SYLLABUS

B.sc. I.T.

DEPARTMENT OF COMPUTER SCIENCE

ST. XAVIER'S COLLEGE,

(AN AUTONOMOUS COLLEGE UNDER RANCHI UNIVERSITY)

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INFORMATION TECHNOLOGY   SEMESTER –I

PAPER 1(a): COMPUTER ORGANISATION, ARCHITECTURE AND SYSTEM ANALYSIS & DESIGN

Number System, Binary nos, Signed/Unsigned nos., 2's complements nos,

Boolean algebra, De Morgan;s Theorem, Simplification of Boolean Expressions, Karnaugh Map.

Logic Gates, Truth Tables, Combinational Logic Circuits & Realizations with Logic Gates- Half & Full Adders and codes, Multiplexers, Demultiplexers, Encoders, Decoders,

Code Converters.

Sequential Circuits, JK RS, T, D Master –Slave Flip Flops, Shift register, Synchronous and Asynchronous counters. Architecture of a simple Computer, Microprocessor , Architecture of 8085 & 8086, Registers and ALU, Instruction set, Addressing Modes, Timing diagram, Fetch , decode and Execute Cycle, Interrupt , Mechanism, DMA. Examples of ALP: Sorting, Code Conversion, Data Transfer and operations on data. Memory and Memory Organization, ROM, EPROM, SRAM, DRAM & Auxiliary Memory.

PAPER 1 (b) : PRACTICAL

    (a) Slide making & presenting using MS- Power Points (MS-Office 2000)

    (b) Editing, mail merging ,macros using MS – Word (MS-Office 2000)

    (c) Spreadsheets, worksheets application using MS- Excel (MS-Office 2000)

PAPER 2 (a): DATA STRUCTURE & PROGRAMMING IN C

C Programming : Structure of a C program, variables, constants, modifiers, escape sequences, expressions and operators, Formatted and operators , Formatted input and Output, standard input and output, Control flow, if-else, if, do-while, while, switch –case, for, use of break and continue. String/ character handling, one& two dimensional arrays, function and arguments, passing parameters, recursive function structures, sorting& searching Pointers, pointers in functions, linked lists, files in C, preprocessor, error handling.

Data structure: primitive &Non –primitive data, arrays, stack, queue, circular queue, linked lists, Non linear data structure : binary tree, binary search tree representation, operations, thread representations, sequential representations sorting & searching techniques.(Algorithms related to insertion at a point, deletion from a point , etc is to be asked).

PAPER 2 (b) PRACTICAL

Programming using C

INFORMATION   TECHNOLOGY   SEMESTER –II   PAPER 3(a) OPERATING SYSTEMS

What is an operating System ? simple batch systems, multi programmed batch systems, time-sharing systems, parallel distributed systems, real-time systems.

Computer System structure- Computer System Operation I/O structures storage structure, storage hierarchy and hardware protection.

Operating System structure- System components, system services, system calls , system programs and system structure – simple structure.

Process concept: process state, process control blocks, process scheduling and schedulers threading.

CPU scheduling, CPU-I/O burst cycle, scheduling criteria scheduling algorithms (Non pre-emptive – FCFS, SJFS, P re- emptive –SJFS, and RR).

Memory management (contiguous allocation, paging, Swapping, Segmentation). Virtual memory- Demand paging, page replacement, page replacement algorithms (FIFO, LRU)

Thrashing.

File system structures, file allocation (contiguous, linked, indexed), free space management (bit vector, linked list, grouping, counting).

I/O Hardware, Polling, Interrupts, DMA, Spooling, Buffering.

Disk structure, Disk scheduling (FCFS, SSTF, SCAN) , disk management – formatting boot block, bad block, swap space management.

Security- The problem, authentication and program-threats, encryption.

LINUX   System- Process management, scheduling, memory management, file system, input and output, file structure, inodes, and commands.

PAPER 3 (b): PRACTICAL

a)Creation of Batch files

b) Extension of DOS commands- CLS, MD,RD, DATE, TIME, VER, COPY, REN, DEL,

   TYPE, PATH, PROMPT, LABEL, DIR, XCOPY, DISKCOPY, DELTREE

C) Unix Commands –Is, Pwd, who, whoami,cd, mkdir, date, cal, banner , cp, mv   rmdir, chmod, man, cat

d)Win 98 environment –creating icons, OLE drag & drop, setting and configuration.

PAPER 4 (a) : PROGRAMMING USING C ++

Concepts of OOPS and differences with procedural languages, characteristics of OOPS (Idea of objects , class, data abstraction & encapsulation , inheritance, polymorphism, dynamic binding,, I/O stream, Cin, Cout, I/O manipulation).

Data Types, operators, control structure & looping statements, functions, and arrays Objects & classes: classes and objects, constructor, destructor, overloading binary operators, data conversion,

Inheritance: Derived class and base class, protected access specifier, derived class constructors, class hierarchies, abstract base class, public and private inheritance,

Multiple inheritances, containership (class within classes). Pointers: Address and pointers, pointers and arrays, memory management. "new" & "delete" pointer to objects, linked list, pointer to pointer.

Virtual functions: Virtual functions, Friend functions, static functions, and "this" pointer. Files and streams: String, String I/O ,object I/O , I/O with multiple objects file pointer, error handling, and redirection.

PAPER 4(b): PRACTICAL   0bject Oriented Programming Using C++.

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SEMESTER –III   PAPER 5 (a) VISUAL BAISC. NET FOR DESKTOP APPLICATINS

Using Visual Studio. NET IDE to develop VB. NET , application, creating Windows form, Using Object- oriented Programming through VB. NET, Creating procedures, Using Common dialogue classes, Retrieving and manipulating data to store in data base by ADO. NET.

Generating a report using crystal report.

Creating MDI applications, Creating menus, Performing File Input/ Output. Creating multi- threaded applications

Handling exception, debugging application, creating application assistant from help system, creating and using components, creating user control,

Creating and using web-service.

Deploying an application.

PAPER 5 (b) : PRACTICAL

Designing simple layouts using buttons, textbox, label combo box etc. Making a front end application to connect to remote or local database. Generating simple client application.

PAPER 6 (a) GRAPH THEORY AND DATA HANDLING METHODOLOGY

Graph Theory:

Introduction : what is Graph, Application of Graphs, Finite and Infinite Graphs, Incidence and Degree, Isolated Vertex, Pendant Vertex and Null Graph.

PATHS AND CIRCUITS : Isomorphism, Sub graphs, Walks paths and circuits, Connected Graphs, disconnected Graphs and Components, Euler Graphs, Operations on Graphs, Hamiltonian Paths and Circuits, The Travelling Salesman Problem.

TREES AND FUNDAMENTAL CIRCUTIS : Trees , Some Properties of Trees, Pendent Vertices in a Tree, Distance and Centers in a Tree, Spanning Trees, Fundamental Circuits, Finding all Spanning Trees of a Graph, Spanning Trees in a Weighted Graph.

CUT –SETS AND CUT VERTICES : Cut Sets, Some Properties of a Cut-Set, all Cut- Sets in a Graph, Fundamental Circuits and Cut-Sets, Connectivity and Separability,

Network Flows, I- Isompiphism, 2-Isomorphism, (Statements and applications of Theorems only, no proofs).

Data Handling:- Problems, hypothesis, constructs, variables, definitions, Sampling techniques.

Data Collection:- Observation of behavior, Questionnaire design and administration. Interviews.

Hypothesis testing and analysis of variance, multiple analysis and other multivariate methods, chi- square test.

PAPER 6 (b) PRACTICAL ---- Data handling using SPSS.

INFORMATION TECHNOLOGY

SEMESTER IV   PAPER 7 (a) DATABASE MANAGEMENT SYSTEM & ORACLE

Introduction to DBMS, Purpose, difference with respect to conventional file processing system, data abstraction, data independence, data models (object-based, record based, physical data models), database manager, database administrator , overall system structure.

Entity- Relationship model, Relationship sets, Mapping, Keys and entity sets. Entity- Relationship diagram, specialization, generalization and aggregation, database schema under relational model.

Relationship algebra –Project, select, Cartesian product, joins, natural join, union,

Intersection, minus, division operations.

Normalization – Functional dependency, INF, 2NF, 3NF, BCNF, multivalued dependency & 4NF. Lossless joins, dependency preservation, redundancy control and integrity preservation during decomposition.

Transaction- concepts, transaction state, concurrent executions, serializability, conflict serializability, view serializability.

Concurrency control-locks, granting of locks, timestamps based protocols, deadlock prevention, detection & recovery.

Security & integrity violation. Authorization, views, timestamp based protocols, deadlock prevention, detection & recovery.

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Oracle:-   Oracle functions, SQL (DDL, DML), simple queries, nested sub- queries, self join , equijoin, non-equijoin, PL/SQL   programming (writing small blocks for data Manipulation). Update , Insert, Triggers, Views and grants under Oracle (DCL).

PAPER 7 (b) : PRACTICAL

 Writing and executing simple and complex queries, creation and alteration of tables updating, inserting, deleting, to/from a table .Writing simple PL/SQL codes for data manipulation, database triggers.

PAPER 8 (a) WEB TECHNOLOGY

A Brief Introduction to the Internet, Web Browsers, Web Servers, Uniform Resource Locators, Multipurpose Internet Mail Extensions, The Hypertext Transfer Protocol, Origins and Evolution of HTML and XHTML, Basic Syntax, Standard XHTML Document Structure, Basic Text Formatting , Images, Hypertext Links, Lists, Tables, Forms, Frames, Introduction, Levels of Style Sheets Style Specification Formats, Selector Formats, Property Value Forms, Font Properties, Alignment of Text, Margins, Color, Background Images, Borders, the <span> and <div> Tags,

JAVASCRIPT Overview to JavaScript, Features of JavaScript, variables, operators, JavaScript object hierarchy (window objects and array), Various events methods and objects of JavaScript, Decision making and loop forming statements, Functions, Creation of Document at runtime.

PAPER 8 (b) PRACTICAL   Practical s based on paper 8 (a)

PAPER 9(a) : DATA COMMUNICATION & NETWORKING INTRODUCTION TO INTERNET

A communication model, communication tasks, three- layer approach to protocols, brief introduction to TCP/IP and OSI (brief function to different layers).

Data transmission : concepts and terminology, analog and digital data transmission.

Transmission impairments , Guided transmission media.

Data encoding, digital data digital signal, digital data analog signal, analog data digital signal and analog data analog signal.

Asynchronous & synchronous transmission, interfacing.

Data link control: flow control, error detected (CRC). Error control, High level data

Control (HDLC).

Multiplexing, statistical time division multiplexing.

Circuit switching: switched network, circuit switching networks, switching concepts, routing in circuit switched networks.

Packet switched : packet switching principals, routing, congestion and control, X.25, Digistra's alogorithm, Bellman ford algorithm.

LAN Technology : LAN architecture , Bus/Tree LAN , Ring & stat LANs Ethernet and

Fast Ethernet (CSMA/CD),   Token ring and FDDI.

Bridges: Bridge operation, routing and bridges

Network Security: Requirements,   conventional encryption, public key encryption& digital signature. (no numerical related questions are to be asked).

XML : Introduction to XML, Document type definition (DTD), XML, schema-declaring attributers, namespaces, grouping elements and attributes. Rendering XML document- CSS, XSLT. Displaying data with XSLT, displaying data in tabular format, using HTML tags within XSLT. XML document object model – Objects and methods, using XML DOM objects in scripts.

PAPER 9 (b) PRACTICAL

Creating XML document, XML schema, Declaring attributes & using component of one schema into another, creating XSLT style for formatting data, validating an XML document against a DTD by DOM.

PAPER 10(a) PROGRAMMING IN JAVA

Introduction to Java: History of Java, features of Java, types of Java programs. JDK tools: Java compiler, Java Interpreter, applet viewer, Jot tool, Javap disassemble, Javadoc Tool, Javah tool, java Keywords, data types in java, variable naming conventions, Initializing variables, literals, operators, type conversion, Duiston construct, looping construct, Arrays.

Classes and objects: Declaring classes, creating objects, declaring objects, declaring methods, passing arguments to methods, constructors, access specifiers, modifiers, the main() method, Overloading.

Relationship between classes. Applet & applications: Applet class, Applet & HTML, Life cycle of an Applet, Graphic class, Font class, passing parameters to applets, creating an application, converting applets to applications.

Introduction to threads:Threads, single treaded and multithreaded applications, life cycle of a thread, the current thread, the thread class, problems in multithreading.

Packages: Java packages, using a package, the Lang package, the util package, the collection class, creating a package.

PAPER 10(b): PRACTICAL   :   Simple programming using Java, applet creation, servelet development.

INFORMATION   TECHNOLOGY   SEMESTER- VI

PAPER 11(a): ON JOB TRAINING   I & II   PAPER II (b): PROJECT WORK

ENTREPRENEURSHIP DEVELOPMENT

- Need, scope and characteristics of Entrepreneurship, special schemes for Technical Entrepreneurs, STED.

- Identification of opportunities.

- Exposure to demand based, resource based, service based, import substitute and export promotion industries.

- Market survey techniques.

- Need scope & approaches for project formation.

- Criteria for principles of product selection and development.

- Structure of project report

- Choice of technology, plant and equipment.

- Institutions, financing procedure and financial incentives.

- Financial ratios and their significance.

- Books of accounts, financial statements and fund flow analysis.

- Energy requirement & Utilization.

- Resource Management Men, Machine and Materials.

- Critical path Method (CPM) & Project Evaluation review techniques (PERT) as planning tools for establishing SSI..

- A) Creativity and Innovation B) Strength weakness opportunity and threat (SWOT) techniques.

- Techno – economic feasibility of the project.

- Plant layout & process planning for the product.

- Quality control/ quality assurance and testing of product.

- Elements of Marketing and Sales Management.

- 1) Nature of products and market strategy 2) Packaging and Advertising 3) after sales service.

- Costing and pricing.

- Management of self and understanding human behavior.

- Sickness in small scale industries and their remedial measures.

- Coping with uncertainties, stress management & positive reinforcement.

- 1) Licensing, registration 2) Municipal bye laws and insurance coverage.

- Important provisions of factory act, Sales of Goods Act, partnership Act.

- 1) Dilution control 2) Social responsibility and business ethics.

- Income Tax, Sales Tax and excise rules.

PRACTICALS 15 HOURS OF TEACHING LOAD

- **CONDUCT OF MINI MARKET SURVEY** (One day Exercise): Data collection through questionnaire and personal visits.

- Entrepreneurial Motivation Training: through games, role –playing, discussions and exercises.

- 1) Working capital and fixed capital: Practice assessment and management 2) Exercise on working capital: Practice fixed capital calculation.

- 1) Analysis of sample project report: Discussion 2) Break even analysis: Practice.

- Communication written and oral: Practice.