

SAURASHTRA UNIVERSITY

RAJKOT – INDIA



CURRICULAM

FOR

B.C.A.

Bachelor of Computer Application

(Semester III and Semester IV)

Effective From June – 2013

Bachelor of Computer Application
(Semester – III and Semester - IV)
Saurashtra University
Effective from June - 2013

B.C.A. (Semester – III)			
SR.NO	SUBJECT	NO. OF THEORY LECT. PER WEEK	NO. OF PRACTICAL PER WEEK
1	CS – 13 SAD, Software Quality Assurance and Testing	5	3
2	CS – 14 C++ and Object Oriented Programming	5	6
3	CS – 15 RDBMS Using Oracle	5	6
4	CS – 16 Web Development using PHP	5	6
5	CS – 17 Practical (Based On CS-13, CS-14)	-	-
6	CS – 18 Practical (Based On CS-15, CS-16,)	-	-

Note:

1. Credit of each subject is 5. Total credit of semester is 30.
2. Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
3. Total marks of each practical paper are 100. No internal examination marks in practical papers.

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CS – 13 : SAD, Software Quality Assurance and Testing				
No.	Topics	Details	Marks weight In %	Min Lect.
1.	System Analysis & Design AND Software Engineering	<ul style="list-style-type: none"> ◆ Definitions: System, Subsystem, Business System, Information System (Definitions only) ◆ Systems Analyst (Role: Information Analyst, Systems Designer & Programmer Analyst) ◆ SDLC ◆ Fact – finding techniques (Interview, Questionnaire, Record review and observation) ◆ Tools for Documenting Procedures and Decisions Decision Trees and Decision Tables ◆ Data Flow analysis Tool DFD (context and zero level) and Data Dictionary ◆ Software Engineering (Brief introduction) 	15	10
2	Concepts of Quality Assurance	<ul style="list-style-type: none"> ▪ Introduction to QA ▪ Quality Control (QC) ▪ Difference between QA and Q ▪ Quality Assurance activities 	5	5
3	Basics Of Software Tesing	<ul style="list-style-type: none"> ▪ Introduction to software Testing ▪ Software faults and failures <ul style="list-style-type: none"> • Bug/Error/Defect/Faults/Failures ▪ Testing Artifacts <ul style="list-style-type: none"> • Test case • Test Script • Test Plan • Test Harness • Test Suite 	10	6

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4	Types of Software Testing, Verification and Validation	<ul style="list-style-type: none"> ▪ Static Testing <ul style="list-style-type: none"> • Informal Review • Walthrough • Technical Review • Inspection ▪ Dynamic Testing ▪ Test levels <ul style="list-style-type: none"> • Unit Testing • Integration Testing • System Testing • Acceptance Testing <p>Techniques of software Testing</p> <ul style="list-style-type: none"> ▪ Black Box Testing <ul style="list-style-type: none"> • Equivalence Partitioning • Boundary Data Analysis • Decision Table Testing • State Transition Testing ▪ White Box Testing <ul style="list-style-type: none"> • Statement testing and coverage • Decision testing and coverage ▪ Grey Box Testing ▪ Nonfunctional Testing <ul style="list-style-type: none"> • Performance Testing • Stress Testing • Load Testing • Usability Testing • Security Testing 	15	10
5	Software Development Life Cycle Models	<ul style="list-style-type: none"> ▪ Waterfall Model ▪ Iterative Model ▪ V-Model ▪ Spiral Model ▪ Big Bang Model ▪ Prototyping Model 	10	2
6	Automated Testing	<ul style="list-style-type: none"> ▪ Introduction <ul style="list-style-type: none"> • Concept of Freeware, Shareware, 	10	8

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		<p style="text-align: center;">licensed tools</p> <ul style="list-style-type: none"> ▪ Theory and Practical Case-Study of Testing Tools <ul style="list-style-type: none"> • Win runner • Load runner • QTP • Rational Suite 		
7	Project Economics	<ul style="list-style-type: none"> ▪ Concepts of Project Management ▪ Project Costing based on metrics ▪ Empirical Project Estimation Techniques. ▪ Decomposition Techniques. ▪ Algorithmic methods. ▪ Automated Estimation Tools 	10	5
8	Project scheduling and Tracking	<ul style="list-style-type: none"> ▪ Concepts of project scheduling and tracking ▪ Effort estimation techniques ▪ Task network and scheduling methods ▪ Timeline chart ▪ Pert Chart ▪ Monitoring and control progress ▪ Graphical Reporting Tools 	10	6
9	CAD Project Management Tool	<ul style="list-style-type: none"> ▪ MS – VISIO for designing & Documentation ▪ MS – Project for controlling and Project Management 	10	5
10	UML	<ul style="list-style-type: none"> ▪ UML designing and skill based tools <p>Overview of</p> <ul style="list-style-type: none"> ◆ Class Diagram ◆ Use Case Diagram ◆ Activity Diagram 	5	3
TOTAL			100	60

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Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.

TOTAL LECTURES 60+15=75

Reference Book

1. SAD, Software Quality Assurance and Testing – Bharat & Co. [ISBN No. : 978-93-81786-36-9]
2. Analysis & Design of Information System - James A. Senn.
3. Fundamentals of Software Engineering – RajibMall (PHP)
4. Software Engineering – A Practitioner’s Approach – Pressman
5. UML – A Beginner’s Guide –Jasson Roff – TMH
6. Roger Pressman , “Software Engineering”
7. http://en.wikipedia.org/wiki/Software_testing
8. <http://www.onestoptesting.com/>
9. <http://www.opensourcetesting.org/functional.php>

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CS - 14 : C++ and Object Oriented Programming				
No	Topics	Details	Marks weight in %	App. Lect.
1	Principles of object oriented programming	<ul style="list-style-type: none"> • Procedure – oriented programming • Object oriented programming paradigm • Basic concepts of object oriented Programming • Benefits of object oriented programming • Application of object oriented programming • What is c++? • Application of c++ • Input/output operators • Structure of c++ program • Introduction of namespace 	5	4
2	Tokens, expressions and control statements	<ul style="list-style-type: none"> • Tokens : keywords, identifiers, basic data types, user- defined types, derived data types, symbolic constants, type compatibility, declaration of variables, dynamic initialization of variables, reference variables • Operators in C++: scope resolution operator, member referencing operator, memory management operator, manipulators, type cast operator. • Expression : Expression and their types, special assignment operator, implicit conversions, operator precedence • Control structures <ul style="list-style-type: none"> ◆ Conditional control structure :- simple if, if...else , nested if else, switch etc. ◆ Looping control structure:- for, while , do...while 	10	7
3	Functions in C++	<ul style="list-style-type: none"> • The main function • Function prototype • Call by reference • Return by reference • Inline function • Default arguments • Const arguments 	10	6

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		<ul style="list-style-type: none"> • Functions overloading • Adding C Functions turbo C++ 		
4	Classes and Objects	<ul style="list-style-type: none"> • C structures revisited • Specifying a class • Local Classes • Nested Clases • Defining member functions, nesting of Member functions, private member function, making outside function inline • Arrays within a class • Memory allocation for objects • Static data member • Static member functions • Arrays of objects • Objects as function arguments • Friendly functions • Returning objects • Const member function • Pointer to members 	10	7
5	Constructor and Destructor	<ul style="list-style-type: none"> • Characteristics of constructor • Explicit constructor • Parameterized constructor • Multiple constructor in a class • Constructor with default argument • Copy constructor • Dynamic initialization of objects • Constructing two dimensional array • Dynamic constructor • MIL , Advantage of MIL • Destructors 	10	5
6	Operator overloading and type conversion	<ul style="list-style-type: none"> • Concept of operator overloading • Over loading unary and binary operators • Overloading of operators using friend Function • Manipulation of string using operators • Rules for operator overloading • Type conversions. • Comparison of different method of conversion 	10	6
7	Inheritance	<ul style="list-style-type: none"> • Defining derived classes • Types of inheritance (Single, Multiple, Multi-level, Hierarchical, Hybrid) • Virtual base class & Abstract class 	10	5

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		<ul style="list-style-type: none"> • Constructors in derived class • Application of Constructor and Destructor in inheritance • Containership, Inheritance V/s Containership 		
8	Pointer, Virtual functions and Polymorphism, RTTI	<ul style="list-style-type: none"> • Pointer to Object • Pointer to derived class • this pointer • Rules for virtual function • Virtual function and pure virtual function. • Default argument to virtual function • Run Time Type Identification 	10	5
9	Console I/O operations	<ul style="list-style-type: none"> • C++ streams • C++ stream classes • Unformatted and formatted I/O operations • Use of manipulators. 	5	3
10	Working with Files	<ul style="list-style-type: none"> • File stream classes • Opening and closing a file • Error handling • File modes • File pointers • Sequential I/O operations • Updating a file (Random access) • Command line arguments 	10	5
11	Exception handling	<ul style="list-style-type: none"> • Overview of Exception Handling • Need for Exception Handling • various components of exception handling • Overview of Exception Handling 	5	3
12	Introduction to Template STL	<ul style="list-style-type: none"> • Introduction to templates • Class templates • Function templates • Member function templates • Overloading of template function • Non-type Template argument • Primary and Partial Specialization • Introduction to STL • Overview of iterators, containers 	5	4
TOTAL			100	60

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Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.

TOTAL LECTURES 60+15=75

Reference Books:

1. C++ and Object Oriented Programming – Bharat & Co. [ISBN No. : 978-93-81786-37-6]
2. Object Oriented Programming in C++ - E.Balagurusamy, BPB
3. Mastering C++ - Venugopal
4. Object Oriented Programmin in C++ - Robaret Laphore
5. Let us C++ - Yashvant Kanitkar, BPB

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CS – 15 : RDBMS Using Oracle				
No.	Topics	Details	Marks weight In %	Min Lect.
1	DBMS Overview	<ul style="list-style-type: none"> • Introduction to DBMS • Introduction to RDBMS • Dr.E.F.Codd Rules • Importance of E.R.Diagram in Relational DBMS. • Normalization 	10	4
2	SQL, SQL*Plus	<ul style="list-style-type: none"> • Introduction to SQL • SQL Commands and Datatypes • Introduction to SQL*Plus • SQL*Plus formatting commands • Operator and Expression • SQL v/s SQL*Plus 	5	4
3	Managing Tables and Data	<ul style="list-style-type: none"> • Creating , Altering & Dropping tables • Data Manipulation Command like Insert, update, delete • Different type of constraint and applying of constraint • SELECT statement with WHERE, GROUP BY and HAVING, ORDER BY, DISTINCT, Special operator like IN, ANY, ALL, BETWEEN, EXISTS, LIKE • Join (Inner join ,outer join, self join) • subquery, minus, intersect, union • Built in functions • Numeric Function abs, ceil, cos, decode, exp, floor, greatest, least, log, log10, max, min, rem, round , sign, sin, sinh, sqrt, tan, trunc • Character Function chr, concat, initcap, lower, lpad, ltrim, replace, rpad, rtrim, soundex, substr, treat, trim, upper • Date Function add_months, last_day, months_between, next_day, round (date), sysdate, systimestamp, trunc (date), to_date, to_char • Aggregate function Sum, Count, AVG, MAX, MIN 	15	10
4	Other ORACLE Database	<ul style="list-style-type: none"> • View • Sequence • Synonyms, 	10	10

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	objects	<ul style="list-style-type: none"> • Database Links • Index <ul style="list-style-type: none"> ○ B*Tree Indexes ○ Bitmap Indexes ○ Function-Based Indexes ○ Application Domain Indexes • Cluster , • Snapshot 		
5	Data Control And Transaction Control Command	<ul style="list-style-type: none"> • Creating user & role • Grant, Revoke command • What is transaction? • Starting and Ending of Transaction • Commit, Rollback, Savepoint 	5	3
6	Concurrency control using lock	<ul style="list-style-type: none"> • What Are Locks? • Locking Issues <ul style="list-style-type: none"> ○ Lost Updates ○ Pessimistic Locking ○ Optimistic Locking ○ Blocking ○ Deadlocks ○ Lock Escalation • Lock Types <ul style="list-style-type: none"> ○ DML Locks ○ DDL Locks ○ Latches ○ Manual Locking and User-Defined Locks 	5	2
7	Introduction to PL/SQL	<ul style="list-style-type: none"> • SQL v/s PL/SQL • PL/SQL Block Structure • Language construct of PL/SQL (Variables, Basic and Composite Data type, Conditions looping etc.) • %TYPE and %ROWTYPE • Using Cursor(Implicit, Explicit) • Exception Handling 	10	8
8	Advanced PL/SQL	<ul style="list-style-type: none"> • Creating and Using Procedure, Functions, • Package, • Triggers • Creating Objects, Object in Database-Table • PL/SQL Tables, Nested Tables, Varrays 	15	10
9	Oracle Database Structure	<ul style="list-style-type: none"> • Instance Architecture <ul style="list-style-type: none"> ○ Database Processes ○ Memory Structure. ○ Data files 	15	6

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		<ul style="list-style-type: none"> • Creating & Altering Database • Opening & shutdown Database • Initialization Parameter • Control Files, Redo Logs files • Tablespace(Create, Alter, Drop) • Rollback Segment (Create, Alter) (System & Transaction RBS) • Oracle Blocks • Import • Export • SQL*Loader 		
10	Backup & Recovery	<ul style="list-style-type: none"> • Backup & Recovery • Types of Backups <ul style="list-style-type: none"> ○ Control File Backups ○ Redo Log File Backups ○ Cold Backups ○ Hot Backups • Net 8 <ul style="list-style-type: none"> ○ What is Net 8 ? ○ Why use Net 8 ? ○ Net 8 Features • Listener • Dispatcher 	10	3
	Total		100	60

Students seminar - 5 Lectures.

Expert Talk - 5 Lectures

Students Test - 5 Lectures.

TOTAL LECTURES 60+15=75

Reference Books:

1. RDBMS Using Oracle – Bharat & Co. [ISBN No. : 978-93-81786-38-3]
2. SQL,PL/SQL The programming - Lang.Of Oracle Ivan Bayross - BPB
3. Using Oracle 8i - Page, Hughes - QUE & PHI Publications
4. Oracle 8i The Complete Reference - George Koch, Kevin Loney - Oracle Press and Tata MacGraw-Hill

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CS – 16 : Website Development Using PHP				
No.	Topic	Details	Marks weight In %	Min. Lect.
1	Introduction	<ul style="list-style-type: none"> • Intro. Webpage,Website • Static and Dynamic Web • Client side & Server Side Scripting • Introduction to other server side lanaguages • Webserver (IIS & Apache) • HTTP & HTTPS protocol • FTP • ISP and its Services • Web Hosting, Virtual Host, Multi-Homing • Distributed Web Server Overview, • Document Root, 	5	5
2	PHP Basic	<ul style="list-style-type: none"> • Introduction to PHP • PHP configuration in IIS & Apache Web server • Understanding of PHP.INI file • Understanding of PHP.htaccess file • PHP Variable Static & global variable GET & POST method PHP Operator • Conditional Structure & Looping Structure • Array • User Defined Functions: <ul style="list-style-type: none"> - argument function - default arument - variable function - return function • Variable Length Argument Function <ul style="list-style-type: none"> - func_num_args - func_get_arg, func_get_args • Variable Function Gettype, settype, isset, unset, strval, floatval, intval, print_r • String Function 	20	14

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		<p>Chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim trim, substr, strcmp, strcasecmp, stripslashes, strrpos, strstr, strpos, str_replace, strrev, echo, print, explode(), implode(), join(), md5(), str_split(), str_shuffle(), strcspn(), strpbrk(), substr_compare(), substr_count(), ucfirst(), ucwords()</p> <ul style="list-style-type: none"> • Math Function Abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand, cos(), acos(), sin(), asin(), tan(), atan(), bindec(), decbin(), hexdec(), dechex(), is_finite(), is_infinite(), log(), base_convert(), deg2rad() • Date Function Date, getdate, setdate, Checkdate, time, mktime, date_add(), date_create(), date_format(), gmdate(), localtime(), strftime(), strtotime(), strtotime(), gettimeofday(), • Array Function Count, list, in_array, current, next, previous, end, each, sort, rsort, assort, arsort, array_merge, array_reverse, array_diff(), array_merge_recursive(), array_shift(), array_slice(), array_unique(), array_unshift(), array_keys(), array_key_exists(), array_push(), array_pop(), array_multisort(), array_search() • Miscellaneous Function define, constant, include, require, header, die, exit • File handling Function fopen, fread, fwrite, fclose, file_exists, is_readable, is_writable, fgets, fgetc, file, file_get_contents, fputcsv, fputs, file_putcontents, ftell, fseek, rewind, copy, unlink, rename, move_upload_file 		
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3	Handling Form & Session tracking	<ul style="list-style-type: none"> • Handling form with GET & POST • Cookies • Session • Server variable 	8	6
4	PHP Components	<ul style="list-style-type: none"> • PHP GD Library • PHP Regular expression • Uploading file. • Sending mail using mail() • Sending mail using smtp() 	10	5
3	Interacting with MySQL	<ul style="list-style-type: none"> • Working with MySQL using PhpMyAdmin • PHP-MySQL Connectivity • PHP-MySQL Functions • mysql_connect,mysql_close,mysql_error,mysql_errno,mysql_select_db,mysql_query,mysql_fetch_array,mysql_num_Rows,mysql_affected_Rows,mysql_fetch_assoc,mysql_fetch_field,mysql_fetch_object,mysql_fetch_row,mysql_insert_id,mysql_num_fields,mysql_result,mysql_tablename,mysql_list_tables,mysql_list_fields,mysql_field_type,mysql_db_name,mysql_db_query,mysql_data_seek 	15	4
4	Advance PHP	<ul style="list-style-type: none"> • PHP with OOPS Class, constructor, inheritance, serialize objects • Database Handling with OOPS • PHP with AJAX • What is AJAX. • How AJAX Works with PHP • Working With Ajax as Background Process • JQuery • What is JQuery? • How JQuery Works and How it is Created. • Using JQuery with PHP 	13	10
6	Smarty	<ul style="list-style-type: none"> • Smarty Introduction • Variable: 	10	6

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		<p>Variables assigned from PHP Variables loaded from config files</p> <ul style="list-style-type: none"> • Variable Modifiers: capitalize, lower, upper, truncate, count_characters, count_words, date_format, nl2br, replace • Built in Function: config_load, foreach, foreachelse, include, if,elseif,else, section, sectionelse • Custom Functions: assign, counter, cycle, eval, fetch, html_checkboxes, html_image, html_options, html_radios, html_select_date, html_select_time, html_table 		
7	Creating and Using Webservice	<ul style="list-style-type: none"> • Creating a PHP Based Web service. • Working with SOAP <ul style="list-style-type: none"> - Introduction to SOAP - Installation & Configuration - Predefined Constants - SOAP Client - SOAP Server • Using XML and JSON <ul style="list-style-type: none"> - Introduction to JSON - Installation & Configuration - Resource Types - JsonSerializerizable - JSON Functions <ul style="list-style-type: none"> o json_decode o json_encode 	10	6
8	Content Management System	<ul style="list-style-type: none"> • Introduction to CMS • Uses and Advantages of CMS • Wordpress [Introduction & Installation] • Joomla [Introduction & Installation] 	9	4
TOTAL :			100	60

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Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.

TOTAL LECTURES 60+15=75

Reference Books:

1. Web Development using PHP – Bharat & Co. [ISBN No. : 978-93-81786-39-0]
2. Beginning PHP
3. PHP Bible
4. Professional PHP
5. PHP Manual

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CS-17 : Practical Based On CS – 13 & CS – 15		
Sessions	Topics	Marks
I	♦ CS – 13	50
II	♦ CS – 14	50

Note : Each session is of 3 hours for the purpose of practical examination.

CS-18 : Practical And Viva Based On CS – 14 & CS – 16		
Sessions	Topics	Marks
I	♦ CS – 15	50
II	♦ CS – 16	50

Note : Each session is of 3 hours for the purpose of practical examination.

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B.C.A. (Semester – IV)			
SR.NO	SUBJECT	NO. OF THEORY LECT. PER WEEK	NO. OF PRACTICAL PER WEEK
1	CS – 19 Programming with JAVA	5	6
2	CS – 20 Programming with C#	5	6
3	CS – 21 Network Technology and Administration	5	
4	CS –22 Operating Systems Concepts With Unix / Linux	5	3
5	CS – 23 Practical (Based On CS-19, CS-23)	-	-
6	CS – 24 Practical (Based On CS-20)	-	-

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2. Total marks of each theory paper are 100 (university examination 70 marks + internal examination 30 marks).
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CS – 19 PROGRAMMING WITH JAVA				
No	Topics	Details	Marks weight In %	Min Lec.
1.	History, Introduction and Language Basics	<ul style="list-style-type: none"> - History and Features of Java - Java Editions - JDK, JVM and JRE - JDK Tools - Compiling and Executing basic Java Program - Java IDE (Netbeans and Eclipse) - Data Type (Integer, Float, Character, Boolean) - Java Tokens (Keyword, Literal, Identifier, Whitespace, Separators, Comments, Operators) - Operators (Arithmetic, Relational, Boolean Logical, Bitwise Logical, Assignment, Unnary, Shift, Special operators) - Type Casting - Decision Statements (if, switch) - Looping Statements (for, while, do..while) - Jumping Statements (break, continue, return) - Array (One Dim., Rectangular, Jagged) - Command Line Argument Array 	10	5
2.	Classes and Objects	<ul style="list-style-type: none"> - OOP Concepts (Class, Object, Encapsulation, Inheritance, Polymorphism) - Creating and using Class with members - Constructor - finalize() method - Static and Non-Static Members - Overloading (Constructor & Method) - VarArgs 	10	3
3.	Inheritance	<ul style="list-style-type: none"> - Universal Class (Object Class) - Access Specifiers (public, private, protected, default, private protected) - Doing Inheritance - Constructors in inheritance 	5	5

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		<ul style="list-style-type: none"> - Method Overriding - Interface - Nested and Inner Class - Abstract and Final Class 		
4.	Java Packages	<ul style="list-style-type: none"> - Normal import and Static Import - Introduction to Java API Packages and imp. Classes <ul style="list-style-type: none"> o java.lang o java.util o java.io o java.net o java.awt o java.awt.event o java.applet o java.swing - java.lang Package Classes (Math, Wrapper Classes, String, String Buffer) - java.util Package Classes (Random, Date, GregorianCalendar, Vector, HashTable, StringTokenizer) - Creating and Using UserDefined package and sub-package 	15	10
5.	Exception Handling and Threading	<ul style="list-style-type: none"> - Introduction to exception handling - try, catch, finally, throw, throws - Creating user defined Exception class - Thread and its Life Cycle (Thread States) - Thread Class and its methods - Synchronization in Multiple Threads (Multithreading) 	10	5
6.	Streams (Input and Output)	<ul style="list-style-type: none"> - Stream and its types (Input, Output, Character, Byte) - File and RandomAccessFile Class - Reading and Writing through Character Stream Classes (FileReader, BufferedReader, FileWriter, BufferedWriter) - Reading and Writing through Byte Stream Classes (InputStream, FileInputStream, BufferedInputStream, DataInputStream, OutputStream, FileOutputStream, BufferedOutputStream, 	10	5

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		DataOutputStream) - StreamTokenizer Class		
7.	Applets	- Introduction to Applet - Applet Life Cycle - Implement & Executing Applet with Parameters - Graphics class	5	2
8.	Layout Managers	- FlowLayout - BorderLayout - CardLayout - GridLayout - GridBagLayout with GridBagConstraints - Intro. to BoxLayout, SprigLayout, GroupLayout - Using NO LAYOUT Manager	10	5
9.	GUI using SWING	- Introduction to AWT and Swing - Difference Between AWT and Swing Components - Swing Components <ul style="list-style-type: none"> o JFrame, JPanel o JLabel, JButton, JRadioButton, JCheckBox o JTextField, JPasswordField, JTextArea o JScrollBar, JComboBox, JList o Menus (JMenuBar, JMenu, JMenuItem) 	15	10
10.	Event Handling	- Introduction to Event Handling - Event Delegation Model - Event Packages <ul style="list-style-type: none"> o AWT Event Package o Swing Event Package - Event Classes (ActionEvent, ItemEvent, FocusEvent, MouseEvent, MouseWheelEvent, TextEvent, WindowEvent, etc.) - Listener Interfaces (ActionListener, ItemListener, FocusListener, KeyListener, MouseListener, MoutMotionListener, TextListener, WindowListener, etc.) - Adaptor Classes (FocusAdaptor, KeyAdaptor, MouseAdaptor, MouseMotionAdaptor)	10	10
		Total	100	60

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TOTAL LECTURES 60+15=75

Reference Books:

1. Programming with JAVA – Bharat & Co. [ISBN No. : 978-93-81786-40-6]
2. Complete JAVA2 Certification
3. JAVA2 Black Book
4. A Programmer Guide to JAVA Certification By Khalid A. Mughal

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CS – 20 PROGRAMMING WITH C#				
No	Topics	Details	Marks weight In %	Min Lec.
1.	.NET Framework and Visual Studio IDE	Introduction to .NET Framework Features / Advantages CLR, CTS and CLS BCL / FCL / Namespaces Assembly and MetaData JIT and types Managed Code and Unmanaged Code Introduction to .NET Framework and IDE versions Different components (windows) of IDE Types of Projects in IDE (Console, Windows, Web, Setup, etc.)	10	3
2.	Language Basics	Data Types (Value Type & Reference Type) Boxing and UnBoxing Operators (Arithmetic, Relational, Bitwise, etc.) Arrays (One Dimensional, Rectangular, Jagged) Decisions (If types and switch case) Loops (for, while, do..while, foreach)	5	5
3.	Class and Inheritance	Concept of Class, Object, Encapsulation, Inheritance, Polymorphism Creating Class and Objects Methods with “ref” and “out” parameters Static and Non-Static Members Constructors Overloading Constructor, Method and Operator Inheritance Sealed Class & Abstract Class Overriding Methods Interface inheritance	10	10
4.	Property, Indexer, Pointers,	Creating and using Property Creating and using Indexer	10	5

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	Delegates, Event, Collections	Creating and using Pointers (unsafe concept) Creating and using Delegates (Single / Multicasting) Creating and using Events with Event Delegate Collections (ArrayList, HashTable, Stack, Queue, SortedList) and their differences.		
5.	Windows Programming	Creating windows Application MessageBox class with all types of Show() method Basic Introduction to Form and properties Concept of adding various Events with event parameters Different Windows Controls <ul style="list-style-type: none"> - Button - Label - TextBox - RadioButton - CheckBox - ComboBox - ListBox - PictureBox - ScrollBar - TreeView - Menu (MenuStrip, ContextMenuStrip) - ToolStrip - Timer - Panel and GroupBox Dialog Boxes (ColorDialog, FontDialog, SaveFileDialog and OpenFileDialog) MDI Concept with MDI Notepad Concept of Inheriting Form	30	18
6.	User Controls (Components)	Creating User Control with <ul style="list-style-type: none"> - Property - Method - Event Using User Control in Windows Projects as component	5	2
7.	Database Programming with ADO.NET	Concept of Connected and Disconnected Architecture Data Providers in ADO.NET Connection Object	20	13

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		Connected Architecture - Command - DataReader Disconnected Architecture - DataAdapter - DataSet - DataTable - DataRow - DataColumn - DataRelation - DataView Data Binding GridView Programming		
8.	Crystal Reports	Creating Crystal Reports Types of Reports Report Sections Formula, Special Field and Summary in Report	5	2
9.	Setup Project	Types of Setup Projects Creating Setup Project - File System Editor - User Interface Editor - Launch Conditions Editor	5	2
		Total	100	60

Students seminar - 5 Lectures
 Expert Talk - 5 Lectures
 Students Test - 5 Lectures
TOTAL LECTURES 60+15=75

REFERENCE BOOKS

1. Programming with C# – Bharat & Co. [ISBN No. : 978-93-81786-41-3]
2. C#.NET Programming Black Book - steven holzner –dreamtech publications
3. Introduction to .NET framework - Wrox publication
4. Microsoft ADO. Net - Rebecca M. Riordan, Microsoft Press

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CS – 21 NETWORK TECHNOLOGY AND ADMINISTRATION				
No	Topics	Details	Marks weight In %	Min Lec.
1.	Basics of Network	<ul style="list-style-type: none"> • Network concepts <ul style="list-style-type: none"> - What is network - Use of network • Network model <ul style="list-style-type: none"> -peer – to – peer -client – server • Network Services <ul style="list-style-type: none"> - File service, - Print service, - Comm. service, - Data base service, - Security service, - Application service • Network Access Methods <ul style="list-style-type: none"> - csma / cd, csma / ca, - Token passing - Polling • Network Topologies <ul style="list-style-type: none"> - Bus, Ring, Star, Mesh, Tree, Hybrid • Advanced Network Topologies Ethernet, CDDI, FDDI • Communication Methods <ul style="list-style-type: none"> - Unicasting - Multicasting - Broadcasting 	10	6
2.	Network Models and LAN Sharing	<ul style="list-style-type: none"> • OSI reference model with 7 layers • TCP/IP network model with 4 layers • File And Print Sharing in LAN. • aping of network drive • Disk quota • Encryption • Compression • Net meeting 	10	5
3.	Transmission Media	<ul style="list-style-type: none"> • Transmission Media <ul style="list-style-type: none"> - Types of Transmission media - Guided media - Co – Axial Cable, - Twisted Pair Cable, 	10	5

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		<ul style="list-style-type: none"> - Crimping of Twisted pair cable - Fiber Optic Cable • Unguided media <ul style="list-style-type: none"> - Infrared, Laser, Radio, Microwave, Bluetooth tech. 		
4.	Multiplexing & Switching Concepts	<ul style="list-style-type: none"> • Different Frequency Ranges • Multiplexing & Demultiplexing • Multiplexing Types <ul style="list-style-type: none"> - FDM, - TDM, - CDM, - WDM • Switching Tech. <ul style="list-style-type: none"> - Circuit Switching, - Message Switching, - Packet Switching 	05	5
5.	Network devices	<ul style="list-style-type: none"> • CABLE NETWORK DEVICES • LAYER1 DEVICES <ul style="list-style-type: none"> - LAN CARD, - MODEM , - DSL & ADSL - HUB(Active,Passive,Smart hub) - REPEATER • LAYER2 DEVICES <ul style="list-style-type: none"> - SWITCH(Manageable, nonmanageable) - BRIDGE(Source route, Transactional) • LAYER3 DEVICES <ul style="list-style-type: none"> - ROUTER - LAYER3 SWITCH - BROUTER - GATEWAY - Network Printer • WIRELESS NETWORK DEVICES <ul style="list-style-type: none"> Wireless switch Wireless router, ACCESSPOINT 	10	6
6.	Network Protocols	<ul style="list-style-type: none"> • Packets & Protocols • Conn. Oriented protocols - TCP & connection less protocols-UDP • TCP/IP STACK 	10	5

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		<ul style="list-style-type: none"> - HTTP - FTP - SMTP - POP3 - SNMP - TELNET - ARP - RARP • IPX/SPX • AppleTalk, • NetBIOS Name PROTOCOL • L2CAP, RFCOMM Protocol 		
7.	Network Routing	<ul style="list-style-type: none"> • What is routing • Requirements of routing • Types of Routing <ul style="list-style-type: none"> - static - dynamic - default • Routing protocols <ul style="list-style-type: none"> - Exterior Routing protocol <ul style="list-style-type: none"> 1)BGP - Interior Routing protocol <ul style="list-style-type: none"> (1)Distance vector routing <ul style="list-style-type: none"> - RIP - IGRP - EIGRP (2)Link state routing <ul style="list-style-type: none"> - OSPF - IS IS 	10	5
8.	IP ADDRESSING	<ul style="list-style-type: none"> • What is ip address? • Types of ip address • ipv4 <ul style="list-style-type: none"> - Class structure - subnetting, supernetting • ipv6 <ul style="list-style-type: none"> - Basic structure of ipv6 - Implementation of ipv6 • Migration from ipv4 to ipv6 	05	4
9.	Windows 2008 server	<ul style="list-style-type: none"> • Installation of 2008 enterprise server • Various editions of windows 2008 server • Installation & Configuration of Active Directory <ul style="list-style-type: none"> - Domains, Trees, Forests concept 	10	7

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		<ul style="list-style-type: none"> • Accounts(User, Group,Computer) • Policy (Security and audit) • Logging Events • MMC(Microsoft Management console) 		
10.	Basics of Network Security	<ul style="list-style-type: none"> • Fundamental of Network Security • Requirements of network Security • Policies, Standard, Procedures, Baselines, Guidelines • Security methods <ul style="list-style-type: none"> - Encryption - Cryptography - Authentication • Security Principle –CIA Model 	10	6
11.	Internet connection & Sharing	<ul style="list-style-type: none"> • Basics of Internet • How internet is connect with computer • Technology related internet <ul style="list-style-type: none"> - Dial up tech. - ISDN network tech. - Lease line tech. • VPN <ul style="list-style-type: none"> - Types of VPN - Use of VPN - VPN protocols(PPTP, L2TP, IPsec.) • Proxy server, Firewall • GPS,GPRS • CCTV tech. 	10	6
Total			100	60

Students seminar - 5 Lectures
Expert Talk - 5 Lectures
Students Test - 5 Lectures

TOTAL LECTURES 60+15=75

Reference Books:

1. Network Technology and Administration – Bharat & Co. [ISBN No. : 978-93-81786-42-0]
2. Networking Essential - Glenn Berg Tech. Media
3. MCSE Self-Paced Training Kit (Server 2003)
4. Data Communication and Networking - B A Forouzan

CS – 22 : Operating Systems Concepts With Unix / Linux				
No	Topics	Details	Marks	App.

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			weight In %	Lect
1.	Introduction	<ul style="list-style-type: none"> • Meaning of OS • Functions of OS • Features of OS • OS Types (User Point of View) • OS Types (Features Point of View) 	5	3
2.	Process Management	<ul style="list-style-type: none"> • Introduction of OS process • Process State Transition Diagram • Process Scheduling <ul style="list-style-type: none"> ○ FCFS ○ SJN ○ Round Robin ○ Priority Base Non Preemptive ○ Priority Base Preemptive 	5	4
3.	Memory Management	<ul style="list-style-type: none"> • Physical Memory and Virtual Memory • Memory Allocation • Contiguous Memory Allocation • Noncontiguous Memory Allocation • Virtual Memory Using Paging • Virtual Memory Using Segmentation 	10	5
4.	Getting Started with Unix	<ul style="list-style-type: none"> • Unix Architecture • Unix Features • Types Of Shell (C, Bourn, Korn) • Unix File System • Types Of Files <ul style="list-style-type: none"> ○ Ordinary Files ○ Directory Files ○ Device Files • Unix File & Directory Permissions 	5	2
5.	Unix Shell Command	<ul style="list-style-type: none"> • Connecting Unix Shell : Telnet • Login Commands passwd, logout, who, who am i, clear • File / Directory Related Command ls, cat, cd, pwd, mv, cp, ln, rm, rmdir, mkdir, umask, chmod, chown, chgrp, find,pg,more,less,head,tail,wc,touch • Operators in Redirection & Piping <ul style="list-style-type: none"> ○ < ○ > ○ << ○ >> ○ 	10	14

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		<ul style="list-style-type: none"> • Advance Tools • Finding Patterns in Files grep,fgrep,egrep • Working with columns and fields cut,paste,join • Tools for sorting sort,uniq • Comparing files : cmp,comm.,diff • Changing Information in Files : tr,sed, • Examining File Contents : od • Tools for mathematical calculations bc,factor • Monitoring Input and Output tee,script • Tools For Displaying Date and Time cal,date • Communications telnet,wall,mtod,write,mail,news,finger • Process Related Commands : ps, command to run process in background, nice,kill,at,batch,cron, crontab,wait,sleep • Concept of Mounting a File System mount command • Concept of DeMounting a File System umount command 		
6.	Text Editing With vi Editor	<ul style="list-style-type: none"> • Introduction of vi editor • Modes in vi • Switching mode in vi • Cursor movement • Screen control commands • Entering text, cut, copy, paste in vi editor 	5	2
7.	Shell Programming	<ul style="list-style-type: none"> • Shell Keywords • Shell Variables • System variables PS2, PATH, HOME,LOGNAME, MAIL, IFS, SHELL, TERM, MAILCHECK • User variables set, unset and echo command with shell 	15	14

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		<ul style="list-style-type: none"> variables • Positional Parameters • Interactive shell script using read and echo • Decision Statements <ul style="list-style-type: none"> ○ if then fi ○ if then else fi ○ if then elif else fi ○ case esac • test command • Logical Operators • Looping statements <ul style="list-style-type: none"> ○ for loop ○ while loop ○ until loop ○ break, continue command • Arithmetic in Shell script • Various shell script examples 		
8.	Getting Started with Linux	<ul style="list-style-type: none"> • History of Linux • GNU, GPL Concept • Open Source & Freeware • Structure and Features of Linux • Installation and Configuration of Linux <ul style="list-style-type: none"> - Using with Ubuntu • Startup, Shutdown and boot loaders of Linux 	5	2
9.	Linux Booting	<ul style="list-style-type: none"> • Linux Booting Process <ul style="list-style-type: none"> - LILO Configuration - GRUB Configuration • User Interfaces (GUI and CUI) 	5	1
10.	Working with X-Windows (Ubuntu)	<ul style="list-style-type: none"> • Layered Structure of X <ul style="list-style-type: none"> - Window Manager - Desktop Environment - Start Menu - User Configuration - startx Command • Window Managers <ul style="list-style-type: none"> - GNOME - KDE - Purpose of window manager • The KDE Desktop <ul style="list-style-type: none"> - KDE Panel - Desktop Icons - Managing Windows - The KDE Control Panel 	20	7

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		<ul style="list-style-type: none"> • The GNOME Desktop <ul style="list-style-type: none"> - The GNOME Panel - Desktop Icons - Managing Windows - The GNOME Control Panel • Configuring X <ul style="list-style-type: none"> - /etc/X11/Xorg.conf file - Tuning Xorg.conf - Choosing a Window Manager • Create, Delete, Rename, Copy files and folders • Install / Uninstall Software 		
11.	Linux Admin (Ubuntu)	<ul style="list-style-type: none"> • Creating Linux User Account and Password • Installing and Managing Samba Server • Installing and Managing Apache Server • Optimizing LDAP Services • Optimizing DNS Services • Optimizing FTP Services • Optimizing Web Services • Configure Ubuntu's Built-In Firewall • Working with WINE 	15	6
		Total	100	60

Students seminar - 5 Lectures.
Expert Talk - 5 Lectures
Students Test - 5 Lectures.
TOTAL LECTURES 60+15=75

Reference Books

1. Operating Systems Concepts With Unix / Linux – Bharat & Co. [ISBN No. : 978-93-81786-43-7]
2. Unix Shell Programming - Y. Kanetkar- BPB Publications
3. Unix concepts and applications- Sumitabha Das

Hands-On (Not to be asked in the examination)

- ◆ Installation of Unix / Linux
- ◆ User and Group Creation
- ◆ Demo of Various Applications available in Unix / Linux like Star Office, Games and other productivity tools.
- ◆ Demo of GNOME, KDE Desktops in Linux.

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CS - 23 : Practical based on CS – 19 & CS – 20		
Sessions	Topics	Marks
I	♦ CS – 19	50
II	♦ CS – 23	50

Note : Each session is of 3 hours for the purpose of practical examination.

CS - 24 : Practical Based on CS –21 & CS – 22		
Sessions	Topics	Marks
I	♦ CS – 20	100

Note : Each session is of 3 hours for the purpose of practical examination.