UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

NEW COURSE STRUCTURE– To be effective for Diploma 2023-24
[2nd Year Onwards] Based on CBCS system & OBE model
Recommended scheme of study
(For Diploma in Computer Engineering)

Semester of Study	Category of course	Course Code	Subjects	Mode of Delivery			Total Credits
				L	T	P	C
THIRD	**THEORY**						
	Program Core Course	DCE 301	Computer Programming	3	0	0	3
		DCE 303	Introduction to DBMS	3	0	0	3
		DCE 305	Computer Organization	3	0	0	3
		DCE 307	Mathematical Foundation for Computer Science	3	0	0	3
	Mandatory Course	DHS 301	**Universal Human Values- II**	2	1	0	**3**
	SESSIONAL						
	Program Core Course	DCE 302	Computer Programming Lab	0	0	2	1
		DCE 304	DBMS Lab	0	0	2	1
		DCE 306	Computer Organization Lab	0	0	2	1
		DCE 308	Linux Lab	0	0	2	1
		DCE 310	Web Technologies Lab	0	0	2	1
	Summer Internship	DSI 331	**Summer Internship- I (4 weeks) after II Semester**	0	0	0	0 (Non-credit)
TOTAL CREDITS							**20**
Total Lectures per Week				**25**			
FOURTH	**THEORY**						
	Program Core Course	DCE 401	Data Structures	3	0	0	3
		DCE 403	.NET	3	0	0	3
		DCE 405	Computer Networks	3	0	0	3
		DCE 407	Computer System Architecture	3	0	0	3
		DCE 409	Operating Systems	3	0	0	3
	Open Elective	OE-I: DOE 421/ DOE 422/ DOE 423		3	0	0	3
	SESSIONAL						
	Program Core Course	DCE 402	Data Structures Lab	0	0	2	1
		DCE 404	.NET Lab	0	0	2	1
		DCE 406	Computer Networking Lab	0	0	2	1
		DCE 408	Python Lab	0	0	2	1
	Project	DPR 431	Minor Project	0	0	4	1
	Mandatory Course	DAU 401	Essence of Indian Knowledge and Tradition	2	0	0	0 (Non-credit)
TOTAL CREDITS							**23**
Total Lectures per Week				**14**			
GRAND TOTAL FOR SECOND YEAR							**43**

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DEPARTMENT OF COMPUTER ENGINEERING

PROGRAMME ELECTIVES (PE)

SEMESTER	Code no.	Name of the PE courses	Prerequisite/ Co-requisite courses	L	T	P	C
PE-I							
SEM-V	DPE521	Computer Graphics		3	0	0	3
	DPE522	Introduction to Cloud Computing		3	0	0	3
	DPE523	Object-oriented programming in C++		3	0	0	3
PE-II							
SEM- V	DPE524	Introduction to Computer Algorithms		3	0	0	3
	DPE525	Data Science		3	0	0	3
	DPE526	Multimedia and Animation		3	0	0	3
PE-III							
SEM- VI	DPE621	Foundations of AI/ML		3	0	0	3
	DPE622	Operations Research		3	0	0	3
	DPE623	Cyber Security		3	0	0	
PE-IV							
SEM- VI	DPE624	Internet of Things		3	0	0	3
	DPE625	Machine Learning		3	0	0	3
	DPE626	Computer Oriented Numerical and Statistical Methods		3	0	0	3

(RAMNISH SINHA)

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DEPARTMENT OF COMPUTER ENGINEERING

OPEN ELECTIVES (OE)*

SEMESTER	Code no.	Name of the PE courses	Prerequisite/ Co-requisite courses with code	L	T	P	C
OE-I							
SEM-IV	DOE421	C Programming Language		3	0	0	3
	DOE422	Introduction to Python		3	0	0	3
	DOE423	Data Base Concepts		3	0	0	3
OE-II							
SEM- V	DOE521	Web Programming Concepts		3	0	0	3
	DOE522	Data Structures in C		3	0	0	3
	DOE523	PC Maintenance & Networking		3	0	0	3
OE-III							
SEM- VI	DOE621	Intro. to Computer Graphics		3	0	0	3
	DOE622	Intro. to Machine Learning		3	0	0	3
	DOE623	Introduction to Multimedia		3	0	0	3
*OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS							

UNIVERSITY POLYTECHNIC
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DEPARTMENT OF COMPUTER ENGINEERING

COMPUTER PROGRAMMING

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 301			COURSE TITLE: Computer Programming				
COMPULSORY: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HRS/WK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:

1. To demonstrate proficiency in algorithm development, programming debugging, understanding the structure of a C program, and utilizing various data types, variables, and constants effectively.
2. To enable students to apply arithmetic operators, increment and decrement operations, assignment operators, and develop a clear understanding of operator precedence and associativity.
3. To enable them to use conditional statements and various looping constructs to control the flow of program execution effectively.
4. To enable them to use iterative constructs efficiently, along with understanding the concepts of continue and break statements for iteration control.
5. To train them to perform operations on array elements, define and use functions, manage local and global variables, and manipulate data using pointers.

COURSE OUTCOMES:

At the end of the course students will be able to:

1.	Demonstrate proficiency in algorithm development, programming debugging, understanding the structure of a C program, and utilizing various data types, variables, and constants effectively.
2.	Apply arithmetic operators, increment and decrement operations, assignment operators, and have a clear understanding of operator precedence and associativity.
3.	Use conditional statements like if(), nested if(), switch()...case, and various looping constructs to control the flow of program execution effectively.
4.	Use for(), while(), and do...while() loops efficiently, along with understanding the concepts of continue and break statements for loop control.
5.	Declare and initialize arrays, perform operations on array elements, define and use functions, manage local and global variables, and manipulate data using pointers effectively.

COURSE CONTENT DETAILS:

Module	Topics/Subtopics
1.	**TITLE:** Programming techniques and overview of c language 1.1 Algorithm and programming development, program debugging 1.2 Structure of a C program, flowcharts 1.3 Data-types, variables and constants, Preprocessors. 1.4 Declaration and initialization of variables, sizeof() operator 1.5 I/O Functions (Formatted and Unformatted) Course Outcome: CO1 Teaching Hours: 6 hrs
2.	**TITLE:** Operators and Expressions 2.1 Arithmetic operators 2.2 Increment and decrement 2.3 Assignment operators, type casting 2.4 Precedence and associativity 2.5 Math functions Course Outcome: CO2 Teaching Hours: 6 hrs
3.	**TITLE:** Decision Making , Branching and Looping: 3.1 if() statement 3.2 Relational and logical operators, conditional operators 3.3 Nested if() statement, if()… else if() ladder 3.4 switch() … case statement, default and break Course Outcome: CO3 Teaching Hours: 8 hrs
4.	**TITLE:** Iterative (Looping) Statements 4.1 for() loop 4.2 while() loop 4.3 do… while() loop 4.4 continue and break statements 4.5 Nested loop Course Outcome: CO4 Teaching Hours: 10 hrs
5.	**TITLE:** Arrays, Functions and Pointers 5.1 Declaration and initialization of 1D arrays 5.2 Operations on array elements 5.3 Idea of functions- Function Declaration, Defining functions, Function call 5.4 Local and global variables, scope and lifetime of variables 5.5 Pointers: declaration and initialization, Accessing variable through pointer. Course Outcome: CO5 Teaching Hours: 10 hrs

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Programming in C	Kamthane, A. N., Kamthane, A. A. Pearson, 3e	978-9332543553
2.	Programming with C	Gottfried, B. S., McGraw Hill (Schaum's Outlines), 4e	978-9353160272
3.	Programming in ANSI C	Balagurusamy, E., McGraw Hill.8e	978-9351343202

E-REFERENCES:

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	2	3	0	1	2	3	3	3
CO2	3	3	2	3	0	1	2	3	3	2
CO3	3	3	3	3	0	1	2	3	3	3
CO4	3	3	3	3	0	1	2	3	3	3
CO5	3	3	3	3	0	1	2	3	3	3

SIGNATURES:

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DEPARTMENT OF COMPUTER ENGINEERING

INTRODUCTION TO DBMS

PROGRAMME: Diploma in Computer Engineering							
COURSECODE: DCE 303			COURSE TITLE: Introduction to DBMS				
COMPULSORY: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:

1. Provides foundational knowledge of database concepts, essential for managing and organizing large volumes of data.
2. Teaches skills in designing, implementing, and maintaining databases, which are critical for efficient data storage and retrieval.
3. Equips students with the ability to use SQL and other query languages, enabling effective data manipulation and analysis.
4. Offers insights into database management systems, including transaction management, concurrency control, and data security.
5. Prepares students for careers in database administration, data analysis, and software development, ensuring they can handle real-world data challenges.

COURSE OUTCOMES:

At the end of the course Students will be able to:

1.	Understand the purpose of using database systems and various data models and types of users.
2.	Create Entity-Relationship (ER) diagram with their understanding of entities and relationship existing among them.
3.	Form statements in relational query languages- Relational Algebra and Relational Calculus, and Structured Query Language (SQL), for different specific needs.
4.	Apply the principles of normalization to decompose the table preventing redundancy and anomalies.
5.	Understand the idea of security and integrity in databases, including backup and recovery strategies.

COURSE CONTENT DETAILS:

Module	Topics/Subtopics
1.	**TITLE:** Introduction to Database 1.1 Database Applications, Purpose of Database Systems, 1.2 View of Data – Data Abstraction – Instances and Schemas , Data Models – the ER Model – Relational Model – Other Models 1.3 Data base Users and Administrators-Naïve users-Application programmers-Sophisticated users-Specialized users , 1.4 Transaction Management – data base Architecture – Storage Manager 1.5 Database Languages – DDL, DML, DCL– Database Access for applications Course Outcome: CO1 Teaching Hours :6 hrs
2.	**TITLE:** Data base design 2.1 Entity Relationship Model 2.2 Relationships and Relationship sets 2.3 ER Design Issues– Weak Entity Sets, ER Database schema, ER Schema-to-tables, Keys-Schema Diagrams 2.4 Generalization, Specialization and Aggregation Course Outcome: CO2 Teaching Hours :8 hrs
3.	**TITLE:** Relational Query Languages 3.1 Relational Algebra– Selection, Projection and Set Operations 3.2 Relational calculus– Tuple Relational Calculus, Domain relational calculus. 3.3 Structured Query Language (SQL)– CREATE, INSERT, UPDATE, DELETE, SELECT Statements. 3.4 Set Operations, ORDER BY, HAVING, GROUP BY Clauses, Aggregate Functions, Course Outcome: CO3 Teaching Hours :10 hrs
4.	**TITLE:** Database Normalization 4.1 Redundancy and Anomalies 4.2 Functional dependencies 4.3 Lossless Decomposition 4.4 1st, 2nd and 3rd Normal Course Outcome: CO4 Teaching Hours :8 hrs
5.	**TITLE:** Security and Integrity 5.1 Backup and Recovery 5.2 Database security 5.3 Previlages 5.5 Data integrity 5.6 Types of integrity constraints Course Outcome: CO5 Teaching Hours :8 hrs

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Data base System Concepts	Silberschatz, A., Korth, H. F., Sudarshan, S., McGraw hill, 7e,	978-0078022159
2.	Introduction to Database Management System	ISRD Group, Tata McGraw-Hill, , 2013	978-0070591196

E-REFERENCES:

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	1	0	0	2	3	3	1	0
CO2	3	2	3	2	0	2	3	3	2	2
CO3	3	3	2	2	0	2	3	3	3	3
CO4	3	3	2	2	0	2	3	3	2	2
CO5	3	2	1	2	0	2	3	3	1	1

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DEPARTMENT OF COMPUTER ENGINEERING

COMPUTER ORGANIZATION

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 305		COURSE TITLE: Computer Organization					
COMPULSORY/OPTIONAL: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:

1. Provides a deep understanding of how computers work at a fundamental level, essential for all computer science and engineering disciplines.
2. Helps students understand the design of computer systems, enhancing their problem-solving and analytical skills.
3. Offers insights into the latest advancements in computer architecture, preparing students to adapt to emerging technologies.
4. Lays the groundwork for specialized fields such as computer engineering, embedded systems, and hardware design, facilitating career growth and advanced study opportunities.

COURSE OUTCOMES:

At the end of the course Students will be able to:

1.	Demonstrate proficiency in converting between different number systems, manipulate binary codes, and perform binary arithmetic operations accurately.
2.	Develop the ability to apply Boolean algebra postulates and theorems, analyze Boolean functions, and design logic circuits using various logic gates.
3.	Simplify logical expressions using sum-of-products and product-of-sums forms, apply Karnaugh maps for minimization, and handle don't care conditions efficiently.
4.	Demonstrate competence in designing and implementing combinational logic circuits such as adders, subtractors, decoders, encoders, multiplexers, and demultiplexers.
5.	Gain proficiency in analyzing synchronous sequential circuits, interpreting timing diagrams, designing and implementing various types of flip-flops, and applying them in registers and counters for specific applications.

COURSE CONTENT DETAILS:

Module	Topics/Subtopics
1.	**TITLE**: Number Systems 1.1. Review of Number Systems and Conversion 1.2. Binary Codes- ASCII, EBCDIC, Excess-3, BCD, Gray Code 1.3. (r-1)'s complements, r's complement 1.4. Signed Binary Numbers 1.5. Binary arithmetic (addition, subtraction) Course Outcome: CO1 Teaching Hours :8 hrs
2.	**TITLE**: Boolean Algebra and Logic Gates 2.6 Boolean Algebra: Postulates and Theorems 2.7 Boolean Functions and Logic Gates 2.8 Truth table of a Logic Circuit 2.9 Drawing Logic Circuit from Boolean Function 2.10 Designing Logic Circuit from Truth Table Course Outcome: CO2 Teaching Hours :8 hrs
3.	**TITLE**: Circuit Minimization 3.5 Sum of products (SOP) forms 3.6 Product of sums (POS) forms 3.7 K-map Simplification (2-, 3-, 4-variables) 3.8 Don't Care Conditions 3.9 Simplification using Boolean algebra Course Outcome: CO3 Teaching Hours :8 hrs
4.	**TITLE**: Combinational Logic 4.6 Half-Adder 4.7 Full-Adder 4.8 Subtractor 4.9 Decoder and Encoder 4.10 Multiplexers and De-multiplexer Course Outcome: CO4 Teaching Hours :8 hrs
5.	**TITLE:** Sequential Circuits 5.6 Synchronous Clocked Sequential Circuits 5.7 Timing Diagram 5.8 Latches (SR and D) 5.9 Flip-flops (SR, JK, D, T) 5.10 Characteristic Table and Characteristic Equation 5.11 Master slave Flip-flop 5.12 Applications of Flip-flops- Registers and Counters Course Outcome: CO5 Teaching Hours :8 hrs

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Digital Design: With an Introduction to the Verilog HDL, VHDL, and System Verilog	M. Morris Mano and Michael D. Ciletti, Pearson, 6e, 2018	978-9353062019
	Digital Electronics	B.R. Gupta, V. Singhal, S. K. Kataria & Sons, 2010	978-8185749600

CO VS PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	3	1	2	0	1	3	3	2	1
CO2	3	3	2	3	0	1	3	3	3	2
CO3	3	3	2	3	0	1	3	3	3	2
CO4	3	3	3	3	0	1	3	3	3	3
CO5	3	3	2	3	0	1	3	3	2	3

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DEPARTMENT OF COMPUTER ENGINEERING

MATHEMATICAL FOUNDATION FOR COMPUTER SCIENCE

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 307			COURSE TITLE: Mathematical Foundation for Computer Science				
COMPULSORY: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:

1. The course provides essential knowledge in sets, relations, functions, matrix algebra, determinants, solving linear equations, basic statistics, and probability.
2. These concepts are fundamental for understanding and solving computational problems in various domains of computer science.
3. Also forms a sound background for courses like algorithms analysis, data analysis, machine learning, and computer graphics.
4. Mastering these foundations equips students with critical skills necessary for advanced studies and practical applications in the field.

COURSE OUTCOMES:

After completing this course students should be able to:

CO1	Develop an understanding of sets, relations, and functions, and their applications in computer science.
CO2	Gain proficiency in matrix algebra and determinants, and their use in solving linear equations and other computational problems.
CO3	Learn to solve simultaneous linear equations using matrix methods and elementary row operations.
CO4	Acquire skills in basic statistical methods, including measures of central tendency, dispersion, correlation, and linear regression.
CO5	Understand and apply the concepts of probability, random variables, and probability distributions in various contexts.

COURSE CONTENT DETAILS:

MODULE	TOPIC/SUBTOPIC
1.	**TITLE: Sets, Relations and Functions** 1.1. Sets and: Sets and their representations, The empty set, equivalent set, Subset; power set; Universal set; Venn diagrams; Operations on sets; Complement of a set; Cartesian product 1.2. Relations: Relation, Inverse Relation, Composition of relation, Equivalence of relations and Classes. 1.3. Functions: Functions as a special set Relation, Representation of function, Types of Functions, some examples of Functions applicable in Computer Science. Course Outcome: CO1 Teaching Hours: 8 hrs
2.	**TITLE: Matrices and Determinant** 2.1.Matrix Algebra: Definition of matrix, Algebraic operations on matrices, Addition and Scalar Multiplication. 2.2.Matrix Multiplication and its properties. 2.3.Definition and expansion of determinants of order 2 and 3. Minor, Cofactor of an element of a matrix. 2.4.Adjoint of a matrix and Inverse of matrix by Adjoint method. Course Outcome: CO2 Teaching Hours: 8 hrs
3.	**TITLE: Solution of Simultaneous Linear Equations** 3.1. Solution of simultaneous equations containing 2 and 3 unknowns by matrix methods. 3.2. Elementary Row Operations, Inverse of a matrix by Row operations. Solution of Simultaneous Linear Equations by Row Operations. 3.3. Rank of matrix by Echelon form. 3.4. Introduction to Eigen Values and Eigen Vectors. Course Outcome: CO3 Teaching Hours: 8 hrs
4.	**TITLE: Basic Statistics** 4.1. Measures of Central tendency (mean, median, mode) for ungrouped and grouped frequency distribution. 4.2. Measures of Dispersion such as range, mean deviation, Standard Deviation, Variance and coefficient of variation. 4.3. BivariateData- Correlation: Concepts of a Bivariate Data Set, Correlation Coefficient. 4.4. Bivariate Data-Linear Regression: The Regression line. Course Outcome: CO4 Teaching Hours: 8 hrs
5.	**TITLE: Probability and Random Variates** 5.1.Concepts of Probability: Experiment and Sample Space, Events and Operations with Events, Probability of an Event, Basic Probability Rules, Applications of Probability Rules, Conditional Probability. 5.2.Random Variables: How Random Variable Arise, Probability Distribution of a Random Variable, Mean or Expected Value of a Random Variable. Variance and Standard Deviation of a Random Variable.

	5.3.Binomial Experiments: Structure of a Binomial Experiment, Binomial Probability Distribution. 5.4.Normal Curve and Normal Distribution: Properties of a Normal Curve, Normal Probability Distribution, Areas Under a Normal Curve. Course Outcome: CO5 Teaching Hours: 8 hrs

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition, and Year of publication	ISBN
1	Senior Secondary School Mathematics for Class 11	R. S. Agarwal, Bharati Bhavan Publishers & Distributers. 2020e	978-9350271476
2	Senior Secondary School Mathematics for Class 12	R. S. Agarwal, Bharati Bhavan Publishers & Distributers. 2020e	978-9350271247
3	Statistical Methods (Combined edition volume 1 & 2)	N. G. Das, McGraw Hill Education; 1st edition	978-0070083271

E-REFERENCES:

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	1	0	0	3	3	2	1
CO2	3	3	2	1	0	0	3	3	2	1
CO3	3	3	1	1	0	0	3	3	2	1
CO4	3	3	1	1	0	0	3	3	2	1
CO5	3	3	1	1	0	0	3	3	2	1

SIGNATURES:

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DEPARTMENT OF COMPUTER ENGINEERING

Universal Human Values-II

PROGRAMME: Diploma in Computer Engineering							
COURSECODE: DHS 301			COURSE TITLE: Universal Human Values- II				
COMPULSORY: Mandatory Course							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HRS/WEEK	CREDIT	PE	FINAL	TOTAL
2	1	0	3	3	50	50	100

RATIONALE: The objective of the course is four fold:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society, and nature/existence.
2. Understanding (or developing clarity) of the harmony in the human being, family, society, and nature/existence.
3. Strengthening of self-reflection.
4. Development of commitment and courage to act.

COURSE OUTCOMES: At the end of the course, the students are expected to:

CO1	Be more aware of themselves, and their surroundings (family, society, nature).
CO2	Become more responsible in life, and in handling problems with sustainable solutions, while keeping human relationships and human nature in mind.
CO3	Have better critical ability.
CO4	Become sensitive to their commitment towards what they have understood (human values, human relationships, and human society).
CO5	Apply what they have learned to their own self in different day-to-day settings in real life; at least a beginning would be made in this direction.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUB-TOPICS
1	**Introduction - Need, Basic Guidelines, Content and Process for Value Education** **Lecture 1:** Purpose and motivation for the course, recapitulation from Universal Human Values-I **Lecture 2:** Self-Exploration – what is it? Its content and process; 'Natural Acceptance' and Experiential Validation as the process for self-exploration **Lecture 3:** Continuous Happiness and Prosperity - A look at basic Human Aspirations **Lecture 4:** Right understanding, Relationship, and Physical Facility - the basic requirements for fulfillment of aspirations of every human being with their correct priority **Lecture 5:** Understanding Happiness and Prosperity correctly - A critical appraisal of the current scenario

	Lecture 6: Method to fulfill the above human aspirations: understanding and living in harmony at various levels **Practice Session 1:** Discuss natural acceptance in human beings as the innate acceptance **Practice Session 2:** Arbitrariness in choice based on liking-disliking **Practice Session 3:** Natural acceptance in human beings as the innate acceptance for living with responsibility (living in relationship, harmony, and co-existence) Course Outcome: CO1 Teaching Hours: 9 hrs Marks: 20 (PE + FINAL)
2	Module 2 – Understanding Harmony in the Human Being - Harmony in Myself! Lecture 7: Understanding human being as a co-existence of the sentient 'I' and the material 'Body' Lecture 8: Understanding the needs of Self ('I') and 'Body' - happiness and physical facility Lecture 9: Understanding the Body as an instrument of 'I' (I being the doer, seer, and enjoyer) Lecture 10: Understanding the characteristics and activities of 'I' and harmony in 'I' Lecture 11: Understanding the harmony of 'I' with the Body: Sanyam and Health; correct appraisal of physical needs, meaning of Prosperity in detail Lecture 12: Programs to ensure Sanyam and Health Practice Session 4: Discuss the role others have played in making material goods available to me Practice Session 5: Differentiate between prosperity and accumulation Practice Session 6: Discuss program for ensuring health vs. dealing with disease Course Outcome: CO2 Teaching Hours: 9 hrs Marks: 20 (PE +FINAL)
3	Module 3 – Understanding Harmony in the Family and Society - Harmony in Human-Human Relationship Lecture 13: Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship Lecture 14: Understanding the meaning of Trust; Difference between intention and competence Lecture 15: Understanding the meaning of Respect; Difference between respect and differentiation; the other salient values in relationship Lecture 16: Understanding the harmony in society (society being an extension of family): Resolution, Prosperity, fearlessness (trust), and co-existence as comprehensive Human Goals Lecture 17: Visualizing a universal harmonious order in society - Undivided Society, Universal Order - from family to world family Practice Session 7: Reflect on relationships in family, hostel, and institute as extended family, Teacher-student relationship with real-life examples Practice Session 8: Goal of education

	Practice Session 9: Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives Course Outcome: CO1, CO2, CO3, CO4 Teaching Hours: 8 hrs Marks: 20 (PE + FINAL)
4	Module 4 – Understanding Harmony in the Nature and Existence - Whole Existence as Coexistence Lecture 18: Understanding the harmony in the Nature Lecture 19: Interconnectedness and mutual fulfillment among the four orders of nature - recyclability and self-regulation in nature Lecture 20: Understanding Existence as Co-existence of mutually interacting units in all-pervasive space Lecture 21: Holistic perception of harmony at all levels of existence Practice Session 10: Discuss human beings as the cause of imbalance in nature and pollution Practice Session 11: Discuss human beings as the cause of depletion of resources Practice Session 12: Discuss the role of technology Course Outcome: CO1, CO2, CO3, CO4 Teaching Hours: 7 hrs Marks: 20 (PE + FINAL)
5	Module 5: Implications of the Above Holistic Understanding of Harmony on Professional Ethics Lecture 22: Natural acceptance of human values Lecture 23: Definitiveness of Ethical Human Conduct Lecture 24: Basis for Humanistic Education, Humanistic Constitution, and Humanistic Universal Order Lecture 25: Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems c. Ability to identify and develop appropriate technologies and management patterns for above production systems Lecture 26: Case studies of typical holistic technologies, management models, and production systems Lecture 27: Strategy for transition from the present state to Universal Human Order: a. At the level of individual: as socially and ecologically responsible engineers, technologists, and managers b. At the level of society: as mutually enriching institutions and organizations Lecture 28: Sum up Practice Session 13: Exercises to discuss the conduct as an engineer or scientist Practice Session 14: Case Studies to discuss the conduct as an engineer or scientist Course Outcome: CO1, CO2, CO3, CO4, CO5 Teaching Hours: 9 hrs

	Marks: 20 (PE + FINAL)

TEXT BOOK:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	A Foundation Course in Human Values and Professional Ethics	R R Gaur, R Asthana,G P Bagaria, 3rd Revised Edition, UHV Publications, New Delhi, 2023	978-8195770373

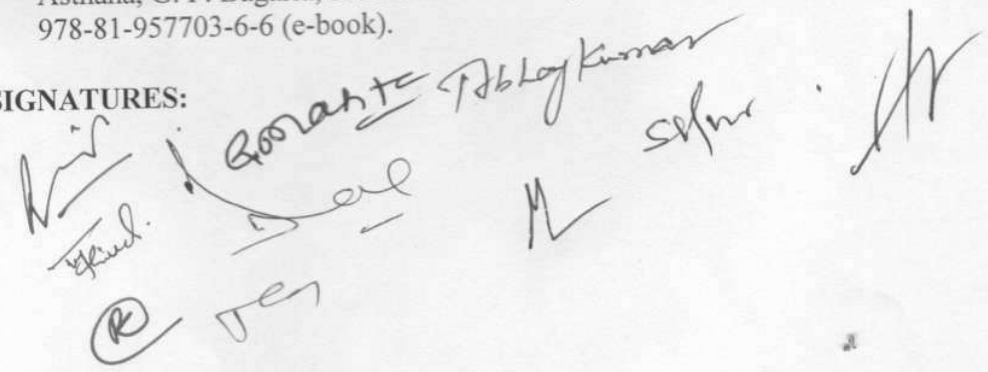
REFERENCE BOOKS:

1. Jeevan Vidya: Ek Parichaya by A. Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.
2. Human Values by A. N. Tripathi, New Age Intl. Publishers, New Delhi, 2004.
3. The Story of Stuff (Book).
4. The Story of My Experiments with Truth by Mohandas Karamchand Gandhi.
5. Small is Beautiful by E. F. Schumacher.
6. Slow is Beautiful by Cecile Andrews.
7. Economy of Permanence by J. C. Kumarappa.
8. Bharat Mein Angreji Raj by Pandit Sunderlal.
9. Rediscovering India by Dharampal.
10. Hind Swaraj or Indian Home Rule by Mohandas K. Gandhi.
11. India Wins Freedom by Maulana Abdul Kalam Azad.
12. Vivekananda by Romain Rolland (English).
13. Gandhi by Romain Rolland (English).

E-REFERENCES:

1. A Foundation Course in Human Values and Professional Ethics by R. R. Gaur, R. Asthana, G. P. Bagaria, 3rd Revised Edition, UHV Publications, New Delhi, 2023; ISBN: 978-81-957703-6-6 (e-book).

SIGNATURES:



UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

COMPUTER PROGRAMMING LAB

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 302	COURSE TITLE: Computer Programming Lab						
COMPULSORY/OPTIONAL: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

RATIONALE:

1. Provides hands-on experience in writing, compiling, and debugging C programs, reinforcing theoretical concepts learned in lectures.
2. Enhances problem-solving skills by implementing algorithms and data structures in C, fostering logical and analytical thinking.
3. Develops a strong foundation in procedural programming, which is crucial for understanding more advanced programming paradigms.
4. Prepares students for real-world programming challenges and advanced courses in computer science by building a solid understanding of the C language and its applications.

COURSE OUTCOMES:

After the completion of the course, students will be able to:

CO1	Demonstrate proficiency in algorithm development, programming debugging, understanding the structure of a C program, and utilizing various data types, variables, and constants effectively.
CO2	Apply arithmetic operators, increment and decrement operations, assignment operators, and have a clear understanding of operator precedence and associativity.
CO3	Use conditional statements like if(), nested if(), switch()...case, and various looping constructs to control the flow of program execution effectively.
CO4	Use for(), while(), and do...while() loops efficiently, along with understanding the concepts of continue and break statements for loop control.
CO5	Declare and initialize arrays, perform operations on array elements, define and use functions, manage local and global variables, and manipulate data using pointers effectively.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1.	**TITLE: Programming techniques and overview of C language** 1.1 Write a program to declare and initialize variables of different data types (int, float, char, double) and display their values. 1.2 Write a program that uses preprocessor directives to define a constant value for PI and calculate the area of a circle. 1.3 Write a program that declares variables of different data types without initializing them. Print their values to observe the default values assigned. 1.4 Write a program to find the size of various data types (int, float, char, double) using the sizeof() operator. 1.5 Write a program to take input from the user using scanf() and display it using printf() in a formatted manner. Outcome: CO1 Teaching Hours: 4 hrs
2.	**TITLE: Operators and Expressions** 2.1 Write a program that takes two numbers as input and performs addition, subtraction, multiplication, division, and modulo operations on them, displaying the results. 2.2 Implement a program that calculates the area and perimeter of a rectangle using arithmetic operators. 2.3 Create a simple calculator program that allows the user to perform basic arithmetic operations (+, -, *, /) on two numbers. 2.4 Write a program that demonstrates the use of prefix and postfix increment and decrement operators. 2.5 Write a program to convert temperature from Celsius to Fahrenheit using appropriate assignment operators and type casting. 2.6 Implement a program that swaps two numbers using assignment operators without using a temporary variable. 2.7 Create a program that calculates compound interest using assignment operators and type casting. 2.8 Create a program to compare the output of different expressions by changing the grouping of operators. 2.9 Write a program to find the square root of a number using the sqrt() function from the math library. 2.10 Implement a program that calculates the power of a number using the pow() function. Outcome: CO2 Teaching Hours: 6 hrs

3.	**TITLE: Decision Making, Branching and Looping:** 3.1. Write a program that takes an integer input from the user and checks if it is positive, negative, or zero using if() statements. 3.2. Implement a program that determines if a given year is a leap year using if() statement. 3.3. Create a program that checks if a character entered by the user is a vowel or a consonant using if() statement. 3.4. Write a program to compare two numbers using relational operators (<, >, ==, !=) and display the result. 3.5. Implement a program that checks if a student is eligible for voting based on their age using logical operators (&&, ||). 3.6. Create a program that determines the largest of three numbers entered by the user using conditional operator (ternary operator). 3.7. Write a program that categorizes a student's performance based on their marks using nested if() statements. 3.8. Implement a program that determines the grade of a student based on their percentage using if()...else if() ladder. 3.9. Create a program that checks if a year is a leap year or not using nested if() statements. 3.10. Write a program that displays the name of a day corresponding to the input number using switch()...case statement. 3.11. Implement a program that converts a given month number into its corresponding name using switch() statement. 3.12. Create a program that calculates the number of days in a month based on the month number entered by the user using switch() statement. Outcome: CO3 Teaching Hours: 6 hrs
4.	**TITLE: Iterative (Looping) Statements** 4.1. Write a program that prints the first 10 natural numbers using a for loop. 4.2. Implement a program that calculates the factorial of a number using a for loop. 4.3. Create a program that prints the multiplication table of a given number using a for loop. 4.4. Write a program that prints all natural numbers from 100 to 1 using a for loop. 4.5. Write a program that prints the A to Z using a for loop. 4.6. Write a program that prints the Z to A using a for loop. 4.7. Write a program that prints even numbers between 1 and 20 using a while loop. 4.8. Implement a program that checks if a number is prime or not using a while loop. 4.9. Create a program that calculates the sum of digits of a number using a while loop.

	4.10. Write a program that prints numbers from 1 to 10 using a do...while loop. 4.11. Implement a program that takes input from the user until they enter a negative number using a do...while loop. 4.12. Create a program that calculates the factorial of a number using a do...while loop. 4.13. Write a program to print numbers from 1 to 20, skipping multiples of 5 using the continue statement. 4.14. Implement a program that finds the first occurrence of a given element in an array using a for loop and the break statement. 4.15. Create a program that checks if a number is present in an array using a while loop and the break statement. 4.16. Write a program that prints a pattern of stars in a right-angled triangle using nested for loops. 4.17. Implement a program that prints the multiplication table of numbers from 1 to 5 using nested while loops. 4.18. Create a program that prints a pattern of numbers in a pyramid shape using nested do...while loops Course Outcome: CO4 Teaching Hour: 4 hrs
5.	**TITLE: Arrays, Functions and Pointers** 5.1. Write a program that declares and initializes an array of integers and prints its element 5.2. Implement a program that takes input from the user to initialize an array and then displays the sum of all elements. 5.3. Write a program to calculate the average of elements in an array of integers. 5.4. Write a function to calculate the factorial of a given number and call this function from main(). 5.5. Write a program that demonstrates the scope of local variables by declaring variables with the same name in different functions. 5.6. Write a program that declares a pointer variable, initializes it to point to an integer, and then prints the value of the integer using the pointer. 5.7. Implement a program that swaps the values of two variables using pointers. Course Outcome: CO5 Teaching Hours: 4 hrs

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Programming in C	Kamthane, A. N., Kamthane, A. A.Pearson	978-9332543553
2.	Programming with C	Gottfried, B. S. McGraw Hill (Schaum's Outlines)	978-9353160272

CO VS PO MAPPING

	PO1	PO	PO3	PO4	PO5	PO6	PO7	PSO	PSO2	PSO3
CO1	3	3	2	3	0	1	2	3	3	3
CO2	3	3	2	3	0	1	2	3	3	3
CO3	3	3	3	3	0	1	2	3	3	3
CO4	3	3	2	3	0	1	2	3	3	3
CO5	3	3	3	3	0	1	2	3	3	3

SIGNATURES:

UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

DBMS LAB

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 304			COURSE TITLE: DBMS Lab				
COMPULSORY/OPTIONAL: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

RATIONALE:

1. Provides hands-on experience in database management and SQL.
2. Enables understanding of fundamental database concepts and real-world applications.
3. Enhances proficiency in creating, managing, and manipulating databases.
4. Develops skills in writing complex queries and utilizing Oracle functions.
5. Prepares students for advanced database management tasks and applications.

COURSE OUTCOMES:

1. Students will be able to create, modify, and manage database tables using SQL.
2. Students will gain proficiency in writing SQL queries to retrieve and manipulate data.
3. Students will learn to apply various Oracle functions to perform complex data manipulations.
4. Students will be able to write SQL queries to group data, retrieve unique records, and sort data.
5. Students will understand and implement different types of join operations and basic PL/SQL concepts.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE: Introduction to SQL** 1.1 Data Definition Language to Create Tables 1.2 Display the table structure 1.3 Data Manipulation Language Insert data in table 1.4 Insert Null explicitly in values by using the word null. 1.5 Specify the columns explicitly in the insert command 1.6 Retrieving all data from a single table 1.7 Retrieving data of selected columns 1.8 Modifying the structure of Tables 1.9 Renaming Tables 1.10 Creating synonyms

	Course Outcome: CO1 Teaching Hours: 4 hrs.
2	**TITLE: Writing queries** 2.1 Write a query based on Select, From, Where 2.2 Write a query based on Arithmetic Operators 2.3 Write a query based on Logical Operators 2.4 Write a query to sort data in a table 2.5 Write a query based on range searching 2.6 Write a query based on pattern matching 2.7 Write a query based on IN, NOT IN predicated. Course Outcome: CO2 Teaching Hours: 4 hrs.
3	**TITLE: Oracle Functions** 3.1 Write a query based on Group functions, SUM, MIN, COUNT, MAX, ROUND 3.2 Write a query based on String functions, LOWER INITCAP, UPPER, SUBSTR 3.3 Write a query based to convert a value of a NUMBER data-type to a CHARACTER data-type 3.4 Write a query based on date conversion function 3.5 Write a query for manipulating date. Course Outcome: CO3 Teaching Hours: 4 hrs.
4	**TITLE: Grouping data from tables** 4.1 Write a query to retrieve all the rows from tables 4.2 Write a query to retrieve selected row from tables with the use of a WHERE clause, which returns only those rows that meet the conditions specified. 4.3 Write a query to retrieve unique rows from the table, with the use of DISTINCT clause. 4.4 Write a query to retrieve row in the sorted order i.e. ascending or descending order, as specified, with the use of ORDER BY clause. 4.5 Write a nested query to insert records in a target table. 4.6 Write a nested query to create tables and insert records in the table created. 4.7 Write a nested query to update records in a target table. Course Outcome: CO4 Teaching Hour: 6 hrs.
5	**TITLE: Join Operator** 5.1 Write a query based to INNER join operator 5.2 Write a query based to OUTER (LEFT, RIGHT, FULL) join operator. 5.3 Write a query based to CROSS join operator. 5.4 Write a query to show how to declare variable in PL/SQL 5.5 Write a query to demonstrate the ROLLBACK event. Course Outcome: CO5 Teaching Hours: 6 hrs.

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	SQL/PLSQL for Oracle 9i	P.S.Deshpande, dreamtech,7th ed.	81-7722471-9
2.	SQL, PL/ SQL The programming language of oracle	Ivan Bayross, BPB Publications, 2010	9788176569644

E-REFERENCES:

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	2	3	0	2	3	3	2	3
CO2	2	3	2	3	0	2	3	2	3	3
CO3	2	3	2	3	0	2	3	2	3	3
CO4	2	3	2	3	0	2	3	2	3	3
CO5	2	3	2	3	0	2	3	2	3	3

SIGNATURES:

UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

COMPUTER ORGANIZATION LAB

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 306			COURSE TITLE: Computer Organization Lab				
COMPULSORY/OPTIONAL: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HRS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

RATIONALE:

1. Provides practical experience with the internal workings of computers, reinforcing theoretical knowledge from lectures.
2. Enhances understanding of computer hardware components and their interactions.
3. Develops troubleshooting and debugging skills through real-world lab exercises and experiments.
4. Prepares students for careers in computer engineering, systems design, and related fields.
5. Provides them the foundational skills essential for advanced study and professional work.

COURSE OUTCOMES:

After the completion of the course, students will be able to:

CO1	Verify functionality of basic and universal logic gates using ICs and simulation software.
CO2	Construct AND and OR gates using NAND and NOR gates with ICs and simulation software.
CO3	Apply De Morgan's theorems to simplify Boolean expressions and validate through ICs and simulations.
CO4	Design and implement combinational logic circuits like adders, subtractors, decoders, encoders, multiplexers, and demultiplexers.
CO5	Analyze synchronous sequential circuits, interpret timing diagrams, and design flip-flops for use in registers and counters.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	TITLE: LOGIC GATES 1.1 Verification of basic Logic gates using ICs 1.2 Verification of basic Logic gates using Simulator 1.3 Verification of Universal logic gates using ICs

	1.4 Verification of Universal logic gates using Simulator Course Outcome: CO1 Teaching Hours: 4 hrs
2	TITLE: Circuit designing using Logic Gates 2.1 Construction of AND gate using NAND Gate using ICs 2.2 Construction of OR gate using NAND Gate using ICs 2.3 Construction of AND gate using NOR Gate using ICs 2.4 Construction of OR gate using NOR Gate ICs 2.5 Construction of AND gate using NAND Gate using Simulator 2.6 Construction of OR gate using NAND Gate using Simulator 2.7 Construction of AND gate using NOR Gate using Simulator 2.8 Construction of OR gate using NOR Gate Simulator 2.9. Write a query based on IN, NOT IN predicated. Course Outcome: CO2 Teaching Hours: 4
3	TITLE: Circuit Minimization 3.1 Prove DE – Morgan's 1st theorem using ICs 3.2 Prove DE – Morgan's 2nd theorem using ICs 3.3 Prove DE – Morgan's 1st theorem using simulator 3.4 Prove DE – Morgan's 2nd theorem using simulator 3.5 Simplification and Realization of Boolean Functions, using NAND gates IC. 3.6 Simplification and Realization of Boolean Functions, using NAND gates using simulator. Course Outcome: CO3 Teaching Hours: 6 hrs
4	TITLE: Combinational Logic 4.1 Construction of Half Adder. 4.2 Construction of Full Adder. 4.3 Design and implementation of Multiplexer using logic gates. 4.4 Design and implementation of De-multiplexer using logic gates. 4.5 Design and implementation of encoder using logic gates. 4.6 Design and implementation of decoder using logic gates. Course Outcome: CO4 Teaching Hour: 6 hrs
5	TITLE:Sequential Circuits 5.1 Design and realization of S.R. latch. 5.2 Design and realization of S.R. flip-flop.

	5.3	Design and realization of J.K. flip-flop.
	5.4	Design and realization of D flip-flop.
	5.5	Design and realization of T flip-flop.
	Course Outcome: CO5	Teaching Hours: 4 hrs

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Digital Design: With an Intr	M. Morris Mano and Michael D. Ciletti Pearson	978-9353062019
2.	Digital Electronics	B.R. Gupta, V. Singhal S. K. Kataria & Sons	

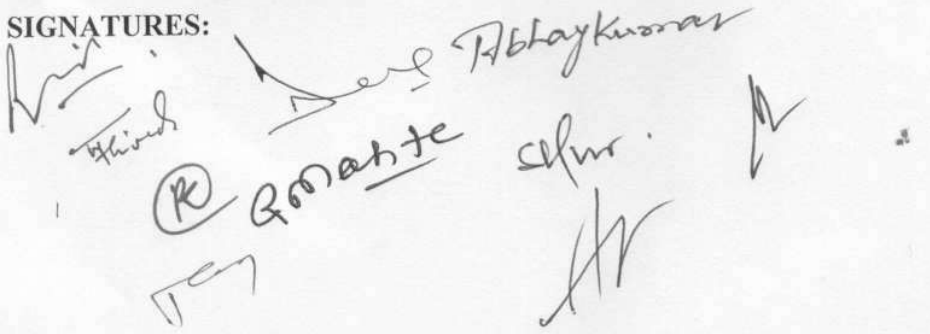
E-REFERENCES:

https://play.google.com/store/apps/details?id=com.duracodefactory.logiccircuitsimulatorpro&hl=en_US&pli=1

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	1	2	3	0	1	3	3	1	3
CO2	3	1	2	3	0	1	3	3	1	3
CO3	3	2	3	3	0	1	3	3	2	3
CO4	3	2	3	3	0	1	3	3	2	3
CO5	3	2	3	3	0	1	3	3	2	3

SIGNATURES:



UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

LINUX LAB

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 308	COURSE TITLE: LINUX LAB						
COMPULSORY/OPTIONAL: Program Core							
Teaching Scheme and Credits					EXAMINATIONSCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

RATIONALE:

1. Introduces students to the fundamentals of the Linux operating system and its file system hierarchy.
2. Provides hands-on experience with essential file system handling commands and their options.
3. Teaches the use of redirections and pipes, enhancing command-line proficiency.
4. Develops skills in using the vi/vim editor for text file management and regular expressions.
5. Enables students to write basic shell scripts and understand decision-making commands, as well as essential administrative commands, preparing them for system administration tasks.

COURSE OUTCOMES: At the end of this course students will be able to:

CO1	know the fundamentals of Linux Operating system as an example of Operating System. Students will learn about shell (Bash) and basic commands to appreciate the File System Hierarchy, and Demonstrating Important Files and, Directories
CO2	equip himself/herself with the knowledge of File System Handling Commands and Detailed Options of file handling commands, and how to use redirections, pipes,
CO3	acquire knowledge of Changing File System Attributes and how to use redirections, pipes.
CO4	gain sound knowledge of vi/vim editor to handle text files and regular expressions
CO5	write basic shell scripts and know the decision-making commands in shell scripts and Admin commands.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE: Introduction to Linux Operating System** 1.1 Logging-In and Logging-Out

	1.2 Concept of Kernel and Shell (Bash Shell) 1.3 On-Line Help: man, info and their options 1.4 Becoming Familiar with Linux Commands and options: date, cal, who, w, which, ls, df, free 1.5 Exploring the File System with cd, pwd. The File System Hierarchy, Demonstrating File System and Important Directories. 1.6 Displaying and Concatenating Files with cat and more/less 1.7 Listing Files with ls, and its basic options Course Outcome: CO1 Teaching Hours: 4 hrs.
2	**TITLE: File System Handling Commands and Detailed Options** 2.1 Displaying Text Files with more and less commands 2.2 Exploring the File Types using ls: (i) Ordinary (Regular) File; (ii) Directory File; (iii) Device File 2.3 Making Directories with mkdir 2.4 Removing Files and Directories with rm, rmdir, 2.5 Copying Files with cp, 2.6 Renaming and moving Files with mv, 2.7 Searching Files and Directories using Wildcard Characters, 2.8 Counting Lines, Words and Characters with wc Course Outcome: CO2 Teaching Hours: 4 hrs.
3	**TITLE: File Attributes** 3.1 Listing File and Directory Attributes with ls -l and -ld option 3.2 Changing File Permissions with chmod, 3.3 umask: Default File and Directory Permissions 3.4 chown: Changing File Ownership 3.5 chgrp: Changing Group Owner 3.6 ln: Creating Hard and symbolic Links. Course Outcome: CO3 Teaching Hours: 4 hrs.
4	**TITLE: The vi/vim Editor Commands and Text Searching** 4.1 text insert, delete, copy, paste. 4.2 Saving files 4.3 Some basic text searching ex commands: Line and Global search 4.4 Regular Expressions 4.5 Creating grep filters and pattern matching using Regular Expressions 4.6 To appreciate and understand file attributes and permissions and change the file permissions in command line.

	Course Outcome: CO4 Teaching Hour: 6 hrs.
5	**TITLE: Shell Programming** 5.1 echo and printf command. 5.2 double, single, back quotes. 5.3 Shell variables and constants, test, [ ], ( ), (( )), [[ ]]. 5.4 Basic integer arithmetic 5.5 Flow Control with Conditional statements: if-fi, case-esac 5.6 Flow Control using Loop statements: while-do-done, until-do-done, 5.7 System Administration: su, sudo, passwd, id, etc Course Outcome: CO5 Teaching Hours: 6 hrs.

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	The Linux Command Line: a Complete Introduction	William E. Shotts, Jr. Nostarch Press, San Francisco.	978-1593279523
2.	Your Unix/Linux: The Ultimate Guide	Sumitabha Das, McGraw-Hill Companies, Inc.	978-0073376202

E-REFERENCES:

CO VS PO MAPPING:

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	2	1	3	0	2	2	3	2	3
CO2	3	3	2	3	0	2	2	3	3	3
CO3	3	3	2	3	0	2	2	3	3	3
CO4	3	3	2	3	0	2	2	3	3	3
CO5	3	3	2	3	0	2	2	3	3	3

SIGNATURES:

UNIVERSITY POLYTECHNIC
BIRLA INSTITUTE OF TECHNOLOGY MESRA – 835215 (RANCHI)
DEPARTMENT OF COMPUTER ENGINEERING

WEB TECHNOLOGIES LAB

PROGRAMME: Diploma in Computer Engineering							
COURSE CODE: DCE 310	COURSE TITLE: Web Technologies Lab						
COMPULSORY/OPTIONAL: Program Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HRS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

RATIONALE:

1. Equips students with essential skills in web development
2. Covering HTML document structuring, dynamic web page creation using JavaScript, and server-side scripting with PHP.
3. Provides hands-on experience preparing students for roles as front-end developers, web designers, and backend developers.
4. These skills meets industry demand for web development professionals and aims at enhancing career opportunities in the rapidly evolving field of web technology.

COURSE OUTCOMES:

After the completion of the course, students will be able to:

CO1	Understand the fundamental concepts of web technologies, including the Internet, World Wide Web, and web servers.
CO2	Create and structure HTML documents using appropriate tags and attributes.
CO3	Develop dynamic web pages using JavaScript, employing variables, operators, control statements, functions, and arrays.
CO4	Implement server-side scripting with PHP, including handling data types, control statements, functions, and form designing.
CO5	Apply principles of web security, including cryptography, digital certificates, signatures, and firewall technologies.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1.	Title : Introduction to Internet 1.1 Concepts of Internet, Domain name and address of Internet,

	1.2 World Wide Web (WWW), Email, Web Pages, Unified Resource Locator(URL) 1.3 The Web Server, Web Browsers, The Proxy Servers, 1.4 Telnet, HTTP, FTP, Hypertext, Hyperlinks and Web Applications 1.5 Concept of E-Commerce and Multi-media Course Outcome: CO1 Teaching Hours: 4 hrs
2.	Title : Introduction to HTML 2.1 Use appropriate HTML elements to format text, including: a. Headings (h1 to h6) b. Paragraphs c. Bold and italic text d. Line breaks and horizontal rules 2.2 Create an HTML document with the basic structure: doctype declaration, html, head, and body tags. 2.3 Use various HTML elements for text formatting, such as headings (h1-h6), paragraphs, bold, italic, underline, and strikethrough text. 2.4 Design a simple table displaying information such as a timetable, schedule, or list of products. 2.5 Construct a basic form with fields for name, email, password, and a submit button. Course Outcome: CO2 Teaching Hours: 6 hrs
3.	Title : Overview of JavaScript 3.1. Write a JavaScript program to display "Hello, World!" in an alert dia 3.2. Write a program to perform arithmetic operations (addition, subtract 3.3. Create a program that determines whether a given number is even o 3.4. Write a program that calculates the factorial of a given number using 3.5. Write a function to calculate the area of a rectangle given its length a 3.6. Write a script that validates a form with fields for name, email, and p Course Outcome: CO3 Teaching Hours:
4.	Title: Basics of PHP 4.1. Write a PHP script to display "Hello, World!" in the browser. 4.2. Write a script that compares two numbers and displays the larger one. 4.3. Write a program to check whether given number is Armstrong or no 4.4. Implement a program to find the sum of all elements in an array. 4.5. Create a function that checks whether a number is prime or not and Course Outcome: CO4 Teaching Hours:

5.	Title: Web Security 5.1. Principles of Security 5.2. Cryptography 5.3. Plain Text and Cipher Text 5.4. Digital Certificates and Signature 5.5. Firewall Course Outcome: CO5 Teaching Hours:

TEXT AND REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Internet and Web Technologies	Raj Kamal Tata McGraw-Hill	9789352300846

CO VS PO MAPPING

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2	PSO3
CO1	3	1	1	2	0	2	3	3	1	3
CO2	3	2	1	3	0	2	3	3	2	3
CO3	3	2	2	3	0	2	3	3	2	3
CO4	3	2	2	3	0	2	3	3	2	3
CO5	2	1	1	2	0	0	3	2	1	2

SIGNATURES: