C21_ Curriculum

DIPLOMA IN COMPUTER ENGINEERING

OFFERED BY

STATE BOARD OF TECHNICAL EDUCATION & TRAINING,

TELANGANA: HYDERABAD

IV SEMESTER

Sl No	Course Code	Course Name	Teaching Scheme				Credits	Examination Scheme						
			Instruction periods per week			Total Periods per semester		Continuous internal evaluation			Semester end examination			
			L	T	P			Mid Sem 1	Mid Sem 2	Internal evaluation	Max Marks	Min Marks	Total Marks	Min marks for Passing including internal
1	SC-401	Advanced Engineering Mathematics	4	1	0	75	3	20	20	20	40	14	100	35
2	CS-402	Relational Database Management Systems	4	1	0	75	3	20	20	20	40	14	100	35
3	CS-403	Java Programming	4	1	0	75	3	20	20	20	40	14	100	35
4	CS-404	Computer Hardware & Networking	4	1	0	75	3	20	20	20	40	14	100	35
5	CS-405	Operating Systems	4	1	0	75	3	20	20	20	40	14	100	35
6	CS-406	Relational Database Management Systems Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
7	CS-407	Java Programming Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
8	CS-408	Computer Hardware & Networking Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
9	CS-409	Microprocessors Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
10	HU-410	Employability Skills Lab	1	0	2	45	1.5	20	20	20	40	20	100	50
11	CS-411	Skill Upgradation	0	0	8	120	2.5	0	0	Rubrics			--	-
	Activities: student performance is to be assessed through Rubrics													

SC-401 - ADVANCED ENGINEERING MATHEMATICS

Course Title	Advanced Engineering Mathematics	Course Code	SC-401
SEMESTER	IV	Course Group	Foundation
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Pre requisites:

This course requires the knowledge of Engineering Mathematics at Diploma first year level and Applied Engineering Mathematics at Diploma 3rd Semester level.

Course Outcomes:

At the end of the course, the student will have the ability to:

CO 1	Solve simple Homogeneous Linear Differential Equations
CO 2	Solve simple Non-Homogeneous Linear Differential Equations and apply them in solving engineering problems.
CO 3	Express f(x) as a Fourier series in the given interval $(c\ ,\ c+2\pi)$
CO 4	Express f(x) as a Fourier Half-Range Cosine series and Sine series in $(0, \pi)$
CO 5	Find Laplace transforms of simple functions.
CO 6	Find Inverse Laplace transforms of simple functions and solve Linear Differential Equations using Laplace Transformations.

Course Contents:

Unit – I

Duration: 07 Periods (L: 5 – T: 2)

Homogeneous Linear Differential equations with constant coefficients

Homogenous linear differential equations with constant coefficients of order two and higher with emphasis on second order.

Unit – II

Duration: 16 Periods (L: 13 – T: 3)

Non-Homogeneous Linear Differential equations with constant coefficients

Non-homogenous linear differential equations with constant coefficients of the form (D)y = X, where X is in the form k(a constant) e^{ax}, sin(ax), cos(ax), x^n, (n= 1,2,3) Complimentary Function (CF), Particular Integral (PI) and General Solution (GS).

Unit-III

Duration: 14 Periods (L: 11 – T: 3)

Fourier series

Orthogonality of trigonometric functions, Representation of a function in Fourier series over the interval $(c\ ,\ c+2\pi)$, Euler's formulae, sufficient conditions for existence of Fourier series for a function f(x). Even, Odd functions and Fourier series over the Interval (0, 2 π) and (-π, π)

Unit – IV

Duration: 08 Periods (L: 7 – T:1)

Fourier Half-range series

Representation of a function f(x) as a Fourier Half-range Sine series and Cosine series over the interval (0, π)

Unit – V

Duration: 14 Periods (L: 11 – T: 3)

Laplace Transformations:

Definition, sufficient conditions for existence of Laplace Transform, Laplace Transform of elementary functions, linearity property, Change of scale property, First shifting theorem , multiplication by t^n, division by t, Laplace Transform of derivatives and integrals, unit step function, Laplace Transform of second shifting theorem

Unit – VI

Duration: 16 Periods (L: 13 – T: 3)

Inverse Laplace transforms:

Inverse Laplace transforms- shifting theorems and change of scale property, multiplication by s^n and division by s –Inverse Laplace Transform using partial fractions – convolution theorem (no proof) – application of Laplace Transformations to solve ordinary differential equations of second order with initial conditions.

Recommended Books:

1. Higher Engineering Mathematics, B.S. Grewal.
2. Laplace Transforms - Murray R. Spigel.
3. Ordinary Differential Equations – R. S. Aggarwal.
4. Fourier Series – A.R. Vasishtha and Gupta.

Suggested E-Learning references:

1. www.freebookcentre.net/mathematics/introductory-mathematics-books.html

2. E-books:www.mathebook.net

Suggested Learning Outcomes

At the end of the course, the student will have the ability to:

Unit-I

1.0 Solve Homogeneous linear differential equations with constant coefficients in engineering situations

1.1 Solve Differential equations of the type $(aD^2 + bD + c)\ y = 0$ when the roots of the Auxiliary Equation (A.E) are real & different, real & repeated and complex.

1.2 Solve the higher order homogeneous linear differential equations with constant coefficients.

Unit-II

2.0 **Solve Non-Homogeneous linear differential equations with constant coefficients in engineering situations**

2.1 Apply the concept of complementary function, particular Integral to get general solution of a differential equation.

2.2 Solve n^{th} order differential equation of the type $f(D)\ y = X$ where $f(D)$ is a polynomial of second order and X is a function of the form k, e^{ax} ,$Sin(ax)$, $Cos(ax)$, x^n.

2.3 Solve simple problems on the above types of 2.2

Unit-III

3.0 Understand the Fourier series expansion of functions

3.1 Know the orthogonality of functions in an interval.

3.2 Identify Fourier series of a function in the interval (C, C+2π) and use the Euler's Formulae for determining the Fourier coefficients.

3.3 Write sufficient conditions for the existence of Fourier series for a function.

3.4 Expand Fourier series of simple functions in the range (0, 2π) and ($-\pi, \pi$).

3.5 Expand Fourier series for even and odd functions in the interval ($-\pi, \pi$)

3.6 Solve simple problems on even and odd functions in the interval. $(0,2\pi)$ and $(-\pi, \pi)$

Unit- IV

4.0 Understand the Half – Range Fourier series expansion of functions

4.1 Expand Half – Range Cosine series of a function in the range $(0\ , \pi)$.

4.2 Expand Half – Range Sine series of a function in the range $(0\ , \pi)$.

4.3 Solve simple problems on Half – Range Cosine and Sine series over the interval $(0, \pi)$

Unit-V

5.0 Understand Laplace transforms

5.1 Apply the definition of Laplace Transform and find Laplace transform of standard functions

5.2 Identify the sufficient conditions for existence of Laplace Transform.

5.3 Use the properties of Laplace Transform – Linearity property, First shifting theorem, Change of Scale property in solving simple problems.

5.4 Apply formulae for Laplace transform of $t^n f(t)$, $\frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u)du$ in terms of Laplace transform of f (t) to solve simple problems

5.5 Identify unit step function and write the Laplace Transform of unit step function

5.6 Apply Second shifting theorem in solving simple problems.

Unit-VI

6.0 Use Laplace transforms and Inverse Laplace transforms to solve differential equation in engineering problems

6.1 Define inverse Laplace Transform and write inverse Laplace Transforms of standard functions.

6.2 Solve simple problems on Inverse Laplace Transforms.

6.3 Write Shifting theorems and Change of scale property of inverse Laplace Transform.

6.4 Solve simple problems on 6.2

6.5 Write inverse Laplace Transforms corresponding to Laplace Transform of the functions $t^n f(t), \frac{f(t)}{t}$, $f^n(t)$, $\int_0^t f(u)du$

6.6 Solve simple problems on 6.5

6.7 Define convolution of two functions and state convolution theorem.

6.8 Solve simple problems on Convolution theorem.

6.9 Use Laplace and inverse Laplace Transforms to solve simple differential equations of Second order.

Suggested Student Activities:

1. Student visits Library to refer Standard Books on Mathematics and collect related material.
2. Quiz
3. Group discussion
4. Surprise tests

5. Seminars
6. Home Assignments.
7. Mathematics for preparing competitive exams and solving old question papers on Arithmetical ability.

CO-PO Mapping Matrix

CO	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	Mapped POs
CO1	3	2					3	1,2, 7
CO2	3	2					3	1,2, 7
CO3	3	2					3	1,2, 7
CO4	3	2					3	1,2, 7
CO5	3	2					3	1,2, 7
CO6	3	2					3	1,2, 7

QUESTION PAPER PATTERN FOR MID SEMESTER EXAMS

MID SEM-I EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-I	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-II	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

MID SEM-II EXAM

S.No	Unit No	R	U	A	Remarks
1	Unit-III	1,2	5(a)	7(a)	
			5(b)	7(b)	
2	Unit-IV	3,4	6(a)	8(a)	
			6(b)	8(b)	
Total Questions		4	4	4	

The length of answer for each question framed in respect of Part-A, B&C shall not exceed ¼ of a page,1page and 2 pages respectively

<table>
<tr><td rowspan="2">Unit No</td><td colspan="4">Questions to be set for SEE</td></tr>
<tr><td colspan="3">R</td><td>U</td><td>A</td></tr>
<tr><td>I</td><td rowspan="6">Q4</td><td colspan="2" rowspan="2">Q1</td><td rowspan="2">Q9(a)</td><td rowspan="2">Q13(a)</td></tr>
<tr><td>II</td></tr>
<tr><td>III</td><td colspan="2" rowspan="2">Q2</td><td rowspan="2">Q10(a)</td><td rowspan="2">Q14(a)</td></tr>
<tr><td>IV</td></tr>
<tr><td>V</td><td rowspan="2">Q3</td><td>Q5,Q6</td><td>Q9(b),
Q11(a), Q11(b)</td><td>Q13(b),
Q15(a), Q15(b)</td></tr>
<tr><td>VI</td><td>Q7,Q8</td><td>Q10(b),
Q12(a), Q12(b)</td><td>Q14(b),
Q16(a), Q16(b)</td></tr>
<tr><td>Total Questions</td><td colspan="3">8</td><td>8</td><td>8</td></tr>
</table>

BOARD DIPLOMA EXAMINATIONS (C21)
MID SEM –I, IV SEMESTER
SC-401- ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04
2 Each question carries **ONE** mark

1. Write the General solution of $(aD^2+bD+c)\ y = 0$, whose roots of auxiliary equation are real and distinct.
2. Find the roots of auxiliary equation of the differential equation $(D^2 + 2D + 1)y = 0$
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^{8x}$
4. Find the P.I of $(D^2 - 9)y = cos3x$

PART-B

Instructions: 1. Answer **ALL** questions 02 X 03 = 06

2. Each question carries **THREE** marks

5 a) Solve $(D^2 + 4D + 13)\ y = 0$

OR

5 b) Solve $(D^2 +16)\ y = 0$

6 a) Solve $(D^2 + 4D + 4)y = 5 + e^{-2x}$

OR

6 b) Find P.I of $(D^3 + D)y$ = sin2x

PART- C

Instructions: 1. Answer **ALL** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Solve $(D^3 – 2D^2 – 4D + 8)\ y = 0$

OR

7 b) Solve $(D^3 – 6D^2 +11\ D – 6)\ y = 0$

8 a) Solve $(D^2 + 36)y = sin^2x$

OR

8 b) Solve : $(D^2 - 3D + 2)y = x + x^2$

BOARD DIPLOMA EXAMINATIONS (C21)
MID SEM –II, IV SEMESTER
SC-401- ADVANCED ENGINEERING MATHEMATICS

TIME: 1: 00 Hour **Max. Marks: 20**

PART-A

Instructions: 1. Answer **ALL** questions 04 X 01 = 04

2 Each question carries **ONE** mark

1. Define periodic function and give one example
2. Define Fourier series of the function f(x) in the interval $(0, 2\pi)$
3. Write Half-range sine series of f(x) in the interval $(0,\pi)$
4. Find a_0 for f(x) $=e^x$ in $0< x < \pi$

PART-B

Instructions: 1. Answer **ALL** questions 02 X 03 = 06

2. Each question carries **THREE** marks

5 a) If f(x) = x^2 in $(0, 2\pi)$, then find the value of a_n in Fourier series of f(x)

OR

5 b) If f(x) =$|x|$ in $(-\pi, \pi)$, then find the value of a_1 in Fourier series of f(x)

6 a).Find the value of a_n in half-range Cosine series for the function f(x) = e^x in $(0,\pi)$

OR

6 b) Obtain the Fourier Half – Range Sine series for f(x) = $(\pi - x) in the interval\ (0, \pi)$

PART- C

Instructions: 1. Answer **ALL** questions 02 X 05 = 10

2. Each question carries **FIVE** marks

7 a) Obtain the Fourier series for f(x) = x in the interval $0< x < 2\pi$

OR

7 b) Find the Fourier series for f(x) = $(x - x^2)$ in the interval $(-\pi, \pi)$. Hence show that

$$\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + \ldots\ldots\ldots + = \frac{\pi^2}{12}$$

8 a) Express f(x) = π x – x^2 as a half-range Sine series in $(0,\pi)$

OR

8 b) Find the half –range cosine series for the function f(x) =x^2 in the interval $(0,\pi)$

BOARD DIPLOMA EXAMINATION, (C-21)
IV SEMESTER END EXAMINATION
SC-401- ADVANCED ENGINEERING MATHEMATICS

Time: 2 hours **[Total Marks: 40]**

PART-A

Instructions: 1. Answer **ALL** questions 08 X 01 = 08

2 Each question carries **ONE** mark

1. Find the roots of auxiliary equation of the differential equation $(D^2 + 4D)y = 0$.
2. Define Fourier Series for the function f(x) in the interval (c, c+2π)
3. Find the Particular Integral of $(D^2 - 4D + 1)y = e^x$
4. Find $L(e^{2t} + Cos3t)$
5. Find $L(t + 5Cosht)$
6. State the First Shifting theorem of Laplace Transforms.
7. Find $L^{-1}\left(\frac{1}{s-3} + \frac{s}{s^2+4}\right)$
8. Find $L^{-1}\left(\frac{1}{2s+5}\right)$

PART-B

Instructions: 1. Answer **ALL** questions 04 X 03 = 12

2. Each question carries **THREE** marks

9a) Solve $(D^2+D + 1)\ y = 4e^{3x}$

OR

9 b) Find $L(tCos3t)$

10 a) Find Half Range Sine Series of f(x) = x in $(0\ ,\pi)$

OR

10 b) Find $L^{-1}\left(\frac{s+1}{s^2+6s-7}\right)$

11 a) If L{f(t)} = $\frac{20-4s}{s^2-4s+20}$, find L{f(3t)}

OR

11 b) Find $\int_0^\infty t.e^{-2t}Sin3tdt$ using Laplace Transform Technique

12 a) Show that $L^{-1}\left(\frac{1}{s(s^2+a^2)}\right) = \frac{1-\cos at}{a^2}$

OR

12 b) Find $L^{-1}\left(\frac{s}{(s+2)^2+4}\right)$

PART- C

Instructions: 1. Answer **ALL** questions 04 X 05 = 20

2. Each question carries **FIVE** marks

13 a) Solve: $(D^2 + D - 2)\, y = x + \sin x$

OR

13 b) Find $L[te^t sin3t]$

14 a) Expand $f(x) = x^2$ as a Fourier series in the interval $(-\pi, \pi)$

OR

14 b) Find $L^{-1}\left(\frac{s}{(s+1)^2(s^2+1)}\right)$

15 a) Find $L\left(\frac{Sin3t.Cost}{t}\right)$

OR

15 b) Evaluate $L\left\{\int_0^t \frac{\sin t}{t}\, dt\right\}$

16 a) Find $L^{-1}\left(\frac{1}{(s+1)(s+2)}\right)$ using Convolution theorem.

OR

16 b) Solve the differential equation $y'' - 2y' - 8y = \sin t$, when $y(0) = 3$, $y'(0) = 6$ by Laplace Transform method.

CS-402-RELATIONAL DATABASE MANAGEMENT SYSTEMS

Course Title	Relational Database Management Systems	Course Code	CS-402
SEMESTER	IV	Course Group	Core
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Prerequisites

Knowledge of programming language.

Course Outcomes
Upon completion of the course the student shall be able to

Course Outcome	
CO1	Describe the characteristics of database, architecture and languages of Database system
CO2	Implement Entity-Relationship diagrams
CO3	Apply relational model concepts and constraints, Apply normalization techniques for relational databases and familiarize with data base transaction processing
CO4	Use Structured Query Language (SQL), frame queries to any database
CO5	Frame queries to any database, managing schema objects and familiarize with PL/SQL
CO6	Develop programs using PL/SQL

Course Contents

1. **Concepts of Databases**:

Duration: 10 Periods

Introduction - An Example - Characteristics of the database approach - Advantages of using the DBMS Approach - A Brief History of Database Applications.

Database System Concepts and Architecture - Data Models – Schemas and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client /Server Architectures for DBMSs - Classification of database Management System.

2. Data Modeling Using the Entity-Relationship(ER) Model

Duration: 10 Periods

Using High Level Conceptual Data Models for Database Design - An example Database Application - Entity Types - Entity Sets - attributes and keys - Relation Types - Relationship Sets - roles and structural constraints - ER Diagrams, naming conventions and design issues - Relationship Types of Degree Higher than Two.

3. Relational Data Model, Normalization for relational databases, Data Base Transaction Processing

Duration: 10 Periods

Relational Model concepts - Relational Model Constraints and relational database schemas - Update operation and Dealing with constraints violations – Informal Design guidelines for relation schemas - Functional dependencies - Normal forms based on primary keys - General Definition of first, second and third normal forms, Boyce-codd Normal form - Introduction to transaction processing - transaction and system concepts - desirable properties of transactions – Serializability - States of Transactions.

4. Concept of SQL

Duration: 15 Periods

Familiarize with SQL - pseudo columns - Data Definition and data types – DDL statements in SQL - DML statements in SQL – Basic queries in SQL - various operators in SQL- specifying constraints in SQL - various functions in SQL

5. Management of schema objects and Concept of PL/SQL

Duration: 15 Periods

SQL sub queries and JOIN statements - Management of Schema objects —indexes – sequences - synonyms – views- PL/SQL Introduction - Data types- Naming Conventions – control statements - sequential control GOTO and NULL statements

6. PL/SQL

Duration: 15 Periods

Records - Subprograms – Procedures –Functions - RETURN statement– Recursion - Stored Procedures - Exceptions – Cursors - Triggers – Packages.

Specific Learning Outcomes:

Upon completion of the course the student shall be able to

1. Concepts of Databases

1.1 Familiarize with Database.

1.2 Illustrate the evolution of DBMS.

1.3 Describe the characteristics of the database approach.

1.4 Discuss about the applications of DBMS.

1.5 Explain different types of Data Models.

1.6 Define Schemas, instances.

1.7 Demonstrate Three-Schema Architecture.

1.8 Define Data Independence.

1.9 Familiarize Database Languages and Interfaces.

1.10 Illustrate Database System Environment.

1.11 Explain Centralized and Client /Server Architectures for DBMSs.

1.12 Classify different types of Database Management System.

2. Data Modeling Using the Entity-Relationship(ER) Model

2.1 Describe how to use High-Level Conceptual Data Models for Database Design.

2.2 Familiarize a Database Application and list some Database applications.

2.3 Describe Entity Types.

2.4 Demonstrate Entity Sets, Weak Entity Sets.

2.5 Illustrate attributes and keys.

2.6 Describe Relation Types.

2.7 Describe Relation sets.

2.8 Explain roles and structural constraints.

2.9 Demonstrate ER Diagrams, naming conventions, design issues.

2.10 Explain Relationship Types of Degree Higher Than Two.

3. **Relational Data Model, Normalization for relational databases, Data Base Transaction Processing**

3.1 Use Relational Model concepts.

3.2 Describe Relational Model Constraints.

3.3 Illustrate relational database schema.

3.4 Describe Update operation and dealing with constraints violations.

3.5 Explain Informal Design guidelines for relation schemas.

3.6 Define Functional dependencies.

3.7 List Normal forms based on primary keys.

3.8 Explain General Definition of first, second and third normal forms, Boyce-Codd Normal form with examples.

3.9 Define Transaction in DBMS.

3.10 Illustrate the ACID Properties of Transactions.

3.11 Illustrate Commit, Rollback, and Save Point.

3.12 Explain Serializability.

3.13 Give the States of Transactions.

4. Concept of SQL

4.1 Familiarize with SQL.

4.1.1 List the features of SQL

4.1.2 List the benefits of SQL

4.1.3 List the components of SQL

4.2 Give some pseudo columns in SQL

4.3 Describe various data types in SQL.

4.4 Explain Data Definition Language statements in SQL.

4.5 Explain Data Modification Language statements in SQL.

4.6 Implement some basic queries with examples in SQL.

4.7 Describe various operators in SQL

4.8 Explain the process of specifying constraints in SQL.

4.9 Explain different categories of SQL functions like numeric functions, aggregate functions, scalar functions, date functions and string functions in SQL.

5. Management of schema objects and Concept of PL/SQL

5.1 Implement sub queries with examples in SQL

5.2 Implement JOIN statements with examples in SQL.

5.3 Explain the management of schema objects.

5.4 Describe steps of managing indexes.

5.5 Explain the management of sequences like creating altering, dropping etc.

5.6 Explain the various synonyms management like creating, dropping etc.

5.7 Explain views and illustrate the creation of views from multiple tables.

5.8 Familiarize with PL/SQL.

5.9 Describe various data types in PL/SQL.

5.10 Explain various control statements in PL/SQL with examples.

5.11 List sequential control GOTO and NULL statements.

6. Advanced PL/SQL

6.1 Familiarize with PL/SQL records.

6.2 Define subprograms.

6.3 Develop PL/SQL programs using procedures.

6.4 Develop PL/SQL programs using functions.

6.5 Define recursion and explain recursion with example.

6.6 Describe about Stored Procedures.

6.7 Develop PL/SQL programs to handle exceptions.

6.8 Define Cursor and explain Cursors with examples.

6.9 Define Triggers and explain Triggers with examples.

6.10 Define Package and explain Packages with examples.

Suggested list of Student Activities

Note: The following activities or similar activities for assessing 2.5 credits (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

- Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme co-coordinator.
- Each group should conduct different activity and no repeating should occur.

1. Visit Library to refer to standard Books on Database Management Systems, collect related material and prepare notes.
2. Refer to online content and videos to get more knowledge on database concepts.
3. Study different types of databases in the industries and prepare a Power Point Presentation (PPT).
4. Write assignments given by course coordinator.
5. Read all the course contents and should be able to write slip tests and surprise tests.
6. Prepare a seminar on a specific topic that is related to latest technologies in the database field and present to all the peers.
7. Design a simple project using any one database.
8. Study IEEE papers on Bigdata, Datascience, DataMining topics and submit a report.
9. Prepare quiz on database related questions and conduct.
10. Participate in state level or national level technical conferences.

Recommended Books

1. "An Introduction to Database Systems" 8th edition by C J Date.
2. "DATABASE SYSTEM CONCEPTS" 6th edition by Abraham Silberschatz *Yale University*, Henry F. Korth *Lehigh University*, S. Sudarshan *Indian Institute of Technology, Bombay.*
3. "Fundamentals of Database Systems" Sixth edition, 2014, RamezElmasri, Shamkan B. Navathe, Pearson Education, ISBN- 9788131792476.
4. "Database Managemet Systems" Raghu Ramakrishnan and Johannes Gehrke-3rd Edition, McGraw-Hill, 2003.
5. "DBMS a practical approach" by E R Rajiv Chopra, S Chand publications.
6. "Database Systems: Design, Implementation, and Management", Eighth Edition by Peter Rob and Carlos Coronel.
7. "Database Systems *A Practical Approach to Design, Implementation, and Management" 6th* edition By Thomas Connolly, Carolyn Begg.

Suggested E-learning references.

1. https://www.w3schools.in/.
2. https://www.tutorialspoint.com/dbms
3. https://beginner-sql-tutorial.com/sql.htm.
4. www.nptel.ac.in .
5. http://www.sql-tutorial.net/

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Describe the characteristics of database, architecture and languages of Database system	**R,U, A**	**1,2,3,4,7**	**10**
CO2	Implement Entity-Relationship diagrams	**R,U, A**	**1,2,3,4,7**	**10**
CO3	Apply relational model concepts and constraints, Apply normalization techniques for relational databases and familiarize with data base transaction processing	**R,U, A**	**1,2,3,4,7**	**10**
CO4	Use Structured Query Language (SQL), frame queries to any database	**R,U, A**	**1,2,3,4,7**	**15**
CO5	Frame queries to any database, managing schema objects and familiarize with PL/SQL	**U, A**	**1,2,3,4,7**	**15**
CO6	Develop programs using PL/SQL	**R,U, A**	**1,2,3,4,7**	**15**
		Total Sessions		**75**

MID SEM – I Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM – II Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

<table>
<tr><th>S.No</th><th>Unit Name</th><th colspan="3">R</th><th>U</th><th>A</th><th>Remarks</th></tr>
<tr><td>1</td><td>Unit-I</td><td rowspan="6">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td></td></tr>
<tr><td>2</td><td>Unit-II</td><td></td></tr>
<tr><td>3</td><td>Unit-III</td><td colspan="2" rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">14(a)</td><td></td></tr>
<tr><td>4</td><td>Unit-IV</td><td></td></tr>
<tr><td>5</td><td>Unit-V</td><td rowspan="2">3</td><td>5,6</td><td>9(b)
11(a)
11(b)</td><td>13(b)
15(a)
15(b)</td><td></td></tr>
<tr><td>6</td><td>Unit-VI</td><td>7,8</td><td>10(b)
11(a)
11(b)</td><td>14(b)
16(a)
16(b)</td><td></td></tr>
<tr><td colspan="2">Total Questions</td><td colspan="3">8</td><td>8</td><td>8</td><td></td></tr>
</table>

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER-I EXAMINATION (C-21)
CS-402 – RELATIONAL DATABASE MANAGEMENT SYSTEMS

TIME: 1 HOUR **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

NOTE: 1. Answer all questions.

2. Each question carries one mark.

1. Define DBMS and list 3 applications of DBMS
2. Define Data Independence.
3. List some structural constraints.
4. Define Weak entity types.

PART-B ***MARKS: 2 X 3=6***

NOTE: 1. Answer any one question from 5 and 6.

2. Each question carries three marks.

5. (A) Describe Three-Schema Architecture.

   or

   (B) List some Database Models.

6. (A) Describe how to use High-Level Conceptual Data Models for Database Design.

   or

   (B) List different types of attributes and keys.

PART-C ***MARKS: 2 X 5=10***

NOTE: 1. Answer any one question from 7 and 8.

2. Each question carries five marks.

7. (A) List and explain, Database Languages and Interfaces

   or

   (B) Explain the Centralized and Client /Server Architectures for DBMSs.

8. (A) Explain a Database Application and list some Database applications.

   or

   (B) Demonstrate ER Diagram for University with a neat sketch.

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER-II EXAMINATION (C-21)
CS-402 – RELATIONAL DATABASE MANAGEMENT SYSTEMS

TIME: 1 HOURS **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

NOTE: 1. Answer all questions.

2. Each question carries one mark.

1. List some relational model concepts.
2. Define Functional dependency.
3. List the benefits of SQL.
4. Write the syntax to create a table in SQL.

PART-B ***MARKS: 2 X 3=6***

NOTE: 1. Answer any one question from 5 and 6.

2. Each question carries three marks.

5. (A) Describe Relational Database Schema.

   or

   (B) List the ACID Properties of Transactions.

6. (A) List some operators in SQL.

   or

   (B) Write about the features and benefits of PL/SQL.

PART-C ***MARKS: 2 X 5=10***

NOTE: 1. Answer any one question from 7 and 8.

2. Each question carries five marks.

7. (A) Explain Serializability with examples.

   or

   (B) Illustrate Commit, Rollback, and Save Point.

8. (A) Implement DDL statements in SQL with examples.

   or

   (B) Implement the aggregate functions and string functions in SQL.

MODEL QUESTION PAPER
BOARD DIPLOMA SEMESTER END EXAMINATION (C-21)
CS-402 – RELATIONAL DATABASE MANAGEMENT SYSTEMS

TIME: 2 HOURS **MAXIMUM MARKS: 40**

PART-A ***MARKS: 8 X 1=8***

NOTE: 1. Answer all questions.
2. Each question carries one mark.

1. Define Schemas, instances.
2. Define Update operation.
3. List the benefits of SQL.
4. List ACID properties.
5. List 3 data types in SQL.
6. Write the syntax to create a table in SQL.
7. List the types of subprograms in PL/SQL.
8. Define cursor.

PART-B

NOTE: 1. Answer any one question from 9, 10, 11 and 12. ***MARKS: 4 X 3=12***

2. Each question carries three marks.

9. (A) List different types of data models.

or

(B) List some operators in SQL.

10. (A) Describe relational database schema.

or

(B) List control statements in PL/SQL.

11. (A) List the types of schema objects.

or

(B) Write about managing indexes.

12. (A) Write about the features and benefits of PL/SQL.

or

(B) Write about sequential control GOTO and NULL statements in PL/SQL.

PART-C

NOTE: 1. Answer any one question from 13, 14, 15 and 16 ***MARKS: 4 X 5=20***

2. Each question carries five marks.

13. (A) List and explain Relation types.

or

(B) Implement DDL statements in SQL with examples.

14. (A) Implement different types of Normal Forms with examples.

or

(B) Develop PL/SQL program using recursive functions with an example.

15. (A) Implement the aggregate functions and string functions in SQL.

or

(B) Illustrate the creation of views from multiple tables with examples.

16. (A) Develop the concept of handling exceptions in PL/SQL with example program.

or

(B) Explain about numeric and date functions in PL/SQL with examples.

CS-403-JAVA PROGRAMMING

Course Title	Java Programming	Course Code	CS-403
Semester	IV	Course Group	Core
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Prerequisites

Knowledge of OOPs concepts and C, C++ Programming language concepts.

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Understand the basics of java programming concepts and develop simple console based applications.
CO2	Develop java programs using Inheritance and interfaces.
CO3	Create user-defined packages and explore classes and interfaces within io, util packages.
CO4	Develop Applet programs and Handle events generated by AWT controls to perform various actions.
CO5	Interpret different types of Exceptions and Handle Exceptions and multi threading concept
CO6	Develop database applications to interact with different types of databases using JDBC and Develop server side programs using Servlets.

Course Contents

1. **Introduction of Java:**

Duration:10 Periods

Fundamentals of Object Oriented Programming- Introduction - Object oriented Paradigm - Basic Concepts of OOP - Java history - Java Features - How Java Differs from C and C++- Java Program Structure - Simple Java Program - Java Tokens – Java data types – variables - type casting- arrays - operators - selection statements – iteration statements – jump, break, and continue statements -classes and objects-constructors - method

overloading- ‘this’ pointer-static and final members-string classes and methods-command-line arguments.

2. **Inheritance and Interfaces:**

Duration: 10 Periods

Inheritance and its types - different types of inheritance with examples- super keyword-method overriding - avoid overriding using ‘final’- Interfaces - class vs interface - extending and implementing interfaces - scope of variables in interfaces - multiple inheritance using interface.

3. **Packages:**

Duration: 10 Periods

Packages - Introduction, Java API Packages- Using System Packages, Naming Conventions – Creating packages – Accessing a Package – Using a package – Adding a class to a package - importing packages - exploring io, util packages - stream classes.

4. **Concepts of Applets, AWT and Event handling**

Duration: 15 Periods

Applet - life cycle of an Applet - creation of Applets - AWT classes - AWT controls – Handling events - Delegation Event model - Event Classes and Event Listener interfaces-Mouse and Keyboard events.

5. **Exception Handling and Multithreaded programming:**

Duration: 15 Periods

types of errors - exceptions and types of Exceptions - general form of exception-handling block - Multi-catch statements - Nested try statements - user-defined exceptions - Define thread – life cycle of thread - Creating Threads- Multi threading - Using Thread Methods - Thread priority –Synchronization- isAlive( ), join( ), suspend( ), resume( ) methods - Inter thread communication – Dead locks

4.1 JDBC and Servlets

Duration: 15 Periods

JDBC - JDBC Architecture - establish connection to database - statements used in jdbc-ResultSet - DDL and DML programs using jdbc - Servlet - life cycle of servlet - java servlet development kit - javax.servlet package- HTTP request and responses.

Recommended Books

1. Programming with Java, 6th edition, Balagurusamy, Mc Graw Hill, ISBN 13-9789351343202 ISB 10- 9351343200
2. Complete Reference Java J2se, Herbert Schildt, Tata McGraw Hill, ISBN 9780070598782
3. Java 6 Programming – Black Book Wiley India Pvt ltd
4. Programming in JAVA2 – Dr. K. Somasundaram Jaico Publish
5. Programming in JAVA – S.S. Khandare – S. Chand Publish
6. "Head First Java", Kathy Sierra, Bert Bates, O'Reilly.
7. 'Effective Java: A Programming Language Guide' (Java Series) 2nd Edition, by Joshua Bloch Sun copyright.
8. Mastering Java Machine Learning Paperback -Uday Kamath,Krishna Choppella, Packt publishers.
9. Core Java Volume I--Fundamentals Eleventh Edition by Cay S. Horstmann Pearson publications.
10. Java: A Beginner's Guide, Seventh Edition Paperback – by Herbert Schildt -Oracle press
11. "The Complete Reference Java2 (Third Edition)", Patrick Naughton-Herbert Sheild, Tata McGraw hill.
12. "Advance JAVA", Kogent learning Solution, DreamTech Press.
13. "Java2 Unleased", Jawroski, Techmedia.
14. "Java2 Programming", Keyur Shah, Tata McGraw.
15. "Java EE6 for Beginners", Sharnam Shah &Vaishali Shah, SPD.
16. "Java Server Programming Black book" , Kogent learning Solution, DreamTech Press.
17. "Java Database Programming with JDBC" by Pratik Patel - The Coriolis Group.

Specific Learning Outcomes:

Upon completion of the course the student shall be able to

1 Introduction of Java

1.1 Explain the basic concepts of OOP

1.2 Write about Java History

1.3 Explain the features of Java

1.4 Compare Java with C and C++.

1.5 Write the structure of Java program with an example program.

1.6 Describe java tokens -white space, literals, separators, keywords.

1.7 Explain java datatypes

1.8 Write about declaration and initialization of variables.

1.9 Perform type conversion and casting features.

1.10 Use one-dimensional and two–dimensional arrays.

1.11 Explain various types of operators.

1.12 Explain about selection and iteration statements of Java.

1.13 Write the syntax of jump, break, and continue statements.

1.14 Create classes and objects.

1.15 Explain about constructors.

1.16 Explain method overloading.

1.17 Use of ‘this’ pointer.

1.18 Explain the working of static and final members.

1.19 Explain string classes and methods.

1.20 Describe the use of command-line arguments.

2 Inheritance and Interfaces

2.1 Define Inheritance and its types.

2.2 Explain different types of inheritance with examples.

2.3 Use of super keyword.

2.4 Explain method overriding and how to avoid overriding using ‘final’.

2.5 Define an Interface and explain the concept of Interfaces.

2.6 Compare class and interface.

2.7 Explain about extending interfaces.

2.8 Explain the concept of implementing interfaces.

2.9 Explain the scope of variables in interfaces.

2.10 Explain multiple inheritance using the concept of interface.

3 Packages

3.1 Define a package.

3.2 Explain about java API packages.

3.3 Describe the concept of class path.

3.4 Describe the concept of Access specifiers.

3.5 Explain the concept of creating, accessing and using a package and subpackages.

3.6 Appreciate the concept of importing packages.

3.7 Exploring io, util packages.

3.8 Explain various stream classes.

4 Concepts of Applets, AWT and Event handling

4.1 Define Applet and life cycle of an Applet.

4.2 Explain the creation of Applets with example programs.

4.3 List and discuss AWT classes

4.4 Describe AWT controls with example programs

4.5 Explain Event handling mechanism and Delegation Event model.

4.6 Explain sources of Events

4.7 Event Classes and Event Listener interfaces.

4.8 Explain Mouse and Keyboard events.

5 Exception Handling and Multithreaded Programming

5.1 Explain the types of errors.

5.2 Explain how to deal with exceptions and types of Exceptions.

5.3 Explain the general form of exception-handling block.

5.4 Explain the concept of Multi-catch statements with example programs.

5.5 Explain Nested try statements

5.6 Explain throw and throws clauses.

5.7 Explain creation of user-defined exceptions

5.8 Define Thread and life cycle of a thread

5.9 Discuss about thread priorities.

5.10 Explain the process of creating thread using Thread class and Runnable interface.

5.11 Write about the creation of multiple threads.

5.12 Explain the concept of synchronization

5.13 Describe isAlive(), join(), suspend(), resume() methods.

5.14 Explain Inter thread communication.

5.15 Discuss dead lock with example programs.

6 JDBC and Servlets

6.1 Know about JDBC and understand JDBC Architecture.

6.2 Explain how to establish connection to database.

6.3 Implement Simple Application and execute query.

6.4 Explain different statements used in jdbc.

6.5 Discuss about ResultSet.

6.6 DDL and DML programs using jdbc.

6.7 Define servlet and explain the life cycle of servlet.

6.8 Discuss about java servlet development kit.

6.9 Understand javax.servlet package and create simple servlet.

6.10 Handling HTTP request and responses with example programs.

Suggested Student Activities

Note: The following activities or similar activities for assessing 2.5 credits (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

- Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme co-coordinator.
- Each group should conduct different activity and no repeating should occur.
  1. Study different Integrated Development Environments (IDEs) available for executing java programs and prepare a report.
  2. Develop some simple window based applications like notepad, calculator etc using AWT and Swing components.
  3. Visit Library to refer to standard Books on core Java and Advanced java concepts, collect related material and prepare notes.
  4. Refer to online content and videos to get more knowledge on database concepts.
  5. Interact with industry people who are working in java and advanced java technologies and prepare a report.
  6. Write assignments given by course coordinator.
  7. Read all the course contents and should be able to write slip tests and surprise tests.
  8. Prepare a seminar on a specific topic that is related to latest technologies in the java and advanced java concepts and present a Power Point Presentation (PPT) to all the peers.
  9. Study IEEE papers on advanced java topics and submit a report.
  10. Prepare quiz on java course related questions and conduct.
  11. Participate in state level or national level technical conferences.
  12. Participate in various technical coding competitions related to java programming.
  13. Develop some projects to design websites like Hotel Management System, E-Bill Board, Online insurance, Online Mobile, Contributor, Online Restaurant, Public Distribution System, Secure E-banking security, District medical data centre using JDBC and Servlet and JSP concepts.

Suggested E-learning references

1. https://www.w3schools.in/java-tutorial/
2. https://www.udemy.com/advanced-java-programming/
3. https://www.roseindia.net/java/Advanced-Java-Tutorials.shtml

4. http://www.javalearner.com/advanced.htm
5. https://www.studytonight.com
6. http://www.Javatpoint.com/Java-tutorial
7. http://www.tutorialspoint.com/Java/
8. http://www.indiabix.com/technical/core-Java/
9. https://www.geeksforgeeks.org/java/

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Understand the basics of java programming concepts and develop simple console based applications.	**R,U, A**	**1,2,3,4,7**	**10**
CO2	Develop java programs using Inheritance and interfaces.	**R,U, A**	**1,2,3,4,7**	**10**
CO3	Create user-defined packages and explore classes and interfaces within io, util packages.	**R,U, A**	**1,2,3,4,7**	**10**
CO4	Develop Applet programs and Handle events generated by AWT controls to perform various actions.	**R,U, A**	**1,2,3,4,7**	**15**
CO5	Interpret different types of Exceptions and Handle Exceptions and multi threading concept	**R,U, A**	**1,2,3,4,7**	**15**
CO6	Develop database applications to interact with different types of databases using JDBC and Develop server side programs using Servlets.	**R,U, A**	**1,2,3,4,7**	**15**
		Total Sessions		**60**

MID SEM – I Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM – II Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

<table>
<tr><th>S.No</th><th>Unit Name</th><th colspan="3">R</th><th>U</th><th>A</th><th>Remarks</th></tr>
<tr><td>1</td><td>Unit-I</td><td rowspan="6">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td></td></tr>
<tr><td>2</td><td>Unit-II</td><td></td></tr>
<tr><td>3</td><td>Unit-III</td><td colspan="2" rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">14(a)</td><td></td></tr>
<tr><td>4</td><td>Unit-IV</td><td></td></tr>
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11(a)
11(b)</td><td>13(b)
15(a)
15(b)</td><td></td></tr>
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11(a)
11(b)</td><td>14(b)
16(a)
16(b)</td><td></td></tr>
<tr><td colspan="2">Total Questions</td><td colspan="3">8</td><td>8</td><td>8</td><td></td></tr>
</table>

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

MODEL QUESTION PAPER

BOARD DIPLOMA MID SEM-I SEMESTER EXAMINATIONS (C-21)

CS-403 - JAVA PROGRAMMING

Duration : 1 Hour **Maximum Marks: 20**

PART-A

Instructions: **(1) Answer all questions.** **4x1 = 4 Marks**

(2) Each question carries *one* mark.

1) List out any four keywords of java
2) Compare Java & C++
3) Define inheritance.
4) What is 'super' keyword.

PART-B **2×3=6 Marks**

Instructions: **(1) Answer *one* question each from 5 and 6**
(2)Each Question is of internal choice type
(3)Each question carries *three* marks.

5(a) Describe the java data types.

(OR)

5(b) Describe string classes and methods.

6(a) Compare class and interface.

(OR)

6(b) Briefly explain scope of variables in interfaces.

PART-C **2×5=10 Marks**

Instructions: **(1) Answer one question each from 7 and 8.**
(2)Each Question is of internal choice type
(3)Each question carries *five* marks.

7(a) Develop a java program using static and final variables.

(OR)

7(b) Explain the structure of java with an example program.

8(a) Explain the concept of interfaces with an example program.

(OR)

8(b) Develop a java program to implement multiple inheritance through interfaces.

MODEL QUESTION PAPER

BOARD DIPLOMA MID SEM-II SEMESTER EXAMINATIONS (C-21)

CS-403 - JAVA PROGRAMMING

Duration : 1 Hour **Maximum Marks: 20**

PART-A

Instructions: **(1) Answer all questions.** **4x1 = 4 Marks**

(2) Each question carries *one* mark.

1) Define package.
2) Write the syntax to import a package.
3) Define Applet.
4) What is Delegation Event Model?

PART-B **2×3=6 Marks**

Instructions: **(1) Answer *one* question each from 5 and 6**
(2)Each Question is of internal choice type
(3)Each question carries *three* marks.

5(a) Explain the steps to create a package.

(OR)

5(b) Explore some classes in util package.

6(a) Demonstrate life cycle an Applet.

(OR)

6(b) List and discuss AWT classes.

PART-C **2×5=10 Marks**

Instructions: **(1) Answer one question each from 7 and 8.**
(2)Each Question is of internal choice type
(3)Each question carries *five* marks.

7(a) Describe the concept of creating and accessing a package with an example program.

(OR)

7(b) Write a java program using to read data from a file using BufferedReader class

8(a) Create an applet to draw graphics.

(OR)

8(b) Explain to handle Mouse events with an example program.

MODEL QUESTION PAPER

BOARD DIPLOMA SEMESTER END EXAMINATION (C-21)

CS-403 - JAVA PROGRAMMING

Duration : 2 Hours **Maximum Marks: 40**

PART-A

Instructions: **(1) Answer all questions.** **8x1 = 8 Marks**

(2) Each question carries *one* mark.

1) Write the syntax to declare a variable.
2) List out java API packages.
3) Define multithreading.
4) List the uses of final keyword.
5) List the types of errors.
6) Define inter thread communication.
7) Define JDBC.
8) Define Servlet.

PART-B **4×3=12 Marks**

Instructions: **(1) Answer *one* question each from 9,10,11 and 12.**
(2)Each Question is of internal choice type
(3)Each question carries *three* marks.

9(a) Describe the use of command line arguments.

(OR)

9(b) Discuss about thread priorities.

10(a) Describe the concept of class path.

(OR)

10(b) List different types of JDBC drivers.

11a) What is synchronization? When do we use it?

(OR)

11(b) Demonstrate life cycle of a thread.

12(a) Discuss about Resultset.

(OR)

12(b) List some classes in javax.servlet package.

PART-C **4×5=20 Marks**

Instructions: **(1) Answer one question each from 13,14, 15 and 16.**
(2)Each Question is of internal choice type
(3)Each question carries *five* marks.

13(a) Write a java program using constructor.

(OR)

13(b) Explain the process of creating thread using Runnable interface.

14(a) Write a java program to handle keyboard events.

(OR)

14(b) Develop a java application to establish a connection to database.

15(a) Explain the concept of multi-catch statements with example programs.

(OR)

15(b) Explain deadlock with an example program.

16(a) Write a java program to insert update and delete data from a database.

(OR)

16(b) Develop a java program to handle HTTP requests.

CS-404-Computer Hardware & Networking

Course Title	Computer Hardware & Networking	Course Code	CS-404
SEMESTER	IV	Course Group	Core
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Prerequisites

Knowledge of PC components

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Identify the PC components
CO2	Learn different system boards, Processors, Memories and Mass storage devices
CO3	Learn Input and Output devices
CO4	Learn Networking Basics & Topologies
CO5	Understand LAN Components & Protocols
CO6	Understand Network Addressing and Management

COURSE CONTENTS

1. PC hardware and its Components.

PC Hardware and software - Importance of BIOS - BIOS hardware interaction - BIOS functions (i) POST, (ii) Bootstrap loading - Configuration of a general purpose computer - Identification of various components on the motherboard.

2. System Board, Processors, Memories and Mass storage devices

- **Mother Board**

Motherboards based on the form factor : such as AT, ATX, micro ATX, mini ATX, Baby AT, BTX, NLX etc., - Various components on motherboard - Various I/O ports available on motherboard – SMPS - Importance of SMPS over linear voltage power supply - Connectors from SMPS and voltage levels of each wire in various connectors based on the standard color of the wire

- **Processors**

Various processors used in the system : INTEL P4, Celeron, XEON, Itanium processors, AMD Athlon, Dual core, Core 2 Duo, Quad core, Octa-core and i-series (i3,i5, i7 and i9) – Chipset - INTEL chipsets 915,945,955, 965, 975 - AMD chipsets - Processor sockets Like ZIF, SEC, LGA, PGA, BGA.

- **Memories**

RAM - Static and Dynamic RAM - RAM types - SDRAM (Synchronous DRAM), **Asynchronous DRAM,** DDR1, DDR2, DDR3 and DDR4 (1-4) RAM, Rambus RAM - SIMM and DIMM - RAM Slots – Up gradation of RAM – Cache Memory – L1, L2 and L3 Cache

- **Mass storage devices**

Hard Disk drive – Construction details of Hard disk drive - Jumper settings - Hard disk interfacings standards like IDE / EIDE / PATA / SCSI / SATA – Optical disk drives - CD-ROM, CD-RW, Combo Drive - DVD-ROM, DVD-RW, and Blu-ray drives – Pen Drive – Solid State Drives (SSD).

3. Study of Input and Output Devices

- **Input Devices**

Various input devices used with a general purpose computer -Working principle of Keyboard (Wired & Wireless Keyboard) - Working principle of Opto-mechanical mouse and Optical Mouse (Wired & wireless Mouse) - Various scanners - Working of Flat bed scanner and Hand held scanner – Webcam.

- **Output Devices**

Various Output devices used with a general purpose computer - Working principle of CRT Monitor - Working principle of LCD/TFT/LED/OLED Monitors - Categories of printers (Impact and Non-Impact) - Working principle of Dot matrix printer, Inkjet printer, Laser printer - Multi-Function printer

4. Introduction to Networking Basics & Topologies

Overview of Networking - Need for Networking. - Classification of Networks –LAN, MAN, WAN - Hardware and Software Components of Computer Network - Overview of Network Topologies - Network Topologies such as Bus, Ring and Star and Complex topologies like

Mesh and Hybrid Topologies - Various Network Communication Standards - OSI Reference Model - TCP/IP Reference Model.

5. LAN components and Protocols

LAN Connectors, Wireless Network adapter - Coaxial Cables, Twisted-Pair Cables, Optical Fiber Cables - Connectors - Preparation of straight and cross cable – Ethernet - LAN Devices – Repeaters, Hubs, Switches, Bridges, Gateways, Network Interface Cards (NICs), Routers, MODEM (56KBPS Internal/External, DSL/ADSL Modems etc.), Access Point - WLANs (Wireless LAN) - Protocols in computer networks - Hyper Text Transfer Protocol (HTTP), Hyper Text Transfer Protocol Secure (HTTPS), File Transfer Protocol (FTP), Simple Mail Transfer Protocol (SMTP), Telnet

6. Network Addressing and Management

Network Addressing - TCP/IP Addressing Scheme - Components of IP Address - IP Address Classes - Internet Protocol addressing IPv4 - Classful addressing and classless addressing in IPv4 - IP Subnetting - Need for IPv6 - Internet protocol version-6 (IPv6) addressing - Wi-fi networking standards and encryption types - Overview of Network Management - ISO Network Management Model - Network Monitoring and Troubleshooting - Networking troubleshooting tools - Simple Network Management Protocol (SNMP) - Remote Monitoring (RMON).

Recommended Books

1. Enhanced Guide to Managing And Maintaining Your PC - Jean Andrews, (Thomson)
2. PC Hardware A Beginners Guide -- Gilster (TMH)
3. Trouble Shooting Your PC -- Stone & poor, Microsoft Press
4. PC Upgrading -- Stephen Bigelow (TMH)
5. Basics of Networking -- NIIT PHI publications
6. Computer Networks -- Andrew S. Tanenbaum, PRENTICE HALL

Specific Learning Outcomes:

Upon completion of the course the student shall be able to

1.0 Understand PC hardware and its Components.

1.1 Explain PC Hardware and software

1.2 State the importance of BIOS

1.3 Describe the BIOS hardware interaction

1.4 Explain the BIOS functions (i) POST, (ii) Bootstrap loading

1.5 State the configuration of a general purpose computer.

1.6 Identify Mother board, Processor, Chipset, SMPS, Disk Drives, RAM,ISA/EISA, PCI, IDE slots, RAM slots, AGP Slot, Mouse, Keyboard connector, Monitor connector (VGA Port), Printer connector, Speaker connector, USB ports, Parallel port, Serial Port, and Modem of the system.

2.0 System Board, Processors, Memories and Mass storage devices

2.1 Mother Board

2.1.1 Explain various motherboards based on the form factor : such as AT, ATX, micro ATX, mini ATX, Baby AT, BTX, NLX etc.,

2.1.2 List various components on motherboard.

2.1.3 List the I/O ports available on motherboard

2.1.4 Explain SMPS

2.1.5 State the importance of SMPS over linear voltage power supply

2.1.6 Know the connectors from SMPS and list the voltage levels of each wire in various connectors based on the standard color of the wire

2.2 Processors

2.2.1 Describe various processors used in the system : INTEL P4, Celeron, XEON, Itanium processors, AMD Athlon, Dual core, Core 2 Duo, Quad core, Octa-core and i-series (i3,i5, i7 and i9).

2.2.2 Define chipset.

2.2.2.1 Explain the INTEL chipsets 915,945,955, 965, 975

2.2.2.2 List the AMD chipsets

2.2.3 State different processor sockets Like ZIF, SEC, LGA, PGA, BGA.

2.3 Memories

2.3.1 Define the static and dynamic RAM.

2.3.2 Explain RAM types - SDRAM (Synchronous DRAM), **Asynchronous DRAM,** DDR1, DDR2, DDR3 and DDR4 (1-4) RAM, Rambus RAM

2.3.3 Know about SIMM and DIMM

2.3.4 Explain RAM Slots

2.3.5 Explain the procedure to upgrade RAM capacity of the system by adding additional RAMs

2.3.6 Define Cache memory and explain how it improves the performance of memory.

2.3.7 Define L1, L2 and L3 cache and their locations.

2.4 Mass storage devices

2.4.1 List the different Mass Storage devices.

2.4.2 Give the constructional details and working of a Hard disk Drive

2.4.3 Explain the importance of jumper settings of Hard Disk drive and give details of it

2.4.4 Familiarize with hard disk interfacings standards like IDE / EIDE / PATA /

2.4.5 SCSI / SATA

2.4.6 Know about various optical disk drives like CD-ROM, CD-RW, Combo Drive, DVD-ROM, DVD-RW, and Blu-ray drives.

2.4.7 Explain the process of reading and writing of data on various disk drives like CD- ROM, CD- Writer, DVD Drive and Blu-Ray Disk drive etc.

2.4.8 Explain the working principle of a Pen drive

2.4.9 Know about Solid-**State Drives (SSD)**

3.0 Study of Input and Output Devices

- **Input Devices**

3.1 List the various Input devices used with a general purpose computer

3.2 Explain the working principle of Keyboard (Wired & Wireless Keyboard)

3.3 Discuss the working principle of Opto-mechanical mouse and Optical Mouse (Wired & wireless Mouse)

3.4 List the various scanners

3.5 Explain the working of flat bed scanner and hand held scanner.

3.6 Explain the working of a Webcam

- **Output Devices**

3.7 List the various Output devices used with a general purpose computer

3.8 Describe the working principle of CRT Monitor

3.9 Describe the working principle of LCD/TFT/LED/OLED Monitors

3.10 Describe different categories of printers (Impact and Non-Impact)

3.11 Describe the working principle of Dot matrix printer

3.12 Describe the working principle of inkjet printer

3.13 Describe the working principle of Laser printer

3.14 Know about Multi-Function printer

4.0 **Introduction to Networks and Network Topologies**

4.1 Understand the Overview of Networking.

4.2 State the Need for Networking.

4.3 Classification of Networks –LAN, MAN, WAN

4.4 List the Hardware and Software Components of Computer Network

4.5 Overview of Network Topologies.

4.6 Understand the basic Network Topologies such as Bus, Ring and Star and Complex topologies like Mesh and Hybrid Topologies.

4.7 Various Network Communication Standards.

4.8 OSI Reference Model.

4.9 TCP/IP Reference Model.

5.0 **LAN components and Protocols**

5.1 Know about LAN Connectors, wireless network adapter

5.2 Know about Coaxial Cables, Twisted-Pair Cables, Optical Fiber Cables, and connectors used in Networking.

5.2.1 Know the Preparation of straight and cross cable

5.3 Know about Ethernet

5.4 Explain LAN Devices

5.4.1 Repeaters

5.4.2 Hubs

5.4.3 Switches

5.4.4 Bridges

5.4.5 Gateways

5.4.6 Network Interface Cards (NICs)

5.4.7 Routers

5.4.8 MODEM (56KBPS Internal/External, DSL/ADSL Modems etc.)

5.4.9 Access Point

5.5 Explain WLANs (Wireless LAN)

5.6 State the need for protocols in computer networks.

5.7 Know about protocols

5.7.1 Hyper Text Transfer Protocol (HTTP)

5.7.2 Hyper Text Transfer Protocol Secure (HTTPS)

5.7.3 File Transfer Protocol (FTP)

5.7.4 Simple Mail Transfer Protocol (SMTP)

5.7.5 Telnet

6.0 Network Addressing and Management

6.1 Introduction to Network Addressing.

6.2 Know about TCP/IP Addressing Scheme.

6.2.1 Components of IP Address.

6.2.2 IP Address Classes.

6.2.3 Classify the Internet Protocol addressing IPv4

6.2.4 Explain classful addressing and classless addressing in IPv4.

6.2.5 Know about IP Subnetting

6.2.6 State the need for IPv6.

6.2.7 Describe Internet protocol version-6 (IPv6) addressing.

6.3 Know about Wi-fi networking standards and encryption types.

6.4 Understand the Overview of Network Management.

6.5 Understand the Model of ISO Network Management

6.6 Understand the Network Monitoring and Troubleshooting.

6.7 Networking troubleshooting tools

6.8 Learn about Simple Network Management Protocol (SNMP).

6.9 Explain how SNMP works.

6.10 Know about Remote Monitoring (RMON).

Suggested Activities

Student activity like mini-project, quizzes, etc. should be done in group of 5-10 students.

1. Each group should do any one of the following type of activity or any other similar activity related to the course with prior approval from the course coordinator and program coordinator concerned.
2. Each group should conduct different activity and no repetition should occur.
3. Explore and analyse topics to improve the level of creativity and analytical skill by taking Quiz/ tests/ assignments. Documents have to be maintained as a record.
4. Create a power point presentation on the topic relevant to course or advanced topic as an extension to the course to improve the communication skills. Documents have to be maintained as a record.
5. Visit different sites relevant to topics. Listen to the lectures and submit a handwritten report
6. Coding competitions

Suggested E-learning references

1. https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
2. http://www.garfieldcs.com/wordpress/wordpress/wp-content/uploads/2011/09/Computer-Hardware-Basics.pdf
3. https://abiiid.files.wordpress.com/2010/12/pc-hardware-a-beginners-guide.pdf
4. https://www.tutorialspoint.com/computer_fundamentals/computer_networking.htm
5. https://www.tutorialspoint.com/communication_technologies/communication_technologies_network_topologies.htm
6. https://www.tutorialspoint.com/ipv4/index.htm
7. https://www.computerhope.com/

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Identify the PC components	**R**	**1,2,3,4**	**5**
CO2	Learn different system boards, Processors, Memories and Mass storage devices	**R,U,A**	**1,2,3,4**	**15**
CO3	Learn Input and Output devices	**R,U,A**	**1,2,3,4**	**10**
CO4	Learn Networking Basics & Topologies	**R,U,A**	**1,2,3,4**	**10**
CO5	Understand LAN Components & Protocols	**R,U,A**	**1,2,3,4**	**10**
CO6	Understand Network Addressing and Management	**R,U,A**	**1,2,3,4**	**10**
		Total Sessions		**60**

MID SEM – I Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM – II Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

<table>
<tr><th>S.No</th><th>Unit Name</th><th colspan="3">R</th><th>U</th><th>A</th><th>Remarks</th></tr>
<tr><td>1</td><td>Unit-I</td><td rowspan="6">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td></td></tr>
<tr><td>2</td><td>Unit-II</td><td></td></tr>
<tr><td>3</td><td>Unit-III</td><td colspan="2" rowspan="2">2</td><td rowspan="2">10(a)</td><td rowspan="2">14(a)</td><td></td></tr>
<tr><td>4</td><td>Unit-IV</td><td></td></tr>
<tr><td>5</td><td>Unit-V</td><td rowspan="2">3</td><td>5,6</td><td>9(b)
11(a)
11(b)</td><td>13(b)
15(a)
15(b)</td><td></td></tr>
<tr><td>6</td><td>Unit-VI</td><td>7,8</td><td>10(b)
11(a)
11(b)</td><td>14(b)
16(a)
16(b)</td><td></td></tr>
<tr><td colspan="2">Total Questions</td><td colspan="3">8</td><td>8</td><td>8</td><td></td></tr>
</table>

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

CS-404, IV Semester, Computer Hardware & Networking

MID EXAM - I MODEL QUESTION PAPER

Time: 1 hour **Max. Marks: 20**

PART-A

Answer <u>All</u> questions. Each carries 1 marks. **4X1=4 Marks**

1. What is BIOS?

2. List any four Components on Mother board.

3. Define Hardware and Software.

4. What is SATA?

PART-B

Answer <u>TWO</u> questions out of Four questions. Each carries 3marks. **2X3=6 Marks**

5(a). Write about Bootstrap Loading (OR)

5(b) Write the configuration of General Purpose computer

6(a) Distinguish between dual core and core2 duo (OR)

6(b). Write any two differences between static RAM and dynamic RAM

PART-C

Answer <u>TWO</u> questions out of four questions. Each carries 5 marks. **2X5 =10Marks**

7(a) Explain the BIOS function POST (OR)

7(b) Explain Chipset.

8(a) Explain different motherboard types (OR)

8(b) Write about processor sockets (a) LGA (b) PGA

CS-404, IV Semester

STATE BOARD OF TECHNICAL EDUCATION & TRAINING:TS:HYDERABD

CS-404, IV Semester, Computer Hardware & Networking

MID EXAM - II MODEL QUESTION PAPER

Time: 1 hour **Max. Marks:20**

PART-A

Answer All questions. Each carries 1 marks. **4X1=4 Marks**

1. Define MAN.
2. What is the need of networking?
3. List any four out put devices.
4. What is an opto mechanical mouse?

PART-B

Answer TWO questions out of Four questions. Each carries 3marks. **2X3=6Marks**

5(a) Write any two differences between impact and non impact printers (OR)

5(b) Write about router.

6(a) Write any three differences between Switch and Hub (OR)

6(b) List any three LAN protocols.

PART-C

Answer TWO questions out of Four questions. Each carries 5 marks. **2X5=10Marks**

7(a) Explain about Multi-Function Printer (OR)

7(b) Explain the classification of LAN, WAN and MAN

8(a) Explain the working principle of LED Monitor (OR)

8(b) Explain ISO/OSI reference Model.

C21-Semester End Examination (SEE)

Model Paper- CS-404, IV Semester, (Computer Hardware & Networking)

Time: 2 Hours **Total Marks: 40**

PART – A

Instructions: **8 X 1 M = 8 Marks**

1. Answer all the following questions:

ii) Each question carries two marks

1. What is POST?
2. What is the need of networking?
3. What is TCP/IP ?
4. Write any two differences between IPV4 and IPV6
5. What is Wi-Fi ?
6. What is HTTPS ?
7. What is SNMP ?
8. What is Bridge in Computer networking ?

PART – B **4X3=12Marks**

Answer any 2 questions from each group

9(a). Explain working principle of flat bed scanner (OR)

(OR)

9(b). Define Cache memory and explain how it improves the performance of PC

10(a). Explain MODEM (OR)

10(b). List any six LAN connectors.

11(a) Write about Access Point (OR)

11(b) Write about Telnet

12(a) Write about Wi-fi networking standards (OR)

12(b) Write about Subnetting.

PART – C **4X5=20Marks**

Answer any Two questions from each group

13(a) Explain about any two mother board components (OR)

13(b) Explain about any four I/O ports available on Motherboard.

14(a) Explain about IP Classes (OR)

14(b) Explain about IPv6.

15(a) Explain about network cables (a) Coaxial Cables (b) Fiber optic Cables (OR)

15(b) Write the procedure for Preparation of straight and cross cable

16(a) Explain about any two Network trouble shooting tools. (OR)

16(b) ISO Network Management Model

CS-405-OPERATING SYSTEMS

Course Title	Operating Systems	Course Code	CS-405
Semester	IV	Course Group	Core
Teaching Scheme in periods (L : T : P)	4:1:0	Credits	3
Methodology	Lecture + Tutorial	Total Contact Periods	75
CIE	60 Marks	SEE	40 Marks

Prerequisites

Basic knowledge of computer and windows operating system.

Course Outcomes

Upon completion of the course the student shall be able to

Course Outcome	
CO1	Describe operating system functions, operations and structures.
CO2	Manage process with various process scheduling algorithms.
CO3	Recognize Synchronization and handle the deadlocks with various deadlock management techniques.
CO4	Explain the memory management techniques.
CO5	Implement virtualization of memory.
CO6	Handle files using file Management techniques.

Course Contents

1. **Introduction to operating systems**

Duration: 08 Periods

Operating System –Evolution of operating system-Types of Operating Systems - Multi Programming and Time Sharing - Distributed and Real time Systems-Goals of Operating System - spooling and buffering - Multi processor systems-Components of Operating Systems - operating System Services - system Calls - single User and Multi user operating System Structure.

2. Process management

Duration: 15 Periods

Process - Process State Diagram - Process Control Block - Process Creation and Termination - Relations between Processes - Threads and Multi Threading - Scheduling Concepts - Schedulers - CPU scheduling criteria - scheduling algorithms.

3. **Synchronization & Deadlocks**

Duration: 10 Periods

Inter Process Communications - semaphores – monitors - Deadlocks - principal of deadlock – Necessary conditions for deadlock - deadlock detection - deadlock prevention - deadlock avoidance.

4. Memory management

Duration: 10 Periods

Address binding -Dynamic Loading- dynamic linking-overlays-swapping- memory allocation-fragmentation-paging-segmentation- segmentation with paging.

5. Virtual memory management

Duration: 08 Periods

Benefits of virtual memory - virtual memory techniques - demand paging - page replacements - page replacement algorithms – thrashing.

6. Disk scheduling and File management

Duration: 09 Periods

Disk performance parameters - Disk scheduling policies - Introduction to file systems - File management - File Operations - Access methods - Directory structure organization - File Protection.

Text Books

1. "Operating System", Willam Stallings, PHI.
2. “Operating System Concepts”, Abraham Silberschatz, Professor, Greg Gagne, and Peter Baer Galvin.
3. “Modern operating system”, Andrew S. Tanenbaum, Pearson education.

Suggested Learning Outcomes:

Upon completion of the course the student shall be able to

1.0 Introduction to operating systems

1.1 Define an operating system.

1.2 Discuss history of operating system.

1.3 Distinguish spooling and buffering.

1.4 Discuss Goals of Operating systems

1.5 Discuss about various types of operating systems.

1.6 Explain the concepts multiprogramming and timesharing.

1.7 Differentiate between distributed and real time systems.

1.8 Describe multiprocessor systems.

1.9 Understand the operating system components.

1.10 Discuss operating system services.

1.11 Define system call with an example.

1.12 List different types of system calls.

1.13 Define single user, multi user operating system structure.

2.0 Process management

2.1 Define process and process control block.

2.2 Understand process state diagram.

2.3 Describe process creation and termination.

2.4 Understand the relation between processes.

2.5 Define Thread and describe multithreading.

2.6 Explain scheduling concepts.

2.7 Describe scheduling queues and schedulers.

2.8 Explain CPU scheduling criteria.

2.9 Explain various scheduling algorithms

- 2.9.1 FCFS
- 2.9.2 SJF
- 2.9.3 Round Robin
- 2.9.4 Priority
- 2.9.5 Multilevel Scheduling.
- 2.9.6 Multilevel Feedback Scheduling

3.0 Synchronization & Deadlocks

3.1 Explain inter process communication.

3.2 Describe semaphores

3.3 Describe Monitors

3.4 Define Deadlock.

3.5 State the necessary conditions for arising deadlocks.

3.6 State various techniques for deadlock prevention.

3.7 Discuss Deadlock avoidance and detection.

3.8 Describe the process of recovering from deadlock.

4.0 Memory management

4.1 Describe briefly address binding, dynamic loading, dynamic linking.

4.2 Define overlays

4.3 Describe briefly swapping.

4.4 Explain single partition allocation.

4.5 Explain multiple partition allocation.

4.6 Explain the concept of fragmentation.

4.7 Explain paging concept.

4.8 Explain how logical address is translated into physical address.

4.9 Explain segmentation and segmentation with paging.

5.0 Virtual memory management

5.1 Define virtual memory techniques.

5.2 Describe demand paging.

5.3 Describe page replacement

5.4 Discuss on page replacement algorithms

- 5.4.1 FIFO
- 5.4.2 LRU
- 5.4.3 Optimal.

5.5 Explain the concept of thrashing.

5.6 Explain working set model and page fault frequency.

6.0 Disk scheduling and File management

6.1 List out various disk performance parameters

6.2 Disk scheduling policies

- 6.2.1 FIFO
- 6.2.2 SSTF
- 6.2.3 SCAN
- 6.2.4 C-SCAN

6.3 Define file management.

6.4 List and explain various file operations.

6.5 List and explain various access methods.

6.6 Explain directory structure organization.

Suggested Activities

Student activity like mini-project, survey, quiz, etc. should be done in group of 3-5 students.

1. Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and program coordinator.
2. Each group should conduct different activity and no repeating should occur

Activities:

1. Installation and Un-installation of an Operating System on a New Computer
2. Removing of Second Operating System from a PC
3. A Survey of recent Operating System.
4. Case study on real time deadlock situation.
5. A case study on real time process synchronization.
6. Comparison of OS working in single core and multi core environment.
7. Documentation of comparing 32 bits and 64 bits OS.
8. Operating system is responsible for following activities in connection with management of memory:
    - Allocation and de-allocation of memory as and when needed.
    - Keeping track of used and unused memory space.
    - Deciding what process to be loaded into memory in case space becomes available.

9. For secondary space management:
    - Swap space and free space management
    - Disk scheduling
    - Allocating space to the data and programs onto the secondary storage device.
10. For process management:
    - Creation, deletion of both user and system process.
    - Handling process synchronization.
    - Deadlock handling.

Suggested E-Learning References

1. http://www.tutorialspoint.com/operating_system/
2. http://nptel.ac.in
3. https://www.geeksforgeeks.org/operating systems/https://www.studytonight.com/operating-system/

Mapping Course Outcomes with Program Outcomes:

(Course Outcome linkage to Cognitive Level)

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Describe operating system functions, operations and structures.	**R, U**	**1,2,3,4,7**	8
CO2	Understand process management and can implement process scheduling algorithms.	**R, U,A**	**1,2,3,4,7**	15
CO3	Recognize Synchronization and handle the deadlocks with various deadlock management techniques.	**R,U, A**	**1,2,3,4,7**	10
CO4	Explain the memory management techniques.	**R, U, A**	**1,2,3,4,7**	10
CO5	Implement virtualization of memory.	**R, U, A**	**1,2,3,4,7**	08
CO6	Handle memory disk and files using file Management techniques.	**R, U, A**	**1,2,3,4,7**	09
		Total Sessions		**60**

Legend: R: Remembering, U: Understanding, A: Applying

MID SEM – I Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

MID SEM – II Exam

S.No	Unit Name	R	U	A	Remarks
1	Unit-I	1, 2	5(a) 5(b)	7(a) 7(b)	
2	Unit-II	3, 4	6(a) 6(b)	8(a) 8(b)	
Total Questions		4	4	4	

Semester End Examination

<table>
<tr><th>S.No</th><th>Unit Name</th><th colspan="3">R</th><th>U</th><th>A</th><th>Remarks</th></tr>
<tr><td>1</td><td>Unit-I</td><td rowspan="6">4</td><td colspan="2" rowspan="2">1</td><td rowspan="2">9(a)</td><td rowspan="2">13(a)</td><td></td></tr>
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<tr><td>4</td><td>Unit-IV</td><td></td></tr>
<tr><td>5</td><td>Unit-V</td><td rowspan="2">3</td><td>5,6</td><td>9(b)
11(a)
11(b)</td><td>13(b)
15(a)
15(b)</td><td></td></tr>
<tr><td>6</td><td>Unit-VI</td><td>7,8</td><td>10(b)
11(a)
11(b)</td><td>14(b)
16(a)
16(b)</td><td></td></tr>
<tr><td colspan="2">Total Questions</td><td colspan="3">8</td><td>8</td><td>8</td><td></td></tr>
</table>

Legend:	Remembering (R)	1 Mark
	Understanding (U)	3 Marks
	Application (A)	5 Marks

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER-I EXAMINATION (C-21)
CS-405 – Operating Systems

TIME: 1 HOURS **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

NOTE: 1. Answer all questions.
2. Each question carries one mark.

1. Define the term operating system.
2. What is spooling?
3. Write various states in process state diagram. List out various scheduling algorithms.

PART-B ***MARKS: 2 X 3=6***

NOTE: 1. Answer any one question from 5 and 6.
2. Each question carries three marks.

1. (A) Distinguish multiprogramming and timesharing operating systems.
   Or
   (B) Describe various types of operating systems.

2. (A) Give the states of process state diagram and explain it.
   Or
   (B) Explain the principal of Round Robin scheduling algorithm.

PART-C ***MARKS: 2 X 5=10***

NOTE: 1. Answer any one question from 7 and 8.
2. Each question carries five marks.

3. (A) How an operating system can control the resources of a system.
   Or
   (B) Explain how multiprogramming concept will increase the performance of a system.

4. (A) How multi threading concept can reduce the execution time of a program.
   Or
   (B) Explain with an example priority based scheduling algorithm.

MODEL QUESTION PAPER
BOARD DIPLOMA MID-SEMESTER-II EXAMINATION (C-21)

CS-405 – Operating System

TIME: 1 HOURS **MAXIMUM MARKS: 20**

PART-A ***MARKS: 4 X 1=4***

NOTE: 1. Answer all questions.
2. Each question carries one mark.

1. Define a deadlock.
2. Give the necessary conditions to occur a dead lock.
1. What is shared memory concept?Explain the term overlays.

PART-B ***MARKS: 2 X 3=6***

NOTE: 1. Answer any one question from 5 and 6.
2. Each question carries three marks.

2. (A) Explain inter process communication.
Or
(B) What are the techniques used to prevent dead lock?

3. (A) What is fragmentation? Explain in detail.
Or
(B) What is segmentation? Explain segmentation with paging.

PART-C ***MARKS: 2 X 5=10***

NOTE: 1. Answer any one question from 7 and 8.

2. Each question carries five marks.

4. (A) How Banker's algorithm will avoid dead lock?
Or
(B) Explain how deadlock can be detected and recovered?

5. (A) How logical address can be converted to physical address?
Or
(B) Discuss briefly about simple paging.

MODEL QUESTION PAPER
BOARD DIPLOMA END EXAMINATION (C-21)
CS-405 – Operating System

TIME: 2 HOURS **MAXIMUM MARKS: 40**

PART-A ***MARKS: 8 X 1=8***

NOTE: 1. Answer all questions.
2. Each question carries one mark.

1. Define the term multiprogramming.
2. What are the necessary conditions to occur a deadlock?
1. List out various file operations. Define a process.
2. Give various page replacement algorithms.
3. What is demand paging?
4. What is meant by seek time?
5. Give the principal of FIFO disk scheduling algorithm.

PART-B

NOTE: 1. Answer any one question from 9, 10, 11 and 12. ***MARKS: 4 X 3=12***
2. Each question carries three marks.

6. (A) Explain FCFS CPU scheduling algorithm with an example.

Or

(B) Explain in brief about paging.

7. (A) Give the various conditions to occur a deadlock.

Or

(B) Give the difference between SCAN and C-SCAN disk scheduling algorithms.

8. (A) Explain how FIFO and LRU page replacement algorithms will work?

Or

(B) Explain the term demand paging.

9. (A) Explain SSTF disk scheduling algorithm.

Or

(B) Explain directory structure organization in detail.

PART-C

NOTE: 1. Answer any one question from 13, 14, 15 and 16 ***MARKS: 4 X 5=20***
2. Each question carries five marks.

10. (A) Explain various types of schedulers in detail.
Or
(B) How paging is applied on segmentation.

14. (A) How virtual memory concept will increase the size of the main memory.
Or
(B) How files are copied on disk? Explain in detail.

15. (A) Explain with an example LRU and Optimal page replacement algorithm.
Or
(B) Explain the concept thrashing with a neat sketch.

16. (A) Explain various file access methods.
Or
(B) Explain various disk scheduling algorithms with examples.

CS-406-Relational Database Management Systems Lab

Course Title	Relational Database Management Systems Lab	Course Code	CS-406
Semester	IV	Course Group	Practical
Teaching Scheme in periods (L : T : P)	1:0:2	Credits	1.5
Methodology	Lecture + Tutorial	Total Contact Periods	45
CIE	60 Marks	SEE	40 Marks

Prerequisites

Knowledge of basics DBMS theoretical concepts.

Course Content

Unit Number	Unit Name	Periods
1	Concepts of Databases	**2**
2	Data Modeling Using the Entity Relationship(ER) Model	**4**
3	Relational Data Model and Relational Data Base Constraints	**6**
4	Normalization and fundamentals of Data Base Transaction Processing	**8**
5	Concept of SQL and management of schema objects.	**13**
6	PL/SQL	**12**
	Total	**45**

Course Objectives

1. Use the concepts of database technologies.
2. Prepare queries to interact with database using SQL DML/DDL commands.
3. Implement Database schema objects for a given problem-domain.
4. Develop programs using PL/SQL.

Course Outcome

On successful completion of the course, the students will be able to attain below Course Outcome(CO):

Course Outcome		Experiment Linked	CL	Linked PO	Lab Sessions
CO1	Use the concepts of database technologies.	1,2,3,4,5	**U, A**	**1,2,3,4,7**	**5**
CO2	Prepare queries to interact with database using SQL DML/DDL commands	6,7,8,9,10,11,12	**U, A**	**1,2,3,4,7**	**15**
CO3	Implement Database schema objects for a given problem-domain.	13,14,15,16,17,18	**U, A**	**1,2,3,4,7**	**10**
CO4	Develop programs using PL/SQL.	19,20,21,22,23,24 ,25	**U,A**	**1,2,3,4,7**	**15**
					45

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

Course-PO Attainment Matrix

Course	Program Outcomes						
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**
RDBMS LAB	**3**	**3**	**3**	**3**	**-**	**-**	**3**

Level 3- Highly Addressed, Level 2-Moderately Addressed, Level 1-Low Addressed.

References

1. "An Introduction to Database Systems" 8th edition by C J Date.
2. "DATABASE SYSTEM CONCEPTS" 6th edition by Abraham Silberschatz Yale University, Henry F. Korth Lehigh University, S. Sudarshan Indian Institute of Technology, Bombay.
3. "Fundamentals of Database Systems" Sixth edition, 2014, RamezElmasri, Shamkan B. Navathe, Pearson Education, ISBN- 9788131792476.

4. “Database Managemet Systems” Raghu Ramakrishnan and Johannes Gehrke-3rd Edition, McGraw-Hill, 2003.
5. https://www.w3schools.in/.
6. https://www.tutorialspoint.com/dbms
7. https://beginner-sql-tutorial.com/sql.htm.
8. www.nptel.ac.in.
9. http://www.sql-tutorial.net/

Course Delivery

The course will be delivered through Demonstration and Practices.

List of Exercises:

1. Install Oracle or Mysql database.
2. Prepare queries to create tables.
3. Prepare queries to insert records into tables.
4. Prepare queries to update records in a table.
5. Prepare queries to modify the structure of the table.
6. Prepare queries to retrieve data from database using SELECT command.
7. Prepare queries using clauses like WHERE, ORDER, IN, LIKE, AND, OR, NOT.
8. Develop queries using numeric functions.
9. Develop queries using string functions.
10. Develop queries using date functions.
11. Develop queries using aggregate functions.
12. Develop queries using scalar functions.
13. Prepare queries using set operators.
14. Develop sub queries.
15. Prepare queries using SQL joins.
16. Create tables using integrity constraints.
17. Implement Sequences.
18. Implement Synonyms.
19. Implement creating and deleting indexes.
20. Implement Clusters.
21. Implement Views.

22. Develop programs using PL/SQL control statements.
23. Develop programs using PL/SQL Procedures.
24. Develop programs using PL/SQL Functions.
25. Develop programs using PL/SQL Recursion.
26. Develop programs using PL/SQL Stored procedures with- in , out , inout parameters.
27. Develop programs using PL/SQL to handle exceptions.
28. Develop programs using PL/SQL cursors – implicit and explicit.
29. Implement Triggers.
30. Implement Packages.

CS-407-Java Programming Lab

Course Title	Java Programming Lab	Course Code	CS-407
Semester	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Periods:	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of C++ programming and OOPs Concepts.

Course outcomes

On successful completion of the course, the students will be able to attain below Course Outcomes (CO):

Course Outcome	
CO1	Develop basic java console based applications.
CO2	Develop programs on inheritance and interfaces.
CO3	Develop programs on packages – io, util.
CO4	Develop programs on applets, AWT controls and event handling.
CO5	Develop programs to handle exceptions and multi threaded applications.
CO6	Develop programs to connect to database and retrieve data and Develop server side programs using Servlets.

Course Contents

Unit Number	Unit Name	Periods
1	Introduction of Java	6
2	Inheritance and Interfaces	8
3	Packages.	8
4	Concepts of Applets, AWT and Event handling	8
5	Exception Handling and Multi threaded programming	8
6	JDBC and Servlets	7
	Total	45

Recommended Books

1. “Head First Java”, Kathy Sierra, Bert Bates, O’Reilly.
2. ‘Effective Java: A Programming Language Guide’ (Java Series) 2nd Edition, by Joshua Bloch Sun copyright.
3. Mastering Java Machine Learning Paperback -Uday Kamath,Krishna Choppella, Packt publishers.
4. Core Java Volume I--Fundamentals Eleventh Edition by Cay S. Horstmann Pearson publications.
5. Java: A Beginner's Guide, Seventh Edition Paperback – by Herbert Schildt -Oracle press
6. “The Complete Reference Java2 (Third Edition)”, Patrick Naughton-Herbert Sheild, Tata McGraw hill.
7. “Advance JAVA”, Kogent learning Solution, DreamTech Press.
8. “Java2 Unleased”, Jawroski, Techmedia.
9. “Java2 Programming”, Keyur Shah, Tata McGraw.
10. “Java EE6 for Beginners”, Sharnam Shah &Vaishali Shah, SPD.
11. “Java Server Programming Black book” , Kogent learning Solution, DreamTech Press.
12. “Java Database Programming with JDBC” by Pratik Patel - The Coriolis Group.

Suggested E-learning references

1. https://www.w3schools.in/java-tutorial/
2. https://www.udemy.com/advanced-java-programming/
3. https://www.roseindia.net/java/Advanced-Java-Tutorials.shtml
4. http://www.javalearner.com/advanced.htm
5. https://www.studytonight.com
6. http://www.Javatpoint.com/Java-tutorial
7. http://www.tutorialspoint.com/Java/
8. http://www.indiabix.com/technical/core-Java/
9. https://www.geeksforgeeks.org/java/

CO-PO Mapping Matrix

Course Outcome		CL	Linked PO	Teaching Periods
CO1	Develop basic java console based applications.	**R,U,A**	**1,2,3,4,7**	**6**
CO2	Develop programs on inheritance and interfaces.	**R,U,A**	**1,2,3,4,7**	**8**
CO3	Develop programs on packages – io, util.	**R,U,A**	**1,2,3,4,7**	**8**
CO4	Develop programs on applets, AWT controls and event handling.	**R,U,A**	**1,2,3,4,7**	**8**
CO5	Develop programs to handle exceptions and multi threaded applications.	**R,U,A**	**1,2,3,4,7**	**8**
CO6	Develop programs to connect to database and retrieve data and Develop server side programs using Servlets.	**R,U,A**	**1,2,3,4,7**	**7**
			Total Sessions	**45**

Suggested Student Activities

Note: The following activities or similar activities for assessing 2.5 credits (Any one)

Student activity like mini-project, surveys, quizzes, etc. should be done in group of 3-5 students.

- Each group should do any one of the following type activity or any other similar activity related to the course and before conduction, get it approved from concerned course coordinator and programme co-coordinator.
- Each group should conduct different activity and no repeating should occur.

1. Study different Integrated Development Environments (IDEs) available for executing java programs and prepare a report.
2. Develop some simple window based applications like notepad, calculator etc using AWT and Swing components.
3. Visit Library to refer to standard Books on core Java and Advanced java concepts, collect related material and prepare notes.
4. Refer to online content and videos to get more knowledge on database concepts.
5. Interact with industry people who are working in java and advanced java technologies and prepare a report.
6. Write assignments given by course coordinator.
7. Read all the course contents and should be able to write slip tests and surprise tests.
8. Prepare a seminar on a specific topic that is related to latest technologies in the java and advanced java concepts and present a Power Point Presentation (PPT) to all the peers.
9. Study IEEE papers on advanced java topics and submit a report.
10. Prepare quiz on java course related questions and conduct.
11. Participate in state level or national level technical conferences.
12. Participate in various technical coding competitions related to java programming.

13. Develop some projects to design websites like Hotel Management System, E-Bill Board, Online insurance, Online Mobile, Contributor, Online Restaurant, Public Distribution System, Secure E-banking security, District medical data centre using JDBC and Servlet and JSP concepts.

List of Exercises

1. Write a Java Program to define a class, define instance methods for setting and retrieving values of instance variables , instantiate its object and operators.
2. Write a Java Program on control and iterative statements.
3. Write a java program to find the transpose, addition, subtraction and multiplication of a two-dimensional matrix using loops.
4. Write a Java program on command line arguments.
5. Write a Java Program to define a class, describe its constructor, overload the Constructors and instantiate its object.
6. Write a Java Program to illustrate method overloading
7. Write a java program to demonstrate static variables and static methods.
8. Write a Java program to practice using String class and its methods.
9. Write a Java program using final members.
10. Write a Java Program to sort a list of names in lexicographical order.
11. Write a Java Program to implement single inheritance.
12. Write a Java Program to implement multilevel inheritance by applying various access controls to its data members and methods.
13. Write a Java program using ‘this’ and ‘super’ keyword.
14. Write a java program to illustrate method overriding
15. Write java program to explain the use of final keyword in avoiding method overriding.
16. Write a program to demonstrate the use of interface.
17. Write a java program to implement multiple inheritance using the concept of interface.
18. Write a Java program on hybrid and hierarchical inheritance.
19. Write a Java program to implement the concept of importing classes from user defined package and creating packages , creating sub packages.
20. Write a Java program on access modifiers.

21. Write a Java program using util package classes.
22. Write a Java program using io package classes .
23. Write a Java program using stream classes.
24. Write a Java program on applet life cycle.
25. Write a Java program on all AWT controls along with Events and its Listeners.
26. Write a Java program on mouse and keyboard events.
27. Write a Java program on inbuilt Exceptions.
28. Write a Java program on Exception handling.
29. Write a program to implement multi-catch statements
30. Write a java program on nested try statements.
31. Write a java program to create user-defined exceptions.
32. Write a program to create thread (i)extending Thread class (ii) implementing Runnable interface
33. Write a java program to create multiple threads and thread priorities, ThreadGroup.
34. Write a java program to implement thread synchronization.
35. Write a java program on Inter Thread Communication.
36. Write a java program on deadlock.
37. Write a Java program to establish connection with database.
38. Write a Java program on different types of statements.
39. Write a Java program to perform DDL and DML statements using JDBC.
40. Write a Java program on Servlet life cycle.
41. Write a Java program to handle HTTP requests and responses using doGet() and doPost() methods.

CS-408-Computer Hardware & Networking Lab

Course Title	Computer Hardware & Networking Lab	Course Code	CS-408
Semester	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Periods:	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

Basic knowledge on working of computer.

Course Outcomes

Upon completion of the course the student shall be able to

	Course Outcome
CO1	Identify the PC components
CO2	Learn different system boards, Processors, Memories and Mass storage devices
CO3	Learn Input and Output devices
CO4	Learn Networking Basics & Topologies
CO5	Understand LAN Components & Protocols
CO6	Understand Network Addressing and Management

Course Content

Unit No	Unit Name	Hours/Periods
1	Identify the PC components	**5**
2	Learn different system boards, Processors, Memories and Mass storage devices	**10**
3	Learn Input and Output devices	**7**
4	Learn Networking Basics & Topologies	**8**
5	Understand LAN Components & Protocols	**9**
6	Understand Network Addressing and Management	**6**
	Total sessions	**45**

Recommended Books

1. Enhanced Guide to Managing -- Jean Andrews (Thomson) and Maintaining Your PC
2. PC Hardware A Beginners Guide -- Gilster (TMH)
3. Computer Networks -- Andrew S. Tanenbaum
4. Windows server 2012 by Charlie Russel and Craig zacker
5. Mastering windows server 2012 R2 by Mark minasi
6. Unix and Linux System Administration hand book 4th edition by Garth snyder
7. Linux Administration by Jason cannon

E-References

1. https://www.tutorialspoint.com/computer_fundamentals/computer_fundamentals_tutorial.pdf
2. http://www.garfieldcs.com/wordpress/wordpress/wp-content/uploads/2011/09/Computer-Hardware-Basics.pdf
3. https://abiiid.files.wordpress.com/2010/12/pc-hardware-a-beginners-guide.pdf
4. **https://www.computerhope.com/**

Mapping Course outcomes with program outcome

Course Outcome		CL	Linked PO	Teaching Hours
1	Identify the PC components	**R, U, A**	**1,2,3,4,7**	**5**
2	Learn different system boards, Processors, Memories and Mass storage devices	**R, U, A**	**1,2,3,4,7**	**10**
3	Learn Input and Output devices	**R,U, A**	**1,2,3,4,7**	**7**
4	Learn Networking Basics & Topologies	**U, A**	**1,2,3,4,7**	**8**
5	Understand LAN Components & Protocols	**R,U, A**	**1,2,3,4,7**	**9**
6	Understand Network Addressing and Management	**R,U, A**	**1,2,3,4,7**	**6**
			Total Sessions	**45**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

LIST OF EXCERCISES:

1. Identify the front panel indicators and switches and rear side connector in a computer system.
2. Identify various motherboards components, connectors, slots, ports (USB, VGA, DVI, and HDMI), cables and Connectors, ROM, RAM (Memory), CPU (Processor), Hard Drive Connections, AGP, CD/DVD, Add On Cards, IDE/PCI Slots, Sound Cards.
3. Configure BIOS Setup Program
4. Installation of Hard Disk (a) Install Hard Disk (b) Partition and Format Hard Disk (c) Disk Defragmentation
5. Installation of additional RAM
6. Installation of operating system software
7. Installation of application software
8. Installation of Printer (Laser/Inkjet/Multifunction Printer) & device driver software
9. Installation of Scanner & Device driver Software
10. Know the precautions to be taken while troubleshooting the hardware and know about Anti-static Wrist band, Workbench etc.,
11. Trouble shooting Keyboard, Monitor and Printer.
12. Study of various LAN Devices.
13. Install and Configure Wired and Wireless NIC .
14. Preparing the UTP cable (Cat-5 or Cat-6) for cross and straight connections using crimping tool.
15. Install and configure Network Devices: HUB, Switch.
16. Install and Configure Router (Normal or Wireless).
17. Connect the computers in Local Area Network.
18. Implementation of Wi-Fi Network with the help of Wireless router and Access Point.

CS-409-Microprocessors Lab

Course Title :	Microprocessors Lab	Course Code	CS-409
Semester	IV	Course Group	Practical
Teaching Scheme in Periods(L:T:P)	1:0:2	Credits	1.5
Methodology	Lecture + Practical	Total Contact Hours :	45
CIE	60 Marks	SEE	40 Marks

Pre requisites

Knowledge of Computer Operation.

Course outcomes

Course Outcome		CL	Linked PO	Teaching Hours
CO1	Write programs using Data Transfer Instructions and Arithmetic Instructions	**R, U, A**	**1,2,4,6,7**	**10**
CO2	Write Programs using Logical, Shift and Rotate Instructions	**R, U, A**	**1,2,4,6,7**	**5**
CO3	Write Programs using Branching Instructions	**R,U, A**	**1,2,4,6,7**	**20**
CO4	Write Programs using CALL and RET Instructions	**U, A**	**1,2,4,6,7**	**10**
			Total Sessions	**45**

Legends: R = Remember U= Understand; A= Apply and above levels (Bloom's revised taxonomy)

List of Experiments

1. Execute an assembly language program for the addition of two 8 bit Numbers and two 16 bit Numbers.
2. Execute an assembly language program for the Subtraction of two 8 bit Numbers and two 16 bit Numbers
3. Execute an assembly language program for Multiplication of two 8 bit Numbers and two 16 bit Numbers
4. Execute an assembly language program for Division of 16 bit Number by 8 bit Number
5. Execute an assembly language program to add two BCD numbers.
6. Execute an assembly language program to find reverse of a given number.

7. Execute an assembly language program to find the factorial of a number.
8. Execute an assembly language program using AND,OR and NEG instructions.
9. Execute an assembly language program using ROR and ROL instructions.
10. Execute an assembly language program to count number of ones and zeros in a number.
11. Execute an assembly language program to find sum of 'N' numbers given in an array.
12. Execute an assembly language program to find sum of 'N' Natural Numbers
13. Execute an assembly language program to find the Smallest among 'N' Numbers.
14. Execute an assembly language program to move data from one location to another location.
15. Execute a program for generating multiplication table for a given number
16. Execute an assembly language program to sort the list of numbers in ascending order.
17. Execute an assembly language program to sort the list of numbers in descending order.

Suggested Student Activities

Student activity like mini-project, quizzes, etc. should be done in group of 5-10 students.

1. Each group should do any one of the following type of activity or any other similar activity related to the course with prior approval from the course coordinator and program coordinator concerned.
2. Each group should conduct different activity and no repetition should occur.
3. Visit different web sites relevant to topics. Listen to the lectures and submit a handwritten report
4. Coding competitions

HU -410 – Employability Skills Lab

Course Title	Employability Skills Lab	Course Code	HU-410
Semester	IV	Course Group	Core
Teaching Scheme in Hrs (L:T:P)	1:0:2	Credits	1.5
Methodology	Pair Work, Group Work, Activities, Lecture, Self-Learning	Total Contact Hours	45 (3 contact hours per week)
CIE	60 Marks	SEE	40 Marks

Rationale:

The course is designed to impart employability skills to make the students of diploma get the initial employment, maintain the employment and get better employment, if they wish.

Prerequisites:

The course requires the basic knowledge of vocabulary, grammar, four language learning skills, viz. listening, speaking, reading and writing and life skills.

Course Outcomes

CO1	Comprehend the importance of employability skills and strategies to survive in a job.
CO2	Converse fluently and accurately accordingly in JAM sessions. Group Discussions will enhance the willingness to take the Initiative, accept adaptability in turn developing leadership qualities and Communication Skills.
CO3	Understand purpose and process of interview in turn knowing how to prepare and succeed in interview.
CO4	Making effective presentation, Develop Public speaking skills and learn to make visually attractive PPTs.
CO5	Learn various writing formats useful at workplace and to develop an ability to apply technical information in documentation.
CO6	Build strong workplace relationships by learning workplace etiquette, professional ethics and importance of gender sensitization.

Course Contents

Module 1: Introduction to Employability Skills

Duration: 6 Periods (L 2 P 4)

a. Filling the Curriculum gaps
   i. Attributes and values
   ii. Specific and general skills
   iii. Academic Knowledge and Aptitude Skills
   iv. Analytical skills / Data Analysis
b. How to get into a job?
   i. Good personal presentation and attitude
   ii. Core generic skills

iii. Technical / Professional skills
iv. Good Communication skills

c. How to survive in a job?
   i. Learning skills needed for self-advocacy and networking
   ii. Adaptability to cope with the changing circumstances.
   iii. Reliability and Integrity
   iv. Continuous Learning and Consistency in performance.

Module 2: JAM & Group Discussion

Duration: 9 Periods (L 3 P- 6)

i. What is JAM?
ii. Significance of JAM
iii. Enhancing Speaking skills, fluency, usage, coherence, spontaneity, voice modulation, eye contact, body language, Creativity, Sense of humor, Confidence and Time management.
iv. Learn avoiding hesitation, deviation and repetition
v. Purpose of Group Discussion
vi. Types of Group Discussion
vii. Different expressions and phases and their effective usage
   a. Opinion expression agrees and disagrees, partially agree or disagree, interrupt politely, add new information and conclusion
viii. Dos and Don'ts of a Group Discussion
ix. Importance of body language, Etiquettes and awareness of group dynamics
x. Practice.

Module 3: Interview Skills

Duration: 9 Periods (L 3 P 6)

i. Importance of interview skills
ii. Types of interviews
   a) Face to Face / One to One, Telephonic / Video, Panel Interview.
iii. Understanding the process of interview.
   a) Before the interview
   b) On the day of the interview
   c) After the interview
iv. FAQs, Common expressions of an interviewer and interviewee
v. Acceptable and unacceptable gestures. Body language, and Attire,
vi. Do's and Don'ts of an interview
vii. Mock Interviews

Module 4: Presentation Skills:

Duration: 9 Periods (L-3 P-6)

a) Significance of presentation
b) Types of presentations.
   i. Informative, Instructional, Arousing, Persuasive and Decision-Making

c) . What makes a good presentation?

i. Understand, Collect, Organize, Use presentational aids and Practice

d) Tips for an effective presentation

i. Good Beginning – Greeting, Confidence, Body Language, Opening Ideas (Funny Videos, Ridicule. Asking Questions, Quote someone/Proverb or telling a story/referring an historical event)

ii. Unveiling – Develop systematically, usage of appropriate linkers or discourse markers. Eye contact and Effective usage of PPTs

iii. Conclusion – Summarize - Giving time to the audience for queries and Time management

e) Guidelines for PPTs

f) Public Speaking Skills

i. Benefits – Personal and Professionals.

ii. Strategies to improve public speaking skills.

iii. Obstacles to effective public speaking.

iv. Overcoming the barriers of public speaking.

g) Prepare presentation template.

Module 5: Writing Skills at Workplace:

Duration: 6 Periods (L – 2 P – 4)

a) Various writing formats useful at workplace
b) Skills involved in writing at workplace
c) Different templates for different purposes
d) Useful technical information in documentation

Module 6: Workplace Awareness

Duration 6 Periods (L – 2 P – 4)

a) Workplace etiquette
b) Knowledge, skills and attributes useful at workplace
c) Workplace Relationships
d) Professional ethics
e) Importance of gender sensitization
f) Sense of responsibility towards the society

Suggested Student Activities:

- Paper Presentations
- Seminars
- Mock Interviews
- Telephonic Interviews
- Group Discussions
- Role Plays

- Creating advertisements
- Five-minute activities
- Creating a model of workplace

Course Outcomes

CO1	Comprehend the importance of employability skills and strategies to survive in a job.
CO2	Converse fluently and accurately accordingly in JAM sessions. Group Discussions will enhance the willingness to take the Initiative, accept adaptability in turn developing leadership qualities and Communication Skills
CO3	Understand purpose and process of interview in turn knowing how to prepare and succeed in interview.
CO4	Making effective presentation, develop public speaking skills and learn to make visually attractive PPTs.
CO5	Learn various writing formats useful at workplace and to develop an ability to apply technical information in documentation.
CO6	Build strong workplace relationships by learning workplace etiquette, professional ethics and importance of gender sensitization.

CO-PO Matrix

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	Mapping POs
410.1	-	-	-	-	3		3	5,7
410.2	-	-	-	-	3	2	3	5,6,7
410.3	-	-	-	-	3	3	3	5,6,7
410.4	-	-	-	-	2	2	3	5,6,7
410.5	-	-	-	-	2	2	3	5,6,7
410.6		-	--	--	2		3	5,7

Evaluation Pattern:

I. Continuous Internal Examination: 60 Marks

a. **Mid Sem - I** 20 marks
   Syllabus:
   i. Introduction to Employability skills
   ii. JAM & Group Discussion

b. **Mid – II** 20 Marks
   Syllabus:
   i. Interview Skills
   ii. Presentation skills

c. **Internal assessment** 20 marks

   i. Seminars: 10 marks
   ii. Assignments: 5 marks
   iii. Lab record submission: 5 marks

II. Semester End Examination: 40 Marks

a. Write an essay on a given topic or participate in an activity: 15 Marks
b. Interview or Group Discussion: 15 Marks
c. *Viva Voce* 10 marks

References:

Adair, John. *Effective Communication*. London: Pan Macmillan Ltd., 2003.

Ajmani, J. C. *Good English: Getting it Right*. New Delhi: Rupa Publications, 2012.

Amos, Julie-Ann. *Handling Tough Job Interviews*. Mumbai: Jaico Publishing, 2004.

Collins, Patrick. *Speak with Power and Confidence*. New York: Sterling, 2009.

Fensterheim, Herbert and Jean Baer. *Don't Say Yes When You Want To Say No*. New York: D

Raman, Meenakshi & Sangeeta Sharma. *Technical Communication: Principles and Practice*. Second Edition. New Delhi: Oxford University Press, 2011

E-Learning Resources:

http://www.dailywritingtips.com/

http://www.englishdaily626.com/c-errors.php
http://www.owlnet.rice.edu/~cainproj/
http://www.thehumorsource.com/
http://www.indiabix.com/group-discussion/topics-with-answers/
http://networketiquette.net/
https://public.wsu.edu/~brians/errors
http://www.bbc.co.uk/worldservice/learningenglish/radio/specials/15

Unit No	Unit name	Periods	Questions for SEE			Marks weightage	%Weightage
			R	U	A		
1.	Introduction to Employability Skills	**6**			**2**	**2**	
2	JAM/ Group Discussions	**9**			**2**	**2**	
3	Interview Skills	**9**			**2**	**2**	
4.	Presentation Skills	**9**			**2**	**2**	
5.	Writing skills at work place	**6**			**1**	**1**	
6.	Workplace awareness	**6**			**1**	**1**	
	Total	**45**			**10**		**100**

BOARD DIPLOMA EXAMINATION (C-21)
MID SEMESTER EXAMINATION – I
HU-410- EMPLOYABILITY SKILLS LAB

Time: 1 Hour **Total Marks: 20**

Part – A **10 marks**

Instruction: *Answer any one of the following questions.*

1. Write a paragraph on the importance of employability skills.
2. List out the important employability skills.
3. Mention the different strategies to enhance the employability skills.

Part – B **10 marks**

Instruction: *Answer any one of the following questions.*

4. What are the rules to be implemented in a JAM session?
5. What are the do's and don'ts of a group discussion.
6. List out the steps involved in a group discussion and mention some phrases and expressions commonly used.

BOARD DIPLOMA EXAMINATION (C-21)
MID SEMESTER EXAMINATION - II
HU-410- EMPLOYABILITY SKILLS LAB

Time : 1 Hour **Total Marks: 20**

Part – A **10 marks**

Instruction: *Answer any one of the following questions.*

1. Write a list of frequently asked questions in an interview. Write the answers for the questions.
2. Mention the instructions to attend a telephonic interview.
3. What are the do's and don'ts for a formal interview?

Part – B **10 marks**

Instruction: *Answer any one of the following questions.*

4. Write the various steps involved in making presentations effectively.
5. What are the do's don'ts of body language during a presentation?
6. List out a few audio-visual aids and explain their role in making an effective presentation.

BOARD DIPLOMA EXAMINATION (C-21)
SEMESTER END EXAMINATION
HU-410- EMPLOYABILITY SKILLS LAB

Time: 3 Hours **Total Marks: 40**

Part – A **10 marks**

Instruction: *Pick any one question from the given lot.*

1. How are employability skills helpful to secure a good job?
2. Describe the steps involved in JAM and group discussion.
3. Write the guidelines involved in making a good presentation.
4. List few professional ethics useful at workplace.
5. Mention few skills involved in writing at workplace.

Part – B **15 marks**

6. Interview / Group Discussion

Part – C **15 marks**

7. *Viva Voce*

CS-411-SKILL UPGRADATION

Course Title	Skill Upgradation	Course Code	CS-411
Semester	IV	Course	Core
Teaching Scheme in periods	0:0:8	Credits	2.5
Methodology	Activities	Total Contact	120
CIE	Rubrics	SEE	Nil

Rationale: This course is introduced for all semesters with a purpose of providing outside classroomexperiences that lead to overall development of the students. One whole day is allocated for activities.

Course Objective:

1. To create an awareness on Engineering Ethics and Human Values.
2. To instill Moral, Social Values and Loyalty.
3. Create awareness about social responsibilities of Engineers
4. To improve Communication and Participation skills

Course Content and Blue Print of Marks for CIE			
ActivityNo	Activity	Periods	Frequency
1	Haritha Haram(plantation &Maintenance)/ Waste management /Swachh Bharat	21	7 times in a semester
2	Mini projects	18	6 times in a semester
3	Online Video Tutorials/ MOOCs in SWAYAM /NPTEL/ e-Journals	16	4 times in a semester
4	Seminars/Quizzes/ Technical Paper Presentations /Group discussions/ Participate in Tech fests and coding competitions	24	6 times in a semester
5	Field Visits/Field Practice(also within the campus)	14	2 times in a semester
6	Expert/Guest Lectures • Safety and Responsibilities of an Engineer • Occupational crime/Cyber crimes • Responsibility of engineers • Emerging technologies	27	4 Times in a semester
	Total Periods	120	

Note: in case Expert faculties are not available English faculty may handle the expert lectures or Video clips on the suggested lectures may be played and the suggested activities are flexible.

Course Outcomes:

CO	Outcome	CO/PO Mapping
CO1	Application of known knowledge on real time problems	1,2,3,4,5,6,7
CO2	Practice the moral values that ought to guide the Engineeringprofession.	5,6,7
CO3	Develop the set of justified moral principles of obligation, ideals that ought to be endorsed by the engineers and applythem in real life situations	5,7
CO5	Create awareness of saving environment through activities	3,4,5,7
CO6	Create awareness of Constitution of India	5

COURSE CONTENT:

SAFETY, RESPONSIBILITIES OF ENGINEERS

Safety and risk-definition- - assessment of safety and risk - risk benefit analysis and reducing risk-–Personal risk- Public risk-Reducing risk-Voluntary Risk-Collegiality and loyalty–Authority- Types- collective bargaining - occupational crime –Responsibility of engineers–Types-Social responsibility-Professional responsibility- confidentiality-conflicts of interest-liability

Evaluation:

The student must maintain a record of all activities conducted on ***skill upgradtion/ Activities*** day andprepare a soft copy of report and submit it to their mentor or upload to the institute website or mail.

The reports shall be evaluated by the mentors though rubrics and accordingly give the eligibility for 2.5 credits. The student must have participated in at least 75% of activities to get eligibility.

CO-PO MAPPING MATRIX

	Basic & Discipline knowledge	Problem Analysis	Design Development tools	Engineering Tools	Engineering for society and Environment	Project Management	Lifelong learning	Mapped PO
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	
CO1	✓	✓	✓	✓	✓	✓	✓	1,2,3,4,5,6,7
CO2					✓	✓	✓	5,6,7
CO3					✓		✓	5,7
CO4			✓	✓	✓		✓	3,4,5,7
CO5					✓			5

FORMAT FOR STUDENT ACTIVITY ASSESSMENT

DIMENSION	Unsatisfactoy 1	Developing 2	Satisfactoy 3	Good 4	Exemplary 5	Score
Collection of Data	Does not collect any information relating to the topic	Collects very limited information; some relate to the topic	Collects some basic information; refer to the topic	Collects relevan t informa tion; concerned to thetopic	Collects a great deal of information; all refer to the topic	2
Fulfill team‟s roles & duties	Does not perform any duties assigned to the team role	Performs very littleduties	Performs nearly allduties	Performs all duties	Performs all duties of assigned team roles with presentation	4
Shares work equally	Always relies on others to do the work	Rarely does the assigned work; often needs reminding	Usually does the assigned work; rarely needs reminding	Does the assigne d job without having to be reminded.	Always does the assigned work without having to be reminded and on given time frame	2
Listen to other team mates	Is always talking; never allows anyone else to speak	Usually does most of the talking; rarely allows others tospeak	Listens, but sometimes talk too much	Listens and contributes to the relevant topic	Listens and contributes precisely to the relevant topic and exhibit leadership qualities	2
					TOTAL	10/4=2.5

All student activities should be done in a group of 4-5 students with a team leader.

NOTE: **This is only an example. Appropriate rubrics may be devised by the concerned course co-coordinator for assessing the given activity. If the average score is greater than 1(>1), then 2.5 credits will be awarded to student.**