B.Tech. in Computer Science and Business Systems

(In Collaboration with TCS)

Mission of the Department

Mission Stmt - 1	*To impart knowledge in cutting edge Computer Science and Engineering technologies in par with industrial standards.*
Mission Stmt - 2	*To collaborate with renowned academic institutions to uplift innovative research and development in Computer Science and Engineering and its allied fields to serve the needs of society*
Mission Stmt - 3	*To demonstrate strong communication skills and possess the ability to design computing systems individually as well as part of a multidisciplinary teams.*
Mission Stmt - 4	*To instill societal, safety, cultural, environmental, and ethical responsibilities in all professional activities*
Mission Stmt - 5	*To produce successful Computer Science and Engineering graduates with personal and professional responsibilities and commitment to lifelong learning*

Program Educational Objectives (PEO)

PEO - 1	*Graduates will be able to perform in technical/managerial roles by thorough understanding of contemporary technologies*
PEO - 2	*Graduates will be able to successfully pursue higher education in reputed institutions where information technology businesses are a priority*
PEO - 3	*Graduates will be able to apply technology abstraction and common business principles*
PEO - 4	*Graduates will be able to demonstrate innovation abilities.*
PEO - 5	*Graduates will be able to demonstrate ethics and responsibility and have accumulated life values*

Mission of the Department to Program Educational Objectives (PEO) Mapping

	Mission Stmt. - 1	Mission Stmt. - 2	Mission Stmt. - 3	Mission Stmt. - 4	Mission Stmt. - 5
PEO - 1	*H*	*H*	*H*	*H*	*H*
PEO - 2	*L*	*H*	*H*	*H*	*H*
PEO - 3	*H*	*H*	*M*	*L*	*H*
PEO - 4	*M*	*H*	*M*	*H*	*H*
PEO - 5	*H*	*H*	*M*	*M*	*H*

H – High Correlation, M – Medium Correlation, L – Low Correlation

Mapping Program Educational Objectives (PEO) to Program Learning Outcomes (PLO)

	Program Learning Outcomes (PLO)														
	Graduate Attributes (GA)												Program Specific Outcomes (PSO)		
	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
PEO - 1	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*
PEO - 2	*H*	*H*	*H*	*H*	*H*	*L*	*L*	*H*	*L*	*H*	*L*	*H*	*H*	*H*	*H*
PEO - 3	*H*	*H*	*H*	*H*	*H*	*L*	*L*	*L*	*L*	*L*	*H*	*H*	*H*	*H*	*H*
PEO - 4	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*
PEO - 5	*H*	*H*	*H*	*H*	*H*	*M*	*M*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*

H – High Correlation, M – Medium Correlation, L – Low Correlation

PSO – Program Specific Outcomes (PSO)

PSO - 1	*Ability to understand client requirements and suggest solutions*
PSO - 2	*Ability to create innovative Software for business and service orientations*
PSO - 3	*Ability to utilize Logic & Reasoning Skills*

Program Structure: B.Tech. in Computer Science and Business Systems

1. Humanities & Social Sciences including Management Courses (H)					
Course Code	Course Title	Hours/ Week L	T	P	C
18MBA161T	Business Communication & Value Science - I	2	0	0	2
18MBA162T	Business Communication & Value Science - II	2	0	0	2
18MBA163T	Fundamentals of Economics	2	0	0	2
18MBA261T	Introduction to Innovation, IP Management and Entrepreneurship	3	0	0	3
18MBA262J	Design Thinking	2	0	2	3
18MBA361T	Business Communication & Value Science – III	2	0	0	2
18MBA362T	Business Communication & Value Science - IV	2	0	0	2
18MBA363T	Fundamentals of Management	2	0	0	2
18MBA364T	Business Strategy	2	0	0	2
18MBA365T	Financial and Cost Accounting	2	0	0	2
18MBA461T	Financial Management	2	0	0	2
18MBA462T	Human Resource Management	2	0	0	2
18MBA463J	Services Science and Service Operational Management	3	0	2	4
18MBA464J	IT Project Management	3	0	2	4
18MBA465T	Marketing Research and Marketing Management	2	0	0	2
Total Learning Credits					**36**

3. Engineering Science Courses (S)					
Course Code	Course Title	Hours/ Week L	T	P	C
18EES161J	Principles of Electrical Engineering	2	0	2	3
18EES162J	Principles of Electronics	2	0	2	3
Total Learning Credits					**6**

5. Professional Elective Courses (E) (Any 5 Elective Courses)					
Course Code	Course Title	Hours/ Week L	T	P	C
	Professional Elective - 1				
18CSE361J	Conversational Systems	2	0	2	3
18CSE362J	Cloud, Microservices& Application	2	0	2	3
18CSE363J	Machine Learning	2	0	2	3
	Professional Elective - 2				
18CSE364J	Robotics and Embedded Systems	2	0	2	3
18CSE365J	Modern Web Applications	2	0	2	3
18CSE366J	Data Mining and Analytics	2	0	2	3
	Professional Elective - 3				
18CSE467J	Enterprise Systems	2	0	2	3
18CSE468J	Advance Finance	2	0	2	3
18CSE469J	Image Processing and Pattern Recognition	2	0	2	3
	Professional Elective - 4				
18CSE461J	Cognitive Science & Analytics	2	0	2	3
18CSE462J	Introduction to IoT	2	0	2	3
18CSE463J	Cryptology	2	0	2	3

2. Basic Science Courses (B)					
Course Code	Course Title	Hours/ Week L	T	P	C
18PYB161J	Fundamentals of Physics	2	0	2	3
18MAB161T	Discrete Mathematics	3	1	0	4
18MAB162T	Probability and Statistics	3	0	0	3
18MAB163T	Linear Algebra	3	1	0	4
18MAB164J	Statistical Modeling	3	0	2	4
18MAB261J	Operations Research	2	0	2	3
Total Learning Credits					**21**

4. Professional Core Courses (C)					
Course Code	Course Title	Hours/ Week L	T	P	C
18CSC161J	Fundamentals of Computer Science	3	0	4	5
18CSC162J	Data Structures and Algorithms	3	0	4	5
18CSC261T	Formal Language and Automata Theory	3	0	0	3
18CSC262J	Computer Organization and Architecture	3	0	2	4
18CSC263J	Object Oriented Programming	2	0	4	4
18CSC264J	Computational Statistics	3	0	2	4
18CSC265J	Software Engineering	3	0	2	4
18CSC266J	Operating Systems	3	0	2	4
18CSC267J	Database Management Systems	3	0	2	4
18CSC268J	Software Design with UML	2	0	2	3
18CSC361J	Design and Analysis of Algorithms	3	0	2	4
18CSC362J	Compiler Design	3	0	2	4
18CSC363J	Computer Networks	3	0	2	4
18CSC364J	Information Security	3	0	2	4
18CSC365J	Artificial Intelligence	3	0	2	4
18CSC461J	Usability Design of Software Applications	2	0	2	3
18CSC462J	IT Workshop using Scilab	1	0	2	2
Total Learning Credits					**65**

Open Elective Courses (O) (Any 1 Courses))					
Course Code	Course Title	Hours/ Week L	T	P	C
18CSO161T	Behavioral Economics	2	1	0	3
18CSO162T	Computational Finance & Modeling	2	1	0	3
18CSO163T	Psychology	2	1	0	3
Total Learning Credits					**3**

7. Project Work, Seminar, Internship In Industry/ Higher Technical Institutions (P)					
Course Code	Course Title	Hours/ Week L	T	P	C
18CSP361L	Mini Project - 1	0	0	2	1
18CSP461L	Project Evaluation - 1	0	0	6	3
18CSP462L	Project Evaluation - 2	0	0	20	10
Total Learning Credits					**14**

	Professional Elective - 5				
18CSE464J	Quantum Computation & Quantum Information	2	0	2	3
18CSE465J	Advanced Social, Text and Media Analytics	2	0	2	3
18CSE466J	Mobile Computing	2	0	2	3
	Total Learning Credits				**15**

8. Mandatory Courses (M)					
Code	Course Title	L	T	P	C
18PDM101L	Professional Skills and Practices	0	0	2	0
18PDM201L	Competencies in Social Skills	0	0	2	0
18PDM202L	Critical and Creative Thinking Skills	0	0	2	0
18PDM301L	Analytical and Logical Thinking Skills	0	0	2	0
18LEM101T	Constitution of India	1	0	0	0
18LEM102J	Value Education	1	0	1	0

8. Mandatory Courses (M)					
Code	Course Title	L	T	P	C
18GNM101L	Physical and Mental Health using Yoga	0	0	2	0
18GNM102L	NSS	0	0	2	0
18GNM103L	NCC				
18GNM104L	NSO				
18LEM109T	Indian Traditional Knowledge	1	0	0	0
18LEM110L	Indian Art Form	0	0	2	0
18CYM101T	Environmental Science	1	0	0	0

Program Articulation: B.Tech. in Computer Science and Business Systems

Course Code	Course Name	Program Learning Outcomes (PLO)														
		Graduate Attributes												PSO		
		Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
18PYB161J	Fundamentals of Physics	H	H	H	H	H	M	L	M	H	M	M	H	H	H	M
18MAB161T	Discrete Mathematics	H	H	H	H	M	L	L	L	M	M	L	H	H	H	H
18MAB162T	Probability and Statistics	H	H	H	H	M	M	L	L	M	M	L	H	H	H	H
18MAB163T	Linear Algebra	M	H	M	H	M	M	L	M	M	M	M	H	L	H	H
18MAB164J	Statistical Modeling	M	H	H	H	H	M	L	M	M	M	M	H	L	H	H
18MAB261J	Operations Research	H	H	H	M	H	M	L	M	H	M	M	H	L	H	H
18EES161J	Principles of Electrical Engineering	H	H	H	H	H	L	L	M	H	H	L	H	H	H	H
18EES162J	Principles of Electronics	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
18MBA161T	Business Communication & Value Science – I	H	H	M	M	H	L	L	M	H	M	L	H	L	H	H
18MBA162T	Business Communication & Value Science – II	H	H	H	H	M	L	L	M	H	M	M	H	L	H	H
18MBA163T	Fundamentals of Economics	H	H	H	H	H	M	L	M	H	H	M	H	L	H	H
18MBA261T	Introduction to Innovation, IP Management and Entrepreneurship	H	M	H	M	L	L	L	M	L	L	L	M	H	M	M
18MBA262J	Design Thinking	H	H	H	H	M	M	L	M	M	M	M	H	L	H	H
18MBA361T	Business Communication & Value Science – III	H	H	H	H	H	M	L	M	H	M	M	H	H	H	M
18MBA362T	Business Communication & Value Science – IV	H	H	H	H	H	H	H	H	H	H	H	H	L	H	M
18MBA363T	Fundamentals of Management	H	H	M	M	H	L	L	M	H	M	L	H	L	H	H
18MBA364T	Business Strategy	H	H	H	H	L	L	L	L	M	M	L	H	H	H	H
18MBA365T	Financial and Cost Accounting	H	H	H	H	H	M	L	M	H	M	M	H	H	H	M
18MBA461T	Financial Management	H	H	H	H	H	M	L	M	H	M	M	H	H	H	M
18MBA462T	Human Resource Management	H	H	H	H	M	L	L	L	M	M	L	H	H	H	H
18MBA463J	Services Science and Service Operational Management	H	H	H	H	M	M	L	L	M	M	L	H	H	H	H
18MBA464J	IT Project Management	M	H	M	H	M	M	L	M	M	M	M	H	L	H	H
18MBA465T	Marketing Research and Marketing Management	M	H	H	H	H	M	L	M	M	M	M	H	L	H	H
18CSC161J	Fundamentals of Computer Science	H	H	H	M	H	M	L	M	H	M	M	H	L	H	H
18CSC162J	Data Structures and Algorithms	H	H	H	H	H	L	L	M	H	H	L	H	H	H	H
18CSC261T	Formal Language and Automata Theory	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
18CSC262J	Computer Organization and Architecture	H	H	H	H	H	M	L	M	H	M	M	H	H	H	M
18CSC263J	Object Oriented Programming	M	H	H	H	M	M	H	M	H	M	M	H	H	H	H
18CSC264J	Computational Statistics	H	H	H	H	H	M	M	M	M	M	M	H	L	H	H
18CSC265J	Software Engineering	H	H	H	H	H	H	L	M	H	M	M	H	M	H	H
18CSC266J	Operating Systems	H	H	H	H	M	H	H	M	H	M	H	H	H	M	H

18CSC267J	*Database Management Systems*	*H*	*H*	*H*	*H*	*M*	*M*	*M*	*M*	*M*	*H*	*L*	*H*	*H*	*H*	*H*
18CSC268J	*Software Design with UML*	*H*	*H*	*H*	*H*	*M*	*M*	*M*	*M*	*M*	*H*	*L*	*H*	*H*	*H*	*H*
18CSC361J	*Design and Analysis of Algorithms*	*H*	*H*	*H*	*H*	*M*	*M*	*M*	*M*	*M*	*H*	*L*	*H*	*H*	*H*	*H*
18CSC362J	*Compiler Design*	*H*	*H*	*H*	*H*	*H*	*L*	*L*	*M*	*H*	*H*	*L*	*H*	*H*	*H*	*H*
18CSC363J	*Computer Networks*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*	*H*
18CSC364J	*Information Security*	*H*	*H*	*H*	*H*	*H*	*M*	*M*	*M*	*M*	*H*	*M*	*H*	*H*	*H*	*H*
18CSC365J	*Artificial Intelligence*	*M*	*H*	*H*	*H*	*H*	*M*	*L*	*M*	*M*	*H*	*M*	*H*	*M*	*H*	*H*
18CSC461J	*Usability Design of Software Applications*	*H*	*H*	*H*	*H*	*M*	*H*	*H*	*H*	*M*	*H*	*M*	*H*	*H*	*H*	*H*
18CSC462J	*IT Workshop using Scilab*	*M*	*H*	*H*	*H*	*H*	*M*	*M*	*M*	*M*	*H*	*M*	*H*	*H*	*H*	*H*
18CSP361L	*Mini Project – 1*	*H*	*M*	*M*	*M*	*M*	*M*	*M*	*M*	*H*	*H*	*H*	*M*	*H*	*H*	*H*
18CSP461L	*Project Evaluation – 1*	*H*	*M*	*M*	*M*	*M*	*M*	*M*	*M*	*H*	*H*	*H*	*M*	*H*	*H*	*H*
18CSP462L	*Project Evaluation – 2*	*H*	*H*	*H*	*H*	*H*	*M*	*M*	*H*	*H*	*H*	*H*	*H*	*H*	*M*	*M*
	Program Average	*H*	*H*	*M*	*H*	*M*	*L*	*M*	*L*	*M*	*M*	*M*	*H*	*M*	*M*	*M*

H – High Correlation, M – Medium Correlation, L – Low Correlation

Implementation Plan: B.Tech. in Computer Science and Business Systems

Semester - I

Code	Course Title	Hours/ Week			C
		L	T	P	
18MBA161T	Business Communication & Value Science - I	2	0	0	2
18PYB161J	Fundamentals of Physics	2	0	2	3
18MAB161T	Discrete Mathematics	3	1	0	4
18MAB162T	Probability and Statistics	3	0	0	3
18EES161J	Principles of Electrical Engineering	2	0	2	3
18CSC161J	Fundamentals of Computer Science	3	0	4	5
18PDM101L	Professional Skills and Practices	0	0	2	0
18LEM101T	Constitution of India	1	0	0	0
18GNM101L	Physical and Mental Health using Yoga	0	0	2	0
Total Learning Credits					20

Semester - II

Code	Course Title	Hours/ Week			C
		L	T	P	
18MBA162T	Business Communication & Value Science - II	2	0	0	2
18MBA163T	Fundamentals of Economics	2	0	0	2
18MAB163T	Linear Algebra	3	1	0	4
18MAB164J	Statistical Modeling	3	0	2	4
18EES162J	Principles of Electronics	2	0	2	3
18CSC162J	Data Structures and Algorithms	3	0	4	5
18LEM102J	Value Education	1	0	1	0
18GNM10XL	NCC / NSS / NSO	0	0	2	0
Total Learning Credits					20

Semester - III

Code	Course Title	Hours/ Week			C
		L	T	P	
18MBA461T	Financial Management	2	0	0	2
18MBA462T	Human Resource Management	2	0	0	2
18CSC261T	Formal Language and Automata Theory	3	0	0	3
18CSC262J	Computer Organization and Architecture	3	0	2	4
18CSC263J	Object Oriented Programming	2	0	4	4
18CSC264J	Computational Statistics	3	0	2	4
18CSC265J	Software Engineering	3	0	2	4
18PDM201L	Competencies in Social Skills	0	0	2	0
Total Learning Credits					23

Semester - IV

Code	Course Title	Hours/ Week			C
		L	T	P	
18MBA261T	Introduction to Innovation, IP Management and Entrepreneurship	3	0	0	3
18MBA465T	Marketing Research and Marketing Management	2	0	0	2
18MBA262J	Design Thinking	2	0	2	3
18MAB261J	Operations Research	2	0	2	3
18CSC266J	Operating Systems	3	0	2	4
18CSC267J	Database Management Systems	3	0	2	4
18CSC268J	Software Design with UML	2	0	2	3
18PDM202L	Critical and Creative Thinking Skills	0	0	2	0
18CYM101T	Environmental Science	1	0	0	0
Total Learning Credits					22

Semester - V

Code	Course Title	Hours/ Week			C
		L	T	P	
18MBA361T	Business Communication & Value Science - III	2	0	0	2
18MBA363T	Fundamentals of Management	2	0	0	2
18MBA364T	Business Strategy	2	0	0	2
18CSC361J	Design and Analysis of Algorithms	3	0	2	4
18CSC362J	Compiler Design	3	0	2	4
	Professional Elective – 1	2	0	2	3
	Open Elective – 1	2	0	2	3
18CSP361L	Mini Project – 1	0	0	2	1
18PDM301L	Analytical and Logical Thinking Skills	0	0	2	0
18LEM109T	Indian Traditional Knowledge	1	0	0	0
Total Learning Credits					21

Semester - VI

Code	Course Title	Hours/ Week			C
		L	T	P	
18MBA362T	Business Communication & Value Science - IV	2	0	0	2
18MBA365T	Financial and Cost Accounting	2	0	0	2
18CSC365J	Artificial Intelligence	3	0	2	4
18CSC364J	Information Security	3	0	2	4
18CSC363J	Computer Networks	3	0	2	4
	Professional Elective – 2	2	0	2	3
	Professional Elective – 3	2	0	2	3
18LEM110L	Indian Art Form	0	0	2	0
Total Learning Credits					22

Semester – VII

Code	Course Title	Hours/ Week			C
		L	T	P	
18MBA463J	Services Science and Service Operational Management	3	0	2	4
18MBA464J	IT Project Management	3	0	2	4
18CSC461J	Usability Design of Software Applications	2	0	2	3
18CSC462J	IT Workshop using Scilab	1	0	2	2
	Professional Elective – 4	2	0	2	3
	Professional Elective – 5	2	0	2	3
18CSP461L	Project Evaluation – 1	0	0	6	3
Total Learning Credits					22

Semester - VIII

Code	Course Title	Hours/ Week			C
		L	T	P	
18CSP462L	Project Evaluation – 2	0	0	20	10
Total Learning Credits					10

SEMESTER - I

Course Code	18MBA161T	Course Name	BUSINESS COMMUNICATION & VALUE SCIENCE - I	Course Category	H	Humanities and Social Sciences	L	T	P	C
							2	0	0	2

Pre-requisite Courses	Basic Knowledge of high school English	Co-requisite Courses	NA	Progressive Courses	NA
Course Offering Department	MBA	Data Book / Codes/Standards			

Course Learning Rationale (CLR): *The purpose of learning this course is to:*

CLR-1 :	Understand what life skills are and their importance in leading a happy and well-adjusted life
CLR-2 :	Motivate students to look within and create a better version of self
CLR-3 :	Introduce them to key concepts of values, life skills and business communication
CLR-4 :	To recognize their own strength and opportunities
CLR-5 :	Understand the basic skills in Business Communication
CLR 6:	Apply the learnt techniques in the business world.

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	*Level of Thinking(Bloom)*	*Expected Proficiency (%)*	*Expected Attainment (%)*
CLO-1 :	Recognize the need for life skills and values	2	60	50
CLO-2 :	Recognize own strengths and opportunities	2	80	70
CLO-3 :	Apply the life skills to different situations	1	80	75
CLO-4 :	Understand the basic tenets of communication	2	80	70
CLO-5 :	Apply the basic communication practices in different types of communication	3	90	80
Overall	Gain Knowledge in techniques of business communication and succeed in effective implementation in the corporate arena.	3	90	80

Learning — **Program Learning Outcomes (PLO)**

	1	2	3	4	5	6	7	8	9	10	11	12
	Effective communication skills	Initiate critical thinking	Resources analysis for organizations	Familiarize organizations and its stakeholders	Integrate functional knowledge with strategic skills	Comprehend effectively in globalized environment	Practice business ethics with integrity	Enhance careers and commitment	Instigate entrepreneurial drive	Application of multidisciplinary knowledge comprising of finance, operations, system, marketing and human resources management to integrate business projects.	Usage of business metrics to evaluate business projects to develop growth strategies.	Authorize the students to innovate and execute the business idea during the challenging business situation.
CLO-1 :	*H*	*H*	*H*	*M*	*M*	*L*	*M*	*M*	*L*	*M*	*H*	*L*
CLO-2 :	*H*	*H*	*L*	*L*	*M*	*M*	*M*	*L*	*L*	*M*	*H*	*H*
CLO-3 :	*H*	*H*	*L*	*L*	*M*	*M*	*L*	*L*	*L*	*M*	*H*	*M*
CLO-4 :	*H*	*H*	*M*	*L*	*M*	*M*	*L*	*L*	*L*	*M*	*H*	*H*
CLO-5 :	*H*	*H*	*H*	*L*	*M*	*M*	*L*	*L*	*L*	*M*	*H*	*L*
Overall	H	H	H	M	H	M	H	M	L	H	M	H

Duration (hour)		13	13	13	13	13
S-1	SLO-1	Overview of Leadership Oriented Learning (LOL)	Communication Skills: Overview of Communication Skills Barriers of communication, Effective communication	Verbal communication: clarity of speech	Understanding Life Skills: Movie based learning – Pursuit of Happiness. What are the skills and values you can identify, what Can you relate to? (Part 1)	Life skill: Join a trek – Values to be learned: Leadership
	SLO-2	Theory and Practice	Business communication	Pronunciation	Post discussion	Types and styles
S-2	SLO-1	Activity on introducing Self	Types of communication- verbal and non – verbal – Role-play based learning	Vocabulary Enrichment: Exposure to words from General Service List (GSL) by West, Academic word list (AWL) technical specific terms related to the field of technology, phrases, idioms, significant abbreviations formal business vocabulary	Understanding Life Skills: Movie based learning – Pursuit of Happiness. What are the skills and values you can identify, what can you relate to? (Part 2)	Life skill: Join a trek – Values to be learned: Team Work
	SLO-2	Introducing self and SWOT	Importance of Questioning	Read Economic Times, Reader's Digest, National Geographic and take part in a	Post discussion	Activity

				GD, using the words you Learnt/liked from the articles. Group discussion using words learnt		
S-3	SLO-1	Class activity – presentation on favorite cricket captain in IPL	Listening Skills: Law of nature- Importance of listening skills, Difference between listening and Hearing, Types of listening.	Practice: Toastmaster style Table Topics speech with evaluation	Understanding Life Skills: Movie based learning – Pursuit of Happiness. What are the skills and values you can identify, what can you relate to? (Part 3)	Life skill: Join a trek – Values to be learned: Dealing with ambiguity
	SLO-2	The skills and values they demonstrate	Listening activity	Activity	Post discussion	Activity
S-4	SLO-1	Self-work with immersion – interview a maid, watchman and Sweeper and narrate what you think are the values that drive them	Expressing self	Practice: Toastmaster style Table Topics speech with evaluation 2	Introduction to life skills What are the critical life skills	Life skill: Join a trek – Values to be learned: Managing stress
	SLO-2	Report on interview	On stage activity	Activity	Current trend	Yoga
S-5	SLO-1	Self-work with immersion – interview a cab driver, beggar and narrate what you think are the values that drive them	Connecting with emotions	Written Communication: Summary writing, story writing	Multiple Intelligences Embracing diversity – Activity on appreciation of diversity	Life skill: Join a trek – Values to be learned: Motivating people
	SLO-2	Report on interview	Best moments	Various scenario	Post activity discussion	Intrinsic and extrinsic
S-6	SLO-1	Overview of business communication	Visualizing	Build your CV –start writing your comprehensive CV including every achievement in your life, no format, no page limit	Life skill: Community service– work with an NGO and make a Presentation (Part 1)	Life skill: Join a trek – Values to be learned: Creativity
	SLO-2	Types and techniques	Visual Activity	Mistakes to avoid in CV	Team outing	Special Activity
S-7	SLO-1	Activity: Write a newspaper report on an IPL match	Experiencing Purpose	Project: Create a podcast on a topic that will interest college students	Life skill: Community service– work with an NGO and make a Presentation (Part 2)	Life skill: Join a trek – Values to be learned: Result Orientation
	SLO-2	Compare the report with friends	Discussion	Activity	Team outing	Assessment
S-8	SLO-1	Activity: Record a conversation between a celebrity and an interviewer	Activity: Skit based on communication skills	Life skill: Stress management	Life skill: Community service– work with an NGO and make a Presentation (Part 3)	Life skill: Join a trek – Values to be learned: Motivating people (2)
	SLO-2	Quiz Time		Causes of stress	Team outing	Intrinsic and extrinsic
S-9	SLO-1	Self-Awareness: Identity	Activity: Skit 2 based on communication skills	Life skill: working with rhythm	Life skill: Community service– work with an NGO and make a Presentation (Part 4)	Life skill: Join a trek – Values to be learned: Dealing with ambiguity
	SLO-2	Self-assessment	Record skit	activity	Team outing	Activity
S-10	SLO-1	Self-Awareness: Body Awareness	Activity: Skit 3 based on communication skills	Life skill: Balance	Life skill: Community service– work with an NGO and make a Presentation (Part 5)	Life skill: Join a trek – Values to be learned: Motivating people (3)

	SLO-2	Medical Record	Record skit	Work life balance	Team outing	Rewards
S-11	SLO-1	Self-Awareness: Stress Management	Activity: Skit 4 based on communication skills	Life skill: Team Work	Life skill: Community service– work with an NGO and make a Presentation (Part 6)	Life skill: Join a trek – Values to be learned: Creativity (2)
	SLO-2	To overcome stress	Record skit	Outdoor activity	Team outing	Painting
S-12	SLO-1	Essential Grammar – I: Refresher on Parts of Speech – Listen to an audio clip and note down the different parts of speech followed by discussion	Evaluation on Listening skills – listen to recording and answer questions based on them	Project: Create a musical using the learnings from unit	Life skill: Community service– work with an NGO and make a Presentation (Part 7)	Life skill: Join a trek – Values to be learned: Creativity (3)
	SLO-2	Tenses: Applications of tenses in Functional Grammar – Take a quiz and then discuss	Evaluate audio clip	Activity	Team outing	Adzap
S-13	SLO-1	Sentence formation (general & Technical), Common errors, Voices. Show sequence from film where a character uses wrong Sentence structure	Email writing: Formal and informal emails, activity	Project: Create a musical using the learnings from unit (2)	Community Service :work with an NGO and make a Presentation (Part 7)	Life skill: Join a trek – Values to be learned: Result Orientation (2)
	SLO-2	(e.g. Zindagi Na MilegiDobara where the characters use 'the' before every word)	Paper and web based	Activity	Team outing	Activity

Learning Resources	English vocabulary in use – Alan Mc'carthy and O'dell APAART: Speak Well 1 (English language and communication	APAART: Speak Well 2 (Soft Skills) Bernadin , Human Resource Management ,Tata Mcgraw Hill ,8th edition 2012. Wayne Cascio, Managing Human Resource, McGraw Hill, 2007.

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	30	-	30	-	30	-	40	-	30	-
Level 2	Apply Analyze	40	-	40	-	40	-	30	-	40	-
Level 3	Evaluate Create	30	-	30	-	30	-	30	-	30	-
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Experts From TCS	Dr.K.Latha, Chandasekara University, Kanchipuram	Mr.Vijay Raja, Assistant Professor, SRMSOM
	Dr.Thenmozhi, Professor, University of Madras	Dr.SanthoshKumart, Head – Human Resources , SRMSOM

Course Code	18PYB161J	Course Name	FUNDAMENTALS OF PHYSICS	Course Category	B	Basic Sciences	L	T	P	C
							2	0	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Physics and Nanotechnology	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR): **The purpose of learning this course is to:**

CLR-1 :	Understand the concepts of periodic motion
CLR-2 :	Create insights to the concepts of optical effects
CLR-3 :	Identify the applications of lasers and optical fibers
CLR-4 :	Identify the significance of quantum theory
CLR-5 :	Analyze the principles of thermodynamics
CLR-6 :	Utilize the concepts of physics for application in engineering and technology

Learning / **Program Learning Outcomes (PLO)**

Course Learning Outcomes (CLO): **At the end of this course, learners will be able to:**

		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLO-1 :	Apply the periodic motion to different systems	2	85	75	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	Apply ray propagation and optical effects	2	85	75	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-3 :	Identify the applications of lasers and optical fiber	2	75	70	H	-	-	H	-	-	-	-	-	-	-	-	-	-	-
CLO-4 :	Apply quantum mechanics to basic physical problems	2	85	80	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-5 :	Analyze the thermodynamic process	2	85	75	H	-	H	-	-	-	-	-	-	-	-	-	-	-	-
CLO-6 :	Apply the concepts of optics, quantum theory and thermodynamics in real problems	2	80	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to periodic motion	Theory of interference fringes	Absorption and emission processes-two level system	Introduction to Quantum Mechanics, Planck's hypothesis	X-ray Diffraction, Debye Scherrer powder
	SLO-2	Simple harmonic motion-characteristics of simple harmonic motion	Types of interference	Einstein's theory of matter radiation A and B coefficients	de Broglie hypothesis for matter waves	Laue Method
S-2	SLO-1	Vibration of simple springs mass system	Fresnel's prism	Characteristics of laser beams	Heisenberg Uncertainty principle	Concept of band gap
	SLO-2	Characteristic of mass-spring system	Newton's rings	Essential components of laser system and pumping mechanisms	Physical significance of wave function	Conductor, semiconductor, and insulator
S-3	SLO-1	Resonance-definition.	Diffraction-types of diffraction	Threshold population inversion	Time independent Schrödinger's wave equation	Concept of Band theory: basic idea
	SLO-2	Damped harmonic oscillator	Difference between interference and diffraction	CO2 Laser	Time dependent Schrödinger's wave equation	Formation of Band gap
S-4-5	SLO-1	Lab 1: Basics of experimentation	Lab 3:Study of I-V characteristics of a light dependent resistor (LDR)	Lab 5: Determine the wavelength of monochromatic light Newton's ring	Lab 7 : Determine Particle size by using laser light	Lab 9: Determine of Hall coefficient of semiconductor
	SLO-2					
S-6	SLO-1	Heavy, critical and light damping	Fresnel's half period zone and zone plate	Ruby laser	Particle in a 1 D box	Laws of thermodynamics-Zeroth law of thermodynamics
	SLO-2	Energy decay in a damped harmonic oscillator	Fraunhofer diffraction at single slit-plane	Nd-YaG laser	Normalization and Eigen values	First law of thermodynamics
S-7	SLO-1	Quality factor	Plane diffraction grating	Application of Laser in engineering	Crystallography: Introduction, Basic terms-types of crystal systems	Brief discussion on application of first law
	SLO-2	Quality factor of Different oscillators	Temporal and Spatial Coherence	Holography	Bravais lattices, miller indices d spacing	Second law of thermodynamics
S-8	SLO-1	Forced mechanical	Polarization	Optical fiber-physical structure	Crystal Symmetry	Concept of Engine
	SLO-2	Electrical oscillator	Concept of production of polarized beam of light from two SHM acting at right angles	Total internal reflection	Plane of Symmetry, Axis of Symmetry	Efficiency of engine
S-9-	SLO-1	Lab 2: Determine spring constant –	Lab 4: Determine Planck's constant	Lab 6: Determine laser parameters –	Lab 8:- Study of attenuation and	Lab 10 : Mini Project

10	**SLO-2**	expansion of a helical spring		divergence and wavelength for a given laser source	propagation characteristics of optical fiber	
S-11	**SLO-1**	Del, divergence, curl and gradient operations in vector calculus	Production of Plane polarized light	Numerical aperture	Coordination number, Atomic Packing Fraction	Entropy and internal energy
	SLO-2	Gauss-divergence and Stoke's theorem	Circularly and Elliptically polarized light	Acceptance angle	Atomic Packing fraction for SC, BCC	Entropy as a thermodynamic parameter
S-12	**SLO-1**	Maxwell's equations	Production of Circularly polarized light	Classification of optical fibers : Mode	Atomic Packing fraction for FCC	Change of Entropy in reversible process
	SLO-2	Maxwell's equations	Brewster's Law, Double refraction	Classification of optical fibers : Refractive index	Atomic Packing fraction for HCP	Change of Entropy in irrreversible process

Learning Resources	1. David Jeffery Griffiths, Introduction to Electrodynamics, Revised Edition, Pearson, 2013 2. Ajay Ghatak, Optics, Tata McGraw Hill Education, 5th Edition, 2016	. 3. David Halliday, Fundamentals of Physics, 7th Edition, John Wiley & Sons Australia, Ltd, 2015 4. Eisberg and Resnick, Quantum Physics: of Atoms, Molecules, Solids, Nuclei and Particles, 6th Edition, 2015

Learning Assessment

	Bloom's Level of Thinking	**Continuous Learning Assessment (50% weightage)**								**Final Examination (50% weightage)**	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Expert from TCS	Prof . V. Subramanian, IITM, Chennai, manianvs@iitm.ac.in	Dr.M.Krishnamohan, SRMIST
	Prof . C. Venkateswaran, University of Madras, Chennai, cvenkateswaran@unom.ac.in	Dr.TrilochanSahoo, SRMIST

Course Code	18MAB161T	Course Name	DISCRETE MATHEMATICS	Course Category	B	Basic Sciences	L	T	P	C
							3	1	0	4

Pre-requisite Courses	Nil.	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics	Data Book / Codes/Standards		Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	Apply Boolean algebra, truth table, logic gates, in computer science and communication.
CLR-2 :	Apply concepts of Differential.
CLR-3 :	Apply concepts of integral Calculus-- Multiple integrals for solving engineering problems.
CLR-4 :	Apply set theory, relations in storage, communication and manipulation of data. Learning about groups, rings and fields. Using them to solve engineering related problems.
CLR-5 :	Using combinatory, counting problems, generating functions, recurrence relations in computer network .Apply principle of Mathematical induction and Pigeon hole principle.
CLR-6 :	Utilize the concepts in Discrete Mathematics for the understanding of Engineering and Technology

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning 1 (Level of Thinking (Bloom))	Learning 2 (Expected Proficiency (%))	Learning 3 (Expected Attainment (%))	PLO 1 (Engineering Knowledge)	PLO 2 (Problem Analysis)	PLO 3 (Design & Development)	PLO 4 (Analysis, Design, Research)	PLO 5 (Modern Tool Usage)	PLO 6 (Society & Culture)	PLO 7 (Environment & Sustainability)	PLO 8 (Ethics)	PLO 9 (Individual & Team Work)	PLO 10 (Communication)	PLO 11 (Project Mgt. & Finance)	PLO 12 (Life Long Learning)	PLO 13 (PSO - 1)	PLO 14 (PSO - 2)	PLO 15 (PSO - 3)
CLO-1 :	Gaining knowledge in Boolean arithmetic to solve problems using logic gates.	2	85	80	M	H	L						M	L		H			
CLO-2 :	Solving problems in Differential calculus and its applications.	2	85	80	M	H		M	M				M			H			
CLO-3 :	Solving problems in Integral calculus applying them to solve multiple integral problems.	2	85	80	M	H							M			H			
CLO-4 :	Problem solving in sets and relations. Gaining knowledge in groups, rings and fields. Solving simple problems using elementary concepts.	2	85	80	M	H		M					M			H			
CLO-5 :	Solving problems in basic counting principles, inclusion exclusion and number theory.	2	85	80	M	H	L						M	L		H			
CLO-6 :	Apply the concepts of Boolean Algebra, Abstract Algebra, counting principles, recurrence relations and calculus in real world problems related to Computer Science and Business systems																		

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	**SLO-1**	Introduction to Boolean Algebra- basic definitions.	Differential calculus introduction	Integral calculus-reduction formulae	Introduction to Sets – simple examples.	Basic counting-Permutation and Combination
	SLO-2	Axiomatic definition of Boolean Algebra, logic gates.	Differential calculus introduction	Problems based on reduction formulae.	Properties of sets	Basic counting-Permutation and Combination
S-2	**SLO-1**	Postulates of Boolean Algebra.	Successive differentiation.	Integral calculus-reduction formulae	Relations- definitions and examples.	Balls and bins problems.
	SLO-2	Postulates of Boolean Algebra.	Successive differentiation.	Problems based on reduction formulae.	Relations- definitions and examples.	Balls and bins problems.
S-3	**SLO-1**	Problems using the postulates of Boolean Algebra	Standard results, preliminary transformations and use of partial fractions.	Definite integrals properties without proof.	Problems on relations- types of relations.	Balls and bins problems.
	SLO-2	Problems using the	Standard results, preliminary	Problems based on definite	Problems on relations- types of	Balls and bins problems.

		postulates of Boolean Algebra	transformations and use of partial fractions.	integral properties.	relations.	
S-4	**SLO-1**	Problem solving using tutorial sheet 1	Problem solving using tutorial sheet 4	Problem solving using tutorial sheet 7	Problem solving using tutorial sheet 10	Problem solving using tutorial sheet 13
	SLO-2	Problem solving using tutorial sheet 1	Problem solving using tutorial sheet 4	Problem solving using tutorial sheet 7	Problem solving using tutorial sheet 10	Problem solving using tutorial sheet 13
S-5	**SLO-1**	Principle of Duality.	Leibnitz's theorem,	Integral as the limit of a sum	Binary operation on a set- Groups and axioms of groups.	Generating functions
	SLO-2	Principle of Duality.	Problems using Leibnitz's theorem	Integral as the limit of a sum	Properties of groups.	Problems on generating functions
S-6	**SLO-1**	Problems based on principle of Duality	Problems using Leibnitz's theorem	Double integrals	Examples of groups.	Problems on generating functions
	SLO-2	Problems based on principle of Duality.	Problems using Leibnitz's theorem	Double integrals problems	Permutation group, equivalence classes with addition modulo m and multiplication modulo m.	Problems on generating functions
S-7	**SLO-1**	Canonical forms.	Taylor's series simple problems	Changing the order of integration.	Cyclic groups and properties.	Recurrence relations problems
	SLO-2	Minterms and maxterms, sum of minterms, product of maxterms,	Taylor's series simple problems	Problems on Changing the order of integration.	Subgroups and necessary and sufficiency of a subset to be a subgroup.	Recurrence relations problems
S-8	**SLO-1**	Problem solving using tutorial sheet 2 in duality and minterm and maxterm concepts.	Problem solving using tutorial sheet 5	Problem solving using tutorial sheet 8	Problem solving using tutorial sheet 11	Problem solving using tutorial sheet 14
	SLO-2	Problem solving using tutorial sheet 2 in duality and minterm and maxterm concepts.	Problem solving using tutorial sheet 5	Problem solving using tutorial sheet 8	Problem solving using tutorial sheet 11	Problem solving using tutorial sheet 14
S-9	**SLO-1**	Conversion between canonical forms.	Problems on radius of curvature and centre of curvature.	Double integrals in polar coordinates	Cosets and examples.	Recurrence relations problems
	SLO-2	Conversion between canonical forms.	Problems on radius of curvature and centre of curvature.	Area enclosed by plane curves	Rings- definition and examples. Properties	Recurrence relations problems
S-10	**SLO-1**	Karnaugh maps.	Problems on radius of curvature and centre of curvature.	Inconsistency and indirect method of proof.	Special classes of rings	Proof techniques- principle of Mathematical induction
	SLO-2	Two and three variable maps.	Problems on radius of curvature and centre of curvature.	Volume of solids- volume as double integrals	Ideal and Quotient rings.	Problems using the principle of Mathematical induction
S-11	**SLO-1**	Four variable maps.	Problems on radius of curvature and centre of curvature.	Volume of solids- volume as triple integrals	Fields – definition and examples.	Pigeon hole principle
	SLO-2	Five and six variable maps.	Problems on radius of curvature and centre of curvature.	Volume of solids- volume as triple integrals	Fields – definition and examples.	Problems on pigeon hole principle.
S-12	**SLO-1**	Problem solving using tutorial sheet 3 for conversion between canonical forms.	Problem solving using tutorial sheet 6 in application of differential calculus in Engineering.	Problem solving using tutorial sheet 9 on applications of double integrals	Problem solving using tutorial sheet 12	Problem solving using tutorial sheet 15
	SLO-2	Problem solving using tutorial sheet 3 using K-maps.	Problem solving using tutorial sheet 6 in application of differential calculus in Engineering.	Problem solving using tutorial sheet 9 on applications of double integrals	Problem solving using tutorial sheet 12	Problem solving using tutorial sheet 15

Learning Resources	
1	I. N. Herstein, "Topics in Algebra", John Wiley and Sons
2	M. Morris Mano, "Digital Logic & Computer Design", Pearson
3	B. S. Grewal, "Higher Engineering Mathematics", Khanna Publication, Delhi.
4	Gilbert Strang: Introduction to linear algebra

5	Peter V. O'Neil, "Advanced Engineering Mathematics", Seventh Edition, Thomson Learning.
6	M. D. Greenberg, "Advanced Engineering Mathematics", Second Edition, Pearson Education.
7	P. N. Wartikar and J. N. Wartikar, "Applied Mathematics". Vol. I & II, VidyarthiPrakashan

Learning Assessment											
	Bloom's Level of Thinking	**Continuous Learning Assessment (50% weightage)**								**Final Examination (50% weightage)**	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	20%	-	30%	-	30%	-	30%	-	30%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,
SLO – Session Learning Outcome

Course Designers							
(a) Experts from Industry							
1	Experts From TCS						
(b) Experts from Higher Technical Institutions							
1	Dr.K.C.Sivakumar	IIT, Madras	kcskumar@iitm.ac.in	2	Dr.Nanjundan	Bangalore University	nanzundan@gmail.com
(c) Internal Experts							
1	Dr.A.Govindarajan	SRMIST	givindarajan.a@ktr.srmuniv.ac.in	2	Dr.N.Parvathi	SRMIST	Parvathi.n@srmuniv.ac.in

Course Code	18MAB162T	Course Name	PROBABILITY AND STATISTICS	Course Category	B	Basic Sciences	L	T	P	C
							3	0	0	3

Pre- requisite Courses	Nil	Co-requisite Courses	Nll	Progressive Courses	Nil
Course Offering Department	Mathematics	Data Book / Codes/Standards		Statistical tables	

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	To apply the basic rules and theorems of probability theory such as Baye'sTheorem, to determine probabilities that help to solve engineering problems and to determine the expectation and variance of a random variable from its distribution.
CLR-2 :	To appropriately choose, define probability distributions such as the Binomial, Poisson and Normaletc to model and solve engineeringproblems.
CLR-3 :	To learn the basics of statistics, collection, estimate of statistical data
CLR-4 :	To understand how correlation and regression analysis can be used to develop an equation that estimates how two variables are related
CLR-5 :	To comprehend the fundamentals of sampling techniques of finite and infinite populations

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		LevelofThinking(Bloom)	ExpectedProficiency(%)	ExpectedAttainment(%)	EngineeringKnowledge	ProblemAnalysis	Design&Development	Analysis,Design,Research	ModernToolUsage	Society&Culture	Environment&Sustainability	Ethics	Individual&TeamWork	Communication	ProjectMgt.&Finance	LifeLongLearning	PSO-1	PSO-2	PSO-3
CLO-1 :	Pertain the Knowledge of probability concepts, to determine probabilities that help to solve engineering problems. and to determine the expectation and variance of a random variable from itsdistribution	2	85	80	M		M						M			H			
CLO-2 :	Gain familiarity in deriving probability distributions such as the Binomial, Poisson and Normal etc and apply them tn the problems involving Science and Engineering	2	85	80	M			M	M										
CLO-3 :	Acquire knowledge in descriptive statistics	2	85	80		M							M			H			
CLO-4 :	Getting the knowledge of correlation, Regression analysis and apply them in the problems in Science and Engineering	2	85	80	M	M		M					M			H			
CLO-5 :	Understanding the concept and applications of sampling techniques	2	85	80		M	M						M			H			

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	SLO-1	probability concepts, Types of experiments, Events, sample space, combinatorial probability	Discrete distributions	Definition of Statistics	Descriptive measures	Sampling techniques
	SLO-2	Axioms and theorems	Binomial distribution	Basic objectives	central tendency	Random sampling
S-2	SLO-	Conditional probability	Fitting binomial	Applications in various	Mean, median and	Sampling from

	1	Baye's theorem – without proof	distribution	branches of science with examples	mode	finiteand infinite population
	SLO-2	Applications- Baye's Theorem.	Poisson distribution	More examples	Problems on mean	Simple random sampling
S-3	**SLO-1**	Random variables – Discrete case	Fitting Poisson distribution	Collection of Data, internal and external data	Problems on median and mode	Simple random sampling
	SLO-2	Probability Mass function	Applications of binomial and Poisson distribution	Primary and secondary data	Dispersion	Stratified random sampling
S-4	**SLO-1**	Problem solving using tutorial sheet 1	Problem solving using tutorial sheet 4	Problem solving using tutorial sheet 7	Range, Quartile deviation	Problem solving using tutorial sheet 13
	SLO-2	Problem solving using tutorial sheet 1	Problem solving using tutorial sheet 4	Problem solving using tutorial sheet 7	Standard deviation	Problem solving using tutorial sheet 13
S-5	**SLO-1**	Cumulative distribution function	Geometric distribution	Population and sample	Coefficient of variation	Systematic sampling
	SLO-2	Mathematical expectation – discrete case	Memory less property	Representative sample	Bivariate data. Summarization	Systematic sampling
S-6	**SLO-1**	Variance	Continuous distribution: Uniform distribution	Descriptive Statistics,	marginal and conditional frequency distribution	Cluster sampling
	SLO-2	Probability density function	Applications of Uniform distribution	Classification of Univariate data	marginal and conditional frequency distribution	Cluster sampling
S-7	**SLO-1**	Cumulative distribution function	Exponential distribution, Memory less property	tabulation of univariate data	Applications central tendency and dispersion	Estimates and standard error of sampling with replacement
	SLO-2	Mathematical expectation-continuous case	Applications of exponential distribution	Applications of descriptive statistics	Applications central tendency and dispersion	Estimates and standard error of sampling with replacement
S-8	**SLO-1**	Problem solving using tutorial sheet 2	Problem solving using tutorial sheet 5	Problem solving using tutorial sheet 8	Problem solving using tutorial sheet 11	Problem solving using tutorial sheet 14
	SLO-2	Problem solving using tutorial sheet 2	Problem solving using tutorial sheet 5	Problem solving using tutorial sheet 8	Problem solving using tutorial sheet 11	Problem solving using tutorial sheet 14
S-9	**SLO-1**	Variance	Normal distribution	Graphical representation	Linear Correlation	Estimates and standard error of sampling without replacement
	SLO-2	Raw Moments	Applications of normal distribution	Graphical representation	scatter diagram	Estimates and standard error of sampling without replacement
S-10	**SLO-1**	Central Moments	Chi-Square distribution	Applications of graphical representation	Karl-Pearson correlation	Sampling distribution of sample mean
	SLO-2	Moment generating function	Applications of Chi- square distribution	Frequency curves	Spearman's rank correlation	Sampling distribution of sample mean
S-11	**SLO-1**	MGF- discrete random variable	t- Distribution, F- Distribution	Frequency curves	Linear regression	Applications of sampling distribution of mean
	SLO-2	MGF- continous random variable	Applications of t, F- distributions	Applicationsof Frequency curves	Least square method- Fitting a straight line	Applications of sampling distribution of mean
	SLO-1	Problem solving using tutorial sheet 3	Problem solving using tutorial sheet 6	Problem solving using tutorial sheet 9	Problem solving using tutorial sheet 12	Problem solving using tutorial sheet 15

S-12	**SLO-2**	Applications of Probability in Engineering field	Application of distributions in Engineering	Applications and the importance of descriptive statistics	Engineering Applications of Correlation and Regression	Engineering applications of sampling techniques

Learning Resources	**S.**M. Ross, A First Course in Probability, 6th Ed., Pearson Education India,2002. A. Goon, M. Gupta and B. Dasgupta, "Fundamentals of Statistics", vol. I &II,WorldPress. I. R. Miller, J.E. Freund and R. Johnson, "Probability and Statistics for Engineers". Fourth Edition,PHI. A. M. Mood,F.A. Graybill and D.C. Boes, "Introduction to the Theory of Statistics", McGraw HillEducation.					

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	20%	-	30%	-	30%	-	30%	-	30%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

SLO – Session Learning Outcome

Course Designers

(a) Experts from Industry							
1	Experts From TCS						
(b) Experts from Higher Technical Institutions							
3	Dr.K.C.Sivakumar	IIT, Madras	kcskumar@iitm .ac.in	4	Dr.Nanjundan	Bangalore University	nanzundan@gmail. com
(b) Internal Experts							
5	Dr.A.Govindarajan	SRMIST	govindarajan.a @ktr.srmuniv.ac.in	6	Dr.Srinivasan	SRMIST	srinivasan.va@srmuniv.ac.in

Course Code	18EES161J	Course Name	PRINCIPLES OF ELECTRICAL ENGINEERING	Course Category	S	Engineering Sciences	L	T	P	C
							2	0	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Science and Engineering	Data Book / Codes/Standards		Nil	

Course Learning Rationale (CLR):	*The purpose of learning this course is to:*	Learning	Program Learning Outcomes (PLO)

		1	2	3
CLR-1 :	Analyze DC circuits using network theorems	Level of Thinking(Bloom)	Expected Proficiency (%)	Expected Attainment(%)
CLR-2 :	Examine single phase AC series circuit and parallel circuits. Also understand the basics of three phase circuits			
CLR-3 :	Introduce the basic concepts of electrostatics and magnetostatics			
CLR-4 :	Comprehend the construction, working and performance of transformers and DC machines			
CLR-5 :	Outline the concepts of transducers, measuring devices, electrical wiring and illumination			
CLR-6 :	Enrich the concepts of electric circuits, flux distribution and electrical wiring			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking(Bloom)	Expected Proficiency (%)	Expected Attainment(%)	1 Engineering Knowledge	2 Problem Analysis	3 Design & Development	4 Analysis, Design, Research	5 Modern Tool Usage	6 Society & Culture	7 Environment & Sustainability	8 Ethics	9 Individual &TeamWork	10 Communication	11 Project Mgt & Finance	12 Life Long Learning	13 PSO-1	14 PSO-2	15 PSO–3
CLO-1 :	Compute the various electrical quantities in a DC circuit	3	85	80	H	H	M			-	-		M	-	-		-	-	-
CLO-2 :	Determine the parameters involved in AC circuits.	3	85	80	H	H	M			-	-		M	-	-		-	-	-
CLO-3 :	Understand the electric , magnetic flux distribution and their applications	2	85	80	H	H	M		M	-	-		M	-	-		-	-	-
CLO-4 :	Recall the working of transformers and electrical machines	2	85	80	H	L				-	-		M	-	-		-	-	-
CLO-5 :	Explain the operation of various transducers, sensors and wiring schemes	2	85	80	H					-	-		M	-	-		-	-	-
CLO-6 :	Gain knowledge on the basics of electrical and magnetic circuits, measuring devices , transducers and wiring	2	85	80	H	H	M		M	-	-		M	-	-		-	-	-

Duration (hour)		12	12	12	12	12
S-1	SLO-1	Fundamental of passive and active elements-VI relationship	Introduction to AC Circuits	Principle of Electrostatics	Introduction to Electrostatic devices	Introduction tomeasuring devices and Sensors
	SLO-2	Concept of Potential difference, voltage, current-Ohm's law	Definition : Average value, RMS value, form factor and peak factor of AC waveform	Electrostatic field, electric field intensity, electric flux density, absolute permittivity, relative permittivity	Energy conversion in Electrostatic device	Basic concept of indicating and integrating instruments
S-2	SLO-1	Electric networks- Terminology and symbols-voltage source and current sources, ideal and practical	Form factor and peak factor : Half wave rectifier, full wave rectifier	Coulomb's law, capacitor composite, dielectric capacitors	Construction of Single phase transformer	Concepts of Digital instruments: Digital Ammeter
	SLO-2	Concept of work, power, energy and conversion of energy	Form factor and peak factor : Triangular wave , trapezoidal wave	capacitors in series& parallel, energy stored in capacitors, charging and discharging of capacitors	principle of operation of Single phase transformer	Digital multimeter, Digital storage oscilloscope
S-3 to 4	SLO-1	Lab 1:Demonstration of measurement of electrical quantities in DC systems	Lab 4:Verification of Superposition, Maximum Power Transfer theorem	Lab 7: Simulation of simple solenoid using FEM software	Lab 10 : Verification of relation in between voltage and current in three phase balanced delta connected loads	Lab 13 :Familiarization of electrical Elements, sources and measuring devices related to electrical circuits
	SLO-2					
S-5	SLO-1	Introduction to DC Circuits-Verification of KCL-KVL	Phasor representation in polar and rectangular form	Electro-mechanics: Electricity and Magnetism, Magnetic field	EMF equation	Active and passive transducers
	SLO-2	Network solutions using Mesh analysis	Star/Delta transformation	faraday's law - self and mutual inductance	Problems in EMF equation	Capacitive transducers, Inductive transducers, LVDT
S-6	SLO-1	Nodal analysis	Derive the Impedance, Admittance, active, reactive and apparent power, power factor of R-L excited by AC	Ampere's law- Magnetic flux density and Magnetic field intensity	voltage ratio, current ratio, KVA rating	Electrical Strain Gauges, PIR sensor,
	SLO-2	Simplifications of networks using series-parallel	Derive the Impedance, Admittance, active, reactive and apparent power, power factor of R-C circuit excited by AC	Magnetic circuit, Magnetic material and B-H Curve	Efficiency and regulation.	Proximity Sensor, Hall effect sensors
S-7 to 8	SLO-1	Lab 2:Circuit reduction and basic laws	Lab 5: Simulation of Time domain analysis of R-C transient circuit	Lab 8 : Simulation of Time domain analysis of R-L-C transient circuit for XL> XC, XL< XC& XL = XC	Lab 11 : Demo on single phase transformer	Lab 14 :Determination of resistance temperaturecoefficient
	SLO-2					

S-9	**SLO-1**	Superposition theorem in DC circuits	Derive the Impedance, Admittance, active, reactive and apparent power, power factor of R-L-C series circuit excited by AC supply	Magnetostatics Vs Electrostatics	Application to electromechanical devices: DC motor	Electrical Wiring and Illumination system
	SLO-2	Thevenin'stheorem in DC circuits	Derive the Impedance, Admittance, active,	Application of Electrostatics and	Types of DC motors	Types of lighting system-lamps
			reactive and apparent power, power factor of R-L-C parallel circuit excited by AC supply	Magnetostatics		Incandescent Fluorescent, CFL Sodium Vapour lamp, Mercury Vapour lamp, Metal Halidelamp
S-10	**SLO-1**	Norton's theorem in DC circuits	Star connected 3 phase balanced AC circuits	Principle and types of batteries	Construction and operation DC motors	Necessity of earthing
	SLO-2	Maximum Power Transfer theorem in DC circuits	Delta connected 3 phase balanced AC circuits	Construction and application of battery	Characteristics of DC motor	Types of earthing
S-11 to 12	**SLO-1**	Lab 3:Verification of Thevenin'sand Norton's theorem	Lab 6: Simulation of Time domain analysis of R-L transient circuit	Lab 9 :Verification of relation in between voltage and current in three phase balanced star connected loads.	Lab 12: Demo on Electrical Machine	Lab 15 : Familiarization of transducers related to electrical circuit
	SLO-2					
	SLO-2					

Learning Resources	Dash.S.S,Subramani.C,Vijayakumar.K,BasicElectricalEngineering,1sted.,VijayNicole,2013. Jegatheesan .R, Analysis of Electric Circuits, Tata McGraw-Hill,2014. Vincent.Del.Toro,"ElectricalEngineeringFundamentals",SecondEdition,PrenticeHallIndia	4.S.K. Bhattacharya Basic Electrical and Electronics Engineering, Second edition, Pearson Education, 2017. 5. R. Muthusubramanian, S. Salivahanan,"Basic Electrical and Electronics Engineering, Tata McGraw-Hill, 2012.

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Experts From TCS		1. Mr.B.VinothKumar,SRMIST
		2.Mr.T.Vigneswaran,SRMIST

Course Code	18CSC161J	Course Name	FUNDAMENTALS OF COMPUTER SCIENCE	Course Category	C	Professional Core	L	T	P	C
							3	0	4	5

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Science and Engineering	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR): *The purpose of learning this course is to:*

CLR-1 :	*Think and evolve a logically to construct an algorithm into a flowchart and a pseudocode that can be programmed*
CLR-2 :	*Utilize the various operators ,expressions and programming constructs to solve problems in engineering and real-time*
CLR-3 :	*Utilize custom designed functions and that can be used to perform tasks and can be repeatedly used in any application*
CLR-4 :	*Store and retrieve data in a single and multidimensional array along with references*
CLR-5 :	*Create storage constructs using structure and unions. Create and Utilize files to store and retrieve information*
CLR-6 :	*Create a logical mindset to solve various engineering applications using programming constructs in C*

Learning

Program Learning Outcomes (PLO)

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	1 Level of Thinking(Bloom)	2 Expected Proficiency (%)	3 Expected Attainment(%)	1 Engineering Knowledge	2 Problem Analysis	3 Design & Development	4 Analysis, Design, Research	5 Modern Tool Usage	6 Society & Culture	7 Environment & Sustainability	8 Ethics	9 Individual &TeamWork	10 Communication	11 Project Mgt. & Finance	12 Life Long Learning	13 Engineering Knowledge	14 PSO-2	15 PSO–3
CLO-1 :	Identify methods to solve a problem through computer programming. List the basic data types and variables in C	2	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-2 :	Apply the logic operators and expressions. Use loop constructs and recursion. Use array to store and retrieve data	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-3 :	Analyze programs that need storage and form single and multi-dimensional arrays. Use pointer and preprocessor constructs in C	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-4 :	Create user defined functions for mathematical and other logical operations. Use pointer to address memory and data	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-5 :	Create structures and unions to represent data constructs. Use files to store and retrieve data	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-
CLO-6 :	Apply programming concepts to solve problems. Learn about how C programming can be effectively used for solutions	3	85	80	L	H	H	H	H	-	-	M	M	L	-	H	-	-	-

Duration (hour)		21	21	21	21	21
S-1	SLO-1	Evolution of Programming& Languages	Arithmetic Operators, Relational Operators	Basics of functions	Array Basic and Types	Structures: Initializing Structure, Declaring structure variable
	SLO-2	Problem solving through programming	Logical Operators, Comma, Conditional operators	Function declaration and definition	Array Initialization and Declaration	Structure using typedef, Accessing members, Nested structure
S-2	SLO-1	Creating algorithms	Increment Decrement Operators , Bitwise Operators	Parameter passing and returning type	Accessing, Indexing Array Operations	Array of structure Accessing elements in a structure array
	SLO-2	Drawing flowcharts	Assignment Operators and Expressions	C main return as integer and void	Multi-dimensional array	Passing Array of structure to function, Array of pointers to structures
S-3	SLO-1	Writing pseudocode	Precedence and Order of Evaluation	External, Local, Auto and Static storage classes	Row/column major formats	Self-referral Structures,
	SLO-2	Evolution of C language, its usage history	Associativity of operators	Variable Parameters	Command Line Arguments	Table look up, Typedef, Unions, Bit-fields
S 4-7	SLO-1 SLO-2	Lab 1: Algorithm, Flow Chart, Pseudocode	Lab 4: Operators ,Precedence and Associativity, problem solving	Lab 7: Practicing Functions and storage classes, Variable Parameters	Lab 10: Arrays – Programs using Arrays , 1D, 2D and MultiDimensional, Command line arguments	Lab 13: Structures & Unions
S-8	SLO-1	Input and output functions: Printf and scanf	Statements and Blocks	Register Variables	Pointers and address operator	Files: opening, defining, closing, file access including FILE structure, fopen, fclose
	SLO-2	Variable Names	If-Else-If	Scope Rules,	Size of Pointer Variable and Pointer Operator	File Modes & File Types, stdin, sdtout and stderr
S-9	SLO-1	Proper variable naming and Hungarian Notation	Nested if, else if	Block structure	Pointer Declaration and dereferencing pointers	Writing contents into a file, Reading file contents- fprintf, fscanf, fwrite, fread
	SLO-2	Data Type and Sizes (Little Endian Big Endian)	Switch case	Initialization, Recursion	Pointers and Function Arguments	Appending an existing file
	SLO-1	Integer floating Point representations	Goto , labels	Preprocessor directive , Macro	Pointers and Arrays	File permissions and rights,

S-10	SLO-2	Declaration of Variables and Dynamic Initialization of variables	Programs on conditional and unconditional branching	Standard Library Functions and return types	Address Arithmetic	Error Handling including exit, perror and error.h, Line I/O, related miscellaneous functions
S 11-14	SLO-1 SLO-2	Lab 2: Illustration of Data types, declaration, representations	Lab 5: Control flow : Conditional and Unconditional statements	Lab 8: Illustration of Scope, register variables, Recursion and STL	Lab 11: Functions	Lab 14 : make File utility, multi file processing
S-15	SLO-1	Constants, Named Constants	While loop	String Basics	Character Pointers and Functions	Unix system Interface: File Descriptor,
	SLO-2	Type Conversion	Do..While loop	String Declaration and Initialization	Pointer Arrays , Initialization of Pointer Arrays	Low level I/O – read and write, Open, create, close and uplink
S-16	SLO-1	Type Modifiers	For Loop	String Functions: gets(), puts(), getchar(), putchar(), printf()	Pointer to Pointer,	Random access – lseek
	SLO-2	Header Files	Break and continue	String Functions: atoi, strlen, strcat, strcmp	Pointer to functions	Discussions on Listing Directory, Storage allocator
S-17	SLO-1	Structure of C Program	Structured and un- structured programming	String Functions: sprint, sscanf, strrev, strcpy, strstr, strtok	Complicated declarations and their evaluation	Debugging
	SLO-2	Compiling and Executing C Programs	Programs using looping statements	Arithmetic Characters on Strings	Practicing Pointers	User Defined Header, User Defined Library
S 18-21	SLO-1 SLO-2	Lab 3: Simple C Programs	Lab 6: Practicing using while, Do, For	Lab 9: Programs on Strings and its operations, substring matching	Lab 12: Programs using Pointers and arithmetic , Pointer to function	Lab 15: User defined header, Unix System interface

Learning Resources	B.W.KernighanandD.M.Ritchi,"TheCProgrammingLanguage",SecondEdition,PHI. B.Gottfried,"ProgramminginC",SecondEdition,SchaumOutlineSeries.	Herbert Schildt, "C: The Complete Reference", Fourth Edition, McGrawHill. YashavantKanetkar, "Let Us C",BPBPublications

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20%	20%	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Level 3	Evaluate Create	10%	10%	15%	15%	15%	15%	15%	15%	15%	15%
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Experts From TCS		1. Dr. S.S.Sridhar, SRMIST

Course Code	18LEM101T	Course Name	CONSTITUTION OF INDIA	Course Category	M	Mandatory	L	T	P	C
							1	0	0	0

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	English	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	Utilize the citizen's rights
CLR-2 :	Utilize the basic citizen's fundamental rights of freedom of speech, expression, equality, religion and privacy
CLR-3 :	Identify the Indian constitutional framework with union parliament, government and their functions and citizen's rights
CLR-4 :	Utilize the States functionality and provisions for the betterment of the individual and society
CLR-5 :	Identify the emergency provisions, the functions of election and public service commissions, identify the tax system
CLR-6 :	Utilize the rights of a citizen both individual and as a society by understanding the constitutional provision and rights

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLO-1 :	Identify the basic provisions in the indian constitution	2	80	75	-	-	-	-	-	-	M	H	H	H	-	H	-	-	-
CLO-2 :	List the fundamental rights, rights to equality, freedom, religion, culture, education and the right against exploitation	2	75	70	-	-	-	-	-	-	M	H	H	H	-	H	-	-	-
CLO-3 :	Identify the fundamental duties of the Union of India, President, Vice-President, Union Ministers and Parliament functions	2	80	75	-	-	-	-	-	-	M	H	H	H	M	H	-	-	-
CLO-4 :	Identify the power of states, its legislature, Governors role and the state judiciary	2	75	70	-	-	-	-	-	-	M	H	H	H	M	H	-	-	-
CLO-5 :	List the special provisions and functionality of election commission, public service commission, individual tax and GST	2	85	80	-	-	-	-	-	-	M	H	H	H	H	H	-	-	-
CLO-6 :	Build knowledge on the various aspects in the Indian Constitution, its provisions and right of a citizen and the society	2	85	80	-	-	-	-	-	-	M	H	H	H	M	H	-	-	-

Duration (hour)		6	6	6	6	6
S-1	SLO-1	Meaning of the constitution law and constitutionalism	The Directive Principles of State Policy	President of India (with Powers and Functions)	Governor of the State (with Powers and Functions)	Local Self Government – Constitutional Scheme in India
	SLO-2	Historical perspective of the Constitution of India	Scheme of the Fundamental Right to Equality	Prime Minister of India (with Powers and Functions)	The Chief Minister of the State (with Powers and Functions)	Emergency Provisions : National, President Rule, Financial Emergency
S-2	SLO-1	Salient features and characteristics of the Constitution of India	Scheme of the Fundamental Right to certain Freedom under Article 19	Union Judiciary (Supreme Court) Jurisdiction of the Supreme Court	State Judiciary (High Courts)	Election Commission of India (with Powers and Functions)
	SLO-2	Citizenship	Scope of the Right to Life and Personal Liberty under Article 21	State Government	Union Territories, Panchayats,	The Union Public Service Commission (with Powers and Functions)
S-3	SLO-1	Scheme of the fundamental rights	Union Government, Union Legislature (Parliament)	State Legislature, Legislative Assembly, Legislative Council	Municipalities, Scheduled and Tribal Areas	Amendment of the Constitutional Powers and Procedure
	SLO-2	The scheme of the Fundamental Duties and its legal status	Lok Sabha and Rajya Sabha (with Powers and Functions), Union Executive	Powers and Functions of the State Legislature, State Executive	Co-operative Societies	Income Tax, Goods and Services Tax

Learning Resources	1. DurgadasBasu, Introduction to the Constitution of India,Lexis- Nexis, 2015 2. Subash C Kashyap, Our Parliament, National Books Trust, 2011	3. Kaushal Kumar Agarwal, India's No 1 book on Tax : Simple Language Advanced Problems: Income Tax, Kindle, 2017 4. Vivek K R Agarwal, GST Guide for students: Making GST – Good and Simple Tax, Neelam Book House, 2017

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)								Final Examination	
		CLA – 1 (20%)		CLA – 2 (30%)		CLA – 3 (30%)		CLA – 4 (20%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40%	-	30%	-	30%	-	30%	-	-	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	-	-
	Analyze										
Level 3	Evaluate	20%	-	30%	-	30%	-	30%	-	-	-
	Create										
	Total	100 %		100 %		100 %		100 %		-	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts		
1. Dr. Usha Kodandaraman, ABK AOTS, Chenna . drushak@gmail.com	1 .Dr. S. P.Dhanavel, IITM, Chennai, dhanavelsp@iitm@ac.in	1. Dr. K. Anbazhagan, SRMIST	3. Dr.SukanyaSaha, SRMIST	5. S. Ramya, SRMIST
2. Mr. Durga Prasad Bokka, TCS Chennai, durgaprasad@tcs.com	2. Ms. Subashree, VIT, Chennai, subashree@vit.ac.in	2. Ms. Cauveri B, SRMIST	4. Dr. M. M.Umamaheswari, SRMIST	

Course Code	18GNM101L	Course Name	PHYSICAL AND MENTAL HEALTH USING YOGA	Course Category	M	Mandatory	L	T	P	C
							0	0	2	0

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Centre for Applied Research in Education	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR): *The purpose of learning this course is to:*

		Learning		
		1	2	3
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLR-1 :	*Utilize rich Indian heritage and knowledge for self-healing and self-protection from diseases*			
CLR-2 :	*Apply meditation for attaining happiness and balancing emotions and state of mind and body*			
CLR-3 :	*Intellectually develop oneself by identifying oneness with divine state and transform towards absolute oneness in space*			
CLR-4 :	*Socially transform into a meaningful and purposeful individual to both self and society*			
CLR-5 :	*Spiritually enlighten oneself by purifying the body, soul and have a blissful existence*			
CLR-6 :	*Achieve personal benefits of whole health and wellbeing by practicing yoga for physical, emotional and mental fitness*			

Course Learning Outcomes (CLO): *At the end of this course, learners will be able to:*

		Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLO-1 :	*Identify Indian heritage, culture. Identify key anatomical structures in the human body and basic exercises for the same*	*2*	*80*	*75*	-	*M*	-	-	-	*H*	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-2 :	*Apply yoga meditation practices for emotional development and wellbeing*	*2*	*75*	*70*	-	*M*	-	-	-	*H*	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-3 :	*Identify educational and intellectual development methods using five sense realization and transformation*	*3*	*80*	*75*	-	*M*	-	-	-	*H*	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-4 :	*Demonstrate human values and emotions through thorough understanding about life, naturopathy and food habits*	*3*	*75*	*70*	-	*M*	-	-	-	*H*	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-5 :	*Impact self and society by peaceful coexistence with self-introspection and balanced diet charts*	*3*	*85*	*80*	-	*M*	-	-	-	*H*	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-6 :	*Demonstrate yoga exercises and postures to stretch and strengthen the body and mind*	*3*	*85*	*80*	-	*M*	-	-	-	*H*	*H*	*H*	*H*	*H*	-	*H*	-	-	-

		Physical Development	*Emotional Development*	*Intellectual Development*	*Social Development*	*Spiritual Development*
Duration (hour)		**6**	**6**	**6**	**6**	**6**
S-1	**SLO-1**	*Indian Heritage & Culture, Concept of Yoga, Objectives, Science & Art of Yoga*	*Brain Functions, Bio-Magnetism, Cognitive Mind*	*Education & Intelligence Development using Yoga. Improving Intelligence*	*Introduction: Social Intelligence*	*Spiritual Connect & Yoga: Self-Realization, Self-Awareness, Self-Actualization*
	SLO-2	*Women and Yoga Practice – Classification, Modern Age, Philosophy of Life*	*Emotional Intelligences, Managing Stress and Emotions*	*Learnability through Concentration, Intelligence through learning sense organs*	*Human values, Ethics & Morality*	*Cause and Effect Realization (Karma Yoga), Harmony in Life*
S-2	**SLO-1**	*Practice1: Standing exercise, Surya Namaskar*	*Practice4: Surya Namaskar, Standing asanas*	*Practice7: Yoga for Youthfulness (Kayakalpah Yoga)*	*Practice10: Kayakalpha, Bhandas, Meditation (Crown)*	*Practice13: Management of Physical problems (Yoga therapy)*
	SLO-2	*Meditation (Self Realization), Relaxation*	*Meditation (Five Sense Realization), Relaxation*	*Meditation (Five Sense Realization), Relaxation*	*Self-introspection Practice (Moralization of Desire) & Relaxation*	*Meditation (Nine centre) & Relaxation*
S-3	**SLO-1**	*Physical Health: Body Structure, Diseases and Causes, Science of Human Body*	*Meditation for Emotional development: Eyebrow Center (Agna) Meditation*	*Theory of Intellectual Transformation: Divine state origin, absolute space,*	*Exercises for Self-Introspection: Analysis of thoughts, Moralization of desires*	*Spiritual Enlightenment*
	SLO-2	*Yoga &Youthfulness. Benefits, Comparison between other exercises and Yoga*	*Genetic Centre (Santhi) Meditation. Stress Relaxation Exercises*	*Transformation of universe, living beings, Intelligence, Knowledge, Wisdom & Peace*	*Anger Management, Eradicating worries, concerns & challenges*	*Purifying the Body (Genetic center)*
S-4	**SLO-1**	*Practice2: Surya Namaskar, Sitting Exercises*	*Practice5: Surya Namaskar, Sitting asanas,*	*Practice8: Kayakalpha Yoga, Pranayama*	*Practice11: Kayakalpha Yoga, Krisya Yoga*	*Practice14: Project Submission*
	SLO-2	*Meditation (Self Realization) – Relaxation*	*Meditation (Agna) & Relaxation*	*Meditation (Agna) - Relaxation*	*Yoga Mudhras, Meditation (Santhi) & Relaxation*	*Meditation, Introspection, Sublimation*
S-5	**SLO-1**	*Exercises: Hands, Legs, Neuro-Muscular breathing, Eye, Ears, Nostrils, kidney, brain*	*Asanas (Postures) for Body Structure: Full Body Structure Maintenance*	*Exercises: Intellectual development Brain Crown Centre (Thuriyam) Meditation*	*Therapy for Social Development: Gestures Yoga (Mudhras) – Body locks (Bhandhas)*	*Spirituality for Stress Management*
	SLO-2	*digestive tract, stomach, lungs, spine, hip, neck. Pressure points in our body*	*Standing, Sitting, Prone & Supine Posture, Benefits of asanas*	*Five Senses (Panchendriya) Meditation, Consciousness and Law of nature*	*Indian Medical System: Naturopathy, Food, Nutrition, Diet Chart for Youthfulness*	*Yoga Practices for blissful existence*
S-6	**SLO-1**	*Practice3: Prone & Supine posture Exercises*	*Practice6: Surya Namaskar, Prone & Supine posture Asanas*	*Practice9: Kayakalpha, Mudhras, Self-introspection Practice (Thought Analysis)*	*Practice12: Balancing Asanas,*	*Practice15: Practical Exam*
	SLO-2	*Meditation (Self Realization) – Relaxation*	*Meditation (Shanthi) & Relaxation*	*Meditation (Santhi), & Relaxation*	*Meditation (Crown) & Relaxation*	*Meditation & Relaxation*

Learning Resources	1. *SadhguruJaggiVasudev, Inner Engineering – A yogi's guide to joy, 2016* 2. *Shri Shri Ravi Shankar, The Art of stress-free Living, 2011* 3. *Swami Ramdev Ji Yog Its Philosophy and Practice, 2008* 4. *YogirajVethathiri Maharishi, Yoga for Modern Age, Tenth edition, Vethathiri Publications, 2007* 5. *YogirajVethathiri Maharishi, Simplified Physical Exercises, Forty Second edition, Jan-2014*	6. *Vivekananda KenthriaPrkasan Trust, Yogam, 2006* 7. *Swami Chetanananda, Meditation and Its Methods According to Swami Vivekananda, Jan 2001* 8. *Dr.Lakshminarain Sharma, Yoga for the cure of Common Diseases, Mar 2016* 9. *Swami SatyanandaSaraswati, Asana Pranayama Mudra Bandha, Bihar School of Yoga, 1993* 10. *Dr. Asana Andiappan, Thirumoolar'sAstanga Yoga, International Yoga Academy, 2017*

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)								Final Examination	
		CLA – 1 (20%)		CLA – 2 (30%)		CLA – 3 (30%)		CLA – 4 (20%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	-	*40%*	-	*30%*	-	*30%*	-	*30%*	-	-
Level 2	Apply Analyze	-	*40%*	-	*40%*	-	*40%*	-	*40%*	-	-
Level 3	Evaluate Create	-	*20%*	-	*30%*	-	*30%*	-	*30%*	-	-
	Total	*100 %*		*100 %*		*100 %*		*100 %*		-	

 # CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
1. Mr. K. Sivakumar, LIC of India, ksivalic1970@gmail.com	*1. Dr. R. Elangovan, Tamilnadu Physical Education and SportsUniversity, relangovantnpesu@yahoo.co.in*	*1. Dr. V. Nithyananthan, SRMIST*
2. Mrs. R. Piramukutty, World Community Service Centre, piramukutty.gdvmvkm@gmail.com	*2.Dr.N.Perumal, Vethathiri Maharishi Institute for Spiritual and Intuitional Education, visionacademy@vethathiri.edu.in*	*2. Dr. S. JahiraParveen SRMIST*

Course Code	18PDM101L	Course Name	PROFESSIONAL SKILLS AND PRACTICES	Course Category	M	Mandatory	L	T	P	C
							0	0	2	0

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Career Development Centre	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR): *The purpose of learning this course is to:*

		Learning		
		1	2	3
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLR-1 :	*Utilize success habits to improve achievement in life*			
CLR-2 :	*Develop inter personal skills and be an effective goal oriented team player to achieve success*			
CLR-3 :	*Utilize professionalism with idealistic, practical and moral values that govern the behavior*			
CLR-4 :	*Become an expert in communication and problem solving skills*			
CLR-5 :	*Re-engineer attitude required to succeed and understand its influence on behavior to achieve professionalism*			
CLR-6 :	*Enhance holistic development of students and improve their employability skills*			

Course Learning Outcomes (CLO): *At the end of this course, learners will be able to:*

		Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO – 3
CLO-1 :	*Identify success habits*	*2*	*80*	*75*	-	-	-	-	-	-	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-2 :	*Acquire inter personal skills and be an effective goal oriented team player*	*2*	*75*	*70*	-	-	-	-	-	-	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-3 :	*Develop professionalism with idealistic, practical and moral values*	*2*	*80*	*75*	-	-	-	-	-	-	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-4 :	*Acquire communication and problem solving skills.*	*2*	*75*	*70*	-	-	-	-	-	-	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-5 :	*Re-engineer their attitude and understand its influence on behavior*	*2*	*85*	*80*	-	-	-	-	-	-	*H*	*H*	*H*	*H*	-	*H*	-	-	-
CLO-6 :	*Apply behavior changing elements to construct professionalism in character and behavior*	*2*	*85*	*80*	-	-	-	-	-	-	*H*	*H*	*H*	*H*	-	*H*	-	-	-

Duration (hour)		6	6	6	6	6
S-1	SLO-1	*Personality profiling*	*Etiquette and Grooming*	*Surveying and Reporting*	*Profile building*	*Innovation*
	SLO-2	*Being Proactive*	*Etiquette and Grooming*	*Surveying and Reporting*	*Profile building*	*Innovation*
S-2	SLO-1	*Begin with the end in mind*	*Collaborative skills*	*Projects*	*Personal Branding*	*Innovation*
	SLO-2	*Putting first things first*	*Collaborative skills*	*Projects*	*Personal Branding*	*Innovation*
S-3	SLO-1	*Thinking Win-Win*	*Networking skills*	*Paper presentations*	*Personal Branding*	*Creativity and out of box thinking*
	SLO-2	*Seeking first to understand and then to be understood*	*Networking skills*	*Paper presentations*	*Personal Branding*	*Creativity and out of box thinking*
S-4	SLO-1	*Synergizing*	*Team work and Support*	*Introduction to design thinking*	*USP*	*Creativity and out of box thinking*
	SLO-2	*Sharpening the saw*	*Team work and Support*	*Introduction to design thinking*	*USP*	*Creativity and out of box thinking*
S-5	SLO-1	*Character building*	*Leadership Skills*	*Generate ideas that are potential solutions to the problem identified*	*Developing profile*	*Six thinking hats*
	SLO-2	*IKIGAI*	*Leadership Skills*	*Generate ideas that are potential solutions to the problem identified*	*Developing profile*	*Six thinking hats*
S-6	SLO-1	*Self-worth*	*Leadership Styles*	*Report writing*	*Developing profile*	*Six thinking hats*
	SLO-2	*Attitude*	*Leadership Styles*	*Report writing*	*Developing profile*	*Six thinking hats*

Learning Resources

1. *Charles Harrington Elstor, Covey Sean, Seven Habits of Highly Effective Teens, New York, Fireside Publishers, 1998*
2. *Thomas A Harris, I am ok, You are ok, New York-Harper and Row, 1972*
3. *Carol Dweck, Mindset, The New Psychology of Success, Random House Pub. 2006*

Learning Assessment											
	Bloom's Level of Thinking	**Continuous Learning Assessment (100% weightage)**								**Final Examination**	
		CLA – 1 (20%)		CLA – 2 (30%)		CLA – 3 (30%)		CLA – 4 (20%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	-	*40%*	-	*30%*	-	*30%*	-	*30%*	-	-
	Understand										
Level 2	Apply	-	*40%*	-	*40%*	-	*40%*	-	*40%*	-	-
	Analyze										
Level 3	Evaluate	-	*20%*	-	*30%*	-	*30%*	-	*30%*	-	-
	Create										
	Total	100 %		100 %		100 %		100 %		-	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers			
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts	
1. Ms. SudhaMahadevan, Career Launcher, sudha.m@careerlauncher.com	*1. Mr. Nishith Sinha, dueNorth India Academics LLP, nsinha.alexander@gmail.com*	*1. Dr. T. Mythili, SRMIST*	*2. Mrs. B. Revathi, SRMIST*
2. Mr Ajay Zenner, Career Launcher, ajay.z@careerlauncher.com	*2. Dr.DineshKhattar, Delhi University, dinesh.khattar31@gmail.com*	*3. Mr. P. Priyanand, SRMIST*	*4. Mrs. M. Kavitha,, SRMIST*

SEMESTER - II

Course Code	18MBA162T	Course Name	BUSINESS COMMUNICATION & VALUE SCIENCE - II	Course Category	H	Humanities and Social Sciences	L	T	P	C
							2	0	0	2

Pre-requisite Courses	Basic Knowledge of English (verbal and written) Completion of all units from Semester 1	Co-requisite Courses	NA	Progressive Courses	NA
Course Offering Department	MBA	Data Book / Codes/Standards			

Course Learning Rationale (CLR): *The purpose of learning this course is to:*

CLR-1 :	Develop effective writing, reading, presentation and group discussion skills.
CLR-2 :	Help students identify personality traits and evolve as a better team player.
CLR-3	Introduce them to key concepts of Morality and Behavior and beliefs
CLR-4 :	Introduce them to the key concepts of diversity and inclusion
CLR-5 :	Understand the concept of speed reading
CLR 6:	Identify the individual personality types

Course Learning Outcomes (CLO): *At the end of this course, learners will be able to:*

		Learning			Program Learning Outcomes (PLO)											
		1	*2*	*3*	1	2	3	4	5	6	7	8	9	10	11	12
		LevelofThinking(Bloom)	*ExpectedProficiency(%)*	*ExpectedAttainment(%)*	Effectivecommunicationskills	Initiatecriticalthinking	Resourcesanalysisfororganizations	Familirizeorganizationsanditsstakeholders	Integratefunctionalknowledgewithstrategicskills	Comprehendeffectivelyinglobalizedenvironment	Practicebusinessethicswithintegrity	Enhancecareersandcommitment	Instigateentrepreneurialdrive	Applicationofmultidisciplinaryknowledgecomprisingoffinance,operations,system,marketingandhumanresourcesmanagementtointegratebusinessprojects.	Usageofbusinessmetricstoevaluatebusinessprojectstodevelopgrowthstrategies.	Authorizethestudentstoinnovateandexecutethebusinessideaduringthechallengingbusiness situation.
CLO-1 :	Understand tools of structured written communication	2	60	50	*H*	*H*	*H*	*M*	*M*	*L*	*M*	*M*	*L*	*M*	*H*	*L*
CLO-2 :	Understand the basics of presentation	2	80	70	*H*	*H*	*L*	*L*	*M*	*M*	*M*	*L*	*L*	*M*	*H*	*H*
CLO-3 :	Apply the basic concept of speed reading, skimming and scanning.	1	80	75	*H*	*H*	*L*	*L*	*M*	*M*	*L*	*L*	*L*	*M*	*H*	*M*
CLO-4 :	Identify individual personality types and role in a team.	2	80	70	*H*	*H*	*M*	*L*	*M*	*M*	*L*	*L*	*L*	*M*	*H*	*H*
CLO-5 :	Recognize the concepts of outward behavior and internal behavior	3	90	80	*H*	*H*	*H*	*L*	*M*	*M*	*L*	*L*	*L*	*M*	*H*	*L*
Overall	Gain Knowledge in application of the various techniques of communication	3	90	80	H	H	H	M	H	M	H	M	L	H	M	H

t

Duration (hour)		**12**	**12**	**12**	**12**	**12**
S-1	SLO-1	Icebreaker. 1) Participate in 'Join Hands Movement'.Individual identification ofsocial issues. 2) EachIndividual chooses Oneparticular social issue whichthey would like to address. 3)Class to be divided in teamsfor the entire semester. Allactivities to be done in teamsand the grades, credit Pointswill be captured in the leader board in the class room. 4)Theory to introduce theparticipant Slam book to beused for capturing Individuallearning points andobservations.	*Each group will form an NGO. Create Vision, Mission, Value statement, tagline and Design a logo.*	*Design a skit- a) write the script articulating the message of their respective NGOs. Read out the script. (Skit time- 5 minutes). Feedback of Theory.*	*Touch the target (Blind man) - Debriefing of the Practical. Film: "The fish and I' 'by BabakHabibifar" (1.37mins)*	*Prepare and publish the final episode of the E Magazine.*

	SLO-2	Group discussion, Practical	Practical (practical)	Practical based Learning Formative Evaluation	Practical and Discussion	Practical
S-2	SLO-1	Research on the social causeeach group will work for.	Introduction to basicpresentation skills & ORAI app	Promote the play through asocial media and gather youraudience. Enact the play.Capture the numbers of likesand reviews. Theory to assigngrades to individual team.(Lab Time)	Groups to create a story – 10 minutes of a person's lifeaffected by the social issuegroups are working on. Narrate the story in firstperson. Feedbacks to be shared by the other groups.	SATORI –Participants share the personal takeawayacquired from working inteams, GD, learning aboutpresentations andunderstanding diversityinclusion.
	SLO-2	Practical (practical)	Theory and video	Practical basedlearning Formative Evaluation	Practical, sharing andPractical	Discussion
S-3	SLO-1	Class discussion- GoodandBad Writing. Common errors,punctuation rules, use ofwords.	Groups to present their NGOs. Apply the learning gatheredfrom session 2. Presentationto be recorded by the groups.feedback from the audience/ Professor	Promote the play through asocial media and gather youraudience. Enact the play.Capture the numbers of likesand reviews. Theory to assigngrades to individual team.(ClassTime)	Groups to create a story – 10 minutes of a person's lifeaffected by the social issuegroups are working on. Narrate the story in firstperson. Feedbacks to be shared by the other groups. (Part 2)	Revisit your resume Includeyour recent achievements inyour resume.
	SLO-2	PPT, Theory andPractical	Formative evaluation	Practical basedlearning Formative Evaluation	Practical, sharing andPractical	Submit it to theProfessor
S-4	SLO-1	Group Practical- As a group, they will work on the social issue identified by them. Research, read and generate a report based on the findings. (Apply the learning and recap from the session)	Group to come back andshare their findings from therecording. Post work- individual write up to bewritten and evaluated forthe E- magazine	(1) Theory to find out fromthe participants their Views,observationsand experiencesof working in a team(2) Introof Dr. Meredith Belbin and hisresearch on team work andhow individualscontribute.	Research on a book, incidentor film based on the topic ofyour respectiveNGO	Quiz Time
	SLO-2	Formative evaluation	Sharing of learning,written Practical andformativeevaluation	Discussion andTheory	Research and writtenPractical	SummativeEvaluation for Unit
S-5	SLO-1	Practical: Plan and design an EMagazine. Apply andassimilate the knowledgegathered from Sem-1 till date.Share objective & guideline. All members to contribute anarticle to the magazine,trainer to evaluate the content.	Group to come back andshare their findings from therecording. Post work-individual write up to bewritten and evaluated for the E- magazine (Part 2)	Cont. (3) Belbin's 8 TeamRoles and Lindgren's Big 5personality traits.(4) Belbin's 8team player styles	Research on a book, incidentor film based on the topic ofyour respective NGO(Part2)	Project- 1) Each team tolook for an NGO/ socialgroup in the city which isworking on the issue theircollege group is supporting. 2) Spend a day with theNGO/ social group tounderstand exactly howthey work and thechallenges theyface. 3) Render voluntary serviceto the group for oneday 4) Invite the NGO/ socialgroup to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather

						audience,invite faculty members etc.(they need to get their planratified their professor). Outcome-- Host aninteractive session with theNGOspokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for the cause. (A)
	SLO-2	Practical (Practical)	*Sharing of learning,written Practical andformativeevaluation*	Practical basedlearning followed by a presentation	Research and writtenPractical	Field work:Formative Evaluation
S-6	SLO-1	*Practical: Plan and design an EMagazine. Apply andassimilate the knowledgegathered from Sem-1 till date.Share objective & guideline.* *All members to contribute anarticle to the magazine,trainer to evaluate the content. (Part 2)*	Prepare and publish theSecond episode of the EMagazine.	(1) Team Falcon Practical toidentify individual personalitytraits with Belbin's 8 teamplayer styles	Write a review in a blog onthe topics they are covering intheir research. Theory willgive grades to eachteam.	Project- 1) Each team tolook for an NGO/ socialgroup in the city which isworking on the issue theircollege group is supporting. 2) Spend a day with theNGO/ social group tounderstand exactly howthey work and thechallenges theyface. 3) Render voluntary serviceto the group for oneday 4) Invite the NGO/ socialgroup to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather audience, invite faculty members etc.(they need to get their plan ratified theirprofessor). Outcome-- Host aninteractive session with theNGOspokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for the cause.(B)
	SLO-2	Practical (Practical)	Practical (Lab)	Practical basedlearning followed by a presentation.	Written Practical andFormative Evaluation	**Field work:Formative Evaluation**
S-7	SLO-1	Lucid Writing: Encouragethe students to go throughthe links given about Catherine Morris andJoanie Mcmahon'swritingtechniques.	Prepare and publish theSecond episode of the EMagazine. (Part 2)	(2) Similar personality types toform groups (3) Groupspresent their traits.	Session on Diversity &Inclusion- Different forms ofDiversity in our society.	Project- 1) Each team tolook for an NGO/ socialgroup in the city which isworking on the issue theircollege group is supporting. 2) Spend a day with theNGO/ social group tounderstand exactly howthey work and thechallenges theyface. 3) Render voluntary serviceto the

						group for one day 4) Invite the NGO/ socialgroup to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather audience,invite faculty members etc.(they need to get their planratified their professor). Outcome-- Host aninteractive session with theNGOspokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for the cause.(C)
	SLO-2	Theory andDiscussion	Practical (Lab)	Presentation	PPT, Theory,discussion	Field work:Formative Evaluation
S-8	SLO-1	Create the magazine	Speed Reading session:Introduction to skimming andscanning; practice the same.	Prepare and publish the thirdepisode of the EMagazine.	Teams to video recordinterviews of people fromdiverse groups (Ask 5 questions). Share therecordings in FB	Project- 1) Each team tolook for an NGO/ socialgroup in the city which isworking on the issue theircollege group is supporting. 2) Spend a day with theNGO/ social group tounderstand exactly howthey work and thechallenges theyface. 3) Render voluntary serviceto the group for oneday 4) Invite the NGO/ socialgroup to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather audience,invite faculty members etc.(they need to get their planratified their professor). Outcome-- Host aninteractive session with theNGOspokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for the cause.(D)
	SLO-2	Practical (Lab)	Theory and Practical	Practical	Practical	Field work:Formative Evaluation
S-9	SLO-1	SATORI – Participants sharethe personal take awayacquired from GD, writing andreading skills activitiescaptured in theirhandbook.	SATORI – Join the dots- Participants to connect theirlearning gathered from AIPUnit-2 with their	SATORI – (join the dots withparticipants personal life)Participants share thepersonal take away acquiredfrom working in	Teams to video recordinterviews of people fromdiverse groups (Ask 5 questions). Share therecordings in FB(Part b)	Project- 1) Each team tolook for an NGO/ socialgroup in the city which is working on the issue theircollege group is supporting.

		Share the most Importantlearning points from theactivities done so far and howthat learning has brought a change.	Existingcurriculum	teams, GD,learning about Presentations,presenting their NGOs		2) Spend a day with theNGO/ social group tounderstand exactly Howthey work and thechallenges they face. 3) Render voluntary serviceto the group for one day 4) Invite the NGO/ socialgroup to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather audience,invite faculty members etc.(they need to get their Planratified their professor). Outcome-- Host aninteractive session with theNGO spokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for Thecause. (E)
	SLO-2	Theory/Discussion	Share the mostimportant learning points	Share the mostimportant learning points from theactivities done so far.Participants talkabout the Changesthey perceive inthemselves	Practical	Field work:Formative Evaluation
S-10	SLO-1	Launching an E Magazine.	Quiz Time	Quiz Time	Debate on the topic ofdiversity with an angle ofethics, morality and Respectfor individual (In the Presenceof an external moderator). Groups will be graded by Theprofessor.	Project- 1) Each team tolook for an NGO/ socialgroup in the city which Isworking on the issue theircollege group is supporting. 2) Spend a day with theNGO/ social group tounderstand exactly Howthey work and thechallenges they face. 3) Render voluntary serviceto the group for one day 4) Invite the NGO/ socialgroup to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather audience,invite faculty members etc.(they need to get their Planratified their professor). Outcome-- Host aninteractive session with theNGO spokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for the

						cause.(F)
	SLO-2	Practical (Lab)	SummativeEvaluation for Unit	SummativeEvaluation for Unit	Practical andformative evaluation	Field work:Formative Evaluation
S-11	SLO-1	Launching an E Magazine. (Part 2)	Ad campaign- Brain Stormingsession- Students to Discussand explore the means Ofarticulating and amplifying the social issue their NGO are working for.	Ten minutes of your time – ashort film on diversity. Play thevideo. (Link to be attached in the FG)	Prepared speech- Everystudent will narrate thechallengesfaced by a Memberof a diverse group in 4 minutes (speech in firstperson). Theory to give feedback toeach student.	Project- 1) Each team tolook for an NGO/ socialgroup in the city which Isworking on the issue theircollege group is supporting. 2) Spend a day with theNGO/ social group tounderstand exactly Howthey work and thechallenges they face. 3) Render voluntary serviceto the group for one day 4) Invite the NGO/ social group to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather audience,invite faculty members etc.(they need to get their Planratified their professor). Outcome-- Host aninteractive session with theNGO spokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for the Cause (G)
	SLO-2	Practical (Lab)	Discussion	Video & discussion	Practical andformative evaluation	Field work:Formative Evaluation
S-12	SLO-1	Quiz Time	Design a skit- a) write thescript articulating the messageof their respective NGOs.Read out the script. (Skit time-5 minutes). Feedback ofTheory.	Discuss key take away of thefilm. Theory to connect thekey take away of the film tothe concept of empathy.	Discussion on TCS values,Respect for Individual andIntegrity.	Project- 1) Each team tolook for an NGO/ socialgroup in the city which Isworking on the issue theircollege group is supporting. 2) Spend a day with theNGO/ social group tounderstand exactly Howthey work and thechallenges they face. 3) Render voluntary serviceto the group for one day 4) Invite the NGO/ socialgroup to address theiruniversity students for couple of hours. Plan thesuitable venue in theuniversity, gather audience,invite faculty members etc.(they need to get their

						Planratified their professor). Outcome-- Host aninteractive session with theNGOspokesperson 5) The groups to presenttheir experience of a daywith the NGO and inspirestudents to work for the cause. (H)
	SLO-2	SummativeEvaluation for Unit	Practical basedlearning. Formativeevaluation byTheory	Practical	PPT, Theory,Practical and discussion	Field work:Formative Evaluation

Learning Resources	1. Guiding Souls : Dialogues on the purpose of life; Dr. A.P.J Abdul Kalam ;Publishing Year-2005; Co-author--ArunTiwari 2. The Family and the Nation; Dr. A.P.J Abdul Kalam; Publishing year: 2015; Co-author: AcharyaMahapragya.	3. The Scientific India: A twenty First Century Guide to the World around Us; Dr. A.P.J Abdul Kalam; Publishing year: 2011; Co-author-Y.S.Rajan 4. ForgeYourFuture:Candid,Forthright,Inspiring;Dr.A.P.JAbdulKalam;Publishingyear:2014.

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	30	-	30	-	30	-	40	-	30	-
	Understand										
Level 2	Apply	40	-	40	-	40	-	30	-	40	-
	Analyze										
Level 3	Evaluate	30	-	30	-	30	-	30	-	30	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Experts From TCS	Dr.K.Latha, Chandasekara University, Kanchipuram	Mr.Vijay Raja, Assistant Professor, SRMSOM
	Dr.Thenmozhi, Professor, University of Madras	Dr.SanthoshKumart, Head – Human Resources , SRMSOM

Course Code	18MBA163T	Course Name	FUNDAMENTALS OF ECONOMICS	Course Category		Humanities & Social Sciences	L	T	P	C
							2	0	0	2

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	School of Management	Data Book / Codes/Standards		Nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to:	Learning	Program Learning Outcomes (PLO)

		1	2	3
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)
CLR-1 :	To provide a brief understanding of basic principles in economics			
CLR-2 :	Understand the concepts of demand and supply analysis			
CLR-3 :	Acquire knowledge on the principles of costs and other concepts of production			
CLR-4 :	Understand market structures			
CLR-5 :	Introduction to macro economics			
CLR-6 :	Knowledge of various concepts of micro and macro economics in real time economy			

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	1 Engineering Knowledge	2 Problem Analysis	3 Design & Development	4 Analysis, Design, Researc	5 Modern Tool Usage	6 Society & Culture	7 Environment & Sustainabili	8 Ethics	9 Individual & Team Work	10 Communication	11 Project Mgt. & Finance	12 Life Long Learning	13 PSO-1	14 PSO-2	15 PSO–3
CLO-1 :	Able to assess and understand the firm and the industry basic framework	2	80	70	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-2 :	Able to gauge and incorporate consumers behavior in decision making by the firm and consumers	2	85	75	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-3 :	Able to understand production decisions	2	75	70	H	-			-	-	-	-	-	-	-	-	-	-	-
CLO-4 :	Able to understand and assess decisions of an economy and its working	2	85	80	H	H	-	-	-	-	-	-	-	-	-	-	-	-	-
CLO-5 :	Able to understand the relationship between world economy and Indian economy	2	85	75	H	-	H	-	-	-	-	-	-	-	-	-	-	-	-
CLO-6 :	Able to understand the relationship between world economy and Indian economy	2	80	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Duration (hour)		6	6	6	6	6
S-1	SLO-1	Introduction- Firm and industry- Micro economics	Utility Maximization and Consumption	Production Function	Macro economics-Introduction	External sector
	SLO-2	Meaning and scope of economics	Consumers' and Producers' Surplus	Iso-quants	Aggregate demand	Exports and Imports
S-2	SLO-1	Importance of study of economics	Price Ceilings and Price Floors; Consumer Behaviour	Isocosts	Aggregate supply	Money —Definitions; Demand for Money
	SLO-2	Functions of economics	Axioms of Choice	Producer equilibrium	Circular flow of income	Transactionary and Speculative Demand
S-3	SLO-1	Demand - Introduction	Budget Constraints and Indifference Curves	Cost Minimization	National Income and its Components	Supply of Money
	SLO-2	Theory of demand	Consumer's Equilibrium	Cost Curves — Total, Average and Marginal Costs	GNP, NNP, GDP, NDP	Bank's Credit Creation Multiplier
S-4	SLO-1	Shifting and Expansion of demand	Income and Substitution Effects	Long Run and Short Run Costs	ConsumptionFunction	Integrating Money and Commodity Markets
	SLO-2	Elasticity of demand	Derivation of a Demand Curve;	Equilibrium of a Firm Under Perfect Competition	Investment	IS,LM Model
S-5	SLO-1	Theory of supply	Applications — Tax and Subsidies	Equilibrium of a Firm Under Monopoly	Simple Keynesian Model of Income Determination	Business Cycles and Stabilization — Monetary and Fiscal Policy
	SLO-2	Market equilibrium	Intertemporal Consumption	Equilibrium of a Firm Under Monopolistic Competition	KeynesianMultiplier	Central Bank and the Government; The Classical Paradigm
S-6	SLO-1	Price and output-Firm	Suppliers' Income Effect	Pricing decisions under various market structures	Government Sector	Price and Wage Rigidities
	SLO-2	Price and output - Industry	Decision making	Implications of pricing decisions	Taxes and Subsidies	Voluntary and Involuntary Unemployment

Learning Resources	*Microeconomics*, Pindyck, Robert S., and Daniel L. Rubinfeld *Macroeconomics*, Dornbusch, Fischer and Startz. *Economics*, Paul Anthony Samuelson, William D. Nordhaus.	*Intermediate Microeconomics: A Modern Approach*, Hal R, Varian *Principles of Macroeconomics*, N. Gregory Mankiw.

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	*40*	-	*30*	-	*30*	-	*30*	-	*30*	-
Level 2	Apply Analyze	*40*	-	*40*	-	*40*	-	*40*	-	*40*	-
Level 3	Evaluate Create	*20*	-	*30*	-	*30*	-	*30*	-	*30*	-
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Experts From TCS		*Dr. Nisha Ashokan*
		Dr. Padmaja M

Course Code	18MAB163T	Course Name	LINEAR ALGEBRA	Course Category	B	Basic Sciences	L	T	P	C
							3	1	0	4

Pre-requisite Courses	Nil.	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics	Data Book / Codes/Standards		nil	

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	Apply basic concepts of Matrix method to solve linear equations
CLR-2 :	Apply analytical concepts and numerical methods of Matrix to solve linear equations
CLR-3 :	Apply Vector space and its properties like Dimension, Basis, orthogonality, Projections, Gram-Schmidt orthogonalization and QR decomposition to solve engineering relatedproblems.
CLR-4 :	Apply Eigen values and Eigenvectors, Positive definite matrices, Linear transformations, Hermitian and unitary matrices to solve engineering related problems.
CLR-5 :	Understand the concepts of Singular value decomposition and Principal component analysis on basic applications in Image Processing and Machine Learning.

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		LevelofThinking(Bloom)	ExpectedProficiency(%)	ExpectedAttainment(%)	Engineering Knowledge	ProblemAnalysis	Design&Development	Analysis.Design.Research	ModernToolUsage	Society&Culture	Environment&Sustainability	Ethics	Individual&TeamWork	Communication	ProjectMgt.&Finance	LifeLongLearning	PSO-1	PSO-2	PSO-3
CLO-1 :	Gaining knowledge in basic concepts of Matrix method to solve linear equations.	2	85	80	M	H	L						M	L		H			
CLO-2 :	Gaining knowledge in analytical concepts and numerical methods of Matrix to solve linear equations.	2	85	80	M	H		M	M				M			H			
CLO-3 :	Understanding the concepts of vector space and its properties related to engineering problems	2	85	80	M	H							M			H			
CLO-4 :	Understanding the concepts of linear equations obtained from real world problems based on the characteristics of matrix	2	85	80	M	H		M					M			H			
CLO-5 :	Knowing and comprehend the machine learning methods on simple model of image process by the concepts of Singular value decomposition and Principal componentanalysis	2	85	80	M	H	L						M	L		H			

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		12	12	12	12	12
S-1	SLO-1	Introduction to Matrices	Basic definitions of vectors	Introduction to vector space	Introduction to Eigen values and corresponding Eigen vectors	Introduction to Singular value decomposition

	SLO-2	Problems on Matrices	Examples of vectors	Examples of vector space	Simple problems on Eigen values and corresponding Eigenvectors	Examples of Singular value decomposition
S-2	SLO-1	Problems on Matrices	Formation of linear combinations	Definition of dimension of vector space	Problems on Eigen values and corresponding Eigen vectors	Introduction to Principal component analysis
	SLO-2	Problems on Matrices	Examples of linear combinations	Definition of basis of vector space	Problems on Eigen values and corresponding Eigen vectors	Examples of Principal component analysis
S-3	SLO-1	Introduction to Determinants	Introduction to Rank of matrix	Problemsdimension and basis of vector space	Problems on Eigen values and corresponding Eigen vectors	Simple problems on singular value and principle of decomposition
	SLO-2	Problems on Determinants	Problems on Rank of matrix	Problems on dimension and basis of vector space	Problems on Eigen values and corresponding Eigen vectors	Simple problems on singular value and principle of decomposition
S-4	SLO-1	Problem solving using tutorial sheet 1 in Matrices	Problem solving using tutorial sheet 4 in rank of matrix	Problem solving using tutorial sheet 7 on dimension and basis of vector space	Problem solving using tutorial sheet 10 in finding Eigen values and corresponding Eigenvectors	Problem solving using tutorial sheet 13
	SLO-2	Problem solving using tutorial sheet 1 in determinants	Problem solving using tutorial sheet 4 in rank of matrix	Problem solving using tutorial sheet 7 on dimension and basis of vector space	Problem solving using tutorial sheet 10 in finding Eigen values and corresponding Eigenvectors	Problem solving using tutorial sheet 13
S-5	SLO-1	Solution of Linear Equations	Definition of Gaussian elimination	Definition of Orthogonality with simple examples	Definition of Positive definite of matrices.	Introduction to Image Processing
	SLO-2	Solution of Linear Equations	Problems using Gaussian elimination	Definition of Projections with simple examples	Examples of Positive definite of matrices.	Examples on Image Processing
S-6	SLO-1	Definition of Cramer's rule	Problems using Gaussian elimination	Problems based on Orthogonality andProjections	Problems on Positive definite of matrices.	Simple problems on applications in Image Processing based on Singular value decomposition and Principal component analysis
	SLO-2	Problems based on Cramer's rule	Problems using Gaussian elimination	Problems based on Orthogonality andProjections	Problems on Positive definite of matrices.	Simple problems on applications in Image Processing based on Singular value decomposition and Principal component analysis
S-7	SLO-1	Problems based on Cramer's rule	Problems using Gaussian elimination	Introduction to Gram-Schmidt orthogonalization	Introduction to Linear transformations	Simple problems on applications in Image Processing based on Singular value decomposition and Principal component analysis
	SLO-2	Problems based on Cramer's rule	Problems using Gaussian elimination	Simple Problems on Gram- Schmidt orthogonalization	Problems on Linear transformations	Simple problems on applications in Image Processing based on Singular value decomposition and Principal component analysis

S-8	SLO-1	Problem solving using tutorial sheet 2 in solving Linear Equations	Problem solving using tutorial sheet 5 in Gaussian elimination method	Problem solving using tutorial sheet 9 in Orthogonality and Projections	Problem solving using tutorial sheet 11 in Positive definite of matrices.	Problem solving using tutorial sheet 14
	SLO-2	Problem solving using tutorial sheet 2 in solving Linear Equations	Problem solving using tutorial sheet 5 in Gaussian elimination method	Problem solving using tutorial sheet 9 in Orthogonality and Projections	Problem solving using tutorial sheet 11 in Linear transformations	Problem solving using tutorial sheet 14
S-9	SLO-1	Definition of Inverse of a Matrix	Definition of LU Decomposition	Simple Problems on Gram- Schmidt orthogonalization	Definition of Hermitian with examples	Introduction to Machine Learning
	SLO-2	Problem on Inverse of a Matrix	Problems on LU Decomposition	Simple Problems on Gram- Schmidt orthogonalization	Examples on Hermitian with examples	Examples on Machine Learning
S-10	SLO-1	Problem on Inverse of a Matrix	Problems on LU Decomposition	Definition of QR decomposition	Problem on Hermitian	Simple problems on applications in Machine Learning based on Singular value decomposition and Principal component analysis
	SLO-2	Problem on Inverse of a Matrix	Problems on LU Decomposition	Problems on QR decomposition	Problem on Hermitian	Simple problems on applications in Machine Learning based on Singular value decomposition and Principal component analysis
S-11	SLO-1	Problem on Inverse of a Matrix	Solving Systems of Linear Equations using the tools of Matrices	Problems on QR decomposition	Definition of unitary matrices	Simple problems on applications in Machine Learning based on Singular value decomposition and
						Principal component analysis
	SLO-2	Problem on Inverse of a Matrix	Solving Systems of Linear Equations using the tools of Matrices	Problems on QR decomposition	Examples on unitary matrices	Simple problems on applications in Machine Learning based on Singular value decomposition and Principal component analysis
S-12	SLO-1	Problem solving using tutorial sheet 3 to find Inverse of a Matrix	Problem solving using tutorial sheet 6 in Solving Systems of Linear Equations using the tools of Matrices	Problem solving using tutorial sheet 10	Problem solving using tutorial sheet 12	Problem solving using tutorial sheet 15
	SLO-2	Problem solving using tutorial sheet 3 to find Inverse of a Matrix	Problem solving using tutorial sheet 6 in Solving Systems of Linear Equations using the tools of Matrices	Applications of Orthogonality and Projections in Engineering.	Problem solving using tutorial sheet 12	Problem solving using tutorial sheet 15
		REFERENCE BOOKS/OTHER READING MATERIAL				

1	*Higher Engineering Mathematics*, B. S. Grewal
2	*Advanced Engineering Mathematics*, 7th Edition, Peter V. O'Neil
3	*Advanced Engineering Mathematics*, 2nd Edition, Michael. D. Greenberg
4	*Introduction to linear algebra*, 5th Edition, Gilbert Strang
5	*Applied Mathematics* (Vol. I & II) , by P. N. Wartikar& J. N. Wartikar
6	*Digital Image Processing*, R C Gonzalez and R E Woods
7	https://machinelearningmastery.com/introduction-matrices-machine-learning/

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	40%	-	30%	-	30%	-	30%	-	30%	-
	Understand										
Level 2	Apply	40%	-	40%	-	40%	-	40%	-	40%	-
	Analyze										
Level 3	Evaluate	20%	-	30%	-	30%	-	30%	-	30%	-
	Create										
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

SLO – Session Learning Outcome

Course Designers

(a) Experts from Industry

1	***Experts From TCS***						

(b) Experts from Higher Technical Institutions

3	*Dr.K.C.Sivakumar*	*IIT, Madras*	*kcskumar@iitm.ac.in*	4	*Dr.Nanjundan*	*Bangalore University*	*nanzundan@gmail.com*

(b) Internal Experts

5	*Dr.A.Govindarajan*	*SRMIST*	givindarajan.a@ktr.srmuniv.ac.in	6	*Dr.N.Parvathi*	*SRMIST*	*Parvathi.n@srmuniv.ac.in*

Course Code	18MAB164J	Course Name	STATISTICAL MODELING	Course Category	BS	Basic Sciences	L	T	P	C
							3	0	2	4

Pre-requisite Courses	18MAB162T	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Mathematics	Data Book / Codes/Standards	Statistical tables		

Course Learning Rationale (CLR):	The purpose of learning this course is :
CLR-1 :	To apply the basic Linear Statistical Models in Engineering field and to understand how correlation and regression analysis can be used to develop an equation that estimates how two variables are related
CLR-2 :	To learn the procedure of estimate of statistical data
CLR-3 :	To learn the basics and importance of Testing Hypothesis
CLR-4 :	To learn the basics and importance of Non-parametric methods in testing hypothesis
CLR-5 :	To know the procedure for Time Series Analysis & Forecasting
CLR-6:	To comprehend the applications of R statistical programming language and acquired the knowledge of statistical modeling using R programming

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)															
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		Level of Thinking (Bloom)	Expected Proficiency (%)	Expected Attainment (%)	Engineering Knowledge	Problem Analysis	Design & Development	Analysis, Design, Research	Modern Tool Usage	Society & Culture	Environment & Sustainability	Ethics	Individual & Team Work	Communication	Project Mgt. & Finance	Life Long Learning	PSO - 1	PSO - 2	PSO - 3
CLO-1 :	Pertain the Knowledge of Linear Statistical Models in Engineering field and to understand how correlation and regression analysis	3	85	80	M	H	L						M	L		H			
CLO-2 :	Gain familiarity in estimate of statistical data	3	85	80	M	H		M	M				M			H			
CLO-3 :	Acquire knowledge in Testing Hypothesis	3	85	80		M							M			H			
CLO-4 :	Gaining knowledge in non-parametric methods	3	85	80	M	H	L	M					M	L		H			
CLO-5 :	Getting the knowledge of Time Series Analysis & Forecasting and apply them in the problems in Science and Engineering	3	85	80	M	H	M						M			H			
CLO-6 :	Understanding the concept and applications of R statistical programming language and to solve the problems of statistics using R programming	3			M	H							M			H			

		Learning Unit / Module 1	Learning Unit / Module 2	Learning Unit / Module 3	Learning Unit / Module 4	Learning Unit / Module 5
Duration (hour)		15	15	15	15	15
S-1	SLO-1	Linear Statistical Models - Introduction	Introduction to Estimation	Problems based on Methodsof estimation including maximum likelihood estimation.	Non-parametric Inference	Basics of Time Series Analysis & Forecasting
	SLO-2	Linear Statistical Models - Introduction	Introduction to Estimation	Problems based on Methodsof estimation including maximum likelihood estimation.	Non-parametric Inference	Basics of Time Series Analysis & Forecasting
S-2	SLO-1	Simple linear correlation	Point estimation	Problems based on consistency	Comparison with parametric inference	Stationary models
	SLO-2	Simple linear correlation	Point estimation	Problems based on consistency	Use of order statistics	Stationary models identification
S-3	SLO-1	Simple linear regression	Point estimation	Problems based on sufficient estimation	Signtest	Stationary models Estimation and Forecasting
	SLO-2	Simple linear regression	criteria for good estimates (un-biasedness	Problems based on sufficient estimation	Wilcoxon signed rank test	Stationary models Estimation and Forecasting
S-4,5	SLO-1	**Lab 1:** Introduction to R	**Lab 4:** Working with Vectors and Matrices	**Lab 7:** Writing Data	**Lab 10:** Manipulating Data	**Lab 13:** Data Frame
	SLO-2					
S-6	SLO-1	multiplecorrelation	criteria for good estimates (consistency)	Introduction to Test of hypothesis	Mann-Whitney	ARIMA Models
	SLO-2	multiplecorrelation	criteria for good estimates (consistency)	Concept & formulation	Mann-Whitney	ARIMA Models identification
S-7	SLO-1	multiple regression Sufficient Statistic: Concept & examples	Methodsof estimation including maximum likelihood estimation.	Type I and Type II errors	Run test	ARIMA Models Estimation and Forecasting
	SLO-2	multiple regression	Methodsof estimation including maximum likelihood estimation.	Type I and Type II errors	Run test	ARIMA Models Estimation and Forecasting

S-8	SLO-1	Introduction to Analysis of variance	Problems based on Methodsof estimation including maximum likelihood estimation.	Neyman Pearson lemma	Kolmogorov-Smirnov test	Problems based on ARIMA Models
	SLO-2	One way ANOVA with as well as without interaction	Sufficient Statistic: Concept & examples	Neyman Pearson lemma	Kolmogorov-Smirnov test	Problems based on ARIMA Models
S-9,10	SLO-1 SLO-2	**Lab 2:** Functions- Control flow and Loops	**Lab 5:**Working with Vectors and Matrices	**Lab 8:** Working with Data	**Lab 11:** Manipulating Data	**Lab 14:** Graphics in R
S-11	SLO-1	Problems based on One way ANOVA	Sufficient Statistic: Concept & examples	Example based on Neyman Pearson lemma	Spearman's and Kendall's test, Tolerance region	Problems based on Stationary models
	SLO-2	Problems based on Two way ANOVA	complete sufficiency, their application in estimation	Example based on Neyman Pearson lemma	Spearman's and Kendall's test, Tolerance region	Problems based on Stationary models
S-12	SLO-1 SLO-2	Problems based on one and Two way ANOVA	complete sufficiency, their application in estimation	More Example based on Neyman Pearson lemma	More problems based on Non-Parametric methods	Problems based on Stationary models ARIMA Models
S-13	SLO-1 SLO-2	Applications of Linear Statistical Models and ANOVA in Engineering field	Application of estimation in Engineering field	Application of estimation and testing hypothesis in Engineering	Applications and the importance of Testing Hypothesis	Engineering Applications ofTime Series Analysis & Forecasting
S - 14-15	SLO-1 SLO-2	**Lab 3:** Functions- Control flow and Loops	**Lab 6:** Reading in Data	**Lab 9:** Working with Data	**Lab 12:** Simulation - Linear model	**Lab 15:** Graphics in R
Learning Resources		1. Probability and Statistics for Engineers (4th Edition), I.R. Miller, J.E. Freund and R. Johnson, 2015. 2. Fundamentals of Statistics (Vol. I & Vol. II), A. Gun, M. k. Gupta and B.Dasgupta, 2016. 3. The Analysis of Time Series: An Introduction, Chris Chatfield, Sixth edition-2016. 4. Hands-on Programming with R,- Garrett Grolemund, 2014 5. R for Everyone: Advanced Analytics and Graphics, Jared P. Lander, First edition-2013.				

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	20 %	20 %	15%	15%	15%	15%	15%	15%	15%	15%
Level 2	Apply Analyze	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %	20 %
Level 3	Evaluate Create	10 %	10 %	15 %	15 %	15 %	15 %	15 %	15 %	15 %	15 %
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,
SLO – Session Learning Outcome

Course Designers

(a) Experts from Industry

1	Mr.V.Maheshwaran	CTS, Chennai	maheshwaranv@yahoo.com				
(b) Experts from Higher Technical Institutions							
2	Dr.K.C.Sivakumar	IIT, Madras	kcskumar@iitm.ac.in	3	Dr.Nanjundan	Bangalore University	nanzundan@gmail.com
(b) Internal Experts							
4	Dr.A.Govindarajan	SRMIST	govindarajan.a@ktr.srmuniv.ac.in	5	Dr.Srinivasan	SRMIST	srinivasan.va@srmuniv.ac.in

Course Code	18EES162J	Course Name	PRINCIPLES OF ELECTRONICS	Course Category	S	Engineering Sciences	L	T	P	C
							2	0	2	3

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	Computer Science Engineering	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to: Understand Electronic circuits and design simple circuits		Learning		Program Learning Outcomes (PLO)

			LevelofThinking(Bloom)	ExpectedProficiency(%)	ExpectedAttainment(%)		EngineeringKnowledge	ProblemAnalysis	Design&Development	Analysis,Design,Research	ModernToolUsage	Society&Culture	Environment&Sustainability	Ethics	Individual&TeamWork	Communication	ProjectMgt.&Finance	LifeLongLearning	PSO–1(Knowingthebasics)	PSO–2(Applyingleamtknowledge)	PSO–3(Exentdinglearnttheory)
CLR-1:	For the student to understands the use of Silicon based diode and transistor operations he can build complex circuits		1	2	3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
CLR-2:	BJT is the initial transistor made, by learning about it the use of multiple pn junction devices can be understood																				
CLR-3:	MOSFET is a building block for any complex electronic circuit and hence the need to understand its working and application																				
CLR-4:	Many of electronic circuits are based on signal amplifiers; it can be configured to provide many functionalities																				
CLR-5:	Without knowing digital electronics, computational circuits are not possible																				
CLR-6:	-																				
Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:																				
CLO- 1 :	Understand physical process of Si based pn junctions; able to design simple circuits using pn junction diodes.		2	80	70		H	M	-	-	-	-	-	-	-	-	-	-	L	-	-
CLO- 2 :	Understand the working of diodes and BJTs.; In addition he will gain knowledge on using it for simple designs		2	85	75		H	M	-	-	-	-	-	-	-	-	-	-	M	-	-
CLO- 3 :	Understand the working of MOSFETs and circuits based on it. He will also be capable of making small circuits		2	85	75		H	-	H	H	-	-	-	-	-	-	-	-	-	M	-
CLO- 4 :	Study and analyze linear and non linear circuits, including amplifiers in small and large signal conditions.		4	85	75		H	H	-	H	-	-	-	-	-	-	-	-	-	M	-
CLO- 5 :	Design simple digital circuits and analyze, simulate and implement		4	90	85		H	M	-	M	-	-	-	-	-	-	-	-	-	H	L
CLO- 6 :	-																				

Duration (hour)		12	12	12	12	12
S- 1	SLO- 1	Crystalline materials	BJT formation	MOSFET fundamentals	Theoretical basis of small signal amplifiers	Analog and digital signals, waveform,
	SLO- 2	Electrical and mechanical properties	Difference between the three regions	MOSFET fundamentals	Theoretical basis of small signal amplifiers	Levels, representation and noise
S- 2	SLO- 1	Energy band theory	BJT electrical characteristics	FET biasing	Concept of feed back	Boolean Algebra
	SLO- 2	Fermi level	BJT electrical characteristics	Fixed and self biasing	Types of feedback and its effects	Boolean function and truth tables
S- 3	SLO- 1	Pn junction	Analysis of BJT in CE mode	Depletion and enhancement modes	Loop gain and open loop gain	Simplification of logic expressions
	SLO- 2	Drift and diffusion carriers	Biasing and load line effect	Depletion and enhancement modes	Problems	K- map & problems
S- 4	SLO- 1	Built-in potential	Analysis of CB and CC mode	CS configuration analysis	Output and input impedance	Adder and subtractor
	SLO- 2	Biased pn junction	Analysis of CB and CC mode	Problems	Output and input impedance	Multipluxers, demultipluxers and its uses
S	SLO-	Lab: Simulating pn junction	Lab: BJT characteristics, load line,	Lab on FET characteristics, load line,	Lab: Simulation of any one MOSFET	Lab: Implementing a digital function

5-6	**1** **SLO- 2**	*characteristics*	*biasing effects.*	*biasing*	*amplifier and analysis*	*using gates and digital ICs, measuring noise.*
S- 7	**SLO- 1**	*Zener Diodes*	*Cut-off, active and saturation modes*	*CD configuration analysis*	*Operation amplifier*	*Concept of sequential circuits and clock*
	SLO- 2	*LEDs*	*Cut-off, active and saturation modes*	*Problem*	*Typical circuit diagram*	*Flip flop and typical circuit*
S- 8	**SLO- 1**	*Load line analysis*	*Injection efficiency*	*CG configuration*	*Characteristics of OPAMP*	*Various types of FFs*
	SLO- 2	*Series – parallel configurations of diodes*	*Base transport factor in CE mode*	*Combining configurations*	*Characteristics of OPAMP*	*Various types of FFs*
S- 9	SLO	*AND / OR gates with diodes*	*Current amplification factor in CB mode*	*Designing FET amplifier networks*	*Inverting and non-inverting modes*	*Shift register – serial to parallel*
	SLO- 2	*Rectifiers*	*Current amplification factor in CB mode*	*Problems*	*Problems*	*Parallel to serial*
S- 10	SLO- 1	*Ripple factor and filtering*	*Biasing and stability analysis*	*CMOS fundamentals*	*Applications of OPAMPS: Adder, subtractor, constant gain amplifier*	*Ripple carry counter*
	SLO- 2	*Effect of load on ripple factor*	*Simple CE amplifier*	*Problems*	*Voltage follower, Integrator, differentiator.*	*Synchronous counter*
S 11-12	SLO- 1 SLO- 2	*Lab: Full wave and half wave rectifiers, with and without RC filter*	*Lab: Design and testing of CE amplifier*	*Lab: FET amplifier, simple and cascade*	*Lab: Design and build OPAMP amplifier*	*Lab: Implementation of any one shift register or counter*

Learning Resources	*1. Adel S. Sedra and Kenneth Carless Smith, "Microelectronic Circuits, Theory and applications", 7th edition, Oxford press.2. Jacob Millman, Christos Halkias, Chetan Parikh, "Millman's Integrated Electronics", McGraw Hill, 2017.*	1. *Morismano, "Digital Logic & Computer Design", Pearson, 2017.*

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50%								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	*20%*	*20%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*	*15%*	*15%*
Level 2	Apply Analyze	*20%*	*20%*	*20%*	*20%*	*30%*	*30%*	*20%*	*30%*	*20%*	*20%*
Level 3	Evaluate Create	*10%*	*10%*	*15%*	*15%*	*10%*	*10%*	*10%*	*10%*	*15%*	*15%*
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Experts From TCS		*Prof. V. Natarajan (ECE department SRMIST)*

Course Code	18CSC162J	Course Name	DATA STRUCTURES AND ALGORITHMS	Course Category	C	Professional Core	L	T	P	C
							3	0	4	5

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	
Course Offering Department	Computer Science and Engineering	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR):	The purpose of learning this course is to:
CLR-1 :	Utilize the different data types; Utilize searching and sorting algorithms for data search
CLR-2 :	Utilize linked list in developing applications
CLR-3 :	Utilize stack and queues in processing data for real-time applications
CLR-4 :	Utilize tree data storage structure for real-time applications
CLR-5 :	Utilize algorithms to find shortest data search in graphs for real-time application development
CLR-6 :	Utilize the different types of data structures and its operations for real-time programming applications

Course Learning Outcomes (CLO):	At the end of this course, learners will be able to:	Learning			Program Learning Outcomes (PLO)														
		1	2	3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
		LevelofThinking(Bloom)	ExpectedProficiency(%)	ExpectedAttainment(%)	EngineeringKnowledge	ProblemAnalysis	Design&Development	Analysis,Design,Research	ModernToolUsage	Society&Culture	Environment&Sustainability	Ethics	Individual&TeamWork	Communication	ProjectMgt.&Finance	LifeLongLearning	PSO-1	PSO-2	PSO–3
CLO-1 :	Identify linear and non-linear data structures. Create algorithms for searching and sorting	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-
CLO-2 :	Create the different types of linked lists and evaluate its operations	3	85	75	M	H	L	M	L	-	-	-	M	L	-	H	-	-	-
CLO-3 :	Construct stack and queue data structures and evaluate its operations	3	75	70	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-4 :	Create tree data structures and evaluate its types and operations	3	85	80	M	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-5 :	Create graph data structure, evaluate its operations, implement algorithms to identify shortest path	3	85	75	H	H	M	H	L	-	-	-	M	L	-	H	-	-	-
CLO-6 :	Construct the different data structures and evaluate their types and operations	3	80	70	L	H	-	H	L	-	-	-	L	L	-	H	-	-	-

Duration (hour)		21	21	21	21	21
S-1	SLO-1	Introduction-Basic Terminology	Array	General Trees	Graph Terminology	Hashing: Hash functions - Introduction
	SLO-2	Data Structures	Operations on Arrays – Insertion and Deletion	Tree Terminologies	Graph Traversal	Types of hashing
S-2	SLO-1	Data Structure Operations	Applications on Arrays - Multidimensional Arrays- Sparse Matrix	Tree Representation	Topological sorting	Hash functions
	SLO-2	ADT	Linked List Implementation - Insertion	Tree Traversal	Minimum spanning tree – Prims Algorithm	Applications of Hash Table
S-3	SLO-1	Algorithm specification	Linked List- Deletion and Search	Binary Tree Representation	Minimum Spanning Tree - Kruskal's Algorithm	Hashing : Collision avoidance
	SLO-2	Recursion, Performance analysis	Applications of Linked List - Polynomial Arithmetic	Expression Trees	Shortest Path Algorithm: Dijkstra's Algorithm	Hashing : Separate chaining
S 4-7	SLO-1	Lab 1: Implementation of Towers of Hanoi Using recursion	Lab 4 :Implementation of Linked List	Lab 7 :Implementation of Tree Traversals	Lab 10: Implementation of Minimal Spanning Tree	Lab 13: Implementation of Bubble Sort ,Insertion sort
	SLO-2					
S-8	SLO-1	Programming Style, Refinement of Coding	Cursor Based Implementation	Binary Tree Traversal	Searching -Linear search	Open Addressing
	SLO-2	Complexity – Time , Space Trade off	Circular Linked List - Applications of Circular List -Joseph Problem	Threaded Binary Tree	Searching -Binary search	Linear Probing
S-9	SLO-1	Mathematical notations	Doubly Linked List Insertion	Binary Search Tree :Construction, Searching	Breadth First search	Quadratic probing
	SLO-2	Asymptotic notations-Big O, Omega	Doubly Linked List Deletion	Binary Search Tree : Insertion and Deletion	Depth First search	Double Hashing

S-10	SLO-1	*Asymptotic notations - Theta*	*Stack ADT- Stack Array Implementation*	*AVLTrees: Rotations*	*Introduction to Sorting*	*Rehashing*
	SLO-2	*Mathematical functions*	*Stack Linked List Implementation*	*AVL Tree: Insertions*	*Bubble sort*	*Extensible Hashing*
S 11-14	SLO-1	*Lab 2: Implementation of Array – Insertion, Deletion.*	*Lab 5: Implementation of Doubly linked List*	*Lab 8: Implementation of Binary search tree*	*Lab 11:Implementation of Shortest path Algorithm*	*Lab 14 :Implementation of Graph using Array*
	SLO-2					
S-15	SLO-1	*Data Structures and its Types*	*Applications of Stack- Infix to Postfix Conversion*	*B-Trees Constructions*	*Insertion sort*	*Introduction to Files*
	SLO-2	*Linear and Non-Linear Data Structures*	*Applications of Stack- Postfix Evaluation*	*B-Trees Search*	*Selection sort*	*File Organization*
S-16	SLO-1	*1D, 2D Array Initialization using Pointers*	*Applications of Stack- Balancing symbols*	*B-Trees Deletions*	*Shell sort*	*Sequential*
	SLO-2	*1D, 2D Array Accessing usingPointers*	*Queue ADT-Queue Implementation using array - Queue Implementation using Linked List*	*B+ tree*	*Merge sort*	*Direct*
S-17	SLO-1	*Declaring Structure and accessing*	*Circular Queue -Implementation of Circular Queue*	*Splay Trees*	*Quick sort*	*Index Sequential*
	SLO-2	*Declaring Arrays of Structures and accessing*	*Applications of Queue*	*Applications of Trees*	*Heap sort*	*Hashed*
S 18-21	SLO-1	*Lab 3: Implement Structures using Pointers*	*Lab 6: Implementation of Stack and its Applications*	*Lab 9: Implementation of B-Trees*	*Lab 12: Implementation of Quick Sort ,Merge sort*	*Lab 15 :Implementation of File concepts*
	SLO-2					

Learning Resources	*1. Fundamentals of Data Structures, E. Horowitz and S. Sahni,1977.* *2. DataStructuresandAlgorithms,AlfredV.Aho,JohnE.Hopcroft,JeffreyD.Ullman.* *3. Mark Allen Weiss, Data Structuresand Algorithm Analysis in C, 2nded., Pearson Education, 2015*	*4. ReemaThareja, Data Structures Using C, 1sted., Oxford Higher Education,2011* *5. Thomas H Cormen, Charles E Leiserson, Ronald L Revest, Clifford Stein, Introduction to Algorithms 3rded., The MIT Press Cambridge,2014*

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (50% weightage)								Final Examination (50% weightage)	
		CLA – 1 (10%)		CLA – 2 (15%)		CLA – 3 (15%)		CLA – 4 (10%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*
	Understand										
Level 2	Apply	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*
	Analyze										
Level 3	Evaluate	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*
	Create										
	Total	100 %		100 %		100 %		100 %		-	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers		
Experts from Industry	Experts from Higher Technical Institutions	Internal Experts
Experts From TCS		***1****. Mr. G. Manoj Kumar, SRMIST*

Course Code	18LEM102J	Course Name	VALUE EDUCATION	Course Category	M	Mandatory	L	T	P	C
							1	0	1	0

Pre-requisite Courses	Nil	Co-requisite Courses	Nil	Progressive Courses	Nil
Course Offering Department	English and Foreign Languages	Data Book / Codes/Standards	Nil		

Course Learning Rationale (CLR): *The purpose of learning this course is to:*

CLR-1 :	*Connect the learners to their potential, identifytheir potential to create a new positive world*
CLR-2 :	*Analyze the merits and demerits of different educational systems. Identify the different systems of education*
CLR-3 :	*Draw attention towards the weaknesses they are susceptible to and inspire them through positive models*
CLR-4 :	*Instill a sense of professional ethics which help them develop a safe comfortable and prosperous society*
CLR-5 :	*Cultivate a spirit of willing accommodation in an increasingly diverse world*
CLR-6 :	*Strengthen, enhance the spirit of positivity and facilitate positive contribution in various spheres of life*

Course Learning Outcomes (CLO):	*At the end of this course, learners will be able to:*	Learning: Level of Thinking (Bloom)	Learning: Expected Proficiency (%)	Learning: Expected Attainment (%)	PLO 1: Engineering Knowledge	PLO 2: Problem Analysis	PLO 3: Design & Development	PLO 4: Analysis, Design, Research	PLO 5: Modern Tool Usage	PLO 6: Society & Culture	PLO 7: Environment & Sustainability	PLO 8: Ethics	PLO 9: Individual & Team Work	PLO 10: Communication	PLO 11: Project Mgt. & Finance	PLO 12: Life Long Learning	PSO 1	PSO 2	PSO 3
CLO-1 :	*Equipped with an awareness of their positive energy and power*	2	80	75	L	M	-	-	M	H	-	H	H	H	-	H	-	-	-
CLO-2 :	*Identify the meaning of 'education'; have a clearer and better understanding in taking education to the masses*	2	75	70	M	H	M	-	H	H	M	M	H	H	-	H	-	-	-
CLO-3 :	*Assess their weaknesses; understand risks involved and rectify them through learning from positive and negative instances*	2	80	75	M	-	-	-	M	H	M	M	H	H	-	H	-	-	-
CLO-4 :	*Realize their professional responsibilities*	2	75	70	H	M	-	-	H	H	H	H	H	H	-	H	-	-	-
CLO-5 :	*Acquire the required values in an expanding pluralistic world not be swept off their feet due to the rapid changes*	2	85	80	M	-	-	-	H	H	H	H	H	H	-	H	-	-	-
CLO-6 :	*Equip with better understanding of themselves, society they live. Identify responsibilities in creating a peaceful world*	2	80	75	M	M	-	-	H	H	H	H	H	H	-	H	-	-	-

		Visions for Youth	*Youth and Education*	*Youth and Society*	*Youth as Professionals*	*Youth in Pluralistic Society*
Duration (hour)		**6**	**6**	**6**	**6**	**6**
S-1	**SLO-1**	*Introduction*	*Meaning and the significance of education*	*Need for social values in the present context*	*Introduction to professional values*	*Introduction to pluralistic society, forces of globalization*
	SLO-2	*Quiz*	*Brainstorming*	*Poem – "Where the mind is without fear" Write up on various instances from real life*	*Brainstorming through visual cues*	*Group Discussion*
S-2	**SLO-1**	*Two speeches by great personalities*	*Overview of different (traditional, modern) educational systems*	*Individual and group behavior, respect for others*	*Engineering societies in India*	*Science and technology intercultural proximity*
	SLO-2	*Oral presentations*	*Debate*	*Case study on recent happenings*	*Quiz*	*Narration of stories from various religions to illustrate the oneness of humanity*
S-3	**SLO-1**	*Quotes, proverbs relating to the power and potential of youth, Excerpts: Wings of Fire*	*Overview of different (traditional, modern) educational systems*	*Civic sense, bullying-substance abuse, uses of expletives*	*Challenges to be addressed by Engineers in India*	*Positive, Negative impact: religion, politics, gender, economic status, aesthetics*
	SLO-2	*Collecting proverbs highlighting the potential of youth*	*Debate*	*Case study on recent happenings*	*Case Study*	*Discussion on "To Kill a Mocking Bird"*
S-4	**SLO-1**	*Two news articles highlighting the initiatives for social causes by youth*	*Role of youth in education, Urban and Rural set up, dissemination*	*Hero worship, gender insensitivity, moral policing*	*Challenges in different sectors: agriculture*	*Values required to live in a global society*
	SLO-2	*Role play in a similar context*	*Student presentations*	*Case study on recent happenings*	*Case Study*	*Poster presentation on festivals of various religions*
S-5	**SLO-1**	*Two news articles highlighting the initiatives for social causes by youth*	*Designing and framing educational curriculum and materials*	*Positive contribution by youth in promoting social welfare*	*Challenges in different sectors: urban development, environment*	*Learning the etiquettes of various societies*
	SLO-2	*Role play in a similar context*	*Students' Presentation based on write ups*	*Short videos followed by discussions*	*Group activity (oral and written)*	*Poster presentation on festivals of various religions*
S-6	**SLO-1**	*One song exhibiting the positive energy of youth*	*The pressing challenges in current educational system*	*Positive contribution by youth in promoting social welfare*	*Challenges in different sectors: sustainable development, cyber security*	*Success of pluralistic society, enliven the society, religious harmony through literary*
	SLO-2	*Discussion on the song*	*Collage Design*	*Short videos followed by discussions*	*Case Study – from Newspapers*	*Writing the aspects of pluralistic society based on the text*

Learning Resources	*1. Kalam, APJ Abdul. Wings of Fire: AN Autobiography of APJ Abdul Kalam. Ed. Sangam Books Ltd., 1999* *2. "Banaras Hindu University Speech" and "To Students". The Voice of Truth. General Editor Shriman Narayan. Navajivan Publishing*	*4. Thomas A Address to VTU Students by Narayana Murthy. https://www.karnataka.com/personalities/narayana-murthy/vtu-address-2006/*

	House. pp. 3-13 and pp. 425-30. www.mkgandhi.org *3. Piroda, Sam. "Challenges in Science and Technology". www.nfdindia.org/loc19.htm*	*5. World Economic forum. "India's top 7 challenged from skills to water scarcity*

Learning Assessment

	Bloom's Level of Thinking	Continuous Learning Assessment (100% weightage)								Final Examination	
		CLA – 1 (20%)		CLA – 2 (30%)		CLA – 3 (30%)		CLA – 4 (20%)#			
		Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice	Theory	Practice
Level 1	Remember Understand	*20%*	*20%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	-	-
Level 2	Apply Analyze	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	*20%*	-	-
Level 3	Evaluate Create	*10%*	*10%*	*15%*	*15%*	*15%*	*15%*	*15%*	*15%*	-	-
	Total	100 %		100 %		100 %		100 %		100 %	

CLA – 4 can be from any combination of these: Assignments, Seminars, Tech Talks, Mini-Projects, Case-Studies, Self-Study, MOOCs, Certifications, Conf. Paper etc.,

Course Designers

Experts from Industry	Experts from Higher Technical Institutions	Internal Experts		
1. Dr. Usha Kodandaraman, ABK AOTS, drushsk@gmail.com	*1. Dr. S. P.Dhanavel, IIT Madras, dhanavelsp@iitmac.in*	*1. Dr .K.Anbazhagan, SRMIST*	*2. Dr. B. Cauveri, SRMIST*	
2. Mr. Durga Prasad Bokka, TCS, durgaprasad@tcs.com	*2. Ms. Subashree, VIT, Chennai, subashree@vit.ac.in*	*3. Dr. M. M.Umamaheswari, SRMIST*	*4. Dr. SukanyaSaha, SRMIST*	*5. Ms .S. Ramya, SRMIST*