

B.S. Abdur Rahman University

Bachelor of Computer Applications [Mobile Applications and Information Security]

Programme Objective

This unique course provides dual career options for the students in the hot-favourite technology sectors of Information Security and Mobile Applications. In addition to all the mandatory subjects of a traditional BCA, this specialized course offers in-depth practical know-how of the current trend Technology. These sectors have the potential to grow exponentially and will provide challenging job opportunities for young professionals with the right skill sets.

On the Information Security front, this course equips the students with the concepts and the technical skills in Information Security. The focus of the course is on the models, tools and techniques for enforcement of Security Policies, with emphasis on Cryptography, Ethical Hacking, Computer Forensics and Virtualization and Cloud Security.

On the Mobile Application front, the course provides the students the fundamental knowledge of all aspects of mobile Technology with emphasis on application development for Android, with industry requirements in mind.

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CURRICULUM & SYLLABI FOR BCA (BACHELOR OF COMPUTER APPLICATIONS IN MOBILE APPLICATIONS AND INFORMATION SECURITY) (SIX SEMESTERS / FULL TIME)

Semester I

SI No	Course Code	Course Title	L	T	P	C
1	ENC1182	English - I	3	0	0	3
2	MAC1187	Algebra, Calculus and Trigonometry	3	0	0	3
3	CAC1101	Communication Skills	3	0	0	3
4	CAC1102	Computer Fundamentals & Organization	3	0	0	3
5	CAC1103	Programming in C	3	0	0	3
6	CAC1104	Introduction to Linux	3	0	0	3
7	CAC1105	C Programming Lab	0	0	3	1
8	CAC1106	Linux Lab	0	0	3	1
						20

Semester II

SI No	Course Code	Course Title	L	T	P	C
1	ENC1283	English –II	3	0	0	3
2	MAC1288	Probability and Statistics	3	0	0	3
3	CAC1201	Fundamentals of Storage Management	3	0	0	3
4	CAC1202	Operating System	3	0	0	3
5	CAC1203	OOPS with C++	3	0	0	3
6	CAC1204	Data Structures using C	0	0	0	3
7	CAC1205	OOPS with C++ Lab	0	0	3	1
8	CAC1206	Data Structures Lab	3	0	3	1
						20

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Semester III

Sl No	Course Code	Course Title	L	T	P	C
1	CAC2101	Reasoning and Thinking	3	0	0	3
2	CAC2102	Information Security Fundamentals	3	0	0	3
3	CAC2103	Software Engineering	3	0	0	3
4	CAC2104	RDBMS	3	0	0	3
5	CAC2105	Computer Networks	3	0	0	3
6	CAC2106	Programming in JAVA	0	0	0	1
7	CAC2107	RDBMS Lab	0	0	3	1
8	CAC2108	Programming in JAVA Lab	3	0	3	1
						20

Semester IV

Sl No	Course Code	Course Title	L	T	P	C
1	CAC2201	Employability Skills	3	0	0	3
2	CAC2202	Ethical Hacking Fundamentals	3	0	0	3
3	CAC2203	Cryptography Fundamentals	3	0	0	3
4	CAC2204	Basic Android	3	0	0	3
5	CAC2205	Mobile Architecture and App Development	3	0	0	3
6	CAC2206	Mobile, Wireless and VOIP Security	0	0	0	3
7	CAC2207	Ethical Hacking Lab	0	0	3	1
8	CAC2208	Basic Android Lab	3	0	3	1
						20

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Semester V

Sl No	Course Code	Course Title	L	T	P	C
1	CAC3101	Computer Forensics and Investigation	4	0	0	4
2	CAC3102	Virtualization and Cloud Security	4	0	0	4
3	CAC3103	IT Governance, Risk, & Information Security Management	4	0	0	4
4	CAC3104	Advanced Android	3	0	2	4
5	CAC3105	Mobile Ecosystem, Business Analysis and Models	4	0	0	4
6	CAC3106	Enterprise Application Development	4	0	0	4
7	CAC3107	Computer Forensics and Investigation - Lab	0	0	3	1
8	CAC3108	Advanced Android – Lab	0	0	3	1
						26

Semester VI

Sl No	Course Code	Course Title	L	T	P	C
1	CAC3201	Mobile Testing	4	0	0	4
2	CAC3202	Project and Viva-Voce	24			16
						20

Cumulative Credits-20+20+20+20+26+20=126

SEMESTER-I

Communication Skills

L	T	P	C
3	0	0	3

Objective:The objective of this course is to make students feel the significance of communicating well and how it can have a profound effects in both our professional and personal lives. Students will learn various aspects of managerial writing including report writing. Business writing like Quote creation, Business letters, Orders, Complains and etc. are also taught to students.

Module1: Technical vocabulary

Technical Vocabulary, Punctuation, Numerical Expressions, Expanding Acronyms and Abbreviations, Concord, 'If' clauses, Infinitives. Homonyms, Homographs and Homophones, Telephone conversations, Reading Comprehensions, Making of an advertisement.

Module 2: Basic skills-reading and speaking skills

Reading and interpretation, Intensive reading,. Writing reviews on books and films, Descriptions, Process description, Summarizing, Instructions, Oral presentations. Debate.

Module 3: Basic skill: technical writing skill

Letters – formal, informal, Cover Letter and CV, Synonyms and Antonyms, Indefinite Adjectives, Non-verbal communication, Interactive sessions. Role Plays, Critical reading, Listening and Note taking.

Module 4: Basic skill: listening and speaking skills

Active and Passive Voice, Impersonal Passive, Essay Writing, Comprehension Passage, Editing, Correction of errors, Direct and Indirect, Conversations , Dialogue writing, Discourse Markers. Group activities.

Module 5: Technical writing and communication

Reports – Types, structure, data collection, content, form, Definitions, extended definition, Recommendations, Memos, Checklists. Group Discussions, Listening and comprehending the conversations.

Text book:

1. Department of English, Anna University, Mindscapes, ‘English for Technologists and Engineers’, Orient Longman Pvt. Ltd, Chennai: 2012.
2. Department of Humanities and Social Sciences, Anna University, “English for Engineers and Technologists” Combined Edition (Volumes 1 and 2), Chennai: Orient Longman Pvt. Ltd., 2006.
3. M.Ashraf Rizvi, “Effective Technical Communication”, Tata McGraw-Hill Publishing Company Limited, New Delhi. 2009.

Reference book:

1. Sumant. S, ‘Technical English’, Second Edition, McGraw-Hill Education (India) Pvt. Ltd., 2008.
2. Dr. M. Hariprasad,” Communicative English “Third Edition, Neelkamal Publications, PVT. LTD., 2007.
3. Sangeeta Sharma , Binod Mishra, ‘Communication Skills for Engineers and Scientists, PHI Learning Private Limited., New Delhi, 2009.

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Outcome: Students shall overcome their inhibitions and limitations in communication and become effective communicators. They will learn to compose letters in English error-free and communicate effectively with their peers, colleagues, managers and so on, via appropriate business communication forms

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English-I

L T P C
3 0 0 3

OBJECTIVES:

- To help the students acquire efficiency in Spoken English through role plays.
- To enable them to make Presentation effectively.
- To develop reading skills among students through extensive readers.
- To orient them in writing letters.
- To train them in appreciating and interpreting English literature.

MODULE I

7

Oral and Written Communication – implications in real life and workplace situations Essential English Grammar - 1-6 units

MODULE II

8

One-minute Presentations (JAM) on concrete and abstract topics that test their creative thinking (ii)
Prepared presentations and extempore presentations

Short Story ; O Henry - “Robe of Peace” (Extensive Reading)

MODULE III

8

Role-Play – establishing a point of view - convincing someone on social issues such as preservation of water, fuel, protection of environment, gender discrimination.

Poetry: William Shakespeare - “All the World’s a Stage”

MODULE IV

8

Letter Writing- Letter of Invitation & Permission

Developing story from hints- Short Story : John Galsworthy - “Quality” (Extensive Reading)

MODULE V

8

Précis Writing- Writing instructions and recommendations

Reading Comprehension: Short Story--Rudyard Kipling – “The Miracle of PuranBhagat” (Extensive Reading)

MODULE VI

6

Written correspondence - - e-mail writing

Prose : Education, Employment, Unemployment

TOTAL : 45

REFERENCES:

1. Anderson, Kenneth & et.al. “Study Speaking : A Course in Spoken English for Academic Purposes” (Second Edition). Cambridge University Press, UK. 2004.
2. Sharma, R.C. & Krishna Mohan, “Business Correspondence and Report Writing”. Tata MacGraw – Hill Publishing Company Limited, New Delhi. 2002
3. Hurlock, B. Elizabeth. “Personality Development”. Tata McGraw Hill, New York. 2004.
4. Krishnaswamy. N, Sriraman T. . Current English for Colleges. Hyderabad: Macmillan Indian Ltd, 2006.
5. Dahiya SPS. Ed. Vision in Verse- An Anthology of Poems. New Delhi: Oxford University Press, 2002
6. Murphy, Raymond. Essential English Grammar. New Delhi: Cambridge University Press, 2009.
7. Seshadri, K G Ed. Stories for Colleges. Chennai: Macmillan India Ltd, 2003.

OUTCOME:

Students would be able to

- Actively take part in role plays
- Make effective presentation s
- Read and comprehend various texts.
- Write letters without making mistakes.
- Analyse literary texts.

MAC 1187

ALGEBRA, CALCULUS AND TRIGONOMETRY

Objective:

The course is aimed at

- Developing the skills of students in applying basic concepts in chosen topics of mathematics that are imperative for effective understanding of application oriented topics.
- Laying the foundation for learning concepts of Differentiation, Integration and Trigonometry.

MODULE I Matrices **(9+3)**

Symmetric – Skew-Symmetric - Orthogonal and Unitary matrices - Rank of a Matrix - Consistency - Characteristic equation - Eigenvalues and Eigenvectors - properties - Cayley Hamilton's Theorem (proof not needed) - Simple applications.

MODULE II Theory of equations **(9+3)**

Partial Fractions - Theory of equations- Polynomial Equations with real Coefficients - Irrational roots - Complex roots - Symmetric functions of roots - Transformation of equation by increasing or decreasing roots by a constant - Reciprocal equations.

MODULE III Differential Calculus **(9+3)**

Rules of differentiation - Derivative of implicit function - Successive differentiation- n^{th} derivatives - Leibnitz theorem (without proof) and applications - maxima and minima of functions of two variables - Partial differentiation - Euler's Theorem.

MODULE IV Integral Calculus **(9+3)**

Integration of rational functions - algebraic expressions involving only one irrational quantity- rational functions of $\sin x$ and $\cos x$ - Trigonometric substitutions - Bernoulli's formula for integration by parts - reduction formulae - properties of definite integral - Evaluation of double and triple integrals.

MODULE V Trigonometry **(9+3)**

De Moivre's theorem and its application - Circular and Hyperbolic functions - Inverse circular and hyperbolic functions - Expansion of trigonometric functions in terms of power and multiples - Separation of real and imaginary parts of logarithmic - trigonometric and inverse trigonometric functions - Summation of series including C+iS method.

L : 45, T : 15, Total hours: 60

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Text Books:

1. Narayanan, S. and Manicavachagom Pillay, T.K. (2015) Calculus Vol. I,II &III S.Viswanathan (Printers & publishers) Pvt. Ltd., Chennai.
2. Venkataraman, M.K., “Higher Mathematics for Engineering and Science”, Third Edition, The National Publishing Co., Madras, 1986.
3. Kandasamy P, K. Thilagavathi and K. Gunavathy- Allied Mathematics Paper-I, First semester, 1/e, S. Chand & Co., New Delhi, 2003

REFERENCE BOOKS:

1. Stewart J - Single Variable Calculus (4th edition) Brooks / Cole, Cenage Learning 2010.
2. Tom M. Apostol - Calculus, Vol. I (second edition) John Wiley and Sons, Inc., Jan 2007.
3. Burnside W.S. and A.W. Panton - The Theory of Equations, Dublin University Press, 1954.
4. MacDuffee, C.C. - Theory of Equations, John Wiley & Sons Inc., 1954.
5. Ushri Dutta, A.S.Muktibodh and S.D. Mohagaonkar: Algebra and Trigonometry, PHI India, 2006

OUTCOME:

On completion of the course the students will be able to

- solve eigenvalue and eigenvector problems
- classify and solve polynomial equations of different types.
- differentiate different types of functions.
- integrate rational and trigonometric functions and to evaluate definite integrals (double and triple).
- demonstrate the application of Demoivre’s theorem and find the sum of series of trigonometric functions.

Course Objective:

The basic knowledge of how a computer works is very important for any fresh networking or operating system professional. The functional knowledge of a computers working and its main building parts are paramount. The computers of today may come with variety of features but the basic working principles remain the same. Students will explore the fundamentals of organization of a computer and the principles and building units of a computer (its hardware). Also, they will be introduced to the basics of networking and MS Office.

Module 1: General Features of a Computer

General features of a computer, Generation of computers, Personal computer, workstation, mainframe computer and super computers. Computer applications – data processing, information processing, commercial, office automation, industry and engineering, healthcare, education, graphics and multimedia.

Module 2: Computer Organization

Computer organization, central processing unit, computer memory – primary memory and secondary memory, Secondary storage devices – Magnetic and optical media, Input and output units, OMR, OCR, MICR, scanner, mouse, modem.

Module 3: Computer Hardware and Software

Computer hardware and software, Machine language and high level language, Application software, computer program, operating system, Computer virus, antivirus and computer security, Elements of MS DOS and Windows OS, Computer arithmetic, Binary, octal and hexadecimal number systems, Algorithm and flowcharts, illustrations, elements of a database and its applications, Basic Gates (Demorgans theorems, duality theorem, NOR, NAND, XOR, XNOR gates), Boolean expressions and logic diagrams, Types of Boolean expressions

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Module 4: MS Office

Word processing and electronic spread sheet, An overview of MSWORD, MSEXCEL and MSPOWERPOINT

Module 5: Introduction to Networking

Network of computers, Types of networks, LAN, Intranet and Internet, Internet applications, World Wide Web, E-mail, browsing and searching, search engines, multimedia applications

Reference Books:

1. Alexis Leon and Mathews Leon (1999) : Fundamentals of information Technology, Leon Techworld Pub.
2. Jain, S K (1999) : Information Technology “O” level made simple, BPB Pub
3. Jain V K (2000) “O” Level Personal Computer software, BPB Pub.
4. Rajaraman, V (1999): Fundamentals of Computers, Prentice Hall India
5. Hamacher, Computer Organization McGrawhill
6. Alexis Leon: Computers for everyone. Vikas, UBS
7. Anil Madaan : Illustrated Computer Encyclopedia. Dreamland Pub
8. Sinha. Computer Fundamentals BPB Pub.

Course Outcome:

Students will get in-depth knowledge about the general features of a computer, which will allow introduce them to various features of computer, on which they can base their learning and design. An insight to the different software and hardware components of a computer will take them a step ahead in terms of what they can accomplish from their learning.

Course Objective:

Even with the introduction of several high level languages and frameworks, the development of procedural codes is important in several commercial app developments. The object oriented platforms and event driven systems use procedural languages for coding integral command content. C is an important procedural language and was developed initially to write the UNIX operating system. UNIX operating system, C compiler and all UNIX application programs are written in C. C is popular because, it is easy to learn, produces efficient programs, can handle low-level activities, and can be compiled on a variety of platforms. This course focuses on all the basic concepts, syntax and constructs of the C language. For students, who are new to programming, this unit can be considered as the starting point before taking up any other programming oriented units. The students will be implementing the concepts explained here to create simple to complex programs.

Module 1: Overview of Programming:

Introduction to computer based problem solving, Program design and implementation issues- Flowcharts & Algorithms, Top down design & stepwise refinement, **Programming environment** – Machine language, assembly language, high level languages, Assemblers, Compilers, Interpreters

Module 2: Fundamentals of C programming:

Overview of C, Data Types, Constants & Variables, Operators & Expressions, **Control constructs**-if then, for, while, **Arrays**- single & multidimensional arrays, **Functions**-fundamentals – general form, function arguments, return value, **Basic I/O**-formatted and Unformatted I/O, **Advanced features**- Type modifiers and storage class specifiers for data types, Bit operators, ? operator, &operator, * operator, Type casting, type conversion.

Module 3: Advanced programming techniques:

Control constructs- Do while, Switch statement, break and continue, exit() function, go to and label, **Scope rules**- Local & global variables, scope rules of functions, **Functions**-parameter passing, call by value and call by reference, calling functions with arrays, argc and argv, recursion- basic concepts, ex-towers of Hanoi

Module 4: Dynamic data structures in C:

Pointers- The & and * operator, pointer expression, assignments, arithmetic, comparison, mallocvscalloc, arrays of pointers, pointers to pointers, initializing pointers, pointers to functions, function returning pointers, **Structures**- Basics, declaring, referencing structure elements, array of structures, passing structures to functions, structure pointers, arrays and structures within structures, **Unions** – Declaration, uses, enumerated data-types, typedef

Module 5: Additional features:

File Handling – The file pointer, file accessing functions, fopen, fclose, puc, getc, fprintf, **C Preprocessor**- #define, #include, #undef, Conditional compilation directives, **C standard library and header files**: Header files, string functions, mathematical functions, Date and Time functions

Reference Books:

1. Let us C by YashwantKanetka, 6th Edition, PBP Publication
2. The C programming Language by Richie and Kenninghan, 2004, BPB Publication
3. Programming in ANSI C by Balaguruswamy, 3rd Edition, 2005, Tata McGraw Hill

Course Outcome: Students will learn how to write simple programs using C Language and execute them

Course Objective:

The course provides an overview of the Linux Operating System, geared toward new users as an exploration tour and getting started guide. This unit provides examples to help the learners get a better understanding of the Linux system. The unit also provides the guidelines for the learners to take up vendor certifications. The unit explores the basics of Linux, the underlying management of the Linux operating system and its network configuration. The complete system services of Linux is explained along with the troubleshooting.

Module 1: Linux Introduction

Introduction to Multi user System, History of UNIX, Features & Benefits, Versions of UNIX, Features of UNIX File System,, Commonly Used Commands like who, pwd, cd, mkdir, rm, rmdir, ls, mv, ln, chmod, cp, grep, sed, awk ,tr, yacc etc. getting Started (Login/Logout) . Creating and viewing files using cat, file comparisons, View files, disk related commands, checking disk free spaces. **Exploring Linux Flavors** - Introduction to various Linux flavors, Debian and rpm packages, Vendors providing DEBIAN & RPM distribution & Features. Ubuntu. History, Versions, Installation, Features, Ubuntu one, Fedora: History, Versions, Installation, Features.

Module-2: The Unix File System

Inodes - Structure of a regular file – Directories - Conversion of a path name to an inode - Super block - Inode assignment to a new file - Allocation of disk blocks. System calls for the file System: Open – Read - Write - Lseek – Close - File creation - Creation of special files - Changing directory and root - changing owner and mode – stat and fstat - pipes - Dup - Mounting and Un mounting file systems - Link and Un link.

Module 3: Unix Process Management

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The Structure of Processes: Process States and Transitions - Layout of system memory - Context of a process. Process Control: Process Creation – Signals – Process Termination – Invoking other programs – PID & PPID – Shell on a Shell.

Module 4: VI editor

Vi Editor: Introduction to Text Processing, Command & edit Mode, Invoking vi, deleting & inserting Line, Deleting & Replacing Character, Searching for Strings, Yanking, Running Shell Command Macros, Set Window, Set Auto Indent, Set No. Communicating with Other Users: who, mail, wall, send, mesg, ftp.

Module 5: System Administration

Common administrative tasks, identifying administrative files configuration and log files, Role of system administrator, Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes, Temporary disabling of user's accounts, creating and mounting file system, checking and monitoring system performance - file security & Permissions, becoming super user using su. Getting system information with uname, host name, disk partitions & sizes, users, kernel, installing and removing packages with rpm command

Reference Books:

1. The Design of Unix Operating System, Maurice J. Bach, Pearson Education, 2010
2. Advance UNIX, a Programmer's Guide, S. Prata, BPB Publications, and New Delhi, 2011
3. Unix Concepts and Applications, Sumitabh Das, 2010
4. The UNIX Programming Environment, B.W. Kernighan & R. Pike, Prentice Hall of India. 2009
5. Guide to UNIX Using LINUX, Jack Dent Tony Gaddis, Vikas/ Thomson Pub. House Pvt. Ltd. 2010

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Course Outcome:

To enable the students to have a hands on practical exposure to the Linux Red Hat Enterprise and make them prepared for the RHCE Certification.

Course Objective: For students, who are new to programming, this unit can be considered as the starting point before taking up any other programming oriented units. The students will be implementing the concepts explained here to create simple to complex programs.

List of Programs

Part A

- 1 Printing the reverse of an integer.
- 2 Printing the odd and even series of N numbers.
- 3 Get a string and convert the lowercase to uppercase and vice--versa using `getchar()` and `putchar()`.
- 4 Input a string and find the number of each of the vowels appear in the string.
- 5 Accept N words and make it as a sentence by inserting blank spaces and a full stop at the end.
- 6 Printing the reverse of a string.

Part B

- 1 Searching an element in an array using pointers.
- 2 Checking whether the given matrix is an identity matrix or not.
- 3 Finding the first N terms of Fibonacci series.
- 4 Declare 3 pointer variables to store a character, a character string and an integer respectively. Input values into these variables. Display the address and the contents of each variable.
- 5 Define a structure with three members and display the same.

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- 6 Declare a union with three members of type integer, char, string and illustrate the use of union.
- 7 Recursive program to find the factorial of an integer.
- 8 Finding the maximum of 4 numbers by defining a macro for the maximum of two numbers.
- 9 Arranging N numbers in ascending and in descending order using bubble sort.
- 10 Addition and subtraction of two matrices.
- 11 Multiplication of two matrices.
- 12 Converting a hexadecimal number into its binary equivalent.
- 13 Check whether the given string is a palindrome or not.
- 14 Demonstration of bitwise operations.
- 15 Applying binary search to a set of N numbers by using a function.
- 16 Create a sequential file with three fields: empno, empname, empbasic. Print all the details in a neat format by adding 500 to their basic salary.

Course Outcome: Students will write programs in C Language for lab experiments in this course and execute them.

Course Objective:

The course provides an overview of the Linux Operating System, geared toward new users as an exploration tour and getting started guide. This unit provides examples to help the learners get a better understanding of the Linux system. The unit also provides the guidelines for the learners to take up vendor certifications. The unit explores the basics of Linux, the underlying management of the Linux operating system and its network configuration. The complete system services of Linux is explained along with the troubleshooting.

List of Programs

1. Execute 25 basic commands of UNIX.
2. Basics of functionality and modes of VI Editor.
3. WAP that accepts user name and reports if user is logged in.
4. WAP which displays the following menu and executes the option selected by user:

1. ls 2. Pwd 3. ls -l 4. ps -fe
5. WAP to print 10 9 8 7 6 5 4 3 2 1 .
6. WAP that replaces all “*.txt” file names with “*.txt.old” in the current.
7. WAP that echoes itself to stdout, but backwards.
8. WAP that takes a filename as input and checks if it is executable, if not make it executable.
9. WAP to take string as command line argument and reverse it.

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10. 1. Create a data file called employee in the format given below:

- a. EmpCode Character
- b. EmpName Character
- c. Grade Character
- d. Years of experience Numeric
- e. Basic Pay Numeric

\$vi employee

A001	ARJUN	E1	01	12000.00
A006	Anand	E1	01	12450.00
A010	Rajesh	E2	03	14500.00
A002	Mohan	E2	02	13000.00
A005	John	E2	01	14500.00
A009	Denial Smith	E2	04	17500.00
A004	Williams	E1	01	12000.00

Perform the following functions on the file:

- a. Sort the file on EmpCode.
- b. Sort the file on
 - (i) Decreasing order of basic pay
 - (ii) Increasing order of years of experience.
- c. Display the number of employees whose details are included in the file.
- d. Display all records with 'smith' a part of employee name.

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- e. Display all records with EmpName starting with 'B'.
- f. Display the records on Employees whose grade is E2 and have work experience of 2 to 5 years.
- g. Store in 'file 1' the names of all employees whose basic pay is between 10000 and 15000.
- h. Display records of all employees who are not in grade E2.

Course Outcome:

To enable the students to have a hands on practical exposure to the Linux Red Hat Enterprise and make them prepared for the RHCE Certification.

SEMESTER II

English-II

L T P C
0 0 3 1

Objectives:

- To prepare students for Interviews and Group Discussions
- To train them in writing official letters , resume' writing and reports.
- To train them in analysing different genre of literature.

Module-I **7**

Filling Money Order Challan and Bank Challan

Short Story :G.K.Chesterton – The Hammer of God (Extensive Reading)

Essential English Grammar– 7-12 units

Module-II **8**

Brainstorming – Think, pair and share activity

Poetry :Walt Whitman- I Celebrate Myself

Module-III **8**

Dialogue Writing- Discussion etiquette -Assigning different roles in a GD (Note-taker, Manager, Leader and Reporter)

Prose: Environment

Module-IV **8**

Interview skills- SWOT Analysis

Letter Writing- Letter to the Editor- Letter of Application and CV

Module-V **8**

Report Writing- feasibility report and survey report

Short Story : Katherine Mansfield—A Cup of Tea (Extensive Reading)

Module-VI **6**

Technical reports –Writing a technical report – format and content

Total- 45

References:

1. M. Ashraf Rizvi ‘Effective Technical Communication’. Tata McGraw – Hill Education, 2005. Gerson, Sharon & Steven M. Gerson, “ Technical Writing : Process and Product”

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2. Pearson Education, New Delhi, 2004. 6. Riordan & Pauley. 'Report Writing Today'. 9th Edition. Wadsworth Cengage Learning, USA. 2005.
3. Krishnaswamy. N, Sriraman T. **Current English for Colleges**. Hyderabad: Macmillan Indian Ltd, 2006.
4. Dahiya SPS. Ed. **Vision in Verse- An Anthology of Poems**. New Delhi: Oxford University Press, 2002.
5. Murphy, Raymond. **Essential English Grammar**. New Delhi: Cambridge University Press, 2009.
6. Seshadri, K G Ed. **Stories for Colleges**. Chennai: Macmillan India Ltd, 2003.

OUTCOME:

Students would be able to

- Take part in group discussions and interviews with confidence.
- Write official letters, their application letter with CV and reports.
- Analyse various genre of literature.

MAC 1288

PROBABILITY AND STATISTICS

L	T	P	C
3	1	0	4

Objective:

- To impart knowledge about the basic concepts of probability in solving application oriented problems
- To provide an understanding on the concepts of statistics

Recap Introduction to Probability (4)

Sample space - events - algebraic operations on events - definition of probability - conditional probability - addition and multiplication theorems of probability – Baye's theorem.

MODULE I Random variables and distribution functions (10+3)

Discrete and continuous random variables - distribution function and its properties - probability mass function and probability density function - discrete and continuous probability distributions - Binomial, Geometric, Poisson, Uniform, Exponential and Normal distributions.

MODULE II Moments and Moment generating functions (8+3)

Expectation of a random variable – probability generating function – properties - moment generating function.

MODULE III Two dimensional random variables (6+3)

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Joint, marginal and conditional distribution functions - independence of random variables.

MODULE IV

Descriptive statistics

(8+3)

Types of data - primary and secondary data - classification and representation of data - formation of frequency distribution - various measures of central tendency, dispersion and their merits and demerits - concept of skewness and kurtosis.

MODULE V

Correlation and curve fitting

(9+3)

Correlation coefficient and regression - rank correlation - curve fitting by least square methods - fitting a straight line, parabola, power curve and exponential curves. (no derivation, numerical problems only)

L : 45, T : 15, Total hours: 60

Text Books:

1. Richard Arnold Johnson, Irwin Miller, John E. Freund , Miller & Freund's Probability and Statistics for Engineers, Prentice Hall, 2011.
2. Dr. P. Kandaswamy, Dr. K. Thilagavathy and Dr. K. Gunavathy, Probability and Queuing Theory, Revised edition, S. Chand Publishing, 2013.
3. T. Veerarajan, Probability, Statistics and Random Processes, Tata McGraw Hill, 2nd edition.

References:

1. Goon, A.M., M. K. Gupta and B. Das Gupta Fundamentals of Statistics- Vol. I, World Press Ltd, Kolkata, 2002.
2. Gupta, S.C. and V.K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, New Delhi, 2002.
3. Hogg, R.V. and A. Craig, Introduction to Mathematical Statistics, McMillan Publishing co., Inc. 1978.
4. Mood A.M., F.A. Graybill and D.C. Boes, Introduction to Theory of Statistics McGraw Hill Book Co., 1974.
5. Sheldon M. Ross, Introduction to Probability and Statistics for Engineers and Scientists, Fourth Edition, Elsevier.

OUTCOME:

On completion of the course the students will be able to

- solve basic problems in probability and fundamentals of statistics.

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- solve problems using standard probability distributions.
- find the marginal and conditional distributions of two dimensional random variables.
- calculate rank correlation and fitting curves for the given data.

use method of moments and moment generating functions.

Fundamentals of Storage Management

L T P C
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Course Objective:

Data is all around us, in different forms and amounts. As we are steeping into revolutionizing world of advanced computing like cloud computing, data storage has also undergone many transformations in terms of techniques and hardware used for the same. This makes it significant for a computer student to learn different aspects of data storage. In this course, students will learn fundamentals of data storage, covering topics like demands on data, how storage techniques have evolved over a period of time and vital information about storage topologies like DAS, NAS and SAN, along with their comparison features. The second unit deals with different hardware required for storage like adapters, connectors, cables and their individual features. Different storage protocols used like ATA, SATA, SPI and its sub-categories will be taught to students in the following units. Topics storage security and storage infrastructure are addressed in the final unit.

Module 1 : Introduction to Information storage and Management

Information Storage: Data – Types of Data –Information - Storage , Evolution of Storage Technology and Architecture, Data Center Infrastructure - Core elements- Key Requirements for Data Center Elements -Managing Storage Infrastructure, Key Challenges in Managing Information, Information Lifecycle - Information Lifecycle Management - ILM Implementation -ILM Benefits ,Summary

Module 2: Storage System Environment

Components of a Storage System Environment – Host –Connectivity – Storage, Disk Drive Components –Platter – Spindle - Read/Write Head - Actuator Arm Assembly - Controller - Physical Disk Structure - Zoned Bit Recording - Logical Block Addressing , Disk Drive Performance -1 Disk Service Time , Fundamental Laws Governing Disk Performance , Logical Components of the Host - Operating System - Device Driver -Volume Manager - File System – Application , Application Requirements and Disk Performance, Summary

Module 3: Backup and Recovery

Backup Purpose -Disaster Recovery - Operational Backup –Archival, Backup Considerations, Backup Granularity, Recovery Considerations, Backup Methods , Backup Process, Backup and Restore Operations, Backup Topologies - Serverless Backup , Backup Technologies -Backup to Tape - Physical Tape Library - Backup to Disk - Virtual Tape Library

Module 4 : Local Replication

Source and Target -Uses of Local Replicas, Data Consistency - Consistency of a Replicated File System - Consistency of a Replicated Database , Local Replication Technologies - Host-Based Local Replication - Storage Array-Based Replication , Restore and Restart Considerations - Tracking Changes to Source and Target , Creating Multiple Replicas, Management Interface

Module5: Managing the storage Infrastructure

Monitoring *the* Storage Infrastructure -Parameters Monitored - Components Monitored - Monitoring Examples - Alerts, Storage Management Activities - Availability management - Capacity management - Performance management - Security Management - Reporting- Storage Management Examples, Storage Infrastructure Management Challenges

Text Book:

1. Storage Networks: The Complete Reference, Robert Spalding, Tata McGraw Hill Publication, 2003

Reference Book:

2. Information Storage and Management: Storing, Managing, and Protecting Digital Information, EMC Education Services, Wiley; 1 edition (April 6, 2009)

Course Outcome:

A good knowledge of data storage techniques using various storage topologies and their comparisons, will provide with students choose the best suitable data storage method for their programs and applications.

Course Objective:

The operating system is the most important program that runs on a computer. Every general-purpose computer must have an operating system to run other programs. Operating systems perform basic tasks, such as recognizing input from the keyboard, sending output to the display screen, keeping track of files and directories on the disk, and controlling peripheral devices such as disk drives and printers. This course covers the concept of operating system and its applications.

Module 1 – Introduction to Operating System

Introduction, Objectives and Functions of OS, Evolution of OS, OS Structures, OS Components, OS Services, System calls, System programs, Virtual Machines.

Module 2 – Process Management

Processes: Process concept, Process scheduling, Co-operating processes, Operations on processes, Inter process communication, Communication in client-server systems. **Threads:** Introduction to Threads, Single and Multi-threaded processes and its benefits, User and Kernel threads, Multithreading models, Threading issues. **CPU Scheduling:** Basic concepts, Scheduling criteria, Scheduling Algorithms, Multiple Processor Scheduling, Real-time Scheduling, Algorithm Evaluation, Process Scheduling Models. **Process Synchronization:** Mutual Exclusion, Critical – section problem, Synchronization hardware, Semaphores, Classic problems of synchronization, Critical Regions, Monitors, OS Synchronization, Atomic Transactions **Deadlocks:** System Model, Deadlock characterization, Methods for handling Deadlocks, Deadlock prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

Module 3: Storage Management

Memory Management: Logical and physical Address Space, Swapping, Contiguous Memory Allocation, Paging, Segmentation with Paging. **Virtual Management:** Demand paging, Process creation, Page Replacement Algorithms, Allocation of Frames, Thrashing, Operating System Examples, Page size and other considerations, Demand segmentation **File-System Interface:** File concept, Access Methods, Directory structure, File- system Mounting, File sharing, Protection and consistency semantics **File-System Implementation:** File-System structure, File-System Implementations, Directory Implementation, Allocation Methods, Free-space Management, Efficiency and Performance, Recovery **Disk Management:** Disk Structure, Disk Scheduling, Disk Management, Swap-Space Management, Disk Attachment, stable-storage Implementation

Module 4: Protection and Security

Protection: Goals of Protection, Domain of Protection, Access Matrix, Implementation of Access Matrix, Revocation of Access Rights, Capability- Based Systems, Language – Based Protection. **Security:** Security Problem, User Authentication, One – Time Password, Program Threats, System Threats, Cryptography, Computer – Security Classifications.

Reference Books:

1. Milan Milonkovic, Operating System Concepts and design, II Edition, McGraw Hill 1992.
2. Tanenbaum, Operation System Concepts, 2nd Edition, Pearson Education.
3. Silberschatz / Galvin / Gagne, Operating System,6thEdition,WSE (WILEY Publication)
4. William Stallings, Operating System, 4th Edition, Pearson Education.
5. H.M.Deitel, Operating systems, 2nd Edition ,Pearson Education
6. Abraham Silberschatz and peter Baer Galvin, Operating System Concepts, 8th Edition, Pearson Education 1989 (Chapter 1,3.1,3.2,3.3,3.4,3.6,4,5,6 (Except 6.8,6.9), 7, 8,9,10,11,13, (Except 13.6) 19 (Except 19.6),20(Except 20.8, 20.9), 22,23)
7. Nutt: Operating Systems, 3/e Pearson Education 2004

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Course Outcome: After learning the fundamental concepts in Operating system including how OS has evolved over the years and different components of OS, students will continue to more significant functions of OS like Process management, storage and memory management etc. This will provide the necessary information for students to extract maximum benefits out of the OS while developing programs, working with applications and etc.

Course Objective:

The main objective is to learn the basic concept and techniques which form the object oriented programming paradigm. Object-oriented programming is a new way of thinking about problem using models organizes around real world concept. The Fundamental construct is the object which combines both data-structure and behaviour in a single entity which is in contrast to conventional programming in which data-structure and behaviour are loosely connected.

Module 1: Introduction

Evolution of programming methodologies-Procedure oriented versus Object Oriented Programming-characteristics of OOP, Basics of OOP, Merits and Demerits of OOP. **Data Types:** Different data types, operators and expressions in C++, Keywords in C++. **Input and Output:** Comparison of stdio.h and iostream.h, cin and cout. **Decision and loop:** Conditional statement - if-else statement, nested if-else statement, switch, break, continue, and goto statements, Looping statements- for loop, while loop, Do-while loop. **Arrays, String and Structures :** fundamentals-Single dimensional, multi-dimensional arrays, fundamentals of strings, different methods to accept strings, different string manipulations, array of strings, Basics of structures-declaring and defining structure- Accessing structure members, array of structures, Unions difference between structures and Unions, Enumerated data types-declaration and their usage.

Module 2:

Class: Definition-defining the class, defining data members and member functions, Access specifier-private, public, protected, objects as function arguments, returning objects from the function, scope resolution operator, member function defined outside the class, difference between class and structure, array as class member data, Array of objects. **Functions in C++ :** Function definition, function declaration, Built-in functions, user defined functions, calling the function, passing parameter-actual and formal, different methods of calling the function call by value, call by reference using reference as

parameter and pointer as parameter, overload function-different types of arguments-different number of arguments, inline function, default argument, storage classes-automatic, external, static, register.

Constructor and Destructor: Constructors-constructor with argument, constructor without arguments, constructor with default arguments, Dynamic constructor, constructor overloading, copy constructor, destructors, Manipulating private data members.

Module 3:

Operator overloading: Defining operator overloading, overloading unary operator, overloading binary operator, manipulation of string using overloaded operator, rules for overloading operator. Data conversion: conversion between Basic types, conversion between objects & Basic types, conversion between objects of different classes. **Inheritance:** Base Class & derived class, defining derived classes, protected access specifier, public inheritance and private inheritance-member accessibility, constructors and destructors in derived classes, Level of inheritance-single inheritance, multiple inheritance, multi-level inheritance, hierarchical inheritance, hybrid inheritance.

Module 4:

Pointer: Pointer declaration and Access, Pointer to void, pointer and arrays, pointer constant and pointer variable, pointer and functions, pointer, call by pointer arrays, array of pointers to string, printer sort, memory management-new and delete, pointer to object-referencing members using pointers, self containing class, this pointer, returning values using this pointer. **Virtual function:** Normal member functions accessed with pointers, virtual member function access, late binding, pure virtual function, abstract class, virtual base class. **Friend functions and static function:** Purpose, defining friend functions, friend classes, static function, accessing static function numbering positive objects.

Module 5:

Templates and Exception Handling: Introduction to templates, class templates, function templates, Member function templates, Template arguments, Exception handling. **Console IO Operator :** C++ stream and C++ stream classes, unformatted I/O operators, formatted I/O operators-manipulators-user defined manipulators. **Files :** Class for file stream operators, opening and closing a file, file nodes, writing an object to disk, reading an object from disk, binary versus character files, I/O with multiple object, stream class, file pointer-specifying the position, specifying the object, tellg() function, seekg() function. Command line arguments.

Reference Books:

1. E. Balaguruswamy: Object Oriented Programming with C++, Tata McGraw Hill. Publications
2. Strousstrup: The C++ Programming Language, Pearson Edition, 3rd Edition
3. Lafore Robert: Object Oriented Programming in Turbo C++, Galgotia Publications
4. Lippman: C++ Primer, 3/e Pearson Education
5. C++ completer reference by Herbert Schildt, Tata McGraw Hill Publications.
6. Let us C++ by Yeshwanth Kanetkar

Course Outcome: Students will learn to program in C++

Course Objective:

A data structure is a particular way of storing and organizing data in a computer so that it can be used efficiently. Different kinds of data structures are suited to different kinds of applications and some are highly specialized to specific tasks. This course covers the basic concepts of different data structures which are the basic building blocks of Programming and problem solving.

Module 1: Introduction to Data structures

Definition,

Classification of data structures: primitive and non primitive, Elementary data organization, Time and space complexity of an algorithm (Examples), String processing. Dynamic memory allocation and pointers: Definition of dynamic memory allocation, Accessing the address of a variable, Declaring and initializing pointers, Accessing a variable through its pointer, Meaning of static and dynamic memory allocation, Memory allocation functions: malloc(), calloc(), free() and realloc(). Recursion: Definition, Recursion in C (advantages), Writing Recursive programs – Binomial coefficient, Fibonacci, GCD.

Module 2: Searching and Sorting

Basic Search Techniques: Sequential search: Iterative and Recursive methods, Binary search: Iterative and Recursive methods, Comparison between sequential and binary search. Sort: General background and definition, Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort

Module 3: Stack and Queue

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Stack – Definition, Array representation of stack, Operations on stack: Infix, prefix and postfix notations, Conversion of an arithmetic expression from Infix to postfix, Applications of stacks. Queue: Definition, Array representation of queue, Types of queue: Simple queue, Circular queue, Double ended queue (deque) , Priority queue , Operations on all types of Queues

Module 4: Linked List

Definition, Components of linked list, Representation of linked list, Advantages and Disadvantages of linked list. Types of linked list: Singly linked list, doubly linked list, Circular linked list, Operations on singly linked list: creation, insertion, deletion, search and display.

Module 5: Tree Graphs and their Applications:

Definition : Tree, Binary tree, Complete binary tree, Binary search tree, Heap Tree terminology: Root, Node, Degree of a node and tree, Terminal nodes, Non-terminal nodes, Siblings, Level, Edge, Path, depth, Parent node, ancestors of a node. Binary tree: Array representation of tree, Creation of binary tree. Traversal of Binary Tree: Preorder, Inorder and postorder. Graphs, Application of Graphs, Depth First search, Breadth First search.

Reference Books:

1. Weiss, Data Structures and Algorithm Analysis in C, II Edition, Pearson Education, 2001
2. Lipschutz: Schaum's outline series Data structures Tata McGraw-Hill
3. Robert Kruse Data Structures and program designing using 'C'
4. Trembley and Sorenson Data Structures
5. E. Balaguruswamy Programming in ANSI C.
6. Bandyopadhyay, Data Structures Using C Pearson Education, 1999

7. Tenenbaum, Data Structures Using C. Pearson Education, 200
8. Kamthane: Introduction to Data Structures in C. Pearson Education 2005.
9. Hanumanthappa M., Practical approach to Data Structures, Laxmi Publications, Fire Wall media 2006
10. Langsam, AusensteinMaoshe& M. Tanenbaum Aaron Data Structures using C and C++ Pearson Education

Course Outcome: Students will benefit from the knowledge of Data Structures and different operating one can perform on these like searching, sorting, stacking and etc. This forms a very strong foundation for programming in different languages that the students will take up in subsequent semesters or in any other course

Course Objective: To provide practical experience to students and reinforce the theory concepts

List of Programs

Part A

1. Number of vowels and number of characters in a string.
2. Write a function called zeros maller () that is passed with two introduce arguments by reference and set the smaller of the number to zero. Write a man() program to access this function.
3. Demonstration of array of object.
4. Using this pointer to return a value (return by reference).
5. Pointer sort.
6. Demonstration of virtual function.
7. Demonstration of static function.
8. Accessing a particular record in a student's file.

Part B

9. Using different methods to write programs to implement function overloading with default arguments for the following problems :
 - a) To find whether a given number is prime.
 - b) To find the factorial of a number

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10. Write a program to create a database for a bank account contains Name, Account no, Account type, Balance, Including the following a) Constructors b) destructors call) default constructors d) input and output function ; input and output for 10 people using different methods.
11. Create a class to hold information of a husband and another for the wife. Using friend functions give the total salary of the family.
12. Write a program to overload the following operators (any 3)
 - a) Binary operator '+' to concatenate 2 strings
 - b) Relational operator '<' to find whether one data is less than the other
 - c) Unary operator '++' to find the next date of a given date.
13. Create a base class for a stack and implement push and pop operation. Include a derived class to check for stack criteria such as a) stack empty b) stack full c) stack overflow d) stack underflow.
14. Create a database using concepts of files for a student including the following fields : Student-name, Student's Reg No, Student's Attendance (overall % of attendance); and enter data for 10 students and output the same in proper format.
15. Using operator overloading concept implement arithmetic manipulation on two complex numbers.

Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

Course Objective: To provide practical experience to students and reinforce the theory concepts

List of Programs

Part A

1. Use a recursive function to find GCD of two numbers.
2. Use a recursive function to find the Fibonacci series.
3. Use pointers to find the length of a string and to concatenate two strings.
4. Use pointers to copy a string and to extract a substring from a given a string.
5. Use a recursive function for the towers of Hanoi with three discs.
6. Insert an integer into a given position in an array.
7. Deleting an integer from an array.
8. Write a program to create a linked list and to display it.
9. Write a program to sort N numbers using insertion sort.
10. Write a program to sort N numbers using selection sort.

Part B

1. Inserting a node into a singly linked list.

2. Deleting a node from a singly linked list.
3. Pointer implementation of stacks.
4. Pointer implementation of queues.
5. Creating a binary search tree and traversing it using in order, preorder and post order.
6. Sort N numbers using merge sort.

Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

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Mathematics- II

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University Syllabus

SEMESTER III

Information Security Fundamentals

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Course Objective:

The course primarily covers the Types of Threats, Vulnerabilities, Risks and various terminologies in Information Security. It explains the formation of Security policy at various levels inside the Organization and provides the definition Procedures, Standard and Guidelines. The units emphasizes the need of Performing Asset Classification and Declassification, Retention and Disposal of Information Asset also it identifies the various levels of Authorization for access Viz., Owner, Custodian and User. The course covers the different types of Access Controls and Physical security measures to safeguard the Assets and conclusively, it deals with the Digital Rights Management also covering the concepts of Common Authentication protocols and Real world Protocols.

Module 1: Introduction to Information Security

Definition of Information Security, Evolution of Information Security; Basics Principles of Information Security; Critical Concepts of Information Security; Components of the Information System; Balancing Information Security and Access; Implementing IT Security, The system Development Life cycle, Security professional in the organization.

Module 2: The Need for IT Security

Business Needs-Protecting the functionality, Enabling the safe operations, Protecting the data, safe guarding the technology assets; Threats-compromises to Intellectual property, deliberate software attacks, Espionage and trespass, sabotage and vandalism; Attacks-Malicious Codes, Back Doors, Denial of Service and Distributed Denial of Service, Spoofing, sniffing, Spam, Social Engineering.

Module 3: Risk Management

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Definition of risk management, risk identification, and risk control, Identifying and Accessing Risk, Assessing risk based on probability of occurrence and likely impact, the fundamental aspects of documenting risk via the process of risk assessment, the various risk mitigation strategy options, the categories that can be used to classify controls.

Module 4: Network Infrastructure Security and Connectivity

Understanding Infrastructure Security- Device Based Security, Media-Based Security, Monitoring and Diagnosing; Monitoring Network- Firewall, Intrusion Detection System, Intrusion Prevention system; OS and Network Hardening, Application Hardening; Physical and Network Security- Policies, Standards and Guidelines.

Reference Books:

1. Information Security Risk Analysis - Thomas R. Peltier, Third Edition, Pub: Auerbach, 2012
2. Operating System Concepts, 8th Edition by Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Pub: John Wiley & sons, Inc., 2009.
3. Information security: Principles and Practice - Mark Stamp, 2nd Edition, Pub: John Wiley & Sons, Inc., 2011

Course Outcome:

To enable students to understand the concepts of IT security, Threats, Vulnerabilities, Impact and control measures. And also to get familiarize with Asset management along with the objective to create awareness in Digital Rights management

Course Objective:

Software engineering incorporates various accepted methodologies to design software. This subject gives a detailed description of the entire process of developing a software project and also the issues associated after development. This course covers the introductory concepts of software engineering and its design.

Module 1: Software Product and Process

Introduction – S/W Engineering Paradigm – Verification – Validation – Life Cycle Models – System Engineering – Computer Based System – Business Process Engineering, Overview – Product Engineering Overview.

Module 2: Software Requirements

Functional and Non-Functional – Software Document – Requirement Engineering Process – Feasibility Studies – Software Prototyping – Prototyping in the Software Process – Data – Functional and Behavioral Models – Structured Analysis and Data Dictionary.

Module 3: Analysis, Design Concepts and Principles

Systems Engineering - Analysis Concepts - Design Process And Concepts – Modular Design – Design Heuristic – Architectural Design – Data Design – User Interface Design – Real Time Software Design – System Design – Real Time Executives – Data Acquisition System – Monitoring And Control System.

Module 4: Testing

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Taxonomy Of Software Testing – Types Of S/W Test – Black Box Testing – Testing Boundary Conditions – Structural Testing – Test Coverage Criteria Based On Data Flow Mechanisms – Regression Testing – Unit Testing – Integration Testing – Validation Testing – System Testing And Debugging – Software Implementation Techniques

Module 5: Software Project Management

Measures And Measurements – ZIPF's Law – Software Cost Estimation – Function Point Models – COCOMO Model – Delphi Method – Scheduling – Earned Value Analysis – Error Tracking – Software Configuration Management – Program Evolution Dynamics – Software Maintenance – Project Planning – Project Scheduling– Risk Management – CASE Tools

Text Books:

1. Ian Sommerville, “Software engineering”, Seventh Edition, Pearson Education Asia, 2007
2. Roger S. Pressman, “Software Engineering – A practitioner's Approach”, Sixth Edition, McGraw-Hill International Edition, 2005

Course Outcome:

Learners will develop knowledge about Software Development Life Cycle, which is very essential for any Software Developer to design and develop any application or software. This course also includes modules on Software testing which forms an essential part of SDLC

RDBMS

L T P C
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Course Objective:

A database management system (DBMS) is collection of software meant to manage a Database. Many popular databases currently in use are based on the relational database model. RDBMSs have become a predominant choice for the storage of information in new databases used for financial records, manufacturing and logistical information, personnel data and much more. The course covers the basic concepts of databases in general with an emphasis on relational databases, modeling techniques and writing queries. Normalization techniques, Transaction processing, Concurrency Control techniques and Recovery of databases against crashes are also covered.

Module 1: Introduction

Purpose of Database System — Views of data – Data Models – Database Languages — Database System Architecture – Database users and Administrator – Entity– Relationship model (E-R model) – E-R Diagrams -- Introduction to relational databases

Module 2: Relational Model

The relational Model – The catalog- Types– Keys - Relational Algebra – Domain Relational Calculus – Tuple Relational Calculus - Fundamental operations – Additional Operations- SQL fundamentals, Oracle data types, Data Constraints, Column level & table Level Constraints, working with Tables, Defining different constraints on the table, Defining Integrity Constraints in the ALTER TABLE Command, Select Command, Logical Operator, Range Searching, Pattern Matching, Oracle Function, Grouping data from Tables in SQL, Manipulation Data in SQL. Joining Multiple Tables (Equi Joins), Joining a Table to itself (self Joins), Sub queries Union, intersect & Minus Clause, Creating view, Renaming the

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Column of a view, Granting Permissions, - Updating, Selection, Destroying view Creating Indexes, Creating and managing User, Integrity – Triggers - Security – Advanced SQL features –Embedded SQL– Dynamic SQL- Missing Information– Views – Introduction to Distributed Databases and Client/Server Databases

Module 3: Database Design

Functional Dependencies – Non-loss Decomposition – Functional Dependencies – First, Second, Third Normal Forms, Dependency Preservation – Boyce/Codd Normal Form-Multi-valued Dependencies and Fourth Normal Form – Join Dependencies and Fifth Normal Form

Module 4: Transactions

Transaction Concepts - Transaction Recovery – ACID Properties – System Recovery – Media Recovery – Two Phase Commit - Save Points – SQL Facilities for recovery –Concurrency – Need for Concurrency – Locking Protocols – Two Phase Locking – Intent Locking – Deadlock- Serializability – Recovery Isolation Levels – SQL Facilities for Concurrency.

Text Books:

1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Fifth Edition, Tata McGraw Hill, 2006
2. RamezElmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Fourth Edition, Pearson/Addision Wesley, 2007.
3. Raghu Ramakrishnan, “Database Management Systems”, Third Edition, McGraw Hill, 2003.

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Course Outcome: Students will learn how to write queries, transactions and different modelling techniques in a relational database.

Course Objective:

It is important for networking professionals to have a sound grounding in the basics of networking and with the networking technology being developed thick and fast, the professionals need to be updated of them at all times. The focus of this unit is providing a background to the basics of networking and its underlying principles. The learners taking this unit will explore the fundamentals of networking, the principle and purpose behind layered models, devices used in networks and their wireless connectivity and the ways to troubleshoot network related issues. This course enables learners to understand computer networking concepts, how they work, how they operate and the protocols, standards and the models associated with networking technology and their troubleshooting mechanisms.

Module 1: Networking Fundamentals

Basics of Network & Networking, Advantages of Networking, Types of Networks, Network Terms- Host, Workstations, Server, Client, Node, Types of Network Architecture- Peer-to-Peer & Client/Server, Workgroup Vs. Domain. Network Topologies, Types of Topologies, Logical and physical topologies, selecting the Right Topology, Types of Transmission Media, Communication Modes, Wiring Standards and Cabling- straight through cable, crossover cable, rollover cable, media connectors (Fiber optic, Coaxial, and TP etc.) Introduction of OSI model, Seven layers of OSI model, Functions of the seven layers, Introduction of TCP/IP Model, TCP, UDP, IP, ICMP, ARP/RARP, Comparison between OSI model & TCP/IP model. Overview of Ethernet Addresses

Module 2: Basics of Network Devices

Network Devices- NIC- functions of NIC, installing NIC, Hub, Switch, Bridge, Router, Gateways, And Other Networking Devices, Repeater, CSU/DSU, and modem, Data Link Layer: Ethernet, Ethernet standards, Ethernet Components, Point-to-Point Protocol (PPP), PPP

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standards, Address Resolution Protocol, Message format, transactions, Wireless Networking: Wireless Technology, Benefits of Wireless Technology, Types of Wireless Networks: Ad-hoc mode, Infrastructure mode, Wireless network Components: Wireless Access Points, Wireless NICs, wireless LAN standards: IEEE 802.11a, IEEE 802.11b, IEEE 802.11g, wireless LAN modulation techniques, wireless security Protocols: WEP,WPA, 802.1X, Installing a wireless LAN

Module 3: Basics of Network, Transport and Application Layers

Network Layer: Internet Protocol (IP), IP standards, versions, functions, IPv4 addressing, IPv4 address Classes, IPv4 address types, Subnet Mask, Default Gateway, Public & Private IP Address, methods of assigning IP address, IPv6 address, types, assignment, Data encapsulation, The IPv4 Datagram Format, The IPv6 Datagram Format, Internet Control Message Protocol (ICMP), ICMPv4, ICMPv6, Internet Group Management Protocol (IGMP),Introduction to Routing and Switching concepts, Transport Layer: Transmission Control Protocol(TCP), User Datagram Protocol (UDP), Overview of Ports & Sockets, Application Layer: DHCP, DNS, HTTP/HTTPS, FTP, TFTP, SFTP, Telnet, Email: SMTP, POP3/IMAP, NTP

Module 4: WAN Technology

What Is a WAN?, WAN Switching, WAN Switching techniques Circuit Switching, Packet Switching etc., Connecting to the Internet : PSTN, ISDN, DSL, CATV, Satellite-Based Services, Last Mile Fiber, Cellular Technologies, Connecting LANs : Leased Lines, SONET/SDH, Packet Switching, Remote Access: Dial-up Remote Access, Virtual Private Networking, SSL VPN, Remote Terminal Emulation, Network security: Authentication and Authorization, Tunneling and Encryption Protocols, IPsec, SSL and TLS, Firewall, Other Security Appliances, Security Threats

Module 5: Network Operating Systems and Troubleshooting Network

Network Operating Systems: Microsoft Operating Systems, Novell NetWare, UNIX and Linux Operating Systems, Macintosh Networking, Trouble Shooting Networks: Command-

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Line interface Tools, Network and Internet Troubleshooting, Basic Network Troubleshooting : Troubleshooting Model, identify the affected area, probable cause, implement a solution, test the result, recognize the potential effects of the solution, document the solution, Using Network Utilities: ping, traceroute, tracert, ipconfig, arp, nslookup, netstat, nbtstat, Hardware trouble shooting tools, system monitoring tools

Reference Books:

1. CCNA Cisco Certified Network Associate: Study Guide (With CD) 7th Edition (Paperback), Wiley India, 2011
2. CCENT/CCNA ICND1 640-822 Official Cert Guide 3 Edition (Paperback), Pearson, 2013
3. Routing Protocols and Concepts CCNA Exploration Companion Guide (With CD) (Paperback), Pearson, 2008
4. CCNA Exploration Course Booklet : Routing Protocols and Concepts, Version 4.0 (Paperback), Pearson, 2010

Course Outcome: Students will develop knowledge and skills required to take up vendor certifications in the networking domain.

Course Objective:

Object oriented programming is the most proven technique for developing reliable programs. It helps in increased productivity, reusability of code, decrease in the development time, and reduces cost of production to an extent. The cost of maintaining such systems have also considerably decreased. There are many languages which used the object oriented concepts and techniques. Some of them are C++, Java, Smalltalk, Objective-C, etc. Java is a purely object oriented language. Systems/applications created using java programming language reduces the need for developing and maintain complex and space consuming applications. Java has a lot of advantages of being simple, robust, platform independent, etc. Nowadays java is also found in the mobile phones. This unit focuses on the concepts of object oriented programming language and the different constructs for creating applications in java. This course provides students with an understanding of the object oriented concepts which helps in the field of programming, management of data, etc. and of Java programming which helps to explore the object oriented nature of the language and the multi-platform versatility offered by it.

Module 1: Introduction

History, Overview of Java, Object Oriented Programming, A simple Program, Two control statements - if statement, for loop, using Blocks of codes, Lexical issues - White space, identifiers, Literals, comments, separators, Java Key words. Data types: Integers, Floating point, characters, Boolean, A closer look at Literals, Variables, Type conversion and casting, Automatic type promotion in Expressions Arrays. **Operators:** Arithmetic operators, The Bit wise operators, Relational Operators, Boolean Logical operators, Assignment Operator, Operator Precedence. Control Statements: Selection Statements - if, Switch: Iteration Statements - While, Do-while, for Nested loops, Jump statements.

Module 2: Classes:

Class Fundamentals, Declaring objects, Assigning object reference variables, Methods, constructors, “this” keyword, finalize () method A stack class, Over loading methods, using objects as parameters, Argument passing, Returning objects, Recursion, Access control, Introducing final, understanding static, Introducing Nested and Inner classes, Using command line arguments. Inheritance: Inheritance basics, Using super, method overriding, Dynamic method Dispatch, using abstract classes, using final with Inheritance.

Module 3: Packages

Definition, Access protection importing packages, Interfaces: Definition implementing interfaces. Exception Handling: Fundamental, Exception types, Using try and catch, Multiple catch clauses, Nested try Statements, throw, throws, finally, Java’s Built - in exception, using Exceptions.

Module 4: Multithreaded Programming

The Java thread model, The main thread, Creating a thread, Creating multiple thread, Creating a thread, Creating multiple threads, Using isalive() and Join(), Thread - Priorities, Synchronization, Inter thread communication, suspending, resuming and stopping threads, using multi threading. I/O basics, Reading control input, writing control output, Reading and Writing files, Applet Fundamentals, the AWT package,AWT Event handling concepts The transient and volatile modifiers, using instance of using assert.

Module 5: JAVA Database Connectivity (JDBC)

Database connectivity: JDBC architecture, JDBC Drivers, the JDBC API: loading a driver, connecting to a database, Creating and executing JDBC statements, Handling SQL exceptions, Accessing result sets: Types of result sets, Methods of result set interface. An example JDBC application to query a database

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Reference Books:

1. The complete reference Java –2: V Edition By Herbert Schildt Pub. TMH.
2. SAMS teach yourself Java – 2: 3rd Edition by Rogers Cedenhead and Leura Lemay Pub. Pearson Education.

Course Outcome:

Students will learn how to write Programs using Java

Course Objective: To provide practical experience to students and reinforce the theory concepts

1. Create User in Oracle Database and grant and revoke the privileges and use of commit savepointrollback command.
2. Create the following:
 - Synonym sequences and Index
 - Create alter and update views.
3. Create PL/SQL program using cursors, control structure, exception handling
4. Create following:
 - Simple Triggers
 - Package using procedures and functions.
5. Create the table for
 - COMPANY database
 - STUDENT database and Insert five records for each attribute.
6. Illustrate the use of SELECT statement
7. Conditional retrieval - WHERE clause
8. Query sorted - ORDER BY clause
9. Perform following:
 - UNION, INTERSECTION and MINUS operations on tables.
 - UPDATE, ALTER, DELETE, DROP operations on tables
10. Query multiple tables using JOIN operation.

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11. Grouping the result of query - GROUP BY clause and HAVING clause
12. Query multiple tables using NATURAL and OUTER JOIN operation.

Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

Course Objective: To provide practical experience to students and reinforce the theory concepts

List of Programs

Part A

1. Write a program to check whether two strings are equal or not.
2. Write a program to display reverse string.
3. Write a program to find the sum of digits of a given number.
4. Write a program to display a multiplication table.
5. Write a program to display all prime numbers between 1 to 1000.
6. Write a program to insert element in existing array.
7. Write a program to sort existing array.
8. Write a program to create object for Tree Set and Stack and use all methods.
9. Write a program to check all math class functions.
10. Write a program to execute any Windows 95 application (Like notepad, calculator etc)
11. Write a program to find out total memory, free memory and free memory after executing garbage Collector (gc).

Part B

12. Write a program to copy a file to another file using Java to package classes. Get the file names at run time and if the target file is existed then ask confirmation to overwrite and take necessary actions.
13. Write a program to get file name at runtime and display number of lines and words in that file.
14. Write a program to list files in the current working directory depending upon a given pattern.
15. Create a textfield that allows only numeric value and in specified length.
16. Create a Frame with 2 labels, at runtime display x and y coordinate of mouse pointer in the labels.

Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

Course Objective: It is the objective of the course to introduce to the students, concepts like Reasoning and thinking which are very important for any individual in every aspect and walk of life and assists them in taking the right decisions, approach every problem with diligence and perform action accordingly.

Module 1: Verbal ability

Synonyms, Antonyms and One word substitutes

Module 2: Basic quantitative aptitude

Speed, Time and Distance, Time and Work, Linear Equations, Progressions (Sequences & Series), Permutation and Combination, Probability, Functions, Set Theory, Number Systems, LCM and HCF, Percentages, Collection and Scrutiny of data: Primary data, questionnaire and schedule; secondary data, their major sources including some government publications.

Module 3: Logical Reasoning - I

Number and Letter Series, Calendars, Clocks, Cubes, Venn Diagrams, Binary Logic, Seating Arrangement, Logical Sequence, Logical Matching, Logical Connectives, Syllogism

Reference Books:

1. Richard I Levin, David S. Rubin: Statistics for Management, Pearson Prentice Hall Education Inc. Ltd, NewDelhi, 5th Ed. 2007
2. Bajpai, N. Business Statistics, Pearson, 2010

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3. Sharma J.K., Business Statistics, Pearson Education India, 2010.
4. Anderson; David R, Dennis J. Sweeney and Thomas A. Williams, Quantitative Methods for Business, Prentice-Hall, WestPublishing Company, 1996.
5. CAT Complete course, UPKAR publications

Course Outcome: Through various Verbal ability activities and concepts, student will participate in solving questions in aptitude and logical reasoning questions.

SEMESTER IV

Ethical Hacking Fundamentals

L T P C
3 0 03

Course Objective:

The course primarily covers the Ethical hacking methodology and its different stages which include the Foot printing, Scanning, Enumeration and System hacking techniques and a broad knowledge about white box and black box testing. The Unit describes a wide range of attacks that can cause adverse negative effects on IT systems that include Denial of service, Session hijacking and severe vulnerabilities that can be seen in Web Applications. The Unit also covers hacking attacks caused in other Operating System environment like Linux and the secret techniques to Evade Firewalls. The Unit not only captures valuable information on vulnerabilities and threats but also covers an effective way of report making methodology that can helps the top level management to take immediate decisions on mitigating the threats.

Module 1: Introduction to Ethical Hacking

Hacking Methodology, Process of Malicious Hacking, Footprinting and Scanning: Footprinting, Scanning. Enumeration: Enumeration. System Hacking and Trojans: System Hacking, Trojans and Black Box Vs White Box Techniques

Module 2: Hacking Methodology

Denial of Service, Sniffers, Session Hijacking and Hacking Web Servers: Session Hijacking, Hacking Web Servers. Web Application Vulnerabilities and Web Techniques Based Password Cracking: Web Application Vulnerabilities, Web Based Password Cracking Techniques

Module 3: Web and Network Hacking

SQL Injection, Hacking Wireless Networking, Viruses, Worms and Physical Security: Viruses and Worms, Physical Security. Linux Hacking: Linux Hacking. Evading IDS and Firewalls: Evading IDS and Firewalls

Module 4: Report writing & Mitigation

Introduction to Report Writing & Mitigation, requirements for low level reporting & high level reporting of Penetration testing results, Demonstration of vulnerabilities and Mitigation of issues identified including tracking

Reference Books:

1. The CEH Prep Guide: The Comprehensive Guide to Certified Ethical Hacking, by Ronald L. Krutz (Author), Russell Dean Vines, Wiley Publications, First Edition

Course Outcome: Students will learn the ethical hacking concepts which will provide them with in –depth understanding of the web application vulnerabilities and exploitation techniques. They will also familiarize themselves with the wide range of attacks in a networking environment and prepare a well-defined vulnerability report along with remediation techniques.

Course Objective:

Security is ubiquitous. With the advent of e-commerce and electronic transactions, the need for development of secured systems has grown tremendously. Cryptography is the study of building ciphers to ensure the confidentiality and integrity of information. Along with it is the activity of analyzing the strength of a cipher by subjecting it to several forms attack. This course covers the basic concepts of Cryptography, certain cryptographic algorithms and its applications.

Module 1: Introduction to Cryptography

The Confidentiality, Integrity & Availability (CIA) Triad, Cryptographic concepts, methodologies & practices, Symmetric & Asymmetric cryptography, public & private keys, Cryptographic algorithms and uses, Construction & use of Digital signatures

Module 2: Types of Algorithms

The basic functionality of hash/crypto algorithms (DES, RSA, SHA, MD5, HMAC, DSA) and effects on key length concepts in Elliptical Curve Cryptography & Quantum Cryptography

Module 3: Key Management

The basic functions involved in key management including creation, distribution, verification, revocation and destruction, storage, recovery and life span and how these functions affect cryptographic integrity

Module 4: Application of Cryptography

Major key distribution methods and algorithms including Kerberos, ISAKMP etc., Vulnerabilities to cryptographic functions, the Use and functions of Certifying Authorities (CAs), Public Key Infrastructure (PKI) and System architecture requirements for implementing cryptographic functions

Reference Books:

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole
2. Cryptography and Security by C K Shyamala, N Harini and Dr T R Padmanabhan – Wiley Publications, First Edition

Course Outcome: Students will learn the basics of Cryptography, certain Cryptographic algorithms and its applications

Course Objective:

Android is a comprehensive open source platform designed for mobile devices. It is championed by Google and owned by Open Handset Alliance. The goal of the alliance is to “accelerate innovation in mobile and offer consumers a richer, less expensive, and better mobile experience.” Android provides all the tools and frameworks for developing mobile apps quickly and easily. The Android SDK is all you need to start developing for Android. Android OS can be found in a series of mobile devices currently.

This unit focuses to provide a conceptual understanding of android programming including design principles, practical implementation and development skills for programmer. On completion of this unit the learner should be able to design and implement a variety of basic Android Apps.

Module 1: Introduction to Android

Introduction to Android Architecture: Introduction, History, Features and Android Architecture. Android Application Environment, SDK, Tools: Android Studio, Application workflow. Programming paradigms and Application Components - Part 1: Application Components, Activity - start, stop, resume, restart and recreate, Manifest File, Programming paradigms and Application Components Part 2: Intents, Content providers, Broadcast receivers, Services

Module 2: User Interface Design

User Interface Design part 1: Views & View Groups, Views : Button, Text Field, Radio Button, Toggle Button, Checkbox, Spinner, Image View, Image switcher, Event Handling, Listeners, Layouts : Linear, Relative, List View, Grid View, Table View, Web View, Adapters. User Interface Design part 2: Menus, Action Bars, Notifications : Status, Toasts and Dialogs, Styles and Themes, Creating Custom Widgets, Focus, Touch Mode, Screen Orientation. Android design

principles, Material design - animation, components, style, layout, patterns, and usability, Designing for Tablets – Working with tablets: Developing for different android platform versions, languages and screens, Fragments, Manipulating objects with drag and drop, Optimizing applications for high screen resolution, combining fragments into a multilane UI, flexible UI. Resources, Assets, Localization: Resources and Assets, Creating Resources, Managing application resources and assets, Resource-Switching in Android. Localization, Localization Strategies, Testing Localized Applications, Publishing Localized Applications

Module 3: Mobile Data Management

Content Providers: Contents provider, Uri, CRUD access, Browser, CallLog, Contacts, Media Store, and Setting. Data Access and Storage: Shared Preferences, Storage External, Network Connection. SQLite - SQLite Databases, Saving data - Key-value sets, files, SQL databases, Content sharing - data, files and files with NFC

Module 4: Native Capabilities, Multimedia and Maps

Camera, Audio, Sensors and Bluetooth: Taking photos, recording videos, Controlling Camera, Android Media API: Playing audio/video, Managing audio playback, focus and output hardware, Media recording, Printing content. Sensors -Sensor manager, listener, Accelerometer, Android Gestures. Bluetooth. Maps & Location: Location API, GPS, Working with Location Manager, Working with Google Maps extensions, Maps via intent and Map Activity, Location based Services. Location Updates, Location Providers, Selecting a Location Provider, Finding Your Location, Map - Based Activities, How to load maps, To finding map API key, Google Play Services.

Module 5: Testing and Commercialization

Testing: Testing and Commercializing Applications - Basics of Testing, Testing from an IDE (Eclipse), Activity testing, Service testing, Content provider testing, Test Classes, Debugging using DDMS, How to get your app on the app store, Automating UI tests, Building effective unit tests, Commercializing apps - regulatory issues, ownership and licensing issues, IP associated with a successful app, legal issues, Using Google Play to distribute and monetize - Monetize

premium and freemium apps, monetize with subscription, e-commerce - Android Pay, AdMob Ads, User value and Analytics.

Reference Books:

1. Professional Android 4 Development by Reto Meier, John Wiley and Sons, 2012
2. Android in Action, Third Edition, by W. Frank Ableson, RobiSen, Chris King, C. Enrique Ortiz, 2012
3. Android Application Development Cookbook, by Wei-Meng Lee, John Wiley and Sons, 2013
4. Beginning Android 4, by Grant Allen, Apress, 2011
5. Android Studio Application Development by Belén Cruz Zapata
6. Android by Example using Android Studio by Daniel Black
7. Android For Beginners. Developing Apps Using Android Studio, by Barbara Hohensee, Amit Dilip Dharma(Translator)

Course Outcome: Students will learn the knowledge and skills required to develop Simple Android Applications.

Course Objective:

Usage of mobile devices have increased exponentially over the past decade. Most of the people have more than one mobile devices. The introduction of Smart Phones have created a new revolution in the telecommunication industry. The rise in demand of mobile phones have led telecommunication companies to delve into newer technologies and standards. This course covers the basics of mobile network, device and their architecture. It explains the importance of developing quality applications - both native as well as web-based. The course explains about the importance, features, functions and types of mobile operating systems.

Module1 : Mobile Network Architecture

Wireless Communication Principles, Network Evolution, Radio Communication, Analog and Digital Communication, Computer Network, OSI Model, Mobile Network OSI layer functions, Mobile Network Protocol Layers, Telephony Networks, PSTN, Telecommunication Networks, Fixed Networks, Mobile Networks, Cellular Network Concepts, Cellular Networks, Cells and Base Stations, Frequency and Interface in Cells, Mobile Network Architecture, Wireless Network Generations, GSM, GPRS.

Module2 : Mobile Device Architecture

Mobile Phone Evolution, Mobile Handset Characteristics, Bluetooth , Display, Keypad, Camera, Mobile Handset Categories, Handset Components, Handset Design, Handset hardware architecture, Elements inside a Mobile Handset, Hardware Architecture Evolution, Hardware architectural trends, CPU and Memory, Internal storage, Handset Power Requirements, Power Management, Introduction and Definition to the SIM, Functions and usage of the SIM, Phones without SIMs, Key Handset software components, Device Drivers.

Module3 : Mobile Application Development

Mobile Application Development Paradigm, Mobile Programming Tools, Mobile Application Evolution, Thin Client, Fat Client, Future of Mobile App Development, Mobile Client Server App Architecture, Mobile App Programming in different languages, Mobile Programming best

practices, Pros and Cons of Mobile Web App, SIM based Mobile App Development, SIM as a Platform, SIM as Service Differentiator, Evolution of Mobile Services, Types of Mobile Services, App Server, Mobile Context of AS, AS Deployment Architecture, App Server Layers.

Module4 : Mobile Web Application

World Wide Web, Web Application, Web Application Architecture, Web Server, Web Server Features, Web Application Server, Mobile Internet Access, Mobile Web browser Evolution, Mobile Web Development Approaches, Dynamic Content, RSS, Feed, Mobile Advertising Motivation, Dynamic Mobile Advertising, Web Service Architecture, Users on the Go, Best Development Practices.

Module5 : Mobile Operating System

Introduction to Mobile Operating Systems and why they are needed, Open Platforms, Mobile OS Features, Symbian, BlackBerry, Android, iOS, Windows, Tizen, Ubuntu, etc.

Reference Books:

1. Wireless and Mobile Network Architectures by Yi-Bang Lin and Imrich Chlamtac, Wiley-India, 2008
2. Mobile Networks Architecture by Andre Perez, Wiley, March 2012
3. Mobile Computing – Technology, Application & Service Creation by Asoke. K Talukder, Roopa R. Yavagal, Asoke K. Talukder, Tata McGraw-Hill, 2005
4. GSM - Architecture, Protocols and Services by Jörg Eberspächer, Hans-Joerg Vögel, Christian Bettstetter, Christian Hartmann John Wiley & Sons, Dec-2008
5. Mobile Handset Design by Sajal K. Das, John Wiley and Sons, 2010
6. Smart Phone and Next Generation Mobile Computing by Pei Zheng and Lionel M. Ni., Morgan Kaufmann, 2006
7. Professional Mobile Application Development by Jeff McWherter, Scott Gowell, 2012
8. Mobile Computing Principles: Designing and Developing Mobile Applications by Reza B'Far, Cambridge University, 2005

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9. Mobile Applications: Architecture, Design, and Development by Valentino Lee, Heather Schneider and Robbie Schell, Pearson Education, 2004
10. Mobile Web Development by Nirav Mehta, Packt Publishing, 2008
11. Next Generation Wireless Applications: Creating Mobile Applications in a Web 2.0 and Mobile 2.0 World by Paul Golding, John Wiley & Sons, 2008
12. Head First Mobile Web by Lyza Danger Gardner, Jason Grigsby, 2011

Course Outcome:

Students will learn the basics of mobile networks. They will be able to understand the different concepts needed for the proper functioning of a mobile device. They will be able to identify different types of applications, the importance of mobile operating system and features of the same.

Course Objective: Basic understanding of security in wireless world is very important for any IT Security Professional. As organizations are increasingly adapting VoIP for converged messaging, call centres and interactive multimedia collaboration, implementing security principles is vital for maintaining confidentiality and privacy.

Module 1: Introduction to Mobile communication

Mobile & Telecommunication protocols and their vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address Mobile & Telecommunication vulnerabilities

Module 2: Wireless Security

Wireless protocols and their vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address Wireless vulnerabilities

Module 3: Voice over Internet Protocol (VOIP) Security

VOIP concepts, protocols and vulnerabilities, Gain knowledge of managerial, technical and procedural controls to address VOIP vulnerabilities

Module 4: Mobile Forensics & Data Extraction

Mobile forensics process including seizure, data acquisition types like Physical, Logical, Manual, External & Internal memory, storage, analysis using tools & techniques

Books for Reference

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole
2. Network Security Bible by Eric Cole – Second Edition

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Course Outcome: Students will learn to implement security in a wireless environment, and in Mobile applications.

Course Objective: To provide practical experience to students and reinforce the theory concepts

List of experiments:

1. Passive Reconnaissance using “Who is” and Online tools
2. Active Reconnaissance using “Sampad” and web site details
3. Full Scan, Half Open Scan and Stealth scan using “nmap”
4. UDP and Ping Scanning using “Advance Lan Scanner” and “Superscan”
5. Packet crafting using “Packet creator” tools
6. Exploiting NetBIOS vulnerability
7. Password Revelation from browsers and social networking application
8. Creating and Analyzing spoofed emails
9. Creating and Analyzing Trojans
10. OS password cracking

Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

Course Objective: To provide practical experience to students and reinforce the theory concepts

List of experiments:

1. Display Hello World
2. Add two Edit Text. When a number is entered in Edit Text 1, the square of that number should be displayed in Edit Text 2.
3. Add an Edit Text and a button. When the button is clicked, the text inputted in Edit Text should be retrieved and displayed back to the user.
4. Add two Edit Text and a button. When the button is clicked, the text inputted in Edit Text 1 should be retrieved and displayed in EditText2.
5. Program a calculator
6. Create a Unit convertor for height
7. Create a Unit convertor for height and weight in the same application. Selection of height/weight can be done using a spinner.
8. Add a spinner. When the spinner is selected, there should be three options (e.g., android, java, testing). When you click on each option, it should go to another page containing some other components. Each of these pages should have a “back” button, which on pressing will take you back to the page with the spinner.
9. Create applications to include ActionBar, Menus, Dialogs and Notifications
10. Create a user login form and registration form. First time users have to register through the registration form and the details should be stored in the database. Then they can login using the login page.
11. Create a camera application, where you can click a picture and then save it as the wallpaper.
12. Create a media player which plays an mp3 song.
13. Create a media recorder which will record the sound.
14. Testing applications

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Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

Course Objective: To be qualified for employment and to work in a corporate sector demands not only the technical knowledge and experience but interpersonal skills like speaking skills, professional etiquettes and so on. In this course, students will be taught how to develop these skills and apply them in our everyday interactions with people, both in our personal and professional lives.

Module 1: Speaking skills

Group Discussions; Importance of Group Discussions; Difference between Group Discussion, Panel Discussion and Debate; Format of GD as used in national level recruitment boards, Rules, ambience and normal practices, Dos and Don'ts in Group Discussions, Traits Evaluated in GDs

Module 2: Etiquette and Mannerism 10 hours)

Introduction; Professional etiquette – Etiquette at meetings, Dining, Involuntary Awkward Actions; Technology Etiquette – Phone, Email, Social Media, Video Conferencing, Web interview

Module 3: Professional Presentations

Nature of Oral Presentation; Planning a Presentation, Preparing the Presentation; Delivering the Presentation

Reference Books:

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1. Objective English: 3 rd Edition, Edgar Thorpe and Showick Thorpe, Pearson Publishers, 2010 print.
2. Presentation skills. The essential guide for students, Patsy McCarthy& Caroline Hatcher, Sage publications, 2002.
3. Soft Skills – An integrated approach to Maximise Personality, Gajendra Singh Chauhan &Sangeeta Sharma, Wiley Publications

Course Outcome: Students will participate in various group discussions and debates and get familiar with patterns and interactive methods.

SEMESTER V

Computer Forensics and Investigation

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Course Objective:

Computer Forensics deals with the development of tools and software to gather evidences from computers, without corrupting the information contained. A relatively new field, it is quickly gaining momentum as the complexities in the crimes are on the rise and it has become imperative to treat each cybercrime with diligence. Students are taught about different forms of cybercrime and its implications and duties of professionals employed at different levels towards analysing and controlling cybercrime. Methods to recover data from storage devices are covered in following chapters. Different forensic techniques and cyber laws are also dealt in detail.

Module 1: Computer Forensics

Introduction to Computer Forensics, Forms of Cyber Crime, First Responder Procedure- Non-technical staff, Technical Staff, Forensics Expert and Computer Investigation procedure

Module 2: Storage Devices & Data Recover Methods

Storage Devices- Magnetic Medium, Non-magnetic medium and Optical Medium. Working of Storage devices-Platter, Head assembly, spindle motor. Data Acquisition, Data deletion and data recovery method and techniques

Module 3: Forensics Techniques

Windows forensic, Linux Forensics, Mobile Forensics, Steganography, Application Password cracking-Brute force, Dictionary attack, Rainbow attack. Email Tacking – Header option of SMTP, POP3, IMAP

Module 4: Cyber Law

Corporate espionage, Evidence handling procedure, Chain of custody, Main features of Indian IT Act 2008 (Amendment)

Reference Books:

1. Guide to Computer Forensics and Investigations by Nelson

Course Outcomes:

This course will open the doors to students for latest trends and technologies used in the field of cyber forensics as applied to crime investigation and so on.

Course Objective:

Server virtualization is today's most rapidly-evolving and widely-deployed technologies. Highly beneficial to organizations in terms of cost and ease of deployment and management of virtualized servers, deploying desktop, application and network virtualization is in demand. Beginning from basics of virtualization and Cloud Security, students proceed to more detailed topics in Cloud like Cloud Trust Protocol & Transparency and Cloud Controls Matrix.

Module 1: Introduction to Virtualization & Cloud

Virtualization and Cloud computing concepts, Private cloud Vs Public cloud, IAAS, PAAS & SAAS concepts, Virtualization security concerns, Hypervisor Security, Host/Platform Security, Security communications, Security between Guest instances, Security between Hosts and Guests

Module 2: Cloud Security

Cloud Security vulnerabilities and mitigating controls, Cloud Trust Protocol, Cloud Controls Matrix. Complete Certificate of Cloud Security Knowledge (CCSK)

Module 3: Cloud Trust Protocol & Transparency

Introduction to Cloud Trust Protocol & Transparency, Cloud Trust Protocol and Transparency, Transparency as a Service, Concepts, Security, Privacy & Compliance aspects of cloud

Module 4: Cloud Controls Matrix & Top Cloud Threats

Introduction to Cloud Controls Matrix & Top Cloud Threats, Cloud Controls Matrix, Trusted Cloud Initiative architecture and reference model, requirements of Security as a Service (SecaaS) model and Top Security threats to the cloud model

Reference Books:

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1. Cloud Security – A comprehensive Guide to Secure Cloud Computing by Ronald L. Krutz and Russel Dean Vines

Course Outcome:

Beginning from basics of virtualization and Cloud Security, students proceed to more detailed topics in Cloud like Cloud Trust Protocol & Transparency and Cloud Controls Matrix.

Course Objective:

The unit primarily covers the importance of IT and IS Governances and the best practices followed by the Role of Steering committee and Chief Information Security Officer. The Unit also deals with the Risk management and the Information Security Management Practices including Hiring, Training, Promotion, Performance Evaluation, Required Vacations and Termination Policies, Sourcing Practices and Strategy for Information Security. The Unit also covers the Committee of Sponsoring Organizations and its importance and applicability, Sarbannes Oxley Act and its implications to the Industry.

Module 1: IT Governance

Introduction & Concepts, Role of Governance in Information Security, Best Practices for IT Governance. Role of IT Strategy Committee, Standard IT Balanced Scorecard. Val-IT framework of ISACA

Module 2: Information Systems Strategy

Role of Strategic Planning for IT, Role of Steering committee, Policies and Procedures

Module 3: Risk Management Program

Develop a Risk Management Program. Risk Management Process. Risk Analysis methods. Risk-IT Framework of ISACA

Module 4: Information Security Management

Introduction, Performance Optimization, IT Security roles & responsibilities, Segregation of Duties, Description of COBIT and other Frameworks

Reference Books:

1. Information Systems Security: Security Management, Metrics, Frameworks and Best Practices by Nina Godbole

Course Outcome: Students will understand the role of IT Governance and best practices that are used. They will learn how to develop a risk management program within the framework of ISACA

Course Objective:

Today's world is an enterprise world. Maximum services are enterprise services. In that case it is important to understand the concepts of enterprise applications. In current scenario, enterprise mobility is also a growing trend. Many domains are providing enterprise services. Some of them are banking domain, insurance domain etc. The organization will be following ERP modules for their day to day work.

To develop an enterprise application, servers as well as supported servers commonly known as clusters are necessary. Enterprise application can also be developed using object-oriented technology. An Enterprise application gives you flexibility, reusability, scalability, performance, security and availability. XML, JPA, JTA, etc plays a major role here.

This unit concentrates mainly on java enterprise applications, enterprise architecture, and enterprise mobility. Practical concepts of java enterprise applications will also be explored in this unit.

Module 1: Introduction to Enterprise Application

Enterprise Architecture – life cycle, development framework, architectural model, conceptual layers, enterprise IT architecture domain; Enterprise Server – introduction, different types of enterprise servers, set up clusters; Enterprise Resource Planning (ERP) - Customer Relationship Management (CRM) - SCM – HRM; Enterprise Java – Introduction to web application and its lifecycle; Different containers

Module 2: Web Tier

XML and Java API for XML processing – Introduction to JAXP; DOM, SAX and StAX interface; XSLT; Servlets – Introduction; servlet life cycle; sessions; session tracking using hidden fields, user authentication, URL rewriting and Cookies; Inter-servlet communication; Java Server Pages (JSP) – introduction to JSP tags; JSP Life Cycle; Directives; Custom JSP tags; Java Server Faces Technology – Introduction; Page Navigation; Tags; Life Cycle and Architecture

Module 3: Enterprise Information Systems Tier

Java Database Connectivity – Introduction; Different types of drivers; Steps to establish a connection and query it; Java Persistence API – JPA Architecture; Entities; Entity Relationship; Managing Entities; Java Transaction API (JTA) – Transactions in J2EE; Serializability; Concurrent transactions; Distributed transaction and transaction manager; Mobile Database – Need for mobile database; Architecture; different products; Mobile transactions

Module 4: Business Tier

Enterprise JavaBeans (EJB) – EJB container; enterprise beans; Session beans; Message-driven beans; JAX-WS Web service endpoints – introduction to creating web services and client; Business Intelligence and Data warehousing – Data model, Data integrity, OLAP, Application in an enterprise; Model-View-Controller (MVC) Architecture – Introduction, Model1 and Model 2 architecture

Module 5: Enterprise Mobility

Introduction to Enterprise Mobility: Trends and benefits; Drivers; Risks and analysis, Enterprise Mobility Architecture – High level architecture; Building Modules; Capability Model; Meta Model – Mobile Device Security; Enterprise Mobility infrastructure: Secure VOIP; Enterprise Mobility Middleware and Solutions - MEAPs, Native Apps, HTML5

Reference Books:

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1. Head First Servlets and JSP by Bryan Basham, Kathy Sierra, and Bert Bates from O'Reilly Media, INC, 2008
2. Java Server Faces: The Complete Reference by Chris Schalk, Ed Burns and James Holmes, 2006
3. A Practical Guide to Enterprise Architecture by James McGovern, 2003
4. Java EE 6 Development using GlassFish Application Server by David R. Heffelfinger, Packt Publishing, 2009
5. Effective Enterprise Java by Ted Neward, 2004
6. Java Enterprise Best Practices by Robert Eckstein and J. Steven Perry from O'Reilly Authors, 2002

Course Outcome:

Students will understand the concepts of enterprise application development and enterprise mobility; in the course of which they can develop java enterprise applications.

Course Objective:

Mobile industry is witnessing exponential growth year by year with the introduction of a variety of devices and services. So, the industry should possess characteristics which will enable them to handle the fast growth of the number of users, new technologies and the volatile environment, i.e. the mobile ecosystem has a set of players and a constantly changing environment. This rapid change started with the introduction of Smartphone. The role of each player in the ecosystem is uncertain. They can be contributing to various areas at different times.

The organizations use different business models to develop the mobile ecosystem. There cannot be a single business model for all the organizations. Business model will be providing a description of the roles and relationships of the company, customers, partners, suppliers, etc.

This unit focuses on mobile ecosystem from the business perspective, the different business models that can be implemented and a set of case studies of the current mobile ecosystem.

Module 1: Understanding Business Models and Ecosystem

Business ecosystems, Methodological Approach, Ecosystem Evolution, Value chains, Business Models

Module 2: Overview of Mobile Market

Mobile ecosystem, Global mobile ecosystem, Mobile ecosystem in India, Impact of Open Source, Open Source Operating Systems Vs. Proprietary Operating Systems – Cost Effectiveness.

Module 3: Mobile Application Monetization

Prevailing Business Models, Disruption and Innovation, Trends, Monetizing App: free and paid apps, app store search, advertising, e-mail marketing, types of apps, native or cross platform apps.

Module 4: Mobile Marketing and Advertising

Mobile Marketing, M-Coupons, Mobile Advertising: Mobile advertising and search, mobile products and service offerings, incentives and loyalty programs, banner display ads, interstitial ads, in-content ads, ads to download other apps, making money with ads, app advertising, ad networks vs. media owners. affiliate marketing, Case studies on Google and Apple Ecosystem.

Module 5: M-Commerce and Ecosystem Case Studies

M-commerce: future of mobile marketing, mobile sites, services, benefits, mobile banking, mobile purchase, m-commerce apps, challenges. Case Studies: Ecosystem of a Mobile Application Development Company, Ecosystem of a Device Manufacturer.

Reference Books:

1. Mobile Marketing - How technology is revolutionizing marketing, communications and advertising, by Daniel Rowles, 2014
2. Mobile Design and Development Practical concepts and techniques for creating mobile sites and web apps, by Brian Fling, O'Reilly Media, 2009
3. M-Commerce, by Paul Skeldon, 2013
4. Mobile Advertising: Supercharge Your Brand in the Exploding Wireless Market – 2008, by Chetan Sharma, Joe Herzog, Victor Melfi, 2013
5. Mobile App Marketing and Monetization, by Alex Genadinik, 2014

Course Outcome: The aim of this unit is to develop student's understanding in mobile ecosystem and the various business models followed by the mobile industry.

Course Objective:

Android is a comprehensive open source platform designed for mobile devices. It is championed by Google and owned by Open Handset Alliance. The goal of the alliance is to “accelerate innovation in mobile and offer consumers a richer, less expensive, and better mobile experience.” Android provides all the tools and frameworks for developing mobile apps quickly and easily. The Android SDK is all you need to start developing for Android. Android OS can be found in a series of mobile devices currently.

This unit focuses to provide an advanced level of understanding of android programming including services, networking, third party apps, multimedia and graphics, web application etc. this unit also informs the learner how to commercialize the applications developed by them.

Module 1: App Development Topics

Services: Services and Notifications – bound/unbound services, Starting and stopping services, Android Interface Definition Language, Handler and Messenger, Passing objects over IPC, Scheduling of services, Remote service communication, Background processing using handlers, AsyncTask and Loaders, Setting up notifications, Notification manager, Networking: Introduction Android networking capabilities, Android SDK networking packages, Android Socket programming, Proxy Settings, Broadcasting, SMS application using Broadcast Receiver. Managing network usage, Android Xml remote procedure calls on android, what is XML-RPC, History, Data types, using web services on android phones. Integrating with Embedded Applications: Embedded Apps: Telephony, SMS, etc.

Module 2: Graphics & Animation

Graphics & Multimedia – Introduction to Graphics, displaying bitmaps, displaying graphics with OpenGL ES, defining and drawing shapes, projection, motion, response to touch

events, Animating views - Scenes and Transitions, Frame Animations, Tween Animation, scale, rotate, translate, alpha, Interpolation, Canvas/Drawing into a view, Surface View/Surface Holder, Adding animations - Crossfading two views, ViewPager, card flip, zooming a view, animating layout changes

Module 3: Threads & Processes

Tasks & Processes: Tasks, Switching between Task, Process, Process lifecycle. Threads, Thread Life cycle, Worker Threads, Thread Handlers, Threads & Loopers and IPC.

Using network service discovery, P2P connections,

Module 4: Web Applications

Web Apps & Web Services: Web Applications - Web View, ViewPort, Page navigation, Debugging web applications Web Services – Android Server Communication: communication protocols, interacting with server-side applications, develop clients for web services, Exchanging Data over the Internet, data parsing using json and xml parsing, XmlPullParser. Integrating with 3rd party Apps using Web Services- Facebook, LinkedIn.

Module 5: Commercializing your application

Security, Performance - Kernel, Application level Security, Using permissions, designing for Performance & Designing for Performance, Syncing to cloud, Transferring data using Sync adapters, building apps for wearables, tv, Using Google Play to monetize - Selling in-app products

References Books:

1. Professional Android 4 Development by Reto Meier, John Wiley and Sons, 2012
2. Android in Action, Third Edition, by W. Frank Ableson, RobiSen, Chris King, C. Enrique Ortiz, 2012
3. Android Application Development Cookbook, by Wei-Meng Lee, John Wiley and Sons, 2013
4. Beginning Android 4, by Grant Allen, Apress, 2011
5. Beginning Tablet Programming, by Robbie Matthews, Apress, 2011

Course Outcome:

Students will acquire knowledge on various principles of advanced programming in Android and apply these skills to design and build android applications

Course Objective: To provide practical experience to students and reinforce the theory concepts

List of Experiments:

1. Physical Collection of electronic evidence using forensic standards
2. Dismantling and re-building PCs in order to access the storage media safely
3. Boot sequence and Power On Self Test mode analysis
4. Examination of File systems of Windows, Linux and Mac
5. Analysing Word processing and Graphic file format
6. Network data sniffing and analysing
7. Password and encryption techniques
8. Internet forensic and Malware analysis
9. Data recovery techniques for hard drive
10. Data recovery techniques for Pen drive and CD

Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

Course Objective: To provide practical experience to students and reinforce the theory concepts

List of Experiments:

1. Write a Program to Start a service
2. Write a Program to Stop a service
3. Demonstrate startService(), stopService() and onBindService()
4. Manipulate notifications
5. Android socket programming
6. Create web services
7. Working with processes and threads
 - a. Create a thread which performs a single task
 - b. Perform multithreading
8. Graphics apps in android
 - a. Create an application where different shapes of different colors are displayed.
 - b. Create an application where
 - c. Create an application to show a cyclist moving from one direction to another
9. Animation apps like
 - a. Bouncing ball
 - b. Moving arrow, etc
10. Game creation in android like
 - a. Shooting bubbles
 - b. Shooting arrows
 - c. Simple snake game, etc.

Course Outcome: Students will work on the tasks provided to them in the form of experiments and write programs to produce the desired result

SEMESTER VI

Mobile Testing

L T P C
4 0 04

Course Objective: Any technology, software or application can authorized for use by developers and Software engineers once it gets certified after testing. Testing is also a way of refining on developmental aspects of technology and is a valuable source for developing newer versions of the same. Mobile testing is not far from this truth. With the constantly increasing focus on mobile technology around the world and the number of mobile applications being developed for its users, mobile testing has predominantly gained momentum.

Module 1: Testing Fundamentals

SDLC, SDLC Phases, need of Testing, methods of Testing: Functional, Black Box, White Box, Regression, Stress, Monkey etc., TestCase, Rules to write TestCase, Testsuite and Test Runner

Module 2: Introduction to Android testing framework:

JUnit: JUnit Test Framework, Features of JUnit Test Framework, Testing Fundamentals-TestCase, TestSuite,TestRunners, JUnit classes, JUnit in Android, Android Testing Framework, Test Projects-Directory Structure, Android Testing API, Mock Objects, Activity Testing, what to Test, ContentProvider Testing, service Testing, choosing devices to test, Testing tools

Module 3: Mobile apps testing

Need of testing, Mobile applications testing landscape, Common types of testing, UI and functional testing strategies of mobile applications, compatibility testing need and methods, non-functional testing methods of mobile applications - Performance, security, types of operations testing for mobile applications - Installation, un-installation, upgrade, methods of testing the mobile application integration with phone features, challenges in testing, difference between testing mobile web and testing native app

Module 4: Mobile testing tools

Testing lifecycle of mobile applications, alternatives of testing environments for mobile apps testing, Differentiate between testing on physical devices, cloud devices and emulators, different test automation tools for mobile applications, key features of monkey talk tool, installation and use of monkeytalk tool for a mobile application on emulator, installation and use of monkeytalk tool for a mobile application on PC connected device, installation and use of monkeytalk tool for a mobile web, installation and use of monkeytalk tool for a mobile application for cloud device.

Module 5: UI and functional testing:

Using monkey talk - creation of test project, test suite and test script, record and playback feature, different verification techniques, data driven testing methods, synchronization, script parameterization, reporting features. **Using Robotium** - creation of test project, test suite, Robotium Framework, data driven testing methods

Reference Books:

1. Android Application Testing Guide, Diego Torres Milano, 2010
2. Robotium Automated Testing for Android, HrushikeshZadgaonkar, 2011
3. A Practical Guide to Testing Wireless Smartphone Applications by Julian Harty, MahadevSatyanarayanan, 2011
4. Testing Applications on the Web: Test Planning for Mobile and Internet-Based Systems Hung Q. Nguyen, Bob Johnson, Michael Hackett, 2012

Course Outcome: Students will be able to perform tests on Mobile applications using the available testing methodologies and tools

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Project and Viva-Voce

Details of the project will be provided later