrieving Single Elements - Collection Ordering - Collection Aggregate Operations - Collection Write Operations - List Specific Operations - Set Specific Operations - Map Specific Operations.	13
Unit IV	Coroutines : Coroutine Basics - Cancellation and Timeouts - Composing Suspending – Functions - Coroutine Context and Dispatchers - Asynchronous Flow – Channels - Exception Handling - Shared mutable state and concurrency - Select Expression.	13
Unit V	Multiplatform Programming : Platform-Specific Declarations - Building Multiplatform Projects with Gradle: Project Structure - Setting up a Multiplatform Project - Gradle Plugin - Setting up Targets - Configuring Source Sets - Default Project Layout - Running Tests - Publishing a Multiplatform Library - Java Support in JVM Targets - Android Support - Using Kotlin/Native Targets.	13
	Total Hours	65

	<i>*Italicized texts are for self study</i>	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	“Kotlin 1.3 Language Documentation”, https://kotlinlang.org/docs/kotlin-docs.pdf , Kotlin official website	
REFERENCES	1. Ken Kousen, “Kotlin Cookbook”, First Edition, 2019, O'Reilly Media, Inc., ISBN: 9781492046660 2. David Griffiths, Dawn Griffiths, “Head First Kotlin”, First Edition, 2019, O'Reilly Media, Inc., ISBN: 9781491996683	

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	18UCS519	Title :	Batch :	2018-2021
Hrs/Week:	4	Core XIII: Cyber Security	Semester:	V
			Credits:	02

Course Objective

This course provides students with concepts of computer security, cryptography, digital money, secure protocols, detection and other security techniques. Upon the completion of this course, students should be able to understand, appreciate, employ, design and implement appropriate security technologies and policies to protect computers and digital information.

Course Outcomes (CO)

K1	CO1	Evaluate the computer network and information security needs of an organization.
K2	CO2	Assess cyber security risk management policies in order to adequately protect an organization's critical information and assets.
K3	CO3	Troubleshoot, maintain and update an enterprise-level information security system.
K4	CO4	Implement continuous network monitoring and provide real-time security solutions.
K5	CO5	Formulate, update and communicate short- and long-term organizational cyber security strategies and policies.

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Why Network Security is needed – Management principles – Security principles - Network management - Security attacks – Qualities of a Good Network. Organizational Policy and Security: Security policies, Standards and Guidelines – Information Policy – Security Policy - Physical Security – Social Engineering – Security Procedures – Building a Security Plan. Security Infrastructure: Infrastructure Components – Goals of Security Infrastructure – Design Guidelines – Security Models	10
Unit II	Cryptography: Terminology and background – Data Encryption Methods – Cryptographic Algorithms- Secret Key Cryptography - Public key cryptography – Message Digest – Security Mechanisms. Database Security: Introduction to Database – Characteristics of a Database Approach – Database Security Issues - Database Security – Vendor-Specific Security – Data Warehouse Control and Security	10

Unit III	Intrusion Detection Systems: What is not ad IDS – Infrastructure of IDS – Classification of Intrusion Detection Systems – Host-Based IDS – Network-Based IDS - Anomaly Vs Signature Detection – Manage an IDS – Intrusion Detection Tools – IDS Products and Vendors. Network Security: Fundamental Concepts – Identification and Authentication – Access Control – A Model for Network Security – Malicious Software – Firewalls	11
Unit IV	Network Management: Goal of Network Management – Network Management Standards – Network Management Model – Infrastructure for Network Management - Security Management: Security Plan - Security Analysis - Change Management - Disaster Recovery - Systems Security Management - Protecting Storage Media- Exchanges of Information and Software – Security Requirements of Systems.	11
Unit V	Electronic Mail Policy: Electronic Mail – What are the E-mail threats that organization's face - Why do you need an E-mail Policy - How do you create an E-mail Policy - Publishing the E-mail Policy - University E-mail Policy. Security of Internet Banking Systems: Introduction Banking System – Security Problem – Methodology for Security Problem – Schematic flow of Internet Banking – A layered approach to security.	10
	Total Contact Hrs	52
	<i>*Italicized texts are for self study</i>	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1. Brijendra singh ,Network Security and Management, PHI, 2007	
REFERENCES	.1. Rick Howard, “Cyber Security Essentials” Auerbach Publications 2011.	

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	18UCS5S2	Title :	Batch :	2018-2021
		Skill Based Elective -I:	Semester:	V
Hrs/Week:	1	Dream Weaver	Credits:	02

Course Objective

The objective of this course is to train the students to use a friendly interface for creating and editing the web pages using HTML, XML, CSS, and JavaScript.

Course Outcomes (CO)

K3	CO1	To apply the different controls in dreamweaver for creating a webpage
K4	CO2	To analyze the markup languages and using them based on the requirements
K5	CO3	To validate the webpage using javascript

Syllabus

Units	Contents	Hrs						
	SET A - To create a picture gallery. - To create a template. - To create CSS text rollovers. - To create Mailto Links. - To create small pop-up windows for ads or news. SET B - To create a website. - To create a link to different pages from the same image. - To create customizing input boxes, list menus, submit buttons. - To create a webpage using internal and external CSS. - To create links without an underline using CSS Styles. EXTERNAL MARK (50 Marks) <table><tr><td>Record Note</td><td>10 Marks</td></tr><tr><td>Set A</td><td>20 Marks</td></tr><tr><td>Set B</td><td>20 Marks</td></tr></table>	Record Note	10 Marks	Set A	20 Marks	Set B	20 Marks	13
Record Note	10 Marks							
Set A	20 Marks							
Set B	20 Marks							

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	18UCS622	Title	Batch :	2018-2021
		Core XIV: Python Programming	Semester	VI
Hrs/Week:	4		Credits:	03

Course Objective

On successful completion of this course the students should understand the core principles of the Python Language and use the tools to produce well designed programs in python and create effective GUI applications.

Course Outcomes (CO)

K1	CO1	To remember the principles of structured programming and to understand basics of python.
K2	CO2	To understand the common programming idioms: variables, loop, branch, subroutine, and input/output
K3	CO3	To deploy the concepts of functions, standard libraries, modular programming and the design of user interfaces
K4	CO4	To figure out ability to analyze and solve the problems using advanced facilities of the Python Language
K5	CO5	To evaluate the object oriented features in python using functions and standard libraries.

Syllabus

Units	Contents	Hrs
Unit I	BASICS : Python - Variables - Executing Python from the Command Line - Editing Python Files - Python Reserved Words - Basic Syntax-Comments - Standard Data Types – Relational Operators - Logical Operators - Bit Wise Operators - Simple Input and Output.	10
Unit II	CONTROL STATEMENTS: Control Flow and Syntax - Indenting - if Statement - statements and expressions- string operations- Boolean Expressions - while Loop - break and continue - for Loop - Lists – Tuples - Sets - Dictionaries	11
Unit III	FUNCTIONS: Definition - Passing parameters to a Function - Built-in functions- Variable Number of Arguments - Scope – Type conversion-Type coercion-Passing Functions to a Function - Mapping Functions in a Dictionary – Lambda - Modules - Standard Modules – sys – math – time – dir - help Function.	10

Unit IV	ERROR HANDLING: Run Time Errors - Exception Model - Exception Hierarchy - Handling Multiple Exceptions - Data Streams - Access Modes Writing - Data to a File Reading - Data From a File - Additional File Methods - Using Pipes as Data Streams - Handling IO Exceptions - Working with Directories.	11
Unit V	OBJECT ORIENTED FEATURES: Classes Principles of Object Orientation - Creating Classes - Instance Methods - File Organization - Special Methods - Class Variables – Inheritance – Polymorphism - Type Identification - Simple Character Matches - Special Characters - Character Classes – Quantifiers - Dot Character - Greedy Matches – Grouping - Matching at Beginning or End - Match Objects – Substituting - Splitting a String - Compiling Regular Expressions.	10
	Total Contact Hrs	52
	<i>*Italicized texts are for self study</i>	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1. Mark Summerfield. —Programming in Python 3: A Complete introduction to the Python Language, Addison-Wesley Professional, 2009. 2. Martin C. Brown, —PYTHON: The Complete Reference, McGraw-Hill, 2001.	
REFERENCES	1. Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist‘‘, 2nd edition, Updated for Python 3, Shroff/ O‘Reilly Publishers, 2016 2. Guido van Rossum and Fred L. Drake Jr, —An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011. 3. Wesley J Chun, —Core Python Applications Programming, Prentice Hall, 2012.	

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	19PCS313	Title	Batch :	2019-2021
		Angular JS	Semester	III
Hrs/Week:	4		Credits:	4

Course Objective

On successful completion of this course, students will be able to create dynamic web applications that depend on the Model-View-Controller architecture, and also to minimize the dependence on JavaScript requirement for functionalizing the web applications.

Course Outcomes (CO)

K1	C01	To recollect the fundamental concepts of javascript
K2	C02	To get the idea about AngularJS framework and Model View Controller(MVC)
K3	C03	To deploy the programs using filters, modules, controllers and directives
K4	C04	To review the various services and server communications
K5	C05	To validate the forms by using model binding

CONTENTS	Hours
UNIT I JavaScript: Introduction- Including Scripts on a Page- Statements- Functions- Parameters and Return Values- Types and Variables- <i>Primitive Types</i> - JavaScript Operators- Equality vs. Identity- Pre- vs. Post-Increment- Working with Objects: Creating Objects- Reading and Modifying an Object's Properties- Adding Methods to Objects- Enumerating Properties- Control Flow- Working with Arrays- Callbacks- JSON.	10
UNIT II AngularJS: Basics of AngularJS-Framework- Downloading and Installing AngularJS- Browser Support- First AngularJS Application- Declarative vs. Procedural Programming- Directives and Expressions- Introduction to MVC: Design Patterns- Model View Controller- Why MVC- MVC the AngularJS Way- Filters and Modules: Introduction to Filters- Built-in Filters- The Number Filter- The Date Filter- The limitTo Filter- AngularJS Modules- Bootstrapping AngularJS- Creating a Custom Filter	10
UNIT III Controllers : Defining Controllers- Creating and Applying Controllers – Scopes: Setting up the scope- Modifying the Scope- Directives: Basics of Directives- Using Directives- Built-in Directives- Event-Handling Directives- Creating a Custom Directive- Working with Forms: <i>HTML Forms Overview</i> - Model Binding- AngularJS Forms- Validating Forms	10
UNIT IV Services and Server Communication: Using Services- The \$window Service- The \$location Service- The \$document Service- Creating Services- Server Communication- Handling Returned Data- Organizing Views: Installing the ngRoute Module- Using URL Routes-	10

Defining Routes- Route Parameters- Eager vs. Conservative Routes- Route Configuration Options- HTML5 Mode.	
UNIT V AngularJS Animation: Installing the ngAnimate Module- CSS Animation Overview- Applying Animations- Deployment Considerations: Configuration- Testing- Error Handling- Hide Unprocessed Templates- Minification and Bundling- Managing the Build Process- Deployment.	10
Total Hours	50
<i>*Italicized texts are for self study</i>	
Power point Presentations, Seminar , Assignment, Brain storming	
Text Books 1. Andrew Grant, “Beginning AngularJS”, 1st Edition, Apress, 2014 2. Adam Freeman, “Pro AngularJS”, 1st Edition, Apress, 2014	
Reference Books 1. Brad Green and Shyam Seshadri , “AngularJS – Up and Running”, 2 nd Edition, O’ Reilly, 2014	

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS307	Title :	Batch :	2019-2022
Hrs/Week:	4	Core V: Java Programming	Semester:	III
			Credits:	04

Course Objective

The objective of this course is to make the students to understand the various features of Java such as Packages, Applets, AWT controls, Stream classes and Files and make the students to apply the same for writing the programs.

Course Outcomes (CO)

K1	CO1	To remember the OOPs concepts such as class, methods, inheritance, encapsulation and polymorphism etc.
K2	CO2	To understand the differences between application programs and applets, applet lifecycle and graphics programming.
K3	CO3	To implement programs using Thread, Applet and AWT controls like Text Fields, Buttons, Checkboxes, Radio Buttons and Layouts etc.,
K4	CO4	To evaluate java programs using stream classes and files.

Units	Contents	Hrs
Unit I	Java Evolution-Overview of Java Language-Constants, Variables & Datatypes-Operators & Expressions-Decision making & branching-Decision making & looping.	9
Unit II	Classes, Objects & methods- Arrays, Strings & Vectors-Interfaces: Multiple Inheritance-Packages: Putting classes together - Multithreaded Programming.	9
Unit III	Managing Errors & Exceptions- Applet Programming: Introduction-How Applets differ from application-Writing Applets-Building applet code- lifecycle-Executable Applet-Designing Web page-Applet tag-Adding & Running Applet using HTML File-Passing Parameters to Applets-Event Handling-Graphics Programming.	11
Unit IV	AWT: Labels, Buttons, Checkboxes, Radio Buttons(CheckBoxGroups), Choice and List Controls. AWT –Managing Scrollbars-TextFields-Text Areas. AWT: Layout Managers: FlowLayout- BorderLayout.	10
Unit V	Managing Input/Output in files in Java: Introduction-Concept of Streams-Stream Classes-Byte Stream classes-Character Stream Classes-Using Streams-Using I/O Classes, File Class-I/O Exceptions-Creation of Files-Reading/Writing Characters & Bytes-Handling primitive data types-Random Access Files-Interactive I/O-Other Stream Classes.	11
	Total Contact Hrs	50
	<i>*Italicized texts are for self study</i>	
	Power point Presentations, Seminar, Quiz and Assignment	

TEXT BOOKS	1.E.Balagurusamy,”Programming with Java – A Primer”, Tata McGraw Hill Publishing Company Limited, New Delhi, 5th Edition, 2014. 2. Herbert Schildt,”The Complete Reference-Java2”, Tenth Edition, TataMcGraw Hill Publishing Company Limited, New Delhi, 2017.
REFERENCES	1. Kogent Solutions Inc., “JAVA 6 Programming Black Book”, Dream TechPress , New Delhi, 2009 2. K.Somasundram, “Programming in Java2”, Jaico Publishing House, Chennai, 2005. 3. ISRD Group,” Introduction to Object Oriented Programming through Java”, Tata McGraw Hill Publishing Company, New Delhi, 2007.

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS3N1	Title :	Batch :	2019-2022
Hrs/Week:	1	Non-Major Elective Paper-I: Photoshop Lab	Semester:	III
			Credits:	02

Course Objective

The objective of this course is to make the students to gain a working knowledge of Photoshop and develop their skills in editing and altering photographs for through a basic understanding of the tool bar, layers, and the adjustments panel.

Course Outcomes (CO)

K3	CO1	To apply the different type of tools available in Photoshop to create simple applications.
K4	CO2	To interpret programs using various filters in Photoshop.
K5	CO3	To access the new tools for designing multi-layered applications.

Syllabus

Units	Contents	Hrs						
	SET A - Image Menu using Photoshop - Reduce Picture Size using Photoshop - Replace color in an image using Photoshop - Make a simple book cover by using basic functionalities using Photoshop - Transfer an object from one image to another and erase background using Photoshop - Add a pattern as background using Photoshop SET B - Create India Map using Photoshop - Retouching photos using Photoshop - Take a logo and modify it using Photoshop - Alter an image using filters using Photoshop - Special Effects-Color in black and white image using Photoshop - Special Effects-Feathered Portraits (Soft fade) using Photoshop EXTERNAL MARK (50 Marks) <table><tr><td>Record Note</td><td>10 Marks</td></tr><tr><td>Set A</td><td>20 Marks</td></tr><tr><td>Set B</td><td>20 Marks</td></tr></table>	Record Note	10 Marks	Set A	20 Marks	Set B	20 Marks	
Record Note	10 Marks							
Set A	20 Marks							
Set B	20 Marks							

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS3N2	Title :	Batch :	2019-2022
		Non-Major Elective Paper-I:	Semester:	III
Hrs/Week:	1	Advanced Applications in MS Excel Lab	Credits:	02

Course Objective

This course was designed for the intermediate student who has already mastered the basic skills and wants to gain more advanced skills to put to work in a business environment or for personal use.

Course Outcomes (CO)

K3	CO1	To apply the basic concepts of Excel such as mathematical function, Data function, text function
K4	CO2	To analyze the data using charts
K5	CO3	To validate the data using if statements.

Syllabus

Units	Contents	Hrs						
	SET A • In a new worksheet, create a table and insert information of student details. Use features of Format Menu. • Create employee table and calculate the salary. Use mathematical functions for the worksheet. • Create own templates in Excel. • Create and use data validation rules. • Create, manage, and format pivot tables and pivot charts. SET B • Create and write complex formulas. • Create and use IF statements. • Apply custom and prebuilt conditional formatting. • Work with functions to manipulate strings of text and data. • Create charts in excel EXTERNAL MARK (50 Marks) <table><tr><td>Record Note</td><td>10 Marks</td></tr><tr><td>Set A</td><td>20 Marks</td></tr><tr><td>Set B</td><td>20 Marks</td></tr></table>	Record Note	10 Marks	Set A	20 Marks	Set B	20 Marks	
Record Note	10 Marks							
Set A	20 Marks							
Set B	20 Marks							

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS412	Title :	Batch :	2019-2022
Hrs/Week:	4	Core V: .NET Programming	Semester:	IV
			Credits:	04

Course Objective

The course gives introduction to the .Net framework, library and various applications involved in it. It enables the students to learn and develop Windows and Web applications for the .NET platform.

Course Outcomes (CO)

K1	CO1	To remember the OOPs concepts such as class, objects, methods, Inheritance etc.
K2	CO2	To understand the concepts of the .NET framework as a whole and the technologies that constitutes the framework.
K3	CO3	To deploy various application oriented projects using ADO.NET
K4	CO4	To analyze industry defined problem and suggesting solution using .NET application.

Syllabus

Units	Contents	Hrs
Unit I	Introduction to .Net: .net framework- Introducing C#-Overview of C#-Literals, variables and data types-operators and expressions-Decision making and branching-decision making and looping-methods in C#-Arrays.	10
Unit II	Difference between VB6 and VB.Net-Object-Oriented programming and VB.Net-Data types-Variables-Operators-Arrays-Conditional logic.	9
Unit III	Procedures- Dialog boxes- File IO and System objects- Error handling- -Classes and Objects- Multithreading-Message Queue.	11
Unit IV	VB.Net IDE-Compiling and Debugging- Data access: ADO.Net- Visual studio .Net and ADO.Net. Windows Forms: Controls-Specific controls- Irregular forms.	11
Unit V	Vb.Net and web: Introduction to ASP.Net page framework- HTML server controls- Web controls- Validation controls- Events- State management- Tracing- Security.	9
	Total Contact Hrs	50
	<i>*Italicized texts are for self study</i>	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1.Bill Evjen, Jason Beres, et.al, Visual Basic .Net programming, Wiley Dreamtech India (p) Ltd. ISBN 81-265-0254-1. 2. E.Balaguruswamy “Programming in C#” McGraw-Hill publication,2012 Edition.	

REFERENCES	1. K- Steven Holzner “Visual Basic .NET Programming Black Book” 2005 Edition. 2. E.Balaguruswamy “Programming in C#” McGraw-Hill publication,2012 Edition. 3. Jeffrey R. Shapiro”VB.NET Complete Reference” McGraw-Hill Companies, 2002. 4. Mc Downell “ASP.NET complete reference”, 2007.
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Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS413	Title :	Batch :	2019-2022
		Core IX: Data Communication and Computer Networks	Semester:	IV
Hrs/Week:	4		Credits:	04

Course Objective

To enable the students to understand the concepts and principles of data communication and networking including topology, protocols, and types of networks.

Course Outcomes (CO)

K1	CO1	To remember the basic concepts Networks
K2	CO2	To get the idea on Connection-oriented and Connection-less networks
K3	CO3	To apply design principles and functionalities in OSI Reference Layers
K4	CO4	To analyze ISDN network, TCP/IP, etc.,

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Communications and Networking-fundamental concepts-Data communications-Protocols-Standards-Signal Propagation-Analog and Digital Signals-Parallel and Serial Communications-Simplex, Half-duplex and full duplex communications-Multiplexing-Transmission errors-Detection and Correction-Error classification-Delay Distortion-Attenuation-noise. Types of Error-Error Detection	9
Unit II	Transmission Media: Guided Media-Twisted Pair-Coaxial Cable-Optical fiber-Unguided Media –Microwave Communication-Satellite Communication–FDMA,CDMA,SDMA. Network Topology: Mesh Topology-Star Topology-Tree Topology-Ring Topology-Bus Topology-Hybrid Topology. Switching and Routing: Switching basics-Circuit switching-Packet switching-Message switching-Router and Routing.	11
Unit III	Networking protocols and OSI model-Protocols in Computer Communication-OSI Reference Models -Physical layer-Data link layer-Network layer-Transport Layer-Session Layer-Presentation Layer-Application Layer-Internet Layer.	9
Unit IV	Local Area Network (LAN) -Ethernet-Ethernet properties-CSMA/CD-Metropolitan Area Network (MAN)-Distributed Queue Dual Bus(DQDB)-Switched Multimegabit Data Services(SMDS)-Wide Area Network(WAN)-WAN Architecture	10
Unit V	Integrated Services Digital Network(ISDN)-ISDN Architecture -ISDN Interfaces-X.25 Protocol-Understanding and Working of X.25 protocol. TCP/IP: An Introduction to TCP/IP - Basics- IP Addresses-Logical Addresses-TCP/IP Example. ARP-RARP.	11
	Total Contact Hrs	50

	<i>*Italicized</i> texts are for self study	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	1 . Achyit S Godbole,”Data Communications And Computer Networks”, - TataMcGrawHill, FourteenthEdition, 2007. 2. William Stallings,” Data and Computer Communications”, PearsonEducation, Sixth Edition, 20	
REFERENCES	1. Andrew S. Tannenbaum,”Computer Networks”, Prentice hall of India, FourthEdition, 2003. 2. W.Stallings,”Data and Computer Communications”, Prentice hall of India, SeventhEdition, 2004.	

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS414	Title :	Batch :	2019-2022
Hrs/Week:	4	Core X:Software Engineering	Semester:	IV
			Credits:	04

Course Objective

The objective of this course is to make the students to learn all the software development approaches and design methodologies and usage of tools in software development process.

Course Outcomes (CO)

K1	CO1	To recollect basic software quality assurance practices to ensure that software designs, development, and maintenance meet or exceed applicable standards.
K2	CO2	To understand concepts of software process models, management activities, requirement gathering.
K3	CO3	To implement proficiency of quality in software development process.
K4	CO4	To review and manage software projects in designing, testing, cost estimation and risk management.

Syllabus

Units	Contents	Hrs
Unit I	Software and Software Engineering :Nature of software- Defining software, Software Application Domains, Legacy Software-, Software Engineering, The software process, Software Engineering practice – The essence of Practice, General Principles -, Software Myths. Process models: A generic process model – Defining a framework activity , identifying a Task Set, Process Patterns -	9
Unit II	Understanding Requirements: Requirements Engineering , Establishing the groundwork – Identifying Stakeholders, Recognizing multiple viewpoints, Working toward Collaboration, Asking the first questions, Eliciting requirements – Collaborative requirement gathering, Quality function Deployment, Usage Scenario, Elicitation Work Products , Developing use cases, building the requirements model – Elements of the requirements Model, Analysis pattern,Negotiating requirements, validating requirements. Requirement Modelling:Requirement Analysis, Data modelling concepts, Class-based modelling, Requirement modelling strategies, Flow oriented modeling.	9
Unit III	Design Concepts :Design within the context of Software Engineering, The design process – Software quality guidelines and attributes , The evolution of software design -, Design concepts – Abstraction, Architecture, <i>Patterns</i> , Separation of concerns, Modularity, information hiding, Functional Independence, refinement, Aspects, Refactoring, Object Oriented design concepts- Design classes , The design Model – Data Design elements, Architectural Design elements, Interface Design Elements, Component-Level Design elements, Deployment level Design elements.	11

Unit IV	Quality concepts: Introduction, Software quality, Achieving software quality, Review metrics and their use, Informal reviews, Formal technical reviews . Software Quality Assurance: SQA tasks, Goals and metrics, Formal approaches to SQA, Statistical Software quality assurance-A Generic example –six sigma for software Engineering, Software Reliability-Measures of Reliability and availability-software safety, SQA plan.	10
Unit V	Project Management concepts: The management spectrum. Estimation for software projects: The project planning process, Software project estimation, Decomposition techniques, Empirical estimation models, Project scheduling. Risk management: <i>Risk identification</i> , Risk projection, The RMMM plan.	11
		50
	<i>*Italicized texts are for self study</i>	
	Power point Presentations, Seminar, Quiz and Assignment	
TEXT BOOKS	Pressman S Roger, Software Engineering A Practitioner’s Approach, McGraw Hill, International Editions, 7th edition, 2014.	
REFERENCES	1. Somerville, Ian, Software Engineering, Addison Wesley,9th Edition, 2010. 2. Rumbaugh, James, Object Oriented Modeling and design,searson Education, New Delhi, 2005. Evaluation Pattern.	

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS4N1	Title :	Batch :	2019-2022
		Non-Major Elective Paper-II:	Semester:	IV
Hrs/Week:	1	Flash Lab	Credits:	02

Course Objective

The objective of this course is to make the students to learn about Macromedia Flash and develop their skills in creating animations and special effects by using the tools.

Course Outcomes (CO)

K3	CO1	To apply the various tools available in Flash for creating animations.
K4	CO2	To get the idea about timeline, frames and motion tweens.
K5	CO3	To validate the animations by running the test movies.

Syllabus

Units	Contents	Hrs						
	SET A • Bouncing ball using Flash • Volcano Eruption using Flash • Drawing and creating text with effects using Flash • Logo using Flash • Robot arm using Flash SET B • Rotating globe using Flash • Fog Effect using Flash • Lightning Effect using Flash • Animated Effect using Flash • Raining Effect using Flash EXTERNAL MARK (50 Marks) <table><tr><td>Record Note</td><td>10 Marks</td></tr><tr><td>Set A</td><td>20 Marks</td></tr><tr><td>Set B</td><td>20 Marks</td></tr></table>	Record Note	10 Marks	Set A	20 Marks	Set B	20 Marks	
Record Note	10 Marks							
Set A	20 Marks							
Set B	20 Marks							

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	19UCS4N2	Title :	Batch :	2019-2022
Hrs/Week:	1	Non-Major Elective Paper-II: Internet Applications Lab	Semester:	IV
			Credits:	02

Course Objective

To enable the students to know how to work with internet, the usage of internet and its applications.

Course Outcomes (CO)

K3	CO1	To Know about basic of internet
K4	CO2	To analyze the concept through online.
K5	CO3	To get idea about online applications.

Syllabus

Units	Contents	Hrs						
	SET A • Download a information about “Power of Indian president” from a website by using a search engine. • Select two electronics items by e-shopping. • Select mobile phone items by e-shopping. • Book Online train Tickets from coimbatore to Chennai. • Using Search Engine download information on “Benefits of Yoga”. • Open an email account in your names in gmail/yahoomail/hotmail. • Write e-mail to Pradeep by marking a blind copy to Priya. • Download information about “greatness of Himalayas for tourism interest” in powerpoint presentation. • Create an electronic greeting card with personal remarks and pictures. SET B • Download information about greatness of Himalayas for tourism interest. • Write a congratulating letter to your friend on his promotion using mail. • Download research articles on “Information technology Applications” and save as doc. Files. • Download m.phil application form in bharathiar university • Search the information about “ powerpoint creation” in youtube • Download pdf about the concept of “Environmental studies”. • Convert word to pdf and pdf to word using online convertor. • Pay EB-Bill through online EXTERNAL MARK (50 Marks) <table><tr><td>Record Note</td><td>10 Marks</td></tr><tr><td>Set A</td><td>20 Marks</td></tr><tr><td>Set B</td><td>20 Marks</td></tr></table>	Record Note	10 Marks	Set A	20 Marks	Set B	20 Marks	
Record Note	10 Marks							
Set A	20 Marks							
Set B	20 Marks							

M.Sc. Computer Science

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS101	Title	Batch :	2020-2022
		Design & Analysis of	Semester	I
Hrs/Week:	5	Computer Algorithms	Credits:	5

Course Objective

On successful completion of the course the students should understand the various design and analysis of various data structure algorithms.

Course Outcomes (CO)

K1	CO1	To remember worst case running times of algorithms using asymptotic analysis
K2	CO2	To understand divide-and-conquer paradigm, dynamic-programming paradigm, greedy paradigm and branch and bound strategies and apply them for the appropriate problems
K3	CO3	To deploy different data structures
K4	CO4	To analyze major graph algorithms and to employ graphs to model engineering problems
K5	CO5	To validate divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm

CONTENTS		Hours
UNIT I Introduction: algorithm definition and specification – performance analysis –Elementary Data structures:- <i>stacks and queues</i> – <i>trees</i> – dictionaries – priority queues – sets and disjoint set union – graphs – Basic traversal and search techniques – Techniques for Binary Tree – Techniques for Graphs: Breadth First Search and Traversal, Depth First Search and Traversal.		13
UNIT II Divide – and – conquer: - General method – binary search – merge sort – quick sort –The Greedy method: - General method – knapsack problem – minimum cost spanning tree – single source shortest path.		13
UNIT III Dynamic Programming: General method – multistage graphs – all pair shortest path – optimal binary search trees – 0/1 Knapsack – traveling salesman problem – flow shop scheduling.		13
UNIT IV Backtracking: General method – 8-Queens problem – sum of subsets – graph coloring – Hamiltonian cycles – knapsack problem .		13

UNIT V Branch and bound: The method – Least Cost (LC) Search – The 15 puzzle: An Example – Control abstractions for LC Search – Bounding – FIFO Branch and Bound – LC Branch and Bound – 0/1 Knapsack problem – LC Branch and Bound solution – FIFO Branch and Bound solution – Traveling salesperson.	13
Total Hours	65
<i>*Italicized texts are for self study</i> Power point Presentations, Seminar , Assignment, Brain storming	
Text Books 1. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, “Computer Algorithms”, 2 nd Edition, Galgotia Publications, 2008.	
Reference Books 1. Ellis Horowitz, Sartaj Sahni, “Fundamentals of data structures”, Reprinted Edition, Galgotia Publications, 2015. 2. Alfred V.Aho, John E.Hopcroft & Jeffery D Ullman, “Data structures and Algorithms”, Reprinted, 2009 Edition, PHI learning pvt Ltd 3. Adam Drozdek, “Data Structures and Algorithms in C++”, 4 th Edition, Vikas publishing house, NewDelhi, 2012.	

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS102	Title	Batch :	2020-2022
		Internet of Things	Semester	I
Hrs/Week:	5		Credits:	5

Course Objective

On successful completion of this course, students will understand the fundamentals of Internet of Things, IoT Protocols, built a small low cost embedded system using Raspberry Pi and to apply the concept of Internet of Things in the real world scenario.

Course Outcomes (CO)

K1	CO1	To remember web services to access/control IoT devices
K2	CO2	To understand the portable IoT using Raspberry Pi
K3	CO3	To deploy use of IoT application and connect to the cloud
K4	CO4	To analyze various protocols for IoT
K5	CO5	To evaluate Real World IoT Design Constraints, Industrial Automation in IoT.

CONTENTS		Hours
UNIT I Introduction to IoT: Introduction – Physical Design – Logical Design – IoT Enabling Technologies – IoT Levels & Deployment Templates – Domain Specific IoTs. IoT and M2M: M2M – Difference between IoT and M2M – SDN and – NFV for IoT.		13
UNIT II IoT System Management with NETCONF – YANG: Need for IoT Systems Management - Simple Network Management Protocol – Network Operator Requirements – NETCONF – YANG. IoT Platforms Design Methodology: Introduction – Design Methodology. IoT Architecture: M2M high-level ETSI Architecture – IETF Architecture for IoT.		13
UNIT III IoT Reference model – Domain model - Information model - Functional model – Communication model - IoT Reference Architecture. IoT Protocols: Protocol Standardization for IoT – Efforts – M2M and WSN Protocols - SCADA and RFID Protocols – Protocols – IEEE 802.15.4 – BACNet Protocol - Modbus – Zigbee Architecture - Network Layer – 6LowPAN – CoAP – Security.		13
UNIT IV Building IoT with RASPBERRY Pi and ARDUINO: Building IoT with RASPBERRY Pi – IoT Systems – Logical Design using Python – IoT Physical Devices and Endpoints – IoT Device – Building blocks – Raspberry Pi – Board – Linux on Raspberry Pi – Raspberry Pi Interfaces - Programming Raspberry Pi with Python – Other IoT Platforms - Arduino		13

UNIT V Case studies: Home Automation – Cities – Environment – Agriculture – Productivity Application. Tools for IoT: Chef – Chef Case Studies – Puppet – Puppet Case Study. <i>Amazon Web Services for IoT</i> .	13
Total Hours	65
<i>*Italicized texts are for self study</i> Power point Presentations, Seminar , Assignment	
Text Book 1. Arshdeep Bahga , Vijay Madisetti , “Internet of Things –A hands –on pproach”,Universities Press , 2015.	
Reference Books 1. Dieter Uckelmann , Mark Harrison, Michahelles,Florian(Eds), “Architecting the Internet of Things”, Springer, 2011. 2. Honbo Zhou, “The Internet of Things in the cloud: A Middleware Perspective”, CRC Press, 2012. 3. Jan Holler ,Vlasios Tsiatsis ,Catherine Mulligan , Stamatis , Karnouskos Stefan Avesand , David Boyle , “From Machine – to- Machine to the Internet of Things – Introduction to a New Age of Intelligence”, Elsevier 2014. 4. Olivier Hersent, David Boswarthick , Omar Elloumi – “The Internet of things – Key applications and Protocols”,Wiley 2012.	

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS207	Title	Batch :	2020-2022
		Advanced Java Programming	Semester	II
Hrs/Week:	5		Credits:	5

Course Objective

On successful completion of this course, the students will be able to understand the advanced Java concepts, to develop Java based applications and hands on practices by applying these advanced concepts to implement in web based applications.

Course Outcomes (CO)

K1	CO1	To recollect different classes, constructors and methods of Swing components
K2	CO2	To get an idea to construct an enterprise application using Java Beans
K3	CO3	To deploy RMI programs for real world applications
K4	CO4	To analyze session tracking using Session objects and Cookies
K5	CO5	To validate server side java programs using Servlets and JSP

CONTENTS		Hours
UNIT I Java Swings: JPanel-JFrame-JApplet-JSplitPane-JTabbedPane-JViewport-JMenu-Items and Labels - JTextField - JTextArea - JButtons - JButton Classes - JCheckBoxes - JRadioButton-JComboBoxes-JList.		13
UNIT II Advanced Components: JTree - JTable - JInternalFrame - JDesktopPane -JTextPane - JProgressbar.		13
UNIT III Java Beans: Introduction to Java Bean-Advantages of a Java Bean-Application Builder tools-The Bean Developer Kit (BDK)-Jar files-Introspection-Developing a Simple Bean-Using Bound Properties-Using Bean Info Interface-Constrained Properties-Persistence-Customizers-Java Bean API.		13
UNIT IV Servlet Overview and Architecture: Movement to Server Side Java-Practical Applications for Java Servlets-Java Servlet Alternatives-Reason to use Java Servlets-Java Server Architecture – Servlet Basics-The Lifecycle of Servlet-A Basic Servlet. Servlet Chaining: Definition for Servlet Chaining-Uses of Servlet Chains-A Practical example using Servlet Chaining-Servlets and JDBC-Two Tier and Three Tier Database access models-JDBC Servlet-Session Tracking-Using Cookies-Using Session Objects.		13
UNIT V Java Server Page (JSP): Introduction-Server-side programming-Life Cycle of JSP- To create and run JSP- Architecture of JSP-Scripting tag Elements- Implicit Object- Beans - Conditions - Directives - Declarations – Implicit Variables -Expressions. RMI (Remote Method Invocation): Introduction - RMI Architecture-Bootstrapping and RMI Registry - The RMI Compiler - Object Specialization and Parameter Passing - A Simple example.		13
Total Hours		65
<i>*Italicized texts are for self study</i>		

Power point Presentations, Seminar , Assignment, Brain storming

Text Books

1. Herbert Schildt, “ Java-2, The Complete Reference”, 11th Edition, Tata McGraw Hill, 2019.
2. Jim Keogh, “The Complete Reference J2EE”, Tata McGraw Hill, 2007.
3. KogentSolutionss, “Java Server Programming Java EE7 Black Book”,Dreamtech Press, 2014.
4. Sams Series,James GoodWill, “Developing Java Servlets”, 1st Edition, SAMS Techmedia, 2004.
5. Sam Series, “Java RMI”, Tata McGraw Hill, 2006.

Reference Books

1. Brian Cole, Robert Eckstein, James Elliott, Marc Loy, David Wood, “Java Swing”, 2nd Edition, O“Reilly Publishers, 2002.
2. Stephen Potts, Mike Kopack, “Web Services”, Kindle Edition, Pearson Education, 2004.

Programme code:	M.Sc	Programme Title :	Master of Computer Science	
Course Code:	20PCS209	Title	Batch :	2020-2022
		Cloud and Big Data Analytics	Semester	II
Hrs/Week:	4		Credits:	4

Course Objective

On successful of this course, students will understand the concept of Virtualization and design of cloud Services and will be able to analyze the big data using intelligent techniques.

Course Outcomes (CO)

K1	C01	To remember the fundamental concepts of big data	
K2	C02	To understand the applications using Map Reduce Concepts	
K3	C03	To deploy the concept of Virtualization and design of cloud Services	
K4	C04	To analyze the big data using intelligent techniques	
K5	C05	To present the broad perceptive of cloud architecture and model	
CONTENTS			Hours
UNIT I Cloud Architecture and Mode: Technologies for Network-Based System – System Models for Distributed and Cloud Computing - NIST Cloud Computing Reference Architecture. Cloud Models:-Characteristics – Cloud Services – Cloud Models (IaaS,PaaS,SaaS) – Public vs Private Cloud – Cloud Solutions – Cloud ecosystem – Service Management – Computing on demand, Virtualization : Basics of Virtualization – Types of Virtualization – Implementation Levels of Virtualization – Virtualization Structures - Tools and Mechanism – Virtualization of CPU, Memory I/O Devices - Virtual Clusters and Resource Management – Virtualization for Data-Center Automation.			11
UNIT II Cloud Infrastructure: Architectural Design of Compute and Storage Clouds – Layered Cloud Architecture Development – Design Challenges – Inter Cloud Resource Management – Resource Provisioning and Platform Deployment – Global Exchange of Cloud Resources. Programming Model: Parallel and Distributed Programming Paradigms – MapReduce, Twister and Iterative MapReduce – Hadoop Library from Apache – Mapping Applications – Programming Support – Google App Engine, Amazon AWS – Cloud Software Environments – Eucalyptus, Open Nebula, OpenStack, Aneka, CloudSim.			11
UNIT III Getting Started with Big Data: Introduction – Grasping the Fundamentals of Big Data-Examining Big Data Types – Old Meets New - Technology Foundation for Big Data : Digging into Big Data Technology Components – Virtualization and How It Supports Distributed Computing – Examining the Cloud and Big Data – Big Data Management: Operational Databases - Map Reduce Fundamentals – Exploring the World of Hadoop – The			10

Hadoop Foundation and Ecosystem – Appliances and Big Data Warehouses.	
UNIT IV Analytics and Big Data: Defining Big Data Analytics – Understanding Text Analytics and Big Data – Customized Approaches for Analysis of Big Data. Big Data Implementation: Integrating Data Sources – Dealing with Real-Time Data Streams and Complex Event Processing – Operationalizing Big Data – Applying Big Data within Your Organization – Security and Governance for Big Data Environments.	10
UNIT V Big Data Solutions in the Real World: The Importance of Big Data to Business – Analyzing Data in Motion – Improving Business Process With Big Data Analytics. The Part of Tense: Ten Big Data Best Practices-Ten Great Big Data Resources – Ten Big Data Do’s and Don’ts.	10
Total Hours	52
*Italicized texts are for self study	
Power point Presentations, Seminar ,Assignment, Experience Discussion, Brain storming	
Text Books 1. Kai Hwang, Geoffrey C Fox, Jack G Dongarra, “Distributed and Cloud Computing, Processing to the Internet of Things”, Morgan Kaufmann Publishers, 2012 from Parallel (Unit I – II). 2. Judith Hurwitz, Alan Nugent, Dr. Fern Halper and Marcia Kaufman, “Big Data for Dummies” A Wiley Brand Publications.2013. (Unit III–V). 3. Jeffrey Stanton, “An Introduction to Data Science” Syracuse University, 2012(Case Study).	
Reference Books 1. Michael Miller, ”Cloud Computing”, Que Publishing , 2008 2. Nick Antonopoulos, Cloud Computing, Springer Publications, 2010.	

B.Sc Computer Science

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS101	Title:	Batch :	2020-2023
Hrs/Week:	04	Core I: Programming in 'C'	Semester:	I
			Credits:	04

Course Objective

The course objective is to know the basic components of the computer and working of each device, the student gain experience about structured programming, understand the implementation of C language and understand various features in C.

Course Outcomes (CO)

K1	CO1	To keep in mind the fundamentals of C programming
K2	CO2	To understand the loops and decision making statements to solve the problem
K3	CO3	To implement different operations on arrays and use functions to solve the given problem.
K4	CO4	To review the C program that uses pointers, structures and files

Syllabus

Units	Contents	Hrs
Unit I	Introduction to C :Overview of C – History and Importance of C – Basic Structure of C programs -Development of program logic skills through Flowchart and Algorithm – Programming Style – Executing a 'C' program – Character set – C Tokens – Keywords – Identifiers – Constants– Variables – Rules for defining variables- Data types, – <i>Declaring and initializing variables</i> – Operators & Expressions – Precedence of arithmetic – Type conversion in expressions – Mathematical functions – Managing Input and output operations : Introduction –Reading a character –Writing a character – Formatted input- Formatted output . <i>Simple Programs</i>	10
Unit II	Control Statements: IF, <i>IF..ELSE Statements</i> , ELSE...IF ladder – Switch Statement – GOTO Statement – WHILE Statement – Do Statement – FOR Statement.-Jumps in loops. Arrays: One dimensional Arrays – Two Dimensional Arrays – Multi Dimensional Arrays – Structures : Arrays within Structures – Structures within structures – Structures and Functions – Union. <i>Programs using Control Structures and Derived data types</i>	10

Unit III	Functions: User-defined functions- A-Multi-function program- Elements of user defined function, definition of function-Return value &their types, function calls & declarations-Category of functions: No arguments & No return values-arguments that No return values – Arguments with return values-No arguments that return a value- Nesting of functions-Recursion - Passing arrays and strings to functions. The scope, Visibility and Lifetime of Variables in functions. Programs using functions	11
Unit IV	String manipulation: Introduction - Declaring & Initializing String variables – Reading string from terminal, Writing string to screen – String handling Functions. Pointers: Introduction-Accessing, Declaring & Initializing pointer variables--Pointers and Character strings-Array of pointers-Pointers as function arguments-Function returning pointers-Pointers to functions-Pointers and Structures. Programs using String and Pointers	10
Unit V	Files: Defining and opening a file – Closing a file –I/O operations on file – Error handling during I/O operations – Random access files – Command line arguments-Preprocessor – Macro Substitution – File Inclusion – Compiler control directives. Programs using Files and Command Line Arguments	11
	Total Contact Hrs	52
	<i>*Italicized texts are for self study</i>	
TEXT BOOKS	Power point Presentations, Seminar, and Assignment	
	1.E.Balagurusamy, “Programming in Ansi C”, Tata McGraw-Hill Publishing Co& Ltd.,Sixth Edition, 2016.	
REFEREN CES	1. Yaswanth Kanishkar, “LET US C”, BPB Publications, Fourteenth Edition, 2016. 2.Ashok N. Kamthane, “Programming with ANSI and Turbo C”, First Edition ,2009	

Programme code:	B.Sc	Programme Title :	Bachelor of Science (Computer Science)	
Course Code:	20UCS204	Title :	Batch :	2020-2023
		Core III: Object Oriented Programming Using C++	Semester:	II
Hrs/Week:	4		Credits:	04

Course Objective

On successful completion of the course the students should understand all the features of C++ and make the students to apply the same for writing programming for solving problem.

Course Outcomes (CO)

K1	CO1	To remember the basic OOPs concepts such as Class, Inheritance, Abstraction, Polymorphism etc.
K2	CO2	To understand how C++ differentiates between object oriented programming and procedural programming and the use of function, operator overloading.
K3	CO3	To implement programs using more advanced features such as composition of Objects, Operator overloads, Inheritance, Polymorphism, Dynamic memory allocation etc.
K4	CO4	To evaluate C++ programs using File I/O, Command line Arguments and Exception Handling.

Syllabus

Units	Contents	Hrs
Unit I	Introduction: Evolutions of C++- Object oriented Technology- Programming Paradigms- Disadvantages of Conventional Programs- Key concepts of object oriented programming- Advantages of OOPs- Applications of oops -Input and Output in C++:Streams in C++- Predefined Streams – Stream Classes- Formatted and Unformatted data - Formatted Console I/O Operations – Unformatted Console I/O operations- Bit Fields	8
Unit II	C++ Declarations: Parts of C++ programs – Types of Tokens, Keywords, Identifiers. Data Types: Basic, Derived, User defined, Void – Operators in C++ - Constants- Memory Management Operators- Precedence of Operators in C++. Control Structures: Decision making statements: if- else, nested if – else, goto, break, continue, Switch Case- For loop- While Loop- do while loop. Functions in C++: Parts of a function- passing arguments- Inline Function- Function overloading.	9
Unit III	Classes and Objects: Classes in C++ - Declaring Objects: Public, Private, Protected-Defining Member functions – Characteristics of Member Functions – Rules for Inline Functions- Array of Objects- Friend functions- Constant Member function- Data Hiding- overloading member function. Arrays: Characteristics of arrays- Initialization of Array using functions- Array of Classes. Constructors and Destructors: Characteristics of Constructors and Destructors-Application with constructors- Overloading and Copy Constructors.	10
Unit IV	Operator Overloading and Type Conversion: Keyword Operator – Overloading Unary Operators- Operator Return Type- Constraint on Increment and Decrement Operators- Overloading with friend functions- Type Conversion- Rules for Overloading Operators. Inheritance: Introduction –types of Inheritance: Single, Multi-level, Multiple, Hierarchical, Multi-Path Advantages and its Disadvantages. Polymorphism: Introduction- Pointer to derived Class Objects- Virtual Functions- Rules- Pure Virtual functions.	11

Unit V	Files: File Stream Classes- Steps of File Operation – Finding End of File- File Opening Modes- Manipulators with Arguments – Sequential Read and Write Operations – Binary and ASCII Files- Command Line Arguments. Exception Handling- Principles of Exception Handling- Try, Throw, Catch- Exception Handling Mechanism- Commonly used header Files. Templates: Class Templates-Function Templates– Manipulators.	12
	Total Contact Hrs	50
	<i>*Italicized texts are for self study</i>	
	Power point Presentations, Seminar, and Assignment	
TEXT BOOKS	1. E. Balagurusamy,“Object Oriented Programming with C++”,Tata McGraw Hill publication, Fifth edition, 2012. 2. Ashok N. Kamthane,“Object Oriented Programming with ANSI and Turbo C++”, Pearson Education 5th Impression 2008.	
REFERENCES	1. D.Ravichandran,J, “Programming with C++”, Tata McGraw Hill publication, fourteenth edition, 2001. 2. RabortLafore, “Object Oriented Programming with C++”, Galgotia Publication Pvt. Ltd, second edition,2001. 3. Ashok Kamathane-“Programming in C++” Prentice Hall 2003	