FACULTY OF SCIENCE

SYLLABI

FOR

COMPUTER APPLICATIONS
(ELECTIVE)

1st, 2nd & 3rd Year

(SEMESTER SYSTEM)

For

2016 - 2017 SESSIONS

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<tr>
<th>Sr. No.</th>
<th>Paper</th>
<th>Name of Paper</th>
<th>Lectures per week</th>
<th>Max. Marks</th>
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FIRST SEMESTER
Paper –CA01: Fundamentals of IT

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Note:
i. The Question Paper will consist of Four Sections.
ii. Examiner will set total of NINE questions comprising TWO questions from each Section and ONE compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt ONE question from each Section and the Compulsory question.
iv. All questions carry equal marks unless specified.

Objectives: This course will enable students to get familiar with computer and programming fundamentals.

SECTION – A
Computer Appreciation: Introduction to computers, characteristics of computer; History of computers; Classification of computers on basis of size: (Micro, Mini, Mainframe and super computers), Working Principles, Generations; Applications of computers; Commonly used terms–Hardware, Software, Firmware; Basic Computer Organization: Block diagram of computer system- Input unit, Processing Unit and Output Unit; Description of Computer input devices: Keyboard, Mouse, Trackball, Light Pen, Touch screens, Scanner, Digital Camera; Output devices: Monitors, Printers, Plotters

Computer Memory: Representation of information: BIT, BYTE, Memory, Memory size; Units of measurement of storage; Main memory: Storage evaluation criteria, main memory organization, RAM and ROM and their types; Secondary storage devices: Sequential Access Memory, Direct Access Memory, Magnetic Tapes, Magnetic disks, Optical disks: CD, DVD; Memory storage devices: Flash Drive, Memory card

SECTION – B
Types of software: System, Utility and Application software; Programming Languages: Generation of Languages; Translators - Interpreters, Compilers, Assemblers and their comparison.

Introduction to Computer based Problem-solving: Steps of development of a program, Algorithm development, Flowchart, Pseudo codes, basic programming constructs, Documentation, Testing and Debugging

SECTION – C
Understanding Number System: Computer arithmetic; Number systems: Decimal, Binary, Octal, Hexadecimal, Conversions between different number systems.

Character Codes: Introduction, need, ASCII, EBCDIC and Unicode character sets.

SECTION – D
Understanding Operating System using DOS: Introduction to operating systems and its functions, DOS and versions of DOS, Booting sequence; Warm and Cold Boot; Concepts of files and directories, Wildcard characters, Types of DOS commands, Internal Commands: cls, copy con, type, ver, volume, prompt, path name, date, time, md, cd, rd, copy, Del; External Commands: doskey, format, unformat, xcopy, fdisk, Attrib, chkdsk; Introduction to Config.Sys and Autoexec.Bat.


References:
4. Fundamentals of Computers, PHI, New Delhi
Paper –CA02: Application Software

Total Periods: 60
(6 Periods/week) Max. Marks: 30+5
Exam Hours: 3

Note:

i. The Question Paper will consist of Four Sections.

ii. Examiner will set total of NINE questions comprising TWO questions from each Section and ONE compulsory question of short answer type covering whole syllabi.

iii. The students are required to attempt ONE question from each Section and the Compulsory question.

iv. All questions carry equal marks unless specified.

v. Examiner will set paper independent of specific Word processing, Spreadsheet, Presentation and Data Base Management software.

Objectives: This course will enable students to get familiar with Application Software for Word processing, Spreadsheet, Presentation and Data Base Management.

SECTION – A

Word Processing: Opening, Creating, Saving, Printing and closing Documents, Using the Interface (Menu Toolbars), Editing Text (Copy, Delete, Move), Finding and Replacing Text, Spell Check, Autocorrect; Auto text, Character formatting, Page formatting; Document Enhancement: Adding Borders and shading, Adding Headers and Footers, Setting up Multiple columns, Adjusting Margins and Hyphenating Documents; Mail Merge: Creating Master Document and Data Source, Merging and printing Documents; Inserting Pictures, Tables, Macros: create, execute and reusability feature.

SECTION – B

Spreadsheets: Worksheet overview, Row, Column, Cells, Menus, Creating, Opening, Saving and printing worksheet; Auto fill, working with Formulae, Data formatting (number formatting, date formatting), Working with Ranges, Absolute, relative and Mixed addressing, creating, sorting and filtering Data Base; Charts: creating chart, adding Titles, Legends etc. to charts, Printing Charts; Macros: creating Macros, Recording Macros, Running Macros, Assigning shortcuts to Macros; Functions (Statistical, financial, Mathematical, string, date and time).

SECTION – C

Presentation Software: Creating, saving, and printing presentations; selecting design templates, Inserting tables and images, animations and transitions, Auto content Wizard, Changing Background

SECTION – D

Databases: Introduction to database, Creating database using Wizard or from scratch, creating tables using wizard, entering data, using design view, saving, inserting, editing, Changing properties of fields, setting primary key.

References:

2. OOoAuthors Team: Getting Started with OpenOffice.org 3.3, Friends of OpenDocument
Paper – PCA01: Practical based on CA01 and CA02

Total Periods: 60          Max. Marks: 30
(6 Periods/week)         Exam Hours: 3

- Introduction to Autoexec.bat, Modifying config.sys, Important DOS commands
- Word Processing: Formatting, Spelling Checking, Mail-merging of documents, Macros
- Using worksheets/Database for Payroll, Inventory etc.
- Creating and managing Database
- Preparation of presentation on topics covered in Theory paper

Note: Paper will be set at the time of examination. Due weight age may be given to the practical note-
book and Assignments in evaluation.
SECOND SEMESTER
Paper CA03: C Programming Language

Total Periods: 60
(6 Periods/week)
Max. Marks: 30+5
Exam Hours: 3

Note:

i. The Question Paper will consist of Four Sections.
ii. Examiner will set total of Nine questions comprising Two questions from each Section
    and One compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt One question from each Section and the Compulsory
    question.
iv. All questions carry equal marks unless specified.

Objective: The course will enable students to understand the basics of C programming language.

SECTION - A
1. Basics of ‘C’ Language: History, Structure of a C program, Data types, Constants and variables,
2. Control constructs: If, If-else, nested if-else, else-if ladder, switch, goto, for, while, do... while, jumps
   in loops: break and continue.

SECTION - B
3. Preprocessor: #define, #include, #undef, #conditional compilation directives (#if, #else, #elif, #endif,
   ifndef and ifndef), Storage classes, Header files (stdio.h, ctype.h, string.h, math.h, stdlib.h, time.h);
   Type casting, Type conversion, Scope Rules: Local and Global variables
4. Functions: library functions, user defined functions, scope rule of functions, Parameter passing: call by
   value and call by reference, calling functions with Arrays, Recursion: Basic concepts, Design examples
   (Tower of Hanoi)

SECTION – C
5. Arrays: Creating and using One dimensional and two dimensional arrays.
6. Strings: Introduction to strings, declaring and initializing string variables, reading and writing strings,
   string handling functions.
7. Pointers: & and * operators, Declaring and initializing pointers, Pointer expression, Pointer
   assignments, Pointer arithmetic. The dynamic memory allocation functions – malloc and calloc, Pointer
   vs Arrays, Passing Array to functions, Arrays of pointers, and Functions with variable number of
   arguments.

SECTION – D
8. Structures: Basics of Structures, Declaring a structure, Referencing structure elements, Array of
   structures, passing structures to functions. Unions: Declaration, Uses; Enumerated data types, type def.
   accessing functions (fopen, fclose, putc, getc, fprintf); argc and argv; File opening modes: Text mode,
   Binary mode.

References:
Paper-CA04: Operating System Concepts

Total Periods: 60
(6 Periods/week)

Max. Marks: 30+5
Exam Hours: 3

Note:

i. The Question Paper will consist of Four Sections.
ii. Examiner will set total of Nine questions comprising Two questions from each Section and One compulsory question of short answer type covering whole syllabi.
iii. The students are required to attempt One question from each Section and the Compulsory question.
iv. All questions carry equal marks unless specified.

Objective: The course will enable the students to get familiar with concepts of operating system in general.

SECTION – A


SECTION – B


SECTION – C

4. Memory management: Logical vs Physical address space, Dynamic loading and linking, Swapping, Introduction to Paging and Segmentation, Virtual Memory-Demand paging
5. Introduction to Page replacement algorithms: FIFO, Optimal, LRU, Stack algorithms and LRU approximation.

SECTION – D

6. File System: File System structure, Allocation methods, contiguous allocation, linked allocation, indexed allocation; Directory Structure: Single level, Two level, Tree and Acyclic structure; Directory implementation-linear list, hash table; Free Space Management- Bit vector, linked list, grouping
7. Device Management: Disk structure, disk scheduling; FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling algorithms, Control of various devices, Device drivers, Interrupt driven and poll driven data transfers

References:

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<tr>
<td>1</td>
<td>Abraham Silberschatz &amp; Peter B Galvin</td>
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<td>Donovan, John J.</td>
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6
Paper PCA02: Practical based on CA03

Total Periods: 60        Max. Marks: 30
(6 Periods/week)        Exam Hours: 3

- Developing and writing Programs in C Language to demonstrate -
  - The use of constants, Variables, operators and expressions
  - Input and output statements, library functions
  - Conditional statements: if-else, nested-if, switch
  - Branching statements: Jump statements, break, continue, goto
  - Loops: while, do-while, for
  - Functions, recursive functions
  - Call – by value/reference
  - Arrays - Single and Multidimensional Array
  - String handling
  - Pointers, passing pointers to functions, pointers and arrays
  - Structure – accessing members, nested structures, structure with pointers
  - File handling, Creating and processing data files
  - Use of command line arguments
THIRD SEMESTER

Paper – A : Web-Based Applications

Total Periods: 60 (6 Periods/week)  Max. Marks: 65
Exam Hours: 3

Note :

i. The Question Paper will consist of Four Sections.

ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section
    and **ONE** compulsory question of short answer type covering whole syllabi.

iii. The students are required to attempt **ONE** question from each Section and the Compulsory
    question.

iv. All questions carry equal marks unless specified.

Objective: This course enables students to create web pages using scripting language (HTML,
Java script) & the Java programming language.

SECTION – A

1. Networking: Definition, Network hardware and Software, Network Topologies, Types and
   uses of Computer Networks, Brief Introduction to OSI reference model and TCP/IP
   reference Model. Internet, WWW, URL, Introduction to Search engines.

2. HTML: Introduction to HTML, Building blocks of HTML, lists, links, images, tables,
   frames, forms, Introduction to cascading style sheets (CSS) defining and applying CSS.
   (No. of Lectures : 15)

SECTION – B

3. Java Script: Features, tokens, data types, variables, operations, control constructs, strings
   arrays, functions, core language objects, client side objects, event handling. Applications
   related to client side form validation.

4. Fundamentals of Java: Java Vs. C++, Byte code, Java virtual machine, constants, variables,
   data types, operators, expressions, control structures, defining class, creating objects,
   accessing class members, constructions, method overloading.
   (No. of Lectures : 15)

SECTION – C

5. Arrays, String handling Inheritance: Basics, member access, using super to call super class
   constructors, creating a multi level hierarchy, method overriding, Dynamic method
   dispatch, using abstract classes, using Final.

6. Packages and Interfaces: Defining a package, understanding CLASSPATH, Access
   protection: Importing packages, Interfaces: Defining an Interface, Implementing. Interfaces,
   Applying, Interfaces, Variables in Interfaces. Exception Handling: Fundamentals, exception
   types, using Try and catch, Multiple Try and Catch clauses, Nested Try statements, Built –
   in exceptions.
   (No. of Lectures : 15)
SECTION – D

7. Multi-threaded Programming: The Java Thread model, Thread priorities, synchronizations, messaging. The thread class and runnable Interface, The Main Thread: Creating a Thread, Implementing Runnable, Extending Thread, creating Multiple Threads, Thread Priorities; synchronizations: Methods, statements, Inter Thread communication, Deadlock, suspending, Resuming and stopping Threads, Applet fundamentals

8. I/O Basics: streams, the predefined streams; Reading console Input, Writing console output. The print writer class; Reading and Writing files

(No. of Lectures : 15)

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<td>4.</td>
<td>Bayross, Ivan</td>
<td>: Java 2 by BPB publication</td>
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Write programs in Java to demonstrate:

- Implementation of Classes and Objects
- Constructors and their types
- Inheritance – calling super class constructors, abstract classes, multilevel hierarchy
- Method overloading and overriding
- String handling
- Creating Packages and Interfaces: Defining an Interface, Importing packages
- Implementation and handling of built-in and user defined exceptions
- I/O streams
- Applet programming using AWT controls
- Event handling

Creation of WebPages using HTML, DHTML, JavaScript:

- Creating Time-Table of a student using tables
- Creating various lists using list tags
- Preparing Bio-Data using tables, images, formatting tags, lists
- Create a simple website using frames and other features of HTML
- Calculate expression using eval function
- Form Validation Using JavaScript event Handlers and functions

Note: Paper will be set at the time of examination. Due weight age may be given to the practical note-book and Assignments in Evaluation.
FOURTH SEMESTER

Paper – B : Programming in C++

Total Periods: 60                                           Max. Marks: 65
(6 Periods/week)                                           Exam Hours: 3

Note:

i. The Question Paper will consist of Four Sections.

ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.

iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.

iv. All questions carry equal marks unless specified.

Objective: The course enables the students to get familiar with the features of Object Oriented programming language and develop programs using different concepts.

SECTION - A

1. Concepts of Object Oriented Programming: Object, Class, Encapsulation, Data hiding, Inheritance, Polymorphism. Analysis and design of system using object oriented approach Structure of a C++ Program, Include files, Declaration of an object, main function, I/O streams. Classes and Objects Class Declaration: Data Members, Member Functions, Private and Public members, data hiding and encapsulation, Arrays within a class. (No. of Lectures: 15)

SECTION - B

2. Class Function Definition: Member Function definition inside the class declaration and outside the class declaration, Scope resolution operator, Private and Public member function, Nesting of Member functions. Creating Objects, Accessing class data members, Accessing member functions, Arrays of Objects, Objects as function arguments: Pass by value, Pass by Reference, Pointers to Objects. (No. of Lectures: 15)

SECTION - C

3. Constructors Declaration and Definition, Default Constructors, Parameterized Constructors, Copy Constructors. Destructors: Definition and use, Function Overloading, Operator overloading, Inheritance - Extending Classes, Concept of inheritance, Base class, Derived class, Defining derived classes, Visibility modes: Private, Public, Protected; Single inheritance: Privately derived, Publicly derived; Making a protected member inheritable, Access Control to private and protected members by member functions of a derived class, Multilevel inheritance, Nesting of classes. (No. of Lectures : 15)

SECTION - D

4. Files and Streams: Text and binary streams, The stream class hierarchy, Processing files, declaring files, opening files using open() function or constructor function, closing files, String I/O, Sequential and random Access, File updation
References:


Total Periods: 60  
(6 Periods/week)  
Max. Marks: 25  
Exam Hours: 3

Write programs in C++ to demonstrate:

- The use of C++ operators, tokens and keywords.
- Input and output statements
- Control statements
- Functions (Function overloading, inline functions, friend functions).
- Classes (Object Declaration, Private and Public members, defining member functions)
- Data hiding and encapsulation
- Static data members and member functions
- Array of objects
- Objects as function arguments
- Implementation of Constructor and Destructor.
- Operator Overloading (using member function and friend function)
- Inheritance (using visibility modes: Private, public, protected)
- All types of inheritance (multiple, multilevel, hybrid, hierarchial)
- Polymorphism (pointers to objects, Virtual Functions)
- File operations using classes

Note: Paper will be set at the time of examination. Due weight age may be given to the practical note-book and Assignments in Evaluation.
FIFTH SEMESTER

Paper – A: Programming with VB.NET and Oracle

Total Periods: 60                                            Max. Marks: 65
(6 Periods/week)                                            Exam Hours: 3

Note:
 i. The Question Paper will consist of Four Sections.
 ii. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.
 iii. The students are required to attempt **ONE** question from each Section and the Compulsory question.
 iv. All questions carry equal marks unless specified.

Objective: The course is designed to enable the students to develop applications using event driven programming with VB.net (as front end) and oracle (at back end).

SECTION - A

1. **Overview of the Visual Studio .NET IDE:** Menu Bar and Tool Bar, Solution Explorer, ToolBox, Properties, Displaying and printing Text, Displaying Image, Arithmetic, relational operators, Control structures (branching, looping), assignment operators.

2. **Procedures:** Introduction, Modules, classes, sub Procedures, function procedures, passing arguments (pass by value versus pass by reference), Recursion: factorial, Fibonacci series
   (No. of Lectures: 15)

SECTION - B

3. **Arrays and Strings:** Declaring and allocating Arrays, passing Arrays to procedures. Sorting Arrays using Bubble Sort, searching Arrays using Linear Search, Binary Search, String functions.

4. **Accessing Data with ADO.NET:** Understanding ADO.net Object model, architecture, and components, Database, Connecting to and querying an access data source, Creating Applications which can Insert, Delete, and Update information from a database using SQL statements, viewing data using Data Grid View Control.
   (No. of Lectures: 15)

SECTION - C


(No. of Lectures: 15)

SECTION - D

7. Data Definition Language (DDL): Creating Tables, Creating a Table with data from Another table, Inserting Values into a Table, Updating Column(s) of a Table, Deleting Row(s) from a Table, Dropping a Column, Views, Manipulating the Base table(s) through views, Rules of DML, Statements on Join Views, Dropping a View, Inline Views, Materialized Views. Database Security and Privileges, Grant and Revoke Command, Privileges Management, Enhancing Performance, Sequences, COMMIT and ROLLBACK.


(No. of Lectures: 15)

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<td>3.</td>
<td>Introduction to Database Sytems</td>
<td>C.J.Date, Pearson 2006.</td>
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Paper – B :       Practical on Paper - A

Total Periods: 6 per week             Max. Marks: 25

- Development of any minor application using VB.net (Front End) and Oracle (Back End). The evaluation of Project will be done on the basis of Project report submitted by the candidate and Vive Voce examinations.
SIXTH SEMESTER

Paper – B : Operating Systems

Total Periods: 60 Max. Marks: 65
(6 Periods/week) Exam Hours: 3

Note :

v. The Question Paper will consist of Four Sections.
vi. Examiner will set total of **NINE** questions comprising **TWO** questions from each Section and **ONE** compulsory question of short answer type covering whole syllabi.

vii. The students are required to attempt **ONE** question from each Section and the Compulsory question.

viii. All questions carry equal marks unless specified.

Objective: The course enables the students to get familiar with major functions of Operating System and also covers a case study of Operating System using LINUX.

SECTION – A

8. Operating System: Software Classification, Functions of Operating System. Interaction of Operating Systems with hardware and user programs; Multi-user, Multitasking, Multiprocessing and Real time operating systems, Parallel Systems, Distributed Systems

9. Memory management: Logical versus Physical address space, Swapping, Paging, and Segmentation, Virtual Memory-Demand paging, Page replacement algorithms

(NO. of Lectures : 15)

SECTION – B


(NO. of Lectures :15)

SECTION – C

11. File System: File System structure, Allocation methods, contiguous allocation, linked allocation, indexed allocation; Free Space Management- Bit vector, linked list, grouping; Directory implementation-linear list, hash table.

12. Device Management: Disk structure, disk scheduling, FCFS, SSTF, SCAN, C-SCAN and LOOK scheduling algorithms Control of various devices. Device drivers, Interrupt driven and poll driven data transfers

(NO. of Lectures :15)

(No. of Lectures : 15)

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<td>Norton Peter</td>
<td>Complete guide to LINUX, SAMS, 1999.</td>
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Paper – D :  Minor Project – Based on VB.Net, Oracle & Linux

Total Periods: 60                                          Max. Marks: 25
(6 Periods/week)                                           Exam Hours: 3

Development of any application using VB.net (Front End) and Oracle (Back End). The evaluation of Project will be done on the basis of Project report submitted by the candidate and Viva Voce examination.