

**UNIVERSITY POLYTECHNIC  
B.I.T., MESRA, RANCHI**

**Syllabus of Diploma in Engineering (Computer Engineering) (Semester IV)**

**COURSE STRUCTURE  
(W.E.F. 2011 Batch Students)  
(Total Unit 7.5)**

<b>Course Code</b>	<b>Theory</b>	<b>Unit</b>	<b>Course Code</b>	<b>Sessional</b>	<b>Unit</b>
DCP 4001	Data Structures	1.0	DCP 4002	Data Structures Lab.	0.5
DEC 4003	Electronics Circuits	1.0	DEC 4004	Electronics Circuits Lab.	0.5
DCP 4003	Object Oriented Programming in C++	1.0	DCP 4004	C++ Lab.	0.5
DCP 4005	RDBMS (Oracle)	1.0	DCP 4006	Oracle & Developer 2000 Lab.	0.5
DCP 4007	Computer Organization	1.0	DGA 4002	PT & Games/Creative Arts/NSS	0.5
		<b>5.0</b>			<b>2.5</b>
			DHU 4002	Commn. Practice WS-III	0.5 (NC)

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**Subject: - Data Structures**

**Course Code : DCP 4001**

**Module 1:**

**04 Lectures**

**Introduction:** Meaning of Data structure. Broad Classification, Characteristics of linear and Non-linear data structures.

**Module 2:**

**04 Lectures**

**Array as Data Structures:** Implementation of contiguous list; List operations – Add, View, Delete, Insert, Sorting, Searching;

**Module 3:**

**08 Lectures**

**Linear Data Structures (Sequential):** Stacks, Queues, Circular Queries, Simple Algorithms for operations and application of the above.

**Module 4:**

**08 Lectures**

**Linear Data structures (Linked):** Brief description of linear linked lists, circular by linked lists, Double linked lists, Simple Algorithms for operations and applications of the above.

**Module 5:**

**06 Lectures**

**Non linear Data Structures:** Brief description of graphs, trees, binary trees, binary search trees, traversal (No algorithms)

**Module 6:**

**06 Lectures**

**Sorting and Searching:** Brief description of various simple sorting and searching methods (no algorithms)

**Module 7:**

**04 Lectures**

**File Structures:** Introduction to sequential, Index sequential and relative files.

**Text Book:**

Seymour Lipschutz, “Theory and problem of data structures”, McGraw Hill Book Co.

**Reference Book:**

Jean-Paul Tremblay, Paul G. Sorenson, “An introduction to Data Structures with Applications”, 2e, Tata McGraw Hill Pub. Co. Ltd., New Delhi – 2003.

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**Syllabus of Diploma in Engineering (Computer Engineering) (Semester IV)**

**Subject : Electronics Circuits**

**Course Code : DEC 4003**

**Module – 1**

BJT at high frequency, The high frequency  $\pi$  model, Hybrid  $\pi$  conductance in terms of h-parameter, simplified model, Gain bandwidth product.

**Module – 2**

Field Effect Transistors (FET), Introduction to JFET & MOSFET characteristics, Biasing circuits of JFET & MOSFETs.

**Module – 3**

Low frequency analysis of CS and CD, High frequency small signal model analysis of CS and CD, FET as VVR.

**Module – 4**

CMOS, CMOS precautions, handling of CMOS.

**Module – 5**

Different possible cascading of amplifiers, Types of cascaded amplifiers, Analysis of cascaded amplifiers, RC coupled amplifiers.

**Module – 6**

Negative feedback amplifiers, General, properties, Classification of feedback amplifiers, shunt voltage feedback, series voltage feedback, series and shunt current feedback.

**Module – 7**

Active Analog filters, Biquad second order filters, LPF, HPF, BPF, BRN, filter characteristics.

**Books :**

1. Electronics Devices and Circuits by P. John Paul – New Age International Publishers
2. Electronics Circuits and Systems ( Analog & Digital) by Y. N. Bapat (TMH)
3. Integrated Electronics by Milman & Halkias

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**Subject: - OOP in C++**

**Course Code : DCP 4003**

- Module 1:** **04 Lectures**  
**Introduction:** Application of C++, A simple C++ Program, Object Oriented Programming, Advantages of Object Oriented Programming over Procedural Programming.
- Module 2:** **06 Lectures**  
**Function:** Simple concept, Call by value, Call by Reference, Return by reference, Inline Function, Function Overloading.
- Module 3:** **08 Lectures**  
**Class & Objects:** Basic Concept of Class, Structure & Class, Defining Member function, Public, Private access specifiers, Static data Member, Array within class, Array of Objects, Friend Function.
- Module 4:** **04 Lectures**  
**Constructors & Destructors:** Importance of Constructor, Parameterized Constructor, Constructor with default arguments, Copy Constructor, Destructor.
- Module 5:** **06 Lectures**  
**Operator Overloading, Type Conversion, Inheritance:** Defining Operator Overloading, Overloading Unary operator, Overloading Binary Operator, Type Conversions. Inheritance, Defining derived class, Forms of Inheritance, Virtual Base class, Abstract Class.
- Module 6:** **04 Lectures**  
**Pointers, Virtual Function & Polymorphism:** Pointers to object, Pointer to derived Class, Virtual function.
- Module 7:** **08 Lectures**  
**Working with Files:** Classes for File Stream operation, Opening and closing file, File Modes, File Pointers & their Manipulators, Managing output with Manipulators.

**Text Books:**

E.Balagurusamy, "Object Oriented Programming with C++", 2e, TMH

**Reference Book:**

1. R. Lafore, "Object Oriented Programming in Turbo C++", Galgotia Publication
2. D. Ravichandran, "Programming with C++", 2e, TMH

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**Syllabus of Diploma in Engineering (Computer Engineering) (Semester IV)**

**Subject: - RDBMS (Oracle)**

**Course Code : DCP 4005**

**Module 1:**

**04 Lectures**

**Concepts:** Concept of databases. Databases versus file management system. Features of databases. Introduction to RDBMS. Introduction to ORDBMS.

**Module 2:**

**06 Lectures**

**Introduction to SQL:** Data definition language, Data Manipulation language, Data control language, Data query language, Transaction control language. Inserting data into table, Inserting NULL values, retrieving all data, retrieving selected columns. How to write query, The update statement, Deletion of data, dropping table, renaming the table.

**Module 3:**

**06 Lectures**

**Keys and Constraints:** Candidates Keys, Super keys, Primary Key, Foreign Key, Check Unique, Not null., transaction, Commit and Rollback.

**Module 4:**

**06 Lectures**

**Set Operations:** (i) Union, Intersect, Minus, Retrieving data from multiple tables. Views, subqueries  
(ii) Join: Cartesian product, Logical operator, self-join, Natural join, Outer join.

**Module 5:**

**06 Lectures**

**SQL Functions:** Number functions, Character function, Date function, and other function. Rowid, Rownum, Aggregate functions, Group by Clause, Order by Clause.

**Module 6:**

**08 Lectures**

**PL/SQL:** Advantages of PL/SQL, Structure of PL/SQL Block using variable and constants. Dynamic Data type of a variable. %type, %rowtype. Conditional Operator, iterative control structure unconditional Branching using labels goto.

- Procedures, Functions, Packages, Triggers,
- Cursors Explicit cursors, Implicit cursor, cursor variables. %notfound, %found, %rowcount etc.
- Error Handling with Exceptions: The zero Divide Exception, The VALUE ERROR exception, The NoDataFound exception, using multiple exceptions.

**Module 7:**

**04 Lectures**

**Normalization and Denormalization:** Data redundancy, Functional Dependency, 1NF, 2NF, 3NF.

**Text Book**

P.S. Desphende, "SQL/PLSQL for Oracle 9i", Dreamtech Press

**Reference Book**

Kevin Loney, "Oracle 9i The Complete Reference", Oracle Press, TMH,

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**Syllabus of Diploma in Engineering (Computer Engineering) (Semester IV)**

**Subject: - Computer Organization**

**Course Code : DCP 4007**

- Module 1:** **04 Lectures**  
**Numbering System:** Decimal, Binary, BCD, Octal, Hexadecimal, Gray Code. X53 Code, ASCII code, EBCDIC Code.
- Module 2:** **04 Lectures**  
**Logic Gates:** Inverter, AND, OR, NAND, NOR, XOR, XNOR.
- Module 3:** **08 Lectures**  
**Boolean Algebra:** Boolean Postulates, Boolean Laws, Application of De Morgan's Theorem, Simplification of Boolean Algebraic expressions, Logic circuits, Translating Algebra to Logic and Logic Circuit to Algebraic, Truth table from logic circuit, Logic circuit from truth table, Combinational circuit using NAND/NOR converting AND/OR NAND/NOR converting AND/OR to NAND/NOR logic.
- Module 4:** **06 Lectures**  
**Karnaugh Map Technique:** Introduction, K-maps, SOP & POS reduction, Don't care states Combinational logic circuits design.
- Module 5:** **04 Lectures**  
**Arithmetic Logic Circuits:** Introduction, Signed & Unsigned binary numbers, 1's & 2's complement representation and the arithmetic, Arithmetic circuits, Half/Full adder, Binary Subtraction, Half/Full Subtractor.
- Module 6:** **06 Lectures**  
**Combinational Logic Circuits:** Introduction, decoder, encoder, multiplexer, demultiplexer.
- Module 7:** **08 Lectures**  
**Flip-Flops:** Introduction, RS NAND/NOR Latch, clocked RS Latch, D Latch, JK Master slave F/F, JK edge triggered F/F, converting JK F/F to other types.

**Text Books:**

M.Morris Mano, "Digital Logic & Computer Design", PHI

**Reference Book:**

Virendra Kumar, "Digital Technology", New Age International