SRI VASAVI ENGINEERING COLLEGE (Autonomous)

(Permanent Affiliation to JNTUK, Kakinada),
PEDATADEPALLI, TADEPALLIGUDEM-534 101

A.Y: 2025-26

III SEM CSE Handbook
(V23 Regulation)

Department of Computer Science and Engineering (Accredited by NBA)

Pedatadepalli, Tadepalligudem-534101, A.P

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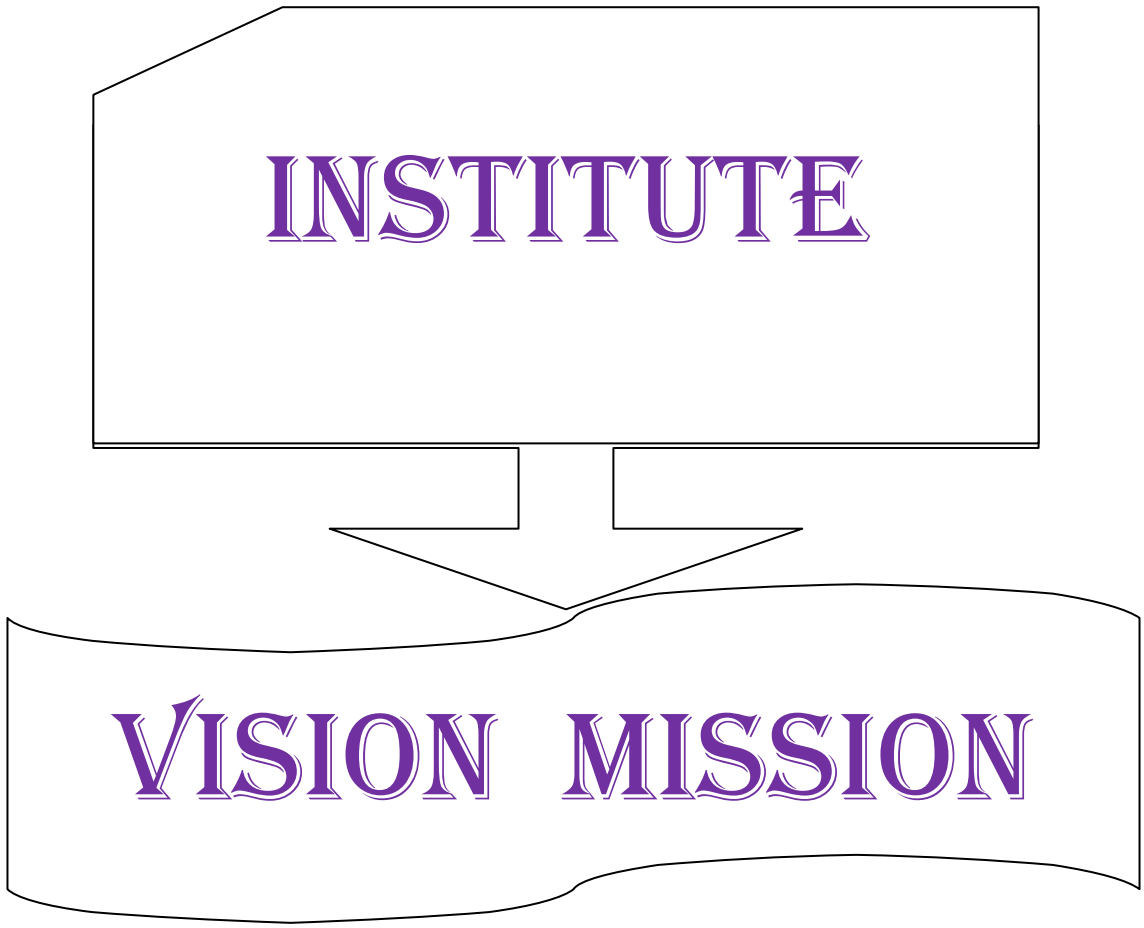
INSTITUTE
VISION MISSION

INSTITUTE VISION AND MISSION

VISION

To be a premier technological institute striving for excellence with global perspective and commitment to the nation.

MISSION

- To produce engineering graduates of professional quality and global perspective through Learner Centric Education.
- To establish linkages with government, industry and research laboratories to promote R&D activities and to disseminate innovations.
- To create an eco-system in the institute that leads to holistic development and ability for life-long learning.


DEPARTMENT
VISION
MISSION

DEPARTMENT
VISION AND MISSION

Vision:

- To evolve as a centre of academic and research excellence in the area of Computer Science and Engineering.

Mission:

- To utilize innovative learning methods for academic improvement.
- To encourage higher studies and research to meet the futuristic requirements of Computer Science and Engineering.
- To inculcate Ethics and Human values for developing students with good character

PROGRAMME EDUCATIONAL OBJECTIVES, PROGRAMME OUTCOMES & PROGRAMME SPECIFIC OUTCOMES

Program Educational Objectives (PEOs): Graduates of this programme will

PEO 1: Adapt to evolving technology.

PEO 2: Provide optimal solutions to real time problems.

PEO 3: Demonstrate his/her abilities to support service activities with due consideration for Professional and Ethical Values.

Programme Specific Outcomes (PSO s): A graduate of the Computer Science and Engineering Program will be able to:

PSO 1: Use Mathematical Abstractions and Algorithmic Design along with Open Source Programming tools to solve complexities involved in Programming. [K3]

PSO 2: Use Professional engineering practices and strategies for development and maintenance of software. [K3]

Program Outcomes (POs): Computer Science Engineering Graduates will be able to:

1. **Engineering knowledge**: Apply the knowledge of Mathematics, Science, Engineering Fundamentals and Concepts of Computer Science Engineering to the solution of complex Engineering problems. **[K3]**

2. **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of Mathematics, Natural Sciences and Computer Science. **[K4]**

3. **Design/development of solutions**: Design solutions for complex engineering problems and design system components or processes that meet the specific needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations. **[K5]**

4. **Conduct investigations of complex problems**: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. **[K5]**

5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex Engineering activities with an understanding of the limitations**.** **[K3]**

6. **The Engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional Engineering practice. **[K3]**

7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. **[K3]**

8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the Engineering practice. **[K3]**

9. **Individual and team work**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. **[K6]**

10. **Communication**: 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. **[K2]**

11. **Project management and finance**: Demonstrate knowledge and understanding of the Engineering and Management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. **[K6]**

12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. **[K1]**

ACADEMIC CALENDAR

✉ : principal@srivasavienegg.ac.in
svec.a8@gmail.com

☎: 08818- 284344, 355

SRI VASAVI ENGINEERING COLLEGE (AUTONOMOUS)
(Sponsored by Sri Vasavi Educational Society)
(Approved by AICTE, New Delhi & Permanently affiliated to JNTUK, Kakinada)
(Accredited by NAAC with 'A' Grade ,Recognized by UGC under section 2(f) & 12(B))
(**NBA** Accreditation to B.Tech., EEE,CSE, ME and ECE Branches for 3 Years)
Pedatadepalli, **TADEPALLIGUDEM** – 534 101. W.G.Dist. **(A.P)**

Principal's Office
Date: 02-06-2025

Academic Calendar
For II B.Tech (III and IV Semesters), Academic Year 2025-26

Description	From	To	Weeks
III Semester			
Commencement of Class Work	**07.07.2025**		
I Unit of Instructions	07.07.2025	30.08.2025	8 W
I Mid Examinations	01.09.2025	06.09.2025	1 W
II Unit of Instructions	08.09.2025	01.11.2025	8 W
II Mid Examinations	03.11.2025	08.11.2025	1 W
Preparation & Practicals	10.11.2025	15.11.2025	1 W
End Examinations	17.11.2025	29.11.2025	2 W
Commencement of Next Semester Class Work (IV Semester)	**01.12.2025**		
IV Semester			
I Unit of Instructions	01.12.2025	24.01.2026	8 W
I Mid Examinations	27.01.2026	31.01.2026	1 W
II Unit of Instructions	02.02.2026	28.03.2026	8 W
II Mid Examinations	30.03.2026	04.04.2026	1 W
Preparation & Practicals	06.04.2026	11.04.2026	1 W
End Examinations	13.04.2026	25.04.2026	2 W
Community Service Project	27.04.2026	13.06.2026	8 W
Commencement of Next Semester Class Work (V Semester)	**15.06.2026**		

PRINCIPAL

Copy to : ALL

Vision
To be a premier technological institute striving for excellence with global perspective and commitment to the nation.

Mission
- To produce Engineering graduates of professional quality and global perspective through learner-centric education.
- To establish linkages with government, industry and Research laboratories to promote R&D activities and to disseminate innovations.
- To create an eco-system in the institute that leads to holistic development and ability for life-long learning.

SRI VASAVI ENGINEERING COLLEGE (Autonomous)

Pedatadepalli, TADEPALLIGUDEM-534 101, W.G. Dist.

Department Of Computer Science &Engineering(Accredited by NBA)

III SEM CLASS CONSOLIDATED TIME TABLE

W.e.f. 07.07.2025

Section – A **Class Coordinator: Mrs. Y Sunitha** **Room: B-301**

Periods / Time / Day	1 (09.30 AM-10.30 AM)	2 (10.30 AM-11.20 AM)	3 (11.20 AM-12.10 PM)	4 (12.10 PM-01.00 PM)	1:00PM 2:00PM	5 (02.00 PM-02.50 PM)	6 (02.50 PM-03.40 PM)	7 (03.40 PM-04.30 PM)
Mon	OOPTJ	MEFA	DLCO	DMGT	LUNCH BREAK	ADSAA	**PCS-I**	
Tue	ADSAA	DMGT	DTI	DLCO		OOPTJ	MEFA	**Sports**
Wed	MEFA	**OOPTJ Lab**				DMGT	DLCO	ADSAA
Thu	DLCO	OOPTJ	ADSAA	MEFA		**ADSAA Lab**		
Fri	DMGT	DLCO	OOPTJ	**Library**		DTI	DTI	MEFA
Sat	**PP Lab**	**PP Lab**				ADSAA	OOPTJ	DMGT

Section – B **Class Coordinator: M V V Gopala Krishna Murthy** **Room: B-302**

Periods / Time / Day	1 (09.30 AM-10.30 AM)	2 (10.30 AM-11.20 AM)	3 (11.20 AM-12.10 PM)	4 (12.10 PM-01.00 PM)	1:00PM 2:00PM	5 (02.00 PM-02.50 PM)	6 (02.50 PM-03.40 PM)	7 (03.40 PM-04.30 PM)
Mon	DMGT	ADSAA	OOPTJ	MEFA	LUNCH BREAK	**OOPTJ Lab**		
Tue	OOPTJ	**PP Lab**				DMGT	DLCO	ADSAA
Wed	DLCO	**PCS-I**		ADSAA		DMGT	MEFA	**PP Lab**
Thu	ADSAA	MEFA	DLCO	**Library**		OOPTJ	DLCO	DMGT
Fri	MEFA	**ADSAA Lab**				DMGT	OOPTJ	OOPTJ
Sat	DTI	DLCO	MEFA	ADSAA		DTI	DTI	**Sports**

Section – C **Class Coordinator: Mr. N.V.Murali Krishna Raja** **Room: B-303**

Periods / Time / Day	1 (09.30 AM-10.30 AM)	2 (10.30 AM-11.20 AM)	3 (11.20 AM-12.10 PM)	4 (12.10 PM-01.00 PM)	1:00PM 2:00PM	5 (02.00 PM-02.50 PM)	6 (02.50 PM-03.40 PM)	7 (03.40 PM-04.30 PM)
Mon	DLCO	**PCS-I**		ADSAA	LUNCH BREAK	MEFA	OOPTJ	DLCO
Tue	MEFA	DLCO	ADSAA	DMGT		**ADSAA Lab**		
Wed	**PP Lab**	DMGT	MEFA	DLCO		OOPTJ	DMGT	**Library**
Thu	DMGT	MEFA	OOPTJ	ADSAA		**PP Lab**		
Fri	ADSAA	ADSAA	OOPTJ	DMGT		MEFA	DLCO	DTI
Sat	OOPTJ	**OOPTJ Lab**				DTI		**Sports**

Section –D **Class Coordinator: Mr. B Bhasker Murali Krishna** **Room: B-304**

Periods / Time / Day	1 (09.30 AM-10.30 AM)	2 (10.30 AM-11.20 AM)	3 (11.20 AM-12.10 PM)	4 (12.10 PM-01.00 PM)	1:00PM 2:00PM	5 (02.00 PM-02.50 PM)	6 (02.50 PM-03.40 PM)	7 (03.40 PM-04.30 PM)
Mon	DMGT	ADSAA	MEFA	DTI	LUNCH BREAK	**PP Lab**		
Tue	DLCO	**OOPTJ Lab**				OOPTJ	DMGT	MEFA
Wed	OOPTJ	DMGT	ADSAA	MEFA		**ADSAA Lab**		
Thu	ADSAA	OOPTJ	DMGT	DLCO		DLCO	DTI	
Fri	**PP Lab**	OOPTJ	MEFA	DLCO		DMGT	ADSAA	**Library**
Sat	MEFA	**PCS-I**		DLCO		ADSAA	OOPTJ	**Sports**

Section –E **Class Coordinator: Mrs. A. Naga Jyothi** **Room: B-202**

Periods / Time / Day	1	2	3	4	1:00PM 2:00PM	5	6	7
	(09.30 AM-10.30 AM)	(10.30 AM-11.20 AM)	(11.20 AM-12.10 PM)	(12.10 PM-01.00 PM)		(02.00 PM-02.50 PM)	(02.50 PM-03.40 PM)	(03.40 PM-04.30 PM)
Mon	OOPTJ	**OOPTJ Lab**			LUNCH BREAK	DMGT	ADSAA	MEFA
Tue	MEFA	DMGT	DLCO	ADSAA		OOPTJ	DTI	
Wed	DLCO	MEFA	DLCO	DMGT		PP Lab	OOPTJ	**Library**
Thu	DLCO	**ADSAA Lab**				**PCS-I**		OOPTJ
Fri	DMGT	DTI	OOPTJ	ADSAA		MEFA	ADSAA	**Sports**
Sat	ADSAA	**PP Lab**				DMGT	MEFA	DLCO

Head of the Department

Head of the Department
Dept. of Computer Science & Engineering
Sri Vasavi Engineering College
TADEPALLIGUDEM-534 101

Staff Details:

S. No.	*Course Code*	*Course Name*	*A*	*B*	*C*	*D*	*E*
1.	V23MAT05	Discrete Mathematics & Graph Theory **(DMGT)**	Dr. V.S.Naresh	Mr. N.V.M Krishna Raja	Mr. N.V.M Krishna Raja	Dr. V.S.Naresh	Mr. N.V.Murali Krishna Raja
2.	V23MBT51	Managerial Economics and Financial Analysis **(MEFA)**	Mrs. V. Sandhya	Mr. D. Satyanarayana	Mrs. V. Sandhya	Dr. K. Rambabu	Dr. K. Rambabu
3.	V23CST03	Digital Logic & Computer Organization **(DLCO)**	Mrs. Y Sunitha	Mrs. Y Sunitha	Mrs. Y Sunitha	Mrs.M Vineela	Mrs.M Vineela
4.	V23CST04	Advanced Data Structures & Algorithm Analysis**(ADSAA)**	Mrs. B.Sri Ramya	Mrs. B.Sri Ramya	Mr. K. Lakshmi Narayana	Mr. K. Lakshmi Narayana	Mrs. A. Naga Jyothi
5.	V23CST05	Object Oriented Programming Through Java **(OOPTJ)**	Dr. K. Shirin Bhanu	Dr. K. Shirin Bhanu	Mr. G. Nataraj	Mr. G. Nataraj	Mr.L Atri Datta Ravi Tez
6.	V23CSL04	Advanced Data Structures and Algorithm Analysis Lab **(ADSAA Lab)**	Mrs. B.Sri Ramya / Mr. G. Nataraj	Mrs. B.Sri Ramya / Mr. K Phanindra Brahmaji	Mr. K. Lakshmi Narayana / Ms. Ch N P Latha	Mr. K. Lakshmi Narayana / Mrs. M Vineela	Mrs. A. Naga Jyothi / K Sai Ektha Kumar
7.	V23CSL05	Object Oriented Programming Through Java Lab **(OOPTJ Lab)**	Dr. K. Shirin Bhanu / Mrs. B.Sri Ramya	Dr. K. Shirin Bhanu / Mr. K Praveen Kumar	Mr. G. Nataraj / Mr. N V M K Raja	Mr. G. Nataraj / Dr. K. Shirin Bhanu	Mr.L Atri Datta Ravi Tez / Ms. Y Divya Vani
8.	V23CSSE01	***Skill Enhancement Course:*** Python Programming Lab **(PP Lab)**	Mr. K. Lakshmi Narayana / Mr. Syed Akheel Hassan Gori	Mr. E Hanuman Sai Guptha / Mr.L Atri Datta Ravi Tez	Mr. E Hanuman Sai Guptha / Mr. M V V Gopala Krishna Murthy	Mr.Md. Sadik / Mr. M V V Gopala Krishna Murthy	Mr.Md. Sadik / Mrs. Y. Divyavani
9.	V23MET09	Design Thinking & Innovation **(DTI)**	M V V Gopala Krishna Murthy	M V V Gopala Krishna Murthy	Mr. B Bhasker Murali Krishna	Mr. B Bhasker Murali Krishna	Mr. P. Rama Mohan Rao
10.	V23ENT02	Professional Communication Skills - I **(PCS-I)**	Ms. A Kiranmayee/ Mr. G Srinivasa Rao	Mr. M Venkata Ramana / Ms. A Kiranmayee	Mr. M Venkata Ramana / Dr. B Ananda Rao	Mrs. Ch Tanuja / Dr. K Venkata Rao	Ms. A Kiranmayee / Dr. B Ananda Rao

Lab Venues:

S. No.	Name of the Lab	Lab Venue
1	Advanced Data Structures and Algorithm Analysis Lab **(ADSAA Lab)**	E F CODD Lab (CSE-B Block Ground Floor)
2	Object Oriented Programming Through Java **(OOPs through Java Lab)**	
3.	Python Programming Lab **(PP Lab)**	JAMES GOSLING Lab(CSE-B Block Ground Floor) - CSE-A
		JAMES GOSLING Lab (CSE-A and CSE-C)
		PG CP Lab (CSE-B, CSE-D, CSE-E &CST)

COURSE STRUCTURE

SEMESTER-III (SECOND YEAR)

S.No.	Course Code	Name of the Course		L	T	P	C
1	V23MAT05	Discrete Mathematics & Graph Theory	BS&H	3	0	0	3
2	V23MBT51	Managerial Economics and Financial Analysis	Management Course- I	2	0	0	2
3	V23CST03	Digital Logic & Computer Organization	ESC	3	0	0	3
4	V23CST04	Advanced Data Structures & Algorithm Analysis	PCC	3	0	0	3
5	V23CST05	Object Oriented Programming Through Java	PCC	3	0	0	3
6	V23CSL04	Advanced Data Structures and Algorithm Analysis Lab	PCC	0	0	3	1.5
7	V23CSL05	Object Oriented Programming Through Java Lab	PCC	0	0	3	1.5
8	V23CSSE01	Python Programming Lab	Skill Enhancement Course	0	1	2	2
9	V23MET09	Design Thinking & Innovation	BS&H	1	0	2	2
10	V23ENT02	Professional Communication Skills - I	Audit Course	2	0	0	0
			Total	**17**	**1**	**10**	**21**

LESSON PLANS

Discrete Mathematics and Graph Theory

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C,D & E**
Name of the Course: Discrete Mathematics and Graph Theory
Course Code: V23MAT05

LESSON PLAN

Course Outcomes (Along with Knowledge Level): After completion of this course, Student will be able to:

S. No.	CO. No.	Course Outcome	BTL
1.	CO1	Develop skills required for solving mathematical problems using mathematical logic.	K3
2.	CO2	Demonstrate the set theory principles, relations and functions in real-time situations.	K3
3.	CO3	Apply the knowledge of combinatorics and recurrence relations in formulating and solving complex problems.	K3
4.	CO4	Apply the graph theory principles and techniques in computer science-related problems.	K3
5.	CO5	Find shortest paths and minimal spanning trees using prim's and Kruskal's algorithms, BFS and DFS algorithms.	K3

Text Books:

1. Discrete Mathematical Structures with Applications to Computer Science, J.P. Tremblay and P. Manohar, Tata McGraw Hill.
2. Elements of Discrete Mathematics-A Computer Oriented Approach, C.L.Liuand D. P. Mohapatra, 3rd Edition, Tata McGraw Hill.
3. The ory and Problems of Discrete Mathematics, Schaum's Outline Series, Seymour Lipschutz and Marc Lars Lipson, 3rd Edition, McGraw Hill.

Reference Books:

1. Discrete Mathematics for Computer Scientists and Mathematicians, J.L.Mott, A.Kandel and T. P. Baker, 2nd Edition, Prentice Hall of India.
2. Discrete Mathematical Structures, Bern and Kolman, Robert C. Bus by and Sharon Cutler Ross, PHI.
3. Discrete Mathematics, S.K. Chakraborthy and B.K.Sarkar, Oxford,2011.
4. Discrete Mathematics and its Applications with Combinatorics and Graph Theory, K.H.Rosen,7th Edition,Tata Mc GrawHill.

Targeted Proficiency and attainment Levels (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4	CO5
Targeted Proficiency Level		60	60	60	60	60
Targeted level of Attainment	**Level 3**	60	60	60	60	60
	Level 2	50	50	50	50	50
	Level 1	40	40	40	40	40

Lecture Plan:

Unit -I

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching aids
1.	CO1	Dissemination of Vision, Mission, PEOs, POs,PSOs		1	Lecture	BB
2.		**Mathematical Logic:** Define Statements and their Notations, Connectives	K1	1	Lecture	BB
3.		Describe Well Formed Formulas, Truth Tables, Tautologies	K2	1	Lecture with Discussion	BB
4.		Explain equivalence of Formulas	K2	2	Lecture	BB
5.		State duality Law, Tautological implications	K1	1	Lecture with Discussion	BB
6.		Explain normal forms	K2	2	Lecture	BB
7.		Illustrate theory of inference for statement calculus	K3	2	Lecture	BB
8.		Practice Consistency of Premises , Indirect method of proof	K3	2	Lecture	BB
9.		**Predicate Calculus:** Identify Predicates, Predicative Logic, Statement Functions	K2	1	Lecture with Discussion	BB
10.		Recognize Variables and Quantifiers, Free and Bound Variables	K2	2	Lecture	BB
11.		Illustrate Inference Theory for Predicate Calculus.	K3	2	Lecture	BB
		Total		**17**		

UNIT-2

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching aids
1.	CO 2	**Set Theory and Relations:** Define basic concepts	K1	1	Lecture	BB
2.		Illustrate operations on binary sets	K2	1	Lecture	BB
3.		Use principle of inclusion and exclusion	K3	1	Lecture	BB
4.		Describe Relation and properties of binary relations on a set and Transitive Closure	K2	2	Lecture	BB

5.		Sketch out relation matrix and digraph	K3	1	Lecture with Discussion	BB
6.		Practice equivalence, compatibility, and partial ordering relations	K3	2	Lecture with Discussion	BB
7.		Construct hasse diagrams, lattice and state its properties.	K3	2	Lecture	BB
8.		**Functions:** Illustrate Bijective, Composition, Inverse, Permutation, and Recursive Functions	K3	3	Lecture	BB
		Total		**13**		

UNIT-3

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching aids
1.	**CO3**	**Combinatorics:** Explain Basis of Counting	K2	1	Lecture	BB
2.		Solve Permutations, Permutations with Repetitions	K3	1	Lecture with discussion	BB
3.		Solve Circular and Restricted Permutations	K3	1	Lecture with discussion	BB
4.		Solve Combinations, Restricted Combinations	K3	1	Lecture with discussion	BB
5.		Discuss Binomial and Multinomial Coefficients and Theorems	K2	2	Lecture with discussion	BB
6.		**Recurrence Relations** Explain Generating of functions	K2	2	Lecture	BB
7.		Calculate Coefficient of generating functions	K3	2	Lecture	BB
8.		Explain Recurrence relations	K2	1	Lecture with discussion	BB
9.		Solve homogeneous Recurrence relations by method of substitution	K3	1	Lecture	BB
10.		Solve homogeneous Recurrence relations by Generating functions	K3	2	Lecture with discussion	BB
11.		Solve Recurrence relations by method of characteristic roots	K3	1	Lecture with discussion	BB
12.		Solve inhomogeneous recurrence relations	K3	2	Lecture	BB
		Total		**17**		

UNIT-4

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching aids
1.	**CO 4**	Describe basic concepts of graphs	K1	1	Lecture with Discussion	BB
2.		Explain Graph Theory and its Applications	K2	1	Lecture with Discussion	BB
3.		Illustrate matrix representation of graphs, Adjacency matrices, Incidence matrices	K2	1	Lecture	BB
4.		Find subgraph, isomorphic graphs, paths and circuits	K3	2	Lecture	BB
5.		Demonstrate Eulerian and Hamiltonian Graphs,	K3	2	Lecture with Discussion	BB
6.		Total		**7**		

UNIT-5

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching aids
1.	**CO 5**	Explain MultiGraphs, Bipartite and Planar Graphs.	K1	1	Lecture	BB
2.		Use Euler's Formula for Planar Graphs	K3	1	Lecture	BB
3.		Explain Graph Colouring and Chromatic Number	K2	1	Lecture	BB
4.		Explain tree and spanning trees	K2	2	Lecture	BB
5.		Sketch Minimal spanning trees using Kruskal's algorithms	K3	2	Lecture	BB
6.		Sketch Minimal spanning trees using Prim's algorithms	K3	2	Lecture	BB
7.		Construct BFS	K3	2	Lecture	BB
8.		Construct DFS	K3	2	Lecture	BB
9.		Total		**13**		

Total No. of Classes: 67

Managerial Economics and Financial Analysis

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C, D&E**
Name of the Course: Managerial Economics and Financial Analysis
Course Code: V23MBT51

LESSON PLAN

Course Outcomes (Along with Knowledge Level): After completion of this course, Student will be able to:

S. No	CO. No	Course Outcomes	BTL
1.	CO1	Understanding the basic concepts of managerial economics, demand, elasticity of demand and methods of demand forecasting.	**K2**
2.	CO2	Interpret production concept, least cost combinations and various costs concepts in decision making.	**K3**
3.	CO3	Differentiate various Markets and Pricing methods along with Business Cycles.	**K2**
4.	CO4	Prepare financial statements and its analysis.	**K3**
5.	CO5	Assess various investment project proposals with the help of Capital Budgetir techniques for decision making	**K3**

Text Books:

1. Dr. N. Appa Rao, Dr. P. Vijay Kumar: 'Managerial Economics and Financial Analysis', Cengage Publications, New Delhi – 20112.
2. Dr. A. R. Aryasri – Managerial Economics and Financial Analysis, TMH 2011.

Reference Books:

1 Dr. B. Kuberudu and Dr. T. V. Ramana: Managerial Economics &Financial Analysis,Himalaya Publishing House, 2014
2. S. A. Siddiqui; A. S. Siddiqui: Managerial Economics and Financial Analysis, New AgeInternational Publishers, 2012.

Targeted Proficiency and attainment Levels (for each Course Outcome):

COs		CO1	CO2	CO3	CO4	CO5
Targeted Proficiency Level		60	60	60	60	60
Targeted level of Attainment	**Level 3**	60	60	60	60	60
	Level 2	50	50	50	50	50
	Level 1	40	40	40	40	40

Lecture Plan:

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching aids
1.	CO1	Define managerial economics	K1	1	Lecture Discuss	IFP
2.		Describe ME with other disciplines	K1	1	Lecture	IFP
3.		Explain Nature and scope of managerial economics	K2	1	Lecture	IFP
4.		Define Demand	K1	1	Lecture Discuss	IFP
5.		Describe law of demand	K2	1	Lecture	IFP
6.		Explain Elasticity of demand	K2	2	Lecture	IFP
7.		Find the of elasticity of demand	K2	2	Lecture	IFP
8.		Explain Demand forecasting, methods.	K2	2	Lecture Discuss	IFP
		Total		11		
S. No	**Course Outcome**	**Intended Learning Outcomes (ILO)**	**Knowledge Level of ILO**	**No. of Hours Required**	**Pedagogy**	**Teaching aids**
1.	CO2	State Production function	K1	1	Lecture	IFP
2.		State Isocost	K1	1	Lecture	IFP
3.		State Iso quants	K1	1	Lecture	IFP
4.		Explain Cob-Douglas production function	K2	1	Lecture Discuss	IFP
5.		Describe economies of scale	K2	1	Lecture	IFP
		Enumerate various cost concepts	K1	1	Lecture	IFP
		Solve break even analysis problems	K3	4	Lecture	IFP
		Total		**10**		
1.	CO3	Describe Different types of market structures	K1	3	Lecture	IFP
2.		Explain Price-output determination under different market structures	K2	4	Lecture	IFP
3.		Explain Pricing objectives, Cost and demand based Pricing methods	K2	2	Lecture	IFP
4.		Describe competition, strategy based pricing methods.	K2	2	Lecture	IFP

5.		State the meaning and features of business cycles	K1	1	Lecture	IFP
6.		Describe the Phases of business Cycles.	K2	2	Lecture	IFP
		Total		**14**		
1.	**CO4**	Describe double entry system	K2	3	Lecture	IFP
2.		Preparation of financial statements	K3	4	Lecture	IFP
3.		Interpretation of financial statements by using, Ratios.	K3	6	Lecture	IFP
		Total		**13**		
1.	**CO5**	Define Capital	K1	1	Lecture	IFP
2.		Explain significance of of capital budgeting	K1	1	Lecture	IFP
3.		Explain capital budgeting, Process	K2	4	Lecture	IFP
4.		Apply capital budgeting techniques	K3	4	Lecture	IFP
		Total		**10**		

Total No. of Classes: 58

DIGITAL LOGIC & COMPUTER ORGANIZATION

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C,D&E**
Name of the Course: DIGITAL LOGIC & COMPUTER ORGANIZATION
Course Code: V23CST03

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No.	CO No.	Course Outcome	BTL
1.	CO1	Explain different Data Representation and various Combinational Digital Logic Circuits.	K2
2.	CO2	Explain various Sequential Digital Logic Circuits and Basic Structure of Computers.	K2
3.	CO3	Describe the Computer Arithmetic and basic concepts of Processor Organization	K2
4.	CO4	Illustrate different types of Memory.	K2
5.	CO5	Demonstrate the ways of accessing various Interfacing devices with processor.	K3

Text Books:

1. Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 6th edition, McGraw Hill
2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education.
3. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson.

Reference Books:

1. Computer Systems Architecture, M.Moris Mano, 3rdEdition, Pearson.
2 Computer Organization and Design, David A. Paterson, John L.Hennessy, Elsevier
3. Fundamentals of Logic Design, Roth, 5thEdition, Thomson.

Targeted Proficiency and attainment Levels (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4	CO5
Targeted Proficiency Level		60	60	60	60	60
Targeted level of Attainment	Level 3	60	60	60	60	60
	Level 2	50	50	50	50	50
	Level 1	40	40	40	40	40

Lecture Plan:

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO 1	Dissemination of Vision, Mission of the Dept. and PEOs, Pos, & PSOs of the Programme		1	Lecture	BB/ICT
		Data Representation: Digital Logic Circuits-I:				
2.		Explain Binary Numbers.	K2	3	Lecture & Active Learning	BB/ICT
3.		Explain Fixed Point Representation.	K2	1	Lecture & Active Learning	BB/ICT
4.		Explain Floating Point Representation.	K2	1	Lecture & Active Learning	BB/ICT
5.		Describe Signed binary umbers.	K1	1	Lecture & Active Learning	BB/ICT
6.		Explain Basic Logic Functions, Logic gates	K2	2	Lecture & Gamification	BB/ICT
7.		Describe Minimization of Logic expressions.	K2	1	Lecture & Flipped Classroom	BB/ICT
8.		Describe K-Map Simplification.	K1	2	Lecture & Collaborative Learning	BB/ICT
9.		Illustrate the Combinational Circuits, Decoders, Multiplexers	K2	2	Lecture with Discussion	BB/ICT
		Total		**14**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
	CO 2	**Digital Logic Circuits-II: Basic Structure of Computers:**				
1.		Explain Sequential Circuits, Flip-Flops,	K2	2	Lecture with Discussion	BB/ICT
2.		Explain Binary counters, Registers.	K2	2	Lecture with Discussion	BB/ICT
3.		Explain Shift Registers, Ripple counters	K2	2	Lecture	BB/ICT
4.		Explain Computer Types, Functional units, Basic operational Concepts	K2	2	Peer Instruction	BB/ICT
5.		Explain Bus structures, Software, Performance	K2	2	Lecture with Discussion	BB/ICT
6.		Explain multiprocessors and multi computers.	K2	1	Lecture with Discussion	BB/ICT

7.		Explain Computer Generations, Von- Neumann Architecture	K2	2	Peer Instruction & Lecture with Discussion	BB/ICT
		Total		**13**		

S .No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
		Computer Arithmetic : Processor Organization:				
1.	**CO 3**	Describe The Addition and Subtraction of Signed Number	K1	1	Lecture with Discussion & Peer Instruction	BB/ICT
2.		Explain Design of Fast Adders, Multiplication of Positive Numbers	K2	2	Lecture with Discussion	BB/ICT
3.		Explain Signed-operand Multiplication, Fast Multiplication, Integer Division,	K2	2	Lecture with Discussion.	BB/ICT
4.		Describe Floating-Point Numbers and Operations	K1	1	Lecture & Active Learning	BB/ICT
5.		Describe the Fundamental Concepts in execution of instruction.	K1	1	Lecture	BB/ICT
6.		Describe the Execution of instruction involves register transfer.	K1	1	Lecture with Discussion	BB/ICT
7.		Explain the multiple bus organization.	K2	1	Lecture with Discussion	BB/ICT
8.		Illustrate the hardwired control unit.	K2	1	Lecture with Discussion	BB/ICT
9.		Illustrate the micro programmed control unit.	K2	2	Lecture with Discussion	BB/ICT
		Total		**12**		

S .No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
		The Memory Organization:				
1.	**CO 4**	Describe Basic Concepts of Memory.	K1	1	Lecture	BB/ICT
2.		Discuss Semi Conductor RAM Memories.	K2	1	Lecture with Discussion	BB/ICT
3.		Discuss Read Only Memories.	K2	1	Lecture with Discussion.	BB/ICT
4.		Describe Speed, Size and Cost of memories.	K1	1	Lecture with Discussion & Problem Based Learning	BB/ICT
5.		Illustrate the cache memory organization of computer	K2	2	Lecture with Discussion	BB/ICT
6.		Explain-Performance Considerations	K2	1	Lecture with Discussion	BB/ICT
7.		Illustrate Virtual Memories	K2	2	Lecture with Discussion	BB/ICT
8.		Explain Memory-Management Requirements.	K2	1	Lecture with Discussion	BB/ICT
9.		Explain Secondary Storage	K2	2	Lecture with Discussion	BB/ICT
		Total		**12**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
		Input/ Output Organization:				
1.	**CO 5**	Describe the Accessing of I/O Devices.	K1	1	Lecture	BB/ICT
2.		Demonstrate interrupt of I/O Devices.	K2	2	Lecture with Discussion	BB/ICT
3.		Discuss Read Only Memories.	K2	1	Lecture with Discussion	BB/ICT
4.		Describe Speed, Size and Cost of memories.	K1	1	Lecture with Discussion & Problem Based Learning	BB/ICT
5.		Illustrate the cache memory organization of computer	K2	2	Lecture with Discussion	BB/ICT
6.		Explain-Performance Considerations	K2	1	Lecture with Discussion	BB/ICT
		Total		**8**		

Total No. of Classes: 63

Advanced Data Structures and Algorithm Analysis

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C,D &E**
Name of the Course: Advanced Data Structures and Algorithm Analysis
Course Code: V23CST04

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No	CO. No	Course Outcomes	BTL
1.	CO1	Demonstrate asymptotic notations and nonlinear data structures like AVL Trees and B-Trees.	**K3**
2.	CO2	Demonstrate graphs and Divide and conquer technique.	**K3**
3.	CO3	Use Greedy and Dynamic programming techniques to determine various problems.	**K3**
4.	CO4	Develop algorithms using Backtracking and Branch & Bound techniques.	**K3**
5.	CO5	Solve different graph problems using NP Hard and NP Complete Problems.	**K3**

Text Books:

1. Fundamentals of Data Structures in C++, Horowitz, Ellis; Sahni, Sartaj; Mehta, Dinesh, 2ndEdition Universities Press.
2. Computer Algorithms in C++, Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2nd Edition University Press

Reference Books:

1. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
2. An introduction to Data Structures with applications, Trembley& Sorenson, McGraw Hill
3. The Art of Computer Programming, Vol.1: Fundamental Algorithms, Donald E Knuth, Addison-Wesley, 1997.
4. Data Structures using C & C++: Langsam, Augenstein&Tanenbaum, Pearson, 1995.
5. Algorithms + Data Structures & Programs:, N.Wirth, PHI.
6. Fundamentals of Data Structures in C++: Horowitz Sahni& Mehta, Galgottia Pub.
7. Data structures in Java:, Thomas Standish, Pearson Education Asia

Targeted Proficiency Level and Targeted level of Attainment (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4	CO5
Targeted Proficiency Level		60	60	60	60	60
Targeted level of Attainment	**Level 3**	65	65	60	60	60
	Level 2	60	60	55	55	55
	Level 1	55	55	50	50	50

LESSON PLAN

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO1	Describe Asymptotic Notations with examples.	K2	2	Lecture+ Discussion	Lecture Based Learning & Lab Based Learning
2.		Explain insertion and deletion in AVL Trees.	K2	3	Lecture+ Discussion	
3.		Construct AVL Trees.	K3	1	Lecture+	
4.		Discuss Applications of AVL Trees	K2	1	Discussion	
5.		Explain insertion and deletion in B Trees.	K2	2	Lecture	
6.		Construct B Trees of different orders.	K3	1	Lecture+ Discussion	
		Total		**10**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1	CO2	Describe Min and Max Heaps	K2	1	Lecture+ Discussion	Lecture Based Learning & Lab Based Learning
2		Illustrate operations and applications of Min and Max Heaps	K3	2	Lecture+ Discussion	
3		Discuss Graph terminology, representations, Search & Traversals	K2	4	Lecture+ Discussion	
4		Explain Connected and Bi connected Components	K2	3	Lecture	
5		Use Divide and Conquer in General Method, Quick Sort and Merge Sort	K3	4	Lecture+ Discussion	
6		Illustrate Strassen's Matrix Multiplication and Convex Hull	K3	3	Lecture	
		Total		**17**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1	CO3	Discuss Greedy and Dynamic Programming techniques.	K2	1	Lecture	Lecture Based Learning & Lab Based Learning
2		Illustrate Job Sequencing with deadlines.	K3	2	Lecture+ Discussion	
3		Explain Knapsack Problem.	K2	2	Lecture+ Discussion	
4		Construct Minimum Cost Spanning Trees using Prims and Kruskals algorithms.	K2	3	Lecture	
5		Find single source shortest path using Dijkstra's algorithm.	K2	2	Lecture	
		Total		**10**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO4	Solve Complex problems using General Method	K3	2	Lecture + Discussion	Lecture Based Learning & Lab Based Learning
2.		Illustrate Single Source Shortest Paths – General Weights (Bellman-Ford Algorithm)	K3	2	Lecture + Discussion	
3.		Construct Optimal Binary Search Trees	K3	1	Lecture + Discussion	
4.		Explain 0/1 Knapsack problem	K2	2	Lecture + Discussion	
5.		Describe String Editing	K2	1	Lecture + Discussion	
6.		Illustrate Travelling Salesperson Problem (TSP)	K3	2	Lecture + Discussion	
7.		Illustrate General Method in backtracking,	K3	1	Lecture + Discussion	
8.		Illustrate 8-Queens Problem with example	K3	2	Lecture + Discussion	
9.		Illustrate Sum of Subsets Problem,	K3	1	Lecture + Discussion	
10.		Explain Graph Coloring with example	K2	1	Lecture + Discussion	
		Total		**15**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO 5	Illustrate NP Hard and NP Complete Problems	K2	3	Lecture + Discussion	Lecture Based Learning & Lab Based Learning
2.		Explain Cook's Theorem	K3	2	Lecture + Discussion	
3.		Illustrate NP Hard Graph Problems: CDP, CNDP, TSP	K3	4	Lecture+ Discussion	
4.		Illustrate NP Hard Scheduling Problems	K3	2	Lecture+ Discussion	
5.		Illustrate Job Shop scheduling with example	K3	2	Lecture+ Discussion	
		Total		**13**		

Total No. of Classes: 65

Object Oriented Programming Through Java

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C, D & E**
Name of the Course: Object Oriented Programming Through Java
Course Code: V23CST05

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No.	CO No.	Course Outcome	BTL
1.	CO1	Demonstrate the object-oriented programming principles with Java programming environment.	K3
2.	CO2	Demonstrate the concepts like classes, objects, argument passing mechanism, overloading, and overriding.	K3
3.	CO3	Illustrate the concepts of arrays, inheritance, and interfaces.	K3
4.	CO4	Demonstrate packages, java libraries, exception handling, java I/O, and File concepts.	K3
5.	CO5	Illustrate the concepts of string handling, multithreading, and Java FX GUI.	K3

Textbooks:

1. JAVA one step ahead, Anitha Seth, B.L.Juneja, Oxford.
2. Joy with JAVA, Fundamentals of Object Oriented Programming, DebasisSamanta, Monalisa Sarma, Cambridge, 2023..
3. JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

Reference Books:

1. The complete Reference Java, 11thedition, Herbert Schildt,TMH
2. Introduction to Java programming, 7th Edition, Y Daniel Liang, Pearson

Targeted Proficiency and attainment Levels (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4
Targeted Proficiency Level		60	60	60	60
Targeted level of Attainment	**Level 3**	60	60	60	60
	Level 2	55	55	55	55
	Level 1	50	50	50	50

Lecture Plan:

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching Aids
1.	CO1	Syllabus, Cos and POs				
		Introduction to Object-Oriented Programming	K2	1	Lecture with Discussion	ICT
2.		Explain Java's Features and its History	K2	1	Lecture	ICT
3.		Discuss Java Program Structure and Syntax	K2	1	Lecture with Examples	ICT
4.		Describe Data Types, Variables, and Operators	K2	2	Lecture with Examples	ICT
5.		Explain Control Statements and Looping Constructs	K2	2	Lecture with Discussion	ICT
6.		Discuss Command Line Arguments and User Input Handling	K2	2	Lecture	ICT
7.		Illustrate the Concept of Static Variables and Methods	K2	1	Lecture	ICT
8.		Explain Java's Memory Management and Garbage Collection	K2	2	Lecture with Discussion	ICT
9.		Demonstrate Basic Java Programs	K3	3	Practical Session	ICT
10.		Discuss Programming Style and Best Practices	K2	1	Lecture	ICT
11.		Explain Type Casting and Type Promotion	K2	2	Lecture with Examples	ICT
		Total		**18**		

S. No.	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching Aids
1	CO2	Introduction to Classes and Objects	K2	1	Lecture	ICT
2		Describe Class Declaration and Object Instantiation	K2	2	Lecture with Examples	ICT
3		Explain Constructors and Constructor Overloading	K2	2	Lecture with Discussion	ICT
4		Discuss Method Overloading and Overriding	K2	2	Lecture with Examples	ICT
5		Explain the use of the this Keyword	K2	1	Lecture	ICT
6		Illustrate Access Modifiers and Access Control	K2	1	Lecture	ICT
7		Discuss Passing Arguments by Value and Reference	K2	2	Lecture with Examples	ICT
8		Explain Nested and Inner Classes	K2	1	Lecture	ICT
9		Demonstrate Object Cloning and Copying Objects	K3	2	Practical Session	ICT
10		Discuss Final Classes and Methods	K2	1	Lecture	ICT

11		Illustrate Real-world Applications of Classes and Objects	K3	2	Practical Session	ICT
		Total		**17**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching Aids
1	**CO3**	Introduction to Arrays	K2	1	Lecture	ICT
2		Discuss Array Declaration and Initialization	K2	2	Lecture with Examples	ICT
3		Explain Two-dimensional and Multidimensional Arrays	K2	2	Lecture with Examples	ICT
4		Illustrate Array Operations and Methods	K2	2	Lecture	ICT
5		Explain the Concept of Inheritance and its Types	K2	2	Lecture with Examples	ICT
6		Discuss Method Overriding and Dynamic Method Dispatch	K2	2	Lecture with Discussion	ICT
7		Illustrate the Use of the super Keyword and Constructor Chaining	K2	2	Lecture with Examples	ICT
8		Explain Interfaces and Abstract Classes	K2	2	Lecture with Examples	ICT
9		Discuss Implementing Multiple Interfaces	K2	1	Lecture	ICT
10		Demonstrate Real-world Applications of Inheritance and Interfaces	K3	2	Practical Session	ICT
		Total		**18**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching Aids
1.	**CO4**	Introduction to Packages and Access Control	K2	1	Lecture	ICT
2.		Discuss Importing and Creating Packages	K2	2	Lecture with Examples	ICT
3.		Explain Java's Built-in Packages (java.lang, java.util, etc.)	K2	2	Lecture	ICT
4.		Discuss Exception Handling Mechanisms	K2	2	Lecture with Examples	ICT
5.		Explain the Use of try, catch, and finally Blocks	K2	2	Lecture	ICT
6.		Illustrate Custom Exceptions and Exception Hierarchies	K2	2	Lecture with Discussion	ICT
7.		Explain Java I/O and File Handling Concepts	K2	2	Lecture with Examples	ICT
8.		Discuss Byte Streams and Character Streams	K2	2	Lecture with Examples	ICT

9.		Demonstrate File I/O Operations	K3	2	Practical Session	ICT
		Total		**17**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours Required	Pedagogy	Teaching Aids
1.	**CO5**	Introduction to Strings and String Handling	K2	1	Lecture	ICT
2.		Discuss String Methods and Operations	K2	2	Lecture with Examples	ICT
3.		Explain StringBuffer and StringBuilder Classes	K2	2	Lecture with Discussion	ICT
4.		Illustrate Regular Expressions and Pattern Matching	K2	2	Lecture	ICT
5.		Explain Multithreading and Concurrency Concepts	K2	2	Lecture with Examples	ICT
6.		Discuss Creating Threads and Thread Lifecycle	K2	2	Lecture	ICT
7.		Illustrate Synchronization and Inter-thread Communication	K2	2	Lecture with Discussion	ICT
8.		Explain Java FX GUI Development	K2	2	Lecture with Examples	ICT
9.		Discuss Event Handling in Java FX	K2	1	Lecture	ICT
10.		Demonstrate Building a GUI Application with Java FX	K3	1	Practical Session	ICT
		Total		**17**		

Total No. of Classes: 87

Advanced Data Structures and Algorithm Analysis Lab

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C,D&E**
Name of the Course: Advanced Data Structures and Algorithm Analysis Lab
Course Code: V23CSL04

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No.	CO No.	Course Outcome	BTL
1.	CO1	Demonstrate programs on AVL Trees and Heap trees.	**K3**
2.	CO2	Develop programs on Sorting algorithms and Graph traversal algorithms.	**K3**
3.	CO3	Develop programs using Greedy and Dynamic programming technique.	**K3**
4.	CO4	Develop programs using Backtracking and branch & Bound technique.	**K3**

Reference Books:

1. Fundamentals of Data Structures in C++, Horowitz Ellis, SahniSartaj, Mehta, Dinesh,2nd Edition, Universities Press
2. Computer Algorithms/C++ Ellis Horowitz, SartajSahni, SanguthevarRajasekaran, 2nd Edition, University Press
3. Data Structures and program design in C, Robert Kruse, Pearson Education Asia
4. An introduction to Data Structures with applications, Trembley& Sorenson, McGrawHill

Targeted Proficiency and attainment Levels (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4
Targeted Proficiency Level		60	60	60	60
Targeted level of Attainment	**Level 3**	65	65	60	60
	Level 2	60	60	55	55
	Level 1	55	55	50	50

Lecture Plan:

S. No.	Course Outcome	Program Name	Knowledge Level	No. of Hours	Pedagogy	Teaching Aids
1.	**CO1**	Construct an AVL tree for a given set of elements which are stored in a file. And implement insert and delete operation on the constructed tree. Write contents of tree into a new file using in-order.	K3	6	Lecture& Experiment	Lecture Based Learning & Lab Based Learning
2.		Construct B-Tree an order of 5 with a set of 100 random elements stored in array. Implement searching, insertion, and deletion operations.				
3.	**CO2**	Construct Min and Max Heap using arrays, delete any element, and display the content of the Heap.	K3	12	Lecture& Experiment	Lecture Based Learning & Lab Based Learning
4.		Demonstrate BFT and DFT for given graph when graph is represented by a) Adjacency Matrix b) Adjacency Lists.				
5.		Develop a program for finding the bi connected components in a given graph.				
6.		Implement Quick sort and Merge sort and observe the execution time for various input sizes (Average, Worst, and Best cases).				
7.		Examine the performance of Single Source Shortest Paths using Greedy method when the graph is represented by adjacency matrix and adjacency lists.				
8.	**CO3**	Demonstrate Job Sequencing with deadlines using Greedy strategy.	K3	6	Lecture& Experiment	Problem Based Learning & Lab Based Learning
9.		Demonstrate a program to solve 0/1 Knapsack problem using Dynamic Programming.				
10.	**CO4**	Demonstrate N-Queens Problem using Backtracking.	K3	9	Lecture& Experiment	Problem Based Learning & Lab Based Learning
		Use Backtracking strategy to solve 0/1 Knapsack problem.				
		Demonstrate Travelling Sales Person problem using Branch and Bound approach.				

Total No. of Hours: 33

Object Oriented Programming through Java Lab

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C, D & E**
Name of the Course: Object Oriented Programming through Java Lab
Course Code: V23CSL05

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No.	CO No.	Course Outcome	BTL
1.	CO1	Construct programs to handle classes and objects.	[K3]
2.	CO2	Develop programs that incorporate inheritance and interfaces.	[K3]
3.	CO3	Construct programs on exception handling and File I/O.	[K3]
4.	CO4	Develop programs using multithreading and Java FX.	[K3]

Text Books:

1. JAVA one step ahead, Anitha Seth, B.L. Juneja, Oxford.
2. Joy with JAVA, Fundamentals of Object Oriented Programming, Debasis Samanta, Monalisa Sarma, Cambridge, 2023.
3. JAVA 9 for Programmers, Paul Deitel, Harvey Deitel, 4th Edition, Pearson.

Targeted Proficiency Level and Targeted level of Attainment (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4
Targeted Proficiency Level		80	80	80	80
Targeted level of Attainment	**Level 3**	75	75	75	75
	Level 2	70	70	70	70
	Level 1	65	65	65	65

Lecture Plan:

Exp. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO1	Develop a JAVA program to display default values of all primitive data types of JAVA.	K3	15	Demonstration & Experiment	ICT
2.		Develop a JAVA program that displays the roots of a quadratic equation $ax^2+bx+c=0$. Find the dis criminant D and basing on value of D, describe the nature of the root				ICT
3.		Develop a JAVA program to search for an element in a given list of elements using binary search.				ICT
4.		Develop a JAVA program to sort the list of elements using bubble sor				ICT
5.		Develop a JAVA program using String Buffer to delete, remove character.				ICT
6.		Develop a JAVA program to implement class Mechanism. Build a class, methods and invoke them inside main method.				ICT
7.		Develop a JAVA program to implement method overloading.				ICT
8.		Develop a JAVA program to implement constructor.				ICT
9.		Develop a JAVA program to implement constructor overloading.				ICT
10.	CO2	Develop a JAVA program to implement Single Inheritance.	K3	9	Demonstration & Experiment	ICT
11.		Develop a JAVA program to implement multi level Inheritance.				ICT
12.		c) Develop a JAVA program for abstract class to find areas of different shapes.				ICT
13.		a) Develop a JAVA program on ―super‖ keyword.				ICT
14.		b) Develop a JAVA program to implement Interface. What kind of Inheritance can be achieved?				ICT
15.		c) Develop a JAVA program that implements Runtime polymorphism.				ICT

16.	**CO3**	Exercise – 6: a) Develop a JAVA program that describes exception handling mechanism	**K3**		Demonstration & Experiment	ICT
17.		Develop a JAVA program on Multiple catch clauses.				ICT
18.		Develop a JAVA program to generate Built-in Exceptions.				ICT
19.		Develop a JAVA program to generate User Defined Exception.				ICT
20.	**CO4**	Develop a JAVA program that creates threads by extending Thread class. First thread display Good Morning ―every 1 sec, the second thread displays ―Hello ―every 2 seconds and the third display ―Welcome‖ every 3 seconds,(Repeat the same by implementing Runnable)	**K3**	15	Demonstration & Experiment	ICT
21.		b) Develop a program on isAlive() and join ().				ICT
22.		c) Demonstrate Daemon Threads.				ICT
23.		Demonstrate Producer Consumer Problem.				ICT
24.		a) Develop a JAVA program that import and use the user defined packages.				ICT
25.		b) Demonstrate a GUI that display text in label and image in an ImageView (use JavaFX) Without writing any code.				ICT
26.		Develop a Tip Calculator app using several JavaFX components and learn how to respond to user interactions with the GUI				ICT

Total No. of Classes:48

Python Programming-Skill Enhancement Course

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C, D & E**
Name of the Course: Python Programming-Skill Enhancement Course
CourseCode: V23CSSE01

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No	CO. No	Course Outcomes	BTL
1.	CO1	Illustrate basic concepts and control structures in python Programming	**K1**
2.	CO2	Demonstrate functions and packages	**K2**
3.	CO3	Construct python programs using structured data types.	**K3**
4.	CO4	Develop programs on Files, Exception handling and OOPs Concepts.	**K4**
5.	CO5	Construct programs for Data Analysis using Num Py and Pandas	**K5**

Text Books:

1. Gowrishankar S, Veena A., Introduction to Python Programming, CRC Press.
2. Python Programming, S Sridhar, J Indumathi, V M Hariharan, 2ndEdition, Pearson, 2024
3. Introduction to Programming Using Python, Y. Daniel Liang, Pearson.

Online Learning Resources:

1. https://www.coursera.org/learn/python-for-applied-data-science-ai
2. https://www.coursera.org/learn/python?specialization=python#syllabus

Targeted Proficiency and Attainment Levels (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4	CO5
Targeted Proficiency Level		70	70	70	65	65
Targeted level of Attainment	**Level 3**	70	70	70	65	65
	Level 2	60	60	60	60	60
	Level 1	50	50	50	50	50

Lecture Plan

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO1	Introduction to OBE, Dissemination of Vision, Mission of the Dept.and PEOs,POs & PSOs of the Programme.		1	Lecture	IFP
2.		History of Python Programming Language	K3	1	Lecture	IFP
3.		Thrust Areas of Python,	K3	1	Lecture	IFP
4.		Installing Anaconda Python Distribution	K3	1	Demo	Laptop
5.		Installing and Using Jupyter Notebook	K3	1	Demo	Laptop
6.		Identifiers, Keywords, Statements and Expressions, Variables.	K3	1	Lecture + Discussion	IFP
7.		Reading Input, Print Output, Type Conversions, the type () Function and Is Operator, Dynamic and Strongly Typed Language	K3	1	Lecture	IFP / Laptop
8.		Control Flow Statements: if statement, if-else statement, if...elif…else, Nested if statement	K3	1	Lecture	IFP / Laptop
9.		While Loop, for Loop, continue and break Statements. Catching Exceptions Using try and except Statement.	K3	1	Lecture	IFP / Laptop
10.		**Total**		**9**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO2	Built-In Functions, Commonly Used Modules, Function Definition and Calling the function, return Statement and void Function	K3	1	Lecture	IFP
2.		Scope and Lifetime of Variables, Default Parameters, Keyword Arguments, *args and **kwargs, Command Line Arguments.	K3	1	Lecture	IFP
3.		Creating and Storing Strings, Basic String Operations. Accessing Characters by Index Number,	K3	1	Lecture	IFP
4.		String Slicing and Joining, String Methods, String Formatting.	K3	2	Lecture	IFP

5.		Creating Lists, Basic List Operations, Indexing and Slicing in Lists.	K3	2	Lecture	IFP
6.		Built-In Functions Used on Lists, List Methods, del Statement.	K3	1	Lecture	IFP
7.		**Total**		**8**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	**CO3**	Creating Dictionary, Accessing and Modifying key: value Pairs in Dictionaries.	K3	1	Lecture	BB
2.		Built-In Functions Used on Dictionaries.	K3	1	Lecture + Lab	IFP
3.		Dictionary Methods, del Statement.	K3	1	Practice	IFP
4.		Creating Tuples, Basic Tuple Operations, tuple() Function, Indexing and Slicing in Tuples.	K3	2	Lecture+ Lab	IFP
5.		Built-In Functions Used on Tuples, Relation between Tuples and Lists, Relation between Tuples and Dictionaries.	K3	2	Lecture+ Lab	IFP
6.		Using zip() Function, Sets, Set Methods, Frozenset.	K3	1	Lecture	IFP
		Total		**8**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	**CO4**	Types of Files, Creating and Reading Text Data, File Methods to Read and Write Data.	K3	2	Lecture	IFP
2.		Reading and Writing Binary Files, Pickle Module.	K3	1	Practical	IFP
3.		Reading and Writing CSV Files, Python os and os.path Modules.	K3	1	Demo	Laptop
4.		Classes and Objects, Creating Classes in Python, Creating Objects in Python.	K3	1	Practical	Laptop
5.		Constructor Method, Classes with Multiple Objects, Class Attributes Vs Data Attributes,	K3	2	Practical	Laptop
6.		Encapsulation, Inheritance, Polymorphism.	K3	1	Lecture	IFP
		Total		8		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO5	Functional Programming, JSON and XML in Python.	K3	2	Lecture	IFP
2.		NumPy with Python Pandas.	K3	2	Lecture	IFP
3.		NumPy Arrays	K3	1	Practical	Laptop
4.		Use of ndim, shape, size, dtype	K3	1	Practical	Laptop
5.		Basic slicing, integer and Boolean indexing.	K3	1	Practical	Laptop
6.		Find min, max, sum, cumulative sum of array.	K3	1	Practical	Laptop
		Total		**8**		

Total No. of Classes: 42

Design Thinking and Innovation

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C, D & E**
Name of the Course: Design Thinking and Innovation **CourseCode: V23MET09**

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No	CO. No	Course Outcomes	BTL
1	CO1	Define the concepts related to design thinking	**K1**
2	CO2	Explain the fundamentals of Design Thinking and Innovatioin	**K2**
3	CO3	Apply the design thinking techniques for solving problems in various sectors	**K3**
4	CO4	Analyse to work in a multidisciplinary environment	**K4**
5	CO5	Evaluate the value of creativity	**K5**

Text Books:

1. Tim Brown, Change by design, 1/e, Harper Bollins, 2009.
2. Idris Mootee, Design Thinking for Strategic Innovation, 1/e, Adams Media, 2014.

Reference Books:

1. David Lee, Design Thinking in the Classroom, Ulysses press, 2018.
2. Shrrutin N Shetty, Design the Future, 1/e, Norton Press, 2018.
3. William lidwell, Kritinaholden, &Jill butter, Universal principles of design, 2/e, Rockport Publishers, 2010.
4. Chesbrough.H, The era of open innovation, 2003.

Targeted Proficiency and Attainment Levels (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4	CO5
Targeted Proficiency Level		70	70	70	65	65
Targeted level of Attainment	**Level 3**	60	60	60	60	60
	Level 2	50	50	50	50	50
	Level 1	50	50	50	50	50

Lecture Plan:

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO1	Introduction to OBE, Dissemination of Vision, Mission of the Dept. and PEOs, POs & PSOs of the Programme.		1	Lecture	IFP
2.		Identify the elements of design thinking.	K1	1	Lecture	Charts + crayons
3.		State the principles of design.	K1	1	Lecture	IFP
4.		Discuss the importance and challenges of Design Thinking process.	K2	2	Lecture with discussion	IFP
5.		Explain the history of Design Thinking.	K1	1	Lecture + Discussion	IFP
6.		Explain about new products available in the market.	K2	1	Lecture + Discussion	IFP
7.		Explain about innovative technologies present in the society.	K2	1	Lecture with Discussion and in class Assignment	IFP
		Total		**8**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1	CO2	Illustrate Design Thinking Process.	K2	1	Lecture	IFP
2		Discuss the importance of Empathy.	K1	1	Project Based	IFP
3		List the problems that are identified around them.	K2	1	Project Based	IFP
4		Identify problem statement	K1	1	Problem Based	IFP
5		Explain how ideas are to be converted into implementation	K2	1	Active Learning	IFP
6		Explain the tools involved in Design thinking.	K2	1	Lecture	IFP
7		Discuss persona and how to approach end user	K2	2	Active Learning	IFP
8		Explain the importance of journey map and product development	K2	2	Problem Based	IFP
		Total		**10**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1	CO3	Define Innovation and its purpose.	K1	1	Lecture	IFB
2		Explain the difference between innovation and creativity	K2	1	Lecture + Discussion	IFB
3		Explain the role of creativity and innovation in an organisation.	K2	1	Lecture	IFB
4		Illustrate the steps from creativity to innovation	K2	2	Lecture+ Discussion	IFB
5		Identify the teams for innovation	K1	1	Lecture + Discussion	Activity
6		Describe the impact and value of creativity	K1	2	Lecture + Discussion	Activity
		Total		**8**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1	CO4	Show product formation & design	K1	1	Lecture	Activity
2		Demonstrate product design strategies	K2	1	Practical	IFB
3		Illustrate the role of product value, and product planning	K2	2	Lecture + Discussion	IFB
4		Explain the importance of modelling.	K2	1	Lecture	IFB
5		Explain how to set the specifications of a product	K2	2	Lecture + Discussion	IFB
6		Innovative Ideas for their own product	K2	1	Lecture	Charts
7		Case Studies : Detailed study of the needs of the end user and develop a product design	K3	2	Lecture + Discussion + class Assignment	Charts
		Total		**10**		

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1	CO5	Apply design thinking strategies in Business	K3	1	Case Based Teaching	Activity
2		Experiment with innovative ideas to redesign the product	K3	2	Project Based Learning	Activity
3		Explain the challenges in the business	K2	2	Project Based Learning	IFB
4		Analyse the needs of the business	K2	2	Project Based Learning	Activity
5		Develop a prototype for their product.	K3	2	Project Based Learning	Activity
6		Motivate the students for start up ideas	K4	2	Collaborative Learning	Activity
		Total		**11**		

Total No. of Classes: 47

Professional Communication Skills - I

Academic Year: 2025-26 **Programme: B.Tech**
Year/ Semester: III **Section: A,B,C,D & E**
Name of the Course: Professional Communication Skills -III
CourseCode:V23ENT02

LESSON PLAN

COURSE OUTCOMES (Along with Knowledge Level): After completion of this course, the students will be able to:

S. No.	CO No.	Course Outcome	BTL
1.	CO1	Demonstrate a concise and effective self-introduction in various settings, employing suitable vocabulary.	K3
2.	CO2	Interpret the meaning of common idiomatic expressions and phrases in context. Utilize a range of descriptive vocabulary and idiomatic expressions to vividly portray persons, places, things, events, and processes.	K3
3.	CO3	Dramatise various roles in simulated real-life scenarios, demonstrating appropriate language and behavior. Improve sentences and, subsequently, paragraphs for clarity, cohesion, and impact.	K3
4.	CO4	Compare and contrast pictures effectively, using suitable words and phrases. Draft well-structured professional correspondence through formal emails.	K4
5.	CO5	Illustrate stories creatively, maintaining coherence and plot consistency. Convey complex ideas, emotions, and experiences clearly and compellingly by mastering biographical writing.	K4

Reference Books:

- Lewis Norman, Word Power Made Easy (2008). Goyal Publishers & Distributors Pvt. Ltd.
- Sunita Mishra & C.Muralikrishna, Communication Skills for Engineers (2006). Dorling Kindersley (India) Pvt. Ltd., licensees of Pearson Education in South Asia.
- Joshi Manik, Popular English Idioms and Phrases: English Idiomatic Expressions (2013).
- Isleem, N. (2020). Role-plays: Communicative activities for language classroom and oral proficiency assessment. Independently Published.
- Joshi Manik, Homonyms, Homophones and Homographs: Vocabulary Building (2014).
- Sawhney, Clifford. Improve your Word Power (2013). V&S Publishers.

Targeted Proficiency Level and Targeted level of Attainment (for each Course Outcome):

Cos		CO1	CO2	CO3	CO4	CO5
Targeted Proficiency Level		55	55	55	55	55
Targeted level of Attainment	**Level 3**	55	55	55	55	55
	Level 2	50	50	50	50	50
	Level 1	45	45	45	45	45

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO 1	**Self-Introduction:** Apply appropriate language structures and vocabulary to deliver a structured self-introduction that includes personal and academic information, interests and hobbies, strengths and limitations, and goals.	K2	2	Lecture with Activity	IFP
2.		**Low-Frequency Vocabulary:** Develop appropriate vocabulary by using synonyms, antonyms, and one-word substitutes accurately in sentences and context-based exercises. Demonstrate the ability to identify and replace descriptive expressions with suitable one-word equivalents in context.	K3	2	Lecture with Activity	IFP & Handout
3.		**Homophones:** Practice homophones and commonly confused words to accurately distinguish and use them in appropriate written and spoken contexts.	K3	2	Lecture with discussion	IFP & Handout

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO 2	Illustrate meaning and usage of idioms by constructing meaningful sentences in both formal and informal settings.	K3	2	Lecture with Discussion and Activity	IFP & Handout
2.		Practice and perform oral and written tasks to describe people, places, and events using vivid and accurate descriptive expressions	K3	4	Lecture with Discussion and Activity	IFP & Handout

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO 3	**Interactive Learning:** Demonstrate the ability to use appropriate vocabulary, tone, and body language while engaging in skill-specific role-plays.	K3	4	Lecture with Discussion and Activity	IFP & Handout
2.		**Writing Refinement:** Construct coherent paragraphs by organizing sentences logically around a central idea by using rules of grammar and syntax to improve sentence structure in written communication	K3	4	Lecture with Discussion and Activity	IFP & Handout

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1.	CO 4	**Comparative Description:** Interpret tasks with visual analysis skills to compare and contrast images based on elements such as setting, characters, objects, and actions.	K3	4	Lecture with Discussion and Activity	IFP & Handout
2.		**Professional Correspondence:** Arrange ideas to draft formal and professional emails by analyzing tone, structure, and language to ensure clarity, appropriateness, and effectiveness in workplace communication.	K4	2	Lecture with Discussion and Activity	IFP & Handout

S. No	Course Outcome	Intended Learning Outcomes (ILO)	Knowledge Level of ILO	No. of Hours	Pedagogy	Teaching aids
1	CO 5	**Storytelling with Creativity:** Analyse the key elements of a short story (such as plot, character, and theme) and apply expressive techniques to narrate the story effectively and engagingly.	K4	3	Lecture with Discussion and Activity	IFP & Handout
2		**Biographical Writing:** Analyse the significant events, achievements, and impact of an individual's life and apply appropriate narrative structure and descriptive language to write a coherent and engaging biographical account.	K4	3	Lecture with Discussion and Activity	IFP & Handout

Total No. of Classes: 32