Syllabus of
TDC (B.A. / B.Sc. / B.Com) with Information Technology
(CHOICE BASED CREDIT SYSTEM)

This is approved in the Academic Council held on 8/11/2019

TDC Program with **Information Technology** as a regular subject.

Program Objectives:

Upon successful completion of a TDC program with Information Technology, students will be able to:

1. Demonstrate proficiency in problem-solving techniques using the computer.
2. Demonstrate proficiency in at least one high-level programming language and one operating system.
3. Demonstrate proficiency in the analysis of complex problems and the synthesis of solutions to those problems.
4. Demonstrate comprehension of modern software engineering principles.
5. Demonstrate a breadth and depth of knowledge in latest Information Technology tools and techniques.

Program Learning Outcomes:

The goals of the computer science department are to prepare students for graduate training in some specialized area of computer science and applications, to prepare students for jobs in industry, business or government, and to provide support courses for students in technology, mathematics and other fields requiring computing skills.

CBCS Course Structure for TDC with Information Technology

SEMESTER WISE PLACEMENT OF THE COURSES

SE ME STE R	CORE COURSE (12)	Ability Enhancement Compulsory Course(AECC)(2)	Skill Enhancement Course (SEC) (4)	Elective: Discipline Specific DSE (6)
I	Fundamentals of Information Technology (TIT-RC-1016)	(English/MIL Communication) (ENG-AE-1014) (ASM-AE-1014) /Environmental Science (ENV-AE-1014)		
II	Introduction to Programming in C (TIT-RC-2016)	Environmental Science (ENV-AE-2014) /(English/MIL Communication) (ENG-AE-2014/ ASM-AE-1014)		
III	ICT Hardware (TIT-RC-3016)		SEC -1 Open Source Software (TIT-SE-3014)	
IV	Introduction to DBMS (TIT-RC-4016)		SEC – 2 (any one) (i) System Administration and Maintenance (TIT-SE-4014) (ii) E-Commerce Technologies (TIT-SE-4024)	
V			SEC – 3 (any one) (i) Web Technology (TIT-SE-5014) (ii) PHP Programming (: TIT-SE-5024)	DSE – 1A (TIT-RE-5016) Project Work / Dissertation
VI			SEC – 4 (any one) (i) Programming With Python (TIT-SE-6014) (ii) Android Programming (TITV-SE-6024) (iii) Management Information System (TIT-SE-6034)	DSE – 1B (any one) (i) Programming in Java (TIT-RE-6016) (ii) Computer Networks (TIT-RE-6026) (iii) Software Engineering (TIT-RE-6036) (iv)Operating System (TIT-RE-6046)

Detailed Syllabus

TIT-RC-1016: Fundamentals of Information Technology

4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures
End Semester Marks:
Theory: 60 Marks, Practical: 20 Marks
Internal Marks:
Sessional: 10 Marks, Practical: 6 Marks, Attendance: 4 Marks

UNIT 1: Fundamentals (8 Lectures)

Major components of a computer (A brief introduction of CPU, Main Memory, I/O units), Keyboard, display, mouse, printers etc, Secondary storage devices (hard disks, optical disks, flash memory), backup devices .Computer Software, Bootstrapping

UNIT 2: Representation of information (8 Lectures)

Number system-Binary, Octal, Decimal & Hexadecimal numbers, Characters, ASCII, EBCDIC, BCD, Gray code, Unicode, Conversion of bases

UNIT 3: Information Technology Basics (3 Lectures)

Introduction, Information, Technology, Information Technology (IT), Role in present scenario

UNIT 4: Algorithms (8 Lectures)

Concept of algorithm and flow chart, Writing simple algorithms and drawing flow charts for simple problems like finding sum, max, min, average of a list of numbers etc.

UNIT 5: Operating System (5 Lectures)

Evolution of OS, types of OS, functions of OS, DOS- Internal & external commands

UNIT 6: Computer Networks (12 Lectures)

Data communication, Transmission Media- Coaxial, UTP, Optical-Fiber, Wireless, Components of Computer Networks, Types of wireless communication (mobile, WiFi, WiMAX, Bluetooth, Infrared –concept and def only)

UNIT 7: Internet (12 Lectures)

Internet-Evolution of Internet, Basic Internet terms(Client, Server, MODEM, Web page, Web site, Homepage, Browser, URL, ISP, Web server, Download & Upload, Online & offline), Internet applications(e-mail, search engines, ftp, VOIP, Video Conferencing, Audio-Video streaming, Chatting).Computer Security, Definition, Viruses and Worms, Antivirus, Digital Signature, Software Piracy, Firewall, Hacking and Cracking (basic concepts only for these topics).

UNIT 8: Applications of IT   **(4 Lectures)**
Railways, Airlines, Banking, Inventory Control, Education and Information Kiosks

Practical / Lab work to be performed

Office Automation Lab
   (**N.B:** Students have to perform the following experiments and are encouraged to work in the Linux platform)

1. Create a new folder and do the following:
    - Make a word processing document in it.
    - Make a Spreadsheet document in it.
    - Make a new folder in it
    - Rename the initial folder
    - Move the initial folder
    - Copy the initial folder.
    - Delete the initial folder
2. Implement the various well known features of the operating system such as Painting, System tools, Entertainment tools etc.
    3. Implement various display properties by right clicking on the Desktop.
    4. Explore the taskbar
    5. Set the wall paper and screen saver.
    6. Set the data/time.

Word Processing Tool

1. Create a document and
    a. Put Bullets and Numbers
    b. Apply various Font parameters.
    c. Apply Left, Right, and Centre alignments.
    d. Apply hyperlinks
    e. Insert pictures
    f. Insert ClipArt
    g. Show the use of WordArt
    h. Add Borders and Shading
    i. Show the use of Find and Replace.
    j. Apply header/footers
2. Create any document and show the use of File versions.
3. Create any document and show the difference between paste and paste special.
4. Create a document to show the use of Washout/Watermark.
5. Implement the concept of mail merge.
6. Implement the concept of macros.
7. Implement the concept of importing a file/document.
8. Implement the concept of merging the documents.
9. Crate a student table and do the following:

a. Insert new row and fill data
b. Delete any existing row
c. Resize rows and columns
d. Apply border and shading
e. Apply merging/splitting of cells
f. Apply sort
g. Apply various arithmetic and logical formulas.
10. Create your resume using General Templates.

Spreadsheet Tool

1. Create a student worksheet containing roll numbers, names and total marks. Open a document in Word and insert the excel worksheet using:-
   i)   Copy/Paste
   ii)   Embedding
   iii)   Linking
2. The term wise marks for APS class of 20 students are stored in 3 separate sheets named term1, term2 and term3. Create 4th worksheet that contains student names and their total and average marks for the entire year. Give proper headings using headers. Make the column headings bold and italic. The 4th worksheet should contain college name as the first line. Make it bold, italic and center it.
3. Using a simple pendulum, plot 1-T and 1-T^2 graph.

I	t1	t2	t3	Mean(t)	T=t/20	T^2
70						
80						
90						
100						

4.   Consider the following employee worksheet:-

Full Name (First Last)	Grade 1/2/3	Basic Salary	HRA	PF	Gross	Net	(VA) Vehicle Allowance

HRA is calculated as follows:
Grade   HRA %(of Basic)
1   40%
2   35%
3   30%
Gross = Basic + HRA + VA
Net = Gross –PF

PF is 8% for all Grades

VA is 15000, 10000 and 7000 for Grades 1, 2 and 3.

i) Find max, min and average salary of employees in respective Grade

ii) Count no. of people where VA>HRA

iii) Find out most frequently occurring grade.

iv) Extract records where employee name starts with "A" has HRA>10000

v) Print Grade wise report of all employees with subtotals of net salary and also grand totals. Use subtotal command.

vi) Extract records where Grade is 1 or 2 and salary is between 10000 and 20000 both inclusive.

5. In a meeting of a marketing department of an organization it has been decided that price of selling an item is fixed at Rs40. It was resolved to increases the sell of more of more items and getting the profit of Rs40,000/.Use Goal Seek of find out how many items you will have to sell to meet your profit figure.

6. To study the variation in volume with pressure for a sample of an air at constant temperature by plotting a graph for P – V and P-I/V. Sample observations are:-

Pressure(P)	Volume (V)	I/V	PV	P/V
75	20			
78.9	19			
83.3	18			
88.2	17			

7. Plot the chart for marks obtained by the students (out of 5) vs. frequency (total number of students in class is 50).

8. Create the following worksheet(s) containing a year wise sale figure of five salesmen in Rs.

Salesman	2002	2003	2004	2005
MOHAN	10000	12000	20000	50000
MITRA	15000	18000	50000	60000
SHIKHA	20000	22000	70000	70000
ROHIT	30000	30000	100000	80000
MANGLA	40000	45000	125000	90000

Apply the following Mathematical & Statistical functions:

i) Calculate the commission for each salesman under the condition:-

a) If total sales is greater than Rs. 3, 00,000/-, then commission is 10% of total sale made by the salesman.

b) Otherwise, 4% of total sale.

ii) Calculate the maximum sale made by each salesman.

iii) Calculate the maximum sale made in each year.
iv) Calculate the minimum sale made by each salesman.
v) Calculate the minimum sale made in each year.
vi) Count the no. of salespersons.
vii) Calculate the cube of sales made by Mohan in the year2002.
viii) Find the difference in sales by salesman Mitra between the year 2002 and 2003. Find the absolute value of difference.
ix) Also calculate the Mode, Stddev, Variance, Median for the sale made by each Sales man.
x) Calculate the year wise Correlation coefficient between the sales man Mohan and Mitra year wise

9. The following table gives a year wise sale figure of five salesmen in Rs.

Salesman	2000	2001	2002	2003
S1	10000	12000	20000	50000
S2	15000	18000	50000	60000
S3	20000	22000	70000	70000
S4	30000	30000	100000	80000
S5	40000	45000	125000	90000

i)   Calculate total sale year wise.
ii) Calculate the net sales made by each salesman
iii) Calculate the commission for each salesman under the condition:-
   a) If total sales is greater than Rs. 4, 00,000/-, then commission is 5% of total sale made by the salesman.
   b) Otherwise, 2% of total sale.
iv)   Calculate the maximum sale made by each salesman.
v) Calculate the maximum sale made in each year.
vi) Draw a bar graph representing the sale made by each salesman.
vii) Draw a pie graph representing the sale made by salesmen in year2001.

10.   Consider the following worksheet for APS 1st year students:-

S.No.	Name	PH	CH	BY	MT	CS	Total Marks	%	Grade
1									
2									

Grade is calculated as follows:-

If %>=90   Grade A
If % >=80 &<90   Grade B
If % >=70 &<80   Grade C
If % >=60 &<70   Grade D

Otherwise students will be declared fail.
- i) Calculate Grade using if function
- ii) Sort the data according to total marks
- iii) Apply filter to display the marks of the students having more than 65%marks.
- iv) Draw a pie chart showing % marks scored in each subject by the topper of the class.
- v) Draw the doughnut chart of the data as in(iv)
- vi) Enter the S.No. of a student and find out the Grade of the student using VLOOKUP.
- vii) Extract all records where name
    - a) Begins with"A"
    - b) Contains"A"
    - c) Ends with"A"

Presentation Tool

1. Make a presentation of College Education System using
   a. Blank Presentation
   b. From Design Template
   c. From Auto Content Wizard
2. Make a presentation on "Wild Life" and apply the following:
   a. Add audio and video effects
   b. Apply various Color Schemes
   c. Apply various animation schemes.
   d. Apply Slide Show

REFERENCE BOOKS

1. P. K. Sinha & Priti Sinha, "Computer Fundamentals", BPB Publications, 2007
2. Dr. Anita Goel, "Computer Fundamentals", Pearson Education, 2010
3. T. Budd, "Exploring Python", TMH, 1st Ed, 2011
4. Allen Downey, Jeffrey Elkner, Chris Meyers , "How to think like a computer scientist: learning with Python", Freely availableonline.2012
5. V. Rajaraman, "A Text Book of Information Technology".
6. "Introduction to Information Technology", ITL solutions Ltd, Pearson Education.
7. V. Rajaraman, "Fundamentals of Computer".
8. Sushila Madan, "Introduction to Essential tools", JBA, 2009.

TIT-RC-2016: Introduction to Programming in C

4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: Introduction to C   **(20 Lectures)**

Elementary data types, variables, constants and identifiers. Integer, character floating point and string constants, variable declarations, Syntax and semantics, Reserved word, Initialization of variable during declarations Constant data types, Expression in C, precedence and associativity of C operators, unary, binary and ternary operators, C arithmetic operators, assignment operators, relational operators, logical operators and bit –wise operators, L-value and R-value, Side effects of operators, Expression statement.
Conditional Statement-if, if-else, switch, Iterative Statement-white, do-while, for
Other Statement –break, continue, goto, return, null Statement, block Statement. Function: function declaration, Calling a function, Parameters –Call by value, Call by reference and its absence in C. Recursion and how it works. Cast and sizeof operator, Automatic type Conversion

UNIT 2: Arrays and pointers   **(20 Lectures)**

Storage classes: Automatic, External, Static, Register, Scope and lifetime of variables, Arrays and pointers and corresponding operators, Pointer arithmetic, Programs using arrays and pointers like sum, average, minimum, maximum of an array of numbers. Add and delete an element of an array. Merge two sorted arrays, String manipulation programs like addition, subtraction, multiplication and their combinations. Sum of rows, columns, and diagonal elements of a matrix, Transpose of a matrix, Linear search, binary search. Selection sort and bubble sort.

UNIT 3: Structures and Files   **(20 Lectures)**

Structure – declaration and use, Structure member resolution and structure pointer member resolution operators, Programs to show the use of structure, Standard C library. Files in C— opening, closing, reading and writing of files, seeking forward and backward, Simple examples of file handling programs

Practical / Lab work to be performed

Introduction to Programming in C Lab

(At least 20 programming assignments have to be done by each student from the following list. The assignments should be selected in such a way that all the features of C language are covered.)

1. Write a program to convert a given temperature value from Fahrenheit scale to Centigrade scale and vice versa.
2. Write a program to display ASCII value of a character.
3. Write a program to check whether a number is perfect or not.

4. Write a   program to find out the biggest of three numbers using nested if.
5. A company insures its drivers if either of the following conditions are satisfied
   - Driver is married.
   - Driver is an unmarried, male and above 30 years of age.
   - Driver is unmarried, female and above 25 years of age.

   Write a program to decide if a driver is to be insured using logical operators.
6. Write a program to read a list of positive integers terminated by -1 and display the odd and even numbers separately and also their respective counts.
7. Write a program to read values of n and x and print the value of y using switch case where
   a. $y=n+x$ when $n=1$
   b. $y=1+x/n$ when $n=2$
   c. $y= n+3x$ when $n=3$
   d. $y=1+nx$ when $n>3$ or $n<1$.
8. Write a program to n values of sales and then calculate the commission on sales amount where the commission is calculated as follows:
   a. If sales $<=$ Rs.500, commission is 5%.
   b. If sales > 500 but $<= 2000$, commission is Rs 35 plus 10% above Rs 500.
   c. If sales > 2000 but $<= 5000$, commission is Rs 185 plus 12% above Rs.2000.
   d. If sales > 5000 ,commission is 12.5%.
9. Write a program to find out minimum, maximum, sum and average of n numbers without using array.
10. Write a program to find out the roots of a quadratic equation. Use proper testing to find checks for real and complex roots.
11. Write a program to print the digits of a number in words. (eg. if a number 841 is entered through the keyboard your program should print "Eight Four One".)
12. Write a program to print the PASCAL Triangle up to the n-th row where n is an input to the program.
13. Write a function to return the HCF of two positive integers. Write a main function to read two positive integers and print their HCF and LCM by using the above function.
14. Write a program to convert a decimal number into binary number using function.
15. Write aprogram to display the result of sine series using function.
16. Write a program to find the sum of the following series
        $1+x-x^3/3!+x^5/5!-x^7/7!+$ . . . . . corrected up to the 3 decimal place.
17. Write a program to read n numbers in a sorted array and insert a given element in a particular position
18. Write functions to compute the factorial of a number using both recursive and non-recursive procedure.
19. Write a program to print the values of ^nc_r and ^np_r for given positive integers $n \square$ $r > 0$. Use a function fact(n) to return the factorial of a non-negative integer n.
        $^nc_r=n!/r!*(n-r)!$ $^np_r=n!/(n-r)!$
20. Write a program to display the first n Fibonacci numbers using function.
21. Write a program to display the prime numbers within a given range. Write a function to check whether a given integer is prime or not and use it.
22. Write a program to Multiply two matrices using function

23. Write a program to display the upper Triangle and lower Triangle of a given square matrix using function.
24. Write a function to check if a given square matrix is symmetric or not. Write a main function to implement it.
25. Write a program to read a m X n matrix and calculate the Row sum and Column Sum of the matrix
26. Write a function to read in an integer and print the representation of the number using the sign and magnitude representation scheme using 8 bits. The program should check for overflow/under flow conditions. The left most bit is to be used as the sign bit.
27. Write a program to merge two sorted arrays.
28. Write a program to count the number of vowels in a string.
29. Write a program to concatenate two strings using function (without using library function).
30. Write a program to convert a string from upper case to lower case and vice versa.
31. Write a program to swap two numbers using function (pass the pointers).
32. Write a program to sort n number of strings in ascending order using pointer.
33. Write a program using pointers to copy a string to another string variable (without using library function).
34. Declare a structure of a student with details like roll number, student name and total marks. Using this, declare an array with 50 elements. Write a program to read details of n students and print the list of students who have scored 75 marks and above.
35. Create a structure to store the following information of employees.
    a. Employee's number, name, pay and date of joining.
It has been decided to increase the pay as per the following rules:

        Pay <= Rs.3000   : 20% increase
        Pay <= Rs.6000 but > Rs.3000   :15%   increase
        Pay > Rs.6000   : no increase

Write a program to implement the above structure.
36. Write a program to read a text file and count the number of vowels in the text file.
37. Write a program to copy a text file to another file.

REFERENCE BOOKS

1   B.S. Gottfried, "Programming with C", Tata Mc-Graw Hill.
2   B.W. Kernighan and D.M.Ritchie, "The C Programming Language", PHI
3   Herbert Schild, " The complete reference to C++", Osborn McGraw Hill
4   R. Lafore, "Object Oriented Programming using C++", Galgotia Publications
5   Ian Graham, "Object Oriented Methods", Addison Wesley.
6   Programming in ANSI C, E.Balagurusamy, Tata McGraw – Hill

TIT-RC-3016: ICT Hardware

4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: (12 Lectures)

Evolution of computer system, Modern computer, Classification of computer, Personal Computer, hardware: Monitor, Keyboard, Mouse, Scanner, printer, speaker

UNIT 2: (12 Lectures)

Hard Disk Drive: logical structure and file system, FAT, NTFS. Hard disk tools: Disk cleanup, error checking, de fragmentation, scanning for virus, formatting, installing additional HDD. New trends in HDD, Floppy Disk Drive

UNIT 3: (12 Lectures)

Optical Media, CDROM, drive speed, buffer, cache, CD-R, CD-RW, DVD ROM, DVD technology, preventive maintenance for DVD and CD drives, New Technologies, Driver installation, Writing and cleaning CD and DVD

UNIT 4: (12 Lectures)

Processor: Intel processor family. Latest trends in processor, Motherboard, Sockets and slots, power connectors. Peripheral connectors, Bus slots, USB, pin connectors. Different kinds of motherboards, RAM, different kinds of RAM. RAM up gradation. Cache and Virtual Memory (only concept will be given without going into implementation details)

UNIT 5: (12 Lectures)

SMPS. BIOS, Network Interface Card, network cabling, I/O Box, Switches, RJ 45 connectors, Patch panel, Patch cord, racks, IP address.

Practical / Lab work to be performed
ICT Hardware Lab

Objectives
The Practical introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like Windows OS, LINUX OS, and device drivers. Basic system administration in Linux which includes: Basic Linux commands in bash, Create hard and symbolic links, Text processing, using wildcards In addition hardware and software level troubleshooting process, tips and tricks would be covered, Different ways of hooking the PC on to the network and internet from home and workplace and effectively usage of the internet, Configuring the TCP/IP setting. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced. The students should perform the following tasks.
Task 1: Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Task 2: Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva.

Task 3: Every student should individually install MS windows on the personal computer. They should learn how to format and partition a hard disk. Lab instructor should verify the installation and follow it up with a Viva.

Task 4: Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Task 5: Basic commands in Linux

Task 6: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Task 7: Software Troubleshooting: Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Task 8: The test consists of various systems with Hardware / Software related troubles, Formatted disks without operating systems. Installation of antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

REFERENCE BOOKS

1. Comdex; Hardware and Networking Course Kit; Dream Tech press
2. PC hardware: A beginners Guide; Ron Gilster; Tata Mc Graw Hill.
3. Computer Fundamentals, Anita Goel, Pearson, 2010.

TIT-SE-3014: Open Source Software

02 Lectures, 04 Practical, Credits 4 (2+2)
Theory: 20 Lectures   Practical: 20 Lectures

UNIT 1: LaTeX   (8 Lectures)

Installation of LaTeX, Understanding Latex compilation, Basic Syntax, Writing equations, Matrix, Tables, Page Layout – Titles, Abstract Chapters, Sections, References, Equation references, citation, List making environments, Table of contents, Generating new commands, Figure handling, table & figure numbering, List of figures, List of tables, Generating index, Packages: Geometry, Hyperref, amsmath, amssymb, algorithms, algorithmic graphic, color, tilez listing, Classes: article, book, report, beamer, slides, Applications: Writing Resume, Writing question paper, Writing articles/ research papers, Presentation using beamer

UNIT 2: Scilab   (8 Lectures)

Introduction to scilab, Installation of Scilab (windows & Linux), Basic syntax, Mathematical Operators, Predefined constants, Built in functions. Complex numbers, Polynomials, Vectors, Matrix operations (functions like inv(), spec(), zeros(), ones(), eye(), rand(), Handling these data structures using built in functions. Programming : Functions , Loops(for & while) , Conditional statements , Handling .sci files , Installation of additional packages e.g. optimization, Graphics handling: 2D, 3D , Generating .jpg files , Function plotting, Data plotting , Applications: Numerical Linear Algebra (Solving linear equations, eigen values etc.) solving Ordinary Differential Equations, Numerical Analysis – iterative methods , GUI in scilab, Plotting 2D graphs, Comparison with C / C++/ Matlab

UNIT 3: Python   (4 Lectures)

Introduction to Python, The procedure to install Python, How to open Python console, Basic Python commands

Practical / Lab work to be performed

Each student should do at least 8 assignments from the following list.

1) Calculate the value of x using the following formula in scilab

$$x= \ b+\surd b2 \ \ 4ac2a$$

where a, b and c are constants.

2) Write a code to check if a number is less than 10, if yes, then display `< 10', if it is greater than 10, then display `> 10', else display the square of the number.

3) Write code to check if a given number n is less than or equal to 10, if yes, display its square.

4) Write a for loop to display all the even numbers between 1 to 50.

5) Write a program to find the sum of a list of numbers.

6) Write a program using while loop to display odd numbers in the range 1 to 25.

7) if A=[1,4,0;   1, 5,8; 4, 5, 6]

    a. Find A(:,:)

b. Extract the 2nd column of A

8) Determine the determinant and eigen values of the matrix, A2 + 2* A where A is define in Q.No 7.

9) Define a 3x3 matrix A with all elements equal to 1. Multiply 1st and 2nd row with scalars, 3 and 4 respectively, and determine the determinant of the resultant matrix.

10) A = [2 3 1; 4 6 5; 1 3 6] Use a suitable sequence of row operations on A to bring A to upper triangular form.

REFERENCE BOOKS

1. http://fossee.in or http://scilab.in 2. http://spoken-tutorial.org/NMEICT-Intro 3
 Reliable web resources as recommended by class teacher.

TIT-RC-4016: Introduction to Database Management System

4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: Introduction to Database Management Systems   **(15 Lectures)**
    Characteristics of database approach, data models, DBMS architecture and data independence.

UNIT 2: Entity Relationship and Enhanced ER Modeling   **(15 Lectures)**
    Entity types, relationships, SQL- 99: Schema Definition, constraints, and object modeling.

UNIT 3: Relational Data Model   **(15 Lectures)**
    Basic concepts, relational constraints, relational algebra, SQL queries

UNIT 4: Database Design   **(15 Lectures)**
    ER and EER to relational mapping, functional dependencies, normal forms up to third normal form.

Practical / Lab work to be performed

Note: MyAccess/MySQL may be used.
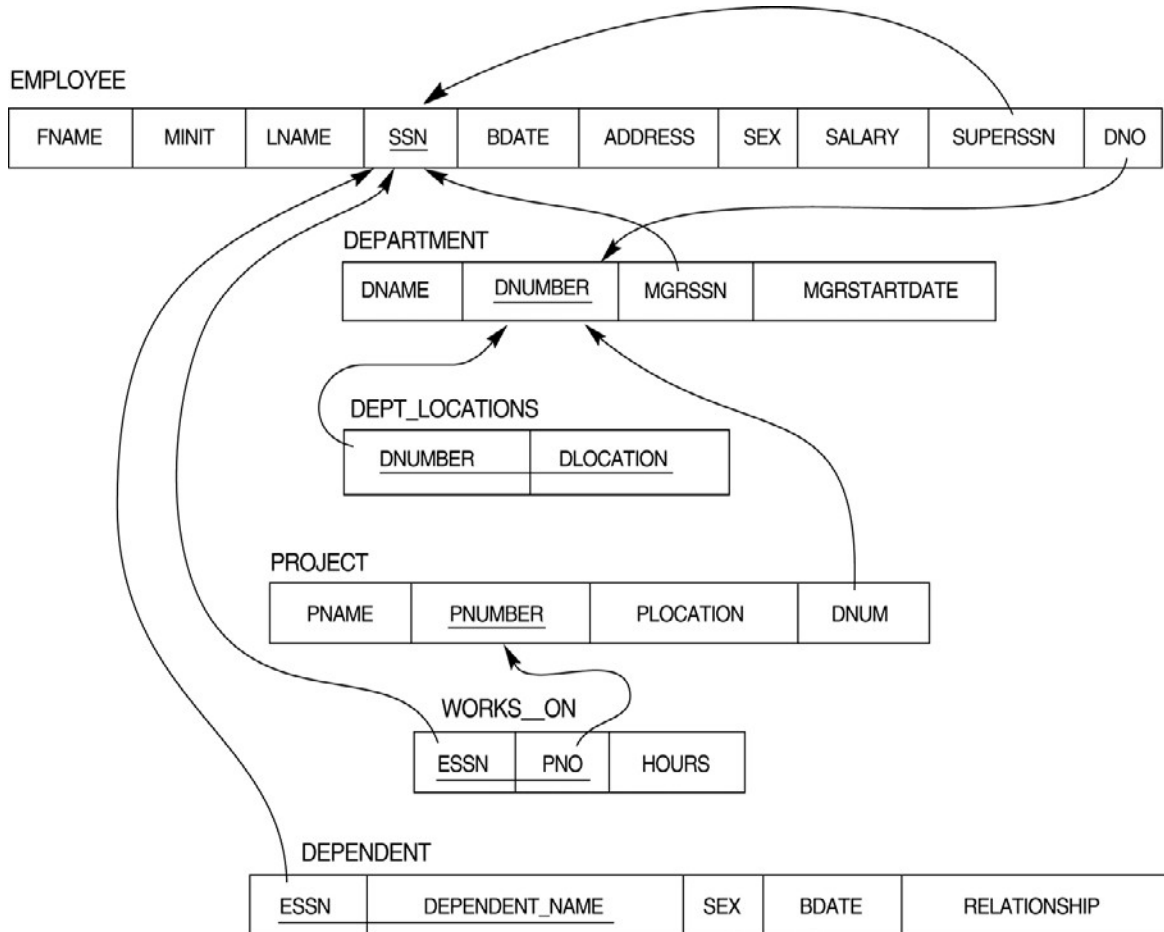
The following concepts must be introduced to the students:
DDL Commands
- Create table, alter table, drop table
DML Commands
- Select , update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or, not,=,<>,>,<,>=,<=)
- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by……..having
- Arranging using order by

Relational Database Schema - COMPANY

EMPLOYEE

FNAME	MINIT	LNAME	SSN	BDATE	ADDRESS	SEX	SALARY	SUPERSSN	DNO

DEPARTMENT

DNAME	DNUMBER	MGRSSN	MGRSTARTDATE

DEPT_LOCATIONS

DNUMBER	DLOCATION

PROJECT

PNAME	PNUMBER	PLOCATION	DNUM

WORKS__ON

ESSN	PNO	HOURS

DEPENDENT

ESSN	DEPENDENT_NAME	SEX	BDATE	RELATIONSHIP

Questions to be performed on above schema

1. Create tables with relevant foreign key constraints

2. Populate the tables with data

3. Perform the following queries on the database:
1. Display all the details of all employees working in the company.
2. Display ssn, lname, fname, address of employees who work in department no7.
3. Retrieve the birth date and address of the employee whose name is 'Franklin T. Wong'
4. Retrieve the name and salary of every employee
5. Retrieve all distinct salary values
6. Retrieve all employee names whose address is in 'Bellaire'

7. Retrieve all employees who were born during the1950s
8. Retrieve all employees in department 5 whose salary is between 50,000and 60,000(inclusive)
9. Retrieve the names of all employees who do not have supervisors
10. Retrieve SSN and department name for all employees
11. Retrieve the name and address of all employees who work for the 'Research' department
12. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.
13. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
14. Retrieve all combinations of Employee Name and Department Name
15. Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan' either as a worker or as a manager of the department that controls the project.
16. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
17. Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
18. Select the names of employees whose salary does not match with salary of any employee in department10.
19. Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
20. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
21. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
22. Find the sum of the salaries and number of employees of all employees of the 'Marketing' department, as well as the maximum salary, the minimum salary, and the average salary in this department.
23. Select the names of employees whose salary is greater than the average salary of all employees in department10.
24. For each department, retrieve the department number, the number of employees in the department, and their average salary.

25. For each project, retrieve the project number, the project name, and the number of employees who work on that project.
26. Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6respectively.
27. For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.
28. Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary insertion in the Department table.
29. Delete all dependents of employee whose ssn is'123456789'.
30. Delete an employee from Employee table with ssn ='12345' (make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and

Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL

31. Perform a query using alter command to drop/add field and a constraint in Employee table.

REFERENCE BOOKS

1. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
2. R. Elmasri, S.B.Navathe, Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.
3. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education,2010.
4. R. Ramakrishanan, J. Gehrke, Database Management Systems, Edition, McGraw-Hill, 3rd 2002.

TIT-SE-4014: System Administration and Maintenance

02 Lectures, 04 Practical, Credits 4 (2+2)
Theory: 20 Lectures   Practical: 20 Lectures

UNIT 1: (Linux/Unix)   **(8 Lectures)**

Basics of operating system, services,

- Installation and configuration, maintenance
- What is linux/ unix Operating systems, Kernel, API, cli, gui,
- Difference between linux/unix and other operating systems
- Features and Architecture
- Linux features, advantages, disadvantages

UNIT 2: (Windows)   **(12 Lectures)**

- Windows as operating system, history, versions.
- PC hardware, BIOS, Devices and drivers,
- Kernel Configuration and building
- Application installation, configuration and maintenance
- Server services and Client services
- Difference between Windows XP/windows7 and windows server2003/2008

Practical / Lab work to be performed

Software Lab Based on System Administration and Maintenance Linux:

Linux Desktop tour, Configuring desktop environment and desktop settings

Basic Commands : Terminal, shell ,Cat, ls, cd, date, cal, man, echo, pwd, Mkdir, rm, rmdir Ps, kill
Package Installation Synaptic package manager

Windows:

Creating users – Admin and regular. Path of their personal files. Adding and changing passwords. Difference between workgroup and domain. Concept of roles. User profiles – creating and roaming Concept of Active Directory. Creating active directory in windows 2003/2008.

Process and Disk management Windows Task manager. File systems – NTFS, FAT.
Services Control Panel C:/program Files, C:/system C:/windows Add /remove new hardware (like printer), Add/remove new programmes
Network Administration Ipconfig,Ping, tracert, route, hostname, net, netstat, whoami Set manual IP address, check connectivity – ipv4, ipv6
Administrator Tools Control Panel -> Administrative Tools Computer Management, Local security Policy, Performance Monitor, Task Scheduler, Antivirus and firewall.
Misc Start->Accessories->System tools -> All options (Remote desktop, backup/restore etc.) **LAN** – sharing printer, files and folder over the network.

TIT-SE-4024: E-Commerce Technologies

02 Lectures, 04 Practical, Credits 4 (2+2)
Theory: 20 Lectures   Practical: 20 Lectures

UNIT 1: An introduction to Electronic commerce   **(5 Lectures)**

What is E-Commerce (Introduction And Definition), Main activities E-Commerce, Goals of E-Commerce, Technical Components of E-Commerce, Functions of E-Commerce, Advantages and disadvantages of E-Commerce, Scope of E-Commerce, Electronic Commerce Applications, Electronic Commerce and Electronic, Business models (C2B,C2C, B2B, B2C,B2G,G2B,G2C)

UNIT 2: The Internet and WWW   **(3 Lectures)**

Evolution of Internet, Domain Names and Internet Organization (.edu, .com, .mil, .gov, .net etc.) , Types of Network, Internet Service Provider, World Wide Web, Internet & Extranet, Role of Internet in B2B Application, building own website

UNIT 3: Electronic Data Exchange   **(3 Lectures)**

Introduction, Concepts of EDI and Limitation, Applications of EDI, Disadvantages of EDI, EDI model, Electronic Payment System: Introduction, Types of Electronic Payment System, Payment Types, Value Exchange System, Credit Card System, Electronic Fund Transfer, Paperless bill, Modern Payment Cash, Electronic Cash

UNIT 5: Planning for Electronic Commerce   **(5 Lectures)**

Planning Electronic Commerce initiates, Linking objectives to business strategies, Measuring cost objectives, Comparing benefits to Costs, Strategies for developing electronic commerce web sites

UNIT 6: Internet Marketing   **(4 Lectures)**

The PROS and CONS of online shopping, The cons of online shopping, Justify an Internet business, Internet marketing techniques, The E-cycle of Internet marketing, Personalization e-commerce.

Practical / Lab work to be performed

(N.B: Student has to perform **any four** of the following experiments**)**
E- Commerce Technologies LAB (based on the following topics):

1. HyperText Markup Language (HTML): structural setup; page layout; text manipulation; special characters; images; links. Intermediate: image maps; tables; frames, forms; meta tags; web forms.
2. Cascading Style Sheets (CSS) : embedding/linking; HTML element selectors; classes; ID selectors, text manipulation; background; borders and spacing; layout; context selectors and grouping, pseudo-classes; pseudo-elements.

3. JavaScript : writing your first script; creating HTML tags; user input and output; loops and tables; payroll calculator, forms and text fields; validating an email address; radio buttons; check boxes; self-grading tests, image rollovers; slide shows; real-time clock; controllable clock; working with cookies.
4. Perl/CGI 10: sample Perl operations; random numbers; lists; dealing four poker hands; time manipulation; subroutines, hash tables; files; string matching, CGI; registration lists; surveys.
5. SQL and regular expressions: Regular expressions: select; where; order by; insert; update; delete, like; aggregate functions; create table; alter table; drop deterministic functions; non-deterministic functions, basics; repeating; positioning.
6. Beginner: between; in; distinct; group by; aliases; table., nested selects; Sound Ex; join;
7. ASP structural setup: response write; retrieving from forms; retrieving from query string; variables; control constructs; subroutines and functions; session state; application variables; server variables; debugging, reading and writing cookies; server-side includes; response object methods; VBScript functions; error handling; debugging, browser details; CDONTS; files; output from a record set; global.asa; setup instructions for using IIS and ASP. Flash 3 Create Flash movies of moving and interactive objects.

REFERENCE BOOKS

1. G.S.V.Murthy, E-Commerce Concepts, Models, and Strategies- :- Himalaya Publishing House, 2011.
2. Kamlesh K Bajaj and Debjani Nag, E- Commerce, 2005.
3. Gray P. Schneider, Electronic commerce, International Student Edition, 2011,
4. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, E Commerce, Fundamentals and Applications, Wiely Student Edition, 2011

TIT-SE-5014: WEB TECHNOLOGY

02 Lectures, 04 Practical, Credits 4 (2+2)
Theory: 20 Lectures   Practical: 20 Lectures

UNIT 1: Web page design   **(3 Lectures)**

Designing web pages with HTML- use of tags, hyperlinks, tables, text formatting, graphics & multimedia, imagemap, frames, forms and Cascading Style Sheet in web pages

UNIT 2: Creating interactive and dynamic web pages with JavaScript   **(3 Lectures)**

Client-side scripting languages, JavaScript overview; constants, variables, operators, expressions and statements; user-defined & built-in-functions; properties and methods of built-in objects, client-side form validation

UNIT 3: Extensible Markup Language (XML)   **(3 Lectures)**

Introduction to XML, need for XML, advantages, simple XML programs, XML DTDs.

UNIT 4: Web Browsers   **(3 Lectures)**

Functions and working principle of web browsers; Web browsers Netscape navigator and IE

UNIT 5: Client/Server Computing   **(3 Lectures)**

Client-Server computing basics; types of Client/Server systems; middleware; N-tiered systems: 2-tier/3-tier/4-tier systems; Fat Clients Versus Fat Servers.

UNIT 6: Web Servers   **(3 Lectures)**

Functions, architecture of web servers

UNIT 7: Introduction to Server-side scripting   **(2 Lectures)**

Overview of CGI, ASP

Practical / Lab work to be performed

<u>**Web Technology Lab**</u>

HTML
(At least 16 assignments has to be done from this group)
1. Create a HTML document consisting of HTML heading, paragraphs and images.
2. Create a HTML document and insert comments in the HTML source code and
   insert horizontal lines.
3. Construct HTML document to set the font of a text , size of the font, style of the
   font.
4. Create a HTML document to show how to create hyperlinks.
5. Create a HTML document to use an image as a link.
6. Create a HTML document to open link in a new browser window.

7. Create a HTML document to jump to another part of a document (on the same page).

8. Create a HTML document to insert images from another folder or another server.

9. Create an image-map, with clickable regions.

10. Create a HTML document with all table elements (Table, Caption, Table Row,
  Table Data element, Table Heading Element, THEAD, TFOOT, TBODY)

11. Create HTML document to make an unordered list, an ordered list, different types
  of ordered lists, different types of unordered lists, Nested list, Definition list.

12. Create HTML form with the all FORM elements (text fields, password field,
  Checkboxes, Radio buttons, Select elements, Drop-down list with a pre-selected value,
  Textarea (a multi-line text input field) and buttons.

13. Create HTML document with all Frame elements (FRAMESET, FRAME, NOFRAMES, and
  INLINE FRAME).

14. Create a HTML document to add AUDIO and VIDEO.

15. Create a HTML document to aligning images
  (Let the image float to the left/right of a paragraph)

16. Create a HTML document to jump to a specified section within a frame

17. Construct a HTML document with CSS to Set the background colour of a page.

18. Construct a HTML document with CSS to set an image as the background of a page

19. Construct HTML document with CSS to Set the text color of different elements and align the text.

20. Construct HTML document to set different colours to visited/unvisited links, Specify a background
  colour for links

JAVAScript

(At least 10 assignments has to be done from this group)

21. Write a program in JavaScript to accept a name from the user and display the same name in an alert
  box.

22. Write a program in JavaScript to display a message in a confirm box.

23. Write a program in JavaScript to display the message „time is running out" in the status bar.

24. Write a program in JavaScript to enter marks of a student and find his/her grade according to the
following:

>   if marks>=90 then grade A
>   if marks>=80 then grade B
>   if marks>=70 then grade C
>   if marks>=60 then grade D
>   else fail.

25. Write a program in JavaScript to create a button and when the button is clicked the message „Hello
  World" is displayed on an alert box..

26. Write a program in JavaScript to accept 2 nos from the user and show the working of all arithmetic
  operators.

27. Write a program in JavaScript to accept 2 strings and concatenate them.

28. Write a program in JavaScript to display the current date and time.

29. Write a program in JavaScript that responds to a mouse click anywhere on the
  page (using mouse click).

30. Write a program in JavaScript to display the contents of a check box in a alert box.
31. Write a program in JavaScript to validate a form containing the fields - user id and password .

XML
32. Construct an XML document that contains information about products of an organization.
33. Construct an XML document that contain information of 5 students (such as rollno., name, address, class).
34. Construct an XML document that contains details of 10 books.

ASP
35. Write a program in ASP to interact with a user in a form that uses the "get" method.
36. Write a program in ASP to interact with a user in a form that uses the "post" method.
37. Write a program in ASP to interact with a user in a form with radio buttons.

TIT-SE-5024: PHP Programming

02 Lectures, 04 Practical, Credits 4 (2+2)
Theory: 20 Lectures   Practical: 20 Lectures

UNIT 1: Introduction to PHP   (3 Lectures)
- PHP introduction, inventions and versions, important tools and software requirements (like Web Server, Database, Editors etc.)
- PHP with other technologies, scope of PHP
- Basic Syntax, PHP variables and constants
- Types of data in PHP , Expressions, scopes of a variable (local, global)
- PHP Operators: Arithmetic, Assignment, Relational, Logical operators, Bitwise, ternary and MOD operator.
- PHP operator Precedence and associativity

UNIT 2: Handling HTML form with PHP   (3 Lectures)
- Capturing Form Data
- GET and POST form methods
- Dealing with multi value fields
- Redirecting a form after submission

UNIT 3: PHP conditional events and Loops   (5 Lectures)
- PHP IF Else conditional statements (Nested IF and Else)
- Switch case, while ,For and Do While Loop
- Goto , Break ,Continue and exit

UNIT 4: PHP Functions   (5 Lectures)
- Function, Need of Function , declaration and calling of a function
- PHP Function with arguments, Default Arguments in Function
- Function argument with call by value, call by reference
- Scope of Function Global and Local

UNIT 5: String Manipulation and Regular Expression   (2 Lectures)
- Creating and accessing String , Searching & Replacing String
- Formatting, joining and splitting String , String Related Library functions
- Use and advantage of regular expression over in built function
- Use of preg_match(), preg_replace(), preg_split() functions in regular expression

UNIT 6: Array   (2 Lectures)
- Anatomy of an Array ,Creating index based and Associative array ,Accessing array
- Looping with Index based array, with associative array using each() and for each()
- Some useful Library function

Practical / Lab work to be performed

1. Create a PHP page using functions for comparing three integers and print the largest number.
2. Write a function to calculate the factorial of a number (non-negative integer). The function accept the number as an argument.
3. WAP to check whether the given number is prime or not.
4. Create a PHP page which accepts string from user. After submission that page displays the reverse of provided string.
5. Write a PHP function that checks if a string is all lowercase.
6. Write a PHP script that checks whether a passed string is palindrome or not? (A palindrome is word, phrase, or sequence that reads the same backward as forward, e.g., madam or nurses run)
7. WAP to sort an array.
8. Write a PHP script that removes the whitespaces from a string. Sample string : 'The quick "" brown fox'
   Expected Output : The quick""brown fox
9. Write a PHP script that finds out the sum of first n odd numbers.
10. Create a login page having user name and password. On clicking submit, a welcome message should be displayed if the user is already registered (i.e.name is present in the database) otherwise error message should be displayed.
11. Write a PHP script that checks if a string contains another string.
12. Create a simple 'birthday countdown' script, the script will count the number of days between current day and birthday.
13. Create a script to construct the following pattern, using nested for loop.
    ```
    *
    * *
    * * *
    * * * *
    * * * * *
    ```
14. Write a simple PHP program to check that emails are valid.
15. WAP to print first n even numbers.
16. $color = array('white', 'green', 'red")
    Write a PHP script which will display the colors in the following way
    : Output : white, green, red,
    - green
    - red
    - white
17. Using switch case and dropdown list display a "Hello" message depending on the language selected in drop down list.
18. Write a PHP program to print Fibonacci series using recursion.
19. Write a PHP script to replace the first 'the' of the following string with 'That'.
    Sample: 'the quick brown fox jumps over the lazy dog.'
    Expected Result: That quick brown fox jumps over the lazy dog.

TIT-RD-5016: Project Work /Dissertation

Credit: 6

- The students will be allowed to work on any project based on the concepts studied in core/elective or skill based elective courses.
- The group size should be of maximum three (03) students.
- Each group will be assigned a teacher as a supervisor who will handle both their theory as well lab classes.
- A maximum of Four (04) projects would be assigned to one teacher.
- Theory classes will cover project management techniques.

TIT-SE-6014: Programming in Python

02 Lectures, 04 Practical, Credits 4 (2+2)
Theory: 20 Lectures   Practical: 20 Lectures

UNIT 1: Planning the Computer Program   (2 Lectures)

Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation

UNIT 2: Techniques of Problem Solving   (2 Lectures)

Flowcharting, decision table, algorithms, Structured programming concepts, Programming methodologies viz. top-down and bottom-up programming

UNIT 3: Overview of Programming   (4 Lectures)

Structure of a Python Program, Elements of Python

UNIT 4: Introduction to Python   (4 Lectures)

Python Interpreter, Using Python as calculator, Python shell, Indentation, Atoms, Identifiers and keywords, Literals, Strings, Operators (Arithmetic operator, Relational operator, Logical or Boolean operator, Assignment, Operator, Ternary operator, Bit wise operator, Increment or Decrement operator).

UNIT 5: Creating Python Programs   (4 Lectures)

Input and Output Statements, Control statements (Branching, Looping, Conditional Statement, Exit function, Difference between break, continue and pass.), Defining Functions, Default arguments.

UNIT 6: Python File Operations   (4 Lectures)

Understanding read functions, read(), readline() and readlines(), Understanding write functions, write() and write lines(), Programming using file Operations, Reading config files in python, Writing log files in python.

Practical / Lab work to be performed

Section: A (Simple programs)

(N.B: Student has to perform **any four** of the following experiments**)**

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria :

> Grade A: Percentage >=80
> Grade B: Percentage>=70 and <80
> Grade C: Percentage>=60 and <70
> Grade D: Percentage>=40 and <60
> Grade E: Percentage<40

3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. Write a program to display the first n terms of Fibonacci series.
5. Write a program to find factorial of the given number.
6. Write a program to find sum of the following series for n terms:
$$1 - 2/2! + 3/3! - - - - - n/n!$$
7. Write a program to calculate the sum and product of two compatible matrices.

Section: B (Visual Python)
(N.B: Student has to perform **any four** of the following experiments**)**
All the programs should be written using user defined functions, wherever possible.

1. Write a menu-driven program to create mathematical 3D objects
   (i) curv (ii) sphere (iii) cone (iv) arrow (v) ring (vi) cylinder
2. Write a program to read n integers and display them as a histogram.
3. Write a program to display sine, cosine, polynomial and exponential curves.
4. Write a program to plot a graph of people with pulse rate p vs. height h. The values of p and h are to be entered by the user.
5. Write a program to calculate the mass m in a chemical reaction. The mass m (in gms) disintegrates according to the formula m=60/(t+2), where t is the time in hours. Sketch a graph for t vs. m, where t>=0.
6. A population of 1000 bacteria is introduced into a nutrient medium. The population p grows as follows:
   $$P(t) = (15000(1+t))/(15+ e)$$
   where the time t is measured in hours. WAP to determine the size of the population at given time t and plot a graph for P vs t for the specified time interval.
7. Input initial velocity and acceleration, and plot the following graphs depicting equations of motion:
   (i)   velocity wrt time (v=u+at)
   (ii) distance wrt time (s=u*t+0.5*a*t*t)
   (iii) distance wrt velocity (s=(v*v-u*u)/2*a)
8. Write a program to show a ball bouncing between 2 walls. (Optional)

REFERENCE BOOKS

1. T. Budd, Exploring Python, TMH, 1st Ed, 2011
2. Python Tutorial/Documentation www.python.or 2015
3. Allen Downey, Jeffrey Elkner, Chris Meyers , How to think like a computer scientist : learning with Python , Freely available online.2012
4. http://docs.python.org/3/tutorial/index.html
5. http://interactivepython.org/courselib/static/pythonds
6. http://www.ibiblio.org/g2swap/byteofpython/read/

TIT-SE-6024: Android Programming

02 Lectures, 04 Practical, Credits 4 (2+2)
Theory: 20 Lectures   Practical: 20 Lectures

UNIT 1: Introduction   **(2 Lectures)**

History of Android, Introduction to Android Operating Systems, Android Development Tools, Android Architecture

UNIT 2: Overview of object oriented programming using Java   **(4 Lectures)**

OOPs Concepts: Inheritance, Polymorphism, Interfaces, Abstract class, Threads, Overloading and Overriding, Java Virtual Machine.

UNIT 3: Development Tools   **(5 Lectures)**

Installing and using Eclipse with ADT plug-in, Installing Virtual machine for Android sandwich/Jelly bean (Emulator), configuring the installed tools, creating a android project – Hello Word, run on emulator, Deploy it on USB-connected Android device.

UNIT 4: User Interface Architecture   **(3 Lectures)**

Application context, intents, Activity life cycle, multiple screen sizes

UNIT 5: User Interface Design   **(4 Lectures)**

Form widgets, Text Fields, Layouts, Button control, toggle buttons, Spinners (Combo boxes), Images, Menu, and Dialog.

UNIT 6: Database   **(2 Lectures)**

Understanding of SQLite database, connecting with the database

Practical / Lab work to be performed

1. Create "Hello World" application. That will display "Hello World" in the middle of the screen in the emulator. Also display "Hello World" in the middle of the screen in the Android Phone.
2. Create an application with login module. (Check username and password).
3. Create spinner with strings taken from resource folder (res >> value folder) and on changing the spinner value, Image will change.
4. Create a menu with 5 options and selected option should appear in textbox.
5. Create a list of all courses in your college and on selecting a particular course teacher-in-charge of that course should appear at the bottom of the screen.
6. Create an application with three option buttons, on selecting a button colour of the screen will change.
7. Create and Login application as above. On successful login, pop up the message.
8. Create an application to Create, Insert, update, Delete and retrieve operation on the database.

REFERENCE BOOKS

1. Android application development for java programmers. By James C. Sheusi. Publisher: Cengage Learning, 2013.

ONLINE READING / SUPPORTING MATERIAL:

1. http://www.developer.android.com
2. http://developer.android.com/about/versions/index.html
3. http://developer.android.com/training/basics/firstapp/index.html
4. http://docs.oracle.com/javase/tutorial/index.htm (Available in the form of free downloadable ebooks also).
5. http://developer.android.com/guide/components/activities.html
6. http://developer.android.com/guide/components/fundamentals.html
7. http://developer.android.com/guide/components/intents-filters.html.
8. http://developer.android.com/training/multiscreen/screensizes.html
9. http://developer.android.com/guide/topics/ui/controls.html
10. http://developer.android.com/guide/topics/ui/declaring-layout.html
11. http://developer.android.com/training/basics/data-storage/databases.html

TIT-SE-6034: Management Information System

04 Lectures, Credits 4 (4)
Theory: 40 Lectures

UNIT 1   **(8 Lectures)**

Organization and Information Systems, Changing Environment and its impact on Business - The IT/IS and its influence. The Organization: Structure, Managers and activities - Data, information and its attributes - The level of people and their information needs - Types of Decisions and information - Information System, categorization of information on the basis of nature and characteristics.

UNIT 2   **(8 Lectures)**

Kinds of Information Systems : Transaction Processing System (TPS) - Office Automation System (OAS) - Management Information System (MIS) - Decision Support System (DSS) and Group Decision Support System (GDSS) - Expert System (ES) - Executive Support System (EIS or ESS).

UNIT 3   **(8 Lectures)**

Manufacturing and Service Systems: Information systems for Accounting, Finance, Production and Manufacturing, Marketing and HRM functions - IS in hospital, hotel, bank.

UNIT 4   **(8 Lectures)**

Enterprise System: Enterprise Resources Planning (ERP): Features, selection criteria, merits, issues and challenges in Implementation - Supply Chain Management (SCM): Features, Modules in SCM - Customer Relationship Management (CRM): Phases, Knowledge Management and e-governance

UNIT 5   **(8 Lectures)**

Nature of IT decision - Strategic decision - Configuration design and evaluation Information technology implementation plan.): Ethical responsibilities of Business Professionals – Business, technology, Computer crime – Hacking, cyber theft, and unauthorized use at work. Piracy – software and intellectual property, Privacy Issues and the Internet Privacy.

REFERENCE BOOKS

1. "Management Information Systems", Kenneth J Laudon, Jane P. Laudon, Pearson/PHI,10/e, 2007
2. "Management Information Systems", W. S. Jawadekar, Tata McGraw Hill Edition, 3/e, 2004
3. "Management Information Systems", Ralph Stair

TIT-RE-6016: Programming in Java

4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: Introduction to Java **(2 Lectures)**

Features of Java, JDK Environment

UNIT 2: Object Oriented Programming Concept **(10 Lectures)**

Overview of Programming, Paradigm, Classes, Abstraction, Encapsulation, Inheritance, Polymorphism, Difference between C++ and JAVA

UNIT 3: Java Programming Fundamental **(10 Lectures)**

Structure of java program, Data types, Variables, Operators, Keywords, Naming Convention, Decision Making (if, switch), Looping(for, while) ,Type Casting

UNIT 4: Classes and Objects **(10 Lectures)**

Creating Classes and objects, Memory allocation for objects, Constructor, Implementation of Inheritance, Implementation of Polymorphism, Method Overloading, Method Overriding, Nested and Inner classes

UNIT 5: Arrays and Strings **(8 Lectures)**

Arrays, creating an array, Types of Arrays, String class Methods, String Buffer methods.

UNIT 6: Abstract Class, Interface and Packages **(8 Lectures)**

Modifiers and Access Control, Abstract classes and methods, Interfaces, Packages Concept, Creating user defined packages

UNIT 7: Exception Handling **(4 Lectures)**

Exception types, Using try catch and multiple catch, Nested try, throws and finally, Creating User defined Exceptions.

UNIT 8: File Handling **(5 Lectures)**

Byte Stream, Character Stream, File IO Basics, File Operations, Creating file, Reading file, Writing File

UNIT 9: Applet Programming **(3 Lectures)**

Introduction, Types Applet, Applet Life cycle, Creating Applet, Applet tag

Practical / Lab work to be performed

1. WAP to find the largest of n natural numbers.
2. WAP to find whether a given number is prime or not.
3. Write a menu driven program for following:

a. Display a Fibonacci series
b. Compute Factorial of a number
c. WAP to check whether a given number is odd or even.
d. WAP to check whether a given string is palindrome or not.
4. WAP to print the sum and product of digits of an Integer and reverse the Integer.
5. Write a program to create an array of 10 integers. Accept values from the user in that array. Input another number from the user and find out how many numbers are equal to the number passed, how many are greater and how many are less than the number passed.
6. Write a program that will prompt the user for a list of 5 prices. Compute the average of the prices and find out all the prices that are higher than the calculated average.
7. Write a program in java to input N numbers in an array and print out the Armstrong numbers from the set.
8. Write java program for the following matrix operations:
   a. Addition of two matrices
   b. Summation of two matrices
   c. Transpose of a matrix
   d. Input the elements of matrices from user.
9. Write a java program that computes the area of a circle, rectangle and a Cylinder using function overloading.
10. Write a Java for the implementation of Multiple inheritance using interfaces to calculate the area of a rectangle and triangle.
11. Write a java program to create a frame window in an Applet. Display your name, address and qualification in the frame window.
12. Write a java program to draw a line between two coordinates in a window.
13. Write a java program to display the following graphics in an applet window.
   a. Rectangles
   b. Circles
   c. Ellipses
   d. Arcs
   e. Polygons
14. Write a program that reads two integer numbers for the variables a and b. If any other character except number (0-9) is entered then the error is caught by Number Format Exception object. After that ex. getMessage() prints the information about the error occurring causes.
15. Write a program for the following string operations:
   a. Compare two strings
   b. Concatenate two strings
   c. Compute length of a string
16. Create a class called Fraction that can be used to represent the ratio of two integers. Include appropriate constructors and methods. If the denominator becomes zero, throw and handle an exception.

REFERENCE BOOKS

1. Ivan Bayross, Web Enabled Commercial Application Development Using Html, Dhtml, javascript, Perl Cgi , BPB Publications,2009.
2. Cay Horstmann, BIG Java, Wiley Publication , 3rd Edition.,2009
3. Herbert Schildt , Java 7, The Complete Reference, , 8th Edition,2009.
4. E Balagurusamy , Programming with JAVA, TMH,2007

TIT-RE-6026: Computer Networks

4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: Basic concepts   **(16 Lectures)**

Components of data communication, standards and organizations, Network Classification, Network Topologies ; network protocol; layered network architecture; overview of OSI reference model; overview of TCP/IP protocol suite.

UNIT 2: Physical Layer   **(6 Lectures)**

Cabling, Network Interface Card, Transmission Media Devices- Repeater, Hub, Bridge, Switch, Router, Gateway.

UNIT 3: Data Link Layer   **(8 Lectures)**

Framing techniques; Error Control; Flow Control Protocols; Shared media protocols - CSMA/CD and CSMA/CA.

UNIT 4: Network Layer   **(8 Lectures)**

Virtual Circuits and Datagram approach, IP addressing methods – Sub-netting; Routing Algorithms (adaptive and non-adaptive)

UNIT 5: Transport Layer   **(6 Lectures)**

Transport services, Transport Layer protocol of TCP and UDP

UNIT 6: Application Layer   **(10 Lectures)**

Application layer protocols and services – Domain name system, HTTP, WWW, telnet, FTP, SMTP

UNIT 7: Network Security   **(6 Lectures)**

Common Terms, Firewalls, Virtual Private Networks

Practical / Lab work to be performed
Implement the concepts of Computer Networks such as:
1. Simulate Check sum Algorithm.
2. Simulate CRC Algorithm
3. Simulate Stop & Wait Protocol.
4. Simulate Go-Back-N Protocol.
5. Simulate Selective Repeat Protocol.

REFERENCE BOOKS

1. B.A. Forouzan: Data Communication and Networking, 4th Edition, Tata McGraw Hill, 2007.
2. D.E. Comer, Internetworking with TCP/IP, Vol. I, Prentice Hall of India, 1998.

3. W. Stalling, Data & Computer Communication, 8th edition, Prentice Hall of India, 2006.
4. D. Bertsekas, R. Gallager, Data Networks, 2nd edition, Prentice Hall of India, 1992.

TIT-RE-6036: Software Engineering

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4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: Introduction **(10 Lectures)**

The Evolving Role of Software, Software Characteristics, Software v/s Programs, Emergence of Software Engineering, Notable Changes in Software Development Practices, Software Development Life Cycle Models (SDLC): *Build and Fix, V-Model, Waterfall models, Prototyping Model, Incremental Model, Evolutionary model, Spiral Model*

UNIT 2: Requirement Analysis **(4 Lectures)**

Software Requirement Analysis and Gathering, Different ways of Requirement Gathering Process, Requirement Analysis and Modeling Techniques, Need for SRS, Components of SRS, Characteristics of good and bad SRS

UNIT 3: Software Project Management **(14 Lectures)**

Goal of Software Project management, Organization of SPMP (Software Project Management Plan) document, Estimation in Project Planning Process, Lines of Code (LOC), Function Point (FP) metric, Project Estimation Techniques: (*Empirical Estimation, Heuristics Estimation),* Expert Judgment, Delphi Cost Estimation, COCOMO models, Project Scheduling, Work breakdown structure, Activity Network Representation, Critical Path Method, Staffing level estimation, Norden's work, Putnam's work

UNIT 4: Risk Management **(4 Lectures)**

Software Risks, Risk Identification, Types of Risks, Risk Assessment, Risk Refinement, Risk Mitigation, Monitoring and Management Plan (RMMM) Plan

UNIT 5: Quality Management **(8 Lectures)**

Quality Concepts, Evolution of Quality Systems, Software Quality Assurance (QA), Total Quality Management (TQM), ISO 9000, How to get ISO 9000 Certification, Shortcomings of ISO 9000, SEI-Capability Maturity Model (CMM) and Integration

UNIT 6: Design Engineering **(10 Lectures)**

Design Concepts, Cohesion and Coupling, Classification of Cohesion and Coupling, Function Oriented design vs Structured Design, Elements of a Data Flow Diagram (DFDs), properties of a DFD, Balancing DFD, Synchronous and Asynchronous DFD, Structured design (SD) concepts, Basic elements used to design a SD, Design Review

UNIT 7: Testing Strategies & Tactics **(10 Lectures)**

Software Testing Fundamentals, Strategic Approach to Software Testing, Verification and validation process, Unit Testing, Integration Testing :*Top Down approach* and *Bottom up approach,* System testing- Black-Box Testing: *Equivalent partitioning* and *boundary value analysis*, White-Box Testing and their type: *Statement Coverage, Branch Coverage,*

Multiple Condition Coverage and Basis Path Testing (*Path Coverage)*, Control Flow Graph (CFG), McCabe's Cyclomatic Complexity metric,

Practical / Lab work to be performed
(**N.B:** *Student has to perform **any eight** of the following experiments*)

Expertiment-1: Consider a Software project to do the followings: *Define problem Statement, Needs of the project, Identify the suitable life cycle model to use, possible software crisis, Strategies and techniques used for Requirement analysis and Gathering.*

Experiment-2: Consider a project and design the suitable SRS document for the same.

Experiment-3: Execute the LOC size estimation metric for a given problem.

Experiment-4: Apply the Function Point (FP) size estimation metric for a given problem with suitable technical constrains.

Experiment-5: Consider a project to implement COCOMO model to estimate effort of the project

Experiment-6: Apply the Norden's model of staffing level estimation for a given problem definition.

Experiment-7: Consider a project to implement Putnam's model of staffing level estimation.

Experiment-8: Consider a problem definition to apply equivalent class partition technique to develop test cases.

Experiment-9: Apply Boundary value analysis method to develop test cases for a project.

Experiment-10: Design test suits for a given code segment applying statement Coverage testing technique.

Experiment-11: Design test suits for a given code segment applying Branch Coverage testing technique.

Experiment-12: Apply the Basis path testing for a given code segment of a project.

Experiment-13: Design the DFD for a given project. (N.B: *using Software tools*)

Experiment-14: Design the Structure Chart for a given project. (N.B: *using Software tools*)

Sample List of Projects: (N.B: one or more projects from the given list can be considered as a basis for the laboratory work)

1. **Criminal Record Management**: Criminal record management system for jailers, police officers and CBI officers
2. **DTC Route Information**: Online information about the bus routes and their frequency and fares
3. **Car Pooling**: Maintain information about the corporate employees within an organization to avail the facility of carpooling effectively.

4. Patient Appointment and Prescription Management System
5. Organized Retail Shopping Management Software
6. Online Hotel Reservation Service System
7. Examination and Result computation system
8. Automatic Internal Assessment System
9. Parking Allocation System
10. Wholesale Management System
11. Library Management System
12. Attendance Management System

REFERENCE BOOKS

1. R.S. Pressman, Software Engineering: A Practitioner's Approach (7th Edition), McGraw-Hill, 2009.
2. P. Jalote, An Integrated Approach to Software Engineering (2nd Edition), Naros Publishing House, 2003.
1. K.K. Aggarwal and Y. Singh, Software Engineering (2nd Edition), New Age International Publishers, 2008.
4. I. Sommerville, Software Engineering (8th Edition), Addison Wesley, 2006.
5. D. Bell, Software Engineering for Students (4th Edition), Addison-Wesley, 2005.
6. R. Mall, Fundamentals of Software Engineering (2nd Edition), Prentice-Hall of India, 2004.

TIT-RC-6046: Operating Systems

4 Lectures, 4 Practical, Credits 6 (4+2)
Theory: 60 Lectures, Practical: 60 Lectures

UNIT 1: Introduction   **(4 Lectures)**

System Software, Resource Abstraction, OS strategies

UNIT 2: Types of operating systems   **(8 Lectures)**

Multiprogramming, Batch, Time Sharing, Single user and Multiuser, Process Control & Real Time Systems

UNIT 3: Operating System Organization   **(10 Lectures)**

Factors in operating system design, basic OS functions, implementation consideration; process modes, methods of requesting system services – system calls and system programs.

UNIT 4: Process Management   **(14 Lectures)**

System view of the process and resources, initiating the OS, process address space, process abstraction, resource abstraction, process hierarchy, Thread model

UNIT 5: Scheduling   **(12 Lectures)**

Scheduling Mechanisms, Strategy selection, non-pre-emptive and pre-emptive strategies

UNIT 6: Memory Management   **(12 Lectures)**

Mapping address space to memory space, memory allocation strategies, fixed partition, variable partition, paging, virtual memory

Practical / Lab work to be performed
(N.B: *Student has to perform **any five** of the following experiments***)**

1. Write a program to create a child process that starts looping and then terminates.
2. Write a program to show that the child can be set up to ignore a signal from its parent.
3. Write a program to show that a process can ignore a signal.
4. Write a program to create a thread in which prints "We are proud to be Indians" and terminates.
5. Write a program to demonstrate how to "wait" for thread completions by using the P thread join routine. Threads are explicitly created in a joinable state.
6. Write a program to create a thread in which print "We are proud to be Indians" and pass multiple arguments using structure during its creation.
7. Write a program to compute the dot product of two vectors and also show the use of mutex variable.
8. Write a program to implement Banker's Algorithm for multiple resource type each.
9. Write a program to simulate Dining Philosophers Algorithm

REFERENCE BOOKS

1. A Silberschatz, P.B. Galvin, G. Gagne, Operating Systems Concepts, 8th Edition, John Wiley Publications 2008.
2. A.S. Tanenbaum, Modern Operating Systems, 3rd Edition, Pearson Education2007.
3. G. Nutt, Operating Systems: A Modern Perspective, 2nd Edition Pearson Education1997.
4. W. Stallings, Operating Systems, Internals & Design Principles, 5th Edition, Prentice Hall of India. 2008.
5. M. Milenkovic, Operating Systems- Concepts and design, Tata McGraw Hill 1992.