ARKA JAIN University
Jharkhand
Estd. Under Jharkhand State Private University Act

Syllabus of

Diploma in Computer Science & Engineering (POLYTECHNIC-CSE)

Semester-I, II, III, IV, V & VI

(Batch 2020-2023)

Table of Content

ARKA JAIN University
Jharkhand

Syllabus of

Diploma in Computer Science & Engineering

Semester-I

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
Scheme of Study (w.e.f Batch 2020-23)

SEMESTER –I

Sr. No.	Subject	Group	L-T-P	Credit
1	Mathematics-I	A & B	3-1-0	4
2	Communication Skills in English	A	3-0-0	3
	Fundamentals of Electrical & Electronics Engg.	B	3-1-0	4
3	Applied Physics	A	3-1-0	4
	Introduction to IT system	B	3-0-0	3
4	Applied Chemistry	A	3-1-0	4
	Engineering Mechanics	B	3-1-0	4
5	Environmental Science	B	2-0-0	0
	PRATICAL			
6.	Applied Physics Lab	A	0-0-1	1
	Fundamentals of electrical & electronics Engg. Lab	B	0-0-1	1
7.	Applied Chemistry Lab	A	0-0-1	1
	Introduction to IT system Lab	B	0-0-1	1
8.	Communication Skills in English Lab	A	0-0-1	1
	Engineering Mechanics Lab	B	0-0-1	1
9.	Engineering Workshop Practice	A	0-0-2	2
	Engineering Graphics	B	0-0-2	2
	Total	**A or B**	**23-5-10**	**36**

SEMESTER -II

Sr. No.	Subject	Group	L-T-P	Credit
1	Mathematics-II	A & B	3-1-0	4
2	Communication Skills in English	B	3-0-0	3
	Fundamentals of Electrical & Electronics Engg.	A	3-1-0	4
3	Applied Physics	B	3-1-0	4
	Introduction to IT system	A	3-0-0	3
4	Applied Chemistry	B	3-1-0	4
	Engineering Mechanics	A	3-1-0	4
5	Environmental Science	A	2-0-0	0
	PRATICAL			
6.	Applied Physics Lab	B	0-0-1	1
	Fundamentals of electrical & electronics Engg. Lab	A	0-0-1	1
7.	Applied Chemistry Lab	B	0-0-1	1
	Introduction to IT system Lab	A	0-0-1	1
8.	Communication Skills in English Lab	B	0-0-1	1
	Engineering Mechanics Lab	A	0-0-1	1
9.	Engineering Workshop Practice	B	0-0-2	2
	Engineering Graphics	A	0-0-2	2
	Total	**A or B**	**23-5-10**	**36**

SEMESTER –I(Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-I	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER I (Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -I	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER II (Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -II	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER –II(Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-II	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER-III

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Python Programming	PCC	3	3	100	70	20	5	5
2	Data Structure	PCC	3	3	100	70	20	5	5
3	Computer System Organization	PCC	3	3	100	70	20	5	5
4	Computer Programming	PCC	3	3	100	70	20	5	5
5	Algorithms	PCC	3	3	100	70	20	5	5
6	Essence of Indian Knowledge Tradition	AC	0	2	50	35	10	2.5	2.5
	Practical								
7	Data Structure Lab	PCC	2	4	50	35	5	5	5
8	Computer Programming Lab	PCC	2	4	50	35	5	5	5
9	Python Programming Lab	PCC	2	4	50	35	5	5	5
10	Summer Internship-1(3-4 Weeks)	PROJ	2	0	50	35	15	0	0
	TOTAL		**23**	**29**	**750**	**525**	**140**	**42.5**	**42.5**

SEMESTER-IV

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Operating System	PCC	3	3	100	70	20	5	5
2	Computer Network	PCC	3	3	100	70	20	5	5
3	Web Technologies	PCC	3	3	100	70	20	5	5
4	Introduction to DBMS	PCC	3	3	100	70	20	5	5
5	Software Engineering	PEC	3	3	100	70	20	5	5
6	Open Elective-I Artificial Intelligence & Machine Learning Soft Computing Techniques	OEC	3	3	100	70	20	5	5
	Practical								
7	Web Technologies Lab	PCC	2	4	50	35	5	5	5
8	Operating System Lab	PCC	2	4	50	35	5	5	5
9	Introduction to DBMS Lab	PCC	2	4	50	35	5	5	5
10	Minor Project	PROJ	2	4	50	35	15	0	0
	TOTAL		**27**	**36**	**850**	**595**	**165**	**45**	**45**

SEMESTER V

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Introduction to E-Governance	PCC	3	3	100	70	20	5	5
2	Internet of Things	OEC	3	3	100	70	20	5	5
3	Program Elective-I Information Security Fundamentals of AI	PEC	3	3	100	70	20	5	5
4	Program Elective-II Mobile Computing Data Sciences: Data Warehousing & Data Mining	PEC	3	3	100	70	20	5	5
5	Open Elective -II Web Designing and Multimedia Technology Robotics	OEC	3	3	100	70	20	5	5
	Practical								
6	Summer Internship-II(4-6 Weeks)	PROJ	3	0	100	70	30	0	0
7	Major Project-I (Project to be carried over to next semester)	PROJ	1	2	50	35	15	0	0
	TOTAL		19	17	650	455	145	25	25

Project to be carried over to next semester

SEMESTER VI

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Program Elective-III Multimedia Technology Advance Computer Networks	PEC	3	3	100	70	20	5	5
2	Program Elective-IV Network Forensics Software Testing	PEC	3	3	100	70	20	5	5
4	Open elective -III Cyber Security Laws, Standards and IPR Sustainable Development	OEC	3	3	100	70	20	5	5
5	Entrepreneurship and Start-ups	PROJ	4	4	100	70	20	5	5
6	Indian constitution	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Seminar	PROJ	1	2	50	35	15	0	0
7	Major Project-II	PROJ	3	6	100	70	30	0	0
	TOTAL		**17**	**23**	**600**	**420**	**135**	**22.5**	**22.5**

Distribution of Credit across 6 semesters:

Sl. No	Type of Paper	No. of Paper	Total Credit
1	Humanities and Social Sciences Courses **(HSC)**	2	4
2	Basic Science courses**(BSC)**	6	18
3	Engineering Science courses **(ESC)**	8	18
4	Professional core courses (**PCC)**	17	45
5	Professional Elective courses**(PEC)**	4	12
6	Open Electives Courses (**OEC)**	4	12
7	Project work, seminar and internship in industry or elsewhere**(PROJ)**	7	16
8	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]**(AC)**	3	(non-credit)
	Total	51	125

CIA – Continuous Internal Assessment – Based on Projects / Assignment during the semester

Note:

AICTE Activity Points to be earned by students admitted to Diploma program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):

Every regular student, who is admitted to the 3-year Diploma program, is required to earn 75 activity points in addition to the total credits earned for the program. Students entering 3 years Diploma Program through lateral entry are required to earn 50 activity points in addition to the total credits earned for the program.
The activity points earned by the student shall be reflected on the students 6th Semester grade card.
The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled.
Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.
Incase student fail to earn the prescribed activity points, Sixth semester Grade Card shall be issued only after earning the required activity Points.
Students shall be eligible for the award of degree only after the release of the Six Semester grade card.

There are two groups (A & B) in semester 1 & 2. The Group division will be decided by The Dean SoE & IT before commencement of classes*

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

PROGRAM OUTCOMES

After completing this undergraduate program, a learner:

[PO.1]. Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems

[PO.2]. Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

[PO.3]. Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

[PO.4]. Engineering Tools: Apply appropriate technologies and tools with an understanding of the limitation.

[PO.5]. The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

[PO.6]. Environment and sustainability: Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development..

[PO.7]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

[PO.8]. Individual and team work: Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

[PO.9]. Communication: An ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.10]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

PROGRAM SPECIFIC OUTCOMES

[PSO.1]. Students will able to design software and computer based system using latest and advanced technologies in computer hardware and software field.

[PSO.2]. Apply knowledge of computer science & engineering and an understanding of management principles for applying them while managing software and hardware projects.

PROGRAM ARTICULATION MATRIX

SEM	COURSE CODE	PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES											
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
I	Communication Skills in English –DIP11149			1	1		1			1	1		
	Mathematics-I –DIP11001	1	1	1	2	1		1			1		
	Applied Physics –DIP11147	2	1	3	2								
	Applied Chemistry –DIP11145	1	1			1	1				1		1
	Engineering Workshop Practice –DIP11151	1	1	1	1		1			1			
	Applied Physics Lab –DIP11148	1	1	3	2		1						
	Applied Chemistry Lab –DIP11146			1	1		1					1	
	Communication Skills in English Lab –DIP11150	1		1	1		1	1	1	1			
II	Mathematics -II –DIP12008	1	1	1	1	1						1	
	Fundamentals of Electrical & Electronics Engg. –DIP12278	1	1	1	2	1					1	1	1
	Introduction to IT system –DIP12157	1		2	3		1			1	2		
	Engineering Mechanics –DIP12153	3	3		3						3		3
	Environmental Science –DIP12155					2	3				2		
	Fundamentals of Electrical & Electronics Engg. Lab –DIP12156	1	2	2	3	2		2					
	Introduction to IT system Lab –DIP12279	1		2	3		1			1	2	1	
	Engineering Mechanics Lab –DIP12154	1	2	2	3	2		2					
	Engineering Graphics –DIP12152	2	1		1							2	2
	Python Programming –DIP13180	2	3	2	2	2			2		3	2	
	Data Structure –DIP13044	2	2	2	2	2	3	2			2	2	1
	Computer System Organization –DIP13162	2	2		2		2					2	
	Computer Programming –DIP13160	1	2		2		2				2		

III	Algorithms –DIP13158	2	2		2	2	3	2			2	2	1
	Essence of Indian Knowledge Tradition –DIP13172						2	1			1		
	Data Structure Lab -13048	1	2	2	3								
	Computer Programming Lab –DIP13161	2	2		2								
	Python ProgrammingLab –DIP13181		2									2	
	Summer Internship-1(3-4 Weeks) –DIP13177												
IV	Operating System –DIP14056	3	2	2	2	1						2	
	Computer Network –DIP14051	1	2	1	3					1	2	2	
	Web Technologies –DIP14212	1	2	1	3	1				1	2	2	1
	Introduction to DBMS –DIP14199	1	3	2	2	2					3	2	1
	Software Engineering –DIP14207	2	1	1		3	3	2	3			3	2
	Open Elective-I												
	Artificial Intelligence & Machine Learning –DIP15215	2	1	2							1	2	
	Soft Computing Techniques –DIP14206	2	2	2		2						2	
	Web TechnologiesLab –DIP14213	1	2	2	2		2					1	1
	Operating System Lab –DIP14058	2	2		2		2						
	Introduction to DBMS Lab –DIP14200	2	2	2									
	Minor Project- DIP14203												
V	Introduction to E-Governance –DIP15235	2	1										
	Internet of Things-DIP15234	2			2								
	Program Elective-I Information Security –DIP15233	2	2										
	Fundamentals of AI –DIP15225	2			2								
	Program Elective-II												
	Mobile Computing –DIP15238			2								1	
	Data Sciences: Data Warehousing & Data Mining –DIP15220				2							1	
	Open Elective -II												
	Web Designing and Multimedia Technology –DIP15249	1	1	2	1							1	

	Robotics –DIP16273	1	2	2			2				2		
	Summer Internship-II(4-6 Weeks) –DIP15244												
	Major Project-I (Project to be carried over to next semester)-DIP15236												
VI	Program Elective-III												
	Multimedia Technology –DIP16268	1	2	2	2							2	
	Advance Computer Networks –DIP16260	2	3	2								1	2
	Program Elective-IV												
	Network Forensics –DIP16269	2	2		2								
	Software Testing –DIP16066	2	1	2	3				2		1	1	2
	Open elective -III												
	Cyber Security Laws, Standardsand IPR –DIP16262	2	2	1	2								
	Indian Constitution- DIP16266												
	Sustainable Development –DIP16276	1	2	1	1			1					
	Entrepreneurship and Start-ups –DIP16265	1	2	2	2	2							
	Seminar –DIP16274												
	Major Project-II –DIP16267												
AVERAGE													

Subject: Mathematics-I

Code: DIP11001

4 Credits | Semester 1

A. Introduction:

- To develop logical understanding, mathematical skill of the subject.
- To make aware students about importance and relation between mathematics and engineering
- To gives sufficient basic concepts for future applications in different subjects

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Rememberingthe concept of Vectors and use of vectors in mathematics

[CO2] Understand, predict and optimize engineering systems.

[CO3] Analyze vectors in geometrically and algebraically.

[CO4] Analyzing about different forms of the equation of straight line and curves

[C05] Evaluating why mathematical thinking is valuable in daily life..

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

TRIGONOMETRY: Concept of angles, measurement of angles in degrees, grades and radians and their conversions,). T-Ratios of Allied angles (without proof), Sum, difference formulae and their applications (without proof). Product formulae (Transformation of product to sum, difference and vice versaT- Ratios of multiple angles, sub-multiple angles (2A, 3A, A/2). Graphs of sin x, cos x, tan x and e^x.

ALGEBRA: Complex Numbers: Definition, real and imaginary parts of a Complex number, polar and Cartesian, representation of a complex number and its conversion from one form to other, conjugate of a complex number, modulus and amplitude of a complex number.
Addition, Subtraction, Multiplication Division of a complex number. De-movier's theorem and ., its applicationPartial fractions: Definition of polynomial fraction proper & improper fractions and definition of partial fractions. To resolve proper fraction into partial fraction with denominator containing non-repeated linear factors, repeated linear factors and irreducible non-repeated quadratic factors. To resolve improper fraction into partial fraction.
Permutations and Combinations: Fundamental rules of counting, Value of nPr
Value of nCr.**Binomial theorem:** Binomial theorem (without proof) for positive integral index (expansion and general form); binomial theorem for any index (expansion without proof) first and second binomial approximation with applications to engineering problems

CO-ORDINATE GEOMETRY: Straight lines: Different forms of equations of straight lines: $y = mx + c$, $y - y_1 = m(x - x_1)$,$y - y_1 = \left(\frac{y_2 - y_1}{x_2 - x_1}\right)(x - x_1)$. General equation of a line$ax + by + c = o$ (graphical representation and statements) and problems on above equations. Equation of lines through a point and parallel or perpendicular to a given line. Problems.**Conic Section:** Definition of conic section. Definition of axis, vertex, eccentricity, focus and length of latus rectum. Equation and Geometrical representation of parabolaEquations of ellipse and hyperbola. Finding axes, vertices, eccentricity, foci and length of lattice rectum of conics. Problems on finding the above said equations with direct substitutionGeneral equation of a circle and its characteristics. To find the equation of a circle, giveni. Centre and radius,ii. Three points lying on it andiii. Coordinates of ends of a diameter;

VECTORS: Definition of vector. Representation of vector as a directed line segment. Magnitude of a vector. Types of vectors. Position vectorExpression of vector by means of position vectors. Addition and subtraction of vectors in terms of line segment. Vector in plane and vector in a space in terms of unit vector i, j and k respectivelyProduct of vectors. Scalar product and vector product of two vectors. Geometrical meaning of scalar and vector product. Applications of dot (scalar) and cross (vector) productsProjection of a vector on another vector. Area of parallelogram and area of triangle.

E. TEXT BOOKS

T1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition2007.

F. REFERENCE BOOKS

R2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1995.
R3. NCERT Mathematics Text books of class XI and XII.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES						CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Remembering the concept of Vectors and use of vectors in mathematics	2		1									
[CO2]	Understand, predict and optimize engineering systems.		1		1								
[CO3]	Analyze vectors in geometrically and algebraically				1	1							
[CO4]	Analyzing about different forms of the equation of straight line and curves							1			1		
[CO5]	Evaluating why mathematical thinking is valuable in daily life									1	1		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Communication Skills in English

Code: DIP11149

Credit - 3 | Semester 1

A. Introduction:

- To introduce students to the understanding of English language and its usage in their field of engineering. It helps the students to enhance their ability to read, write and speak English well.

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Learn the different forms & type of communication.
[CO2] Learn the writing formats and letter story.
[CO3] Learn the Reading comprehension
[CO4] Learn Grammar and Vocabulary
[CO5] Learn Soft skills and Professional Excellence.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

COMMUNICATION: THEORY AND PRACTICE: Basics of communication: Introduction, meaning and definition, process of communication etc.Types of communication: formal and informal, verbal, non-verbal and written Barriers to effective communication**7** Cs for effective communication (considerate, concrete, concise, clear, complete, correct, and courteous).Art of Effective communicationchoosing words, Voice, Modulation, Clarity, Time, Simplification of words, Technical Communication.

PROFESSIONAL WRITING: The art of precise writing, Letters: - business and personnel

READING COMPREHENSION BASED ON FOLLOWING TEXTS: Malgudi days: r.kNarayan, The room on the roof; ruskin bond, The gift of the magi by o. Henry, Night of the scorpion: nizzimezekeil, Stopping by woods on a snowy evening: robert frost

VOCABULARY AND GRAMMAR: Vocabulary of commonly used, Glossary of administrative terms (English and Hindi), One-word substitution, Idioms and phrases etcnelsParts of speech, active and passive voice, tenses etc., Punctuation, subject of agreement , preposition , articles

SOFT SKILLS FOR PROFESSIONAL EXCELLENCE: Introduction: Soft Skills and Hard Skills, Importance of soft skills.Life skills: Self-awareness and Self-analysis, adaptability, resilience, emotional intelligence etc., Applying soft skills across cultures, Case Studies

E. TEXT BOOKS

T1. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.

T2. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilson and Sons, 1908.

T3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Edition 2018).

T4. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.

F. REFERENCE BOOKS

R1. M. Ashraf Rizvi. Effective Technical Communication. Mc-Graw Hill: Delhi, 2002.
R2. John Nielson. Effective Communication Skills. Xlibris, 2008.
R3. Oxford Dictionary
R4. Roget's Thesaurus of English Words and Phrases
R5. Collin's English Dictionary
R6. High school english grammar and composition- Wren and Martin (s.chand&co.)
R7. The king's grammar- Sanjay kumarsinha (s.chand& co.)

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES						CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Learn the different forms & type of communication						2			2			
[CO2]	Learn the writing formats and letter story.			2									
[CO3]	Learn the Reading comprehension								2		2		
[CO4]	Learn Grammar and Vocabulary			2	2								
[CO5]	Learn Soft skills and Professional Excellence.								2				

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Applied Physics

Code: DIP11147

Credits- 4 | Semester 1

A. Introduction:

- Identify, formulate, and solve engineering problems by applying principles of physics.
- To give an understanding of this world both by observation and by prediction of the way in which objects behave.
- Acquire and apply new knowledge as needed, using appropriate learning strategies

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Represent physical quantities as scalar and vectors and solve real life relevant problems.

[CO2] Define scientific work, energy and power and their units. Drive relationships for work, energy and power and solve related problems.

[CO3] Compare and relate physical properties associated with linear motion and rotational motion and apply conservation of angular momentum principle to known problems.

[CO4] Explain the phenomenon of surface tension, viscosity, fluid motion & Hooke's law, which helps to illustrate the properties of matter.

[CO5] Apply the basic knowledge of semiconductors to illustrate the functioning of simple electronic devices &nano technology.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

A. SYLLABUS

FORCE AND MOTION: Units and Measurements: Physical quantities; Definition of unit, types of unit (fundamental and derived) SI units: Definition, Basic and supplementary units, advantages. Scalars and Vectors: Scalar and Vector quantities – examples, representation of vector, types of vectors. Addition and Subtraction of Vectors, Triangle and Parallelogram law (Statement only), Lami'stheorems, Scalar and Vector Product, Resolution of a Vector and its application to inclined plane and lawn roller.Force: Definition of Force, Momentum, Statement and derivation of conservation of linear momentum, its applications such as recoil of gun,

rockets, Impulse and its applications.Circular motion, definition of angular displacement, angular velocity, angular acceleration, frequency, time period, Relation between linear and angular velocity, linear acceleration and angular acceleration (related numerical), Centripetal and Centrifugal forces with live examples, Expression and applications such as banking of roads and bending of cyclist.

WORK, ENERGY AND HEAT: Work Energy & Power: Concept and units, examples of zero work, positive work and negative work .Energy and its units, kinetic energy, gravitational potential energy with examples and derivations, mechanical energy, conservation of mechanical energy for freely falling bodies, transformation of energy (examples). Power and its units, power and work relationship, **Numerical on work , potential and kinetic energy),** calculation of power (numerical problems), **Concept of heat & temperature**: Definitions of heat and temperature with S.I units, definition of Specific heat of substance with S I unit, equation for specific heat of a substance (no derivation).scales of temperature and their relationship, Expansion of solids, liquids and gases, coefficient of linear, surface and cubical expansionsand relation amongst them,**Transmission of heat:** Definitions of conduction, convection and radiation with examples, definition of thermal conductivity, derivation of co-efficient of thermal conductivity (K) and its S.I unit. Applications of conduction, convection and radiation, simple problems on K.**Thermodynamics**: Definition of thermodynamics, Laws of thermodynamics: Zeroth law, I^{st}law and II^{nd}law(only statement), types of thermodynamics process: isothermal process, adiabatic process.

ANGULAR MOTION AND WAVE MOTION: Angular and Rotational Motion: Definition of angular displacement, angular velocity and angular acceleration, relation between linear velocity and angular velocity. Translational and rotational motions with examples, Definition of torque and angular momentum and their examples, Conservation of angular momentum (quantitative) and its applications, **Wave motion**: Transverse and longitudinal waves with examples, definitions of wave velocity, frequency and wave length and their relationship, Sound and light waves and their properties, wave equation (y =r sin t) amplitude, phase, phase difference, principle of superposition of waves and beat formation, **Simple Harmonic Motion:** Definition of periodic motion with example, definition of Simple Harmonic Motion, SHM as a projection of uniform circular motion on any diameter , equation of SHM, derivation of displacement, velocity and acceleration of a body executing SHM.Free vibrations, Forced vibration, Damped vibrations and Un-damped vibrations with examples. **Simple problems**.

PROPERTIES OF MATTER: Properties of solids: Elasticity: definition of stress and strain, moduli of elasticity, Hooke's law, significance of stress-strain curve.**Properties of liquids**:

Pressure: definition, units, atmospheric pressure, gauge pressure, absolute pressure, Fortin's Barometer and its application**Hydrodynamics**: Fluid motion, stream line and turbulent flow, Reynold's number Equation of continuity, Bernoulli's Theorem (only formula and numericals) and its applications.**Surface Tension**: Concept, units, cohesive and adhesive forces, angle of contact, Ascent Formula (No derivation), applications of surface tension, effect of temperature and impurity on surface tension.**Viscosity**: viscosity and coefficient of viscosity, Terminal velocity, Stoke's law and effect of temperature on viscosity, application in hydraulic systems. Simple problems.

SEMICONDUCTOR & MODERN PHYSICS: Semiconductor: Energy bands in solids, Types of materials (insulator, semi-conductor, conductor), intrinsic and extrinsic semiconductors, p-n junction, junction diode and V-I characteristics, types of junction diodes. Diode as rectifier – half wave and full wave rectifier (centre taped). Transistor; description and three terminals, Types- PNP and NPN, some electronic applications (list only). Photocells, Solar cells; working principle and engineering applications. **Lasers**: Principle and Working of Laser, properties of Laser, Types of lasers; Ruby, He-Ne,characteristics and applications. **Optical fibre**: Introduction, Total internal reflection, critical angel acceptance angle, Structure of optical fiber, Numerical Aperture, applications in communication system (Numerical on critical angel , numerical aperture) **Nano-Technology**: Definition of Nanoscale, nanometer &nano particle application of Nano-Technology-electronics, automobiles, medical, textile, cosmetics, environmental, spaces and defence, advantages and dis-advantages of nano-Technology. **Nonconventional source of energy :**Introduction – Non Renewable and renewable (Alternate), energy sources, Examples –Solar Energy, Wind Energy, Tidal Energy, Geo-Thermal Energy and Bio-Mass, Advantages and disadvantages of renewable energy.

E. TEXT BOOKS

T1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi
T2. Concepts in Physics by HC Verma, Vol. I & II, Bharti Bhawan Ltd. New Delhi
T3. Applied Physics, Vol. I and Vol. II, TTTI Publications, Tata McGraw Hill, Delhi

F. REFERENCE BOOKS

R1. Applied Physics, Vol. Vol. II and TTTI Publications, Tata McGraw Hill, Delhi, I
R2. Concepts in Physics by HC Verma, Vol. I & II, BhartiBhawan Ltd. New Delhi
R3. Modern approach to Applied Physics-I and II, AS Vasudeva, Modern Publishers.
R4. A Textbook of Optics, N Subramanyam, BrijLal, MN Avahanulu, S Chand and Company Ltd.

R5. Introduction to Fiber Optics, AjoyGhatak and K Thyagarajan, Cambridge University Press India Pvt. Ltd, New Delhi.
R6. Nanoscience and Nanotechnology, KK Choudhary, Narosa Publishing House, Pvt. Ltd. New Delhi.
R7. Nanotechnology: Importance and Applications, M.H. Fulekar, IK International Publishing House Pvt. Ltd, New Delhi.
R8. E-books/e-tools/ learning physics software/websites etc.
R9. Principle of physics for class XI and XII by V.K.Mehata and Rohit Mehta, as per Karnataka state PUC syllabus S.Chand and Company, New Delhi
R10. Principle of physics by P.V.NaikPHI Learning Pvt. Ltd. New Delhi

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES						CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Represent physical quantities as scalar and vectors and solve real life relevant problems.	3		2									
[CO2]	Define scientific work, energy and power and their units. Drive relationships for work, energy and power and solve related problems.			2									
[CO3]	Compare and relate physical properties associated with linear motion and rotational motion and apply conservation of angular momentum principle to known problems.			2	3								
[CO4]	Explain the phenomenon of surface tension, viscosity, fluid motion & Hooke's law, which helps to illustrate the properties of matter.				2								
[CO5]	Apply the basic knowledge of semiconductors to illustrate the functioning of simple electronic devices & Nano technology.	2	3										

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Applied Chemistry

Code:DIP11145

Credits- 4 | Semester I

A. Introduction:

- There are numerous number materials are used in fabricating and manufacturing devices for the comfort of life.
- The selection, characterization and suitability assessment of natural raw materials essentially requires principles and concepts of Applied Chemistry for technicians.

B. Course Outcomes: At the end of the course, students will be able

[CO1] Understand the classification and general properties of engineering materials such as metal, alloys, glasses, cement, refractory and composite materials using knowledge of chemical bonding.

[CO2] Understand and assess the suitability of water source for domestic and industrial application, effluents and minimize water pollution.

[CO3] Qualitatively analyze the engineering materials and understand their properties and applications.

[CO4] Choose fuel and lubricants suitable for economical industrial processing to obtain eco-friendly finished products

[CO5] Ascertain construction, mechanism efficiency of electrochemical cells, solar cell fuel cells. Understand corrosion and develop economical prevention techniques.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

ATOMIC STRUCTURE, CHEMICAL BONDING AND SOLUTIONS: Rutherford model of atom, Bohr's theory (expression of energy and radius to be omitted), and hydrogen spectrum explanation based on Bohr's model of atom, Heisenberg uncertainty principleQuantum numbers – orbital concept. Shapes of s,p and d orbitals, Pauli's exclusion principle, Hund's rule of maximum multiplicity Aufbau rule, electronic configurationConcept of chemical bonding – cause of chemical bonding, types of bonds: ionic bonding (NaCl example), covalent bond (H2,

F2, HF hybridization in BeCl2, BF3, CH4, NH3, H2O) Coordination bond in NH4+, and anomalous properties of NH3, H2O due to hydrogen bonding, and metallic bonding.

WATER: Graphical presentation of water distribution on Earth (pie or bar diagram). Classification of soft and hard water based on soap test, salts causing water hardness, unit of hardness and simple numerical on water hardness.Cause of poor lathering of soap in hard water, problems caused by the use of hard water Iboiler (scale and sludge, foaming and priming, corrosion etc) Quantitative measurement of water hardness by ETDA method, total dissolved solids (TDS) alkalinity estimation. Municipal water treatment BOD &CODEnlist Indian standard specification of drinking water (collect data and understand standards)

ENGINEERING MATERIALS: Natural occurrence of metals – minerals, ores of iron, aluminum and copper, gangue (matrix), flux, slag, metallurgy – brief account of general principles of metallurgy.Extraction of - iron from hematite ore using blast furnace, aluminumfrom bauxite along with reactions. Alloys – definition, purposes of alloying, ferrous alloys and non-ferrous with suitable examples, properties and applications.Port land cement and hardening, Glasses Refractory and Composite materials.Polymers – monomer, homo and co polymers, degree of polymerization, simple reactions involved in preparation and their application of thermoplastics and thermosetting plastics (usingPVC, PS, PTFE, nylon – 6, nylon – 66, Bakelite only), rubber and vulcanization of rubber

CHEMISTRY OF FUELS AND LUBRICANTS: Definition of fuel and combustion of fuel, classification of fuels, calorific values (HCV and LCV)Proximate analysis of coal solid fuel petrol and diesel - fuel rating (octane and cetane numbers),Chemical composition, calorific values and applications of LPG, CNG, water gas, coal gas, producer gas and biogas.Lubrication – function and characteristic properties of good lubricant, classification with examples, lubrication mechanism –, physical properties (viscosity and viscosity index, oiliness, flash and fire point, could and pour point only) and chemical properties (coke number, total acid number saponification value) of lubricants

ELECTRO CHEMISTRY: Electronic concept of oxidation, reduction and redox reactions.Definition of terms: electrolytes, non-electrolytes with suitable examples, Faradays laws of electrolysis and simple numerical problems.Industrial Application of Electrolysis – Electrometallurgy Application of Redox reactions in electrochemical cells –Primary cells – dry cell,Secondary cell - commercially used lead storage battery, fuel and Solar cells.Introduction to Corrosion of metals – definition, types of corrosion (chemical and electrochemical), H_2 liberation andO_2 absorption mechanism of electrochemical corrosion, factors affecting rate of corrosion.Internal corrosion preventive measures – Purification, alloying and heat treatment and external corrosion preventive measures: metal (anodic, cathodic) coatings.

E. TEXT BOOKS

T1. Text Book of Chemistry for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi, 2017-18.
T2. Agarwal, &Shikha, Engineering Chemistry, Cambridge University Press; New Delhi, 2015.
T3. Agnihotri, Rajesh, Chemistry for Engineers, Wiley India Pvt.Ltd., 2014.
T4. Jain & Jain, Engineering Chemistry, DhanpatRai and Sons; New Delhi, 2015.

F. REFERENCE BOOKS

R1. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
R2. Dara, S. S. &Dr.S.S. Umare, Engineering Chemistry, S.Chand. Publication, New Delhi, New Delhi, 2015.
R3. Dr. Vairam, S., Engineering Chemistry, Wiley India Pvt.Ltd., New Delhi, 2013.
R4. Dr. G. H. Hugar& Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. I and Vol. II NITTTR, Chandigarh, Publications, 2013-14.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES						CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understand the classification and general properties of engineering materials such as metal, alloys, glasses, cement, refractory and composite materials using knowledge of chemical bonding.		2				1						
[CO2]	Understand and assess the suitability of water source for domestic and industrial application, effluents and minimize water pollution.	2											1
[CO3]	Qualitatively analyze the engineering materials and understand their properties and applications				1	1						1	
[CO4]	Choose fuel and lubricants suitable for economical industrial processing to obtain eco-friendly finished products				2			1					1
[CO5]	Ascertain construction, mechanism efficiency of electrochemical cells, solar cell fuel cells. Understand corrosion and develop economical prevention techniques.			2					1				

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Engineering Workshop Practice

Code: DIP11151
Credits 2 | Semester I

A. Introduction:

- To understand basic engineering processes for manufacturing and assembly
- To understand, identify, select and use various marking, measuring, and holding, striking and cutting tools and equipment's
- To understand and interpret job drawings, produce jobs, and inspect the job for specified dimension.

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools &equipment's and machines
[CO2] Understand job drawing and complete jobs as per specifications in allotted time
[CO3] Inspect the job for the desired dimensions and shape
[CO4] Operate, control different machines and equipment's adopting safety practices

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

FITTING SHOP: Introduction Of Workshop Tools & Measuring InstrumentFitting: - Demonstration of different fitting tools, safety practice and general guidelines. Cutting and Filing. Filing, Measurement and Finishing etc Practice: T-fitting , V-Fitting etc

CARPENTRY SHOP: Demonstration of power tools and equipment for carpentry, safety practices and general guidelines. Carpentry: Demonstration of different wood working tools / machines. Demonstration of Different Wood Working Processes Like Plaining Marking ,Chiseling ,Grooving ,Turning of Wood etc Practice: - T-Lap joint, Dovetail joint etc

WELDING SHOP: Demonstration of tools and equipment for welding, safety practices and general guidelines. Demonstration of different welding tools / machines. Demonstration on Arc Welding, Gas Welding, MIG, MAG welding, gas cutting and rebuilding of broken parts with welding Practice : Butt , lap joint etc.

PLUMBING SHOP: Demonstration – plumbing tools, symbols and joints.Joining GI pipes by threading, PVC pipes by gluing and cementingPractice :- To Make Internal & External Thread

MACHINE SHOP: Demonstration of tools and equipment for Machine, safety practices and general guidelines. Demonstration of all machine like Lathe Machine, Drill machine, Milling Machine, Shaper machine etc. Practice :- To make Step Turning , Tapper Turning, Turning, Facing etc.

E. TEXT BOOKS

T1. Workshop Technology Vol-I,II,IIIHajraChoudry., Media Promotors and Publishers P Ltd.

T2.Manufacturing Technology vol 1 by P.N. RaoMc.Grow Hill.

F. REFERENCE BOOKS

R1. Workshop technology by R.S. Raghuwanshi.Dhanpat Ray & co

R2. Workshop technology by R.S. Khurmi&J.K.GuptaS.Chand co.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT .	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Acquire skills in basic engineering practice to identify, select and use various marking, measuring, and holding, striking and cutting tools & equipment's and machines	2								2			
[CO2]	Understand job drawing and complete jobs as per specifications in allotted time						2			2			
[CO3]	Inspect the job for the desired dimensions and shape		2										
[CO4]	Operate, control different machines and equipment's adopting safety practices			2									

1-Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Applied Physics Lab

Code: DIP11148

Credits- 1 | Semester I

A. Introduction:

- To give an understanding of physical world by observations and measurements.
- Use of physical principles and analysis in various fields of engineering and technology is very prominence.
- To supplement the factual knowledge gained in the lecture with hands-on experience with the apparatus & developing skills in taking measurements.
- To develop scientific temper and help to apply the basic concepts and principles in solving engineering and technology based problems.

B. **Course Outcomes:** At the end of the course, students will be able

[CO1] Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, Spherometer) for determining dimensions of physical quantities and make measurements with accuracy and precision.

[CO2] Apply and verify laws of forces and determine resultant force acting on a body.

[CO3] Determine the velocity of sound in air.

[CO4] Understand the fall of a sphere through a viscous liquid

[CO5] Understand gravitational force & calculate the time of a pendulum.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

S.No	Name of Experiments
1.	To measure length, radius of a given cylinder, a test tube and a beaker using a Vernier caliper and find volume of each object.
2.	To determine diameter of a wire, a solid ball and thickness of cardboard using a screw gauge.
3.	To determine radius of curvature of a convex and a concave mirror surface using a spherometer.
4.	To verify experimentally the law of parallelogram of forces.

5.	To verify experimentally the law of converse of triangle of forces.
6.	To determine force constant of a spring using Hook's Law
7.	To find the viscosity of a given liquid (Glycerin) by Stoke's law.
8.	To verify experimentally the Lami's theorems.
9.	To determine the velocity of sound in air at room temperature and at 0 C by using Resonance Air Column method.
10.	To determine force constant of a spring using Hook's Law.
11.	To find the Moment of Inertia of a flywheel about its axis of rotation
12.	To find the time period of a simple pendulum for small amplitudes and draw the graph of length of the pendulum against square of the time period. Use the graph to find the length of the simple pendulum.

E. TEXT BOOKS

T1. Text Book of Physics for Class XI& XII (Part-I, Part-II); N.C.E.R.T., Delhi

T2. Comprehensive Practical Physics, Vol, I & II, JN Jaiswal, Laxmi Publications (P) Ltd., New Delhi

F. REFERENCE BOOKS

R1. Practical Physics by C. L. Arora, S. Chand & Company Ltd.

R2. e-books/e-tools/ learning physics software/you Tube videos/ websites etc.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES						CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Select right kind of measuring tools (Meter scale, Vernier caliper, Screw gauge, Spherometer) for determining dimensions of physical quantities and make measurements with accuracy and precision.				2								
[CO2]	Apply and verify laws of forces and determine resultant force acting on a body.			2	1								
[CO3]	Determine the velocity of sound in air.		2	1									
[CO4]	Understand the fall of a sphere through a viscous liquid						1						
[CO5]	Understand gravitational force & calculate the time of a pendulum.	2		1									

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Applied Chemistry Laboratory

Code: DIP11146

Credits- 1 | Semester I

A. Introduction:

- There are numerous number of materials used in fabricating and manufacturing devices for the comfort of life.
- The course aims to supplement the factual knowledge gained in the lectures by first hand manipulation of processes and apparatus.
- This will develop scientific temper and help to apply the basic concepts and principles in solving engineering problems.

B. Course Outcomes: At the end of the course, students will be able

[CO1] To express quantitative measurements accurately.
[CO2] To practice and adapt good measuring techniques.
[CO3] To use various apparatus for precise measurements.
[CO4] To understand and differentiate different methods of quantitative analysis.
[CO5] To know and understand principles of quantitative analysis using instruments.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

S.No	Name of Experiments
1	Preparation of standard solution of oxalic acid or potassium permanganate.
2	To determine strength of given sodium hydroxide solution by titrating against standard oxalic acid solution using phenolphthalein indicator.
3	Standardization of KMnO4 solution using standard oxalic acid and Determine the percentage ofiron present in given Hematite ore by KMnO4 solution.
4	Alkalinity of given water sample using 0.01M sulphuric acid

5	To determine the viscosity and relative viscosity of given sample by using Ostwald's Viscometer.
6	Volumetric estimation of total hardness of given water sample using standard EDTA solution.
7	Proximate analysis of coal a) Gravimetric estimation moisture in given coal sample
8	Determine the conductivity of given water sample.
9	Determination of the Iron content in given cement sample using colorimeter.
10	Determination of calorific value of solid or liquid fuel using bomb calorimeter.
11	Determination of flash and fire point of lubricating oil using Able's flash point apparatus.
12	Determination of viscosity of lubricating oil using Redwood viscometer.

D. TEXT BOOKS

T1.Dr. G. H. Hugar and Prof A. N. Pathak, Applied Chemistry Laboratory Practices, Vol. Vol. II and NITTTR, Chandigarh, Publications, 2013-14, I

T2. Practical Chemistry by S.S. Dara

E. REFERENCE BOOKS

R1. Practical Chemistry by D N Bajpai – S. Chand Publishing

R2. Advanced Practical Chemistry Book by pragatiprakashan

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES						CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	To express quantitative measurements accurately.	1		1									
[CO2]	To practice and adapt good measuring techniques.		1		1							1	
[CO3]	To use various apparatus for precise measurements.			1									2
[CO4]	To understand and differentiate different methods of quantitative analysis.					1	1						
[CO5]	To know and understand principles of quantitative analysis using instruments.												

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Communication Skills in English Lab

Code: DIP11150

Credits- 1 | Semester I

A. Introduction:

- To develop listening skills for enhancing communication.
- To develop speaking skills with a focus on correct pronunciation and fluency.
- To introduce the need for Personality development- Focus will be on developing certain qualities, which will aid students in handling personal and career challenges, leadership skills etc. for that purpose group discussion, extempore and other activities should be conducted during lab classes.

B. Course Outcomes: At the end of the course, students will be able

[CO1] They will also demonstrate a significant increase in word power

[CO2] The variety of exercises and activities that will be conducted in the Language Lab will developtheir skills needed to participate in a conversation like listening carefully and respectfully to others' viewpoints; articulating their own ideas and questions clearly and over all students will be able to prepare, organize, and deliver an engaging oral presentation

[CO3] They will also develop non-verbal communication such as proper use of body language and gestures

[CO4] Managing personal and professional is life.

[CO5] Enhancing personality development

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

LISTENING SKILLS: Listening Process and Practice: Introduction to recorded lectures, poems, interviews and speeches, listening tests.

INTRODUCTION TO PHONETICS: Sounds: consonant, vowel, diphthongs, etc. transcription of words (IPA), weak forms, syllable division,word stress, intonation, voice etc.

SPEAKING SKILLS: Standard and formal speech: Group discussion, oral presentations, public speaking, business presentationsetc. Conversation practice and role-playing, mock interviews etc.

BUILDING VOCABULARY: Etymological study of words and construction of words, phrasal verbs, foreign phrases, idioms and phrases. Jargon/ Register related to organizational set up, word exercises and word games to enhance self-expression and vocabulary of participants.

E. TEXT BOOKS

T1. Daniel Jones. The Pronunciation of English. Cambridge: Cambridge University Press, 1956.
T2. James Hartman& et al. Ed. English Pronouncing Dictionary. Cambridge: Cambridge University35 First Year Curriculum Structure Common to All Branches Press, 2006.
T3. Kulbhushan Kumar, Effective Communication Skills, Khanna Publishing House, New Delhi (Revised Ed. 2018)
T4. J.D.O'Connor. Better English Pronunciation. Cambridge: Cambridge University Press, 1980.

F. REFERENCE BOOKS

R1. Lindley Murray. An English Grammar: Comprehending Principles and Rules. London: Wilsonand Sons, 1908.
R2. Margaret M. Maison. Examine your English. Orient Longman: New Delhi, 1964.
R3. J.Sethi& et al. A Practice Course in English Pronunciation. New Delhi: Prentice Hall, 2004.
R4. Pfeiffer, William Sanborn and T.V.S Padmaja. Technical Communication: A Practical Approach.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES						CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	They will also demonstrate a significant increase in word power			2						2			
[CO2]	exercises and activities that will be conducted in the Language	2							2				
[CO3]	develop non-verbal communication				2					2			
[CO4]	Managing personal and professionals life						2	2					
[CO5]	Enhancing personality development						2				2		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

ARKA JAIN University
Jharkhand

Syllabus of

Diploma in Computer Science & Engineering

Semester-II

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
Scheme of Study (w.e.f Batch 2020-23)

SEMESTER –I(Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-I	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER I (Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -I	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER II (Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -II	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER –II(Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-II	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER-III

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Python Programming	PCC	3	3	100	70	20	5	5
2	Data Structure	PCC	3	3	100	70	20	5	5
3	Computer System Organization	PCC	3	3	100	70	20	5	5
4	Computer Programming	PCC	3	3	100	70	20	5	5
5	Algorithms	PCC	3	3	100	70	20	5	5
6	Essence of Indian Knowledge Tradition	AC	0	2	50	35	10	2.5	2.5
	Practical								
7	Data Structure Lab	PCC	2	4	50	35	5	5	5
8	Computer Programming Lab	PCC	2	4	50	35	5	5	5
9	Python Programming Lab	PCC	2	4	50	35	5	5	5
10	Summer Internship-1(3-4 Weeks)	PROJ	2	0	50	35	15	0	0
	TOTAL		**23**	**29**	**750**	**525**	**140**	**42.5**	**42.5**

SEMESTER-IV

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Operating System	PCC	3	3	100	70	20	5	5
2	Computer Network	PCC	3	3	100	70	20	5	5
3	Web Technologies	PCC	3	3	100	70	20	5	5
4	Introduction to DBMS	PCC	3	3	100	70	20	5	5
5	Software Engineering	PEC	3	3	100	70	20	5	5
6	Open Elective-I Artificial Intelligence & Machine Learning Soft Computing Techniques	OEC	3	3	100	70	20	5	5
	Practical								
7	Web Technologies Lab	PCC	2	4	50	35	5	5	5
8	Operating System Lab	PCC	2	4	50	35	5	5	5
9	Introduction to DBMS Lab	PCC	2	4	50	35	5	5	5
10	Minor Project	PROJ	2	4	50	35	15	0	0
	TOTAL		**27**	**36**	**850**	**595**	**165**	**45**	**45**

SEMESTER V

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Introduction to E-Governance	PCC	3	3	100	70	20	5	5
2	Internet of Things	OEC	3	3	100	70	20	5	5
3	Program Elective-I Information Security Fundamentals of AI	PEC	3	3	100	70	20	5	5
4	Program Elective-II Mobile Computing Data Sciences: Data Warehousing & Data Mining	PEC	3	3	100	70	20	5	5
5	Open Elective -II Web Designing and Multimedia Technology Robotics	OEC	3	3	100	70	20	5	5
	Practical								
6	Summer Internship-II(4-6 Weeks)	PROJ	3	0	100	70	30	0	0
7	Major Project-I (Project to be carried over to next semester)	PROJ	1	2	50	35	15	0	0
	TOTAL		19	17	650	455	145	25	25

Project to be carried over to next semester

SEMESTER VI

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Program Elective-III Multimedia Technology Advance Computer Networks	PEC	3	3	100	70	20	5	5
2	Program Elective-IV Network Forensics Software Testing	PEC	3	3	100	70	20	5	5
4	Open elective -III Cyber Security Laws, Standards and IPR Sustainable Development	OEC	3	3	100	70	20	5	5
5	Entrepreneurship and Start-ups	PROJ	4	4	100	70	20	5	5
6	Indian constitution	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Seminar	PROJ	1	2	50	35	15	0	0
7	Major Project-II	PROJ	3	6	100	70	30	0	0
	TOTAL		**17**	**23**	**600**	**420**	**135**	**22.5**	**22.5**

Distribution of Credit across 6 semesters:

Sl. No	Type of Paper	No. of Paper	Total Credit
1	Humanities and Social Sciences Courses **(HSC)**	3	7
2	Basic Science courses**(BSC)**	6	18
3	Engineering Science courses **(ESC)**	8	18
4	Professional core courses (**PCC)**	16	42
5	Professional Elective courses**(PEC)**	5	15
6	Open Electives Courses (**OEC)**	4	12
7	Project work, seminar and internship in industry or elsewhere**(PROJ)**	6	12
8	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]**(AC)**	3	(non-credit)
	Total	51	124

CIA – Continuous Internal Assessment – Based on Projects / Assignment during the semester

Note:

AICTE Activity Points to be earned by students admitted to Diploma program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):

Every regular student, who is admitted to the 3 year Diploma program, is required to earn 75 activity points in addition to the total credits earned for the program. Students entering 3 years Diploma Program through lateral entry are required to earn 50 activity points in addition to the total credits earned for the program.
The activity points earned by the student shall be reflected on the students 6th Semester grade card.
The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled.
Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.
Incase student fail to earn the prescribed activity points, Sixth semester Grade Card shall be issued only after earning the required activity Points.
Students shall be eligible for the award of degree only after the release of the Six Semester grade card.

There are two groups (A & B) in semester 1 & 2. The Group division will be decided by The Dean SoE & IT before commencement of classes*

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

PROGRAM OUTCOMES

After completing this undergraduate program, a learner:

[PO.1]. Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems

[PO.2]. Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

[PO.3]. Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

[PO.4]. Engineering Tools: Apply appropriate technologies and tools with an understanding of the limitation.

[PO.5]. The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

[PO.6]. Environment and sustainability: Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development..

[PO.7]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

[PO.8]. Individual and team work: Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

[PO.9]. Communication: An ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.10]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

PROGRAM SPECIFIC OUTCOMES

[PSO.1]. Students will able to design software and computer based system using latest and advanced technologies in computer hardware and software field.

[PSO.2]. Apply knowledge of computer science & engineering and an understanding of management principles for applying them while managing software and hardware projects.

Subject: Mathematics- II

Code: DIP12008

4 Credits | Semester II

A. Introduction:

- To study the functions and this course enables the students to understand the calculus in engineering problems.
- To learn solve system of linear equation by using matrix and determinants.
- To gain profiency in calculus computations.
- for analyzing and describing the behavior of functions limits derivatives and integrals

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Remembering several areas of mathematics beyond calculus

[CO2] Understand to solve differential equations using appropriate methods.

[CO3] Analyzing theConcepts of differentiation in physics & engineering courses

[CO4] Evaluating the ODE of first degree, first order in engineering field

[CO5] Creating interest in mathematics

C. Assessment Plan:

Criteria	**Description**	**Maximum Marks**
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

MATRICES AND DETERMINANTS: Matrices: Basic concepts of matrices: Definition, types of matrices and mathematical operations on matrices (addition, subtraction and multiplication of matrices).**Determinant:** Definition, problems on finding the determinant value of 2^{nd} and 3^{rd} order. Problems on finding unknown quantity in a 2^{nd} and 3^{rd} order determinants using expansion. Solving simultaneous linear equations using matrix method (Cramer's rule up to 3rd order).Inverse and applications of matrices: Minors and Cofactors of elements of matrix. Adjoin and Inverse of matrices of order 2ndand 3rd order. Elementary row and column operations on matrices. Characteristic equation and characteristic roots (Eigen values) of 2x2 matrix. Statement of Cayley-Hamilton theorem and its verification for 2x2 matrixes.

DIFFERENTIAL CALCULUS: Constants and variables. Definition of function. Types of functions: Explicit and implicit function, odd and even functions-2. Concept of $x \to a$.Definition of limit of a function. Indeterminate forms. Evaluation of limit of functions by factorization, rationalization. Algebraic limitStatement of $\lim_{x\to a} \frac{x^n - a^n}{x-a} = na^{n-1}$ where n is any rational number. Proof of $\lim_{\theta\to 0} \frac{\sin\theta}{\theta} = 1$where$\theta$ is in radian. Related problems.Derivatives of functions ofx^n, $\sin x$, $\cos x$&$\tan x$with respect to 'x' from first principle method Rules of differentiation: Sum, product, quotient rule & problems on rules.Derivatives of function of a function (Chain rule) & problems. Inverse trigonometric functions & their derivatives. Implicit functions, Parametric functions & problems, differentiation of exponential and Logarithmic, second order differentiation.

APPLICATION OF DIFFERENTIATION: Geometrical meaning of derivative. Derivative as slope. Equations of tangent & normal to the curve y = f(x) at a given point- (statement only)
Derivative as a rate measure i.e.to find the rate of change of displacement, velocity, radius, area, volume-using differentiationDefinition of increasing & decreasing functionMaxima& minima of a function

INTEGRAL CALCULUS, DEFINITE INTEGRAL & ITS APPLICATIONS: Definition of Integration. List of standard integrals. Rules of integration (only statement)problems.-1, Integration by substitution method. Problems. Standard integrals. Integration by parts definite integration &problemsArea, volume, centers of gravity & moment of inertia by integration method. Simple problems

DIFFERENTIAL EQUATION: Definition, example, order & degree of differential equation with examples Formation of differential equation by eliminating arbitrary constants up to second order.Solution of O. D. E of first degree & first order by variable separable method
Linear differential equations & its solution using integrating factor.

E. TEXT BOOKS

F. REFERENCE BOOKS

R1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, New Delhi, 40th Edition, 2007.
R2. G. B. Thomas, R. L. Finney, Calculus and Analytic Geometry, Addison Wesley, 9th Edition, 1999.
R3. NCERT Mathematics Text books of class XI and XII.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES	CORRELATION WITH PROGRAM SPECIFIC OUTCOMES										
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Remembering several areas of mathematics beyond calculus	1			1								
[CO2]	Understand to solve differential equations using appropriate methods		1			1							
[CO3]	Analyzing the Concepts of differentiation in physics & engineering courses	1		1									
[CO4]	Evaluating the ODE of first degree, first order in engineering field	1				1							
[CO5]	Creating interest in mathematics					1					1		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Fundamentals of Electrical and Electronics Engineering

Code:

4 Credits |Semester II

A. Introduction:

- To provide basic knowledge of the different elements and concepts of electrical engineering field.
- To learn basic concepts of various active and passive electronic components, Signals, Op-Amp and their applications, Digital Electronics and their applications to help students deal with electrical and electronics engineering principles and applications in industrial processes of different fields.
- To impart knowledge of electrical quantities such as current, voltage, power, energy and frequency to understand the impact of technology in a global and societal context.
- To provide working knowledge for the analysis of basic DC and AC circuits used in electrical and electronic devices.
- To explain the working principle, construction, applications of DC machines, AC machines & measuring instruments.
- To highlight the importance of transformers in transmission and distribution of electric power.

B. Course Outcomes: At the end of the course,

[CO1] Remembering the basic terminology/definitions of electrical component & Signals

[CO2] Understanding the Analog electronic Specially Op-Amp & Digital Electronics and their applications

[CO3] Applying the knowledge of theorems/laws for Predict the behavior of any electrical and magnetic circuitsand Use the principles of electromagnetic induction in electrical applications

[CO4] Analyzing the formulation and solution of simple and complex AC, Dc circuits

[CO5] Evaluatingthe requirement of transformers and the type of electrical machine used for that particular application

C. Assessment Plan:

Criteria	**Description**	**Maximum Marks**
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

OVERVIEW OF ELECTRONIC COMPONENTS & SIGNALS: Passive Active Components: Resistances, Capacitors, Inductors, Diodes, Transistors, FET, MOS andCMOS and their Applications. Signals: DC/AC, voltage/current, periodic/non-periodic signals, average,Rms, peak values, different types of signal waveforms, Ideal/non-ideal voltage/current sources Independent/dependent voltage current sources. Overview of electrical & electronics engineering field

OVERVIEW OF ANALOG CIRCUITS AND DIGITAL ELECTRONICS: Operational Amplifiers-Ideal Op-Amp, Practical op amp, Open loop and closed loop configurations, Application of Op-Amp as amplifier, adder, differentiator and integrator. Introduction to Boolean Algebra, Electronic Implementation of Boolean Operations, Gates-Functional Block Approach, Storage elements-Flip Flops-A Functional block approach, Counters: Ripple, Up/down and decade, Introduction to digital IC Gates (of TTL Type).

ELECTRIC AND MAGNETIC CIRCUITS: EMF, Current, Potential Difference, Power and Energy; M.M.F, magnetic force, permeability, hysteresis loop, reluctance, leakage factor and BH curve;Electromagnetic induction, Faraday's laws of electromagnetic induction, Lenz's law; Dynamically induced emf; Statically induced emf; Equationsof self and mutual inductanceAnalogy between electric and magnetic circuits.

A.C. CIRCUITS: Cycle, Frequency, Periodic time, Amplitude, Angular velocity, RMS value, Average value, Form Factor Peak Factor, impedance, phase angle, and power factor; Mathematical and phasor representation of alternating emf and currentVoltage and Current relationship in Star and Delta connections; A.C in resistors, inductors and capacitors; A.C in R-L series, R-C series, R-L-C series and parallel circuits; Power in A. C. Circuits, power triangle.

TRANSFORMER AND MACHINES: Classification: Static & dynamic (rotary) machines, examples. Transformer: Definition, study of principle of operation of transformer, derivation of EMF equation, turns ratio, voltage transformation ratio, step-up & step-down transformers, losses, efficiency, regulation, & simple problemsClassification Transformers: Based on cores, frequency, power and application, & their featuresDC machines: Principle of operation & features of DC motors &generatorsACmachines:Features of AC motors & alternators

E. TEXT BOOKS

T1. Basic Electrical Engineering, V. K. Mehta and Rohit Mehta, S. Chand and Company Publishers, RE 2012, ISBN 81219087

T2. Theraja, B. L., Electrical Technology Vol – I, S. Chand Publications, New Delhi, 2015, ISBN:9788121924405

T3. Theraja, B. L., Electrical Technology Vol – II, S. Chand Publications, New Delhi, 2015, ISBN:9788121924375
T4. Electronic Components, Dr. K. Padmanabhan and P. Swaminathan, Lakshmi Publications, 2006.

F. REFERENCE BOOKS

R1. Fundamentals Of Electric Circuits, 5Th Edn Edition-5, Charles K. Alexander And Matthew N.O. Sadiku, Publisher McGraw Hill India.

R2. Circuit Theory Analysis and Synthesis Paperback – 2018 by AbhijitChakrabarti (Author), publisher DhanpatRai and Co.

R3. Electronics: Fundamentals and Applications by D. Chattopadhyay and P. C. Rakshit, publication - new age international publishers.

R4. RituSahdev, Basic Electrical Engineering, Khanna Publishing House

R5. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN :978-0-07-0088572-5

R6. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latesteditionISBN : 9781107464353

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Remembering the basic terminology/definitions of electrical component & Signals	2	1										
[CO2]	Understanding the Analog electronic Specially Op-Amp & Digital Electronics and their applications			2	3								
[CO3]	Applying the knowledge of theorems/laws for Predict the behavior of any electrical and magnetic circuitsand Use the principles of electromagnetic induction in electrical applications					2		2					
[CO4]	Analyzing the formulation and solution of simple and complex AC, Dc circuits						2		1				
[CO5]	Evaluatingthe requirement of transformers and the type of electrical machine used for that particular application									1	2		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Introduction to IT Systems

Code: DIP12157

Credits - 3 | Semester II

A. Introduction:

- This course is intended to make new students understand computing environment - Learning basic computer skills, learning basic application software tools, understanding computer hardware, cyber security awareness

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Comfortably work on computer, install and configure OS

[CO2] Assemble a PC

[CO3] Connect it to external devices, write documents,

[CO4] Create worksheets, prepare presentations

[CO5] Protect information and computers from basic abuses/ attacks.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: Computer, Functional part of computers, history and evolution of computersBasic internet skills: understanding browser, efficient use of search engines, awareness about Digital India portals (state and national portals), college portals Hardware and software, Advantages and disadvantages of computers.Memory: primary memory (RAM and ROM) and secondary memory, HDD and other peripheral devices

INTRODUCTION TO OPERATING SYSTEM: My computer, recycle bin, status bar, Start and Menu Selection, Creating and rename of files and folders, Copy, paste, moving files , opening and closing of different windows.Introduction to DOS, DOS commands, OS Installation (Linux and MS Windows)Unix Shell and Commands, vi editor.

INTRODUCTION TO OFFICE TOOLS: Open Office writer, Open Office spreadsheet, Open Office Impressworking with MS-Word-inserting text, word art, table, images, adding

background**Powerpoint:-** Difference between presentation and documents, Title, Text Creation: Fonts and size, Bullets ,moving to next slides, Presentation of slides: Selection of types of slides, slide show and presentation

INTRODUCTION TO INTERNET: Introduction to Internet, WWW and Web Browsers: Basic of Computer networks; LAN, WAN; Applications of Internet; World Wide Web; Web Browsing software, Search Engines; Understanding URL; Domain name; IP Address; Using e-governance websiteHTML4, CSS, making personal webpages

INFORMATION SECURITY BEST PRACTICES: Information security, Hacking, cryptography and its applications

E. TEXT BOOKS

T1. Online Resources, Linux man pages, Wikipedia
T2. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett

F. REFERENCE BOOKS

R1. R. S. Salaria, Computer fundamentals, Khanna publication house
R2. Computer Fundamentals Concepts, Systems, Application, D.P.Nagapal, S.Chand Publication
R3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Comfortably work on computer, install and configure OS	1			3								
[CO2]	Assemble a PC			2									
[CO3]	Connect it to external devices, write documents,										2		
[CO4]	Create worksheets, prepare presentations									1			
[CO5]	Protect information and computers from basic abuses/ attacks.						1						

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Engineering Mechanics

Code: DIP12153

Credits- 3 | Semester II

A. Introduction:

- To obtain resultant of various forces
- To obtain resultant of various forces
- To understand role of friction in equilibrium problems
- To know fundamental laws of machines and their applications to various engineering problems

B. Course Outcomes: At the end of the course, students will be able

[CO1] Identify the force systems for given conditions by applying the basics of mechanics.
[CO2] Determine unknown force(s) of different engineering systems.
[CO3] Apply the principles of friction in various conditions for useful purposes.
[CO4] Find the centroid and centre of gravity of various components in engineering systems.
[CO5]Select the relevant simple lifting machine(s) for given purposes.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

BASICS OF MECHANICS AND FORCE SYSTEM: Basic concepts, applied mechanics, Statics, Dynamics.Space, time, mass, particle, flexible body and rigid body.Scalar and vector quantity, Units of measurement (SI units) - Fundamental units and derived units.Force – unit, representation as a vector and by Bow's notation, characteristics and effects of a force, Principle of transmissibility of force, Force system and its classification.Resolution of a force - Orthogonal components of a force, moment of a force, Varignon'sTheorem.Composition of forces – Resultant, analytical method for determination of resultant for concurrent, non-concurrent and parallel co-planar force systems – Law of triangle, parallelogram and polygon of forces.

EQUILIBRIUM: Equilibrium and Equilibrant, Free body and Free body diagram, Analytical and graphical methods of analyzing equilibrium**,** Lami's Theorem – statement and explanation, Application for various engineering problems.Types of beam, supports (simple, hinged, roller and fixed) and loads acting on beam (vertical and inclined point load, uniformly distributed load,

couple),Beam reaction for cantilever, simply supported beam with or without overhang – subjected to combination of Point load and uniformly distributed load, Beam reaction graphically for simply supported beam subjected to vertical point loads only

FRICTION & VIRTUAL WORK: Friction and its relevance in engineering, types and laws of friction, limiting equilibrium, limiting friction, co-efficient of friction, angle of friction, angle of repose, relation between co-efficient of friction and angle of friction.Introduction, laws of coulomb friction, simple contact friction problems, belt friction, the square crew thread rolling resistance, Equilibrium of bodies on level surface subjected to force parallel and inclined to plane. Equilibrium of bodies on inclined plane subjected to force parallel to the plane only.Work of a force, Principle of Virtual work and its application.

CENTROID AND CENTRE OF GRAVITY& TRUSS: Centroid of geometrical plane figures (square, rectangle, triangle, circle, semi-circle, quarter circle),Centroid of composite figures composed of not more than three geometrical figures, Centre of Gravity of simple solids (Cube, cuboid, cone, cylinder, sphere, hemisphere) Centre ofGravity of composite solids composed of not more than two simple solids.The structural model, simple trusses, analysis of simple trusses: method of joints, Method of sections, graphical method.

SIMPLE LIFTING MACHINE: Simple lifting machine, load, effort, mechanical advantage, applications and advantages. Velocity ratio, efficiency of machines, law of machine.Ideal machine, friction in machine, maximum Mechanical advantage and efficiency, reversible and non-reversible machines, conditions for reversibility, Velocity ratios of Simple axle and wheel, Differential axle and wheel, Worm and worm wheel, Single purchase and double purchase crab winch, Simple screw jack, Weston's differential pulleyblock, geared pulley block.

E. TEXT BOOKS

T1.D.S. Bedi, Engineering Mechanics, Khanna Publications, New Delhi (2008)
T2.Khurmi, R.S., Applied Mechanics, S. Chand & Co. New Delhi.
T3.Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.
T4.Ramamrutham, Engineering Mechanics, S. Chand & Co. New Delhi.
T5.Dhade, Jamadar&Walawelkar, Fundamental of Applied Mechanics, Pune Vidhyarthi Gruh.

F. REFERENCE BOOKS

R1. Ram, H. D.; Chauhan, A. K., Foundations and Applications of Applied Mechanics, CambridgeUniversity Press.
R2. Meriam, J. L., Kraige, L.G., Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Identify the force systems for given conditions by applying the basics of mechanics.	3	3								3		2
[CO2]	Determine unknown force(s) of different engineering systems.		3								3		3
[CO3]	Apply the principles of friction in various conditions for useful purposes.		3								3		1
[CO4]	Find the centroid and centre of gravity of various components in engineering systems.	3			3								2
[CO5]	Select the relevant simple lifting machine(s) for given purposes.	3									3		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Environmental Sciences

Code: DIP12155

0 Credits | Semester II

A. Introduction:

- Solve various engineering problems applying ecosystem to produce eco – friendly products.
- Use relevant air and noise control method to solve domestic and industrial problems.
- Use relevant water and soil control method to solve domestic and industrial problems.
- To recognize relevant energy sources required for domestic and industrial applications.
- Solve local solid and e-waste problems.

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Understand the ecosystem and terminology and solve various engineering problems applying

[CO2] Ecosystem knowledge to produce eco – friendly products.

[CO3] Understand the suitable air, extent of noise pollution, and control measures and acts.

[CO4] Understand the water and soil pollution, and control measures and acts.

[CO5] Understand different renewable energy resources and efficient process of harvesting.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	10
	Attendance	2.5
	Assignment	2.5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

ECOSYSTEM: Structure of ecosystem, Biotic & Abiotic components, Food chain and food web Aquatic (Lentic and Lotic) and terrestrial ecosystem Carbon, Nitrogen, Sulphur, Phosphorus cycle.Global warming -Causes, effects, process, Green House Effect, Ozone depletion

AIR AND NOISE POLLUTION: Definition of pollution and pollutant, Natural and manmade sources of air pollution (Refrigerants, I.C., Boiler)Air Pollutants: Types, Particulate Pollutants: Effects and control (Bag filter, Cyclone separator, Electrostatic Precipitator) Gaseous Pollution Control:Absorber, Catalytic Converter, Effects of air pollution due to Refrigerants, I.C., Boiler

Noise pollution: sources of pollution, measurement of pollution level,Effects of Noise pollution, Noise pollution (Regulation and Control) Rules, 2000

WATER AND SOIL POLLUTION: Sources of water pollution, Types of water pollutants, Characteristics of water pollutants Turbidity, pH, total suspended solids, total solids BOD and COD: Definition, calculationWaste Water Treatment: Primary methods: sedimentation, froth floatation, Secondary methods: Activated sludge treatment, Trickling filter, Bioreactor, Tertiary Method: Membrane separation technology, RO (reverse osmosis). Causes, Effects and Preventive measures of Soil Pollution: Causes-Excessive use of Fertilizers, Pesticides and Insecticides, Irrigation, E-Waste.

RENEWABLE SOURCES OF ENERGY: Solar Energy: Basics of Solar energy. Flat plate collector (Liquid & Air). Theory of flat plate collector. Importance of coating. Advanced collector. Solar pond. Solar water heater, solar dryer. Solar stills.Biomass: Overview of biomass as energy source. Thermal characteristics of biomass as fuel. Anaerobic digestion. Biogas production mechanism. Utilizationand storage of biogas.Wind energy: Current status and future prospects of wind energy. Wind energy in India. Environmental benefits and problem of wind energy. New Energy Sources: Need of new sources. Different types new energy sources. Applications of (Hydrogen energy, Ocean energy resources, Tidal energy conversion.) Concept, origin andpower plants of geothermal energy.

SOLID WASTE MANAGEMENT, ISO 14000 & ENVIRONMENTAL MANAGEMENT: Solid waste generation- Sources and characteristics of: Municipal solid waste, E- waste, biomedical waste. Metallic wastes and Non-Metallic wastes (lubricants, plastics, rubber) from industries. Collection and disposal: MSW (3R, principles, energy recovery, sanitary landfill), Hazardous waste Air quality act 2004, air pollution control act 1981, water pollution, and control act1996. Structure and role of Central and state pollution control board. Concept of Carbon Credit, Carbon Footprint. Environmental management in fabrication industryISO14000: Implementation in industries, Benefits.

E. TEXT BOOKS

T1. Metcalf & Eddy, Waste Water Engineering, Mc-Graw Hill, New York, 2013, ISBN: 077441206.
T2. Keshav Kant, Air Pollution & Control, Khanna Publishing House, New Delhi (Edition 2018)

F. REFERENCE BOOKS

R1. S.C. Sharma & M.P. Poonia, Environmental Studies,Khanna Publishing House,NewDelhi
R2. C.N. R. Rao, Understanding Chemistry, Universities Press (India) Pvt. Ltd., 2011.
First Year Curriculum Structure Common to All Branches 52
R3. Arceivala, Soli Asolekar, Shyam, Waste Water Treatment for Pollution Control and

R4. Reuse, Mc-Graw Hill Education India Pvt. Ltd., New York, 2007, ISBN:978-07-062099-
R5. Nazaroff, William, Cohen, Lisa, Environmental Engineering Science, Willy, New York, 2000,ISBN 10: 0471144940.
R6. O.P. Gupta, Elements of Environmental Pollution Control, Khanna Publishing House, New Delhi
R7. Rao, C. S., Environmental Pollution Control and Engineering, New Age International Publication,2007, ISBN: 81-224-1835-X.
R8. Rao, M. N.Rao, H.V.N, Air Pollution, Tata Mc-Graw Hill Publication, New delhi, 1988, ISBN: 0-07-451871-8.
R9. Frank Kreith, Jan F Kreider, Principles of Solar Engineering, McGraw-Hill, New York ; 1978,ISBN: 9780070354760.
R10. Aldo Vieira, Da Rosa, Fundamentals of renewable energy processes, Academic Press Oxford,UK; 2013. ISBN: 9780123978257.
R11. Patvardhan, A.D, Industrial Solid Waste, Teri Press, New Delhi, 2013, ISBN:978-81-7993-502-6

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understand the ecosystem and terminology and solve various engineering problems applying						3						
[CO2]	Ecosystem knowledge to produce eco – friendly products.					2	2						
[CO3]	Understand the suitable air, extent of noise pollution, and control measures and acts.						2						
[CO4]	Understand the water and soil pollution, and control measures and acts.						2						
[CO5]	Understand different renewable energy resources and efficient process of harvesting.										2		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Engineering Graphics

Code: DIP12152

Credits 2 | Semester II

A. Introduction:

- To understand the language of graphics, which is used to express ideas, convey instructions while carrying out engineering jobs.
- To develop drafting and sketching skills, to know the applications of drawing equipment and get familiarize with Indian Standards related to engineering drawings.
- To develop skills to visualize actual object or a part of it based on drawings.
- To develop skills to translate ideas into sketches and to draw and read various engineering curves, projections and dimensioning styles.

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Understand the language of graphics and familiarize with Indian Standards related to engineering drawings

[CO2] Develop drafting and sketching skills, application of drawing equipment's.

[CO3] Read various engineering curves, projections and dimensioning styles.

[CO4] Develop skills to translate ideas into sketches and draw.

[CO5] Develop skills to visualize actual object or a part of it, based on drawings.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

BASIC ELEMENTS OF DRAWING: Drawing Instruments and supporting materials, Convention of lines and their applications.Dimensioning techniques as per SP-46:2003 – types and applications of chain, parallel and coordinate dimensioning.Representative Fractions – reduced, enlarged and full size scales; Engineering Scales such as plain and diagonal scale.Geometrical and Tangency constructions.

ORTHOGRAPHIC PROJECTIONS OF POINTS AND LINES: Introduction to orthographic projection, First angle and Third angle method, their symbols.Conversion of pictorial view into Orthographic Views – object containing plain surfaces, slanting surfaces, slots, ribs, cylindrical surfaces.Projections of points Projections of lines in different quadrants, inclinations, True lengths of the lines projections on auxiliary planes

PROJECTIONS OF PLANE FIGURES: Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one or both reference planes).

PROJECTION OF SOLIDS: Types of Solid. Projection of Cone, Cylinder, Prism &pyramids.Simple cases when solid are placed in different positions Axis faces and tines lying in the faces of the solid making given angles.

ISOMETRIC PROJECTION: Introduction to isometric projections. Isometric scale and Natural scale.Isometric view and isometric projection. Illustrative problems related to objects containing lines, circles and arcs shape only

E. TEXT BOOKS

T1. Engineering Graphics, Agrawal B. & Agrawal C. M, TMH Publication
T2. Textbook on Engineering Drawing, Narayana, K.L. & P Kannaiah, Scitech Publishers

F. REFERENCE BOOKS

R1. Engineering Graphics, N.D Bhatt, Charotar Publishing House Pvt. Limited
R2. Principle of Engineering Graphics and Drawing, R.K Dhawan, S. Chand Publishing
R3. Engineering Graphics and Drafting, P.S GILL, S. K. Kataria& Sons
R4. Engineering Drawing and Computer Graphics, Shah, M.B. &Rana B.C. PearsonEducation

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understand the language of graphics and familiarize with Indian Standards related to engineering drawings	2	1		1								
[CO2]	Develop drafting and sketching skills, application of drawing equipment's.				1								2
[CO3]	Read various engineering curves, projections and dimensioning styles.												
[CO4]	Develop skills to translate ideas into sketches and draw.	1											
[CO5]	Develop skills to visualize actual object or a part of it, based on drawings.											2	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Fundamentals of Electrical and Electronics EngineeringLab

Code: DIP12156

Credits- 1 | Semester II

A. Introduction:

- To provide basic knowledge of the different elements and concepts of electrical engineering field.
- To learn basic concepts of various active and passive electronic components applications in industrial processes of different fields

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Remembering basic problems related to electrical circuits

[CO2] Understanding operation of different electrical technologies.

[CO3] Analyzing different types of signal waveforms.

[CO4] Evaluating a various electronic circuits.

[CO5] Use relevant electric/electronic protective devices safely.

C. Assessment Plan:

Criteria	**Description**	**Maximum Marks**
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

LIST OF PRACTICALS	
1	Determine the resistance of a given unknown resistor experimentally and compare it with its colour coded value.
2.	Determine voltage, current and power in R-L series circuit.
3.	Demonstrate the verification of Ohm's law.
4	Compute the effective resistance experimentally for the following combinations: Three resistors are connected in (a) series and (b) parallel.
5	Connect capacitors in series and parallel combination on bread board and

	measure its value using multimeter.
6.	Demonstrate the verification of Kirchhoff's Current Law (KCL).
7	Demonstrate the verification of Kirchhoff's Voltage Law (KVL).
8	Demonstrate the characteristics of Half Wave Rectifier.
9	Test the PN-junction diodes using digital multimeter and measure the performance of PN-junction diode.
10	Demonstrate the characteristics of full Wave Rectifier.
11	Verify experimentally Thevenin's theorem
12	Verify experimentally Norton's theorem

E. TEXT BOOKS

T1. RituSahdev, Basic Electrical Engineering, Khanna Publishing House, 2018
T2. Mittle and Mittal, Basic Electrical Engineering, McGraw Education, New Delhi, 2015, ISBN : 978-0-07-0088572-5
T3. Saxena, S. B. Lal, Fundamentals of Electrical Engineering, Cambridge University Press, latest edition ISBN : 9781107464353
T4. Theraja, B. L., Electrical Technology Vol – I, S. Chand publications, New Delhi, 2015, ISBN: 9788121924405

F. REFERENCE BOOKS

R1. Theraja, B. L., Electrical Technology Vol – II, S. Chand publications, New Delhi, 2015, ISBN:9788121924375
R2. Jegathesan, V., Basic Electrical and Electronics Engineering, Wiley India, New Delhi, 2015, ISBN : 97881236529513
R3. Sedha, R.S., A text book of Applied Electronics, S.Chand ,New Delhi, 2008, ISBN-13: 978-8121927833
R4. Mehta, V.K., Mehta, Rohit, Principles of Electronics, S. Chand and Company, New Delhi, 2014,ISBN-13-9788121924504
R5. Bell Devid, Fundamental of Electronic Devices and Circuits, Oxford University Press, NewDelhi 2015 ISBN : 9780195425239

F. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Remembering basic problems related to electrical circuits	1		2									
[CO2]	Understanding operation of different electrical technologies.		1		3								
[CO3]	Analyzing different types of signal waveforms.					2							
[CO4]	Evaluating a various electronic circuits.		2										
[CO5]	Use relevant electric/electronic protective devices safely.							2					

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Introduction to IT System Lab

Code:

Credits- 1 | Semester II

A. Introduction:

- This Lab course is intended to practice whatever is taught in theory class of 'Introduction of IT Systems'and become proficient in using computing environment - basic computer skills, basic application software tools, Computer Hardware, cyber security features, etc.

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Comfortably work on computer, install and configure OS
[CO2] Assemble a PC
[CO3] Connect it to external devices, write documents,
[CO4] Create worksheets, prepare presentations
[CO5] Protect information and computers from basic abuses/ attacks.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

LIST OF PRACTICALS	
1	Introduction to various hardware components of a computer.
2.	Introduction to various e-governance/ Digital India portals, understanding their features
3.	Installing Linux/DOS and performing commands
4	HTML program to create a web page
5	HTML program to create a List of items and table
6.	HTML program to create a bio data using CSS

7	Creating a text file using Open Office/ MS-word
8	Creating a text file and adding borders, tables, word art etc
9	Creating a PPt using Open Office/ MS Powerpoint
10	Creating a slide show for the powerpoint presentation

E. TEXT BOOKS

T1. IT Essentials PC Hardware and Software Companion Guide, Davis Anfinson and Ken Quamme, CISC Press, Pearson Education.

T2. PC Hardware and A+ Handbook, Kate J. Chase PHI (Microsoft).

F. REFERENCE BOOKS

R1. Online resources, Linux man pages, Wikipedia.

R2. R.S. Salaria, Computer Fundamentals, Khanna Publishing House.

R3. Ramesh Bangia, PC Software Made Easy – The PC Course Kit, Khanna Publishing House.

R4. Mastering Linux Shell Scripting: A practical guide to Linux command-line, Bash scripting, and Shell programming, by Mokhtar Ebrahim, Andrew Mallett.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES			CORRELATION WITH PROGRAM SPECIFIC OUTCOMES								
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Comfortably work on computer, install and configure OS	1			3								
[CO2]	Assemble a PC			2									
[CO3]	Connect it to external devices, write documents,										2		
[CO4]	Create worksheets, prepare presentations									1			
[CO5]	Protect information and computers from basic abuses/ attacks.						1						

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Engineering Mechanics Lab

Code: DIP12154

Credits- 1 | Semester II

A. Introduction:

- To obtain resultant of various forces.
- To calculate support reactions through conditions of equilibrium for various structures
- To understand role of friction in equilibrium problems
- To know fundamental laws of machines and their applications to various engineering problems

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Identify the force systems for given conditions by applying the basics of mechanics.
[CO2] Determine unknown force(s) of different engineering systems.
[CO3] Apply the principles of friction in various conditions for useful purposes.
[CO4] Find the centroid and center of gravity of various components in engineering systems.
[CO5] Select the relevant simple lifting machine(s) for given purposes..

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

LIST OF PRACTICALS	
1.	To study various equipment is relate to Engineering Mechanics.
2.	To find the M.A., V.R., Efficiency and law of machine for Differential Axle and Wheel.
3.	To find the M.A., V.R., Efficiency and law of machine for Simple Screw Jack.
4.	Derive Law of machine using Worm and worm wheel.
5.	Derive Law of machine using Single purchase crab.
6.	Derive Law of machine using double purchase crab.
7.	Derive Law of machine using Weston's differential or wormed geared pulley block.
8.	Determine resultant of concurrent force system applying Law of Polygon of forces using

	forcetable.
9.	Determine resultant of concurrent force system graphically.
10.	Determine resultant of parallel force system graphically.
11.	Verify Lami's theorem
12.	Study forces in various members of Jib crane.
13.	Obtain support reactions of beam using graphical method.
14.	Determine coefficient of friction for motion on horizontal and inclined plane.
15.	Determine centroid of geometrical plane figures.
16.	Determine support reactions for simply supported beam.

E. TEXT BOOKS

T1. Ram, H. D.; Chauhan, A. K. Foundations and Applications of Applied Mechanics, Cambridge UniversityPress.

T2. Meriam, J. L., Kraige, L.G. , Engineering Mechanics- Statics, Vol. I, Wiley Publication, New Delhi.

F. REFERENCE BOOKS

R1. Bedi D.S., Engineering Mechanics, Khanna Publishing House

R2. Khurmi, R.S., Applied Mechanics, S.Chand& Co. New Delhi.

R3. Bansal R K, A text book of Engineering Mechanics, Laxmi Publications.

R4. Ramamrutham, Engineering Mechanics, S.,S Chand & Co. New Delhi.

R5. Dhade, Jamadar&Walawelkar, Fundamental of Applied Mechanics, Pune VidhyarthiGruh.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES			CORRELATION WITH PROGRAM SPECIFIC OUTCOMES								
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Identify the force systems for given conditions by applying the basics of mechanics.	1		2									
[CO2]	Determine unknown force(s) of different engineering systems.		1		3								
[CO3]	Apply the principles of friction in various conditions for useful purposes.					2							
[CO4]	Find the centroid and center of gravity of various components in engineering systems.		2										
[CO5]	Select the relevant simple lifting machine(s) for given purposes..							2					

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Syllabus of

Diploma in Computer Science & Engineering

Semester-III

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
Scheme of Study (w.e.f Batch 2020-23)

SEMESTER –I(Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-I	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER I (Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -I	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER II (Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -II	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER –II(Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-II	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER-III

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Python Programming	PCC	3	3	100	70	20	5	5
2	Data Structure	PCC	3	3	100	70	20	5	5
3	Computer System Organization	PCC	3	3	100	70	20	5	5
4	Computer Programming	PCC	3	3	100	70	20	5	5
5	Algorithms	PCC	3	3	100	70	20	5	5
6	Essence of Indian Knowledge Tradition	AC	0	2	50	35	10	2.5	2.5
	Practical								
7	Data Structure Lab	PCC	2	4	50	35	5	5	5
8	Computer Programming Lab	PCC	2	4	50	35	5	5	5
9	Python Programming Lab	PCC	2	4	50	35	5	5	5
10	Summer Internship-1(3-4 Weeks)	PROJ	2	0	50	35	15	0	0
	TOTAL		**23**	**29**	**750**	**525**	**140**	**42.5**	**42.5**

SEMESTER-IV

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Operating System	PCC	3	3	100	70	20	5	5
2	Computer Network	PCC	3	3	100	70	20	5	5
3	Web Technologies	PCC	3	3	100	70	20	5	5
4	Introduction to DBMS	PCC	3	3	100	70	20	5	5
5	Software Engineering	PEC	3	3	100	70	20	5	5
6	Open Elective-I Artificial Intelligence & Machine Learning Soft Computing Techniques	OEC	3	3	100	70	20	5	5
	Practical								
7	Web Technologies Lab	PCC	2	4	50	35	5	5	5
8	Operating System Lab	PCC	2	4	50	35	5	5	5
9	Introduction to DBMS Lab	PCC	2	4	50	35	5	5	5
10	Minor Project	PROJ	2	4	50	35	15	0	0
	TOTAL		**27**	**36**	**850**	**595**	**165**	**45**	**45**

SEMESTER V

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Introduction to E-Governance	PCC	3	3	100	70	20	5	5
2	Internet of Things	OEC	3	3	100	70	20	5	5
3	Program Elective-I Information Security Fundamentals of AI	PEC	3	3	100	70	20	5	5
4	Program Elective-II Mobile Computing Data Sciences: Data Warehousing & Data Mining	PEC	3	3	100	70	20	5	5
5	Open Elective -II Web Designing and Multimedia Technology Robotics	OEC	3	3	100	70	20	5	5
	Practical								
6	Summer Internship-II(4-6 Weeks)	PROJ	3	0	100	70	30	0	0
7	Major Project-I (Project to be carried over to next semester)	PROJ	1	2	50	35	15	0	0
	TOTAL		19	17	650	455	145	25	25

Project to be carried over to next semester

SEMESTER VI

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Program Elective-III Multimedia Technology Advance Computer Networks	PEC	3	3	100	70	20	5	5
2	Program Elective-IV Network Forensics Software Testing	PEC	3	3	100	70	20	5	5
4	Open elective -III Cyber Security Laws, Standards and IPR Sustainable Development	OEC	3	3	100	70	20	5	5
5	Entrepreneurship and Start-ups	PROJ	4	4	100	70	20	5	5
6	Indian constitution	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Seminar	PROJ	1	2	50	35	15	0	0
7	Major Project-II	PROJ	3	6	100	70	30	0	0
	TOTAL		**17**	**23**	**600**	**420**	**135**	**22.5**	**22.5**

Distribution of Credit across 6 semesters:

Sl. No	Type of Paper	No. of Paper	Total Credit
1	Humanities and Social Sciences Courses **(HSC)**	3	7
2	Basic Science courses**(BSC)**	6	18
3	Engineering Science courses **(ESC)**	8	18
4	Professional core courses (**PCC)**	16	42
5	Professional Elective courses**(PEC)**	5	15
6	Open Electives Courses (**OEC)**	4	12
7	Project work, seminar and internship in industry or elsewhere**(PROJ)**	6	12
8	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]**(AC)**	3	(non-credit)
	Total	51	124

CIA – Continuous Internal Assessment – Based on Projects / Assignment during the semester

Note:

AICTE Activity Points to be earned by students admitted to Diploma program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):

Every regular student, who is admitted to the 3-year Diploma program, is required to earn 75 activity points in addition to the total credits earned for the program. Students entering 3 years Diploma Program through lateral entry are required to earn 50 activity points in addition to the total credits earned for the program.
The activity points earned by the student shall be reflected on the students 6th Semester grade card.
The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled.
Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.
Incase student fail to earn the prescribed activity points, Sixth semester Grade Card shall be issued only after earning the required activity Points.
Students shall be eligible for the award of degree only after the release of the Six Semester grade card.

There are two groups (A & B) in semester 1 & 2. The Group division will be decided by The Dean SoE & IT before commencement of classes*

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

PROGRAM OUTCOMES

After completing this undergraduate program, a learner:

[PO.1]. Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems

[PO.2]. Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

[PO.3]. Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

[PO.4]. Engineering Tools: Apply appropriate technologies and tools with an understanding of the limitation.

[PO.5]. The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

[PO.6]. Environment and sustainability: Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development..

[PO.7]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

[PO.8]. Individual and team work: Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

[PO.9]. Communication: An ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.10]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

PROGRAM SPECIFIC OUTCOMES

[PSO.1]. Students will able to design software and computer based system using latest and advanced technologies in computer hardware and software field.

[PSO.2]. Apply knowledge of computer science & engineering and an understanding of management principles for applying them while managing software and hardware projects.

Subject: Python Programming

Code: DIP13180

Credits- 3 | Semester III

A. INTRODUCTION:

- To learn how to work with a scripting language

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1] Demonstrate the basic techniques used to create scripts for automating system administrative tasks.

[CO2]Demonstrate the use of regular expressions in processing text.

[CO3]Construct web scraping scripts to programmatically obtain data and content from web pages.

[CO4]Design, code, and test applications using Python scripts.

[CO5]Frame work with different scripting language.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION, VARIABLES AND DATA TYPES: History Features, Setting up path, Installation and Working with Python.Basic Syntax Understanding Python variables, Numeric datatypes, Using string datatype and string operations.Basic Operators, Understanding coding blocks, Defining list and list slicing.Other Data Types (Tuples, List, Dictionary Python, Arrays, Associative Arrays/Hashes)

CONTROL STRUCTURES: Conditional blocks using if, else and forloops and iterations.While loops, Loop manipulation usingcontinue,breakandelse(andpassinPython), Programmingusingconditionalandloopsblock

FUNCTIONS, MODULES AND PACKAGES: Organizing python codes using functions,

organizing python projects into modules.Importing own module as well as external modules, Understanding Packages

FILE I/O, TEXT PROCESSING, REGULAR EXPRESSIONS: Understanding read functions, understanding write functions, Programming using file operations.Powerful pattern matching and searching, Power of pattern searching using regex

FRAMEWORKS: Frameworks - Web2Py, Django.Ruby on Rails, Struts (any one of these or any other)

E. TEXT BOOKS

T1. Taming Python by Programming, Jeeva Jose, Khanna PublishingHouse

T2. Starting Out with Python, Tony Gaddis,Pearson

T3. Core Python Programming, Wesley J. Chun, Prentice Hall

T4. Python Programming: Using Problem Solving Approach, Reema Thareja, OxfordUniversity

F. REFERENCE BOOKS

R1. Introduction to Computation and Programming Using Python. John V. Guttag, MITPress.

R2. Beginning Python using Python 2.6 and Python 3, James Payne,Wrox publishing

R3. PracticalProgramming: AnIntroductionToComputerScienceusingPython3,PaulGries,The PragmaticBookshelf

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Demonstrate the basic techniques used to create scripts for automating system administrative tasks.	2			2								
[CO2]	Demonstrate the use of regular expressions in processing text.		2			2							
[CO3]	Construct web scraping scripts to programmatically obtain data and content from web pages.										3	1	
[CO4]	Design, code, and test applications using Python scripts.			2					2			2	
[CO5]	Frame work with different scripting language.		3									1	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Data Structure

Code: DIP13044

Credits- 3 | Semester III

A. INTRODUCTION:

- To learn strong foundation for implementing
- To learn programming language to formulate
- To learn analyze and develop solutions related to various data structures problems.

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1] For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.

[CO2] For a given Search problem (Linear Search and Binary Search) student will able to implement it.

[CO3] For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.

[CO4] understand the use of complexity analysis to determine which data structure is most efficient and appropriate for use in a particular application

[CO5]Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

C. Assessment Plan:

Criteria	**Description**	**Maximum Marks**
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: Introduction to Data Structures: Basic Terminology, Classification of Data Structures.Operations on Data Structures.

LINEAR DATA STRUCTURES AND QUEUES: Stacks: Introduction to Stacks, Array Representation of Stacks, Operations on a Stack.Applications of Stacks-Infix-to-Postfix Transformation,evaluating Postfix Expressions.Queues: Introduction to Queues, Array Representation of Queues, Operations on a Queue. Types of Queues-deQueue, Circular Queue, Applications of Queues-Round Robin Algorithm.

LINKED LIST: Singly Linked List, Representation in Memory, Operations on a Single Linked List.Circular Linked Lists.Doubly Linked Lists.Linked List Representation and Operations of Stack, Linked List Representation and Operations of Queue.

NON-LINEAR DATA STRUCTURES: Basic Terminologies, Definition and Concepts of Binary Trees.Representations of a Binary Tree using Arrays and Linked Lists.Operations on a Binary Tree-Insertion, Deletion, Traversals, Types of Binary Trees.

GRAPHS: Graph Terminologies, Representation of Graphs- Set, Linked, Matrix, Graph Traversals

E. TEXT BOOKS

T1. Data Structures, R.S. Salaria, Khanna Book Publishing, NewDelhi

T2. Data Structures Using C, Reema Thareja, Oxford University PressIndia.

T3. Classic Data Structures, Samanta Debasis, Prentice Hall ofIndia.

T4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press,India.

F. REFERENCE BOOKS

R1. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning,India.

R2. DataStructuresandAlgorithms:Concepts,TechniquesandApplications,G.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.	2	2		2								
[CO2]	For a given Search problem (Linear Search and Binary Search) student will able to implement it.		1	2		2					2		1
[CO3]	For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.		2										
[CO4]	understand the use of complexity analysis to determine which data structure is most efficient and appropriate for use in a particular application						3					2	
[CO5]	Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.							2					

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Computer System Organization

Code: DIP13162

Credits- 3 | Semester III

A. INTRODUCTION:

- To learn an understanding of the basic structure of digital computer.
- To learn operation of a digital computer.
- To learn its architectures and computational designs

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Explain the organization of basic computer, its design and the design of control unit.

[CO2]Demonstrate the working of central processing unit and RISC and CISC Architecture

[CO3]Describe the operations and language for the register transfer, micro operations and input-output organization.

[CO4]Understand the organization of memory and memory management hardware.

[CO5]Understand the basics of hardwired and micro-programmed control of the CPU.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS:

STRUCTURE OF COMPUTER: Structure of Computers: Computer Functional units, Von-Neumann architecture, Bus structures. Basic Operational Concepts, Data representation (Fixed and Floating point), Error detecting codes. Register Transfer and Micro Operations: Register transfer, Bus and memory transfers, Arithmetic micro-operations, Logic micro-operations, Shift micro-operations, and Arithmetic logic

MICRO PROGRAMMED CONTROL AND COMPUTER ARITHMETIC: Micro Programmed Control: Control memory, Address sequencing, and design of control unit.
Computer Arithmetic: Addition and SubtractionMultiplication and Division algorithms. Floating-point arithmetic operation, Arithmetic Pipeline, Instruction Pipeline, RISC Pipeline Vector Processing, Array Processors.

MICROPROCESSOR ARCHITECTURE: Introduction to Microprocessor Architecture: Instruction Set Architecture design principles from programmer's perspective. One example microprocessor (Intel, ARM, etc).

ASSEMBLYLANGUAGEPROGRAMMING: AssemblyLanguageProgramming: Simpleprograms,Assemblylanguageprogramsinvolvinglogical, branch and call instructions.Sorting, evaluation of arithmetic expressions, string manipulation, assembler directives, procedures andmacros.

MEMORY AND DIGITAL INTERFACING: Memory and Digital Interfacing: addressing and address decoding, interfacing RAM, ROM, EPROM, Programmable peripheral interface, various modes of operation and interfacing to processor, interfacing keyboard, displays, etc.

E. TEXT BOOKS

T1. Computer System Architecture, M. Moris Mano, Pearson/PHI,India.
T2. Microprocessors Interface, Douglas V.Hall, TataMcGraw-Hill.
T3. Computer Organization, Carl Hamacher, Zvonks Vranesic, SafeaZaky,McGraw-Hill

F. REFERENCE BOOKS

R1. Advanced Microprocessors and Peripherals- Architecture, Programming and interfacing, A.K.Ray, K.M.Bhurchandi, Tata McGraw-Hill, New Delhi,India.
R2. Computer Organization and Design: A Hardwar/Software Interface (MIPS Edition) by Patterson andHennessy

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
[CO1]	Explain the organization of basic computer, its design and the design of control unit.	2										2	
[CO2]	Demonstrate the working of central processing unit and RISC and CISC Architecture		2		2								
[CO3]	Describe the operations and language for the register transfer, micro operations and input- output organization.						2						
[CO4]	Understand the organization of memory and memory management hardware.				2								
[CO5]	Understand the basics of hardwired and micro-programmed control of the CPU.		1										

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Computer Programming

Code: DIP13160

Credits- 3 | Semester III

A. INTRODUCTION:

- ToUnderstand the developstructuredsolutionstoproblems
- To learn the implementingusingcomputers.
- Formulating solutionforagivenproblemasawell-definedsequence of actions
- Expressing solution in a machine readable form or a programming language.

B. COURSE OUTCOMES: By the end of this course, students will be able to:

[CO1] Makes students gain a broad perspective about the uses of computers in engineering industry.

[CO2] Develops basic understanding of computers, the concept of algorithm and algorithmic thinking.

[CO3]Develops the ability to analyze a problem, develop an algorithm to solve it.

[CO4] Develops the use of the C programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general.

[CO5] Introduces the more advanced features of the C language.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS:

INTRODUCTION TO C: Introduction to C, History of C, Problem Solving using C(computational way of thinking); Variables and Representation

OPERATORS: Operators: Arithmetic: Precedence of Arithmetic operators Relational, Logical and Bitwise Operators; Input, Output, Formatting and File I/O

CONDITION AND LOOPING: Loops and Nested Loops: If-else looping, If-If-Else looping Conditional Statements: While, Do-While Repeat Statements: For Loop

ARRAY: Arrays: Introduction to array, representation of one dimensional array, Memory Organization, Strings, Multidimensional or two dimensional Arrays , Functions and Parameter Passing

RECURSION: Recursion, Recursive solutions

E. TEXT BOOK

T1. Let Us C, YashavantKanetkar
T2. Problem Solving and Programming in C, R.S. Salaria, Khanna PublishingHouse
T3. C Programming Absolute Beginner's Guide, Dean Miller and GregPerry
T4. The C Programming Language, Kernighan and Ritchie, Prentice Hall ofIndia

F. REFERENCES

R1. Programming in ANSI C, E. Balagurusamy, TataMcGraw-Hill
R2. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGELearning.
R3. Outline of Programming with C, Byron Gottfried, Schaum,McGraw-Hill

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO1	PSO 2
[CO1]	Makes students gain a broad perspective about the uses of computers in engineering industry.				3								
[CO2]	Develops basic understanding of computers, the concept of algorithm and algorithmic thinking.		2									1	
[CO3]	Develops the ability to analyze a problem, develop an algorithm to solve it.										2		
[CO4]	Develops the use of the C programming language to implement various algorithms, and develops the basic concepts and terminology of programming in general.		2				2						
[CO5]	Introduces the more advanced features of the C language.	1											

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Algorithms

Code:DIP13158

Credits-3 | Semester III

A. INTRODUCTION:

- To learnthealgorithmicfoundationsofcomputing.
- To learn asound, grasp ofalgorithmsisessentialforanycomputer scienceengineer.
- To learn allprogramming involves algorithms.

B. COURSE OUTCOMES: By the end of this course, students will be:

[CO1]For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.
[CO2]For a given Search problem student will able to implement it.
[CO3]For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.
[CO4]Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.
[CO5]Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS:

FUNDAMENTALS: Programming Models. Data Abstraction. Sets,Multi sets, Stacks, Queues. Asymptotic and worst-case analysis of algorithms.

SORTING: The sorting problem. Bubble sort, Selection sort, Insertion sort, Merge sort, Quick sort.

SEARCHING: Symbol Tables, Binary Search Trees, Balanced Search Trees. Hash Tables.

GRAPHS: Definitionofadirectedandundirectedgraph.Paths,Cycles,spanningtrees.Directed Acyclic Graphs. Topological Sorting. Minimum SpanningTree algorithms. Shortest Path algorithms: Dijkstra's algorithm. Flow-basedalgorithms.

STRINGS: String Sort. Tries. Substring Search.Regular Expressions. Elementary Data compression.

E. TEXT BOOK

T1. Algorithms, Sedgewick and Wayne,Pearson

T2. Introduction to Algorithms, Cormen, Leiserson, Rivest and Stein. MITPress

F. REFERENCES

R1. Introduction to Theory of Computation, Sipser Michael, CengageLearnng.

R2. Design & Analysis of Algorithms, Gajendra Sharma, Khanna PublishingHouse

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PSO1	PSO2
[CO1]	For a given algorithm student will able to analyze the algorithms to determine the time and computation complexity and justify the correctness.	2			2								
[CO2]	For a given Search problem student will able to implement it.										2		1
[CO3]	For a given problem of Stacks, Queues and linked list student will able to implement it and analyze the same to determine the time and computation complexity.		2		2	2							
[CO4]	Student will able to write an algorithm Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Merge Sort, Heap Sort and compare their performance in term of Space and Time complexity.						3					2	
[CO5]	Student will able to implement Graph search and traversal algorithms and determine the time and computation complexity.		2					2					

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Essence of Indian Knowledge Tradition

Code: DIP13172

0 Credits | Semester III

A. Introduction:

- The course aims at imparting basic principles of thought process, reasoning and differencing. Sustainability is at the core of Indian Traditional knowledge Systems connecting society and nature. Holistic life style of yogic science and wisdom capsules in Sanskrit literature are also important in modern society with rapid technological advancements and societal disruptions. Part-I focuses on introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view, and basic principles of Yoga and holistic health care system.

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Basic principles of thought process, reasoning and differencing.

[CO2] Introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care systems.

[CO3] Focuses on Indian philosophical traditions, Indian linguistic tradition and Indian artistic tradition.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

BASIC STRUCTURE OF INDIAN KNOWLEDGE SYSTEM: Basic structure of Indian Knowledge System. अष्टादशविद्या -४वेद,४उपवेद (आयुर्वेद, धनुर्वेद, गन्धर्ववेद, स्थापत्य आदि)

BASIC STRUCTURE OF INDIAN KNOWLEDGE SYSTEM: ६वेदांग (शिक्षा, कल्प, निरुक्त, व्याकरण, ज्योतिष, छंद) ४ उपाङ्ग (धर्मशास्त्र, मीमांसा, पुराण, तर्कशास्त्र)

MODERN SCIENCE AND INDIAN KNOWLEDGE SYSTEM: Modern Science and Indian Knowledge System.

YOGA AND HOLISTIC HEALTH CARE LAWS: Yoga and Holistic Health care.

CASE STUDIES: Case studies.

E. TEXT BOOKS

T1. Sivaramakrishnan (Ed.), Cultural Heritage of India-course material, Bharatiya.
T2.Vidya Bhavan, Mumbai. 5th Edition, 2014 SwamiJitatmanand, Modern Physics and Vedant, BharatiyaVidyaBhavan
T3Swami Jitatmanand, Holistic Science and Vedant, BharatiyaVidyaBhavan.
T4. Meena Rao (2006), Fundamental concepts in Law of Contract, 3rd Edn. Professional Offset
T5Fritzof Capra, The Wave of life .

F. REFERENCE BOOKS

R1. VN Jha (Eng. Trans.), Tarkasangraha of Annam Bhatta, International Chinmay
R2. Foundation, Velliarnad, Arnakulam Yoga Sutra of Patanjali, Ramakrishna Mission, Kolkata
R3. GN Jha (Eng. Trans.), Ed. RN Jha, Yoga-darshanam with Vyasa Bhashya
R4. VidyanidhiPrakashan, Delhi 2016 RNJha, Science of Consciousness Psychotherapyand Yoga Practices, Vidyanidhi
R5.Prakashan, Delhi 2016 P B Sharma (English translation), ShodashangHridayan

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES					CORRELATION WITH PROGRAM SPECIFIC OUTCOMES					
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Basic principles of thought process, reasoning and differencing.						2	1					
[CO2]	Introduction to Indian Knowledge Systems, Indian perspective of modern scientific world-view and basic principles of Yoga and holistic health care systems.						1				1		
[CO3]	Focuses on Indian philosophical traditions, Indian linguistic tradition and Indian artistic tradition.										1		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Data Structures Lab

Code: DIP13048

Credits - 2 | Semester III

A. Introduction:

- The course is designed to develop skills to design and analyze simple linear and non linear data structures. It strengthen the ability to the students to identify and apply the suitable data structure for the given real world problem. It enables them to gain knowledge in practical applications of data structures

B. **Course Outcomes:** At the end of the course, students will be able to

[CO1]Be able to design and analyze the time and space efficiency of the data structure
[CO2] Be capable to identity the appropriate data structure for given problem
[CO3] Have practical knowledge on the applications of data structures

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

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D. SYLLABUS

Sl.No	Name of Practical
1	Write a program using recursive and non-recursive functions to perform search operation in a given list of integers using linear search technique
2	Search operation in a given list of integers using binary search technique
3	Write a program to implement insertion sorting for a given random data
4	Write a program to implement bubble sorting for a given random data
5	Write a program to implement quick sorting for a given random data
6	Write a program to implement selection sorting for a given random data
7	Write a program to implement heap sorting for a given random data
8	Write a program to implement Hashing tables

9	Write a program to implement single linked list
10	Write a program to implement double linked list
11	Write a program to implement circular linked list
12	Write a program to Implement Stack operations using array and linked list
13	Write a program to Implement Queue operations using array and linked list.
14	Write a program to implement Breadth First Search (BFS)
15	Write a program to implement Depth First Search (DFS)
16	Write a program to implement a binary tree of integers
17	Write a program to find the minimum depth of a binary tree

E. TEXT BOOKS

T1. Data Structures, R.S. Salaria, Khanna Book Publishing, NewDelhi

T2. Data Structures Using C, Reema Thareja, Oxford University PressIndia.

T3. Classic Data Structures, Samanta Debasis, Prentice Hall ofIndia.

T4. Fundamentals of Data Structure in C, Horowitz, Ellis, Sahni, Sartaj, Anderson-Freed, Susan, University Press,India.

F. REFERENCE BOOKS

R1. Data Structures: A Pseudo code approach with C, Richard F. Gilberg, Behrouz A. Forouzan, CENGAGE Learning,India.

R2. DataStructuresandAlgorithms:Concepts,TechniquesandApplications,G.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Be able to design and analyze the time and space efficiency of the data structure	1	2										
[CO2]	Be capable to identity the appropriate data structure for given problem			2	3								
[CO3]	Have practical knowledge on the applications of data structures			2									

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Computer Programming Lab

Code: DIP13161

Credits-2 | Semester III

A. Introduction:

- Student should be able to computationally formulate basic problems and write code snippets to execute them. The focus of the course as mentioned above should be on example based learning

B. **Course Outcomes:** At the end of the course, students will be able to

[CO1]Know concepts in problem solving
[CO2]To do programming in C language
[CO3]To write diversified solutions using C language

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

Sl.No	Name of Practical
1	WAP to compute the factors of a given number
2	WAP a program to find whether the given number ids even or not
3	WAP a program to find whether the number is a Prime number or not
4	WAP to find whether the number is an EVIL number or not
5	WAP to print the sum and product of digits of an integer.
6	WAP to read a year as an input and find whether it is leap year or not. Also consider end of the centuries.
7	WAP to compute the sum of the first n terms of the following series S =1+1/2+1/3+1/4+……

8	WAP to find the square root of a given number *N*. Implement a C program for the same and execute for all possible inputs with appropriate messages. Note: Don't use library function *sqrt(n)*.
9	WAP to find the *reverse* of an integer number NUM and check whether it is PALINDROME or NOT. Implement a C program for the developed algorithm that takes an integer number as input and output the reverse of the same with suitable messages. Ex: Num: 2014, Reverse: 4102, Not aPalindrome
10	WAP to takes three coefficients (a, b, and c) of a Quadratic equation (ax2+bx+c=0) as input and compute all possible roots. Implement a C program for the developed flowchart/algorithm and execute the same to output the possible roots for a given set of coefficients with appropriatemessages.
11	WAP to reads two matrices A(mxn) and B(pxq) and Compute the product A and B. Read matrix A in row major order and matrix B in column major order. Print both the input matrices and resultant matrix with suitable headings and in matrix format. Program must check the compatibility of orders of the matrices for multiplication. Report appropriate message in case ofincompatibility.
12	WAP to implements string copy operation STRCOPY (str1,str2) that copies a string str1 to another string str2 without using library function.
13	WAP to read a sentence and prints frequency of each of the vowels and total count ofconsonants.
14	WAP to takes three coefficients (a, b, and c) of a Quadratic equation (ax2+bx+c=0) as input and compute all possible roots. Implement a C program for the developed flowchart/algorithm and execute the same to output the possible roots for a given set of coefficients with appropriatemessages.
15	WAP to evaluate the polynomial f(x) = a4x4 + a3x3 + a2x2 +a1x + a0, for a given value of x and its coefficients using Horner's method. Implement a C program for the developed algorithm and execute for different sets of values of coefficients andx.
16	Write C Program to compute Sin(x) using Taylor series approximation givenby Sin(x) = x - (x3/3!) + (x5/5!) - (x7/7!) + ……. Compare the result with the built- in Library function and print both the results.
17	Design and develop a C function RightShift(x ,n) that takes two integers x and n as input and returns value of the integer x rotated to the right by n positions. Assume the integers are unsigned. Write a C program that invokes this function with different values for x and n and tabulate the results with suitable headings.
18	WAP to recursive C function to find the factorial of a number, n!, defined by fact(n)=1, if n=0. Otherwise fact(n)=n*fact(n-1). Using this function, write a C program to compute the binomial coefficient (nCr). Tabulate the results for different values of n and r with suitablemessages.
19	WAP using pointers to compute the sum, mean and standard deviation of all elements stored in an array of n realnumbers.

E. TEXT BOOK

T1. Let Us C, YashavantKanetkar

T2. Problem Solving and Programming in C, R.S. Salaria, Khanna PublishingHouse

T3. C Programming Absolute Beginner's Guide, Dean Miller and GregPerry

T4. The C Programming Language, Kernighan and Ritchie, Prentice Hall ofIndia

F. REFERENCES

R1. Programming in ANSI C, E. Balagurusamy, TataMcGraw-Hill
R2. C Programming & Data Structures, B. A. Fouruzan and R. F. Gilberg, CENGAGELearning.
R3. Outline of Programming with C, Byron Gottfried, Schaum,McGraw-Hill

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES							CORRELATION WITH PROGRAM SPECIFIC OUTCOMES				
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Know concepts in problem solving	2											
[CO2]	To do programming in C language		2										
[CO3]	To write diversified solutions using C language				2								

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Python ProgrammingLab

Code:DIP13181

Credits-0 | Semester III

A. Introduction:

This Lab course is intended to practice whatever is taught in theory class of 'Scripting Languages and become proficient in scripting. Computer programming is all about regular practice.

B. Course Outcomes: At the end of the course, students will be able to

[CO1]At the end of the course student will be able to build program with a scripting language and will beable to learn any other scripting language on their own.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

Sl.No	Name of Practical
1	Write a Python program to calculate the sum of three given numbers, if the values are equal then return three times of their sum
2	Write a Python program to find whether a given number (accept from the user) is even or odd, print out an appropriate message to the user
3	Write a Python program to concatenate all elements in a list into a string and return it.
4	Write a Python program to get the largest number from a list.
5	Write a Python program to remove duplicates from a list.
6	Write a Python program to construct the following pattern, using a nested for loop. *

	* * *
7	Write a Python program to convert temperatures to and from Celsius, Fahrenheit.
8	Write a Python program which takes two digits m (row) and n (column) as input and generates a two-dimensional array. The element value in the i-th row and j-th column of the array should be i*j.
9	Write a Python program to print the even numbers from a given list.
10	Write a Python program to make a chain of function decorators (bold, italic, underline etc.) in Python.
11	Write a Python program to find the sequences of one upper case letter followed by lower case letters.
12	Write a Python program that matches a word containing 'z', not at the start or end of the word.
13	Write a Python program to reverse the order of the items in the array.
14	Write a Python program to create a SQL database and connect with the database and print the version of the SQL database.
15	Write a Python program to create a table and insert some records in that table. Finally selects all rows from the table and display the records.(SQL)
16	Write a Python program to insert a list of records into a given SQL table.
17	Write a Python program to delete a specific row from a given SQL table.

E. TEXT BOOKS

T1. Taming Python by Programming, Jeeva Jose, Khanna PublishingHouse

T2. Starting Out with Python, Tony Gaddis,Pearson

T3. Core Python Programming, Wesley J. Chun, Prentice Hall

T4. Python Programming: Using Problem Solving Approach, Reema Thareja, OxfordUniversity

F. REFERENCE BOOKS

R1. Introduction to Computation and Programming Using Python. John V. Guttag, MITPress.

R2. Beginning Python using Python 2.6 and Python 3, James Payne,Wrox publishing

R3.PracticalProgramming:AnIntroductiontoComputerScienceusingPython3,PaulGries,The PragmaticBookshelf

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	At the end of the course student will be able to build program with a scripting language and will beable to learn any other scripting language on their own.		2									2	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject:Summer Internship-1(3-4 Weeks)

Code: DIP13177

2 Credits | Semester III

A. Introduction:

- Following are the intended objectives of internship training:
- Will expose Technical students to the industrial environment, which cannot be simulated in the classroom and hence creating competent professionals for the industry.
- Provide possible opportunities to learn understand and sharpen the real time technical / managerial skills required at the job.
- Exposure to the current technological developments relevant to the subject area of training.
- Experience gained from the 'Industrial Internship' in classroom will be use in classroom discussions.
- Create conditions conducive to quest for knowledge and its applicability on the job

GUIDELINES FOR INTERNSHIP

Summer Internship -1 should be undertaken in an industry/Govt. or Pvt. Certified Agencies which are in social sector/ Govt. Skill Centres/Institutes/Schemes.

S.No.	Suggested Schedule	Suggested Duration (In weeks)	Activities
1	Summer/winter vacation after 2nd/3rd Semester	3-4	Inter/Intra Institutional Activities

Syllabus of

Diploma in Computer Science & Engineering

Semester-IV

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
Scheme of Study (w.e.f Batch 2020-23)

SEMESTER –I(Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-I	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER I (Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -I	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER II (Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -II	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER –II(Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-II	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER-III

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Python Programming	PCC	3	3	100	70	20	5	5
2	Data Structure	PCC	3	3	100	70	20	5	5
3	Computer System Organization	PCC	3	3	100	70	20	5	5
4	Computer Programming	PCC	3	3	100	70	20	5	5
5	Algorithms	PCC	3	3	100	70	20	5	5
6	Essence of Indian Knowledge Tradition	AC	0	2	50	35	10	2.5	2.5
	Practical								
7	Data Structure Lab	PCC	2	4	50	35	5	5	5
8	Computer Programming Lab	PCC	2	4	50	35	5	5	5
9	Python Programming Lab	PCC	2	4	50	35	5	5	5
10	Summer Internship-1(3-4 Weeks)	PROJ	2	0	50	35	15	0	0
	TOTAL		**23**	**29**	**750**	**525**	**140**	**42.5**	**42.5**

SEMESTER-IV

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Operating System	PCC	3	3	100	70	20	5	5
2	Computer Network	PCC	3	3	100	70	20	5	5
3	Web Technologies	PCC	3	3	100	70	20	5	5
4	Introduction to DBMS	PCC	3	3	100	70	20	5	5
5	Software Engineering	PEC	3	3	100	70	20	5	5
6	Open Elective-I Artificial Intelligence & Machine Learning Soft Computing Techniques	OEC	3	3	100	70	20	5	5
	Practical								
7	Web Technologies Lab	PCC	2	4	50	35	5	5	5
8	Operating System Lab	PCC	2	4	50	35	5	5	5
9	Introduction to DBMS Lab	PCC	2	4	50	35	5	5	5
10	Minor Project	PROJ	2	4	50	35	15	0	0
	TOTAL		**27**	**36**	**850**	**595**	**165**	**45**	**45**

SEMESTER V

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Introduction to E-Governance	PCC	3	3	100	70	20	5	5
2	Internet of Things	OEC	3	3	100	70	20	5	5
3	Program Elective-I Information Security Fundamentals of AI	PEC	3	3	100	70	20	5	5
4	Program Elective-II Mobile Computing Data Sciences: Data Warehousing & Data Mining	PEC	3	3	100	70	20	5	5
5	Open Elective -II Web Designing and Multimedia Technology Robotics	OEC	3	3	100	70	20	5	5
	Practical								
6	Summer Internship-II(4-6 Weeks)	PROJ	3	0	100	70	30	0	0
7	Major Project-I (Project to be carried over to next semester)	PROJ	1	2	50	35	15	0	0
	TOTAL		19	17	650	455	145	25	25

Project to be carried over to next semester

SEMESTER VI

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Program Elective-III Multimedia Technology Advance Computer Networks	PEC	3	3	100	70	20	5	5
2	Program Elective-IV Network Forensics Software Testing	PEC	3	3	100	70	20	5	5
4	Open elective -III Cyber Security Laws, Standards and IPR Sustainable Development	OEC	3	3	100	70	20	5	5
5	Entrepreneurship and Start-ups	PROJ	4	4	100	70	20	5	5
6	Indian constitution	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Seminar	PROJ	1	2	50	35	15	0	0
7	Major Project-II	PROJ	3	6	100	70	30	0	0
	TOTAL		**17**	**23**	**600**	**420**	**135**	**22.5**	**22.5**

Distribution of Credit across 6 semesters:

Sl. No	Type of Paper	No. of Paper	Total Credit
1	Humanities and Social Sciences Courses **(HSC)**	3	7
2	Basic Science courses**(BSC)**	6	18
3	Engineering Science courses **(ESC)**	8	18
4	Professional core courses (**PCC)**	16	42
5	Professional Elective courses**(PEC)**	5	15
6	Open Electives Courses (**OEC)**	4	12
7	Project work, seminar and internship in industry or elsewhere**(PROJ)**	6	12
8	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]**(AC)**	3	(non-credit)
	Total	51	124

CIA – Continuous Internal Assessment – Based on Projects / Assignment during the semester

Note:

AICTE Activity Points to be earned by students admitted to Diploma program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):

Every regular student, who is admitted to the 3-year Diploma program, is required to earn 75 activity points in addition to the total credits earned for the program. Students entering 3 years Diploma Program through lateral entry are required to earn 50 activity points in addition to the total credits earned for the program.
The activity points earned by the student shall be reflected on the students 6th Semester grade card.
The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled.
Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.
Incase student fail to earn the prescribed activity points, Sixth semester Grade Card shall be issued only after earning the required activity Points.
Students shall be eligible for the award of degree only after the release of the Six Semester grade card.

There are two groups (A & B) in semester 1 & 2. The Group division will be decided by The Dean SoE & IT before commencement of classes*

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

PROGRAM OUTCOMES

After completing this undergraduate program, a learner:

[PO.1]. Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems

[PO.2]. Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

[PO.3]. Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

[PO.4]. Engineering Tools: Apply appropriate technologies and tools with an understanding of the limitation.

[PO.5]. The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

[PO.6]. Environment and sustainability: Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development..

[PO.7]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

[PO.8]. Individual and team work: Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

[PO.9]. Communication: An ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.10]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

PROGRAM SPECIFIC OUTCOMES

[PSO.1]. Students will able to design software and computer based system using latest and advanced technologies in computer hardware and software field.

[PSO.2]. Apply knowledge of computer science & engineering and an understanding of management principles for applying them while managing software and hardware projects.

Subject: Operating Systems

Code: DIP14056

Credits-3 | Semester IV

A. INTRODUCTION:

- To understand concept of Operating System and its working
- Introduction to various options available so as to develop capacity to compare, contrast, and evaluate the key trade-offs between different designs choices

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Able to demonstrate basic knowledge about Operating System
[CO2] Develop an understanding of various DOS, Linux commands
[CO3]Able to create a program, process, threads and execute them
[CO4] Design and implement file management system.
[CO5] To understand various types of files and operations on them

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION TO OPERATING SYSTEM: Introduction, Concept of Operating Systems, Generations of Operating systems, Types of Operating Systems, OS Services.UNIX/LINUX Architecture, Kernel and its types.Services and systems calls, system programs.

PROCESS MANAGEMENT: Definition, Process management: Process Relationship, Different states of a Process, Process State transitions. IPC, Process Scheduling, Multithreaded programming. Memory management: Memory allocation, Swapping, Paging, Segmentation, Virtual Memory, various faults.

FILE MANAGEMENT: File management: Concept of a file, access methods, directory structure, file system mounting, file sharing and protection, file system structure and implementation, Directory implementation, free space management, efficiency.

I/O SYSTEM: Mass storage structure - overview, disk structure, disk attachment. Disk scheduling algorithms, swap space management, RAID types. and performance. Different types of file systems

OS SECURITY: OS Security: Authentication, Access Control, Access Rights, System Logs

E. TEXT BOOKS

T1. Operating System Concepts, Silberschatz and Galvin, Wiley India Limited

T2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education

T3.Operating Systems, Internals and Design Principles, Stallings, Pearson Education, India

F. REFERENCE BOOKS

R1. Ethics and Politics of the IndianConstitutionRajeev Bhargava Oxford University Press, New Delhi, 2008

R2. The Constitution of India B.L. Fadia Sahitya Bhawan; New edition (2017)

R3. Introduction to the Constitution of India DD Basu Lexis Nexis; Twenty-Third 2018 edition

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Able to demonstrate basic knowledge about Operating System	3				1							
[CO2]	Develop an understanding of various DOS, Linux commands			2									
[CO3]	Able to create a program, process, threads and execute them				2								
[CO4]	Design and implement file management system.		2									2	
[CO5]	To understand various types of files and operations on them	2											

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Computer Networks

Code: DIP14051

Credits -3| Semester IV

A. INTRODUCTION:

- To understand concept of computer networks and its characteristics
- To understand functioning of computer networks and popular networking protocols

B. **COURSE OUTCOMES:** At the end of the course, students will be able to

[CO1]Understanding of computer networks, issues, limitations, options available.
[CO2]Understanding of the care that needs to be taken while developing applications designed to work over computer networks
[CO3]Able to configure basic LAN and connect computers to it.

C. ASSESSMENT PLAN:

Criteria	**Description**	**Maximum Marks**
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION TO COMPUTER NETWORKS: Introduction to computer networks; Network Models- OSI Reference Model TCP/IP Model,.

TRANSMISSION MEDIA: Principles, issues and examples; Wired Media – Coaxial, UTP, STP, Fiber Optic Cables.Wireless Media – HF, VHF, UHF, Microwave, Ku Band; Network topologies.Data Link Layer –design issues, example protocols (Ethernet, WLAN, Bluetooth); Switching Techniques

NETWORK LAYER: Network Layer - design issues, example protocols (IPv4); Routing - principles/issues.Algorithms (Distance-vector, Link-state) and protocols (RIP, OSPF);

TRANSPORT, APPLICATION LAYER: Transport Layer - design issues, example protocols (TCP); Application Layer Protocols (SMTP, DNS)

NETWORK DEVICES: Functioning of Network Devices – NIC, Hub, Switch, Router, Wi-Fi Devices; Network Management System and example protocol (SNMP).

E. TEXT BOOKS

T1. Computer Networks, 4th Edition (or later), Andrew S. Tanenbaum, PHI
T2. TCP/IP Illustrated, Volume-1, W. Richard Stevens, Addision Wesley

F. REFERENCE BOOKS

R1. Data and Computer Communications, William Stallings, PHI
R2. An Engineering Approach to Computer Networking, S. Keshav, Addision Wesley/Pearson
R3. An Integrated Approach to Computer Networks, Bhavneet Sidhu, Khanna Publishing

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understanding of computer networks, issues, limitations, options available.	1			3							2	
[CO2]	Understanding of the care that needs to be taken while developing applications designed to work over computer networks			1							2		
[CO3]	Able to configure basic LAN and connect computers to it.		2							1			

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Web Technologies

Code:DIP14212

Credits -3| Semester IV

A. INTRODUCTION:

- To understand concept of internet and its working through protocols
- Learning from this course may be used in the Mini Project and summer internship

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Understanding the basics of internet and its connections, web browsers
[CO2]Understanding client-server architecture and use in internet
[CO3]Able to configure basic LAN and connect computers to it.
[CO4] Able to combine HTML, CSS, javascript for form validation
[CO5]Understanding the implementation of PHP with database

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION TO WWW: Protocols and programs, secure connections, application and development tools, the web browser.What is server, setting up UNIX and LINUX web servers, Logging users.dynamic IP Web Design: Website design principles, planning the site and navigation

WEB SYSTEMS ARCHITECTURE: Architecture of Web based systems- client/server (2-tier) architecture, 3-Tier architecture. Building blocks of fast and scalable data access Concepts - Caches-Proxies- Indexes-Load Balancers- Queues,Web Application architecture (WAA)

JAVASCRIPT: Client side scripting, What is Javascript, simple Javascript. variables, functions, conditions, loops and repetition

ADVANCE SCRIPTING: Javascript and objects, Javascript own objects, DOM and web browser environments, forms and validations. DHTML: Combining HTML, CSS and Javascript, events and buttons, controlling your browserAjax: Introduction advantages & disadvantages, ajax based web application, alternatives of ajax.XML, XSL and XSLT: Introduction to XML, uses of XML, simple XML,XML key components, DTD and Schemas, XML with application, XSL and XSLT, Introduction to Web Services

PHP: Server side scripting, Arrays, function and forms, advance PHP Databases, Basic command with PHP examples, Connection to server. creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries
deleting database, deleting data and tables, PHP myadmin and database bugs

E. TEXT BOOKS

T1. Web Technologies--A Computer Science Perspective, Jeffrey C.Jackson
T2. Internet & World Wide Web How to Program, Deitel, Deitel, Goldberg, Pearson Education

F. REFERENCE BOOKS

R1. Web programming- Building Internet Application, Chris Bales

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understanding the basics of internet and its connections, web browsers	1			3							2	1
[CO2]	Understanding client-server architecture and use in internet			1							2		
[CO3]	Able to configure basic LAN and connect computers to it.		2							1			
[CO4]	Able to combine HTML, CSS, javascript for form validation				1								
[CO5]	Understanding the implementation of PHP with database					1							

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Introduction to DBMS

Code: DIP14199

Credits -3| Semester IV

A. INTRODUCTION:

It covers the development of database-driven applications using the capabilitiesprovided by modern database management system software. The concepts include conceptualmodeling, relational database design and database query languages.

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1] have a broad understanding of database concepts and database management system software

[CO2] have a high-level understanding of major DBMS components and their function

[CO3] be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.

[CO4] be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.

[CO5] be able to program a data-intensive application using DBMS APIs.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION TO DBMS: Introduction: File based system, Database System, Database System Concepts and Architecture. Database System- advantages, disadvantages, types

DATA MODELLING: Data Modeling using the Entity-Relationship Model, components of ER model . ER diagrams, constraints and its types. Extended ER features, the Enhanced Entity-Relationship (EER) model

RELATIONAL ALGEBRA: The Relational Data Model and Relational Database Constraints; ER/EER to Relational Model mapping. Relational Algebra and Relational Calculus

SQL SCHEMA: SQL-99: Schema definition, Constraints, Queries, and Views; Security. Introduction to SQL programming Techniques

FUNCTIONAL DEPENDENCIES AND NORMALIZATION: Functional dependencies and normalization for relational databases. Relational database design algorithms and further dependencies

E. TEXT BOOKS

T1. Fundamentals of Database Systems, Elmasri & Navathe, Pearson Education

T2. Database Management Systems, Raghurama Krishnan, Johannes Gehrke, Tata McGraw-Hill.

T3. Database System Concepts, Abraham Silberschatz, Henry F. Korth, S. Sudarshan, McGraw-Hill, New Delhi, India.

F.REFERENCE BOOKS

R1. Introduction to Database Systems, C.J.Date, Pearson Education

R2. Introduction to SQL, Rick F.Vander Lans, Pearson Education

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Have a broad understanding of database concepts and database management system software										3		
[CO2]	Have a high-level understanding of major DBMS components and their function		3										1
[CO3]	Be able to model an application's data requirements using conceptual modeling tools like ER diagrams and design database schemas based on the conceptual model.			2		2						2	
[CO4]	Be able to write SQL commands to create tables and indexes, insert/update/delete data, and query data in a relational DBMS.				2								
[CO5]	Be able to program a data-intensive application using DBMS APIs.	1			1								

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Software Engineering

Code:DIP14207

Credits -3| Semester IV

A. INTRODUCTION:

- Inculcate essential technology and software engineering knowledge and skills essential to build areasonably complex usable and maintainable software iteratively.
- Emphasize on structured approach to handle software development.
- Enhance communication skills.

B. **COURSE OUTCOMES:** At the end of the course, students will be able to

[CO1] Inculcate essential technology and software engineering knowledge and skills
[CO2] Describe the Requirements Gathering and Analysis, Design Concepts for softwaredevelopment
[CO3] Describe various aspects and types of testing asoftware and its phases.
[CO4] For a given model, executing a test cases for quality assurance
[CO5] To understand various techniques of project management.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS:

INTRODUCTION TO SOFTWARE ENGINEERING: Introduction to Software Engineering, Lifecycle: Introduction to Software Engineering, Lifecycle. Process Models - Traditional v/s Agile processes

DEVELOPMENT ACTIVITIES: Development Activities - Requirements Gathering and Analysis, Design Concepts . Software architecture and Architectural styles. Basic UI design, Effective Coding and Debugging techniques

SOFTWARE TESTING: Software Testing Basics, Unit, Integration, System andAcceptance Testing, Introduction to various testing techniques (e.g. Stress testing),Writing and executing test cases, Quality Assurance.

SOFTWARE PROJECT MANAGEMENT: Project Management - Project management concepts, Configuration and Release Management.Version Control and its tools (Git), Release Planning, Change Management.Software Maintenance, Project Metrics

E. TEXT BOOKS

T1. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.
T2. Software engineering, Ian Sommerville, Pearson Education
T3. An Integrated Approach to Software Engineering, Pankaj Jalote, Springer Verlag

F. REFERENCE BOOKS

R1. Software Engineering, Nasib Singh Gill, Khanna Book Publishing Co. India.
R2. Software Engineering, K. K. Agarval, Yogesh Singh, New Age International Publishers

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
[CO1]	Inculcate essential technology and software engineering knowledge and skills	2					3						2
[CO2]	Describe the Requirements Gathering and Analysis, Design Concepts for softwaredevelopment								3			3	
[CO3]	Describe various aspects and types of testing a software and its phases.		1										
[CO4]	For a given model, executing a test cases for quality assurance			1									
[CO5]	To understand various techniques ofprojectmanagement.					3		2					

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Artificial Intelligence and Machine Learning

Code:DIP15215

Credits -3| Semester IV

A. INTRODUCTION:

- Introduce and define the meaning of Intelligence and explore various paradigms for knowledge encoding in computer systems.
- To introduce the fundamental concept of learning patterns from data and develop a strong theoretical foundation for understanding state of the art Machine Learning algorithms

B. **COURSE OUTCOMES:** At the end of the course, students will be able to

[CO1] Understanding the basics of Data Analysis skills through artificial intelligence
[CO2] Understanding and Creating AI/ML solutions for various fundamental problems.
[CO3] To inculcate nontrivial understanding of the real-world problems.
[CO4] Able to understand and apply various Data decomposition and analysis schemes.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS:

INTRODUCTION TO AI : Defining Artificial Intelligence, Defining AI techniques, State Space Search and Heuristic Search Techniques: Defining problems as State Space search,Knowledge Representation Issues: Representations and Mappings, Approaches to knowledge representation Using Predicate Logic and Representing Knowledge as Rules: Representing simple facts in logic. Computable functions and predicates, Procedural vs Declarative knowledge

DATA MANAGEMENT: Data Acquisition: Gather information from different sources, Internal systems and External systems. Data Pre-processing and Preparation: Data Munging, Wrangling, Plyer packages. Data Quality and Transformation: Data imputation, Data Transformation (minimax, log transform, z-score transform), Binning, Classing and Standardization.

INTRODUCTION TO MACHINE LEARNING: Introduction: Idea of Machines learning from data, Classification of problem – Regression and Classification.Supervised and Unsupervised learning

NEURAL NETWORKS: Neural Networks: Non-linear Hypothesis, Biological Neurons, Model representation, Intuition for Neural Networks, Multiclass classification, Cost Function, Back Propagation Algorithm, Back Propagation Intuition, Weights initialization, Neural Network Training

SUPPORT VECTOR MACHINES: Support Vector Machines: Optimization Objective, Large Margin Classifiers, Kernels, SVM practical considerations

E. TEXT BOOKS

T1. Artificial Intelligence: A Modern Approach, Stuart Russel, Peter Norvig

F. REFERENCE BOOKS

R1. Building Machine Learning Systems with Python, Richert & Coelho

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understanding the basics of Data Analysis skills through artificial intelligence	2											
[CO2]	Understanding and Creating AI/ML solutions for various fundamental problems.		1										
[CO3]	To inculcate nontrivial understanding of the real-world problems.										1	2	
[CO4]	Able to understand and apply various Data decomposition and analysis schemes.			2									

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Soft Computing Techniques

Code: DIP14206

Credits - 3 | Semester IV

A. INTRODUCTION:

- Soft Computing is a consortia of methodologies which collectively provide a body of concepts and techniques for designing intelligent systems
- To Improve Data Analysis Solutions and to strengthen the dialogue between the statistics and soft computing learners

B. **COURSE OUTCOMES:** At the end of the course, students will be able to

[CO1]Understanding the basics of Data Analysis skills through artificial intelligence
[CO2]Understanding and Creating AI/ML solutions for various fundamental problems.
[CO3]To inculcate nontrivial understanding of the real-world problems
[CO4]Able to understand and apply various Data decomposition and analysis schemes

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS:

INTRODUCTION: What is Soft Computing, Difference between Hard and Soft computing, Requirement of Soft computing, Major Areas of Soft Computing, Applications of Soft Computing, Classification of problem – Regression and Classification, Supervised and Unsupervised learning

NEURAL NETWORKS: What is Neural Network, Learning rules and various activation functions, Single layer Perceptron, Back Propagation networks, Architecture of back propagation(BP) Networks, Backpropagation Learning, Variation of StandardBack propagation Neural Network. Introduction to Associative Memory, Adaptive Resonance theory and Self Organizing Map, Recent Applications

FUZZY SYSTEMS: Fuzzy Set theory, Fuzzy versus Crisp set, Fuzzy Relation,Russification, Minimax Composition, Defuzzification Method, Fuzzy Logic, Fuzzy Rule based systems, Predicate logic, FuzzyDecision Making, Fuzzy Control Systems, Fuzzy Classification.

GENETIC ALGORITHM: History of Genetic Algorithms (GA), Working Principle,Various Encoding methods, Fitness function, GAOperators- Reproduction, Crossover, Mutation, Convergence of GA, Bit wise operation in GA, Multi-level Optimization

BACKPROPAGATION NETWORKS: GA based Back propagation Networks: GA based Weight Determination, K - factor determination in columns. Fuzzy Back propagation Networks:LR type Fuzzy numbers, Fuzzy Neuron, Fuzzy BPArchitecture, Learning in Fuzzy BP, Application of Fuzzy BPNetwork

E. TEXT BOOKS

T1. Neural Networks, Fuzzy Logic and Genetic Algorithms: Synthesis & Applications, S.Rajasekaran, G. A. Vijayalakshami, PHI.

T2. Genetic Algorithms: Search and Optimization, E. Goldberg.

F. REFERENCE BOOKS

R1. Neuro-Fuzzy Systems, Chin Teng Lin, C. S. George Lee, PHI.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understanding the basics of Data Analysis skills through artificial intelligence	2											
[CO2]	Understanding and Creating AI/ML solutions for various fundamental problems.	1											
[CO3]	To inculcate nontrivial understanding of the real-world problems		2	2								2	
[CO4]	Able to understand and apply various Data decomposition and analysis schemes					2							

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Web Technologies Lab

Code:DIP14213

Credits- 2 | Semester IV

A. INTRODUCTION:

- This Lab course is intended to practice whatever is taught in theory class of 'Web Technologies

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1] Use LAMP Stack for web applications

[CO2] Use Tomcat Server for Servlets and JSPs

[CO3] Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs

[CO4] Connect to Database and get results

[CO5] Parse XML files using Java (DOM and SAX parsers)

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

Sl.No	Name of Practical
1	Program to display client- server architecture
2	Program to display basic HTML tags
3	Program to display integration of CSS over HTML
4	Program to display web application using HTML, JavaScript
5	Program to display Advanced Web Application Programs using CSS, javascript
6	Program to display a registration form
7	Program to display form validation
8	Program to display various javascript components
9	Program to display various PHP components

10	Implementation of web application using PHP
11	Implementation of PHP: MySql - tiered Applications

E. Text Book:

T1. "Web Technologies--A Computer Science Perspective", Jeffrey C.Jackson,

T2. "Internet & World Wide Web How to Program", Deitel, Deitel, Goldberg, Pearson Education

F. Reference Books:

R1. "Web programming- Building Internet Application", Chris Bales

R2. Web Applications: Concepts and RealWorld Design, Knuckles

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES								CORRELATION WITH PROGRAM SPECIFIC OUTCOMES			
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Use LAMP Stack for web applications	1			1								
[CO2]	Use Tomcat Server for Servlets and JSPs			2									
[CO3]	Write simple applications with Technologies like HTML, Javascript, AJAX, PHP, Servlets and JSPs				2							1	
[CO4]	Connect to Database and get results		2										
[CO5]	Parse XML files using Java (DOM and SAX parsers)			1			2						1

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Operating Systems Lab

Code:DIP14058

Credits-2 | Semester IV

A. INTRODUCTION:

- To understand various types of commands and their functions
- To understand and implement various scheduling algorithms

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Students should be able to demonstrate basic knowledge about Operating System.
[CO2]Able to apply OS concepts such as processes.
[CO3]Memory and file systems to system design.
[CO4]Able to configure OS in an efficient and secure manner and become an advance user of operating system.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

Sl.No	Name of Practical
1	Implementation of various DOS commands & command of Linux like man, cp, mv, ln, rm, unlink, mkdir, rmdir, etc
2	Implementation of various Shell scripting commands
3	Creation and implementation of threads
4	Implementation of FCFS scheduling
5	Implementation of SJF scheduling
6	Implementation of priority scheduling
7	Implementation of round-robin scheduling
8	Implementation of Page replacement using FIFO

9	Implementation of disk scheduling (FCFS, SSTF)

E. Text Book:

T1. Operating System Concepts, Silberschatz, Abraham and Galvin, Peter, Wiley India Limited
T2. UNIX Concepts and Applications, Sumitabha Das, McGraw-Hill Education

F. Reference Books:

R1. Operating System Concepts, Ekta Walia, Khanna Publishing House

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Students should be able to demonstrate basic knowledge about Operating System.	2											
[CO2]	Able to apply OS concepts such as processes.		2										
[CO3]	Memory and file systems to system design.						2						
[CO4]	Able to configure OS in an efficient and secure manner and become an advance user of operating system.				2								

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Introduction to DBMS Lab

Code:DIP14200

Credits -2| Semester IV

A. INTRODUCTION:

- To understand various types of Data base commands and their functions
- To understand and implement various relational and logical operations in Data Base
- To understand and implement various group functions along with aggregate functions

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]How to design a database, database-based applications
[CO2]How to use a DBMS
[CO3]The critical role of database system in designing several information system-based software systems or applications.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	5
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

Sl.No	Name of Practical
1	Creating &Executing DDL commands in SQL.
2	Creating &Executing Integrity constraints in SQL.
3	Creating &Executing DML commands in SQL.
4	Executingrelational, logical and mathematical set operations using SQL
5	Executing DCL commands in SQL.
6	Execute 50SQL queries (operators, functions, clauses, join Concepts) in SQL
7	Executing group functions in SQL.
8	Executing various aggregate functions in SQL

E. Text Book:

T1. Elmasri & Navathe, Fundamentals of Database Systems, Pearson Education

T2. Raghurama Krishnan, Johannes Gehrke, Database Management Systems, Tata McGraw-Hill, New Delhi, India.

F. Reference Books:

R1. Introduction to Database Systems, C.J.Date, Pearson Education

R2. Introduction to SQL, Rick F.Vander Lans, Pearson Education

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	How to design a database, database-based applications			2									
[CO2]	How to use a DBMS	2											
[CO3]	The critical role of database system in designing several information system-based software systems or applications.		2										

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Minor Project

Code: DIP14203

2 Credits | Semester IV

A. Introduction: The objective of this course is to prepare students to use applications of the theory and practical learned during the course. It will also help students to develop an industry or research oriented project. This course helps students how to carry out project/studies in the field of interest of the student or as given by the industry.

B. Assessment Plan:

Criteria	**Description**	**Maximum Marks**
Continuous Internal Assessment (CIA)	Internal Examination	15
	Attendance	
	Assignment	
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

ARKA JAIN University
Jharkhand

Syllabus of

Diploma in Computer Science & Engineering

Semester-V

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
Scheme of Study (w.e.f Batch 2020-23)

SEMESTER –I(Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-I	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER I (Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -I	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER II (Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -II	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER –II(Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-II	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER-III

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Python Programming	PCC	3	3	100	70	20	5	5
2	Data Structure	PCC	3	3	100	70	20	5	5
3	Computer System Organization	PCC	3	3	100	70	20	5	5
4	Computer Programming	PCC	3	3	100	70	20	5	5
5	Algorithms	PCC	3	3	100	70	20	5	5
6	Essence of Indian Knowledge Tradition	AC	0	2	50	35	10	2.5	2.5
	Practical								
7	Data Structure Lab	PCC	2	4	50	35	5	5	5
8	Computer Programming Lab	PCC	2	4	50	35	5	5	5
9	Python Programming Lab	PCC	2	4	50	35	5	5	5
10	Summer Internship-1(3-4 Weeks)	PROJ	2	0	50	35	15	0	0
	TOTAL		**23**	**29**	**750**	**525**	**140**	**42.5**	**42.5**

SEMESTER-IV

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Operating System	PCC	3	3	100	70	20	5	5
2	Computer Network	PCC	3	3	100	70	20	5	5
3	Web Technologies	PCC	3	3	100	70	20	5	5
4	Introduction to DBMS	PCC	3	3	100	70	20	5	5
5	Software Engineering	PEC	3	3	100	70	20	5	5
6	Open Elective-I Artificial Intelligence & Machine Learning Soft Computing Techniques	OEC	3	3	100	70	20	5	5
	Practical								
7	Web Technologies Lab	PCC	2	4	50	35	5	5	5
8	Operating System Lab	PCC	2	4	50	35	5	5	5
9	Introduction to DBMS Lab	PCC	2	4	50	35	5	5	5
10	Minor Project	PROJ	2	4	50	35	15	0	0
	TOTAL		**27**	**36**	**850**	**595**	**165**	**45**	**45**

SEMESTER V

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Introduction to E-Governance	PCC	3	3	100	70	20	5	5
2	Internet of Things	OEC	3	3	100	70	20	5	5
3	Program Elective-I Information Security Fundamentals of AI	PEC	3	3	100	70	20	5	5
4	Program Elective-II Mobile Computing Data Sciences: Data Warehousing & Data Mining	PEC	3	3	100	70	20	5	5
5	Open Elective -II Web Designing and Multimedia Technology Robotics	OEC	3	3	100	70	20	5	5
	Practical								
6	Summer Internship-II(4-6 Weeks)	PROJ	3	0	100	70	30	0	0
7	Major Project-I (Project to be carried over to next semester)	PROJ	1	2	50	35	15	0	0
	TOTAL		19	17	650	455	145	25	25

Project to be carried over to next semester

SEMESTER VI

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Program Elective-III Multimedia Technology Advance Computer Networks	PEC	3	3	100	70	20	5	5
2	Program Elective-IV Network Forensics Software Testing	PEC	3	3	100	70	20	5	5
4	Open elective -III Cyber Security Laws, Standards and IPR Sustainable Development	OEC	3	3	100	70	20	5	5
5	Entrepreneurship and Start-ups	PROJ	4	4	100	70	20	5	5
6	Indian constitution	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Seminar	PROJ	1	2	50	35	15	0	0
7	Major Project-II	PROJ	3	6	100	70	30	0	0
	TOTAL		**17**	**23**	**600**	**420**	**135**	**22.5**	**22.5**

Distribution of Credit across 6 semesters:

Sl. No	Type of Paper	No. of Paper	Total Credit
1	Humanities and Social Sciences Courses **(HSC)**	3	7
2	Basic Science courses**(BSC)**	6	18
3	Engineering Science courses **(ESC)**	8	18
4	Professional core courses (**PCC)**	16	42
5	Professional Elective courses**(PEC)**	5	15
6	Open Electives Courses (**OEC)**	4	12
7	Project work, seminar and internship in industry or elsewhere**(PROJ)**	6	12
8	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]**(AC)**	3	(non-credit)
	Total	51	124

CIA – Continuous Internal Assessment – Based on Projects / Assignment during the semester

Note:

AICTE Activity Points to be earned by students admitted to Diploma program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):

Every regular student, who is admitted to the 3 year Diploma program, is required to earn 75 activity points in addition to the total credits earned for the program. Students entering 3 years Diploma Program through lateral entry are required to earn 50 activity points in addition to the total credits earned for the program.
The activity points earned by the student shall be reflected on the students 6th Semester grade card.
The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled.
Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.
Incase student fail to earn the prescribed activity points, Sixth semester Grade Card shall be issued only after earning the required activity Points.
Students shall be eligible for the award of degree only after the release of the Six Semester grade card.

There are two groups (A & B) in semester 1 & 2. The Group division will be decided by The Dean SoE & IT before commencement of classes*

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

PROGRAM OUTCOMES

After completing this undergraduate program, a learner:

[PO.1]. Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems

[PO.2]. Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

[PO.3]. Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

[PO.4]. Engineering Tools: Apply appropriate technologies and tools with an understanding of the limitation.

[PO.5]. The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

[PO.6]. Environment and sustainability: Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development..

[PO.7]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

[PO.8]. Individual and team work: Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

[PO.9]. Communication: An ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.10]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

PROGRAM SPECIFIC OUTCOMES

[PSO.1]. Students will able to design software and computer based system using latest and advanced technologies in computer hardware and software field.

[PSO.2]. Apply knowledge of computer science & engineering and an understanding of management principles for applying them while managing software and hardware projects.

Subject: Introduction to E-Governance

Code: DIP15235

Credits-3 | Semester V

A. INTRODUCTION:

- To cover the concepts of e-Governance.
- To understand how technologies and business models shape the contours of government for improving citizen services and bringing in transparency.

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Exposure to introductory ideas and practices followed in a selected number of e-Governance initiatives in India.

[CO2]Understand and appreciate the essence of e-Governance.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: Exposure To emerging trends in ICT for development. Understanding of design and implementation of e-Government projects. E-Government life cycle.

NEED & RULES: Need for Government Process Re-engineering (GPR). National e-Governance Plan (Ne GP) for India. SMART Governments & Thumb rules

ARCHITECTURES & ISSUES: Architecture & models of e-Governance, including Public Private Partnership(PPP). Need for Innovation and Change Management in e-Governance. Critical Success Factors; Major issue including corruption. Resistance for change; e-Security and Cyber Laws.

IMPLEMENTATION AND IMPACT: Focusing on Indian initiatives and their impact on citizens. Sharing of case studies to highlight best practices in managing e-Governance projects in Indian context. Visits to local e-Governance sites(CSC, eSeva, Post Office, Passport Seva Kendra, etc) as part of Tutorials.

PROJECT: Mini Projects by students in groups – primarily evaluation of various e-Governance projects.

E. TEXT BOOKS

T1.Managing Transformation – Objectives to Outcomes. J Sayanarayana, Prentice Hall India
T2. The State, IT and Development. Kenneth Kenniston, RK Bagga and Rohit Raj Mathur, Sage Publications India Pvt Ltd.
T3. E-Government – The Science of the Possible. J Sayanarayana, Prentice Hall India

F. REFERENCE BOOKS

R1. http://www.csi-sigegov.org/publications.php
R2. https://negd.gov.in
R3. https://www.nisg.org/case-studies-on-e-governance-in-india

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Exposure to introductory ideas and practices followed in a selected number of e-Governance initiatives in India.	2											
[CO2]	Understand and appreciate the essence of e-Governance.		1										

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Internet of Things

Code:DIP15234

Credits-3 | Semester V

A. INTRODUCTION:

- To cover Internet of Things (IoT) is presently an important technology with wide ranging interest from Government, academia and industry.
- IoT cuts across different application domain verticals ranging from civilian to defence sectors which includes agriculture, space, health care, manufacturing, construction, water, mining, etc.
- Today it is possible to build different IoT solutions such as shopping system, infrastructure management in both urban and rural areas, remote health monitoring and emergency notification systems, and transportation systems.
- It is very important to learn the fundamentals of this emerging technology

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Students will have good understanding of various aspect ofIoT.
[CO2]Understand and know some tools and have basic implementation skills.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

FUNDAMENTALS: Introduction to IoT.Sensing. Actuation

NETWORKING & PROTOCOLS: Basics of IoT Networking. Communication Protocols. Sensor networks

ARDUINO PROGRAMMING: Introduction to Arduino programming. Integration of Sensors/Actuators to Arduino

IMPLEMENTATION: Implementation of IoT with Raspberry Pi. Data Handling Analytics

CASE STUDY: Case Studies: Agriculture, Healthcare, Activity

E. TEXT BOOKS

T1. https://nptel.ac.in/noc/individual_course.php?id=noc17-cs22
T2. "The Internet of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
T3. Internet of Things by Dr. Jeeva Jose, Khanna Publishing House (Edition 2017)

F.REFERENCE BOOKS

R1. "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti (Universities Press)
R2. Internet of Things: Architecture and Design Principles, Raj Kamal, McGraw Hill
R3. Research papers

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Students will have good understanding of various aspect ofIoT.	2											
[CO2]	Understand and know some tools and have basic implementation skills.				2								

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Information Security

Code: DIP15233

Credits-3 | Semester V

A. INTRODUCTION:

- To learn how to evaluate and enhance information security of IT infrastructure and organizations

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Understanding of security needs and issues of IT infrastructure.

[CO2]Have basic skills on security audit of networks, operating systems and application software.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

FUNDAMENTALS: Introduction to Information Security, Various aspects of information security (PAIN).Security Features of Operating Systems – Authentication, Logs, Audit Features, File System Protection, User Privileges, RAID options, Anti-Virus Software, etc.

NETWORKING & PROTOCOLS: Understanding security weaknesses in popular networking protocols – IP, TCP, UDP, RIP, OSPF, HTTP, SMTP, etc.security weaknesses in common networking devices – Hub, switch, router, WiFi.Security solutions to mitigate security risk of networking protocols (IPSec, HTTPS, etc) and devices (VLAN, VPN, Ingress Filtering, etc)

CRYPTOGRAPHY: Basics of Cryptography.PKI, Security considerations while developing software

NETWORK SECURITY: Network Security Products – Firewall, IDS/IPS, VPN Concentrator, Content Screening Gateways, etc.

SECURITY STANDARDS & POLICIES: Introduction to Security Standards – ISO 27001, Indian IT Act, IPR Laws; Security Audit procedures; Developing Security Policies; Disaster Recovery, Business Continuity Planning

E. TEXT BOOKS

T1. Information Security and Cyber Laws, Sarika Gupta, Khanna Publishing House
T2. RFCs of protocols listed in content (https://www.ietf.org)
T3. Various Acts, Laws and Standards (IT Act, ISO27001 Standard, IPR and Copyright Laws, etc.)

F. REFERENCE BOOKS

R1. Security Guideline documents of Operating Systems (OS Manual, Man Pages, etc)
R2. https://www.cert-in.org.in/
R3. https://www.sans.org/

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understanding of security needs and issues of IT infrastructure.	2											
[CO2]	Have basic skills on security audit of networks, operating systems and application software.		2										

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Fundamentals of AI

Code: DIP15225

Credits-3 | Semester V

A. INTRODUCTION:

- To introduce students to the domain of Artificial Intelligence.

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Student will have general idea about Artificial Intelligence
[CO2]will be able to explore AI tools effectively

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: Overview and Historical Perspective.Turing test, Physical Symbol Systems.scope of Symbolic AI, Agents.

SEARCH: Heuristic Search: Best First Search, Hill Climbing, Beam Search, Tabu Search. Randomized Search: Simulated Annealing, Genetic Algorithms, Ant Colony Optimization.

ALGORITHM: Finding Optimal Paths: Branch and Bound, A*, IDA*, Divide and Conquer approaches, Beam Stack Search.Problem Decomposition: Goal Trees, AO*, Rule Based Systems, Rete Net. Game Playing**:** Minimax Algorithm, AlphaBeta Algorithm, SSS*.

PLANNING: Planning and Constraint Satisfaction: Domains, Forward and Backward Search, Goal Stack Planning, Plan Space Planning, Graphplan, Constraint Propagation.

SECURITY STANDARDS & POLICIES: Logic and Inferences: Propositional Logic, First Order Logic, Soundness and Completeness, Forward and Backward chaining.

E. TEXT BOOKS

T1. Deepak Khemani. A First Course in Artificial Intelligence, McGraw Hill Education (India)
T2. https://nptel.ac.in/courses/106106126/
T3. Stefan Edelkamp and Stefan Schroedl. Heuristic Search, Morgan Kaufmann.
T4. Pamela McCorduck, Machines Who Think: A Personal Inquiry into the History and Prospects of Artificial Intelligence, A K Peters/CRC Press

F. REFERENCE BOOKS

R1. Elaine Rich and Kevin Knight. Artificial Intelligence, Tata McGraw Hill.
R2. Stuart Russell and Peter Norvig. Artificial Intelligence: A Modern Approach, Prentice Hall
R3. M.C. Trivedi, A classical approach to Artificial Intelligence, Khanna Publishing House

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Student will have general idea about Artificial Intelligence	2											
[CO2]	will be able to explore AI tools effectively				2								

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Mobile Computing

Code:DIP15238

Credits-3 | Semester V

A. INTRODUCTION:

- To teaches how to build mobile apps for Android.
- Students are expected to work on a project as part of the course.

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Will be able to develop and deploy basic mobile applications.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: A brief history of Mobile, Types of mobile phone generations.The Mobile Ecosystem, Types of Mobile Applications, Mobile Information Architecture Android Versions.Features of Android, Android Architecture, Installing Android SDK Tools.Configuring Android in Eclipse IDE, Android Development Tools (ADT), Creating Android Virtual Devices (AVD)

ANDROID APPLICATION: Creating first android application, Anatomy of android application, Deploying Android app on USBconnected Android device, Android application components, Activity life cycle, Understanding activities, Exploring Intent objects, Intent Types, Linking activities using intents

COMPONENTS: Fragments life cycle, Interaction between fragments, Understanding the components of a screen (Layouts)Adapting to display orientation, Action Bar, Views(UI Widgets)-Button, Toast, ToggleBut-ton, CheckBox, RadioButton, Spinner, WebView, EditText, DatePickerTimePicker, ListView, Progress-Bar, Analog and Digital clock, Handling UI events, List fragment, Dialog fragment

APPLICATIONS: Menus-Option, Context, Popup, Images-ImageView, ImageSwitcher, AlertDialog, Alarm manager.SMS, E-mail, Media Player, Using camera, recording video, Handling Telephony Manager

STORAGE & OPERATIONS: Storing the data persistently-Data Storage Options: preferences, Internal Storage, External Storage, Content Provider.The SQLite database, connecting with SQLite database. Operations-Insert, Delete, Update, Fetch, Publishing android applications, Deploying APK files

E. TEXT BOOKS

T1. Wei-Meng Lee, Beginning Android 4 Application Development, Wiley Publishing, Inc.
T2. Pradeep Kothari, "Android Application Development Black Book", DreamTech Press
T3. James C.Sheusi, "Android Application Development for Java Programmers", Cengage Learning

F. REFERENCE BOOKS

R1. Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd
R2. Sayed Y Hashimi and Satya Komatineni(2009), "Pro Android", Wiley India Pvt Ltd
R3. Reto Meier, Professional Android 4 Application Development, Wiley India Pvt Ltd

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Will be able to develop and deploy basic mobile applications.			2								1	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Data Science: Data Warehousing & Data Mining

Code:DIP15220

Credits-3 | Semester V

A. INTRODUCTION:

- Introduce students to the domain of Data Warehousing and Data Mining

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Student will have general idea about Data Warehousing and Data Mining techniques, will be able to explore further and effectively use related tools.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: Motivation, Importance, Definitions, Kind of Data, Data Mining Functionalities, Kinds of Patterns, Classification of Data Mining Systems.Data Mining Task Primitives, Integration of A Data Mining System with A Database or Data Warehouse System.Major Issues in Data Mining, Types of Data Sets and Attribute Values, Basic Statistical Descriptions of Data, Data Visualization, Measuring.Data Similarity. PREPROCESSING Data Quality, Major Tasks in Data Preprocessing, Data Reduction, Data Transformation and Data Discretization, Data Cleaning and Data Integration.

DATA WAREHOUSING AND ON-LINE ANALYTICAL PROCESSING: Data Warehouse basic concepts, Data Warehouse Modeling - Data Cube and OLAP, Data Warehouse Design and Usage.Data Warehouse Implementation, Data Generalization by Attribute-Oriented Induction, Data Cube Computation.

PATTERNS, ASSOCIATIONS AND CORRELATIONS: Mining Frequent Patterns, Associations and Correlations: Basic Concepts, Efficient and Scalable Frequent Itemset Mining Methods, Pattern Evaluation Methods, Applications of frequent pattern and associations.Frequent Patterns and Association Mining: A Road Map, Mining Various Kinds of Association Rules.Constraint-Based Frequent Pattern Mining Extended Applications of Frequent Patterns.

CLASSIFICATION: Basic Concepts, Decision Tree Induction, Bayesian Classification Methods, Rule-Based Classification, Model Evaluation and Selection.Techniques to Improve Classification Accuracy: Ensemble Methods, Handling Different Kinds of Cases in Classification, Classification by Neural Networks, Support Vector Machines, Pattern-Based Classification, Lazy Learners (or Learning from Your Neighbors).

CLUSTER ANALYSIS: Basic Concepts of Cluster Analysis, Clustering Structures, Major Clustering Approaches, Partitioning Methods, Hierarchical Methods, Density-Based Methods.Model-Based Clustering, Why outlieranalysis,Identifying and handling of outliers, Outlier Detection Techniques. WEB MINING: Basic concepts of web mining, different types of web mining, PAGE RANK Algorithm, HITS Algorithm.

E. TEXT BOOKS

T1. Jiawei Han, Micheline Kamber, Jian Pei, Data Mining: Concepts and Techniques, Elsevier

T2. Margaret H Dunham, Data Mining Introductory and Advanced Topics, Pearson Education

F. REFERENCE BOOKS

R1. Amitesh Sinha, Data Warehousing, Thomson Learning, India.

R2. Xingdong Wu, Vipin Kumar, the Top Ten Algorithms in Data Mining, CRC Press, UK.

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Student will have general idea about Data Warehousing and Data Mining techniques, will be able to explore further and effectively use related tools.				2							1	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Web Designing & Multimedia Technology

Code:DIP15249

Credits-3 | Semester V

A. INTRODUCTION:

- To develop the skill & knowledge of Web page design.
- Students will understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other information technology sectors.

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Define the principle of Web page design
[CO2]Define the basics in web design
[CO3] Visualize the basic concept of HTML.
[CO4] Recognize the elements of HTML.
[CO5] Introduce basics concept of CSS.
[CO6] Develop the concept of web publishing

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

WEB DESIGN PRINCIPLES: Basic principles involved in developing a web site; Planning process; Five Golden rules of web designing .Designing navigation bar; Page design.Home Page Layout; Design Concept.

BASICS IN WEB DESIGN: Brief History of Internet; What is World Wide Web.Why create a web site; Web Standards

INTRODUCTION TO HTML: What is HTML; HTML Documents; Basic structure of an HTML document Creating an HTML document; Mark up Tags; Heading-Paragraphs.Line Breaks; HTML Tags.

ELEMENTS OF HTML& INTRODUCTION TO WEB PUBLISHING OR HOSTING: Introduction to elements of HTML; Working with Text.Working with Lists, Tables and Frames.Working with Hyperlinks, Images and Multimedia; Working with Forms and controls. Creating the Web Site; Saving the site.Working on the web site; Creating web site structure.Creating Titles for web pages; Themes-Publishing web sites

INTRODUCTION TO CASCADING STYLE SHEETS: Concept of CSS; Creating Style Sheet; CSS Properties; CSS Styling(Background, Text Format, Controlling Fonts).Working with block elements and objects; Working with Lists and Tables; CSS Id and Class; Box Model(Introduction, Border properties, Padding Properties, Margin properties).CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align,Pseudo class, Navigation Bar, Image Sprites, Attribute sector); CSS Color; Creating page Layout and Site Designs.

E. TEXT BOOKS

T1**.** Web Designing & Architecture-Educational Technology Centre University of Buffalo
T2. Steven M. Schafer HTML, XHTML, and CSS Bible, 5ed Wiley India

F. REFERENCE BOOKS

R1. John Duckett Beginning HTML, XHTML, CSS, and JavaScript Wiley India
R2. Ian Pouncey, Richard York Beginning CSS: Cascading Style Sheets for Web Design Wiley India

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
[CO1]	Define the principle of Web page design				1								
[CO2]	Define the basics in web design	1											
[CO3]	Visualize the basic concept of HTML.		1										
[CO4]	Recognize the elements of HTML.		1										
[CO5]	Introduce basics concept of CSS.	1											
[CO6]	Develop the concept of web publishing			2								1	

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Robotics

Code:DIP16273

Credits-3 | Semester V

A. INTRODUCTION:

- To understand the basic concepts and theory governing the programming of robots that performs autonomous tasks such as navigation and manipulation.

B. COURSE OUTCOMES: At the end of the course, students will be able to

[CO1]Describe the different physical forms of robot architectures.
[CO2]Kinematically model simple manipulator and mobile robots.
[CO3]Mathematically describe a kinematic robot system
[CO4] Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty
[CO5] compute forward and inverse kinematics for a small serial kinematic chain.
[**CO6]** consider trade-offs among position control, velocity control, and force control when solving a robot control problem.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: History of robots, Classification of robots, Present status and future trends. Basic components of robotic system. Basic terminology- Accuracy, Repeatability, Resolution, Degree of freedom. Mechanisms and transmission, End effectors, Grippers-different methods of grippingMechanical grippersSlider crank mechanism, Screw type, Rotary actuators, Cam type gripper, Magnetic grippers, Vacuum grippers, Air operated grippers; Specifications of robot.Mechanical grippers-Slider crank mechanism, Screw type, Rotary actuators, Cam type gripper, Magnetic grippers, Vacuum grippers, Air operated grippers; Specifications of robot.

DRIVE SYSTEMS AND SENSORS: Drive system- hydraulic, pneumatic and electric systems.

Sensors in robot – Touch sensors, tactile sensor, Proximity and range sensors, Robotic vision sensor, Force sensor, Light sensors, and Pressure sensors

KINEMATICS AND DYNAMICS OF ROBOTS:2D, 3D Transformation, Scaling, Rotation, Translation, and Homogeneous coordinates, multiple transformation, Simple problems. Matrix representation, Forward and Reverse Kinematics of Three Degree of Freedom, Homogeneous Transformations.Inverse kinematics of Robot,Robot Arm dynamics, D-H representation of robots, Basics of Trajectory Planning.

ROBOT CONTROL, PROGRAMMING AND APPLICATIONS: Robot Controls-Point to point control, Continuous path control, intelligent robot, Control system for robot joint
Control actions, Feedback devices, Encoder, Resolver, LVDT,Motion Interpolations, and Adaptive control Introduction to Robotic Programming:On-line and off-line programming, programming examples. Robot applications-Material handling, Machine loading and unloading, assembly, Inspection, Welding, Spray painting.

E. TEXT BOOKS

T1. S.R. Deb, “Robotics Technology and flexible automation”, Tata McGraw-Hill Education., 2009.
T2. Richard D. Klafter, Thomas .A, ChriElewski, Michael Negin, "Robotics Engineering an Integrated Approach", PHI Learning., 2009.
T3. Francis N. Nagy, Andras Siegler, "Engineering foundation of Robotics", Prentice Hall Inc., 1987.
T4. P.A. Janaki Raman, "Robotics and Image Processing an Introduction", Tata McGraw Hill Publishing company Ltd., 1995.

F. REFERENCE BOOKS

R1. Carl D. Crane and Joseph Duffy, "Kinematic Analysis of Robot manipulators", Cambridge University press, 2008.
R2. Fu. K. S., Gonzalez. R. C. & Lee C.S.G., “Robotics control, sensing, vision and intelligence”, McGraw Hill Book co, 1987.
R3. Ray Asfahl. C., “Robots and Manufacturing Automation”, John Wiley & Sons Inc.,1985

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Describe the different physical forms of robot architectures.	1											
[CO2]	Kinematically model simple manipulator and mobile robots.	1											
[CO3]	Mathematically describe a kinematic robot system.		2										
[CO4]	Analyze manipulation and navigation problems using knowledge of coordinate frames, kinematics, optimization, control, and uncertainty.						2						
[CO5]	Compute forward and inverse kinematics for a small serial kinematic chain.			2									
[CO6]	Consider trade-offs among position control, velocity control, and force control when solving a robot control problem.										2		

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject:Summer Internship-II

Code: DIP15244

3 Credits | Semester V

A. Introduction:

- Following are the intended objectives of internship training:
- Will expose Technical students to the industrial environment, which cannot be simulated in the classroom and hence creating competent professionals for the industry.
- Provide possible opportunities to learn understand and sharpen the real time technical / managerial skills required at the job.
- Exposure to the current technological developments relevant to the subject area of training.
- Experience gained from the 'Industrial Internship' in classroom will be use in classroom discussions.
- Create conditions conducive to quest for knowledge and its applicability on the job

B. Assessment Plan:

Criteria	**Description**	**Maximum Marks**
Continuous Internal Assessment (CIA)	Internal Examination	30
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

GUIDELINES FOR INTERNSHIP

Summer Internship –II should be undertaken in an industry only

S.No.	Suggested Schedule	Suggested Duration (In weeks)	Activities
1	Summer/winter vacation after 4th Semester	4-6	Inter/Intra Institutional Activities

Subject:Major Project-I

Code: DIP15236

1 Credits | Semester V

A. Introduction: The objective of this course is to prepare students to use applications of the theory and practical learned during the course. It will also help students to develop an industry or research oriented project. This course helps students how to carry out project/studies in the field of interest of the student or as given by the industry.

B.Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	15
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	Completion of Internship during the Summer vacation	

GUIDELINES FOR INTERNSHIP

Major Project-I should be based on real/ live problems of the Industry/Govt./NGO/ MSME/Rural Sector or an innovative idea having the potential of a Startup

ARKA JAIN University
Jharkhand

Syllabus of

Diploma in Computer Science & Engineering

Semester-VI

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
Scheme of Study (w.e.f Batch 2020-23)

SEMESTER –I(Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-I	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER I (Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -I	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER II (Group-A)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA *	Attendance
1	Mathematics -II	BSC	4	4	100	70	20	5	5
2	Fundamentals of Electrical & Electronics Engg.	ESC	4	4	100	70	20	5	5
3	Introduction to IT system	ESC	3	3	100	70	20	5	5
4	Engineering Mechanics	ESC	4	4	100	70	20	5	5
5	Environmental Science	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Fundamentals of electrical & electronics Engg. Lab	ESC	1	2	50	35	5	5	5
7	Introduction to IT system Lab	ESC	1	2	50	35	5	5	5
8	Engineering Mechanics Lab	ESC	1	2	50	35	5	5	5
9	Engineering Graphics	ESC	2	4	50	35	5	5	5
	Total		**20**	**27**	**650**	**455**	**110**	**42.5**	**42.5**

SEMESTER –II(Group-B)

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Communication Skills in English	HSC	3	3	100	70	20	5	5
2	Mathematics-II	BSC	4	4	100	70	20	5	5
3	Applied Physics	BSC	4	4	100	70	20	5	5
4	Applied Chemistry	BSC	4	4	100	70	20	5	5
	Practical								
5.	Engineering Workshop Practice	ESC	2	4	50	35	5	5	5
6.	Applied Physics Lab	BSC	1	2	50	35	5	5	5
7.	Applied Chemistry Lab	BSC	1	2	50	35	5	5	5
8.	Communication Skills in English Lab	HSC	1	2	50	35	5	5	5
	Total		**20**	**25**	**600**	**420**	**100**	**40**	**40**

SEMESTER-III

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Python Programming	PCC	3	3	100	70	20	5	5
2	Data Structure	PCC	3	3	100	70	20	5	5
3	Computer System Organization	PCC	3	3	100	70	20	5	5
4	Computer Programming	PCC	3	3	100	70	20	5	5
5	Algorithms	PCC	3	3	100	70	20	5	5
6	Essence of Indian Knowledge Tradition	AC	0	2	50	35	10	2.5	2.5
	Practical								
7	Data Structure Lab	PCC	2	4	50	35	5	5	5
8	Computer Programming Lab	PCC	2	4	50	35	5	5	5
9	Python Programming Lab	PCC	2	4	50	35	5	5	5
10	Summer Internship-1(3-4 Weeks)	PROJ	2	0	50	35	15	0	0
	TOTAL		**23**	**29**	**750**	**525**	**140**	**42.5**	**42.5**

SEMESTER-IV

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Operating System	PCC	3	3	100	70	20	5	5
2	Computer Network	PCC	3	3	100	70	20	5	5
3	Web Technologies	PCC	3	3	100	70	20	5	5
4	Introduction to DBMS	PCC	3	3	100	70	20	5	5
5	Software Engineering	PEC	3	3	100	70	20	5	5
6	Open Elective-I Artificial Intelligence & Machine Learning Soft Computing Techniques	OEC	3	3	100	70	20	5	5
	Practical								
7	Web Technologies Lab	PCC	2	4	50	35	5	5	5
8	Operating System Lab	PCC	2	4	50	35	5	5	5
9	Introduction to DBMS Lab	PCC	2	4	50	35	5	5	5
10	Minor Project	PROJ	2	4	50	35	15	0	0
	TOTAL		**27**	**36**	**850**	**595**	**165**	**45**	**45**

SEMESTER V

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Introduction to E-Governance	PCC	3	3	100	70	20	5	5
2	Internet of Things	OEC	3	3	100	70	20	5	5
3	Program Elective-I Information Security Fundamentals of AI	PEC	3	3	100	70	20	5	5
4	Program Elective-II Mobile Computing Data Sciences: Data Warehousing & Data Mining	PEC	3	3	100	70	20	5	5
5	Open Elective -II Web Designing and Multimedia Technology Robotics	OEC	3	3	100	70	20	5	5
	Practical								
6	Summer Internship-II(4-6 Weeks)	PROJ	3	0	100	70	30	0	0
7	Major Project-I (Project to be carried over to next semester)	PROJ	1	2	50	35	15	0	0
	TOTAL		19	17	650	455	145	25	25

Project to be carried over to next semester

SEMESTER VI

S.No	Name of the Subject	Type of Paper	Credit	Contact Hours Per Week	Total Marks	End Term Theory/ Practical Exam	Mid Term Theory/ Practical Exam	CIA*	Attendance
1	Program Elective-III Multimedia Technology Advance Computer Networks	PEC	3	3	100	70	20	5	5
2	Program Elective-IV Network Forensics Software Testing	PEC	3	3	100	70	20	5	5
4	Open elective -III Cyber Security Laws, Standards and IPR Sustainable Development	OEC	3	3	100	70	20	5	5
5	Entrepreneurship and Start-ups	PROJ	4	4	100	70	20	5	5
6	Indian constitution	AC	0	2	50	35	10	2.5	2.5
	Practical								
6	Seminar	PROJ	1	2	50	35	15	0	0
7	Major Project-II	PROJ	3	6	100	70	30	0	0
	TOTAL		**17**	**23**	**600**	**420**	**135**	**22.5**	**22.5**

Distribution of Credit across 6 semesters:

Sl. No	Type of Paper	No. of Paper	Total Credit
1	Humanities and Social Sciences Courses **(HSC)**	3	7
2	Basic Science courses**(BSC)**	6	18
3	Engineering Science courses **(ESC)**	8	18
4	Professional core courses (**PCC)**	16	42
5	Professional Elective courses**(PEC)**	5	15
6	Open Electives Courses (**OEC)**	4	12
7	Project work, seminar and internship in industry or elsewhere**(PROJ)**	6	12
8	Audit Courses [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Knowledge Tradition]**(AC)**	3	(non-credit)
	Total	51	124

CIA – Continuous Internal Assessment – Based on Projects / Assignment during the semester

Note:

AICTE Activity Points to be earned by students admitted to Diploma program (For more details refer to Chapter 6, AICTE, Activity Point Program, Model Internship Guidelines):

Every regular student, who is admitted to the 3 year Diploma program, is required to earn 75 activity points in addition to the total credits earned for the program. Students entering 3 years Diploma Program through lateral entry are required to earn 50 activity points in addition to the total credits earned for the program.
The activity points earned by the student shall be reflected on the students 6th Semester grade card.
The activities to earn the points can be spread over the duration of the course. However, minimum prescribed duration should be fulfilled.
Activity Points (non-credit) have no effect on SGPA/CGPA and shall not be considered for vertical progression.
Incase student fail to earn the prescribed activity points, Sixth semester Grade Card shall be issued only after earning the required activity Points.
Students shall be eligible for the award of degree only after the release of the Six Semester grade card.

There are two groups (A & B) in semester 1 & 2. The Group division will be decided by The Dean SoE & IT before commencement of classes*

ARKAJAIN University, Jharkhand
School of Engineering & IT
Department of Engineering
Faculty – Diploma in Computer Science & Engineering (DECS)
PROGRAM OUTCOMES AND PROGRAM SPECIFIC OUTCOMES

PROGRAM OUTCOMES

After completing this undergraduate program, a learner:

[PO.1]. Basic knowledge: An ability to apply knowledge of basic mathematics, science and engineering to solve the engineering problems

[PO.2]. Discipline knowledge: An ability to apply discipline - specific knowledge to solve core and/or applied engineering problems.

[PO.3]. Experiments and practice: An ability to plan and perform experiments and practices and to use the results to solve engineering problems.

[PO.4]. Engineering Tools: Apply appropriate technologies and tools with an understanding of the limitation.

[PO.5]. The engineer and society: Demonstrate knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to engineering practice.

[PO.6]. Environment and sustainability: Understand the impact of the engineering solutions in societal and environmental contexts, and demonstrate the knowledge and need for sustainable development..

[PO.7]. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

[PO.8]. Individual and team work: Function effectively as an individual, and as a member or leader in diverse/multidisciplinary teams.

[PO.9]. Communication: An ability to communicate effectively on complex engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

[PO.10]. Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the context of technological changes.

PROGRAM SPECIFIC OUTCOMES

[PSO.1]. Students will able to design software and computer based system using latest and advanced technologies in computer hardware and software field.

[PSO.2]. Apply knowledge of computer science & engineering and an understanding of management principles for applying them while managing software and hardware projects.

Subject: Multimedia Technology

Code:DIP16268

Credits-3 | Semester VI

A. Introduction:

- To introduce students to the domain of Multimedia Technologies, which explain the technologies underlying digital images, videos and audio contents, including various compression techniques and standards, and the issues.
- To deliver multimedia content over the Internet.

B. Course Outcomes: At the end of the course

[CO1]Student will understand various aspects of Multimedia and related standards.

[CO2] Student will be able to build multimedia content, applications, also multimedia enable Web applications, and mobile applications

[CO3]Multimedia enables Web applications and mobile applications

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION TO MULTIMEDIA: Multimedia Foundation and Concepts. Multimedia Hardware, Multimedia Software, Multimedia operating systems. Multimedia communication system

BASIC COMPRESSION TECHNIQUES: Video and Audio Data Compression Techniques – Lossy and Lossless. Example algorithms/standards: Huffman, RLE, JPEG, MPEG, MP3, MP4, LZMA, FLAC, ALAC, ITU G.722, H.261, H.265

CONTENT DEVELOPMENT AND DISTRIBUTION: Desktop publishing (Coral Draw, Photoshop, Page maker) Multimedia Animation & Special effects (2D/3D animation, Flash)

INTRODUCTION TO DIGITAL IMAGING: Basics of Graphic Design and use of Digital technology .Definition of Digital images, Digital imaging in multimedia

INTRODUCTION TO MULTIMEDIA PROGRAMMING AND APPLICATIONS

E. TEXT BOOKS

T1. An Introduction to Multimedia Authoring, A. Eliens

T2. Fundamentals of Multimedia, Prentice Hall/Pearson, Ze-Nian Li & Mark S. Drew.

F. REFERENCE BOOKS

R1. Multimedia and Animation, V.K. Jain, Khanna Publishing House, Edition 2018

R2. Fundamentals of Multimedia, Ramesh Bangia, Khanna Book Publishing Co., N. Delhi (2007)

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
[CO1]	Student will understand various aspects of Multimedia and related standards.	1											
[CO2]	Student will be able to build multimedia content, applications, also multimedia enable Web applications, and mobile applications		2	2								2	
[CO3]	Multimedia enables Web applications and mobile applications				2								

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Advance Computer Network

Code:DIP16260

Credits-3 | Semester VI

A. Introduction:

- Introduce Advance Networking Concepts, Theories and Tools

B. Course Outcomes: At the end of the course, students will be able to

[CO1]Understanding core concepts/theories/algorithms of computer networks

[CO2]Some hands-on capability on various network devices and tools

[CO3]Capability to design and implement a computer network

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: Review of Networking Basics; Advance Topics in IPv4 – Sub netting, Multicasting.Multicast Routing Protocols (IGMP, PIM, DVMRP); Advance Topics in TCP – flow management, congestion avoidance, protocol spoofing; IPv6

NETWORKING & ARCHITECTURES: Telecom Networks, Switching Techniques; Introduction to Frame Relay, ATM, MPLS;VSAT Communication – Star and Mesh architectures, bandwidth reservation; Wireless Networks – WiFi, WiMax, Cellular Phone Technologies – GSM, CDMA, 3G, 4G

DESIGN & STORAGE: Network Redundancy, Load Balancers, Caching, Storage Networks

QoS; Network Monitoring – SNMP, RMON

NETWORK SECURITY: Introduction to Network Security – VLAN, VPN, Firewall, IPS, Proxy Servers

SIMULATION AND CASE STUDY: Network Simulation, Network design case studies and exercises.IP Addressing schema.Protocol Analysers (Wireshark, etc)

E. TEXT BOOKS

T1. RFCs and Standards Documents (www.ietf.org and other standard body websites)

T2. Communication Networking – An Analytical Approach, Anurag-Manjunath-Joy

T3. TCP/IP Illustrated (Vol.1,2), Stevens

F. REFERENCE BOOKS

R1. Data Networks, Bertsekas-Gallager

R2. An Engineering Approach to Computer Networking, S. Keshav

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Understanding core concepts/theories/algorithms of computer networks	2											
[CO2]	Some hands-on capability on various network devices and tools			2								1	
[CO3]	Capability to design and implement a computer network		3										2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Network Forensics

Code: DIP16269

Credits-3 | Semester VI

A. Introduction:

- To understand various network forensic aspects for analysing network security breach

B. **Course Outcomes:** At the end of the course, students will be able to

[CO1]Student will understand basic concepts of network forensics.

[CO2]Learn tools, and will be able to do basic forensic investigations.

[**CO3]**Handle security incidents.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION: Review of Networking concepts and Protocols**.**Introduction to Network Forensics, various aspects of Network Forensics

FORENSICS TOOLS: Introduction to Network Forensic Tools and techniques: Wireshark, TCP Dump, Syslog, NMS.Promiscuous Mode, Network Port Mirroring, snooping, scanning tools, etc.

NETWORKING LAYER & LOGS: Understanding and Examining Data Link Layer, Physical Layer Ethernet Switch Logs, MAC Table, ARP Table, etc.Understanding and Examining Network Layer, Router Logs, WiFi Device logs, Firewall logs,

APPLICATIONS: Understanding audit features of OS and applicationsEnabling and Examining Server logs, User activity logs, Browser history analysis, Proxy server logs, Antivirus logs, Email logs

LIMITATIONS & CHALLENGES: Limitations and challenges of network forensics due to encryption, spoofing, mobility.storage limitations, privacy laws, etc.

E. TEXT BOOKS

T1.Handbook of Digital Forensics and Investigation, Eoghan Casey, Elsevier Academic Press

T2. Cyber Forensics, Albert Marcella and Doug Menendez, CRC Press

T3. Computer Forensics (5 volume Set) mapping to CHFI (Certified Hacking Forensics Investigator), by EC-Council

F. REFERENCE BOOKS

R1. Manuals of OS, application software, network devices

R2. RFCs of various networking protocols (https://www.ietf.org/)

R3. https://www.sans.org/

R4. https://www.cert-in.org.in/

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Student will understand basic concepts of network forensics.	2											
[CO2]	Learn tools, and will be able to do basic forensic investigations.				2								
[CO3]	Handle security incidents.		2										

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Software Testing

Code: DIP16066

Credits-3 | Semester VI

A. Introduction:

- Inculcate essential software testing knowledge and skills.
- Required to reasonably test a system under development in a systematic manner.

B. Course Outcomes: At the end of the course, students will be able to

[CO1]Student will develop skills to understand the system

[CO2]Choose suitable testing methods, strategies, tools and technology, execute and report the test.

[CO3]Student will also be able to understand need and usage of test automation and gain expertise in at least 1 test automation tool

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

BASICS: Introduction to Software Quality basics: Verification and validation, quality perspectives, Testing terminology.Software Testing Life Cycle (STLC), "V" model of Testing, QA process, cost of testing, types of tests

WRITING TEST CASES: Writing test cases, Functional Testing, non-functional testing, (Performance testing), UI testing.Preparing test data, Writing Unit test, Integration test and User Acceptance Tests, preparing test scenarios from Software requirements

TEST EXECUTION AND MANAGEMENT: Test execution, Test Oracles, Test planning, Test strategy including when to stop testing.Test-coverage - Traceability matrix, JIRA, Bugzilla and other bug tracking tools. Test data mining, test reporting.

TEST AUTOMATION: Why automation, when not to automate, writing simple automated test cases .learn and practice any one automated testing framework like Selenium and …

OTHER QUALITY ASSURANCE: Quality and Defect management - Code reviews, Quality tools, Change management, version control

E. TEXT BOOKS

T1. Software Engineering – A Practitioner's Approach, 7th Edition, Roger Pressman.

F. REFERENCE BOOKS

R1. Bugzilla (https://www.bugzilla.org/)

R2. JIRA (https://www.atlassian.com/software/jira)

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
[CO1]	Student will develop skills to understand the system	2	1										
[CO2]	Choose suitable testing methods, strategies, tools and technology, execute and report the test.				3						1	1	
[CO3]	Student will also be able to understand need and usage of test automation and gain expertise in at least 1 test automation tool			2					2				2

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Cyber Security Law, Standards & IPR

Code: DIP16262

Credits-3 | Semester VI

A. Introduction:

- Demonstrate knowledge of Internet safety practices and policies to help protect your identity.
- To combat risks related to online social and recreational activities

B. Course Outcomes: At the end of the course, students will be able to

[CO1]Protect data and respond to threats that occur over the Internet

[CO2]Design and implement risk analysis, security policies, and damage assessment

[CO3]Plan, implement and audit operating systems' security in a networked, multi-platform and cross platform environment

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION TO CYBER SECURITY : Overview of Cyber Security, Internet Governance – Challenges and Constraints, Cyber Threats:- Cyber Warfare-Cyber Crime-Cyber terrorism-Cyber Espionage, Need for a Comprehensive Cyber Security Policy, Need for a Nodal Authority, Need for an International convention on Cyberspace.

CYBER SECURITY VULNERABILITIES AND CYBER SECURITY SAFEGUARDS: Cyber Security Vulnerabilities - Overview, vulnerabilities in software, System administration, Complex Network Architectures, Open Access to Organizational Data, Weak Authentication, Unprotected Broadband communications, Poor Cyber Security Awareness. Cyber Security Safeguards- Overview, Access control, Audit, Authentication, Biometrics, Cryptography, Deception, Denial of Service Filters, Ethical Hacking, Firewalls, Intrusion Detection Systems, Response, Scanning, Security policy, Threat Management.

SECURING WEB APPLICATION, SERVICES AND SERVERS : Introduction, Basic security for HTTP Applications and Services, Basic Security for SOAP Services, Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

CYBERSPACE AND THE LAW & SECURITY LAWS AND STANDARDS: Introduction, Cyber Security Regulations, Roles of International Law, the state and Private Sector in Cyberspace, Cyber Security Standards. The INDIAN Cyberspace, National Cyber Security Policy 2013.Security Assurance ; Security Laws ; IPR ; International Standards ; Security Audit 6.SSE-CMM / COBIT etc

CRYPTOGRAPHY AND NETWORK SECURITY: Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key Cryptography, Message Authentication, Digital Signatures, Applications of Cryptography. Overview of Firewalls- Types of Firewalls, User Management, VPN Security Security Protocols: - security at the Application Layer- PGP and S/MIME, Security at Transport Layer- SSL and TLS, Security at Network Layer-IP Sec.

E. TEXT BOOKS

T1. Beginners, Intermediate and Advance Guide in Cybersecurity Measures Effectively by zach webber

F. REFERENCE BOOKS

R1. An Introduction to Cyber Security by Edward Amoroso and Matthew Amoroso

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Protect data and respond to threats that occur over the Internet	2											
[CO2]	Design and implement risk analysis, security policies, and damage assessment		2										
[CO3]	Plan, implement and audit operating systems' security in a networked, multi-platform and cross platform environment			1	2								

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Sustainable Development

Code: DIP16276

Credits-3 | Semester VI

A. Introduction:

- To impart knowledge on the principles for balancing social, economic and environmental dimensions of development and the associated international and national frameworks

B. **Course Outcomes:** At the end of the course, students will be able to

[CO1] Describe the national and global environmental, economic and social issues and the principles of different sustainable development frameworks

[CO2] Apply the sustainable development principles during the planning of developmental activities

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION ECOSYSTEM: Concept, Type, Structure, Function; Ecological succession, Pyramid, degradation and its remedies from Unsustainable development to sustainable development, Concept of sustainable developmentSocial and environmental issues (local, national and international), Need for studying the economics for sustainable development

ENVIRONMENT AND REHABILITATION: Mined area, Habitats, Water bodies, Mangroves; Global Changes, Biodiversity concerns and precautionary principles, Evaluation of sustainable development

VALUING MARKET AND NON-MARKET ECOSYSTEM: Use of monetary valuation, Cost benefit analysis, Technique of monetary valuation, Definition of conventional and green GNP

INTERNATIONAL TRADE AND SUSTAINABLE DEVELOPMENT: Free trade and globalization vs environment and community, Obstacle of free trade

STRATEGIC APPROACHES AND LAWS TO SUSTAINABILITY: New international institutional contexts, commission on sustainable development; Environmental ethics and laws, India's move towards sustainable development.

E. TEXT BOOKS

T1.Sayer, J. and Campbell, B., "The Science of Sustainable Development: Local Livelihoods and the Global Environment" (Biological Conservation, Restoration &Sustainability), Cambridge University Press, London, 2003.

T2.Kirkby, J., O"Keefe P. and Timberlake, "Sustainable Development", Earth scan Publication, London, 1993.

F. REFERENCE BOOKS

R1.Peter P. Rogers, Kazi F. Jalal, John A. Boyd, "An introduction to sustainable development", Glen Educational Foundation, 2008

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Describe the national and global environmental, economic and social issues and the principles of different sustainable development frameworks	1	2					1					
[CO2]	Apply the sustainable development principles during the planning of developmental activities			1		1							

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Entrepreneurship and Start-Ups

Code: DIP16265

Credits-4 | Semester VI

A. Introduction:

- Acquiring Entrepreneurial spirit and resourcefulness.
- Familiarization with various uses of human resource for earning dignified means of living.
- Understanding the concept and process of entrepreneurship - its contribution and role in the growth and development of individual and the nation.
- Acquiring entrepreneurial quality, competency, and motivation.
- Learning the process and skills of creation and management of entrepreneurial venture

B. Course Outcomes: At the end of the course, students will be able to

[CO1] Understanding the dynamic role of entrepreneurship and small businesses
[CO2] Organizing and Managing a Small Business
[CO3] Financial Planning and Control
[CO4] Forms of Ownership for Small Business
[CO5] Strategic Marketing Planning

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS

INTRODUCTION TO ENTREPRENEURSHIP AND START – UPS: Definitions, Traits of an entrepreneur, Entrepreneurship, MotivationTypes of Business Structures, Similarities/differences between entrepreneurs and managers.

BUSINESS IDEAS AND THEIR IMPLEMENTATION: Discovering ideas and visualizing the business, Activity map, Business Plan

IDEA TO START-UP: Market Analysis – Identifying the target market,Competition valuation and Strategy Development,Marketing and accounting,Risk analysis.

MANAGEMENT: Company's Organization Structure,Recruitment and management of talent. Financial organization and management.

FINANCING AND PROTECTION OF IDEAS: Financing methods available for start-ups in India, Communication of Ideas to potential investors – Investor PitchPatenting and LicensesExit strategies for entrepreneurs, bankruptcy, and succession and harvesting strategy

E. TEXT BOOKS

T1.The Startup Owner's Manual: The Step-by-Step Guide for Building a Great Company Steve Blank and Bob Dorf K & S Ranch ISBN – 978-0984999392

T2.The Lean Startup: How Today's Entrepreneurs Use Continuous Innovation to Create Radically Successful Businesses Eric Ries Penguin UK ISBN – 9780670921607

F. REFERENCE BOOKS

R1.Demand: Creating What People Love Before They Know They Want It Adrian J. Slywotzky with Karl Weber Headline Book Publishing ISBN – 978-0755388974

R2.The Innovator's Dilemma: The Revolutionary Book That Will Change the Way Clayton M. Christensen

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO2
[CO1]	Understanding the dynamic role of entrepreneurship and small businesses	1											
[CO2]	Organizing and Managing a Small Business		2										
[CO3]	Financial Planning and Control			2									
[CO4]	Forms of Ownership for Small Business				2								
[CO5]	Strategic Marketing Planning					2							

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Indian Constitution

Code: DIP16266

0 Credits | Semester VI

A. INTRODUCTION:

- The objective of the Constitution of India is to establish a society where there is Justice in social, economic and political. Liberty - thought, expression, faith, belief and worship.

B. COURSE OUTCOMES: By the end of this course, students will be able to:

[CO1] Recall historical background of the Indian constitution.
[CO2] Observe importance for building democratic India, the structure of Indian government, the structure of state government, the local Administration.
[CO3] Develop the knowledge on directive principle of state policy, the knowledge in strengthening of the constitutional institutions like CAG, Election Commission and UPSC for sustaining democracy.
[CO4] Analyze the History, features of Indian constitution, the role of Governor and Chief Minister,of state election commission, decentralization of power between central, state and local self-Government.
[CO5] Assess Preamble, Fundamental Rights and Duties,Zilla Panchayat, block level organization, various commissions of viz SC/ST/OBC and women
[CO6] Create ideological framework relied upon by the framers of the Constitution of India, the system of government and role of judiciary by discussing and analyzing the rights and duties specified under the Constitution of India.

C. ASSESSMENT PLAN:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	20
	Attendance	5
	Assignment	5
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

D. SYLLABUS:

THE CONSTITUTION – INTRODUCTION:

The History of the Making of the Indian Constitution, Preamble and the Basic Structure, and its interpretation. Fundamental Rights and Duties and their interpretation , State Policy Principles

UNION GOVERNMENT:
Structure of the Indian Union, President – Role and Power, Prime Minister and Council of Ministers, Lok Sabha and Rajya Sabha

STATE GOVERNMENT:

Governor – Role and Power, Chief Minister and Council of Ministers, State Secretariat..

.**LOCAL, DISTRICT& ZILA ADMINISTRATION:**
Local Administration, District Administration , Municipal Corporation , Zila Panchayat.

ELECTION COMMISSION:

Election Commission Role and Functioning, Chief Election Commissioner , State Election Commission.

E. TEXT BOOKS

T1. 'Indian Polity' by Laxmikanth
T2. 'Indian Administration' by SubhashKashyap
T3. 'Indian Constitution' by D.D. Basu
T4. 'Indian Administration' by Avasti and Avasti

F. REFERENCE BOOKS

R1. Ethics and Politics of the Indian Constitution Rajeev Bhargava Oxford University Press, New Delhi, 2008
R2. The Constitution of India B.L. FadiaSahityaBhawan; New edition (2017)

R3. Introduction to the Constitution of India DD Basu Lexis Nexis; Twenty-Third 2018 edition

G. Course Articulation Matrix: (Mapping of COs with POs)

CO	STATEMENT	CORRELATION WITH PROGRAM OUTCOMES										CORRELATION WITH PROGRAM SPECIFIC OUTCOMES	
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PSO 1	PSO 2
[CO1]	Recall historical background of the Indian constitution.					3	2	2					
[CO2]	Observe importance for building democratic India, the structure of Indian government, the structure of state government, the local Administration.					3	1	2					
[CO3]	Develop the knowledge on directive principle of state policy, the knowledge in strengthening of					3		2					
[CO4]	Analyze the History, features of Indian constitution, the role of Governor and Chief Minister, of government.					3		2		2			
[CO5]	Assess Preamble, Fundamental Rights and Duties ,Zilla Panchayat, block level organization,					3	2	2		2			
[CO6]	Create ideological framework relied upon by the framers of the Constitution of India, the system of government and role of judiciary by discussing and analyzing the rights and duties specified under the Constitution of India.					2		3					

1- Low Correlation; 2- Moderate Correlation; 3- Substantial Correlation

Subject: Seminar

Code: DIP16274

1 Credits | Semester VI

A. Introduction:

- The students with consultation with faculty adviser shall arrive at topic of seminar based on exhaustive literature review, current civil engineering scenario, latest techniques or materials etc.
- The students shall review available information and compile the information.
- The students shall prepare technical report.
- The students shall present their seminar to the review committee.
- The seminar topic shall be chosen during the 2nd week of the semester.
- The review and organizing the seminar shall be completed during 6th week.
- The seminar report shall be submitted during 10th week.
- The presentation will be held during 12th week.
- The award of marks is based on the following criteria
    - Selection of Topic for the seminar and its relevance -10%
    - The quality of Seminar Report- 40%
    - Presentation skills and depth of knowledge - 30%
    - Viva and discussion - 20%

B. Course Outcomes:

The students will be able to:

[CO.1]. Appraise the current engineering research/ techniques / developments /interdisciplinary areas.
[CO.1]. Formulate seminar topic by utilizing technical resources/ Journals/ web sources.
[CO.1]. Carry out detailed review of available literature.
[CO.1]. Compose technical report.
[CO.1]. Demonstrate command of voice modulation, voice projection, and pacing duringpresentation.

C. Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	15
	Attendance	
	Assignment	
End Semester Examination(ESE)	End Semester Examination	35
Total		50
Attendance	A minimum of 75% Attendance is required to be maintained by a student to be qualified for taking up the End Semester examination. The allowance of 25% includes all types of leaves including medical leaves.	

Subject:Major Project-II

Code: DIP16267

3 Credits | Semester VI

A. Introduction: The objective of this course is to prepare students to use applications of the theory and practical learned during the course. It will also help students to develop an industry or research oriented project. This course helps students how to carry out project/studies in the field of interest of the student or as given by the industry.

B .Assessment Plan:

Criteria	Description	Maximum Marks
Continuous Internal Assessment (CIA)	Internal Examination	30
End Semester Examination(ESE)	End Semester Examination	70
Total		100
Attendance	Completion of Internship during the Summer vacation	

GUIDELINES FOR INTERNSHIP

Major Project-II should be based on real/ live problems of the Industry/Govt./NGO/ MSME/Rural Sector or an innovative idea having the potential of a Startup