15. INFORMATICS PRACTICES (CODE: 065)

Learning Objectives:

- To gain working knowledge of a computer system including peripherals
- To understand the application development process.
- To gain programming skills in front-end development
- To gain skills in back-end development: Relational Database Creation and Management.

Competencies Developed:

- Sound knowledge of computer system
- Familiarity with application development process using simple IDEs
- Ability to use, develop and debug programs independently.
- Ability to store and retrieve data using an RDBMS.

COURSE DESIGN
CLASS–XI (2013-14)

Unit	Topic	Periods			Marks
		Theory	Practical	Total	
1.	Introduction to Computer Systems	20	08	**28**	**10**
2.	Introduction to Programming	45	42	**87**	**25**
3.	Relational Database Management System	50	45	**95**	**30**
4.	IT Applications	10	20	**30**	**05**
		125	**115**	**240**	**70**

Unit 1: Introduction to Computer Systems

10 Marks (20 Theory + 8 Practical) Periods

Hardware Concepts:

- Computer organization (basic concepts): CPU, Memory (RAM and ROM), I/O devices, communication bus, ports (serial, parallel), device specific ports;
- Input devices: Keyboard, Mouse, Light pen, Touch screen, Graphics Tablet, Joystick, Microphone, OCR, Scanner, Smart Card reader, Barcode reader, Biometric sensor, Web camera;
- Output Devices: Monitor/Visual Display Unit (VDU), LCD screen, Television, Printer (Dot Matrix Printer, Deskjet/ Inkjet/ Bubble jet Printer, Laser Printer), Plotter, Speaker;
- Secondary Storage Devices: Floppy disk, Hard disk, Compact disk, Magnetic tape, Digital Versatile disk (DVD), Flash drive, Memory cards.Comparative properties of storage media;
- Memory Units: bit, byte (Kilobyte, Megabyte, Gigabyte, Terabyte, Petabyte)
- E-waste disposal.

Security of computer system

Sources of attack and possible damages, malware - virus, worms, trojan, spyware- and their propagation,

cookies as security threat, malware detection using a tool.Computer security, Digital certificate, Digital signature, firewall, password, file access permissions

Types of Software:

a) System Software:

(i) Operating systems: Need for operating system, major functions of Operating System; Examples of OS for mainframe, PC/Server, and mobile devices.

(ii) Language Processors: Assembler, Interpreter, and Compiler

b) Utility Software: Compression tools, disk defragmenter, anti-virus.

c) Application Software:

(i) General Purpose Application Software: Word Processor, Presentation Tool, Spreadsheet Package, Database Management System, Integrated Development Environment (IDE)

(ii) Specific Purpose Application software: Inventory Management System, Purchasing System, Human Resource Management System, Payroll System, Financial Accounting, Hotel Management and Reservation System, etc.

Unit 2: Introduction to Programming 25 Marks (45 Theory + 42 Practical) Periods

Getting started with Programming using IDE

- Introduction, Rapid Application Development using IDE (Integrated Development Environment); Familiarization of IDE using basic Interface components- Label, Text Field, Text Area, Button, Checkbox, Radio Button. (As per appendix A)
- Developing General Application (As per the guidelines at appendix B) - Getting Familiar with Java Swing User Interface components-Frame, Dialog, Option Pane, Panel, Scroll Pane, Label, Text Field, Password Field, Text area, Button, Check Box, Radio Button, Combo Box, List.
- Basic component handling methods and properties: setText(), getText(), is Selected(), set Selected().

Programming Fundamentals

- Data Types: Concept of data types; Built-in data types - byte, short, int, long, float, double, char, String, boolean
- Variables: Need to use variable, declaring variables, variable naming convention, assigning value to variables;
- Integer object method: parseInt
- Double object method: parseDouble, parseFloat
- Control structures:

  Decision structure - if, if-else, switch;

  Looping structure- while, do . . while, for;

Programming Guidelines:

- General concepts; modular approach;
- Stylistic guidelines: clarity and simplicity of expressions and names; comments, indentation;
- Running and debugging programs, syntax errors, run-time errors, logical errors;
- Problem solving methodology: Understanding of the problem, Identifying minimum number of inputs required for output, breaking down problem into simple logical steps.

Unit 3: Relational Database Management System

30 Marks (50 Theory + 45 Practical) Periods

Database Management System

- Introduction to database concepts: database, relational database, relation/table, attribute/field, tuple / row;
- Data types: Text (CHAR, VARCHAR), Number (DECIMAL, INT/INTEGER), Date and Time
- Keys: candidate key, primary key, alternate key, foreign key;
- Examples of common Database Management System:MySQL, Ingres, Postgres, Oracle, DB2, MS SQL, Sybase, etc.; Common Database management tools for mobile devices.

Introduction to MySQL

(ANSI SQL 99 standard commands)

- Classification of SQL Commands:

  DML - SELECT, INSERT, UPDATE, DELETE

  DDL - CREATE, DROP, ALTER
- Creating and using a database: SQL CREATE command to create a database, USE command to select a database.
- Creating a table: CREATE command to create a table, DESC command to display a table structure, INSERT command for inserting new rows, inserting new rows with null values and values of all the studied data types.
- Displaying table data: SELECT command for selecting all the columns, selecting specific column(s) using arithmetic operators, operator precedence.
- Defining and using column alias.
- Eliminating duplicate values from display using DISTINCT keyword
- Limiting rows during selection (using WHERE clause)

  o Using comparison operators - =, <, >, <=, >=, <>, BETWEEN, IN, LIKE(%,_);

  o Logical operators -AND, OR, NOT and corresponding operator precedence;
- Working with NULL values.
- ORDER BY clause: Sorting in ascending/descending order, sorting by column alias name, sorting on multiple columns;
- Manipulating data of a table/relation: update command to change existing data of a table, delete command for removing row(s) from a table.
- Restructuring a table: ALTER TABLE for adding new column(s) and deleting column (s);

Functions in My SQL:

- String Functions: ASCII(), CHAR(), CONCAT(), INSTR(), LCASE(), UCASE(), LEFT(), LOWER(), LENGTH(), LTRIM(), MID(), RIGHT(), RTRIM(), SUBSTR(), TRIM(),UPPER(), ASCII()
- Mathematical Functions: - POWER(), ROUND(), TRUNCATE().
- Date and Time Functions: CURDATE(), DATE(), MONTH(), YEAR(), DAYNAME(), DAYOFMONTH(), DAYOFWEEK(), DAYOFYEAR(), NOW(), SYSDATE().

Unit 4: IT Applications 5 Marks (10 Theory + 20 Practical) Periods

- e-Governance: Definition, benefits to citizens, e-Governance websites and their salient features and societal impacts; e-Governance challenges.
- e-Business: Definition, benefits to customers and business, e-Business websites and their salient features and societal impacts; e-Business challenges.
- e-Learning: - Definition; benefits to students (learners), teachers (trainers) and school (institution) management; e-Learning websites and their salient features and societal impacts; e-Learning challenges.

In each of the above domains, identify at least two real-life problems, list the input(s) required for the expected output(s), and describe the problem solving approach.

Impact of ICT on society - social and economic benefits, infomania.

CLASS XI (PRACTICAL) (2013-14)

S.No	Description	Marks
1	Problem Solving using Java	12
2	SQL Queries	4
3	Practical Records:	
	• Productivity Tools	
	• Simple Problems using Java	
	• SQL Queries	
	• IT Applications	10
4	Viva Voce	4
	Total	**30**

Evaluation of Practical Examination

1. Problem Solving using Java

Student is required to solve programming problems based on all concepts covered in theory throughout the year and maintain a record of these in the practical file. Student will be given a problem to be solved using Java during final practical examination to be conducted at the end of the academic session.

2. SQL Queries

Students will be trying out SQL queries in MySQL throughout the year along with course coverage in theory. Student will be asked to write 4 queries based on one or two tables during final practical examination to be conducted at the end of the academic session.

3. Practical Record File

A practical record file is required to be created during the entire academic session. It should be duly signed by the concerned teacher on regular basis and is to be produced at the time of Final Practical Examination for evaluation. It should include the following:

- At least 10 solutions of simple problems using IDE based Java (refer to Appendices 'A' & 'B').
- At least 3 IT applications - problem-solving framework.
- At least 20 SQL queries on any database.

4. Viva Voce

Students will be asked oral questions during practical examination to be conducted at the end of the course. The questions will be from the entire course covered in the academic session. Out of 6 marks, 2 marks are allotted to test student's understanding of basic computer hardware and their functions.

Question Paper Design
Class - XI (2013-14) and XII (2014-15)

Time: 3 Hours **Marks: 70**

S.No.	Typology of Questions	Very Short Answer (VSA) (1 Mark)	Short Answer-I (SA-I) (2 Marks)	Short Answer-II (SA-II) (4 Marks)	Long Answer (LA) (6 Marks)	Total Marks	% Weightage
01.	Knowledge Based	4	3	2		18	26
02.	Conceptual Understanding	4	5	1		18	26
03.	Reasoning Based	4		2	1	18	26
05.	Skill Based		1	2	1	16	22
	Total Marks	**12**	**9**	**7**	**2**	**70**	**100%**

1. No chapter wise weightage. Care to be taken to cover all the chapters.
2. The above template is only a sample. Suitable internal variations may be made for generating similar templates keeping the overall weightage to different form of questions and typology of questions same.