Diploma in Computer Engineering
Revision 2015
Syllabus
Semester - III

Semester III										
S. No	Code	Course	Course Category	Periods per week			Credits	Type	Evaluation	
				Theory	Practical	Total			CA	External
1	3133	Digital Computer Principles	B	4	0	4	4	T	50	100
2	3134	Objected Oriented Programming through C++	B	5	0	5	5	T	50	100
3	3131	Computer Architecture	B	4	0	4	4	T	50	100
4	3132	Database Management System	A	4	0	4	4	T	50	100
5	3001	Environmental Science & Disaster Management	C	3	0	3	3	T	50	100
6	3138	Digital Computer Principles Lab	B	0	5	5	3	P	50	50
7	3137	Objected Oriented Programming Lab	B	0	5	5	3	P	50	50
8	3139	Database Management System Lab	B	0	5	5	3	P	50	50
				20	15	35	29			

COURSE TITLE	**:**	**DIGITAL COMPUTER PRINCIPLES**
COURSE CODE	**:**	**3133**
COURSE CATEGORY	**:**	**B**
PERIODS/WEEK	**:**	**4**
PERIODS/SEMESTER	**:**	**60**
CREDITS	**:**	**4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	**Digital Systems & Logic Gates**	**15**
2	**Combinational Logic**	**15**
3	**Sequential Logic**	**15**
4	**A/D, D/A, Memory and Programmable Logic**	**15**

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	**1**	To understand Digital Systems and Data Representation
	2	To know Logic Gates and Boolean Algebra
2	**1**	To understand Gate Level Minimization
	2	To understand Combinational Logic
3	**1**	To understand Synchronous Sequential Logic
	2	To understand registers and Counters
4	1	To understand Analog to Digital and Digital to analog Convertor
	2	To understand Memory and Programmable Logic

Specific Outcomes:

MODULE –I Digital Systems & Logic Gates

1.1 To understand Digital Systems and Data Representation in Digital Computers

1.1.1 To state Digital Systems

1.1.2 To explain various Number Systems

1.1.3 To describe Binary Codes

1.2 To know Logic Gates and Boolean Algebra

1.2.1 To Describe Logic gates

1.2.2 To explain Boolean Algebra

1.2.3 To solve using Theorems and Properties of Boolean Algebra

MODULE – II Combinational Logic

2.1 To understand Gate Level Minimization

2.1.1 To Describe Map Method

2.1.2 To describe SOP and POS minimisation

2.1.3 To design and solve using Map method

2.2 To understand Combinational Logic

2.2.1 To explain different Combinational Circuits

MODULE – III Sequential Logic

3.1 To understand Synchronous Sequential Logic

3.1.1 To describe Sequential Circuits

3.1.2 To explain Storage elements – Latches & Flip-Flops

3.2 To understand registers and Counters

3.2.1 To explain different Registers

3.2.2 To explain Different counters

MODULE –IV A/D, D/A, Memory and Programmable Logic

4.1 To understand A/D and D/A converter

4.1.1 Discuss the different DAC specifications like resolution, accuracy, settling time monotonocity, line errors.

4.1.2 Study basic concept of DAC

4.1.3 Study basic concept of ADC.

4.2 To understand Memory and Programmable Logic

4.2.1 To describe Memory systems

4.2.2 To explain the decoding technique

4.2.3 To explain the different techniques in error detection and correction of data

4.2.4 To explain PAL and PLA

CONTENT DETAILS

MODULE –I Digital Systems & Logic Gat

Digital Systems – Binary numbers – Number base conversions- Octal, Hexadecimal - Complements of Numbers – Signed Binary Numbers - Binary Codes

Boolean Algebra – Introduction- Basic definitions – Axiomatic Definition of Boolean Algebra -Basic Theorems and Properties of Boolean Algebra – Boolean Functions- Canonical and standard forms –– Digital Logic Gates –

MODULE – II Combinational Logic

The Map Method – Four Variable K-Map – Product –of-Sums & Sum-of-Products Simplification – Don't Care Conditions – NAND and NOR Implementation – Two-level implementation –Exclusive –OR Function

Combinational Circuits – Binary Adder –Subtract or- Decimal Adder – Binary Multiplier – Magnitude Comparators-Decoder –Encoder-Multiplexer

MODULE – III Sequential Logic

Sequential Circuits – Storage elements – Latches & Flip-Flops

Registers – Shift register – Ripple Counters- Synchronous Counters-Ring counters - Johnson Counter

MODULE –IV A/D, D/A, Memory and Programmable Logic

DAC specifications like resolution, accuracy, settling time monotonocity, line errors. - DAC –-ADC

Random Access Memory -Memory decoding -Error detection and correction- Read Only Memory- Programmable Logic Array- Programmable Array Logic

Text Book(s):

1. Digital Design, M. Morris Mano & Michael D. Ciltti, Pearson Education, 5th Edition
2. Digital fundamentals – Thomas Floyd &R.P. Jain, Pearson Education (2005)

References:

1. Digital Principles and Applications – by Malvino & Leach , McGraw-Hill,
2. Fundamentals of digital circuits - A. Anand Kumar, PHI Learning Pvt. Ltd.,2003
3. Digital computer fundamentals - Thomas. C. Bartee, McGraw-Hill , 1985

COURSE TITLE	:	**OBJECT ORIENTED PROGRAMMING THROUGH C++**
COURSE CODE	:	3134
COURSE CATEGORY	:	B
PERIODS/WEEK	:	5
PERIODS/SEMESTER	:	75
CREDITS	:	5

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	**Basic Programming Concepts in C++**	21
2	**Concepts of Object Oriented Programming**	18
3	**Overloading of Operators and Inheritance**	18
4	**Advanced uses of C++**	18

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	To comprehend the basic programming concepts in C++
2	1	To understand the Concepts of Object Oriented Programming
3	1	To understand Overloading and Inheritance.
4	1	Advanced concepts of C++

Specific Outcomes:

MODULE I Basic Programming Concepts in C++

1.1 To comprehend the basic programming concepts in C++

1.1.1 Explain the features of C++
1.1.2 Explain data types and expressions in c++
1.1.3 Explain different control structures in c++
1.1.4 Explain Arrays as Homogeneous Aggregates
1.1.5 Explain Structures as Heterogeneous Aggregates
1.1.6 Describe the concepts Memory Management
1.1.7 Explain input and output with disk files.

MODULE II Concepts of Object Oriented Programming

2.1 To understand the Concepts of Object Oriented Programming
2.1.1 State the basic concepts of Object Oriented Programming
2.1.2 Describe parameter passing in C++ functions.
2.1.3 Explain the functions as modularization tool.
2.1.4 Describe Object-Oriented Programming with Functions
2.1.5 Describe Data Encapsulation and Information Hiding.
2.1.6 Explain classes, objects and methods
2.1.7 Illustrate constructors with examples
2.1.8 Describe the concepts of overloading

MODULE III Overloading of Operators and Inheritance

3.1 To understand Overloading and Inheritance.
3.1.1 Explain Overloading of Operators
3.1.2 Describe overloading for nonnumeric classes.
3.1.3 Describe different types of Inheritances.
3.1.4 Explain Visibility controls
3.1.5 Describe class objects as data members.
3.1.6 Explain base and derived class.
3.1.7 Explain Constructors and Destructors for Derived Classes
3.1.8 Discuss inheritance vs composition.

MODULE IVI Advanced concepts of C++

4.1 To understand Virtual functions and Templates
4.1.1 Explain Virtual functions
4.1.2 Explain conversion between nonrelated classes.
4.1.3 Explain the usage of several base classes.
4.1.4 Discuss subscript and function call operators.
4.1.5 Discuss input output operators.
4.1.6 Explain syntax of template class
4.1.7 Discuss Exception handling mechanism in C++
4.1.8 Describe type cast operators

CONTENT DETAILS

Module I: A Brief Overview of C++

The Basic Program Structure-Preprocessor Directives-Comments-Declarations and Definitions-Statements and Expressions-Functions and Function Calls-Classes-Data and Expressions-Values and Their Types-Integral Types-Floating Point Types-Control Flow-Statements and Expressions-Conditional Statements-Iteration-C++ Jump Statements-Defined Data Types-Arrays as Homogeneous Aggregates-Structures as Heterogeneous Aggregates-Unions, Enumerations, and Bit Fields-Memory Management: Storage Classes-Using Heap- Input and Output with Disk Files.

Module II: Object-oriented programming with C++

Programming With C++ Functions-C++ Functions as Modularization Tools-Argument Promotions and Conversions-Parameter Passing in C++-Inline Functions-Parameters with Default Values-Function Name Overloading-Object-Oriented Programming with Functions-Cohesion-Coupling-Data Encapsulation-Information Hiding.

C++ Class-Basic Class Syntax-Binding Together Data and Operations-Elimination of Name Conflicts-Implementing Member Functions Outside of Class-Defining Class Objects of Different Storage Classes-Controlling Access to Class Members-Initialization of Object Instances-Constructors as Member Functions-Default Constructors-Copy Constructors-Conversion Constructors-Destructors-Timing of Constructor and Destructor Invocations-Class Scope and the Overriding of Names in Nested Scopes-Memory Management with Operators and Function Calls-Using Returned Objects in Client Code-Static Class Members.

Module III Overloading of Operators and Inheritance.

Operator Functions: Overloading of Operators-Limitations on Operator Overloading-Overloaded Operators as Class Members-Friend Functions-Operator Overloading for Nonnumeric Classes-Overloading the Assignment Operator.

Aggregation and Inheritance: Using Class Objects as Data Members-Initialization of Composite Objects Data Members with Special Properties-Container Classes-Similar Classes: Inheritance-Accessing Base and Derived Class Services-Accessing Base Components of a Derived Class Object-Scope Rules and Name Resolution Under Inheritance-Constructors and Destructors for Derived Classes-Inheritance and Composition.

Module IV:Advanced uses of C++

Virtual Functions -Conversions Between Nonrelated Classes-Conversions Between Classes Related Through Inheritance-Multiple Inheritance: Several Base Classes-Unary Operators-Subscript and Function Call Operators-Input/Output Operators.

Templates: Syntax of Template Class Definition-Template Classes with Several Parameters-Relations Between Instantiations of Template Classes-Template Specializations-Template Functions-Programming with Exceptions--Syntax of C++ Exceptions-Exceptions with Class Objects-Type Cast Operators

Text Book(s)

1. Core C++ A Software Engineering Approach-Victor Shtern-Publisher: Prentice Hall PTR-First Edition July 24, 2000
2. The Complete Reference C++, Herbert Schildt, Tata McGraw Hill Publication, Fourth Edition**,**

References

1. E.Balaguruswamy, *Object Oriented Programming in C++,* Mc Graw Hill,Sixth Edition
2. Venugopal, Rajkumar, Ravishankar, *Mastering C++*, Mc Graw Hill,1999
3. Stroustrup, Bjarne, *The C++ Programming Language* , Addison Wesley, Fourth Edition
4. Robert Lafore, *Object Oriented Programming in C++*, Galgotia 1991

COURSE TITLE	**:**	**COMPUTER ARCHITECTURE**
COURSE CODE	**:**	**3131**
COURSE CATEGORY	**:**	**B**
PERIODS/WEEK	**:**	**4**
PERIODS/SEMESTER	**:**	**60**
CREDITS	**:**	**4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Computer Function and Internal Memory	**15**
2	External Memory and Input/Ouptut	**15**
3	Processor Structure	**15**
4	Control Unit Organization	**15**

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	**1**	To understand Von Neumann Machine
	2	To know Computer Memory Systemmplement Branch, Call and time delay
2	**1**	To understand External Memory
	2	To understand I/O Devices
3	**1**	To understand Processor Structure and Functions
4	1	To understand Control Unit Organization
	2	To know Parallel Processing

Specific Outcomes:

MODULE –I Computer Function and Internal Memory

1.1 To understand Von Neumann Machine

1.1.1 To describe Von Neumann Machine

1.1.2 To explain various Computer functions

1.1.3 To describe Interconnection structures

1.1.4 To describe Bus Interconnection

1.2 To know Computer Memory System

1.2.1 To list Cache Memory Principles

1.2.2 To explain Semiconductor Main Memory

1.2.3 To List Advanced DRAM types

MODULE – II External Memory and Input/Output

2.1 To understand External Memory

2.1.1 To Describe the organization of Magnetic Disk

2.1.2 To list and describe RAID

2.1.3 To explain Optical Memory

2.2 To understand I/O Devices

2.2.1 Toexplain different external Devises

2.2.2 To describe I/O Modules – Programmed IO, Interrupt Driven IO, DMA

MODULE – III Processor Structure

3.1 To understand Processor Structure and Functions

3.1.1 To describe Processor organization

3.1.2 To illustrate Register organization

3.1.3 To explain Instruction Cycle

3.1.3 To explain Instruction Pipelining

MODULE –IV Control Unit Organization

4.1 To understand Control Unit Organization

4.1.1 To describe Micro operations

4.1.2 To explain the control of the Processor

4.1.3 To explain the Hardwired implementation

4.1.4 To describe Micro programmed control

4.2 To know Parallel Processing

4.2.1 To explain Parallel processing

4.2.2 To describe Multiple processor organization

CONTENT DETAILS

MODULE –I Computer Function and Internal Memory

The Von Neumann Machine – Computer Components - Computer functions – Instruction Fetch and Execute – Interrupts – I/O Function- Interconnection structures - Bus Interconnection – Bus Structure –Multiple Bus Hierarchies –Elements of Bus Design

Characteristics of Memory System –The Memory Hierarchy - Cache Memory Principles - Elements of Cache Design -- Semiconductor Main Memory – Organization –DRAM and SRAM –Types of ROM - Advanced DRAM types- synchronous DRAM – Rambus DRAM – DDR SDRAM – Cache DRAM

MODULE – II External Memory and Input/Output

Magnetic Disk - Magnetic Read and Write Mechanism – Data Organization and formatting – Physical Characteristics – RAID – Level 0,1,2,3,4,5,6 - Optical Memory – Compact Disk – Digital Versatile Disk – High Definition Optical Disks

External Devices – Keyboard /Monitor – Disk Drive -- I/O Modules – Module function – I/O Module Structure - Programmed IO, Interrupt Driven IO, DMA

MODULE – III Processor Structure

Processor organization - Register organization – User visible Registers – Control and Status Registers - Instruction Cycle –The Indirect Cycle – Data Flow - Instruction Pipelining

MODULE –IV Control Unit Organization

Micro operations – Fetch Cycle – Indirect Cycle - Interrupt Cycle – Execute Cycle – Instruction Cycle - Control of the Processor - Hardwired implementation - Micro programmed control

Parallel processing - Multiple processor organization

Text Book(s)

1. Computer Organization and Architecture– William Stallings Pearson Education , Eighth Edition

References:

1. Computer Organization - Carl Hamachar- Mc Graw Hill, fifth edition.
2. Computer Architecture and Organization-John Hayes- Mc Graw Hill-1998.
3. Computer System Architecture -Morris Mano- Prentice Hallof India- 2002.,

Web Site

http://nptel.ac.in/course :s/Webcourse-contents/IIT-%20Guwahati/comp_org_arc/web/

COURSE TITLE	**:**	**DATA BASE MANAGEMENT SYSTEM**
COURSE CODE	**:**	**3132**
COURSE CATEGORY	**:**	**B/E**
PERIODS/WEEK	**:**	**4**
PERIODS/SEMESTER	**:**	**60**
CREDITS	**:**	**4**

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Database Systems	**15**
2	Database Design	**15**
3	Structured Query Language	**15**
4	Normalisation and Transactions	**15**

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	To Understand Database systems
2	1	To Understand Database Design
3	1	To Understand SQL
4	1	To Understand Emerging Technologies

Specific Outcomes:

MODULE – I Database systems

1.1 To Understand Database systems
- 1.1.1 Define data, information, field, record, file, and database
- 1.1.2 Define DBMS
- 1.1.3 Explain the advantages of DBMS
- 1.1.4 Describe the applications of DBMS
- 1.1.5 List the Database Users.
- 1.1.6 Define instance, schema and subschema
- 1.1.7 Explain Three Schema architecture with diagram
- 1.1.8 Explain Data Independence – Logical Data Independence and Physical Data Independence
- 1.1.9 Describe Conceptual Model, representation and physical model
- 1.1.10 Explain hierarchical, network and relational models
- 1.1.11 Describe DBMS Languages – DDL, DML and DCL
- 1.1.12 Explain Component Modules of DBMS
- 1.1.13 Centralised and Client-Server Database Systems

MODULE – II Database Design

2.1 To Understand Database Design
- 2.1.1 Explain Relational model concepts
- 2.1.2 Define Domains, Attributes, Tuples , Instances, relations and relational schema
- 2.1.3 Explain Keys – Super key, candidate key, composite key, primary key and foreign key
- 2.1.4 Explain E-R Model with example
- 2.1.5 Discuss the features of Enhanced E-R diagram
- 2.1.6 Explain Relational Algebra and fundamental operations
- 2.1.7 Explain Additional Operations - Natural-Join, Outer Join
- 2.1.8 Explain the mapping of E-R model to relational model

MODULE – III Structured Query Language

3.1 To Understand SQL
- 3.1.1 Explain features of SQL
- 3.1.2 Explain Data types in SQL
- 3.1.3 Explain CREATE TABLE command with constraints NULL, DEFAULT,CHECK, PRIMARY KEY, UNIQUE, referential Integrity
- 3.1.4 Explain INSERT, UPDATE and DELETE commands
- 3.1.5 Explain SELECT statements with WHERE, ORDER BY clause with examples
- 3.1.6 Describe the use of Aggregate and scalar functions in SELECT statements with examples
- 3.1.7 Explain SELECT statements with GROUP BY, HAVING clauses with examples
- 3.1.8 Explain Nested queries, sub queries
- 3.1.9 Describe DROP TABLE and ALTER TABLE command
- 3.1.10 Explain what are inner join and outer join
- 3.1.11 Explain how views are created and used
- 3.1.12 Explain transactions

3.1.13 Describe integrity constraints
3.1.14 Explain how index creation is done
3.1.15 Explain about authorizations on data and granting & revoking of privileges
3.1.16 Explain how to create and use functions, procedure, cursor and trigger
3.1.17 Explain Database connectivity using JDBC/ ODBC
3.1.18 Explain how to connect to a database

MODULE – IV Emerging Technologies

4.1 To Understand Normalisation
- 4.1.1 State functional dependency
- 4.1.2 Explain the need of normalisation
- 4.1.3 Describe decomposition of a table with examples

4.2 To Understand Emerging Technologies
- 4.2.1 Explain Object Oriented Concepts
- 4.2.2 Describe Object Identity, Object Structure
- 4.2.3 Explain Parallel DBMS.
- 4.2.4 Describe Distributed DBMS
- 4.2.5 Explain Mobile Databases
- 4.2.6 State Data Mining Technology
- 4.2.7 Describe Data Warehousing

CONTENT DETAILS

MODULE – I Database systems

Database Systems – Data – Information – Record – Field – Need of database system - Advantages and Disadvantages - application areas – people who interact with database - Three schema Architecture - Data independence - Data models – Database Schema versus database instance – Component modules of DBMS – Centralised and Client/Server Database Applications – Classification of DBMS.

MODULE – II Database Design

Relational Model Concepts – Domain – Attribute – tuple – instance – relation – relational schema – Keys – E R Model – Enhanced E R diagram – sub class – super class – inheritance – specialisation – generalisation – UML class diagram - Relational Algebra operations - select, project, Union, Set Difference, Cartesian Product and Rename – additional operations - Natural-Join, Outer Join - mapping of E-R model to relational model

MODULE – III Structured Query Language

SQL – Features of SQL – Data types in SQL - CREATE TABLE command, Constraints – NULL, DEFAULT,CHECK, PRIMARY KEY, UNIQUE, referential Integrity – INSERT, UPDATE and DELETE command - SELECT statements with WHERE, ORDER BY clause - Aggregate and scalar functions in SELECT statements - Nested queries, sub queries Statement - Views

Transaction commands – integrity constraints - CREATE INDEX, CREATE UNIQUE INDEX, DROP INDEX - authorizations on data and granting & revoking of privileges - functions, procedure - cursor and trigger - Database connectivity using JDBC/ ODBC

MODULE – IV Emerging Technologies

Normalisation -Functional Dependency - Decomposition –– Introduction to Object oriented databases-Features-Object identity- Object Structure. Parallel DBMS - Overview - Architecture - Distributed DBMS - Advantages Mobile Databases - Concept .Databases and Internet.Introduction to Data Mining and Data warehousing.

Text Book(s)

1. Database Systems – Elmasri, Navathe (Pearson) Sixth Edition

REFERENCE

1. Introduction to Database Systems – ITL Education Solutions Ltd – PEARSON- 2010
2. Database system concepts - Silberschatz, Korth, and Sudarshan (TMH)-Sixth Edition
3. SQL for professional - Swapne & Rajesh Naik

COURSE TITLE : ENVIRONMENTAL SCIENCE AND DISASTER MANAGEMENT
COURSE CODE : 3001
COURSE CATEGORY : P
PERIODS/ WEEK : 3
PERIODS/ SEMESTER : 45
CREDIT : 3

TIME SCHEDULE

MODULE	TOPICS	PERIODS
1	Renewable and Non-renewable Resources	12
2	Ecosystems	11
3	Environmental Pollution and its control	11
4	Hazards, Disasters and Mitigation measures	11
TOTAL		**45**

GENERAL COURSE OUTCOME

Sl.	Sub	Student will be able to
1	1	Understand the various types of natural resources and problems due to over exploitation.
	2	The components of various types of ecosystem and interrelation between the components.
	3	Understand various factors which cause environmental pollution and their control measures.
2	1	Understand various hazards & disasters, their affects and mitigation measures.

SPECIFIC COURSE OUTCOME:

MODULE - 1: RENEWABLE AND NON-RENEWABLE RESOURCES

1.1.0 Understand the various types of natural resources and problems due to over exploitation.
1.1.1 List various resources supplied by forest.
1.1.2 Explain various uses of forest resources.
1.1.3 Identify the problems due to over exploitation of forests.
1.1.4 Explain the problems due to de-forestation.
1.1.5 Identify the social and ecological problems due to dams.

1.1.6 Identify various sources of fresh water.
1.1.7 State the importance of water as a resource.
1.1.8 Explain the problems due to over consumption of water.
1.1.9 Identify the causes of flood and drought.
1.1.10 Explain the reasons for the conflicts over water.
1.1.11 Describe the advantages and disadvantages due to large dams.
1.1.12 List various mineral resources.
1.1.13 State the problems due to mining.
1.1.14 Explain the environmental impacts due to mining.
1.1.15 State the reasons for global food crisis.
1.1.16 Explain impacts on food production due to adoption of modern agricultural practices.
1.1.17 Explain the problems due to the use of artificial pesticides and fertilizers.
1.1.18 Identify the causes for water logging, salinity and Eutrophication and the problems due to that.
1.1.19 Explain the world energy scenario and energy demands
1.1.20 List various conventional and non-conventional sources of energy.
1.1.21 Distinguish between renewable and non renewable sources of energy.
1.1.22 State the importance of renewable energy.
1.1.23 Explain the importance of energy conservation.
1.1.24 Define sustainable development and state its importance.
1.1.25 Explain why land is considered as a resource.
1.1.26 List the different types of resources from land.
1.1.27 Identify the causes for land degradation.
1.1.28 State the reasons for soil erosion, land slide and desertification.
1.1.29 Describe the control measures for land degradation.
1.1.30 Describe the role of an individual in conservation of resources and achieving sustainable development

MODULE – 2: ECOSYSTEMS

2.1.0 Understand the components of various types of ecosystem and interrelation between the components.

2.1.1 Define an Ecosystem.
2.1.2 Explain the biotic and abiotic components of an ecosystem.
2.1.3 Identify the producers, consumers and decomposers in an ecosystem.
2.1.4 Explain the role of producers, consumers and decomposers in an ecosystem.
2.1.5 State the meaning of what is meant by Biomes.
2.1.6 Explain the phenomenon Ecological Succession.
2.1.7 Explain food chain and food web.
2.1.8 State the inter dependence of each link in a food chain.
2.1.9 Explain the ecological pyramid.
2.1.10 Explain Biomagnifications and its impacts.
2.1.11 Explain the types, structure and characteristic features of forest ecosystem
2.1.12 Explain the types, structure and characteristic features of grassland ecosystem
2.1.13 Explain the types, structure and characteristic features of desert ecosystem
2.1.13 Explain the types, structure and characteristic features of aquatic ecosystem
2.1.14 Describe the importance of biodiversity and the need to conserve it.
2.1.15 Illustrate the effects of urbanization – Heat islands, stress on land and water
2.1.16 Identify the causes of global warming and the effects due to that.

MODULE – 3: ENVIRONMENTAL POLLUTION AND ITS CONTROL

3.1.0 Understand various factors which cause environmental pollution and their control measures.

3.1.1 Define environmental pollution.
3.1.2 Identify the factors contributing air pollution.
3.1.3 State the role of air pollution in global pollution.
3.1.4 Explain the effectsof air pollution.
5.1.5 State various methods to control air pollution.
5.1.6 Explain the functioning of air pollution control devices.
3.1.7 Identify the sources contributing to water pollution.
3.1.8 State the role of water pollution in global pollution.
3.1.9 Explain theeffectsof water pollution.
5.1.10 State various methods to control water pollution.
5.1.11 Explain the functioning of water pollution control devices.
3.1.12 Identify the sources contributing oil pollution.
3.1.13 State the role of oil pollution in marine pollution.
3.1.14 Explain the effectsof oil pollution.
5.1.15 State various methods to control oil pollution.
3.1.16 Identify the factors contributing marine pollution.
3.1.17 State the role of marine pollution in global pollution.
3.1.18 Explain the effectsof marine pollution.
5.1.19 State various measures to control marine pollution.
3.1.20 Identify the factors contributing noise pollution.
3.1.21 State the role of noise pollution in environmental stress.
3.1.22 Explain the effectsof noise pollution.
5.1.23 State various measures to control noise pollution.
3.1.24 Identify the factors contributing thermal pollution.
3.1.25 State the role of thermal pollution in global warming.
3.1.26 Explain the effectsof thermal pollution.
5.1.27 State various measures to control thermal pollution.
3.1.28 Identify the major nuclear hazards occurred in the world.
3.1.29 State the global affects of nuclear radiation.
3.1.30 Explain the local affects of nuclear pollution.
3.1.31 Identify various categories of solid wastes.
3.1.32 Explain various methods of solid waste management specific to each category of waste.
3.1.33 Explain the effectsdue to solid waste pollution.
3.1.34 Explain EIA and the need for EIA while implementing projects.
3.1.35 Identify the factors to be considered for conducting EIA of a mini-project.
3.1.36 Explain the role ofeach individual to control various aspects of environmental pollution.
3.1.37 Explain the case studies of cause and effect of each category of pollution.

MODULE – 4:HAZARDS, DISASTERS AND MITIGATION MEASURES

4.1.0 Understand various hazards & disasters, their affects and mitigation measures.

4.1.1 Define Hazard, Disaster, Vulnerability, Risk and Capacity.
4.1.2 Explain the relation between Hazard, Disaster, Vulnerability, Risk and Capacity.
4.1.3 State the factors influencing vulnerability and risk.
4.1.4 Explain assessment, evaluation and management of risk.

4.1.5 Identify the classifications of hazards based on various aspects.
4.1.6 Explain the causes for different types of disasters.
4.1.7 List the effectsof each type of disaster on human beings and ecosystem.
4.1.8 Illustrate major hazards under each category occurred in world as case study.
4.1.9 Explain the disaster management operation cycle.
4.1.10 Identify and explain various operations to be carried out during pre-disaster phase.
4.1.11 Identify and explain various operations to be carried out during emergency phase.
4.1.12 Identify and explain various operations to be carried out during post-disaster phase.
4.1.13 Explain the relationship between disaster and development.
4.1.14 Illustrate how health and disaster management are interrelated.
4.1.15 Explain the Institutional frame work of disaster management in India at National, state and district level and the role of each body.
4.1.16 Explain hazard zonation map.
4.1.17 Explain new & emerging approach in disaster management – Use of Early warning systems base on IT enabled services like GIS, GPS, MIS, DDS, Remote sensing etc.
4.1.18 Illustrate the community based disaster preparedness programmes as a mitigation measure.
4.1.19 Explain various preventive measures for disaster risk reduction.
4.1.20 Explain the need for safety audit - onsite and offsite safety audits to be done and formulation of emergency plans.
4.1.21 Explain the management plan for transportation accidents.
4.1.22 State the use of TREM card in accidents involving hazardous goods transport.
4.1.23 State the role of regulatory frame work and code of practice in disaster management.
4.1.24 Explain the role played by various acts related to disaster management.

CONTENT DETAILS

MODULE - 1: RENEWABLE AND NON-RENEWABLE RESOURCES

Natural resources and associated problems:

(a) Forest resources: Use and overexploitation, deforestation, case studies, mining, dams and their effects on Forests, Environment and tribal people.
(b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.
(c) Mineral resources: Use and exploitation, environmental effects of Mining and extraction of mineral resources, case studies.
(d) Food resources: World Food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, Genetically modified crops – boon or bane, fertilizer-pesticide problems, water logging, salinity, Eutrophication, Case studies.
(e) Energy resources: Growing energy needs, renewable and non-renewable energy sources, use of alternate energy sources. Importance of energy conservation and sustainable development.
(f) Land resources: Land as a resource, land degradation, role of land use planning in sustainable development, human induced landslides, soil erosion and desertification.
(g) Role of individuals in the conservation of natural resources. Equitable use of resources for sustainable development.

(Students shall conduct a case study of any resource utilization as an assignment)

MODULE - 2: ECOSYSTEMS

Concept of an ecosystem, structure and functions of biotic and abiotic components of an ecosystem, producers, consumers and decomposers. Biomes, Ecological succession.
Food chains, food webs and ecological pyramids, Biomagnifications.
Introduction, types, characteristics features, structure and function of the following ecosystem:

(a) Forest ecosystem
(b) Grassland ecosystem
(c) Desert ecosystem
(d) Aquatic ecosystems (Ponds, streams, lakes, ox-bow lakes, rivers, estuaries, oceans)
(e) Concept of biodiversity - Importance of biodiversity conservation
(f) Urbanization and impacts on environment (Heat island, stress on water and soil), global warming, climate change, sea level rise.

(Students shall study the characteristic features of any local ecosystem as an assignment)

MODULE - 3: ENVIRONMENTAL POLLUTION AND ITS CONTROL

Definition of Environment and Environmental Pollution. Causes, effects and control measures of (a) Air pollution (b) Water pollution (c) Oil pollution (d) Marine pollution e) Noise pollution (f) Thermal pollution g) Nuclear hazards. Case studies in each type of pollution. Environmental stress.
Solid waste management: Causes, effects and control measures of urban and industrial wastes.
Introduction to Environment Impact Analysis. Role of an individual in prevention of pollution.
(Students should conduct the case study of any local pollution issue and suggest remedial measure as an assignment)

MODULE - 4: HAZARDS, DISASTERS AND MITIGATION MEASURES

Define: Hazard, Disaster, Vulnerability (Physical, Economic and Social vulnerability), Risk, Capacity and inter-relationship between them. Factors influencing vulnerability and risk. Risk management, assessment and evaluation.
Classification of disasters, causes and consequences – Natural disasters (cyclone, earth quake, tsunami, flood, drought, land slide, lightning, forest fire, volcanic eruption) and Human-induced disasters (Air, road & rail accidents, boat capsize, oil spill, building collapse, fire, industrial hazards, chemical hazards, explosion, war). Classification of disasters based on the origin (Water & climate based, geological origin, Chemical/industrial/nuclear disasters- Hazchem& MAH(Major Accident hazard) units, biologically related disasters, human induced disasters/accidents) - Case studies of each type of disaster.
Disaster management cycle - Operations in each phase – Pre-disaster phase (Planning, Preparedness, Prevention & Mitigation), Structural and Non-structural mitigation measures (Structural eg. Dams, embankment, stone walls, Installing early warning systems, disaster resistant constructions and non-structural - eg. Insurance, IEC-information-education-communication, land use zoning, preparedness plan, mock drills, costal shelter plantation) – Emergency phase (communication, evacuation, rescue search & relief operation, medical assistance) – Post disaster phase (Reconstruction and rehabilitation, economic & environmental aspects, Administrative & political aspects) - Relationship between disaster and development – Health and disaster management plan, holistic approach.
Disaster profile of India - Institutional frame work of disaster management in India (National, state and district level) – Hazard zonation map - New & emerging approaches in disaster management – Use of

information technology (GIS, GPS etc) in disaster management - Community based disaster preparedness - Disaster risk reduction - Safety audits, onsite and offsite emergency plans – Management of transportation accidents, use of TREM card.
Regulatory frame work and code of practice (Petroleum act-1934, Factories act-1948, Insecticide act-1968, Explosives act-1984, Environmental protection act-1986, Coastal regulation zone (CRZ) Act-1991, Disaster management Act-2005).

REFERENCE BOOKS

1.Environmental studies–From Crisis to Cure,R. Rajagopalan,Oxford UniversityPress, 2005
2.Environmental Science & Engineering, P. Anandan, R. Kumaravelan, Scitech.
3.Environmental Studies for Undergraduate courses, ErachBharucha, UniversitiesPress.
4.R.B.Singh (Ed). Disaster Management, Rawat Publication, New Delhi, 2000
5.H.K.Gupta (Ed). Disaster Management, Universities Press India, 2003

COURSE TITLE	**:**	**DIGITAL COMPUTER PRINCIPLES LAB**
COURSE CODE	**:**	**3138**
COURSE CATEGORY	**:**	**B**
PERIODS/WEEK	**:**	**5**
PERIODS/SEMESTER	**:**	**75**
CREDITS	**:**	**3**

Course General Outcomes:

The student should be able to do the experiments from the following topics on completion of corresponding topic

1.0 To implement basic logic gates

1.0.1 Implement logic gates using basic components

1.0.2 Verify the Logic behaviour of various IC gates: 7408, 7432, 7404, 7400, 7402, 7486)

1.0.3 Implement basic gates using Universal Gates (NAND & NOR)

1.0.4 Simplification of Boolean Functions SOP & POS forms (Demonstrates the relationship between a Boolean Function and the corresponding logic diagram – using Map reduction method)

Eg: Plot the following Boolean function in a Map as well as implement in a logic diagram

F= A'D + BD +B'C + AB'D

2.0 To design and Implement Combinational Circuits

2.0.1 Implement the following Combinational Circuits (Design, construct, and test combinational logic circuit that generates parity bit from four message bits)

2.0.2 Design a combinational circuit that converts a Gray code to binary, Decoder for a binary digit to BCD, and a seven segment indicator

2.0.3 Design, construct, and test a half-adder & a full-adder Implement using Basic gates and Universal gates

2.0.4 Implement a circuit using a four-bit binary parallel adder (IC 7483) implement Adder-Subtractor, and a Magnitude Comparator)

3.0 To demonstrate synchronous sequential logic

3.0.1 Construct, Test, and investigate the operation of SR Latch, D Latch, Master-Slave Flip-Flop, Edge-Triggered Flip-Flop, IC Flip-Flops(using IC 7476, and 7474)

3.0.2 Sequential Circuits (Design, construct, and test Up-Down counter with Enable)

3.0.3 Design, construct, and test a counter that goes through a sequence of binary states (User controlled counting pattern)

3.0.4 Construct, and test Ripple Counter, Synchronous counter, Decimal Counter

3.0.5 Setup a Binary counter with Parallel Load (use IC 74161))

3.0.6 Study the operation of Shift Registers (Investigate the operation of Shift Registers, Ring Counter, Feedback Shift Register, Bidirectional Shift register, Bidirectional Shift Register with Parallel Load)

COURSE TITLE	**:**	**OBJECT ORIENTED PROGRAMMING LAB**
COURSE CODE	**:**	**3137**
COURSE CATEGORY	**:**	**B**
PERIODS/WEEK	**:**	**5**
PERIODS/SEMESTER	**:**	**75**
CREDITS	**:**	**3**

Hardware Requirement: Desk Top Computer

Software Requirement : Linux Operating System with gcc and g++

LIST OF EXPERIMENTS

1. Simple C++ Programs to Implement Various Control Structures.
    a. If statement
    b. Switch case statement and do while loop
    c. For loop
    d. While loop
2. Programs to Understand Structure & Unions.
    a. Structure
    b. union
3. Programs to Understand Pointer Arithmetic.
4. Functions & Recursion.
    a. Recursion
    b. function
5. Inline Functions.
6. Programs to Understand Different Function Call Mechanism.
    a. Call by reference & Call by Value
7. Programs to Understand Storage Specifiers.
8. Constructors & Destructors.
9. Use of “this” Pointer. Using class
10. Programs to Implement Inheritance and Function Overriding.
    a. Multiple inheritance –Access Specifiers
    b. Hierarchical inheritance – Function Overriding /Virtual Function
11. Programs to Overload Unary & Binary Operators as Member Function & Non Member Function.
    a. Unary operator as member function
    b. Binary operator as non member function
12. Programs to Understand Friend Function & Friend Class.
    a. Friend Function
    b. Friend class
13. Programs on Class Templates

COURSE TITLE : DATA BASE MANAGEMENT SYSTEM LAB

COURSE CODE : 3139

COURSE CATEGORY : B

PERIODS/WEEK : 4

PERIODS/SEMESTER : 60

CREDITS : 2

Software Requirement: MySql

Course General Outcomes:

Sl.	G.O	On completion of this course the student will be able :
1	1	Practice different DDL,DML and DCL commands
	2	Practice queries
2	1	Define views
	2	Create cursors and triggers
3	1	Apply connections from programming languages like JAVA and PHP
	2	Implement various embedded languages
4	1	To Understand Normalisation and Transactions

Specific Outcomes:

1.1 Create one or two tables. Bring in all possible constraints like NOT NULL,

DEFAULT, CHECK, PRIMARY KEY, UNIQUE etc.

1.2 Enter considerable number of tuples of all sorts to the tables.

1.3 Write various SELECT clauses to generate different types of listing of data.

(Use WHERE, HAVING, DISTINCT, GROUP BY and ORDER BY clauses and subqueries)

Core Problem (Phase 1): Analyse a real problem situation/application and represent it using an ER-Diagram. Create tables as per ER Diagram and insert relevant data.

2.1 Create various views of the table.

2.2 Delete unwanted tuples from tables.

2.3 Modify the schema of one or more tables to incorporate a change.

2.4 Develop queries for inner and outer joins.

3.1 Create cursors and triggers for manipulating tables.

3.2 Write functions and/or procedure for various simple tasks.

3.3 Develop a simple application in Java/PHP to make a connection to the

database and access the data.

Core Problem (Phase 2):

Check whether the tables created are normalized.

Develop functions/stored procedure for identified tasks.

Develop the miniature form of application that connects to the database using JDBC/ODBC.

4.1 Design and develop a form to enter data into tables using JAVA/PHP.

4.2 Develop a Java/PHP program to access the table and generate a report.

Core Problem (Phase 3):

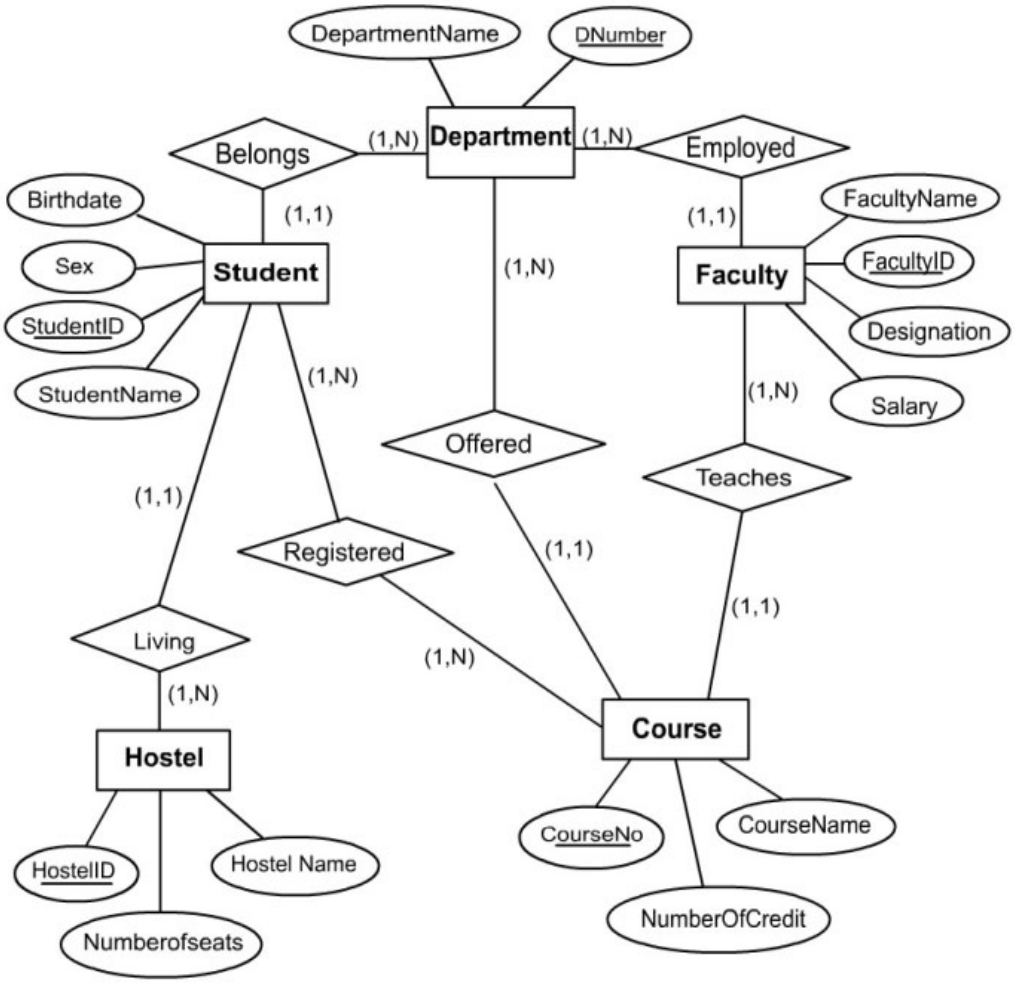
Design and develop table data entry form(s).

Develop the final application from the miniature form.

Sample Core Problem: The diagram shown below represents the academic functioning of a college. There are five entities viz. Department, Faculty, Student, Course, and Hostel. All the five entities have their own attributes.DNumber, FacultyID, StudentID, CourseID, and HostelID are the key attributes of Department, Faculty, Student, Course and Hostel respectively. The entities are related to each other and the respective relationships are explained below:

A college has many departments. A department would have students as well as faculty. The one to many relationship between department and students, and, department and faculty states that a department belongs to many students and it employs many faculty members. Looking at these relationships in a reverse direction conveys that a student as well as a faculty belongs to a single department and thus establishes one to one relationship.

A student can register himself into various courses; similarly a course can be studied by many students. A student lives in a single hostel but a hostel accommodates many students. A department offers many courses but a particular course belongs to a particular department. A faculty teaches many courses but a particular course is taught by a single faculty only.



Phase 1:

Create five tables: 1) Department, 2) Faculty, 3) Student, 4) Course and 5) Hostel. Include the necessary constraints.

Insert at least 10 tuples to each table.

Generate the following results:

i) **List out the ID, Name and Date of Birth of students in the ascending order of Date of Birth**
ii) **List out the ID, Name and Date of Birth of students registered for a specific course.**
iii) **List out the ID, Name and Date of Birth of students registered for a specific course, staying in a specific Hostel.**
iv) **Prepare department wise student list with ID, Name and Date of Birth of students and also find number of students in each department.**

Phase 2:

Modify the 'Student' table to add a new field 'Grade'.

List the names of faculties who teach for a specific course using sub-query.

Phase 3:

Create a cursor to modify the salary of 'Professors' belonging to all departments by 150%.

Phase 4:

Develop a JAVA/PHP application that allows addition, deletion and modification of all table data and generate reports.