



CURRICULUM AND SYLLABUS
REGULATION 2018

Programme: B.Tech. – Artificial Intelligence and Machine Learning

Vision of the Department:

To create highly qualified competitive professionals in Artificial Intelligence and Machine Learning by designing intelligent solutions to solve problems in variety of business domains, applications such as natural language processing, text mining, robotics, reasoning and problem-solving that serves society with greater cause.

Mission of the Department:

M1: Impart practical and technical knowledge along with applications of various integrated technologies.

M2: Design and develop various intelligent engineering projects to solve societal issues.

M3: Use of advanced engineering tools and equipment to enable research based learning to promote ethical values, lifelong learning and entrepreneurial skills.

Programme Educational Objectives (PEOs):

PEO 1: Develop intelligent software solutions demonstrating reasoning, learning and decision support while handling uncertainty using domain knowledge.

PEO 2: Create significant research towards social benefits and engineering improvement with a wide breadth knowledge of AI & ML technologies and their applications

PEO 3: Participate in life-long learning for effective professional growth and demonstrate leadership qualities in disruptive technologies along with a capacity to critically analyse and evaluate design proposals.

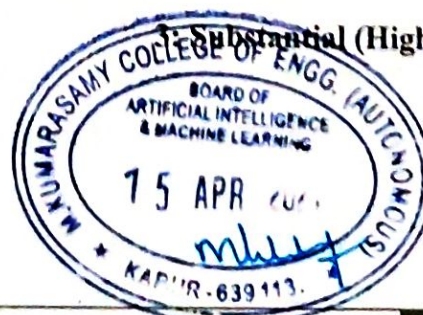
Mapping of Programme Educational Objectives with Mission of the Department:

PEOs / Department Mission Statements	M1	M2	M3
PEO1	3	3	3
PEO2	3	3	2
PEO3	3	2	3

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





Programme Outcomes (POs):

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

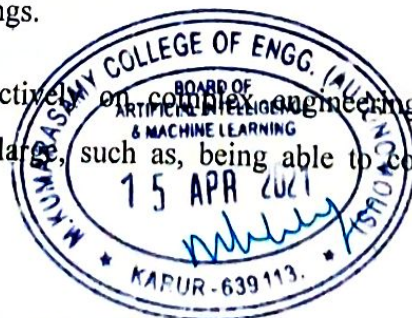
PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

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

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write





effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one’s own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Programme Specific Outcomes (PSOs):

PSO1: Utilize multidisciplinary knowledge along with Artificial intelligence and Machine Learning Principles to create innovative solutions for the development of society.

PSO2: Graduates will use Information and Communication Technology (ICT) tools and techniques to attain advance knowledge to exhibit state of the art technologies to overcome the demand of sustainable development to meet future business and society needs.

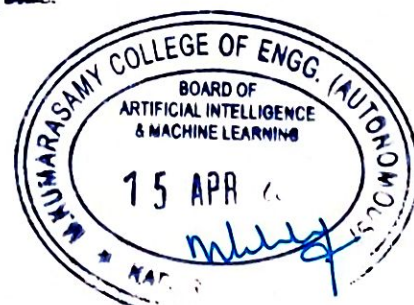
Mapping of Programme Educational Objectives with Programme Outcomes and Programme Specific Outcomes:

PEOs / POs & PSOs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
PEO1	3	3	3	3	3	2	1	1	1	2	3	1	3	3
PEO2	3	3	3	3	3	3	2	1	2	3	2	3	3	2
PEO3	3	3	2	2	2	2	3	2	3	2	3	3	2	3

1: Slight (Low)

2: Moderate (Medium)

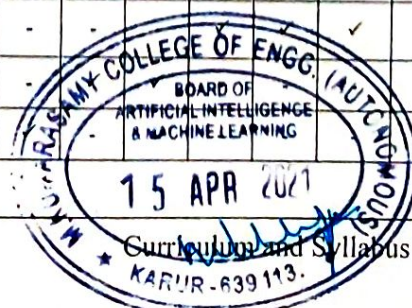
3: Substantial (High)





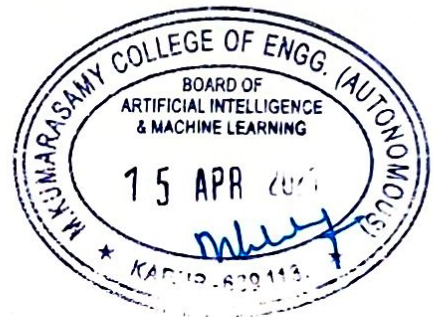
Programme Articulation

Semester	Course Code	Course Name	POs												PSOs		
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
I	18LEH101J	Technical English	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	-
I	18MAB101T	Calculus and Linear Algebra	✓	✓	✓	✓	✓	-	-	-	✓	-	-	✓	✓	-	
I	18CYB101J	Chemistry	✓	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	
I	18EES101J (R)	Basic Electrical and Electronics Engineering	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	✓	✓	✓	
I	18CSS101J (R)	Programming for Problem Solving	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	✓	✓	✓	
I	18MBH102L	General Aptitude	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	
I	18LEM101T	Constitution of India	-	-	-	-	-	-	✓	✓	✓	✓	✓	✓	-	✓	
II	18LEH102J	Professional English	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	
II	18MAB102T	Advanced Calculus and Complex Analysis	✓	✓	✓	✓	✓	-	-	-	✓	-	-	✓	✓	-	
II	18PYB101J	Physics	✓	✓	✓	✓	✓	-	-	-	-	-	✓	-	✓	✓	
II	18MES102J	Basic Civil and Mechanical Engineering	✓	-	✓	-	✓	✓	✓	-	✓	-	-	✓	✓	✓	
II	18MES101J	Engineering Graphics	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	-	✓	✓	✓	
II	18AIC101J	Python Programming	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	
II	18MBH101L	Professional Skills and Practices	-	-	-	-	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	
II	18LEM102T	Value Education	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	
I / II	18GNM101L	Physical & Mental Health using Yoga	-	-	-	-	-	✓	-	-	-	-	-	✓	-	✓	
III	18MAB207T	Probability and Statistics	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	-	
III	18AMC201T	Principles of Artificial Intelligence	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	
III	18AMC202J	Object oriented Programming using JAVA	✓	✓	✓	✓	✓	✓	-	-	✓	-	✓	✓	✓	✓	
III	18AMC203T	Data Structures using C++	✓	✓	✓	✓	✓	✓	✓	✓	-	-	✓	✓	✓	✓	
III	18AMC204T	Computer Organization and Architecture	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	-	
III	18AMC205T	Fundamentals of Operating Systems	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	
III	18AMC206T	Data Structures Laboratory	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓	
III	18AMC207T	Operating Systems Laboratory	✓	✓	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	
III	18AIP201L	Minor Project – I	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
III	18MBM201L	Competencies in Social Skills	✓	✓	✓	✓	-	-	-	-	-	-	✓	✓	✓	✓	
III	18CYM201T	Environmental Science	✓	✓	✓	✓	-	-	-	-	-	-	-	-	✓	✓	
IV	18MAB206T	Discrete Mathematics	✓	✓	✓	✓	-	-	-	-	-	-	-	✓	✓	-	





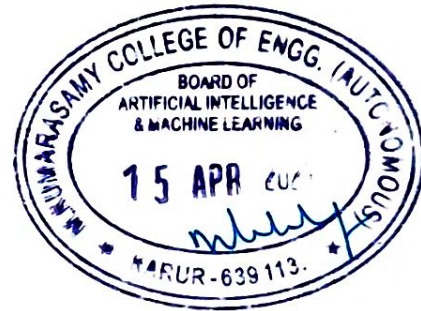
Semester	Course Code	Course Name	POs												PSOs		
			PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	
IV	18AMC208T	Machine Learning Algorithms	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓
IV	18AMC209T	Internet Programming	✓	✓	✓	✓	✓	✓	✓	✓	-	-	-	✓	✓	✓	✓
IV	18AMC210T	Database Management Systems	✓	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓
IV	18AMC211T	Design and Analysis of Algorithms	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	✓	✓
IV	18AMC212T	Software Engineering	✓	✓	✓	✓	✓	✓	✓	✓	-	✓	-	✓	✓	✓	✓
IV	18AMC213L	Machine Learning Laboratory	✓	✓	✓	✓	✓	✓	-	-	-	-	-	✓	✓	✓	✓
IV	18AMC214L	Database Management Systems Laboratory	✓	✓	✓	✓	✓	✓	-	-	-	✓	-	✓	✓	✓	✓
IV	18AIP202L	Minor Project – II	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IV	18MBM202L	Critical and Creative Thinking Skills	✓	✓	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	-	✓
IV	18LEM103T	Indian Tradition and Heritage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	-	-





Structure of Curriculum

S.No.	Category	Credits
1	Humanities and Social Sciences including Management courses (H)	8
2	Basic Science courses (B)	26
3	Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc.(S)	14
4	Professional core courses (C)	65
5	Professional Elective courses relevant to chosen specialization/branch (E)	21
6	Open Electives –Electives from other technical and /or emerging subjects (O)	12
7	Project work, Minor project, seminar and internship in industry or elsewhere (P)	14
8	Mandatory Courses (M) [Environmental Sciences, Induction training, Indian Constitution, Essence of Indian Traditional Knowledge]	4
Total Credits		164





1. Humanities and Social Sciences including Management courses (H)

S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18LEH101J	Technical English	2	0	2	3
2	18LEH102J	Professional English	2	0	2	3
3	18MBH101L	Professional Skills and Practices	0	0	2	1
4	18MBH102L	General Aptitude	0	0	2	1
Total Credits						8

L-Lecture T-Tutorial P-Practical

2. Basic Science courses (B)

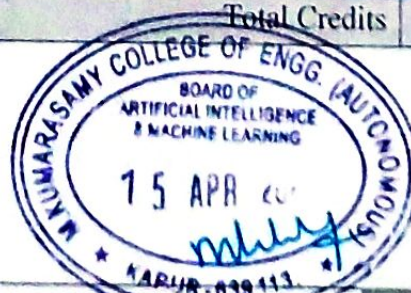
S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18PYB101J	Physics	3	1	2	5
2	18CYB101J	Chemistry	3	1	2	5
3	18MAB101T	Calculus and Linear Algebra	3	1	0	4
4	18MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
5	18MAB207T	Probability and Statistics for Machine Learning	3	1	0	4
6	18MAB206T	Discrete Mathematics and Numerical method	3	1	0	4
Total Credits						26

L-Lecture T-Tutorial P-Practical

3. Engineering Science courses including workshop, drawing, basics of electrical / mechanical / computer etc (S)

S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18ES101J(R)	Basic Electrical and Electronics Engineering	3	0	2	4
2	18MES102J	Basic Civil and Mechanical Engineering	3	0	2	4
3	18MES101J	Engineering Graphics	1	0	4	3
4	18CSS101J(R)	Programming for Problem Solving	2	0	2	3
Total Credits						14

L-Lecture T-Tutorial P-Practical

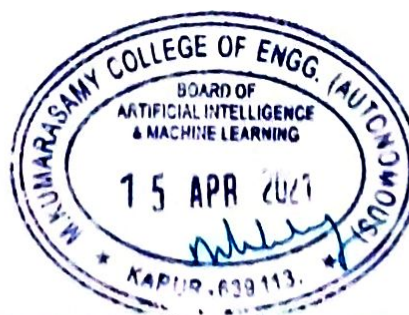




4. Professional core courses (C)

S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18AIC101J	Python Programming	2	0	2	3
2	18AMC201J	Principles of Artificial Intelligence	3	0	0	3
3	18AMC202J	Object Oriented Programming using JAVA	2	0	2	4
4	18AMC203T	Data Structures using C++	3	0	0	3
5	18AMC204T	Computer Organization and Architecture	3	0	0	3
6	18AMC205T	Fundamentals of Operating Systems	3	0	0	3
7	18AMC206T	Data Structures Laboratory	0	0	2	1
8	18AMC207T	Operating Systems Laboratory	0	0	2	1
9	18AMC208T	Machine Learning Algorithms	3	0	0	3
10	18AMC209T	Internet Programming	3	0	0	3
11	18AMC210T	Database Management Systems	3	0	0	3
12	18AMC211T	Design and Analysis of Algorithms	3	0	0	3
13	18AMC212T	Software Engineering	3	0	0	3
14	18AMC213L	Machine Learning Laboratory	0	0	2	1
15	18AMC214L	Database Management Systems Laboratory	0	0	2	1
16	18AMCXXX	Automata Theory and Compiler Design	3	0	0	3
17	18AMCXXX	Digital Image Processing	3	0	0	3
18	18AMCXXX	Application of AI in Robotics	3	0	0	3
19	18AMCXXX	Deep Learning: Principles and practices	3	0	0	3
20	18AMCXXX	Data Mining and Predictive Modeling	3	0	0	3
21	18AMCXXX	Knowledge Engineering and Intelligent Systems	3	0	0	3
22	18AMCXXX	Computational Linguistics and Natural Language Processing	3	0	0	3
23	18AMCXXX	Big Data Analytics using AI and ML Methods	3	0	0	3
24	18AMCXXX	Soft Computing and Swarm Intelligence Techniques	3	0	0	3
Total Credits						65

L-Lecture T-Tutorial P-Practical

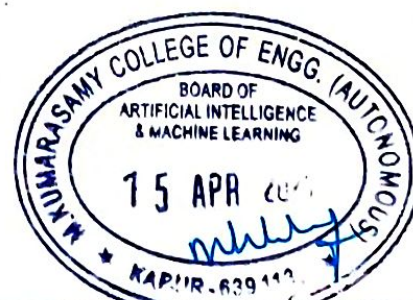




5. Professional Elective courses relevant to chosen specialization/branch (E)

S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18AMCXXX	Professional Elective - 1	3	0	0	3
2	18AMCXXX	Professional Elective - 2	3	0	0	3
3	18AMCXXX	Professional Elective - 3	3	0	0	3
4	18AMCXXX	Professional Elective - 4	3	0	0	3
5	18AMCXXX	Professional Elective - 5	3	0	0	3
6	18AMCXXX	Professional Elective - 6	3	0	0	3
7	18AMCXXX	Professional Elective - 7	3	0	0	3
Total Credits						21

S.No	Course Code	Course Name	Hours / Week			C
			L	T	P	
Professional Elective - 1						
1	18AMCXXX	Computer Vision	3	0	0	3
2	18AMCXXX	High Speed Networks	3	0	0	3
3	18AMCXXX	Intelligent Embedded Systems	3	0	0	3
4	18AMCXXX	Parallel and Distributed Computing	3	0	0	3
5	18AMCXXX	Internet of Things	3	0	0	3
Professional Elective - 2						
6	18AMCXXX	R Programming for Machine Learning	3	0	0	3
7	18AMCXXX	Cryptography and Network Security	3	0	0	3
8	18AMCXXX	Cognitive Systems	3	0	0	3
9	18AMCXXX	Computer Graphics and Multimedia	3	0	0	3
10	18AMCXXX	Nature Inspired Computing Techniques	3	0	0	3
Professional Elective - 3						
11	18AMCXXX	Data Science	3	0	0	3
12	18AMCXXX	Ethical Hacking	3	0	0	3
13	18AMCXXX	Visualisation Techniques	3	0	0	3
14	18AMCXXX	Object Oriented Analysis and Design	3	0	0	3
15	18AMCXXX	Optimization Methodologies for AI Problems	3	0	0	3

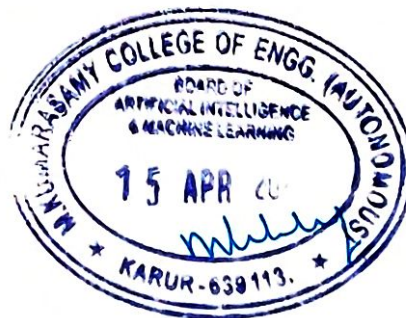




Professional Elective – 4						
16	18AMCXXX	Mobile Computing	3	0	0	3
17	18AMCXXX	Sentiment Analysis and Recommendation Systems	3	0	0	3
18	18AMCXXX	Augmented Reality	3	0	0	3
19	18AMCXXX	Cloud Computing and Virtualization Techniques	3	0	0	3
20	18AMCXXX	Genetic Algorithms	3	0	0	3
Professional Elective – 5						
21	18AMCXXX	Business Intelligence	3	0	0	3
22	18AMCXXX	3D Game Programming Foundations	3	0	0	3
23	18AMCXXX	Mobile Application Development	3	0	0	3
24	18AMCXXX	Pattern Recognition	3	0	0	3
25	18AMCXXX	Fuzzy Logic and Rough set Theory	3	0	0	3
Professional Elective – 6						
26	18AMCXXX	Web Mining and Semantic web	3	0	0	3
27	18AMCXXX	Virtual Reality	3	0	0	3
28	18AMCXXX	Social Network Analysis	3	0	0	3
29	18AMCXXX	Intelligent Information Retrieval Techniques	3	0	0	3
30	18AMCXXX	Mobile Computing and Smart Applications	3	0	0	3
Professional Elective – 7						
31	18AMCXXX	Total Quality Management	3	0	0	3
32	18AMCXXX	Block Chain Technology	3	0	0	3
33	18AMCXXX	Software Project Management	3	0	0	3
34	18AMCXXX	Human Computer Interaction	3	0	0	3
35	18AMCXXX	Professional Ethics	3	0	0	3

L-Lecture T-Tutorial P-Practical

* - Minor Changes Available for Credit





6. Open subjects –Electives from other technical and /or emerging subjects (O) (Any 4 Courses)

Artificial Intelligence and Machine Learning

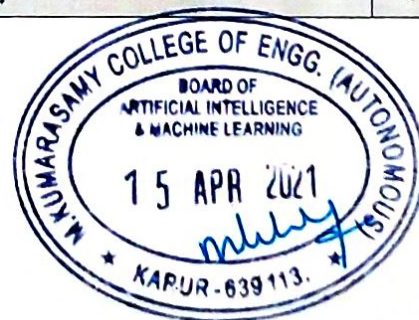
S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18AMCXXX	Principles of Artificial Intelligence	3	0	0	3
2	18AMCXXX	Machine Learning Algorithms	3	0	0	3
3	18AMCXXX	Deep Learning: Principles and practices	3	0	0	3
4	18AMCXXX	Knowledge Engineering and Intelligent Systems	3	0	0	3
5	18AMCXXX	Computational Linguistics and Natural Language Processing	3	0	0	3
Total Credits						12 ^s

^s For Artificial Intelligence and Machine Learning only 4 Open Electives

7. Project work, minor project, seminar and internship in industry or elsewhere (P)

S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18AIP201L	Minor Project – I	0	0	2	1
2	18AIP202L	Minor Project – II (With AI and ML based solutions using Python)	0	0	2	1
3	18AIP301L	Minor Project – III	0	0	2	1
4	18AIP302L	Minor Project – IV	0	0	2	1
5	18AIP303N	MOOC / Industrial Training - 1	0	0	0	1
6	18AIP304N	MOOC / Industrial Training - 2	0	0	0	1
7	18AIP401P	Project work / Semester Internship	0	0	16	8
Total Credits						14

L-Lecture T-Tutorial P-Practical

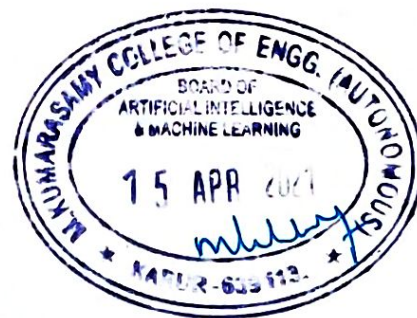




8. Mandatory Courses (M)

S.No.	Course Code	Course Name	Hours / Week			C
			L	T	P	
1	18LEM101T	Constitution of India	1	0	0	Nil
2	18LEM102T	Value Education	1	0	0	Nil
3	18GNM101L	Physical & Mental Health using Yoga	0	0	2	Nil
4	18GNM102L	NCC / NSS / NSO	0	0	2	Nil
5	18MBM201L	Competencies in Social Skills	0	0	2	1
6	18MBM202L	Critical and Creative Thinking Skills	0	0	2	1
7	18CYM201T	Environmental Science	1	0	0	Nil
8	18LEM103T	Indian Tradition and Heritage	1	0	0	Nil
9	18MBM301L	Analytical and Logical Thinking Skills	0	0	2	1
10	18MBM302L	Employability Skills and Practices	0	0	2	1
11	18LEM301T	Indian Art Forms	1	0	0	Nil
12	18LEM302T	Self Development and Entrepreneurship	1	0	0	Nil
13		Languages- Hindi/Germen/French/Japanese	1	0	0	Nil
Total Credits						4

L-Lecture T-Tutorial P-Practical

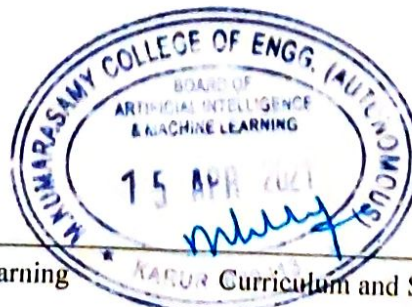




B.Tech. – Artificial Intelligence and Machine Learning

Semester I							
S.No	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	H	18LEH101J	Technical English	2	0	2	3
2	B	18MAB101T	Calculus and Linear Algebra	3	1	0	4
3	B	18CYB101J	Chemistry	3	1	2	5
4	S	18EES101J(R)	Basic Electrical and Electronics Engineering	3	0	2	4
5	S	18CSS101J (R)	Programming for Problem Solving	2	0	2	3
6	H	18MBH102L	General Aptitude	0	0	2	1
Mandatory Courses							
7	M	18LEM101T	Constitution of India	1	0	0	Nil
8	M	18GNM102L / 18GNM101L	NSS / Physical & Mental Health using Yoga	0	0	2	Nil
Total Credits							20

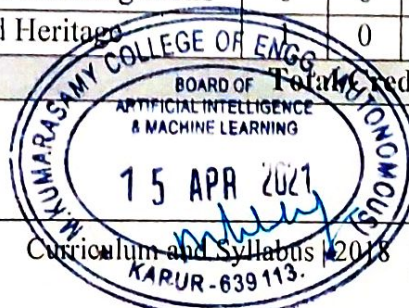
Semester II							
S.No.	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	H	18LEH102J	Professional English	2	0	2	3
2	B	18MAB102T	Advanced Calculus and Complex Analysis	3	1	0	4
3	B	18PYB101J	Physics	3	1	2	5
4	S	18MES102J	Basic Civil and Mechanical Engineering	3	0	2	4
5	S	18MES101J	Engineering Graphics	1	0	4	3
6	C	18AIC101J	Python Programming	2	0	2	3
7	H	18MBH101L	Professional Skills and Practices	0	0	2	1
Mandatory Courses							
8	M	18LEM102T	Value Education	1	0	0	Nil
9	M	18GNM101L / 18GNM102L	Physical & Mental Health using Yoga / NSS	0	0	2	Nil
Total Credits							23





Semester III							
S.No.	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	B	18MAB207T	Probability and Statistics	3	1	0	4
2	C	18AMC201T	Principles of Artificial Intelligence	3	0	0	3
3	C	18AMC202J	Object oriented Programming using JAVA	2	0	2	4
4	C	18AMC203T	Data Structures using C++	3	0	0	3
5	C	18AMC204T	Computer Organization and Architecture	3	0	0	3
6	C	18AMC205T	Fundamentals of Operating Systems	3	0	0	3
Laboratory Course							
7	C	18AMC206L	Data Structures Laboratory	0	0	2	1
8	C	18AMC207L	Operating Systems Laboratory	0	0	2	1
9	P	18AIP201L	Minor Project – I	0	0	2	1
Mandatory Courses							
10	M	18MBM201L	Competencies in Social Skills	0	0	2	1
11	M	18CYM201T	Environmental Science	1	0	0	Nil
Total Credits							24

Semester IV							
S.No.	Category	Course Code	Course Name	Hours / Week			C
				L	T	P	
1	B	18MAB206T	Discrete Mathematics	3	1	0	4
2	C	18AMC208T	Machine Learning Algorithms	3	0	0	3
3	C	18AMC209T	Internet Programming	3	0	0	3
4	C	18AMC210T	Database Management Systems (join course)	3	0	0	3
5	C	18AMC211T	Design and Analysis of Algorithms	3	0	0	3
6	C	18AMC212T	Software Engineering	3	0	0	3
Laboratory Course							
7	C	18AMC213L	Machine Learning Laboratory	0	0	2	1
8	C	18AMC214L	Database Management Systems Laboratory	0	0	2	1
9	P	18AIP202L	Minor Project – II(With AI and ML based solutions using Python)	0	0	2	1
Mandatory Courses							
10	M	18MBM202L	Critical and Creative Thinking Skills	0	0	2	1
11	M	18LEM103T	Indian Tradition and Heritage	0	0	0	Nil
Total Credits							23





Regulation 2018		Semester I	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH101J	TECHNICAL ENGLISH	2	0	2	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Analyze the importance of communication in personal, professional contexts. Identify proper English pronunciation
CLR-2	Strengthen vocabulary and grammar. Enhance listening and writing comprehension. Review films and documentaries
CLR-3	Writing brief paragraphs using appropriate techniques. Enhance their English fluency in speaking
CLR-4	Write effective essays, stories. Experience workplace communication aspects
CLR-5	Research on a topic and write a comprehensible academic project reports. Make effective presentations

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify types, modes, channels and barriers of communication. distinguish different speech sounds, pronounce correctly
CO2	Identify, rectify the errors in the use of grammar and vocabulary. Improve listening and writing skills
CO3	Develop a topic idea into a cohesive paragraph with examples. Improve the fluency of speaking skills
CO4	Develop ideas into logical and coherent essays. Understand better the workplace culture
CO5	Identify the steps involved in writing an academic project report. List and practice skills need for making a presentation

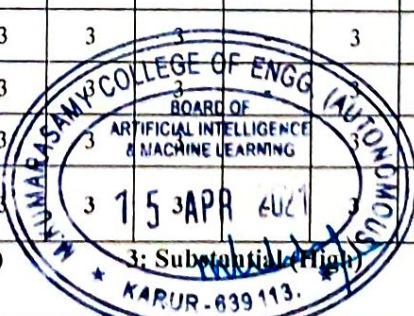
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO2	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO3	1	3	1	3	3	2	1	3	3	3	-	3	-	1
CO4	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO5	1	3	1	3	3	3	1	3	3	3	-	3	-	1
CO (Avg)	1	3	1	3	3	2.8	1	3	3	3	-	3	-	1

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	COMMUNICATION	6
<p>Definition, Process of communication - (Filling in-Class Worksheets) - Verbal and Non-Verbal Communication (Individual and Group Activities - Role play)-Other Types of Communication: General-Technical-Formal, Informal- External, Internal (Write upon a selected type of communication)- Listening, Speaking, Reading, Writing(Group activity (Newspaper) – Discussion and Feedback)- Communication and Language Barriers(Individual Activity- Sharing of Personal Experiences)-Body language(Mime).</p>		
UNIT II	VOCABULARY AND GRAMMAR	7
<p>Words with Foreign Roots, Word Formation – Inflectional, Derivational Prefixes, Suffixes(Quiz - Identifying the Borrowed roots and Their Meanings-Worksheet Exercise)-Synonyms and Antonyms and Standard Abbreviations(Context Based Activity / Learner Compiling Standard Abbreviations from Core Subject)-Homonyms and Homophones(Fun Activities – Worksheets- Cross Words)- Articles, Tenses(Exercise through Worksheets- Individual Activity -Peer Correction- Open Discussion)- Noun-Pronoun Agreement and Subject-Verb Agreement(Identifying and Learning through Error Analysis – Worksheets)-Misplaced Modifiers - Prepositions- Prepositional verbs and Phrasal verbs(Learn through Practice – Placing Same Modifier in Different Places in a Sentence)- Prepositions- Prepositional Verbs and Phrasal Verbs(Filling in-Class Worksheets)</p>		
UNIT III	DISCOURSE TECHNIQUES	7
<p>Sentence Structure, Phrases and Clauses(Exercise: Worksheet, Identifying Phrases, Clauses, Compound, Complex Sentences)-Developing Ideas into Paragraphs –Cohesion Markers(Identify Topic sentence in a Paragraph; Writing a Paragraph Based on a Topic)- -Inputs on Writing Precisely, Redundancies, Wordiness-Repetition-Clichés(Error Analysis and Editing)-Defining, Describing Technical Terms(Writing Definitions-Product and Process Description)-Inputs on Classifying/Categorising and Sequencing Ideas with Relevant Diagrams(Writing a Passage on the Given hints, Tree Diagram, Classification Table and Flow Chart)-Importance of Punctuation – Miscommunication –(Fun Activities - Worksheets for Appropriate Punctuation – Written)- Errors in Punctuation(Fun Activities - Worksheets for Appropriate Punctuation – Written)</p>		
UNIT IV	WORKPLACE COMMUNICATION	6
<p>Reading Comprehension, Guidelines questions (Referential, Critical,Interpretative)(Practice Exercise) - Précis-writing Guidelines(Practice Exercise) - Summarising(Group Activity (Oral/Written) on the Given Passages)-Essay Writing Guidelines: Introduction, Elaboration and Conclusion with Examples(Individual Activity (Written) on the Given Topic)-Organisational Report Writing - Progress Report- Guidelines(Writing a Progress Report)-Interview Skills(Mock Interview).</p>		
UNIT V	PROJECT WRITING	5
<p>Topics for Project Writing(Discussion)- Collection of Data – Avoiding Plagiarism-Authenticity and Credibility of Data(Collection of Data for Verification)- Guidelines for Writing: Outline- Objectives- Background- Methodology-Discussion-Documentation(Drafting an Outline & Preparing References)- Discussion Using Sample Project(Writing the First Draft on the Selected Topic)-Checklist for Project Format (PPT)(Self-Verification and Submission of Final Draft)</p>		





LIST OF EXPERIMENTS

14

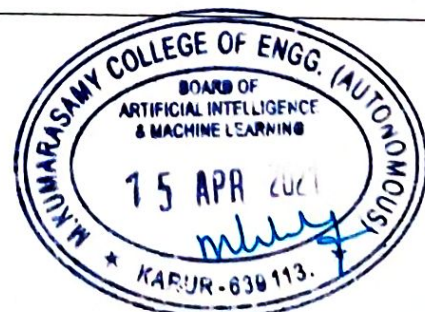
1. Often Mispronounced sounds (Audio Visual Material - Listening to minimal pairs and reproducing)
2. Barriers of communication Language barriers – videos (Identifying the Language Barriers of communication –Written)
3. Short Biographical Account on Famous Personalities –Video(Oral Paraphrasing of the Content Shown)
4. Listening to Long Conversations, Daily Life (Identify Various Communication Contexts and Answering Questions – Collocation)
5. Introduction to Englishes -British and American –Videos (Discussion on Difference between British and American Words)
6. Speaking - Practice Activity – Brain Storming – Mind Mapping (Just a Minute)
7. Describing a Scene or Event –Videos (String Narration – Describing an Event or a Scene)
8. Technical Communication – Interpreting Data (Group Activity - Interpretation of Data - Oral Presentation)
9. Sample Case Studies for Work Ethics – Videos (Debate on the Videos Shown)
10. Learning Interview Techniques through Models (Mock Interview)
11. Guidelines for Preparing a PPT; Presentation Techniques (Preparing PPT on the Topic of Learners' Choice)
12. Formal Presentation

Text Book (s)

- | | |
|---|---|
| 1 | Abirami K ,Technical English –, R.K.Publishers, Coimbatore. |
|---|---|

Reference (s)

- | | |
|---|--|
| 1 | Swan, Michael. Practical English Usage. OUP, 1995 |
| 2 | Kumar Sanjay and PushpaLata. Communication Skills. OUP, 2011 |
| 3 | CIEFL, Hyderabad. Exercises in Spoken English. Parts I-III. OUP |
| 4 | Anbazhagan K, Cauveri B, Devika M.P., English for Engineers. Cengage, 2016 |
| 5 | www.mmm.english.com |
| 6 | www.onlinewriting.com/purdue |
| 7 | www.ieee.org/index.html |





Regulation 2018		Semester I	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18MAB101T	CALCULUS AND LINEAR ALGEBRA	3	1	0	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Apply the Matrices in problems of Science and Engineering
2	Utilize Taylor series, Maxima minima and Jacobian in solving real- time application problems
3	Utilize the concepts of radius of curvature, evolute, envelope in problems of Science and Engineering
4	Apply the concept of Differential Equations in problems of Science and Engineering
5	Apply the Sequences and Series in all problems involving Science and Engineering

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Apply Matrices, Eigenvalues and Eigen Vectors and Reduction of Quadratics form in Science and Engineering problem solving
CO2	Apply Maxima and Minima, Jacobian, and Taylor series to solve problems in Science and Engineering
CO3	Identify Radius, Centre, envelope and Circle of curvature and apply them in the problem solving
CO4	Solve the different types of Differential Equations in Science and Engineering applications
CO5	Apply convergence and divergence of series using different tests and apply sequences and Series in the problem solving

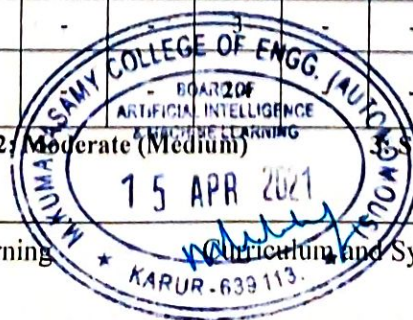
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	-	-	-	-	3	-	-	3	2	-
CO2	3	-	-	3	3	-	-	-	-	-	-	-	2	-
CO3	3	3	-	3	-	-	-	-	3	-	-	3	2	-
CO4	-	3	-	-	-	-	-	-	3	-	-	3	-	-
CO5	-	3	3	-	-	-	-	-	-	-	-	3	2	-
CO (Avg)	1.8	1.8	1.2	1.2	0.6	-	-	-	-	-	-	2.4	1.6	-

1: Slight (Low)

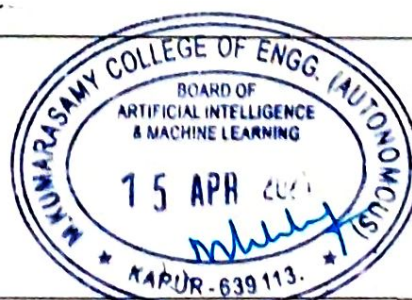
2: Moderate (Medium)

3: Substantial (High)





UNIT I	EIGEN VALUE PROBLEMS	9+3
Characteristic equation- Cayley-Hamilton theorem (excluding proof)- Eigen values and Eigen vectors of a real matrix – Properties- Orthogonal transformation of a symmetric matrix to diagonal form- Quadratic form-Reduction of quadratic form to canonical form by orthogonal transformation.		
UNIT II	FUNCTIONS OF SEVERAL VARIABLES	9+3
Partial derivatives-Euler’s theorem for homogenous functions-Total derivatives-Differentiation of implicit functions-Jacobians-Taylor’s expansion-Maxima and Minima-Method of Lagrangian multipliers.		
UNIT III	APPLICATIONS OF DIFFERENTIAL CALCULUS	9+3
Curvature and Radius of curvature – Circle of curvature and Centre of curvature-Envelope- Evolute as Envelope of Normals.		
UNIT IV	DIFFERENTIAL EQUATIONS OF SECOND ORDER	9+3
Second order linear differential equations with constant coefficients- Particular Integrals for x^n , e^{ax} , $\cos ax/\sin ax$, $e^{ax}\cos bx/e^{ax}\sin bx$ - Method of variation of parameters-Cauchy and Legendre’s linear equation-Simultaneous first order linear equations with constant coefficients.		
UNIT V	SEQUENCES AND SERIES	9+3
Sequences: Definition and examples-Series : Types and Convergence - Series of positive terms-Test of convergence: Comparison test, D’Alembert’s ratio test, Integral test, Rabee’s Root test and Log test-Alternating series-Leibnitz’s test-Series of positive and negative terms(Alternating series)- Absolute and Conditional convergence.		
Text Book (s)		
1	B. H. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons,2006.	
2	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.	
Reference (s)		
1	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi,2008	
2	N.P. Bali and Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008	
3	G.B. Thomas and R.L. Finney, Calculus and Analytic Geometry, 9th Edition, Pearson,Reprint, 2002	
4	Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11 th Reprint, 2010	



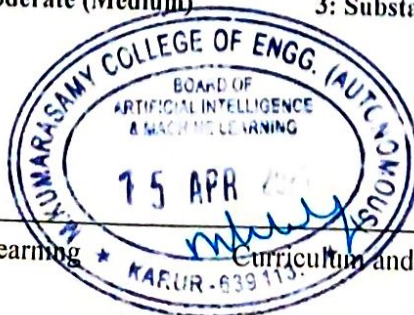


Regulation 2018		Semester II			Total Hours			90						
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
B	18CYB101J	CHEMISTRY	3	1	2	5								
Prerequisite Course (s)														
NIL														
Course Objective (s):														
The purpose of learning this course is to:														
<ul style="list-style-type: none"> Apply the basic principles of chemistry at both atomic and molecular levels in understanding the concepts related to the engineering field. Integrate the chemical principles in their projects undertaken in their respective fields Enhance the quality of a materials used in the product from the technological aspects for societal applications 														
Course Outcome (s) (COs):														
At the end of this course, learners will be able to:														
CO1	Identify the suitable polymeric materials fabrication processes in various application													
CO2	Apply the basic principle of inorganic chemistry at the atomic and molecular levels													
CO3	Apply the various thermodynamic and kinetics concepts to real system													
CO4	Assemble a battery through the understanding of electrochemical principles													
CO5	Catagorize the Engineering materials for their applications													
CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO2	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO3	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO4	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO5	3	3	1	1	1	-	-	-	-	-	-	-	1	1
CO (Avg)	3.00	3.00	1	1	1	-	-	-	-	-	-	-	1	1

1: Slight (Low)

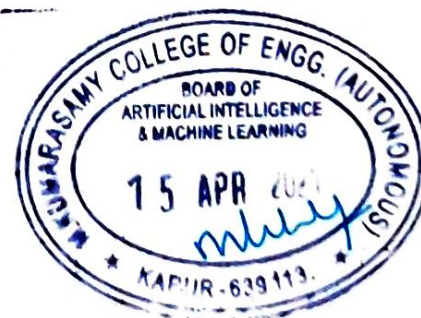
2: Moderate (Medium)

3: Substantial (High)



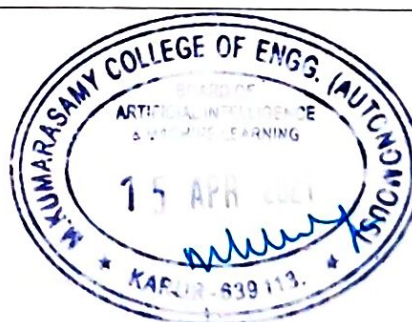


UNIT I	ENGINEERING ORGANIC MATERIALS	9+3
<p>Polymer – Introduction- Classification(Based on Molecular Weight, Structure and Usage)- Types Of Polymerization(Addition, Condensation and Copolymerisation)-Crystallinity, Melting Point and Glass Transition temperature-Mechanism of Polymerization(Free Radical Addition Polymerization)-Elastomer- Structure and Curing(Vulcanization)- Fabrication and Molding of Polymers(Injection Molding and Blow Molding)- Engineering Plastics – PE, PVC, PMMA, Phenol Formaldehyde Resin, Urea Formaldehyde Resin(Preparation, Properties and Uses)- Industrial Applications of Polymers.</p>		
UNIT II	COORDINATION AND ORGANOMETALLIC COMPOUNDS	9+3
<p>Co-Ordination compounds – Introduction- Nomenclature- Types of Ligands (Mono, Di And Poly Dendate Ligands)-Isomerism(Structural And Stereo Isomerism) – Theories of Bonding(Werner And Sidgwick Pouvell Theory(EAN Rule)) – Applications – EDTA Titration – Organometallic Compounds - Synthesis(Organo Zinc, Organo Lithium And Organo Magnesium) – Applications (18 Electron Rule, Ziegler Natta Catalyst and Hydroformylation)</p>		
UNIT III	THERMODYNAMICS AND KINETICS	9+3
<p>Introduction- First and Second Law of Thermodynamics – Gibbs –Helmholtz Equation – Clausius Clapeyron Equation – Maxwell Relations – Vant Hoff Isotherm and Isochore (Problems also)- Kinetics- Introduction- Types of Reactions(Opposing, Consecutive and Parallel Reactions)- Chain Reactions (HBr and HCl formation)- Applications of Kinetics and Thermodynamics.</p>		
UNIT IV	ENGINEERING ELECTROCHEMISTRY	9+3
<p>Introduction- Conductors and its types - Cells (Electrolytic and Electrochemical cells) – Standard electrode potential- Nernst equation of an electrode- Types of electrodes (SHE and Calomal electrode)- Batteries –Types (Primary, Secondary, Flow and reserve battery)- Examples (Lead acid battery, Ni-Cd battery, Lithium battery, Lithium sulphur battery and Hydrogen- Oxygen fuel cells)- Graphene.</p>		
UNIT V	INDUSTRIAL APPLICATIONS OF CHEMISTRY	9+3
<p>Cement (Types, manufacture and properties) – Paints (constitutions and functions)- Lubricants- types- mechanism – properties-abrasives – types –Diamond, Corundum, Emery, Garnet, Quartz, Silicon carbide, Carborundum-Boron Carbide, Alundum (preparation, properties and uses) – Applications – Basics of Biosensor and Biochips.</p>		





LIST OF EXPERIMENTS		30
<ol style="list-style-type: none">1. Determination of total , permanent and temporary hardness of water sample (EDTA method)2. Determination of alkalinity in water sample- Indicator method3. Determination of chloride content of water sample by Argentometric method(Mohr's method)4. Determination of dissolved oxygen content of water sample by winkler's method5. Conductometric titration of strong acid with strong base6. Conductometric titration of mixture of acids7. Determination of strength and amount of Hydrochloric acid- pH metry8. Estimation of strength and amount of ferrous ion by potentiometric method9. Determination of molecular weight of a polymer by viscometry method10. Estimation of ferrous ion by colorimetry.11. Cement analysis		
Text books / Reference books:		
1	B.L.Tembe, Kamaluddin and M.S.Krishnan , "Engineering chemistry"	
2	S.S. Dara "A Text book of Engineering Chemistry" S.Chand & Co.Ltd, New Delhi (2009).	
3	P.C.Jain and Monica Jain, "Engineering Chemistry" Dhanpat Rai Pub, Co., NewDelhi (2012).	
4	Shashi Chawla, Engineering Chemistry: Dhanpat Rai &Co., 3rd Edition, 2015	
5	www.nptel.ac.in	





Regulation 2018		Semester I	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18EES101J(R)	BASIC ELECTRICAL AND ELECTRONICS ENGINEERING	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Gain knowledge about the D.C and A.C circuits.
2	Impart the fundamentals of electrical machines.
3	Study the fundamentals of semiconductor devices
4	Study the working concepts of measuring instruments.
5	Know about digital logic concepts and operational amplifier.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Apply the concepts of ohm's law and Kirchoff's law in DC and AC circuits
CO2	Explain the basic concepts of DC motor, DC generator, Transformer and Induction motor.
CO3	Summarize the nature of semiconductor devices.
CO4	Interpret the concept of measuring devices like PMMC, MI, energy meter and wattmeter.
CO5	Infer the concept of electronics devices and conversion techniques

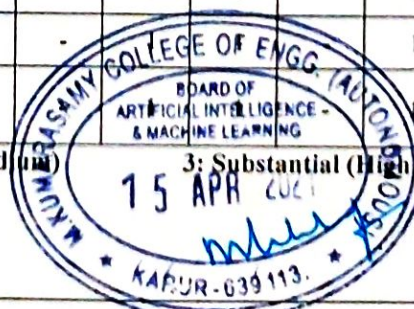
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1	1	1	-	-	-	1	1	-	1	3	1
CO2	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO3	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO4	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO5	3	-	1	1	1	-	-	-	1	1	-	1	3	1
CO (Avg)	3	0.4	1	1	1	-	-	-	1	1	-	1	3	1

1: Slight (Low)

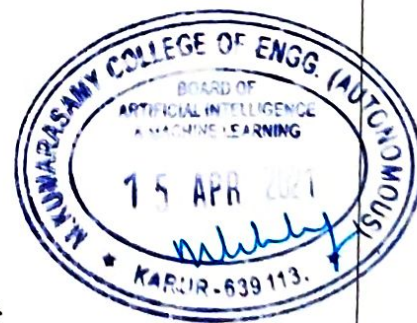
2: Moderate (Medium)

3: Substantial (High)



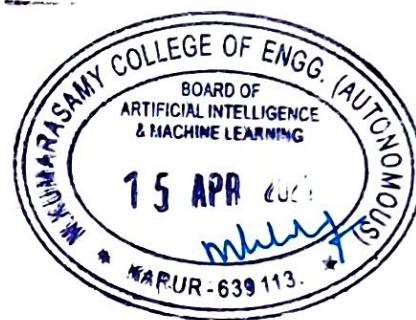


UNIT I	ELECTRICAL CIRCUITS	9
Electrical quantities: Resistors, Inductors, Capacitors - Ohm's Law - Kirchoff's Laws -Series and Parallel circuits - Analysis of DC circuits: Mesh & Nodal analysis, Thevenin's Theorem, Norton's Theorem & Maximum Power Transfer Theorem, Star delta Transformation, RL & RC Transient Analysis. Introduction to AC Circuits: Waveforms and RMS Value – Power and Power factor- Introduction to three phase systems – Types of connections, Relationship between line and phase values		
UNIT II	ELECTRICAL MACHINES	9
Faraday's laws- Construction, Principle of Operation, Basic Equations of DC Generators, DC Motors – Two Point & Three Point Starter – Construction, Working and EMF Equation of Single Phase Transformer – Construction and Working of AC Generator – Three Phase Induction Motor: Construction and Working of Squirrel Cage and Slip Ring Induction Motor – Single Phase Induction Motor (Split Phase, Capacitor Start Induction Motor)		
UNIT III	ELECTRONIC DEVICES	9
Intrinsic and Extrinsic Semiconductors – PN junction diode , Zener diode and its Characteristics – Operation of Half Wave, Full Wave and Bridge Type Rectifiers – Bipolar Junction Transistor: Configurations and Characteristics of CB, CE, CC – Construction and Operation of JFET, MOSFET..		
UNIT IV	MEASUREMENTS	9
Basic Principles and Classification of Instruments – Construction and Working of PMMC, MI Instruments (Attraction & Repulsion type) – Principle of Operation of Dynamometer Type Wattmeter, Induction Type Energy Meter – Instrument transformer – CRO – Megger		
UNIT V	DIGITAL & INTEGRATED DEVICES	9
Number Systems – Boolean Theorems– Logic Gates – Half Adder and Full Adder Circuit – Flip-Flops: RS, JK,T and D – A/D Converter (Successive Approximation Type) – D/A Converter (Binary Weighted Type) – Op-Amp : Functional Block and Types (Inverting , Non-Inverting & Differential Amplifier)		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Verification of Ohm's & Kirchoff's Laws 2. Types of Wiring (Fluorescent Lamp & Staircase) 3. Verification of Thevenin's Theorem 4. Verification of Norton's Theorem 5. Characteristics of PN Junction Diode 6. Characteristics of Common Base Configuration. 7. Characteristics of Common Emitter Configuration. 8. Measurement of Ripple Factor : Half Wave & Full Wave Rectifier. 9. Study of AC and DC Machines 10. Verification of Logic Gates 11. Study of PMMC and MI Meters 		





Text Book (s)	
1	R. Muthusubramanian, S. Salivahanan, "Basic Electrical and Electronics Engineering," Tata McGraw-Hill, 2012
2	Sawhney, A.K., "A Course in Electrical & Electronic Measurements & Instrumentation", Dhanpat Rai and Co, 2011.
Reference (s)	
1	Dash.S.S, Subramani.C, Vijayakumar.K, "Basic Electrical Engineering", Vijay Nicole, 1 st Edition, 2013.
2	Jegatheesan.R, "Analysis of Electric Circuits", Tata McGraw-Hill, 2014.
3	Smarajit Ghosh, "Fundamentals of Electrical and Electronics Engineering", PHI Learning Private Ltd, 2 nd Edition, 2010.



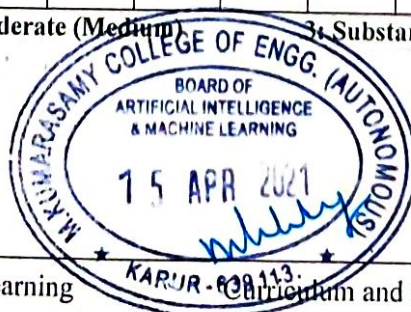


Regulation 2018		Semester I			Total Hours			45						
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
S	18CSS101J (R)	PROGRAMMING FOR PROBLEM SOLVING	2	0	2	3								
Prerequisite Course (s)														
NIL														
Course Objective (s):														
The purpose of learning this course is to:														
CO1	Learn programming using a structured programming language.													
CO2	Provide exposure on C programming.													
CO3	Introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.													
Course Outcome (s) (COs):														
At the end of this course, learners will be able to:														
CO1	Apply the problem solving techniques for solving numeric and string problems													
CO2	Solve basic numeric problems using control statements in C													
CO3	Develop the C program using the concepts of array and string.													
CO4	Apply the concept of function prototypes and pointers.													
CO5	Compare the performance of structures and union in memory management.													
CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO2	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO3	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO4	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO5	3	3	3	3	3	-	-	-	2	1	-	3	3	3
CO (Avg)	3	3	3	3	3	-	-	-	2	1	-	3	3	3

1: Slight (Low)

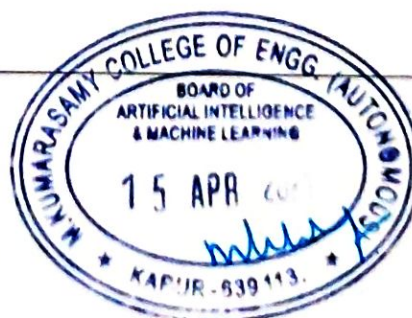
2: Moderate (Medium)

3: Substantial (High)



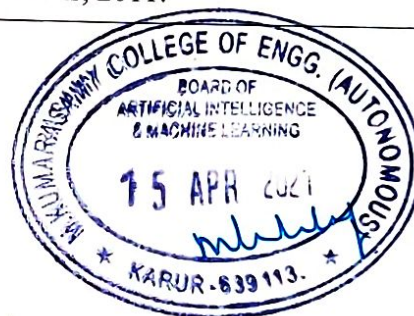


UNIT I	INTRODUCTION	6
Basic Organization of a Computer – Number System – Binary – Decimal – Conversion – Problems – Need for logical analysis and thinking – Algorithm – Pseudo code – Flow Chart.		
UNIT II	C PROGRAMMING BASICS	6
Structure of ‘C’ program – Tokens – Data Types – Operators – Input and Output operations – Decision Making and Branching – Looping Statement.		
UNIT III	ARRAYS AND STRING	6
Arrays: Declaration – Initialization – One dimensional and Two dimensional arrays – String: String Declaration and Initialization – String Function.		
UNIT IV	STRUCTURES AND POINTERS	6
Introduction to Structures-Needs for Structure Data type – Structure: Definition, Declaration – Structure vs Union. Pointers – Definition – Initialization – Pointer and arrays – Null Pointer – Pointer to Structure		
UNIT V	FUNCTIONS	6
Function – Definition of function – Declaration of function – Function Prototype – Pass by value – Pass by reference.		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Programs on Operators 2. Programs on Control statements 3. Programs on one Dimensional Array 4. Programs on Two Dimensional Array 5. Programs on String Handling 6. Programs on Function using Call by Value 7. Programs on Function using Call by Reference 8. Programs on Pointers 9. Programs on Structure 10. Programs on Union 		



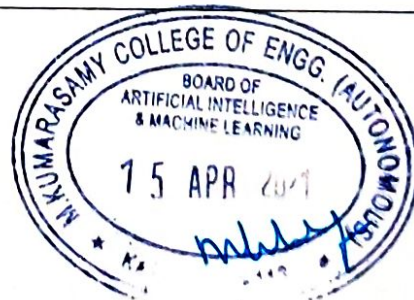


Text Book (s)	
1	Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", Dorling Kindersley(India) Pvt. Ltd., Pearson Education in South Asia, 2011.
2	PradipDey, Manas Ghosh, "Fundamentals of Computing and Programming in C", First Edition,Oxford University Press, 2009
Reference (s)	
1	Byron S Gottfried, "Programming with C", Schaum's Outlines, Second Edition, Tata McGraw-Hill,2006.
2	Dromey R.G., "How to Solve it by Computer", Pearson Education, Fourth Reprint, 2007.
3	Kernighan,B.W and Ritchie,D.M, "The C Programming language", Second Edition, PearsonEducation, 2006.
4	Yashavant P. Kanetkar. " Let Us C", BPB Publications, 2011.





Regulation 2018		Semester I	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18MBH102L	GENERAL APTITUDE	0	0	2	1
Prerequisite Course (s)						
NIL						
Course Objective (s):						
The purpose of learning this course is to:						
CLR1	Recapitulate fundamental mathematical concepts and skills					
CLR2	Hone critical thinking skills by analyzing the arguments with explicit and implicit premises					
CLR3	Sharpen logical reasoning through skilful conceptualization					
CLR4	Identify the relationships between words based on their function, usage and characteristics					
CLR5	Nurture passion for enriching vocabulary					
CLR6	Acquire the right knowledge, skill and aptitude to face any competitive examination.					
Course Outcome (s) (COs):						
At the end of this course, learners will be able to:						
CO1	Build a strong base in the fundamental mathematical concepts					
CO2	Identify the approaches and strategies to solve problems with speed and accuracy					
CO3	Gain appropriate skills to succeed in preliminary selection process for recruitment					
CO4	Collectively solve problems in teams and groups					
CO5	Build vocabulary through methodical approaches					
CO6	Enhance lexical skills through systematic application of concepts and careful analysis of style, syntax, semantics and logic					

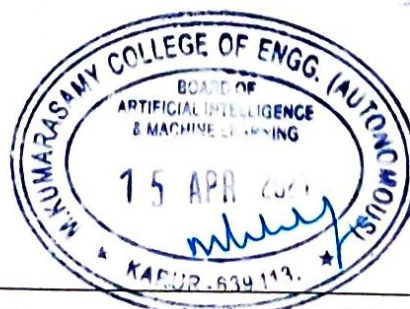




CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3	1	3	2	1	1	-	3	3	1	3	-	1
CO2	-	3	1	3	2	1	-	-	3	3	-	3	-	1
CO3	-	3	1	3	2	1	2	-	3	3	1	3	-	1
CO4	1	3	1	3	2	1	3	1	3	3	-	3	-	1
CO5	-	3	1	3	2	1	-	-	3	3	1	3	-	1
CO6	1	3	1	3	2	1	2	2	3	3	1	3	-	1
CO (Avg)	0.5	3	1	3	2	1	1.33	0.5	3	3	0.67	3	-	1

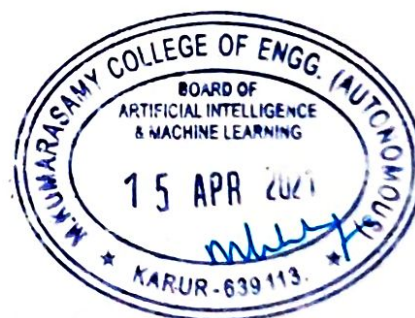
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

UNIT I	6
Types of numbers, Divisibility tests -Introduction to Significance of Verbal Aptitude in Competitive Examinations - LCM and GCD -Vocabulary enrichment techniques - Unit digit, Number of zeroes, Factorial notation - Vocabulary enrichment Techniques.	
UNIT II	6
Square root, Cube roots, Remainder - Identities - Contextual Vocabulary Exercise – Synonyms Fractions and Decimals, surds -Contextual Vocabulary Exercise –Antonyms	
UNIT III	6
Percentage Introduction - Sentence Completion Basic Level Exercises : Single Blank - Percentage Problems - Sentence Completion Basic Level Exercises : Double Blank - Profit and Loss - Cloze Test	
UNIT IV	6
Discount -Reading Comprehension – Introduction -Simple Interest - Reading Comprehension – Summary & Main Idea - Compound Interest, Installments - Reading Comprehension – Summary & Main Idea	
UNIT V	6
Logarithms Intro - Grammar Rules :A comprehensive Introduction - Logarithms Rules - Sentence Completion – Grammar - Linear Equations - Spotting Errors	





Text Book (s)	
NIL	
Reference (s)	
1	Charles Harrington Elstor, Verbal Advantage: Ten Easy Steps to a Powerful Vocabulary, Random House Reference, 2002
2	Merriam Webster's Vocabulary Builder, Merriam Webster Mass Market, 2010
3	Norman Lewis, How to Read Better and Faster, Goyal, 4th Edition
4	Franklin GRE Word List, 3861 GRE Words, Franklin Vocab System, 2014
5	Wiley's GMAT Reading Comprehension Grail, Wiley, 2016
6	Manhattan Prep GRE : Reading Comprehension and Essays, 5th Edition
7	Martin Hewings, Advanced Grammar in Use. Cambridge University Press, 2013
8	Nishit K. Sinha, The Pearson Guide to Quantitative Aptitude and Data Interpretation for the CAT
9	Dinesh Khattar-The Pearson Guide to QUANTITATIVE APTITUDE for competitive examinations





Regulation 2018		Semester I	Total Hours			15
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18LEM101T	CONSTITUTION OF INDIA	1	0	0	-

Prerequisite Course (s)

NIL

Course Objective (s):

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

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify the basic provisions in the Indian constitution
CO2	List the fundamental rights, rights to equality, freedom, religion, culture, education and the right against exploitation
CO3	Identify the fundamental duties of the Union of India, President, Vice-President, Union Ministers and Parliament functions
CO4	Identify the power of states, its legislature, Governors role and the state judiciary
CO5	List the special provisions and functionality of election commission, public service commission, individual tax and GST

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	-	2	3	3	3	-	3	-	1
CO2	-	-	-	-	-	-	2	3	3	3	-	3	-	1
CO3	-	-	-	-	-	-	2	3	3	3	2	3	-	1
CO4	-	-	-	-	-	-	2	3	3	3	2	3	-	1
CO5	-	-	-	-	-	-	-	-	-	3	2	3	-	1
CO (Avg)	-	-	-	-	-	-	-	-	-	3	1.2	3	-	1

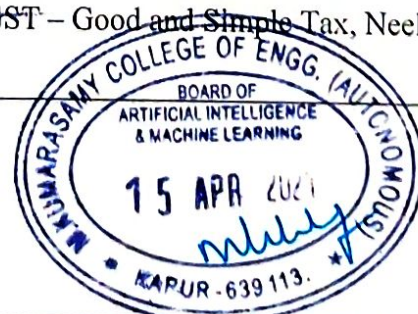
1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

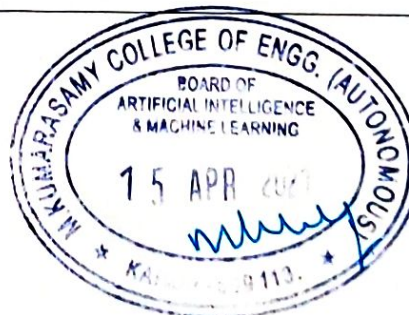


UNIT I	INDIAN CONSTITUTION	3
Meaning of the Constitution law and Constitutionalism- Historical perspective of the Constitution of India- Salient features and characteristics of the Constitution of India Citizenship- Scheme of the fundamental rights- Scheme of the Fundamental Duties and its legal status		
UNIT II	FUNDAMENTAL RIGHTS	3
The Directive Principles of State Policy- Scheme of the Fundamental Right to Equality- Scheme of the Fundamental Right to certain Freedom under Article 19- Scope of the Right to Life and Personal Liberty under Article 21- Union Government, Union Legislature (Parliament)- Lok Sabha and Rajya Sabha (with Powers and Functions), Union Executive		
UNIT III	POWERS AND FUNCTIONS OF CENTRAL GOVERNMENT	3
President of India (with Powers and Functions)- Prime Minister of India (with Powers and Functions) - Union Judiciary (Supreme Court)- Jurisdiction of the Supreme Court - State Government, Legislature, Legislative Assembly, Legislative Council- Powers and Functions of the State Legislature, State Executive- Governor of the State (with Powers and Functions)		
UNIT IV	POWERS AND FUNCTIONS OF STATE GOVERNMENT	3
The Chief Minister of the State (with Powers and Functions)- State Judiciary (High Courts) Union Territory, Panchayat, Municipality- Scheduled and Tribal Areas- Co-operative Societies Consumer Rights - Consumer Protection Act		
UNIT V	POWERS AND FUNCTIONS OF ELECTION AND SERVICE COMMISSION	3
Local Self Government – Constitutional Scheme in India-Emergency Provisions : National, President Rule, Financial Emergency - Election Commission of India (with Powers and Functions) - The Union Public Service Commission (with Powers and Functions) - Amendment of the Constitutional Powers and Procedure -Income Tax, Goods and Services Tax		
Text Book (s)		
NIL		
Reference (s)		
1	Durgadas Basu, 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	





Regulation 2018		Semester II	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18LEH102J	PROFESSIONAL ENGLISH	2	0	2	3
Prerequisite Course (s)						
NIL						
Course Objective (s):						
The purpose of learning this course is to:						
CLR-1	Develop team spirit and stress management skill					
CLR-2	Demonstrate the interpersonal skills of the learners					
CLR-3	Make learners perform well in interviews					
CLR-4	Enable them to listen well and express their ideas, opinions effectively in official contexts					
CLR-5	Sharpen their reading comprehension skill					
CLR-6	Strengthen their official written communication skill.					
Course Outcome (s) (COs):						
At the end of this course, learners will be able to:						
CO1	Work in a team under any situation.					
CO2	Practice interpersonal relationships in workplace					
CO3	Face interviews confidently and successfully					
CO4	Participate and excel in role plays, presentations and formal conversations.					
CO5	Read and infer the meanings of technical and aesthetic passages.					
CO6	Draft official letters, reports, memos, emails, etc.,					

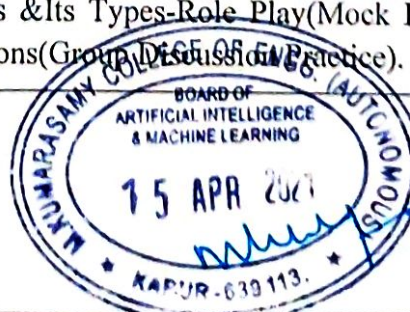




CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO2	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO3	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO4	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO5	1	1	1	3	3	2	1	3	3	3	-	3	1	1
CO6	1	1	3	3	3	2	1	3	3	3	-	3	1	1
CO (Avg)	1	1	1.33	3	3	2	1	3	3	3	-	3	1	1

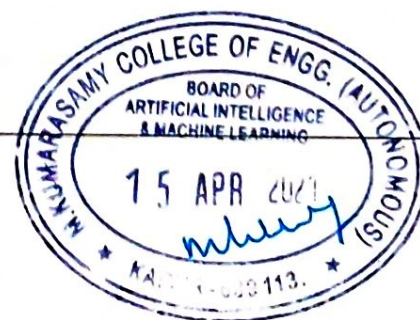
1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

UNIT I	SOFT SKILLS	7
<p>Introduction to Soft Skills(MCQ on Soft Skills)-Leadership Skills(Handling a Team) -Optimism & Business Etiquettes(Presentations on How to Handle Situations Effectively)-Team Management (Motivational Videos on Positive Thinking)- Time Management(Discussion on Real Time Hardships) -StressManagement(Handling Criticism)-Organizational Communication - Channels of Communication(Case Study).</p>		
UNIT II	LISTENING	7
<p>Listening Skills: Active Listening, Passive Listening(Classroom Listening Activities)-Methods for improving Listening Skills, Listening and its process – Barriers to Listening(Innovative Practices and Strategies for Better Listening) – Listening to Pre-Recorded video/audio (Listening to Famous Motivational Speeches)- Listening to Reading in the Class - for Vocabulary - for Complete Understanding – for Better Pronunciation(Read aloud a Story or an Article to Listen and Complete the Task) - Listening for General Content – Listening to fill up Information(Listening –fill in the Form Activity) – Intensive Listening for Specific Purpose-Listening to Monologues(Listening to Announcements) -Extensive Listening(Listening to Business News).</p>		
UNIT III	SPEAKING	5
<p>Defining Presentation and its Purpose; Audience & Local; Organizing Contents; Preparing Outline(Mini presentation)- Audio-Visual Aids; Nuances of Delivery; Body Language;(PPT Presentation) - Dimensions of Speech: Syllable; Accent; Pitch; Rhythm; Intonation; Paralinguistic features of voice(Voice Modulation Practice)-Interviews &Its Types-Role Play(Mock Interview) - Group Discussion-Oral Presentations -Formal Conversations(Group Discussion/Group Practice).</p>		



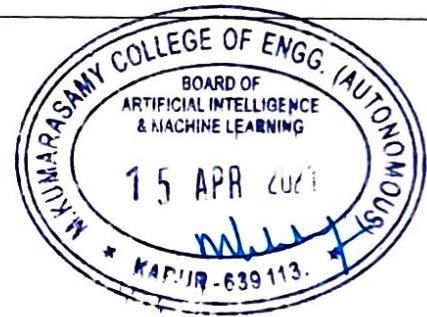


UNIT IV	READING	5
<p>Reading & Its Types- Techniques for Good Comprehension, Reading Comprehension(Reading Comprehension Exercises) - Cloze Test ,Reading Newspaper- Editorials & Business Articles (Cloze Test Exercises)- Inferring Meaning- Improving Comprehension Skills(Reading for Meaning) - Skimming and Scanning– Structure of the Text – Structure of Paragraphs(Skimming and Scanning Exercises) - Interpreting Visual Communication(Graphs, Charts, Tables)(Interpreting the Graphical images)</p>		
UNIT V	WRITING	5
<p>Writing Official Letters(Invitation Letter (Accepting & Declining),Quotation, Ordering, Complaining, Seeking Clarification)(Business Letter Writing Exercises), Writing Official Letters(Permission – In-Plant Training)- Writing CV (Job Application)(Job Application Letter Exercise)- Essay Writing-Email Writing -Writing Reports & Proposal(Writing a Business Report)- Writing Circulars, Memos, Agenda & Minutes(Exercises on Writing Circulars, Memos, Agenda & Minutes).</p>		
LIST OF EXPERIMENTS		16
<ol style="list-style-type: none"> 1. Videos on Stress Management (Stress Management Activities) 2. Videos on Team Spirit (Team Activities) 3. Listening to TED Talks(Listening to Business Interviews) 4. Listening to Business Presentation (Listening to Business Interviews) 5. Telephonic Conversation (Organizing a Meeting) 6. Product Launch (Persuasive Speech) 7. Business Conversations 8. Business Role Play Activities 9. Reading for Pleasure(Intensive Reading) 10. Extensive Reading(Briefing Favourite Self Help Books) 11. Reading Newspaper articles(Reading Business Reports) 12. Reading Business Legends Success Formula(Read Between the Lines) 13. Writing an Advertisement (Writing Slogans for Products) 14. Error Correction Exercises (Formal Language expressions) 15. Business Vocabulary (Writing Official E-mails) 16. Writing Business Proposals (Writing Permission Letters) 		





Text Book (s)	
1	Abirami K, "Professional English", First Edition, R.K.Publishers, Coimbatore, 2019.
Reference (s)	
1	Lina Muhkopadhyay, et al., "English for Jobseekers" ,Cambridge University Press, New Delhi,2013
2	Brook Hart Guy, Business Benchmark Advanced Personal Study Book for BEC and BULATS, Cambridge
3	Mascull , Bill, Business Vocabulary in Use, Third Edition, Nov 2017
4	Emerson Paul, Business English Handbook ,Advanced, Macmillan
5	www.Business English Site.com
6	www.businessenglishpod.com





Regulation 2018		Semester II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18MAB102T	ADVANCED CALCULUS AND COMPLEX ANALYSIS	3	1	0	4

Prerequisite Course (s)

Calculus and Linear Algebra

Course Objective (s):

The purpose of learning this course is to:

- 1 Evaluate Double and triple Integral and apply them in problems in Engineering Industries
- 2 Evaluate Surface, Volume Integral and applications of Gauss theorem, Stoke's and Green's theorem in Engineering fields
- 3 Know the properties of Complex functions and apply them in all the Engineering fields
- 4 Evaluate improper integrals involving complex functions using Residue theorem and apply them in Engineering fields
- 5 Transform engineering problems into ODE, PDE and Integrals and solve them using Laplace / complex analytic methods

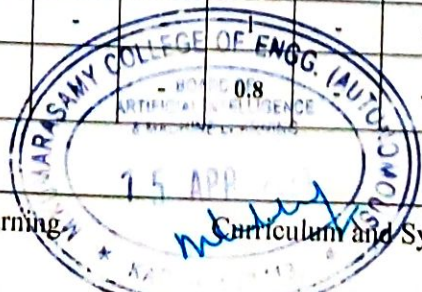
Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Evaluate multiple integrals using change of variables
- CO2 Apply techniques of vector calculus in problems involving Science and Engineering.
- CO3 Apply complex analytic functions and its properties in solving problems
- CO4 Evaluate improper integrals using Residue theorem involving problems in Science and Engineering
- CO5 Apply techniques of Laplace Transforms and inverse transform for problems in Science and Engineering and Solving Ordinary Differential Equations

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	-	-	-	-	1	-	-	3	2	-
CO2	3	-	-	3	3	-	-	-	-	-	-	3	2	-
CO3	3	3	-	3	-	-	-	-	1	-	-	3	2	-
CO4	-	3	3	-	-	-	-	-	1	-	-	3	1	-
CO5	-	3	-	-	-	-	-	-	-	-	-	3	1	-
CO (Avg)	1.8	1.8	1.2	1.2	0.6	-	-	-	0.8	-	-	2.4	1.4	-



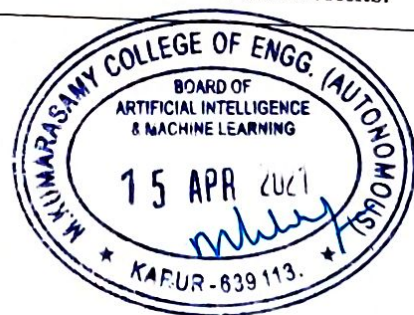


1: Slight (Low)

2: Moderate (Medium)

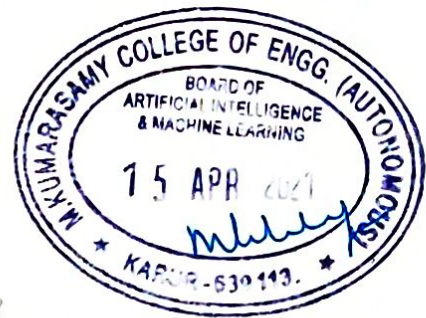
3: Substantial (High)

UNIT I	MULTIPLE INTEGRALS	9 + 3
Evaluation of double integration in cartesian and polar Coordinates - Evaluation of double integral by changing of order of integration - Area as a double integral (Cartesian and Polar) - Conversion from Cartesian to Polar in double integrals - Triple integration in Cartesian Coordinates - Volume as triple integral in Cartesian, Polar and Spherical Coordinates.		
UNIT II	VECTOR CALCULUS	9 + 3
Gradient, Divergence, Curl, Solenoidal, Irrotational fields - Directional derivative - Line integrals - Surface integrals - Volume Integrals - Green's theorem (excluding proof) :Applications in evaluating Line and Region - Gauss divergence theorem (excluding proof):Applications to cubes and parallelopipeds - Stoke's theorem (excluding proof):Applications to cubes and parallelopipeds.		
UNIT III	ANALYTIC FUNCTION	9 + 3
Definition of Analytic function – Cauchy Riemann equations- Properties of Analytic function - Determination of Analytic function using Milne's Thomson method-Conformal mapping ($w=c+z$, $w=cz$, $w=$ Error! Reference source not found.) - Bilinear transformation.		
UNIT IV	COMPLEX INTEGRATION	9 + 3
Cauchy's integral theorems (without proof) - Cauchy's integral formulae - Taylor's expansions with simple problems - Laurent's expansions with simple problems - Singularities - Poles and their types - Residues - Cauchy's residue theorem (without proof)- Contour integration: unit circle and semicircle.		
UNIT V	LAPLACE TRANSFORMS	9 + 3
Laplace Transforms of standard functions- Transforms properties- Transform of derivatives and integrals - Initial & Final value theorems (without proof) and Verification for some problems- Inverse laplace transforms using Partial fractions and Shifting theorem- Convolution theorem- Periodic functions- Solution of linear second order ODE equations with constant coefficients.		





Text Book (s)	
1	B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.
2	N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008
Reference (s)	
1	B. H. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
2	Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008
3	Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11 th Reprint, 2010
4	G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002





Regulation 2018		Semester I	Total Hours			90
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18PYB101J	PHYSICS	3	1	2	5

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Identify the applications of electric field on materials
CLR-2	Identify the applications of magnetic field on materials
CLR-3	Identify the significance of quantum theory
CLR-4	Create insights to the concepts of optical effects
CLR-5	Analyze the working principle of lasers and optical fibers

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

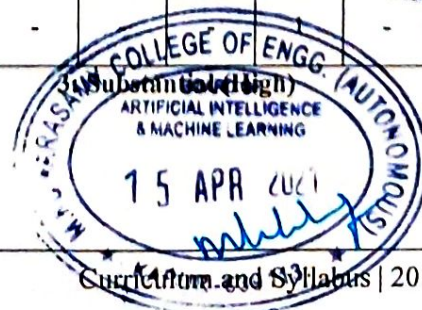
CO1	Identify the effect of charge dynamics
CO2	Analyze electromagnetic induction
CO3	Apply quantum mechanics to basic physical problems
CO4	Apply ray propagation and optical effects
CO5	Identify the applications of lasers and optical fiber

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	1	-	-	-	-	-	1	-	1	1
CO2	3	3	3	3	1	-	-	-	-	-	1	-	1	1
CO3	3	3	3	3	3	-	-	-	-	-	1	-	1	1
CO4	3	3	3	3	3	-	-	-	-	-	1	-	1	1
CO5	3	3	3	3	3	-	-	-	-	-	1	-	1	1
CO (Avg)	3.00	3.00	3.00	3.00	2.2	-	-	-	-	-	1	-	1	1

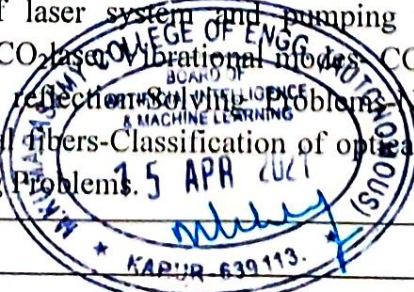
1: Slight (Low)

2: Moderate (Medium)





UNIT I	ELECTROSTATICS AND DIELECTRIC MATERIALS	9+3
<p>Del-divergence-curl and gradient operations in vector calculus-Gauss-divergence and Stoke's theorem-Electric field and electrostatic potential for a charge distribution-Gauss' law and its applications-Laplace's equations for electrostatic potential-Poisson's equations for electrostatic potential-Solving Problems-Concepts of electric current-Continuity equation-Laws of magnetism-Faraday's law-Ampere's law-Maxwell's equations-Solving Problems-Polarizations, permeability and dielectric constant -Polar and non-polar dielectrics -Types of polarization-Frequency and temperature dependence-Internal field in a field-Clausius-Mossotti equation-Solving Problems.</p>		
UNIT II	MAGNETIC AND SUPERCONDUCTING MATERIALS	9+3
<p>Magnetization, permeability and susceptibility-Classification of magnetic materials-Ferromagnetism-Concepts of ferromagnetic domains -Hysteresis-Solving Problems -Properties and applications of ferromagnetic materials -Hard and soft magnetic materials -Ferrimagnetic materials - Magnetic bubbles - Ferrites- Solving Problems-Superconductivity -Properties of superconductivity -Type I & Type II superconductors-High Tc superconductors - SQUID - CRYOTRON-MAG LEV-Solving Problems.</p>		
UNIT III	QUANTUM PHYSICS	9+3
<p>Introduction to Quantum mechanics-Explanation of wave nature of particles-Black body radiation-Compton effect-Solving Problems-Photoelectric effect-de Broglie hypothesis for matter waves - Physical Significance of wave function -Time independent Schrödinger's wave equation -Time dependent Schrödinger's wave equation -Solving Problems-Particle in a 1 D box -Normalization - Born interpretation of wave function -Properties of Matter waves-Verification of matter waves-G.P. Thomson Experiment-Solving Problems.</p>		
UNIT IV	WAVE OPTICS	9+3
<p>Introduction to interference-Introduction to diffraction-Fresnel diffraction-Fraunhofer diffraction-Fraunhofer diffraction at single slit-Fraunhofer diffraction at double slit-Solving Problems-Fraunhofer diffraction at multiple slit-Diffraction grating-Characteristics of diffraction grating-Applications of diffraction grating-Polarization by reflection-Polarization by double refraction-Solving Problems -Scattering of light-Circular polarization-Elliptical polarization-Optical activity-Fresnel's relation -Brewster's angle--Solving Problems.</p>		
UNIT V	LASER AND FIBER OPTICS	9+3
<p>Absorption and emission processes-two level-Einstein's theory of matter radiation A and B coefficients-Characteristics of laser beams-Amplification of light by population inversion-Threshold population inversion-Essential components of laser system and pumping mechanisms-Solving Problems-Nd: YAG laser-Semiconductor laser-CO₂ laser-Vibrational modes - CO₂ laser-energy level-Optical fiber-physical structure-Total internal reflection-Solving Problems-Numerical aperture - Acceptance angle-Losses associated with optical fibers-Classification of optical fibers-Optical fiber communications system-Optical sensors-Solving Problems.</p>		





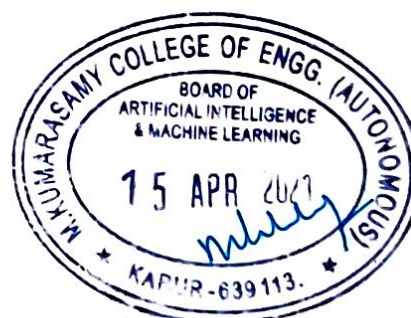
LIST OF EXPERIMENTS

30

1. Basics of experimentation
2. Determine dielectric constant of the sample
3. Calibrate Ammeter using Potentiometer
4. Calibrate voltmeter using Potentiometer
5. Determine the energy loss of magnetic materials using B-H curve experiment
6. Determine Planck's Constant
7. Study of I-V characteristics of a light dependent resistor (LDR)
8. Determine wavelength of monochromatic light by Newton's ring
9. Determine particle size using laser
10. Determine wavelength of using diffraction grating
11. Determine wavelength for a given laser source
12. Study of numerical aperture and acceptance angle of optical fiber
13. Mini project

Text books/ References:

- | | |
|---|---|
| 1 | David Jeffery Griffiths, Introduction to Electrodynamics, Revised edition, Pearson, 2013 |
| 2 | Ajay Ghatak, Optics, Tata McGraw Hill Education, 5th edition, 2012 |
| 3 | David Halliday, Fundamentals of Physics, 7th edition, John Wiley & Sons Australia, Ltd, 2004 |
| 4 | Berg and Resnick, Quantum Physics: Of Atoms, Molecules, Solids, Nuclei and Particles, 2nd Edition, 1985 |





Regulation 2018		Semester II	Total Hours			75
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES102J	BASIC CIVIL AND MECHANICAL ENGINEERING	3	0	2	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	Select building materials and identify the components of a building
2	Identify the various transportation systems, bridges, dams and water supply system
3	Apply the concept of Harnessing energy from various energy sources
4	Know the working of IC engines and identify the sub system requirements
5	Apply manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Identify the building materials and its applications
CO2	Identify different transportation system, water supply system and its applications
CO3	List the basic components and analyze the working of major power plants
CO4	Identify the working of IC engines and understand the need of various auxiliary systems
CO5	Identify manufacturing processes; casting, forming. List machining operations; lathe, drilling. Identify process of welding

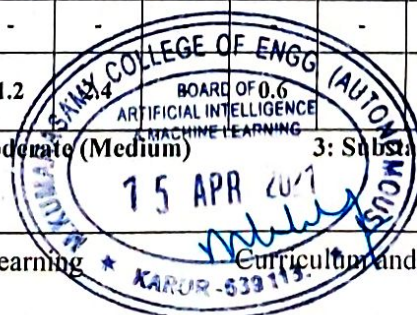
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	-	3	-	-	3	3	-	-	-	-	3	1	-
CO2	3	-	3	-	3	3	3	-	3	-	-	3	1	-
CO3	3	-	-	-	-	-	3	-	-	-	-	-	1	-
CO4	3	-	-	-	-	-	3	-	-	-	-	-	3	1
CO5	3	-	-	-	-	-	-	-	-	-	-	-	3	2
CO (Avg)	3	-	1.2	-	0.6	1.2	-	-	-	-	-	1.2	1.8	0.6

1: Slight (Low)

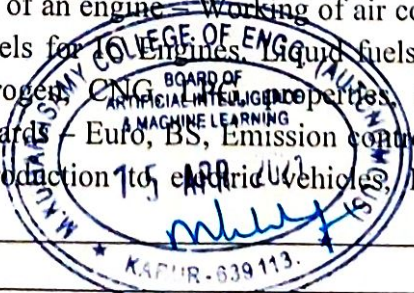
2: Moderate (Medium)

3: Substantial (High)





UNIT I	BUILDING MATERIALS	9
<p>Introduction to Civil Engineering, Building Materials, History, Disciplines in Civil Engineering, Early constructions and development over time, Ancient Monuments: Peruvudaiyar or Brihadeeswarar Temple, Kallanai dam Grand Anicut, Taj Mahal, Golconda fort, Angkor Wat, Pyramids of Giza, Colosseum Development of various materials, Methods of Construction, Building Materials - Stone – Classification of Rocks, Quarrying, Dressing, Properties and Uses of Stone Mortar, Plain and Reinforced Cement, Concrete Grade and properties and uses, Necessity of Special Concrete, Self Compacting Concrete, Construction Chemicals (Plasticizers), Recycling: construction, demolition wastes, Buildings, Classification of Buildings, Selection of site for a building, Components of Buildings, Soil, General types of soil, Bearing Capacity, Factors affecting bearing capacity, Foundations: Functions, General types of, foundation, Shallow foundations</p>		
UNIT II	TRANSPORTATION AND WATER SYSTEM	9
<p>Cement concrete flooring, Marble flooring, Granite flooring, Ceramic tile flooring, Roofs: Types of roofs, Madras terrace roof, Reinforced concrete roofs, Trussed roof, Roof Coverings: Types, Weathering course: Types, Mode of Transportation - Highways - Classification of Roads, Cross section details of flexible pavements, Railways – Zone and Headquarters, Permanent way and its requirement, Components of Permanent way, Bridges: Components of Bridge, Types, Dams: Purpose, Classification, Gravity dams - Advantages and Disadvantages, Elements of protected Water Supply system, Objective, Quantity of water, Design period, Per-capita demand, Factor affecting per capita demand, Sources of Water Supply, Standards of Drinking water, Drinking Water Treatment: Objectives, Treatment plant process, Sewage: Method of collection, Sewage treatment and disposal</p>		
UNIT III	POWER PLANTS	9
<p>Coal based thermal Power Plant: layout, components description, working, advantages, disadvantages, Hydro Electric power plant: layout, components description, working, advantages and disadvantages, Nuclear power plant: Nuclear fission and fusion reactions, Nuclear reactor, components description, Layout, working, merits and demerits of boiling water reactor , Layout, working, merits and demerits of pressurized water reactor, Gas turbine power plants: components description, working and types gas turbines, methods to improve performance, Layout and working of open cycle plant with intercooling, reheating, regeneration, Solar Thermal power plant: layout of Flat plate collector based plant, central receiver type plant, advantages, disadvantages, Wind energy conversion system – wind turbine types, Working, advantages and disadvantages</p>		
UNIT IV	INTERNAL COMBUSTION ENGINES	9
<p>Engine: Classification, operations of 2 stroke & 4 stroke, Comparison of SI & CI engines, Fuel supply system and Battery ignition system, Magneto ignition system of SI engine, Working of a simple carburetor, GDI, MPFI, CRDI, Lubrication system of an engine, Functions and Working of mist and forced feed lubrication system, Cooling system of an engine - Working of air cooled (fans), Water cooled engines (forced circulation), Alternate fuels for Engines, Engine fuels: methanol, ethanol, vegetable oil, Biodiesel, Gaseous fuel: Hydrogen, LPG, CNG, Properties, advantages, disadvantages, Emissions from engine – Emission standards – Euro, BS, Emission control measures – Catalytic converter, Exhaust gas recirculation, Introduction to electric vehicles, Hybrid and autonomous vehicles</p>		



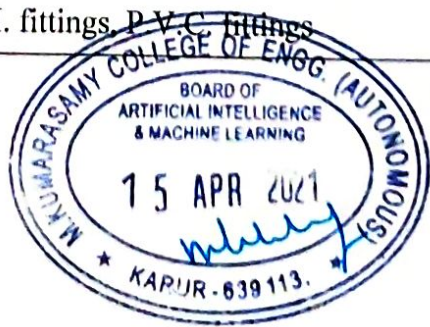


UNIT V	CASTING AND FORMING PROCESS	9
---------------	------------------------------------	----------

Casting introduction and history, Expandable mold casting process , Production steps in a typical sand-casting process, terms including patterns and core, Other expendable mold casting: shell molding, vacuum molding, expanded polystyrene process, Investment casting, Permanent mold casting: hot chamber and cold chamber die casting & Permanent moldcasting: Semi centrifugal and centrifuge casting, Metal forming introduction and its classification, metals and alloys, Bulk deformation: hot, cold forging processes, hot rolling processes, cold rolling processes, Rolling mill classification, hot and cold extrusion processes, wire and bar drawing processes, Sheet metal working, applications. Cutting operations: shearing, blanking, punching, cutoff, parting, slotting, perforating, notching, trimming, shaving, fine blanking, Bending operations: V-bending, edge bending, flanging, hemming, seaming, curling, spring back effect, Drawing operations, its defects, coining, embossing, ironing, lancing, twisting

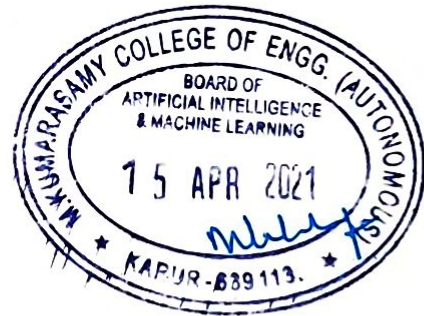
LIST OF EXPERIMENTS		30
----------------------------	--	-----------

1. Study about Brick, Stone & Cement: Types, Uses, Structural steel, Timber properties and uses
2. Study about Water Supply, Distribution System, Water Treatment Plant, Sewerage System
3. Study about basics of Casting, processes, Equipment's, To make the mould using stepped flange
4. Basics of Metal Arc welding operations, Equipment's, Tools, Butt joint of two metal plates using arc welding process
5. Welding-Lap joint of two metal plates overlapping on one another using arc welding process.
6. Basics of fitting practice, tools and method of producing models, Tools, Step fitting of two metal plates using fitting tools
7. Half Round, Vee fitting of two metal plates using fitting tools
8. Basics of Carpentry operations, Equipment's, Tools, Cross halving joint of two wooden pieces at perpendicular direction
9. To make duster from wooden piece using carpentry tools.
10. Basics of Sheet metal operations, Equipment's, Tools and demonstration of producing models, To make geometrical shape like frustum
11. Sheet metal operations - To make geometrical shape like square tray, rectangular tray
12. Sheet metal operations - To make geometrical shape like Cone , Funnel
13. Study the basics of moulding and processes, Equipment's, To make plastic models using injection moulding of simple part
14. Basics of Plumbing practices for G.I and P.V.C., Tools and demonstration of producing models
15. Plumbing of bathroom/ kitchen fittings using G.I. fittings, P.V.C. fittings





Text Book (s)	
1	Dr.V. Rameshbabu,"Basic of Civil and Mechanical Engineering", VRB Publishers pvt ltd, 2017
Reference (s)	
1	SeropeKalpakjian, Steven Schmid," Manufacturing Processes for Engineering Materials", Pearson, 2016
2	Drbal, Larry F. Boston, Patricia G. Westra, Kayla L. Black, Veatch, "Power Plant Engineering", Kluwer Academic Pub., 1995
3	Andy Walker, "Solar Energy", John Wiley & Sons, 2013
4	John B. Heywood, "Internal Combustion Engine Fundamentals", Tata McGraw Hill Education, 2017
5	Kumar. T, LeenusJesu Martin and Murali. G, "Basic Mechanical Engineering", Suma Publications Chennai, 2007.





Regulation 2018		Semester II	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
S	18MES101J	ENGINEERING GRAPHICS	1	0	4	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 Construct ellipse, Parabola, hyperbola, cycloid and involutes.
- 2 Sketch the projection of points, straight lines and plane surfaces.
- 3 Sketch the Projection of simple solids like prisms, pyramids, cylinder and cone
- 4 Sketch the sectional solids and developing the lateral surfaces of simple solids
- 5 Understand the three dimensional drawing of simple solid by isometric projection and perspective projection, and convert isometric projection to orthographic projection.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Apply engineering graphic fundamentals to draw/evaluate engineering curves.
- CO2 Draw the graphics of engineering parts with point, line and plane projections
- CO3 Draw projection of solid objects like prisms, cylinders, pyramids and cones used in engineering objects
- CO4 Develop the lateral surfaces of the sectional solids.
- CO5 Create 3D part models using isometric and perspective projection.

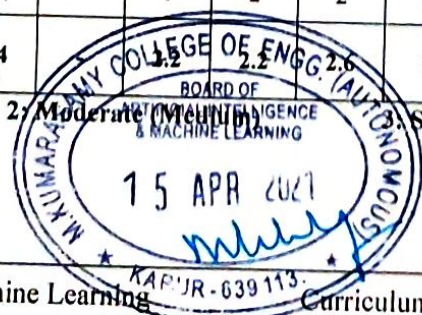
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	-	2	3	2	2	-	3	2	2
CO2	3	2	3	2	2	-	1	2	3	2	-	3	3	1
CO3	3	2	3	2	3	-	1	2	3	2	-	2	2	1
CO4	3	2	3	2	3	-	1	2	3	2	-	2	2	1
CO5	3	2	2	2	2	-	1	2	2	2	-	3	3	1
CO (Avg)	3	2	2.6	2	2.4	-	1.2	2.1	2.6	2	-	2.6	2.4	2.2

1: Slight (Low)

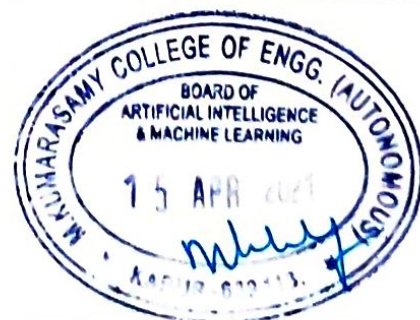
2: Moderate (Medium)

3: Substantial (High)



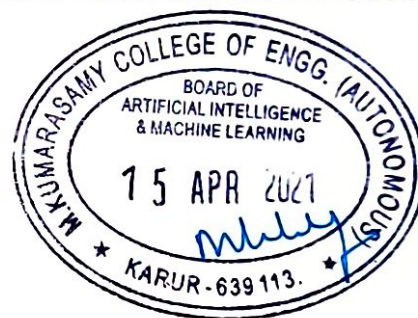


UNIT I	PLANE CURVES	9
Principles of Engineering Graphics - Lettering - dimensioning - Curves used in engineering practices: Conics – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes – Drawing of tangents and normal to the above curves.		
UNIT II	PROJECTION OF POINTS, LINES AND PLANE SURFACES	9
Projection of points and straight lines located in the first quadrant – Determination of true lengths and true inclinations. Projection of polygonal surface and circular lamina inclined to both reference planes.		
UNIT III	PROJECTION OF SOLIDS	9
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.		
UNIT IV	SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES	9
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – Obtaining true shape of section. Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinders and cones – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.		
UNIT V	ISOMETRIC PERSPECTIVE AND ORTHOGRAPHICS PROJECTIONS	9
Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones. Perspective projection of prisms, pyramids and cylinders by visual ray method. Isometric to orthographic multi-view.		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Spiral and involutes using bspline or cubic spline 2. Plan of residential building 3. Simple steel truss 4. Isometric projection of simple objects 5. Creation of 3D model 6. Orthographic projection of given 3D object 7. Projection of planes with inclination to reference plane 8. Solids with inclination to one reference plane 9. Section view of simple solids 10. Development of solids 		





Text Book (s)	
1	K. V. Natrajan, "A text book of Engineering Graphics", Dhanalakshmi Publishers, Chennai (2010).
2	K. Venugopal & V. Prabhu Raja, "Engineering Graphics", New Age International (P) Limited, 15 th edition (2018).
Reference (s)	
1	K. R. Gopalakrishnana, "Engineering Drawing" (Vol.I&II), Subhas Publications, 2010.
2	R. L Jhala "Engineering Graphics", Tata McGraw Hill Publishing Company Limited, New Delhi, 2015.
3	Dhananjay A. Jolhe, "Engineering Drawing with an introduction to AutoCAD" Tata McGraw Hill Publishing Company Limited, 2008.
4	Basant Agarwal and Agarwal C.M., "Engineering Drawing", Tata McGraw Hill Publishing Company Limited, New Delhi, 2012.
5	M.S. Kumar, "Engineering Graphics", D.D. Publications, 2009.

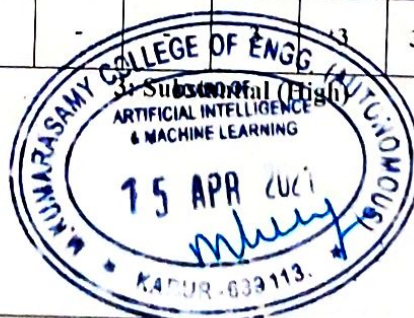




Regulation 2018		Semester II			Total Hours			45						
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
C	18AIC101J	PYTHON PROGRAMMING	2	0	2	3								
Prerequisite Course (s)														
Nil														
Course Objective (s):														
The purpose of learning this course is to:														
1	Understand the fundamentals of Python programming													
2	Handle list, tuples, sets and Dictionaries data types													
3	Learn function prototypes and string functions													
4	Use files and modules for data processing													
5	Understand packages in Python and data visualization													
Course Outcome (s) (Cos):														
At the end of this course, learners will be able to:														
CO1	Develop basic Python programs using conditional and control statements													
CO2	Perform operations on list, tuples, sets and Dictionaries													
CO3	Implement function prototypes and string functions													
CO4	Apply files and modules and perform operations on CSV files													
CO5	Perform data visualization and apply Python packages													
CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO2	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO3	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO4	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO5	3	3	3	3	3	1	-	-	-	-	3	3	3	2
CO (Avg)	3.00	3.00	3.00	3.00	3.00	1.00	-	-	-	-	3	3	3.00	2

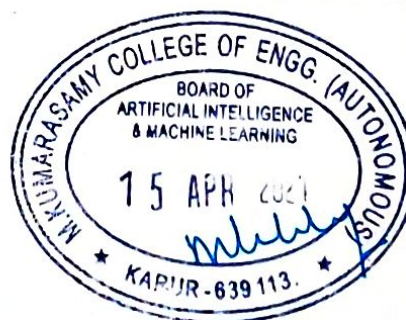
1: Slight (Low)

2: Moderate (Medium)



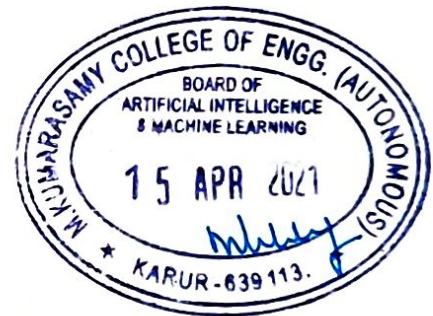


UNIT I	INTRODUCTION TO PYTHON	6
Introduction to Python, features, installing Python, writing and executing Python program — native data types, comments, constants, variables, operators, expression, conditional statements, control statements, continue, pass, break.		
UNIT II	LISTS, TUPLES, SETS AND DICTIONARIES	6
Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Sets: methods and operators, Dictionaries: operations and methods.		
UNIT III	FUNCTIONS AND STRINGS	6
Functions definition, declaration, arguments, parameters – formal and local, parameter passing methods - function prototypes, recursion; Strings: string slices, immutability, string functions and methods, string module, regular expressions.		
UNIT IV	FILES AND MODULES	6
Files and exception: Text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, accessing CSV file.		
UNIT V	PACKAGES AND DATA VISUALIZATION	6
Text processing, Numerical processing: numpy package – mean, median and mode, pandas package – vector, dataframe, data visualization: matplotlib, Time operations.		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Finding factorial of n 2. Generating Fibonacci series 3. Exchange the values of two variables 4. Calculating student grade 5. Sum and average of n elements, linear search, printing a pattern. 6. Find minimum in a list, list operations, create and insert elements in a Dictionary, operations on sets and tuples 7. Counting the vowels and consonants in a given string, exchanging of two values using recursion 8. File operations: accessing a CSV file and generate reports 9. Display a data frame from a dictionary input using Pandas 10. Create a 3x3 matrix with values from 2 to 10 using numpy 		





Text Book (s)	
1	Anurag Gupta,G.P BISWAS ,” Python Programming – Problem solving, packages and Libraries, Edition 1, Tata McGraw Hill, 2018
2	E Balagurusamy, “Problem Solving and Python Programming”, Edition1 , TataMcGraw Hill, 2018
3	Reema Thareja, “Python Programming using Problem Solving Approach”, OXFORD University Press, 2017.
Reference (s)	
1	Allen B. Downey, “Think Python: How to Think Like a Computer Scientist,,,,, 2nd edition, Updated for Python 3, Shroff/O,,Reilly Publishers, 2016.
2	John V Guttag, —Introduction to Computation and Programming Using Python,,,,, Revised and expanded Edition, MIT Press , 2013
3	John V. Guttag,, Introduction to Computation and Programming using Pythonl, Prentice Hall of India, 2014.





Regulation 2018		Semester II	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
H	18MBH101L	PROFESSIONAL SKILLS AND PRACTICES	0	0	2	1

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- CLR-1 Equip students with different aspects of Presentation
- CLR-2 Train students to use appropriate language for public speaking.
- CLR-3 Help students better understand basic leadership qualities and personality traits
- CLR-4 Train the students to face interview confidently.
- CLR-5 Make students understand how setting goals in life is important.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Make presentation in a formal way.
- CO2 Speak with clarity and confidence, thereby enhancing their employability skills.
- CO3 Enable students to understand different aspects of leadership and evaluate in their own strengths.
- CO4 Clear the job interview successfully.
- CO5 Realize that selecting goal is a fundamental component to long-term success of an individual.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	2	2	3	3	3	2	3	1	2
CO2	-	-	-	-	-	2	2	3	3	3	2	3	1	2
CO3	-	-	-	-	-	2	2	3	3	3	2	3	1	2
CO4	-	-	-	-	-	2	2	3	3	3	2	3	1	2
CO5	-	-	-	-	-	2	2	3	3	3	2	3	1	2
CO (Avg)	-	-	-	-	-	2	2	3	3	3	2	3	1	2

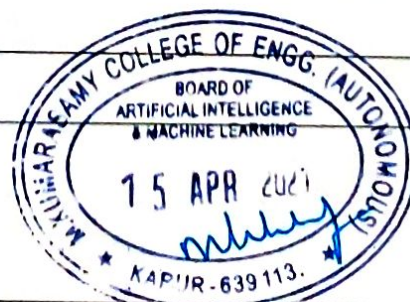
1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)



UNIT I	PRESENTATIONS	5
Tips and Techniques for an Effective Presentation - Effective presentation structure - Types of Presentation - Verbal aspect of a presentation - Non-verbal aspect of a presentation – body language - Stress management during a presentation		
UNIT II	PUBLIC SPEAKING	5
Importance of Public Speech - Dealing with fear and Anxiety - Tips and Techniques for Public Speaking - Informative Speech - Delivering a Persuasive Speech - Dealing with audience questions		
UNIT III	LEADERSHIP SKILLS	5
Communication – Motivation – Delegating – Creativity – Responsibility – Commitment		
UNIT IV	INTERVIEW SKILLS	5
Preparing for a Job Interview - The Interview Process - Telephone Interviews - Interview Techniques - Mock Interview - Mock Interview		
UNIT V	GOAL SETTING	5
Types of goals - Reasons for goal setting - Goal Setting Process - S.M.A.R.T. goals - Tips and Techniques for Goal Setting - Trouble in Setting Goals		
LIST OF EXPERIMENTS		5
<ol style="list-style-type: none"> 1. Make a presentation on a general topic 2. Give a persuasive speech 3. Exhibit your leadership qualities 4. Mock interview 5. Share your realistic short term and long term goals and the ways to attain them. 		
Text Book (s)		
NIL		
Reference(s)		
1	Aruna Koneru, Professional Communication, Tata McGraw-Hill Publishing Company Limited, New Delhi	
2	Professional Skills and Practice, Oxford University Press	
3	https://www.skillsyouneed.com	
4	https://www.Business English Site.com	





Regulation 2018		Semester II	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18LEM102T	VALUE EDUCATION	1	0	0	-

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

CLR-1	Connect the learners to their potential, identify their 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

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Equipped with an awareness of their positive energy and power
CO2	Identify the meaning of 'education'; have a clearer and better understanding in taking education to the masses
CO3	Assess their weaknesses; understand risks involved and rectify them through learning from positive and negative instances
CO4	Realize their professional responsibilities
CO5	Acquire the required values in an expanding pluralistic world not be swept off their feet due to the rapid changes

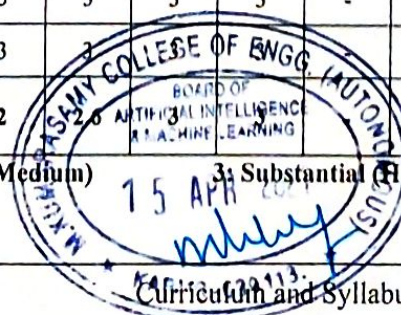
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	-	-	2	3	-	3	3	3	-	3	1	1
CO2	2	3	2	-	3	3	2	2	3	3	-	3	1	1
CO3	2	-	-	-	2	3	2	2	3	3	-	3	1	1
CO4	3	2	-	-	3	3	3	3	3	3	-	3	1	1
CO5	2	-	-	-	3	3	3	3	3	3	-	3	1	1
CO (Avg)	2	1.4	0.4	-	2.6	3	2	2	3	3	-	3	1	1

1: Slight (Low)

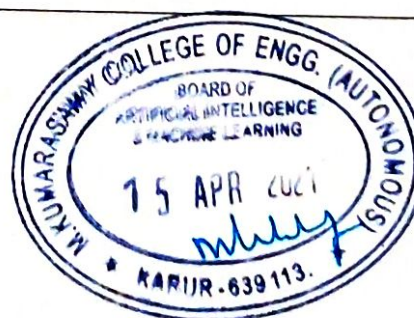
2: Moderate (Medium)

3: Substantial (High)



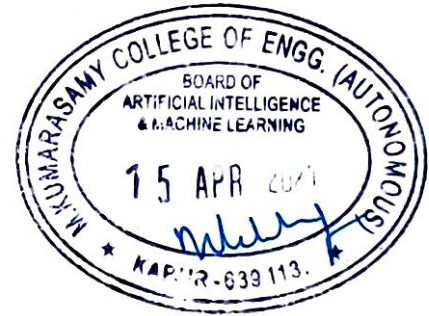


UNIT I	VISIONS FOR YOUTH	6
Introduction (Quiz) - Two speeches by great personalities (Oral presentations) - Quotes, proverbs relating to the power and potential of youth, Excerpts: Wings of Fire (Collecting proverbs highlighting the potential of youth) - Two news articles highlighting the initiatives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





Text Book (s)	
Nil	
Reference (s)	
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 House. pp. 3-13 and pp. 425-30. www.mkgandhi.org
3	Piroda, Sam. “Challenges in Science and Technology”. www.nfdindia.org/loc19.htm
4	Thomas A Address to VTU Students by Narayana Murthy. https://www.karnataka.com/personalities/narayana-murthy/vtu-address-2006/
5	World Economic forum. “India’s top 7 challenges from skills to water scarcity”





Regulation 2018		Semester I / II	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18GNM101L	PHYSICAL & MENTAL HEALTH USING YOGA	0	0	2	Nil

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- CLR-1 Provide Deeper insight into the curriculum of Yogic Sciences along with practical applications of Yoga
- CLR-2 Intend that students should get familiar with the poses if Yogasanam.
- CLR-3 Promote positive health in the Student through Yoga and enabling and imparting skill in them to practice and apply Yogic
- CLR-4 Practice for Health to general public and teach Yoga for Total personality development and spiritual evolution.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

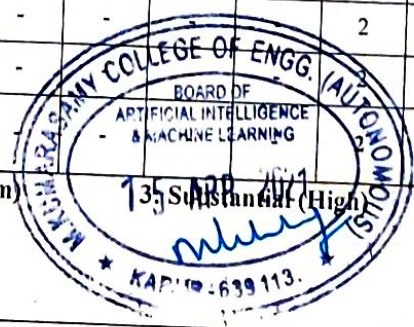
- CO1 Increase the muscle strength
- CO2 Improve respiration, energy and vitality.
- CO3 Maintain a balanced metabolism and weight reduction.
- CO4 Maintain cardio and circulatory health.
- CO5 Improve athletic performance and protection from injury.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	1	-	-	-	-	-	2	-	1
CO2	-	-	-	-	-	1	-	-	-	-	-	2	-	1
CO3	-	-	-	-	-	1	-	-	-	-	-	2	-	1
CO4	-	-	-	-	-	1	-	-	-	-	-	2	-	1
CO5	-	-	-	-	-	1	-	-	-	-	-	2	-	1
CO (Avg)	-	-	-	-	-	1	-	-	-	-	-	2	-	1

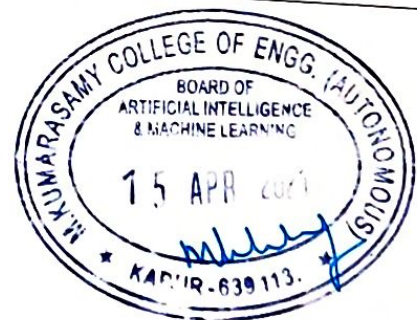
1: Slight (Low)

2: Moderate (Medium)





	Introduction	6
	<ul style="list-style-type: none"> ▪ Human Body – Meaning and its Importance in Yoga ▪ Definition of Anatomy and Physiology ▪ Cell: Structure & Function 	
	General Information, Different parts, Structure, Function and Effect of Yogic Practices.	24
	<ul style="list-style-type: none"> ▪ Tissues: Types, Structure & Function ▪ Musculo-Skeletal System ▪ Digestive System ▪ Excretory System ▪ Respiratory System ▪ Circulatory System ▪ Nervous System ▪ Endocrinal System 	
Text/ Reference (s) Books		
1	Shirley Telles – A Glimpse of the Human Body The structure and Functions, Swami Vivekananda Yoga Prakashana, Bangalore.	
2	Makar and Madhukar Gore – Anatomy and Physiology of Yogic Practices, motilal Banarsidass, New Delhi, 2007.	
3	Anne Waugh, Allison Grant – Iross and Wilson Anatomy and Physiology in Health & Illness, Churchill Livingstone; 2010.	





Regulation 2018		Semester III	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18MAB207T	PROBABILITY AND STATISTICS	3	1	0	4

Prerequisite Course (s)

Advanced Calculus and Complex Analysis

Course Objective (s):

The purpose of learning this course is to:

- 1 Have a well – founded knowledge of standard distributions which can describe real life phenomena.
- 2 Acquire skills in handling situations involving more than one random variable and functions of random variables.
- 3 Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
- 4 Gain the knowledge on test of hypothesis and how they relate to engineering applications.
- 5 Classify the experimental design.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Apply basic probability techniques and models to analyze the performance of computer systems.
- CO2 Illustrate and apply the concept of pairs of random variables from the knowledge of distributions.
- CO3 Apply the concept of random processes in engineering disciplines.
- CO4 Identify the right test statistic to test the hypothesis formulated from the given data.
- CO5 Apply the basic concepts of classifications of design of experiments in the real life phenomena.

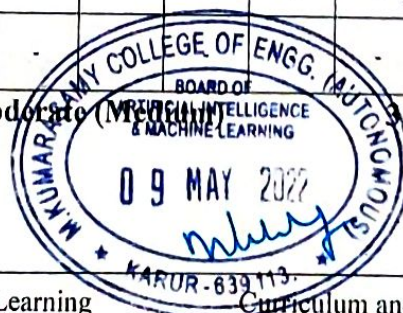
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	1	-	-	-	-	-	-	-	-	1	2	-
CO2	2	2	1	-	-	-	-	-	-	-	-	1	2	-
CO3	2	2	2	1	-	-	-	-	-	-	-	1	2	-
CO4	3	3	2	1	-	-	-	-	-	-	-	1	2	-
CO5	3	3	1	1	-	-	-	-	-	-	-	1	2	-
CO (Avg)	2.4	2.4	1.4	0.6	-	-	-	-	-	-	-	1	2	-

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	RANDOM VARIABLE AND STANDARD DISTRIBUTIONS	9 + 3
Random variable - Probability mass function - Probability density functions- Properties - Moments - Moment generating functions and their properties. Binomial, Poisson, Geometric, Uniform, Exponential, and Normal distributions and their properties .		
UNIT II	TWO DIMENSIONAL RANDOM VARIABLES	9 + 3
Joint distributions - Marginal and conditional distributions – Covariance – Correlation and regression - Transformation of random variables - Central limit theorem.		
UNIT III	MARKOV PROCESSES AND MARKOV CHAINS	9 + 3
Classification-First order, Second order, strictly stationary order, wide-sense stationary - Markov process - Markov chains – Transition probabilities - Poisson process.		
UNIT IV	TESTING OF HYPOTHESIS	9 + 3
Sampling distributions - Tests for single mean, Proportion, Difference of means (large and small samples) – Tests for single variance and equality of variances – chi-square test for goodness of fit – Independence of attributes.		
UNIT V	DESIGN OF EXPERIMENTS	9 + 3
Completely randomized design – Randomized block design – Latin square design - 2^2 – factorial design.		
Text Book (s)		
1	Oliver Ibe, “Fundamentals of Applied Probability and Random Processes” 2nd Edition, Elsevier, 2014.	
2	Douglas C. Montgomery, George C. Runger, “Applied Statistics and Probability for Engineers”, Third Edition, John Wiley & Sons, 2003.	
Reference (s)		
1	R.E. Walpole, R.H. Myers, S.L. Myers, and K Ye, “Probability and Statistics for Engineers and Scientists”, Pearson Education, Asia , 8th edition, 2007.	
2	M.R. Spiegel, J. Schiller and R.A. Srinivasan, “Schaum’s Outlines Probability and Statistics”, Tata McGraw Hill edition, 2004.	
3	I.R. Miller, J.E. Freund and R. Johnson, “Probability and Statistics for Engineers”, 9th Edition, Pearson, 2017.	
4	Hwei Hsu, "Schaum’s Outline of Theory and Problems of Probability, Random Variables and Random Processes", Tata McGraw Hill Edition, New Delhi, 2004.	
5	Yates, R.D. and Goodman. D. J., "Probability and Stochastic Processes", 2nd Edition, Wiley India Pvt. Ltd., Bangalore, 2012.	





Regulation 2018		Semester III	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC201T	PRINCIPLES OF ARTIFICIAL INTELLIGENCE	3	0	0	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 To understand the main approaches to artificial intelligence.
- 2 To Explore areas of application based on knowledge representation
- 3 To Develop abilities to apply, build and modify decision models to solve real problems.
- 4 To Familiarize the Artificial Intelligence techniques for building well-engineered and efficient intelligent systems.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Understand the importance of agents with its types.
- CO2 Analyze the search strategies and its types
- CO3 Analyze the structures and algorithms selection in Artificial Intelligence techniques related to knowledge representation and reasoning.
- CO4 Analyze the knowledge of AI applications.
- CO5 Understand the basics of an expert system.

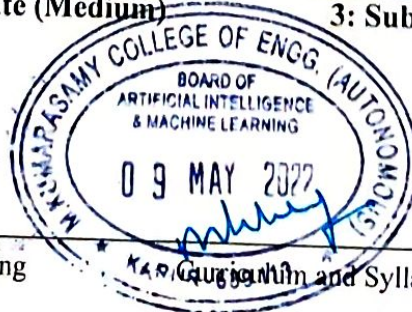
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	3	2	1	-	-	-	1	1	3	2
CO2	3	2	3	3	3	2	1	-	-	2	1	1	3	2
CO3	2	2	3	3	3	2	1	-	-	-	1	1	3	2
CO4	2	2	3	3	3	2	1	-	-	-	1	1	3	2
CO5	3	2	3	3	3	2	1	-	-	-	1	1	3	2
CO (Avg)	2.6	2	3	3	3	2	1	-	-	0.4	1	1	3	2

1: Slight (Low)

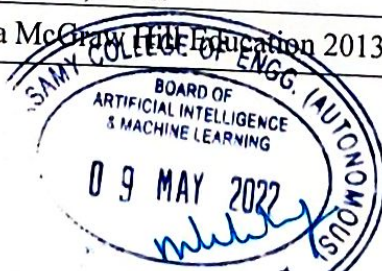
2: Moderate (Medium)

3: Substantial (High)





UNIT I	OVERVIEW OF AI	9
Introduction - Definition - Characteristics of Intelligent Agents - Typical Intelligent Agents - Problem Solving Approach to Typical AI problems, History of Artificial Intelligence, The State of the Art, Future of Artificial Intelligence, Risks and Benefits of AI.		
UNIT II	INTELLIGENT AGENTS	9
Agents and Environment, The Concept of Rationality: Performance measures, Rationality, Omniscience, learning, and autonomy , Agent architectures (e.g., reactive, layered, cognitive), The Nature of Environments: Specifying the task environment, Properties of task environments, The Structure of Agents.		
UNIT III	SEARCH TECHNIQUES	9
Uninformed search strategies: breadth first search, depth first search, depth limited search, bidirectional search. Heuristic search strategies: Greedy best-first search, A* search, AO* search, memory bounded heuristic search, Optimization problems: Hill climbing search, simulated annealing search, local beam search. Constraint satisfaction problems: Adversarial search, optimal decisions & strategies in games, the minimax search procedure, alpha-beta pruning, iterative deepening.		
UNIT IV	KNOWLEDGE & REASONING	8
Logical Agents: Knowledge-Based Agents, Logic, Propositional Logic: A Very Simple Logic, Syntax, Semantics, A simple knowledge base, A simple inference procedure, Propositional Theorem Proving : Inference and proofs, Proof by resolution, Conjunctive normal form, A resolution algorithm, Completeness of resolution, Forward and backward chaining.		
UNIT V	ADVERSARIAL SEARCH AND GAMES	8
Game theory, classification of games, game playing strategies, prisoner's Dilemma, Game playing techniques, minimax procedure, alpha-beta cut-offs, Complexity of alpha-beta search, Limitations of game search algorithms.		
Text Book (s)		
1	S.Russell and P.Norvig, Artificial Intelligence:A Modern Approach, Prentice Hall, Fourth Edition, 2021.	
Reference (s)		
1	I. Bratko ,Prolog : Programming for Artificial Intelligence, Fourth edition , Addison-Wesley Educational Publishers Inc, 2011	
2	David L. Poole and Alan K. Mackworth, Artificial Intelligence : Foundations of Computational Agents, Cambridge University Press, 2010.	
3	Deepak Khemani, Artificial Intelligence, Tata Mc Graw Hill Education 2013	





Regulation 2018		Semester III	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC202J	OBJECT ORIENTED PROGRAMMING WITH JAVA	2	0	2	4

Prerequisite Course (s)

Programming for Problem Solving

Course Objective (s):

The purpose of learning this course is to:

- 1 To understand Object Oriented Programming concepts and basic characteristics of Java.
- 2 To know the principles of packages, inheritance and interfaces.
- 3 To define exceptions and use I/O streams.
- 4 To develop a java application with threads and generics classes.
- 5 To design and build simple Graphical User Interfaces.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Develop Java programs using OOP principles.
- CO2 Develop Java programs with the concepts inheritance and interfaces.
- CO3 Build Java applications using exceptions and I/O streams.
- CO4 Develop Java applications with threads and generics classes.
- CO5 Develop interactive Java programs using swings.

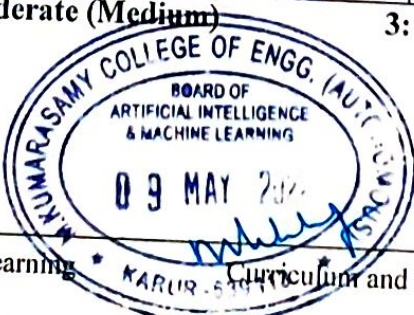
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	1	-	1	2	3	3
CO2	3	3	3	3	3	1	-	-	1	-	1	2	3	3
CO3	3	3	3	3	3	2	-	-	2	-	1	2	2	3
CO4	3	3	3	3	3	1	-	-	2	-	1	2	2	3
CO5	3	3	3	3	3	2	-	-	3	-	1	3	3	3
CO (Avg)	3	3	3	3	3	1.4	-	-	1.8	-	1	2.2	2.6	3

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)



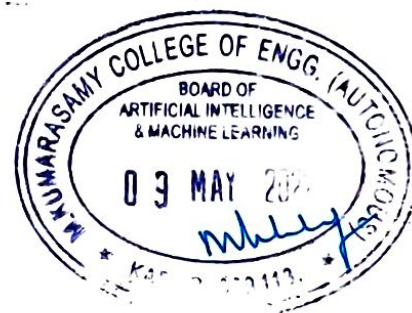


UNIT I	INTRODUCTION TO OOP AND JAVA FUNDAMENTALS	6
OOP in Java – Characteristics– The Java Environment - Java Source File - Structure – Compilation. Fundamental Programming Structures in Java – Defining classes in Java – Constructors, Methods - Access Specifier - Static Members - Comments, Data Types, Variables, Operators, Control Flow, Arrays , Packages - JavaDoc comments.		
UNIT II	INHERITANCE AND INTERFACES	6
Inheritance – Super classes- Sub Classes – Protected Members – Constructors In Sub Classes- The Object Class – Abstract Classes and Methods - Final Methods and Classes – Interfaces – Defining an Interface, Implementing Interface, Differences Between Classes,Interfaces and Extending Interfaces - Object Cloning - Inner Classes		
UNIT III	EXCEPTION HANDLING AND I/O	6
Exceptions - Exception Hierarchy - Throwing and Catching Exceptions – Built-In Exceptions, Creating Own Exceptions, Stack Trace Elements. Input / Output Basics – Streams – Byte streams and Character streams – Reading and Writing Console – Reading and Writing Files		
UNIT IV	MULTITHREADING AND GENERIC PROGRAMMING	6
Multi-threading - Multitasking, Thread Life Cycle, Creating Threads, Synchronizing Threads, Inter-Thread Communication, Daemon Threads, Threads Groups. Generic Programming – Generic classes – generic methods – Bounded Types – Restrictions and Limitations.		
UNIT V	EVENT DRIVEN PROGRAMMING	6
Applet Basics - Applet Architecture - Applet Display Methods - Event Handling Mechanisms - Event Classes - Event Listener - Working with Windows, Graphics, Colours and Fonts - AWT Controls – Database Connectivity and JDBC Concepts		
LIST OF EXPERIMENTS		15
<ol style="list-style-type: none"> 1. Implementing Object Oriented Concepts. 2. Implementing Control Statements 3. Implementation of Interface and Package program. 4. Implement the concept of Exception Handling using predefined and user defined exceptions 5. Implement Multithreading concepts. 6. Implementation of Collection interfaces 7. Implement conversion of InputStream into Byte Array 8. Implement a simple calculator. Use a grid Layout to arrange buttons for the digits and for the +, -, *, / operations. Add a text field to display the results. 9. Implement Mouse events and Keyboard event. 10. Create a database connectivity using any front end with Ms Access/JDBC 		





Text Book (s)	
1	Herbert Schildt, —Java The complete reference, 11th Edition, McGraw Hill Education, 2019
2	Cay S. Horstmann, Gary cornell, —Core Java Volume –I Fundamentals, 9th Edition, Prentice Hall, 2013.
Reference (s)	
1	Paul Deitel, Harvey Deitel, —Java SE 8 for programmersI, 3rd Edition, Pearson, 2015.
2	Steven Holzner, —Java 2 Black bookI, Dreamtech press, 2011.
3	Timothy Budd, —Understanding Object-oriented programming with Javal, Updated Edition, Pearson Education, 2000.





Regulation 2018		Semester III	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC203T	DATA STRUCTURES USING C++	3	0	0	3

Prerequisite Course (s)

Programming for Problem Solving

Course Objective (s):

The purpose of learning this course is to:

- 1 Understand the concepts of Object Oriented Programming.
- 2 Implement ADTs such as arrays, lists, stacks, queues, trees, graphs, search trees in C++ to solve real world problems.
- 3 Analyze various searching and sorting techniques.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Identify the features of object oriented concepts in C++
- CO2 Implement the operations and applications of Stack ADT, Queue ADT and List ADT
- CO3 Classify the types of tree data structures and explain the tree traversal methods
- CO4 Outline the features and applications of graph data structure
- CO5 Design algorithms for searching and sorting techniques

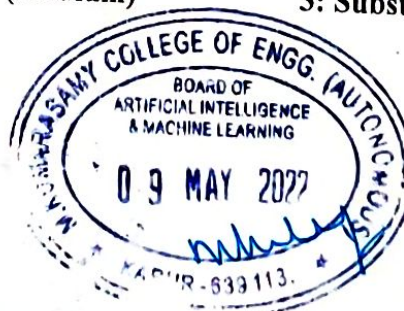
CO-PO Mapping

Cos	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	2	3	-	-	-	2	2	3	3
CO2	3	2	3	3	3	2	3	-	-	-	2	2	3	3
CO3	3	3	3	3	3	2	3	-	-	-	2	2	3	3
CO4	3	3	3	3	3	2	3	-	-	-	2	2	3	3
CO5	3	3	3	3	3	2	3	-	-	-	2	2	3	3
CO (Avg)	3	2.8	3	3	3	2	3	-	-	-	2	2	3	3

1: Slight (Low)

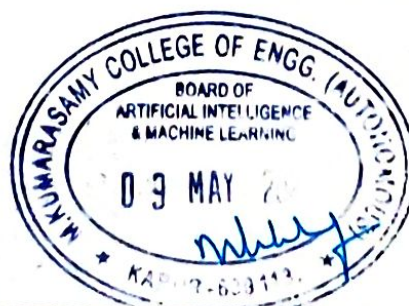
2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION	9
Need for Object Oriented Programming-Characteristics of Object Oriented Programming-Classes and Objects-Member Functions- Constructors and Destructors - Operator Overloading-Inheritance - Function Overloading.		
UNIT II	LINEAR DATA STRUCTURES - STACKS, QUEUES	9
Classification of Data Structures-Abstract Data Types(ADTs)- Array Implementation -Linked List Implementation - Types of Linked List - Applications of List - Stack ADT - Operations - Applications of Stack - Queue ADT - Operations - Circular Queue- Priority Queue - Dequeue - Applications of Queue.		
UNIT III	NON-LINEAR DATA STRUCTURES – TREES	9
Tree ADT - Tree Traversals - Binary Tree ADT - Expression Trees - Applications of Trees - Binary Search Tree ADT - AVL Trees - Heap Tree - B-Tree - B+ Tree - Heap - Applications of Heap.		
UNIT IV	SEARCHING, SORTING AND HASHING TECHNIQUES	9
Searching : Linear Search - Binary Search. Sorting : Bubble sort - Selection sort - Insertion sort – Shell sort - Radix sort. Hashing : Hash Functions - Separate Chaining - Open Addressing - Rehashing - Extendible Hashing.		
UNIT V	NON-LINEAR DATA STRUCTURES – GRAPHS	9
Definition - Representation of Graph - Types of graph - Breadth-first traversal - Depth-first traversal - Topological Sort - Shortest Path Algorithms: Unweighted Shortest Paths - Dijkstra's Algorithm. Minimum Spanning Tree: Prim's Algorithm Kruskal's Algorithm.		
Text Book (s)		
1	Mark Allen Weiss, Data Structures and Algorithm Analysis in C++, 4 th Edition, Pearson Education, 2014.	
Reference (s)		
1	Michael T. Goodrich, Roberto Tamassia and David M. Mount, Data structures and Algorithms in C++, Second Edition, Wiley India, 2011.	
2	E.Balagurusamy, "Object Oriented Programming with C++", Seventh Edition, McGraw Hill Education, 2017.	
3	Robert Lafore, "Object Oriented Programming in C++", Galgotia Publication, 2010.	
4	Aho, J.E.Hopcroft and J.D.Ullman, Data Structures and Algorithms, Pearson education, Asia, 2010.	





Regulation 2018		Semester III	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC204T	COMPUTER ORGANIZATION AND ARCHITECTURE	3	0	0	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 Recognize the basic structure of a digital computer and representation of non-numeric data.
- 2 Learn different arithmetic operations and organization of control unit.
- 3 Study memory organization, different ways of communication with I/O devices and parallel processors.
- 4 Understand the concept of pipelining and its impact in processor design.
- 5 Learn the hierarchical memory system.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Discuss the functionalities of various blocks of a digital computer and express the data representation.
- CO2 Illustrate the logic design of Arithmetic and control Unit.
- CO3 Infer the concepts of memory system, concurrence access in parallel processors and classify the approaches for I/O communication.
- CO4 Distinguish hazards in pipelining and outline its impact in the performance of the processors.
- CO5 Determine the performance of different types of memory.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	3	3	1	1	-	-	-	1	1	3	1
CO2	3	3	3	3	3	1	1	-	-	-	1	1	3	1
CO3	2	3	2	3	3	1	1	-	-	-	2	1	3	1
CO4	2	2	2	3	3	1	1	-	-	-	2	1	3	1
CO5	2	2	2	3	3	1	1	-	-	-	2	1	3	1
CO (Avg)	2.2	2.4	2.2	3	3	1	1	-	-	-	1.6	1	3	1

1: Slight (Low)

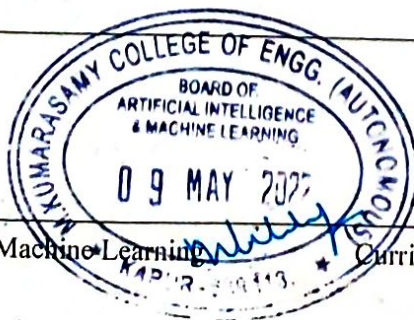
2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION TO COMPUTER ARCHITECTURE	9
Functional blocks of a computer: CPU, memory, input-output subsystems, control unit. Instruction set architecture of a CPU: Registers, instruction execution cycle, RTL interpretation of instructions, addressing modes, instruction set. Outlining instruction sets of some common CPUs. Data representation: Signed number representation, fixed and floating-point representations, character representation.		
UNIT II	COMPUTER ARITHMETIC	9
Integer addition and subtraction, ripple carry adder, carry look-ahead adder, etc. multiplication – shift-and-add, Booth multiplier, carry save multiplier, etc. Division restoring and non-restoring techniques, floating point arithmetic, IEEE 754 format.		
UNIT III	CONTROL UNIT AND PIPELINING	9
Introduction to x86 architecture. CPU control unit design: Hardwired and micro-programmed design approaches, design of a simple hypothetical CPU. Pipelining: Basic concepts of pipelining, throughput and speedup, pipeline hazards. Parallel Processors: Introduction to parallel processors, Concurrent access to memory and cache coherency.		
UNIT IV	PERIPHERAL DEVICES AND THEIR CHARACTERISTICS	9
Input-output subsystems, I/O device interface, I/O transfers – program controlled, interrupt driven and DMA, privileged and non-privileged instructions, software interrupts and exceptions. Programs and processes – role of interrupts in process state transitions, I/O device interfaces – SCII, USB.		
UNIT V	MEMORY ORGANIZATION AND SYSTEM DESIGN	9
Memory interleaving, concept of hierarchical memory organization, cache memory, cache size vs. block size, mapping functions, replacement algorithms, write policies. Memory system design: Semiconductor memory technologies, memory organization.		
Text Book (s)		
1	Morris Mano, “Computer System Architecture” 3rd Edition, Prentice Hall of India, New Delhi, 2014.	
Reference (s)		
1	David A. Patterson and John L. Hennessy, “Computer Organization and Design: The Hardware/Software Interface”, Elsevier, 5th Edition 2013.	
2	Carl Hamacher, Zvonko Vranesic, SafwatZaky, Naraig Manjikian, “Computer Organization and Embedded Systems” McGraw-Hill, 6th Edition 2014.	
3	John P. Hayes, Computer Architecture and Organization, McGraw-Hill ,3rd Edition,2013.	
4	William Stallings, “Computer Organization and Architecture – Designing for Performance”, 10th Edition, Pearson Education, 2015.	
5	Vincent P. Heuring and Harry F. Jordan,” Computer System Design and Architecture”, Prentice Hall, 2 nd Edition, 2004.	





Regulation 2018		Semester III	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC205T	FUNDAMENTALS OF OPERATING SYSTEMS	3	0	0	3

Prerequisite Course (s)

Data structures

Course Objective (s):

The purpose of learning this course is to:

1	To understand the basic concepts and functions of operating systems.
2	To understand Processes and Threads and Scheduling algorithms.
3	To understand the concept of Deadlocks.
4	To analyze various memory and storage management schemes.
5	To understand basic concepts of virtualization.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Illustrate the operating system concepts and its functionalities.
CO2	Compare various CPU scheduling algorithms.
CO3	Explain the need for process synchronization.
CO4	Identify the issues in memory management.
CO5	Illustrate how to optimize the performance of virtualization.

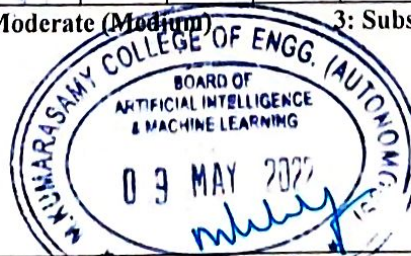
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	2	1	-	-	-	-	1	1	2	3
CO2	3	2	3	2	3	1	-	-	-	-	1	2	3	3
CO3	3	2	2	3	3	1	-	-	-	-	1	2	3	3
CO4	3	2	2	2	3	1	-	-	-	-	1	3	3	2
CO5	3	2	2	3	2	1	-	-	-	-	1	2	3	2
CO (Avg)	3	2	2.4	2.6	2.6	1	-	-	-	-	1	2	2.8	2.6

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)



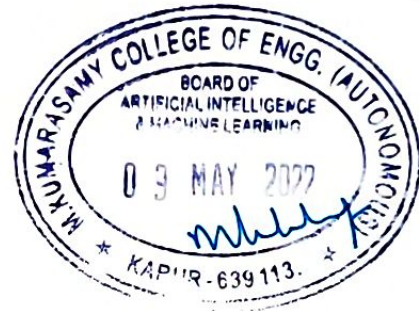


UNIT I	INTRODUCTION	9
Introduction - Operating System Structure – Operating System Operations – Process Management – Memory Management – Storage Management – Protection and Security – Distributed Systems – Computing Environments – System Structures: Operating System Services – User Operating System Interface – System Calls – Types of System Calls – System Programs.		
UNIT II	PROCESS MANAGEMENT AND SYNCHRONIZATION	9
Process Concept: Process Scheduling – Operations on Processes – Inter-process Communication. Multithreaded Programming: Overview – Multithreading Models – Threading Issues Process Synchronization: Introduction - The Critical Section Problem - Synchronization Hardware – Semaphore		
UNIT III	CPU SCHEDULING AND DEADLOCK	9
CPU Scheduling: Basic Concepts – Scheduling Criteria – Scheduling Algorithms – Multiple-Processor Scheduling – Synchronization – The Critical-Section Problem – Peterson’s Solution – Synchronization Hardware – Semaphores – Classic problems of Synchronization – Monitors. Deadlocks: System Model – Deadlock Characterization – Methods for Handling Deadlocks – Deadlock Prevention – Deadlock Avoidance – Deadlock Detection – Recovery from Deadlock		
UNIT IV	MEMORY MANAGEMENT	9
Memory Management Strategies: Swapping – Contiguous Memory Allocation – Paging – Structure of the Page Table – Segmentation Virtual Memory Management: Demand Paging – Copy on Write – Page Replacement – Allocation of Frames – Thrashing.		
UNIT V	STORAGE MANAGEMENT	9
Secondary Storage Structure: Disk Structure – Disk Scheduling – Disk Management – Swap-Space Management. Devices – Device controllers- Device drivers. File System: File Concept – Access Methods – Directory Structure – File Sharing – Protection - File System Structure – File System Implementation – Directory Implementation – Allocation Methods – Free-space Management.		





Text Book (s)	
1	Abraham Silberschatz, Peter B. Galvin, Greg Gagne, "Operating System Concepts Essentials", John Wiley & Sons Inc., 2013.
Reference (s)	
1	Andrew S. Tanenbaum, "Modern Operating Systems", Third Edition Prentice Hall of India Pvt. Ltd, 2010
2	D M Dhamdhere, " Operating Systems: A Concept-based Approach", Second Edition, Tata McGraw-Hill Education, 2007.
3	William Stallings, "Operating Systems Internals and Design Principles", Pearson Education, Eighth Edition, 2015.



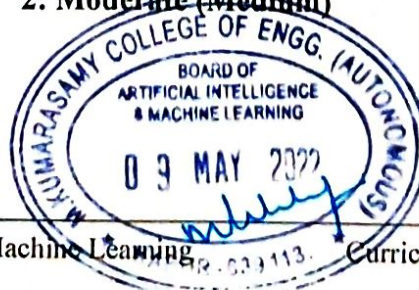


Regulation 2018		Semester III			Total Hours			30						
Category	Course Code	Course Name			Hours / Week			C						
					L	T	P							
C	18AMC206L	DATA STRUCTURES LABORATORY			0	0	2	1						
Prerequisite Course (s)														
NIL														
Course Objective (s): The purpose of learning this course is to:														
1	To apply the concepts of List ADT in the applications of various linear and nonlinear data structures.													
2	To demonstrate the understanding of stacks, queues and their applications.													
3	To analyze the concepts of tree data structure.													
4	To understand the implementation of graphs and their applications.													
5	To be able to incorporate various searching and sorting techniques in real time scenarios.													
Course Outcome (s) (COs): At the end of this course, learners will be able to:														
CO1	Analyze the various data structure concepts.													
CO2	Implement Stacks and Queue concepts for solving real-world problems.													
CO3	Analyze and structure the linear data structure using tree concepts.													
CO4	Critically Analyse various non-linear data structures algorithms.													
CO5	Apply different Sorting, Searching and Hashing algorithms.													
CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	3	3	3	1	-	-	-	-	2	1	3	2
CO2	3	3	2	3	3	1	-	-	-	-	2	2	3	2
CO3	3	3	2	3	3	1	-	-	-	-	2	2	3	2
CO4	3	3	2	3	3	1	-	-	-	-	2	2	3	2
CO5	3	3	2	3	3	1	-	-	-	-	2	1	3	2
CO (Avg)	3	2.8	1.2	3	3	1	-	-	-	-	2	1.6	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

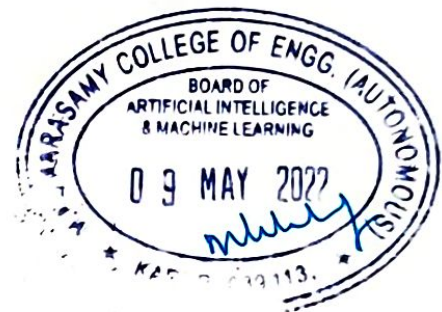




LIST OF EXPERIMENTS

30

1. Array Implementation of List ADT.
2. Array Implementation of Stack and Queue ADTs.
3. Linked list Implementation of Stack, Queue and List ADTs.
4. Implementation of Binary Search Tree.
5. Implementation of AVL Tree.
6. Implementation of Heaps.
7. Graph representation and Traversal algorithms.
8. Applications of graphs.
9. Implementation of Searching and sorting algorithms.
10. Hashing – any two collision techniques.





Regulation 2018		Semester III	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC207L	OPERATING SYSTEMS LABORATORY	0	0	2	1

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	To study the basic concepts and functions of operating systems.
2	To learn about Processes, Threads, Scheduling algorithms and Deadlocks.
3	To study various Memory Management schemes.
4	To learn I/O Management and File Systems.
5	To learn the basics of Distributed operating systems.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Explain the concepts and structures of Operating Systems.
CO2	Design various Scheduling algorithms and methods to avoid Deadlock.
CO3	Compare and contrast various memory management schemes.
CO4	Summarize the concepts of I/O management and design a prototype file system.
CO5	Describe the concepts of Distributed operating systems.

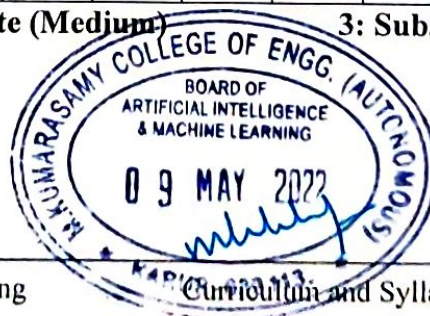
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	1	-	1	2	2	2	3	2
CO2	3	3	3	3	3	-	-	-	2	-	2	2	3	2
CO3	3	3	3	3	3	-	-	-	1	-	2	2	3	2
CO4	3	3	3	3	3	-	-	-	2	-	2	2	3	2
CO5	3	3	3	3	3	-	-	1	1	-	2	2	3	2
CO (Avg)	3	3	3	3	3	-	0.2	0.2	1.4	0.4	2	2	3	2

1: Slight (Low)

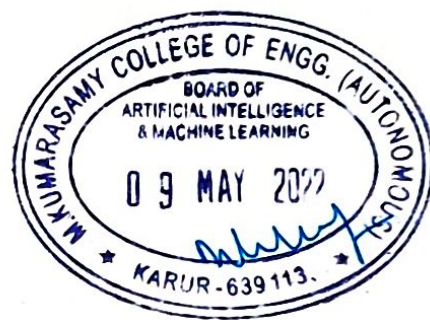
2: Moderate (Medium)

3: Substantial (High)





LIST OF EXPERIMENTS	30
<ol style="list-style-type: none">1. Study of LINUX - Basic Commands2. Shell programming (Using looping, control constructs etc.,)3. Write programs using the following system calls of UNIX operating system: fork, exec, getpid4. Write programs using the I/O system calls of UNIX operating system (open, read, write, etc).5. Implementation of CPU scheduling algorithms: FCFS & SJF6. Implementation of CPU scheduling algorithms: Round Robin & Priority Scheduling7. Implement the Producer – Consumer problem using semaphores.8. Implementation of Banker’s algorithm9. Implement some memory management schemes (First fit, Best fit & Worst fit)10. Implement some page replacement algorithms (FIFO & LRU)	





Regulation 2018		Semester III	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
P	18AIP201L	MINOR PROJECT - I	0	0	2	1

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

Identify the suitable idea and methods to develop the project idea into demonstrative or to explain the concepts in standard procedure and to prepare report.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

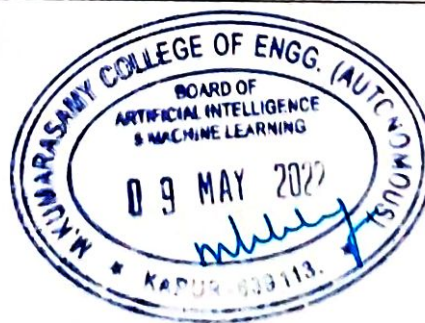
CO1 Identify the requirement and develop the concepts or models through standard procedures and preparation of report.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	1	1	3	1	3	3	3	3
CO (Avg)	3	3	3	3	3	1	1	1	3	1	3	3	3	3

Strategy(s)

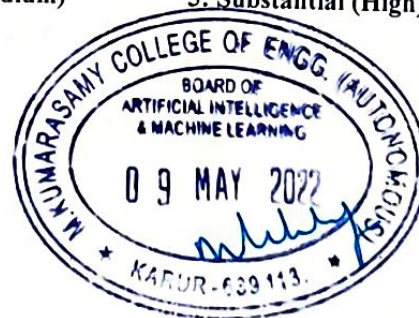
- The Student works on a topic approved by the head of the department under the guidance of a faculty member and prepares a project report after completing the work to the satisfaction.
- The student will be evaluated through continuous assessment by a panel formed under the approval of head of the department.





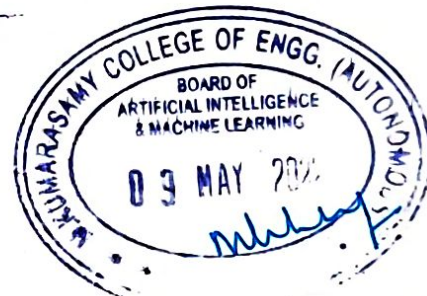
Regulation 2018		Semester III			Total Hours			30						
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
M	18MBM201L	COMPETENCIES IN SOCIAL SKILLS	0	0	2	1								
Prerequisite Course (s)														
NIL														
Course Objective (s): The purpose of learning this course is to:														
1	To sharpen problem solving skill and to improve thinking capability of the students.													
2	To hone soft skill and analytical ability of students.													
3	To engage learners in using language purposefully and cooperatively.													
4	To expertise the writing and presentation skill to fulfill the corporate expectations.													
Course Outcome (s) (COs): At the end of this course, learners will be able to:														
CO1	Students should be able to solve both analytical and logical problems in an effective manner.													
CO2	Students can design and deliver information in a proper manner.													
CO3	Presentation skills of students will be improved individually as well as a team member.													
CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	3	1	-	-	-	-	3	2	1	2	2	1
CO2	3	1	3	1	-	-	-	2	3	2	1	2	2	1
CO3	3	1	3	1	-	-	-	-	2	-	-	-	2	1
CO (Avg)	3	1	3	1	-	-	-	0.67	2.8	1.33	0.67	1.33	2	1

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)





UNIT I	Module – 1	6
Aptitude: Coding & Decoding - Direction Sense Test.		
Communication: Self-Introduction and SWOT analysis - Letter writing - types.		
UNIT II	Module – 2	6
Aptitude: Venn Diagrams - Data Interpretation.		
Communication: Phrasal verbs - Voice of Valluvar.		
UNIT III	Module – 3	6
Aptitude: Averages.		
Communication: Idioms and Phrases - Skits.		
UNIT IV	Module – 4	6
Aptitude: Time and Distance - Problems on Trains.		
Communication: Prefix/Suffix - Root words - Adjectives - JAM (Extempore Speech).		
UNIT V	Module – 5	6
Aptitude: Clocks & Calendars.		
Communication: Homophones - Frame Tales.		
Text Book (s)		
1	Dr.R.S.Aggarwal, “Quantitative Aptitude”, S. Chand & Company Limited, 2015	
2	Dr.R.S.Aggarwal, “A Modern Approach to Verbal & Non - Verbal Reasoning”, S. Chand & Company Limited, 2015	





Regulation 2018		Semester III	Total Hours			15
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18CYM201T	ENVIRONMENTAL SCIENCE	1	0	0	-

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	To demonstrate in-depth knowledge within environmental engineering and an awareness of social, economic, political, and environmental impacts of engineering practices.
2	To have competence for working with multi-disciplinary teams to arrive at solutions to environmental engineering problems.
3	To get solutions which will minimize the negative impact of human activities on the environment and to protect human health?

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Improve fundamental knowledge of the inter-relationships between the built environment and natural systems.
CO2	Characterize and mitigate man-made hazards like nuclear hazards. Understand the principles involved in the generation of different forms of energy.
CO3	Improve the reliability, performance, disaster-management of natural calamities and solid waste and water supplies and treatment processes.
CO4	Understand the source, effects and control measure of various environmental pollution.
CO5	Apply information technology in the control of human population and women and child welfare.

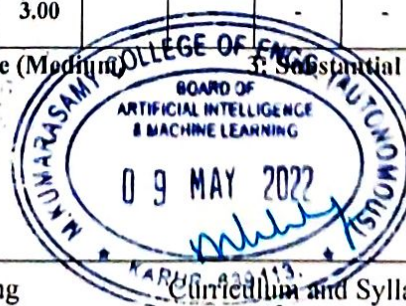
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2	-	-	-	3	-	-	-	-	-	1	1
CO2	2	2	2	-	-	3	3	-	-	-	-	-	1	1
CO3	2	2	2	2	-	3	3	-	-	-	-	-	1	1
CO4	2	2	2	-	-	3	3	-	-	-	-	-	1	1
CO5	2	2	2	2	-	3	3	-	-	-	-	-	1	1
CO (Avg)	2.00	2.00	2.00	0.8	-	2.4	3.00	-	-	-	-	-	1	1

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	ENVIRONMENT & BIODIVERSITY	3
Definition-types of environment, components of environment, scope-importance of environmental studies- Bio diversity-definition-value of biodiversity-Threats to biodiversity - India a mega diversity nation-endangered and endemic species of India-conservation of biodiversity.		
UNIT II	ENERGY SOURCES	3
Energy resources- Growing energy needs- Renewable and Nonrenewable energy sources- Use of alternate energy sources - Nuclear Energy- Alternative energy fuels-power alcohol-Bio diesel (preparation, properties & uses)		
UNIT III	SOCIAL ISSUES AND ENVIRONMENT	3
Environment ethics – Climate change – Global warming – Acid rain – Ozone layer depletion – Nuclear accidents-holocaust. Solid waste management - Rain water Harvesting-watershed management		
UNIT IV	ENVIRONMENTAL POLLUTION & ACTs	3
Source, types, effects & control- Air pollution -Water pollution – Soil pollution – Marine pollution and Plastic Pollution -The Environment (Protection) Act - Air (Prevention and control of pollution) Act - Water (Prevention and control of pollution) Act- Role of individual in prevention of pollution.		
UNIT V	HUMAN POPULATION AND ENVIRONMENT	3
Sustainable development – Urban Population growth and distribution – Population explosion – Family Welfare Program –Women and child welfare- Role of information technology in environment and human health- case studies		
Text Book (s)		
1	Dr.J.P.Sharma, “Environmental studies”, Laxmi Publications(p) Ltd, New Delhi.	
2	Miller “Environmental Science” 11th Edition, Cengage Learning India Private Limited, New Delhi, (2006).	
Reference (s)		
1	Master. G.M., “Introduction to Environmental Engineering and Science”, Pearson Education Pvt Ltd., (2004)	
2	Dr.A.Ravikrishnan “ Environmental Science and Engineering ” Sri Krishna publications, Chennai(2015)	
3	P.Anandan, R.Kumaravelan “Environmental Science and Engineering” Scitech Publication (India) Pvt. Ltd, Chennai, Reprint 2009.	





Regulation 2018		Semester IV	Total Hours			60
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
B	18MAB206T	DISCRETE MATHEMATICS	3	1	0	4

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

- 1 Obtain general knowledge about the area of propositional calculus and apply in Science and Engineering
- 2 Obtain the basic knowledge in predicate calculus and apply in Decision making problems
- 3 Apply the basics of Set theory in real life problems
- 4 Model situations in a mathematical way using combinatorics and derive useful results
- 5 Gain well founded knowledge in the areas of Graph Theory and apply in the computing fields

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Demonstrate their knowledge in propositional calculus
- CO2 Demonstrate their knowledge in predicate calculus
- CO3 Obtain the perception in the area of sets and the knowledge about functions.
- CO4 Obtain perception in the area of combinatorics
- CO5 Obtain perception in the area of graph theory

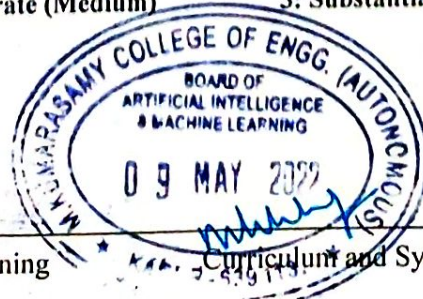
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	1	-	-	-	-	-	-	1	3	-
CO2	3	2	2	2	1	-	-	-	-	-	-	1	3	-
CO3	2	1	2	2	1	-	-	-	-	-	-	1	3	-
CO4	2	1	2	2	1	-	-	-	-	-	3	1	3	-
CO5	3	2	2	2	1	-	-	-	-	-	1	1	3	-
CO (Avg)	2.6	1.6	2	2	1	-	-	-	-	-	0.8	1	3	-

1: Slight (Low)

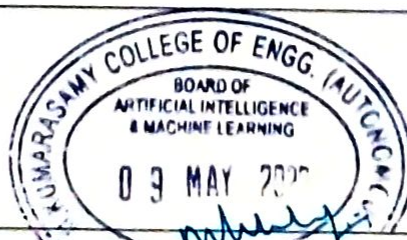
2: Moderate (Medium)

3: Substantial (High)





UNIT I	PROPOSITIONAL CALCULUS	9 + 3
Propositions- Logical connectives-Compound propositions-Conditional and Biconditional propositions- Truth tables - Tautologies and Contradictions - Logical and equivalences and implications - DeMorgan's Laws-Normal forms-Principal conjunctive and disjunctive normal forms - Rules of inference-Arguments-Validity of arguments.		
UNIT II	PREDICATE CALCULUS	9 + 3
Predicates-Statement Function -Variables-free and bound variables- Quantifiers- Universe of discourse- Logical equivalences and implications for quantified statements- Theory of inference- The rules of universal specification and generalization-Validity of arguments.		
UNIT III	SET THEORY AND FUNCTIONS	9 + 3
Set Operations-properties-Power set-Relations-Graph and matrix of a relation- Partial Ordering- Equivalence relations-Partitions- Functions -Types of Functions- composition of relation and functions- inverse functions.		
UNIT IV	COMBINATORICS	9 + 3
Basics of Counting - Counting arguments- Pigeonhole Principle- Permutations and Combinations- Recursion and Recurrence relations-Generating Functions- Mathematical Induction- Inclusion – Exclusion		
UNIT V	GRAPH THEORY	9 + 3
Introduction to Graphs-Graph Operations- Graph and Matrices-Graph Isomorphism- Connected Graphs- Euler Graphs- Hamilton Paths and Circuits- Planar Graph-Graph Colouring-Trees- Shortest Path Problem-Directed and Undirected Graphs- Flows in Networks.		
Text Book (s)		
1	Trembly J.P and Manohar R, —Discrete Mathematical Structures with Applications to Computer Science, Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003.	
2	Ralph. P. Grimaldi, —Discrete and Combinatorial Mathematics: An Applied Introduction, Fourth Edition, Pearson Education Asia, Delhi, 2002.	
Reference (s)		
1	Kenneth H Rosen, Discrete Mathematics and its Applications with Combinatorics and Graph Theory, Seventh Edition, McGraw Hill Education India Private Limited, New Delhi, 2013.	
2	A.Doerr and K.Levasseur, Applied Discrete Structures, Galgotia Publication, New Delhi, 2004.	
3	Gilbert Strang, “Introduction to Linear Algebra”, 4th edition Wellesley- Cambridge Press, 2009.	
4	Johnson baugh, Richard, “Discrete Mathematics”, Sixth Edition, Maxwell, International Edition, 2006.	





Regulation 2018		Semester IV	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC208T	MACHINE LEARNING ALGORITHMS	3	0	0	3

Prerequisite Course (s)

NIL

Course Objective (s):
 The purpose of learning this course is to:

- 1 To understand the concepts of Machine Learning.
- 2 To appreciate supervised learning and their applications.
- 3 To know about the concepts and algorithms of unsupervised learning.
- 4 To understand the basic concept of reinforcement learning algorithm and its applications.
- 5 To study about modelling, aggregation and knowledge representation using graphical models.

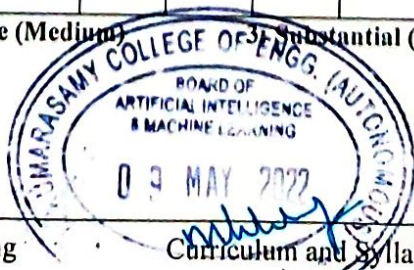
Course Outcome (s) (COs):
 At the end of this course, learners will be able to:

- CO1 Identify applications suitable for different types of Machine Learning with suitable justification.
- CO2 Implement supervised Learning algorithms for real time data sets for Intelligent decision making.
- CO3 Apply Machine Learning techniques to classification and clustering to unstructured data.
- CO4 Apply reinforcement learning techniques for real life problems.
- CO5 Implement probabilistic discriminate and generative algorithms for an applications of your choice and analyze the results.

CO-PO Mapping

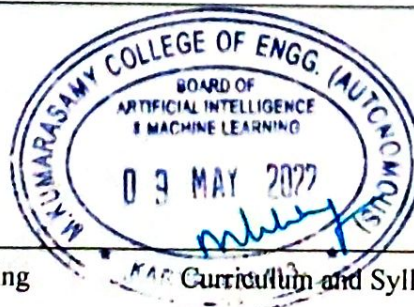
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	-	-	-	-	2	2	3	2
CO2	3	3	3	3	3	1	-	-	-	-	2	2	3	2
CO3	3	3	3	3	3	1	-	-	-	-	2	2	3	2
CO4	3	3	3	3	3	2	-	-	-	-	2	2	3	2
CO5	3	3	3	3	3	1	-	-	-	-	2	2	3	2
CO (Avg)	3	3	3	3	3	1.2	-	-	-	-	2	2	3	2

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)





UNIT I	INTRODUCTION TO MACHINE LEARNING	9
Machine Learning - Machine Learning Foundations - Overview - applications - Types of machine learning - basic concepts in machine learning Examples of Machine Learning -Applications - Linear Models for Regression - Linear Basis Function Models - The Bias-Variance Decomposition - Bayesian Linear Regression - Bayesian Model Comparison		
UNIT II	SUPERVISED LEARNING	9
Linear Models for Classification - Discriminant Functions -Probabilistic Generative Models - Probabilistic Discriminative Models - Bayesian Logistic Regression. Decision Trees - Classification Trees- Regression Trees - Pruning. Ensemble methods- Bagging- Boosting.		
UNIT III	UNSUPERVISED LEARNING	9
Clustering- K-means - EM - Mixtures of Gaussians - The EM Algorithm in General -Model selection for latent variable models - high-dimensional spaces - The Curse of Dimensionality - Dimensionality Reduction - Factor analysis - Principal Component Analysis - Probabilistic PCA- Independent components analysis		
UNIT IV	REINFORCEMENT LEARNING	9
Passive reinforcement learning- direct utility estimation- adaptive dynamic programming- temporal difference learning- active reinforcement learning- exploration- learning an action-utility function- Generalization in reinforcement learning- policy search- applications in game playing- applications in robot control		
UNIT V	PROBABILISTIC GRAPHICAL MODELS	9
Graphical Models - Undirected Graphical Models - Markov Random Fields-Directed Graphical Models - Bayesian Networks-Conditional Independence properties-Markov Random Fields-Hidden Markov Models - Conditional Random Fields(CRFs).		
Text Book (s)		
1	Kevin P. Murphy, Machine Learning : A Probabilistic Perspective, MIT Press, 2012	
Reference (s)		
1	Stephen Marsland, Machine Learning- An Algorithmic Perspective, Chapman and Hall, CRC Press, Second Edition, 2014.	
2	Ethem Alpaydin, Introduction to Machine Learning, MIT Press, Third Edition, 2014.	
3	Christopher Bishop, Pattern Recognition and Machine Learning Springer, 2007.	
4	P. Flach, Machine Learning : The art and science of algorithms that make sense of data, Cambridge University Press, 2012.	





Regulation 2018		Semester IV	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC209T	INTERNET PROGRAMMING	3	0	0	3

Prerequisite Course (s)

- Object Oriented Programming

Course Objective (s):

The purpose of learning this course is to:

- 1 To understand different internet technologies and to design website using HTML.
- 2 To build dynamic webpages
- 3 To create server-side programs using JSP and Servlets
- 4 To construct simple web pages in PHP and to represent data in XML format.
- 5 To demonstrate Java-specific web services

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

- CO1 Construct a basic website using HTML and Cascading Style Sheets
- CO2 Build dynamic web page with validation using Java Script objects and by applying different event handling mechanisms
- CO3 Develop server side programs using Servlets and JSP
- CO4 Construct simple web pages in PHP and to represent data in XML format
- CO5 Apply AJAX and web services to develop interactive web applications

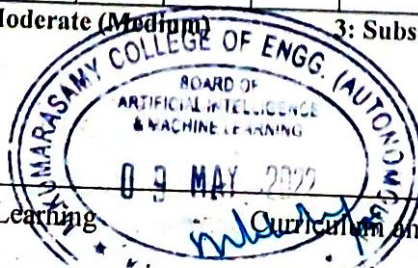
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	1	1	-	-	-	2	1	3	2
CO2	3	3	3	3	3	1	1	-	-	-	2	1	3	2
CO3	3	3	3	3	3	1	1	-	-	-	2	1	3	2
CO4	3	3	3	3	3	1	1	-	-	-	2	1	3	2
CO5	3	3	3	3	3	1	1	-	-	-	2	1	3	2
CO (Avg)	3	3	3	3	3	1	1	-	-	-	2	1	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)





UNIT I	WEBSITE BASICS, HTML, CSS	9
<p>Web Essentials: Clients, Servers and Communication – The Internet – Basic Internet protocols – World wide web – HTTP Request Message – HTTP Response Message – Web Clients – Web Servers – HTML – Tables – Lists – Image – HTML control elements – Semantic elements – Drag and Drop – Audio – Video controls - CSS – Inline, embedded and external style sheets – Rule cascading – Inheritance – Backgrounds – Border Images – Colors – Shadows – Text – Transformations – Transitions – Animations.</p>		
UNIT II	CLIENT SIDE PROGRAMMING	9
<p>Java Script: An introduction to JavaScript–JavaScript DOM Model-Date and Objects,-Regular Expressions- Exception Handling-Validation-Built-in objects-Event Handling- DHTML with JavaScript- JSON introduction – Syntax – Function Files – Http Request – SQL.</p>		
UNIT III	SERVER SIDE PROGRAMMING	9
<p>Servlets: Java Servlet Architecture - Servlet Life Cycle - Parameter Data - Session Handling Understanding Cookies - Installing and Configuring Apache Tomcat Web Server - DATABASE CONNECTIVITY: JDBC perspectives, JDBC program example - JSP: Understanding Java Server Pages - JSP Standard Tag Library (JSTL)-Creating HTML forms by embedding JSP code.</p>		
UNIT IV	PHP and XML	9
<p>An introduction to PHP: PHP- Using PHP- Variables- Program control- Built-in functions Form Validation- Regular Expressions - File handling – Cookies - Connecting to Database. XML: Basic XML- Document Type Definition- XML Schema DOM and Presenting XML, XML Parsers and Validation, XSL and XSLT Transformation, News Feed (RSS and ATOM).</p>		
UNIT V	INTRODUCTION TO AJAX and WEB SERVICES	9
<p>AJAX: Ajax Client Server Architecture-XML Http Request Object-Call Back Methods; Web Services: Introduction- Java web services Basics – Creating, Publishing, Testing and Describing a Web services (WSDL)-Consuming a web service, Database Driven web service from an application – SOAP – REST based web services – Introduction to Java Web Development Frameworks.</p>		

Text Book (s)	
1	Deitel and Deitel and Nieto, “Internet and World Wide Web - How to Program”, Pearson, 5th Edition, 2018.
2	Jeffrey C and Jackson, “Web Technologies A Computer Science Perspective”, Pearson Education, 2011.
Reference (s)	
1	Stephen Wynkoop and John Burke “Running a Perfect Website”, QUE, 2nd Edition, 1999.
2	Chris Bates, “Web Programming – Building Internet Applications”, 3rd Edition, Wiley Publications, 2009.
3	Gopalan N.P. and Akilandeswari J. “Web Technology”, Second Edition, Prentice Hall of





	India, 2014.
4	Uttam K.Roy, "Web Technologies", Oxford University Press, 2011.
5	Nicholas S. Williams, Professional Java for Web Applications, Wrox Publisher, First Edition, 2014.





Regulation 2018		Semester IV	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC210T	DATABASE MANAGEMENT SYSTEMS	3	0	0	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	To infer the essentials of data models to intellectualize and illustrate a database system using ER diagram.
2	To conceptualize the relational database implementation using SQL with effective relational database design concepts.
3	To elaborate the fundamental concepts of transaction processing- concurrency control techniques and recovery procedure.
4	To demonstrate Query evaluation and optimization techniques.
5	To signify the concepts of Database Security, Object Oriented, Data Warehousing and Data Mining.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Distinguish database systems from file systems and describe data models and DBMS architecture.
CO2	Identify the basic issues of transaction processing and concurrency control.
CO3	Demonstrate with understanding of SQL Programming language and normalization theory.
CO4	Practice the basic query evaluation techniques, query optimization and familiar with basic database storage structures and access techniques.
CO5	Analyze and derive an information model expressed in the form of an entity relation diagram and transform into a relational database schema.

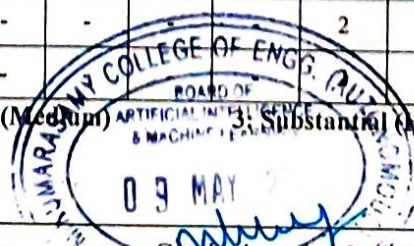
CO-PO Mapping

Cos	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	2	3	3	1	-	-	-	-	2	1	3	2
CO2	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO3	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO4	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO5	3	3	3	3	3	1	-	-	-	-	2	1	3	2
CO (Avg)	3	3	2	3	3	1	-	-	-	-	2	1	3	2

1: Slight (Low)

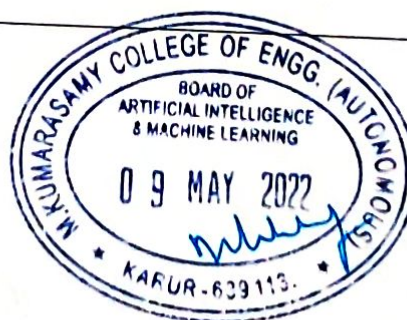
2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION	9
Introduction to Database. Hierarchical, Network and Relational Models. Three-Schema Architecture and Data Independence– The Database System Environment– Data models: Entity-relationship model, network model, relational and object oriented data models, SQL Fundamentals – Advanced SQL features – Triggers – Embedded SQL.		
UNIT II	RELATIONAL QUERY LANGUAGES AND DATABASE DESIGN	9
Relational algebra, Relational Calculus, DDL and DML constructs. Relational Database Design: Domain and data dependency, Armstrong's axioms, Functional Dependencies, Normal forms, Dependency preservation, Lossless design.		
UNIT III	TRANSACTION PROCESSING	9
Concurrency control, ACID property, Serializability of scheduling, Locking and timestamp based schedulers, Multi-version and optimistic Concurrency Control schemes, Database recovery		
UNIT IV	PROCESSING & OPTIMIZATION	9
Query Processing Overview – Algorithms for SELECT and JOIN operations - Evaluation of relational algebra expressions, Query equivalence, Query optimization algorithms.		
UNIT V	DATABASE STORAGE STRATEGIES & SECURITY	9
RAID – File Organization – Organization of Records in Files – Indexing and Hashing –Ordered Indices – B+ tree Index Files – B tree Index Files – Static Hashing – Dynamic Hashing Database Security: Authentication, Authorization and Access Control.		
Text Book (s)		
1	Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 7 th Edition, Tata McGraw Hill, March 2019.	
2	R. Elmasri and S. Navathe, "Fundamentals of Database Systems", Pearson 7th Edition, 2017.	
Reference (s)		
1	J. D. Ullman, "Principles of Database and Knowledge – Base Systems", Vol 1, Computer Science Press, Inc. New York, 1998.	
2	Gupta G K, "Database Management Systems", Tata McGraw Hill Education Private Limited, New Delhi, 2011	
3	Serge Abiteboul, Richard Hull, Victor Vianu, "Foundations of Databases", Addison-Wesley Publishing Company, 1995.	





Regulation 2018		Semester IV	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC211T	DESIGN AND ANALYSIS OF ALGORITHMS	3	0	0	3

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

1	To know about different types of computing problem algorithms and learn how to analyze its efficiency.
2	To make the students understand how computing problems are solved using brute force and divide and conquer methods.
3	To know about problems solved using dynamic programming and greedy techniques
4	To make the students learn about iterative improvement method for problem solving
5	To make students understand the limitations of algorithms and learn about backtracking, branch and bound techniques.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Interpret the fundamental needs of algorithms in problem solving.
CO2	Classify the different algorithm design techniques for problem solving.
CO3	Develop algorithms for various computing problems.
CO4	Analyze the time and space complexity of various algorithms.
CO5	To identify the types of problem, formulate, analyze and compare the efficiency of algorithms.

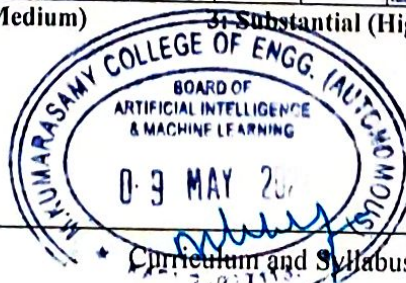
CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	-	2	1	2	1
CO2	3	3	3	2	3	-	-	-	-	-	2	1	2	1
CO3	3	3	3	2	3	-	-	-	-	-	2	1	2	1
CO4	3	3	3	3	3	-	-	-	-	-	2	1	2	1
CO5	3	3	3	3	3	-	-	-	-	-	2	1	2	1
CO (Avg)	3	3	3	2.6	3	-	-	-	-	-	2	1	2	1

1: Slight (Low)

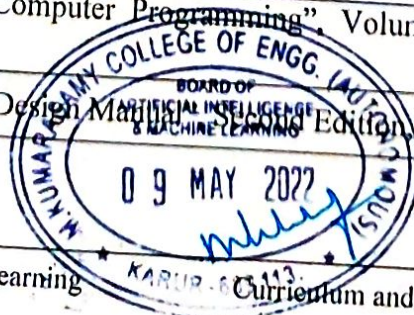
2: Moderate (Medium)

3: Substantial (High)





UNIT I	INTRODUCTION	9
Notion of an Algorithm – Fundamentals of Algorithmic Problem Solving – Important Problem Types – Fundamentals of the Analysis of Algorithmic Efficiency –Asymptotic Notations and their properties. Analysis Framework – Empirical analysis – Mathematical analysis for Recursive and Non-recursive algorithms – Visualization		
UNIT II	BRUTE FORCE AND DIVIDE-AND-CONQUER	9
Brute Force – Computing an- String Matching – Closest-Pair and Convex-Hull Problems - Exhaustive Search – Travelling Salesman Problem – Knapsack Problem – Assignment problem.Divide and Conquer Methodology – Binary Search – Merge sort – Quick sort – Heap Sort - Multiplication of Large Integers – Closest-Pair and Convex – Hull Problems.		
UNIT III	DYNAMIC PROGRAMMING AND GREEDY TECHNIQUE	9
Dynamic programming – Principle of optimality – Coin changing problem, Computing a Binomial Coefficient – Floyd’s algorithm – Multi stage graph – Optimal Binary Search Trees – Knapsack Problem and Memory functions. Greedy Technique – Container loading problem – Prim’s algorithm and Kruskal’s Algorithm – 0/1 Knapsack problem, Optimal Merge pattern – Huffman Trees.		
UNIT IV	ITERATIVE IMPROVEMENT	9
The Simplex Method – The Maximum-Flow Problem – Maximum Matching in Bipartite Graphs, Stable marriage Problem.		
UNIT V	COPING WITH THE LIMITATIONS OF ALGORITHM POWER	9
Lower – Bound Arguments – P, NP NP- Complete and NP Hard Problems. Backtracking – n-Queen problem – Hamiltonian Circuit Problem – Subset Sum Problem. Branch and Bound – LIFO Search and FIFO search – Assignment problem – Knapsack Problem – Travelling Salesman Problem – Approximation Algorithms for NP-Hard Problems – Travelling Salesman problem – Knapsack problem.		
Text Book (s)		
1	Anany Levitin, “Introduction to the Design and Analysis of Algorithms”, Third Edition, Pearson Education, 2012.	
Reference (s)		
1	Thomas H.Cormen, Charles E.Leiserson, Ronald L. Rivest and Clifford Stein, “Introduction to Algorithms”, Third Edition, PHI Learning Private Limited, 2012.	
2	Alfred V. Aho, John E. Hopcroft and Jeffrey D. Ullman, “Data Structures and Algorithms”, Pearson Education, Reprint 2006.	
3	Donald E. Knuth, “The Art of Computer Programming”, Volumes 1 & 3 , Pearson Education, 2009.	
4	Steven S. Skiena, “The Algorithm Design Manual”, Second Edition, Springer, 2008.	





Regulation 2018		Semester IV	Total Hours			45
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
C	18AMC212T	SOFTWARE ENGINEERING	3	0	0	3

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

1	Gain knowledge about the various phases in a software development life cycle.
2	Understand the basic of software requirements, project management and cost estimation.
3	Learn the metrics and models used to estimate the software quality and reliability.
4	Understand the various methodologies in software design using case tools.
5	Learn various testing strategies used to identify faults and failures in software development.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1	Explain the various phases in a software development life cycle.
CO2	Elucidate the software requirement specification and cost estimation for a project management.
CO3	Utilize the metrics and models for estimating the software quality and reliability.
CO4	Develop software using object oriented case tools for a real time application.
CO5	Explain various testing techniques used in verification and validation of a software.

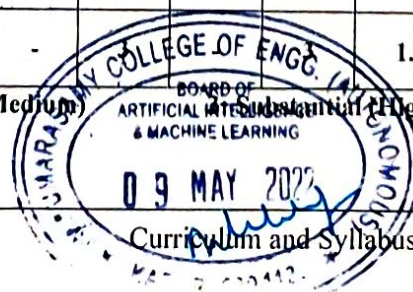
CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2	2	2	1	1	-	3	-	3	1	2	1
CO2	3	3	2	2	2	1	1	-	3	-	3	2	2	1
CO3	3	3	3	2	2	1	1	-	3	-	3	2	2	1
CO4	3	3	3	2	2	1	1	-	3	-	3	2	2	1
CO5	3	3	2	2	2	1	1	-	3	-	3	2	2	1
CO (Avg)	3	2.8	2.2	2	2	1	1	-	3	-	3	1.8	2	1

1: Slight (Low)

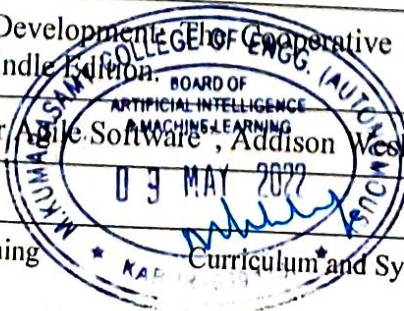
2: Moderate (Medium)

3: Substantial (High)





UNIT I	SOFTWARE PROCESS AND REQUIREMENTS ANALYSIS	9
Introduction to Software Engineering, Software Process, Perspective and Specialized Process Models- Waterfall model, Incremental model, Iterative model, RAD model. Functional and Non-Functional, User requirements, System requirements, Software Requirements Document – Requirement Engineering Process: Feasibility Studies, Requirements elicitation and analysis, requirements validation		
UNIT II	INTRODUCTION TO AGILE	9
The Genesis of Agile, Introduction and background, Agile Manifesto and Principles, Overview of Scrum, Extreme Programming, Feature Driven development, Lean Software Development, Design and development practices in Agile projects, Pair Programming, Agile Tools.		
UNIT III	AGILE SCRUM FRAMEWORK	9
Introduction to Scrum, Project phases, Agile Estimation, Planning game, Product backlog, Sprint backlog, Iteration planning, User story definition, Characteristics and content of user stories, Acceptance tests and Verifying stories, Project velocity, Burn down chart, Sprint Scrum Team.		
UNIT IV	SOFTWARE DESIGN AND DEVELOPMENT	9
Agile design practices, Role of design Principles including Single Responsibility Principle, Open Closed Principle, Liskov Substitution Principle, Interface Segregation Principles, Dependency Inversion Principle in Agile Design, Need and significance of Refactoring, Refactoring Techniques, Continuous Integration, Automated build tools, Version control		
UNIT V	SOFTWARE TESTING	9
The Agile lifecycle and its impact on testing, Test-Driven Development (TDD), xUnit framework and tools for TDD, Testing user stories - acceptance tests and scenarios, Behavior-driven development (BDD), Planning and managing testing cycle, Exploratory testing, Risk based testing, Regression tests, Test Automation, Tools to support the Agile tester.		
Text Book (s)		
1	Roger S. Pressman and Bruce Maxim, Software Engineering – A Practitioner’s Approach, Ninth Edition, Mc Graw-Hill Education, 2019.	
2	Ken Schawber, Mike Beedle, “Agile Software Development with Scrum”, Pearson Education, 2nd Edition, 2014.	
3	Janet Gregory, Lisa Crispin, “Agile Testing Condensed: A Brief Introduction”, Addison Wesley, 2019.	
4	Ian Sommerville, Software Engineering, Tenth Edition, Pearson Education, 2017	
Reference (s)		
1	Robert C. Martin, “Agile Software Development, Principles, Patterns and Practices”, Prentice Hall, 2nd Edition, 2014.	
2	Alistair Cockburn, “Agile Software Development, The Cooperative Game (Agile Software Development Series)” 2 nd Edition, Kindle Edition.	
3	Mike Cohn, “User Stories Applied: For Agile Software”, Addison Wesley, 2 nd Edition, 2016	



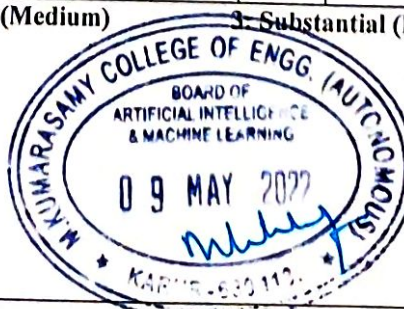


Regulation 2018		Semester IV			Total Hours			30						
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
C	18AMC213L	MACHINE LEARNING LABORATORY	0	0	2	1								
Prerequisite Course (s)														
NIL														
Course Objective (s): The purpose of learning this course is to:														
1	To understand the concepts of Machine Learning.													
2	To implement supervised learning and their applications.													
3	To implement the concepts and algorithms of unsupervised learning.													
4	To practice modelling, aggregation and knowledge representation using graphical models.													
Course Outcome (s) (COs): At the end of this course, learners will be able to:														
CO1	Implement supervised Learning algorithms for real time data sets for Intelligent decision making.													
CO2	Apply Machine Learning techniques to classification and clustering to unstructured data.													
CO3	Apply reinforcement learning techniques for real life problems													
CO4	Identify and apply Machine Learning algorithms to solve real world problems.													
CO5	Apply FIND-S, ID3, back propagation, k-means algorithm													
CO-PO Mapping														
COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO2	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO3	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO4	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO5	3	3	3	3	3	-	-	-	-	-	1	1	3	1
CO (Avg)	3	3	3	3	3	-	-	-	-	-	1	1	3	1

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

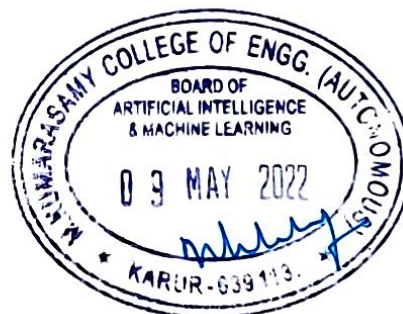




LIST OF EXPERIMENTS

30

1. Load Real Time data Set and Python Libraries, Installing Libraries through Anaconda Prompt, Perform data pre-processing through Pandas Library.
2. Implement the Naive Bayesian classifier for a sample training data set stored as a .CSV file. Compute the accuracy of the classifier, considering few test data sets.
3. Implement decision tree based ID3 algorithm. Use an appropriate data set for building the decision tree and apply this knowledge to classify a new sample.
4. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
5. Implement the non-parametric Locally Weighted Regression algorithm in order to fit data points. Select appropriate data set for your experiment and draw graphs.
6. Implement k-Nearest Neighbour algorithm to classify the iris data set. Print both correct and wrong predictions. Java/Python ML library classes can be used for this problem
7. Assuming a set of documents that need to be classified, use the Semi Supervised Classifier model to perform this task. Built-in Java classes/API can be used to write the program. Calculate the accuracy, precision, and recall for your data set.
8. Implement Q Learning with Linear Function Approximation.
9. Implement the Policy Gradient concept in Reinforcement learning. Compare the Reinforce with Baseline with Actor Critic with Baseline.
10. Consider a time series data set. Plot the data, Identify the components of the Time Series data, Calculate the seasonality and stationarity and Identify the trend patten present in the time series data. Remove the white noise if available in the time series data.



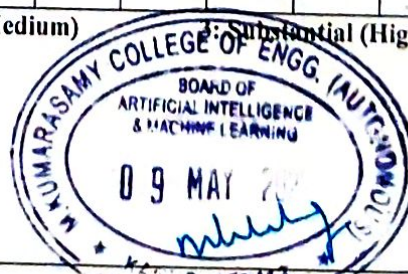


Regulation 2018		Semester IV			Total Hours			30						
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
C	18AMC214L	DATABASE MANAGEMENT SYSTEMS LABORATORY	0	0	2	1								
Prerequisite Course (s)														
NIL														
Course Objective (s): The purpose of learning this course is to:														
1	To understand data definitions and data manipulation commands													
2	To learn the use of nested and join queries													
3	To understand views and constraints													
4	To Implement programs using SQL and PL/SQL													
5	To demonstrate procedural extensions such as procedure, function, cursors and Triggers.													
Course Outcome (s) (COs): At the end of this course, learners will be able to:														
CO1	Use typical data definitions and manipulation commands													
CO2	Design applications to test Nested and Join Queries													
CO3	Implement simple applications that use Views													
CO4	Employ PL/SQL blocks such as stored procedures, functions, triggers and cursors													
CO5	Critically analyze the use of Tables, Views, Functions and Procedures													
CO-PO Mapping														
COs	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	-	-	-	3	-	2	3	3	2
CO2	3	3	3	3	3	-	-	-	3	-	2	3	3	2
CO3	3	3	3	3	3	-	-	-	3	-	2	3	3	2
CO4	3	3	3	3	3	-	-	-	3	-	2	3	3	2
CO5	3	3	3	3	3	-	-	-	3	-	2	3	3	2
CO (Avg)	3	3	3	3	3	-	-	-	3	-	2	3	3	2

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

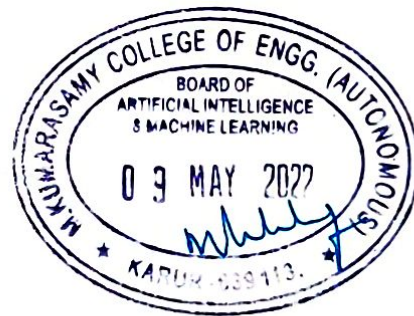




LIST OF EXPERIMENTS

30

1. Creation of a database and writing SQL queries to retrieve information from the database.
2. Implementation of DML, DCL and TCL
3. Queries to demonstrate implementation of Integrity Constraints
4. Practice of Inbuilt functions
5. Creation of Views, Synonyms, Sequence, Indexes, Save point.
6. Implementation of Nested Queries
7. Implementation of Join and Set operators
8. Creating an Employee Database to set various constraints.
9. Implementation of Virtual tables using Views
10. Study of PL/SQL block.
11. Write a PL/SQL block to satisfy some conditions by accepting input from the user.
12. Write a PL/SQL block that handles all types of exceptions.
13. Creation of Procedures and functions.
14. Creation of database triggers and cursors.
15. Application Development using Front End Tools and Database Connectivity.





Regulation 2018		Semester IV	Total Hours			30
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
P	18AIP202L	MINOR PROJECT – II (With AI and ML based solutions using Python)	0	0	2	1

Prerequisite Course (s)

NIL

Course Objective (s):

The purpose of learning this course is to:

Identify the suitable idea and methods to develop the project idea into demonstrative or to explain the concepts in standard procedure and to prepare report.

Course Outcome (s) (COs):

At the end of this course, learners will be able to:

CO1 Identify the requirement and develop the concepts or models through standard procedures and preparation of report.

CO-PO Mapping

COs	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3	3	3	3	3	1	1	1	1	3	3	3	3
CO (Avg)	3	3	3	3	3	3	1	1	1	1	3	3	3	3

1: Slight (Low)

2: Moderate (Medium)

3: Substantial (High)

Strategy(s)

- The Student works on a topic approved by the head of the department under the guidance of a faculty member and prepares a project report after completing the work to the satisfaction.
- The student will be evaluated through continuous assessment by a panel formed under the approval of head of the department.



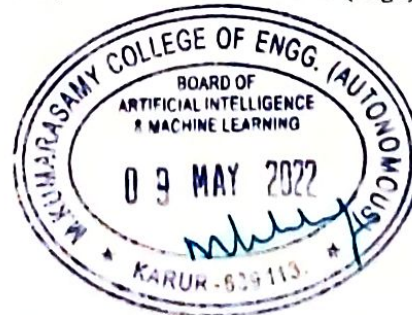


Regulation 2018		Semester IV				Total Hours			30					
Category	Course Code	Course Name	Hours / Week			C								
			L	T	P									
M	18MBM202L	CRITICAL AND CREATIVE THINKING SKILLS	0	0	2	1								
Prerequisite Course (s)							NIL							
Course Objective (s): The purpose of learning this course is to:														
1	To focus on listening, speaking, & writing skills through audio & video sessions.													
2	To hone soft skill and analytical ability of students.													
3	To overcome the fear in group communication and to provide the effective communication.													
4	To expertise intelligible pronunciation, stress and intonation patterns.													
Course Outcome (s) (COs): At the end of this course, learners will be able to:														
CO1	Students can be able to solve both analytical and logical problems in an effective manner.													
CO2	Students can demonstrate an ability to design and deliver messages.													
CO3	The quality of student's communication with practical experience is improved.													
CO-PO Mapping														
COs	Pos												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	2	1	1	-	-	-	-	2	1	1	-	1
CO2	3	1	2	1	2	-	-	-	-	2	1	1	-	1
CO3	3	1	-	1	1	-	-	-	-	2	1	1	-	1
CO (Avg)	3	1	1.33	1	1.33	-	-	-	-	2	1	1	-	1

1: Slight (Low)

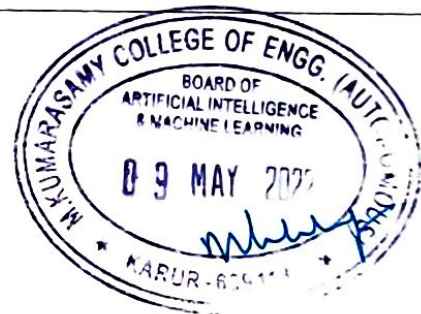
2: Moderate (Medium)

3: Substantial (High)





UNIT I	Module - 1	6
Aptitude: Time and Work - Pipes and Cisterns. Communication: Sentence Pattern - Debate.		
UNIT II	Module - 2	6
Aptitude: Boats and Streams. Communication: Tenses and voices - Tech Talk.		
UNIT III	Module - 3	6
Aptitude: Problems on Ages - Probability Communication: Analogies - Biography.		
UNIT IV	Module - 4	6
Aptitude: Data sufficiency - Logical Puzzles. Communication: Punctuation - Connection.		
UNIT V	Module - 5	6
Aptitude: Mensuration. Communication: Preposition - News of the Week.		
Text Book (s)		
1	Dr.R.S.Aggarwal, "Quantitative Aptitude", S. Chand & Company Limited, 2015	
2	Dr.R.S.Aggarwal, "A Modern Approach to Verbal & Non - Verbal Reasoning", S. Chand & Company Limited, 2015	





Regulation 2018		Semester III / IV	Total Hours			15
Category	Course Code	Course Name	Hours / Week			C
			L	T	P	
M	18LEM103T	INDIAN TRADITION AND HERITAGE	1	0	0	-

Prerequisite Course (s)

Nil

Course Objective (s):

The purpose of learning this course is to:

CLR-1:	Make students understand the role and impact of culture in human life.
CLR-2:	Draw attention towards languages and literatures of ancient period.
CLR-3:	Cultivate secularism in students.
CLR-4:	Equip students with the knowledge of Indian art and architectural evolution over years.
CLR-5:	Make students identify Indian culture in abroad.

Course Outcome (s) (Cos):

At the end of this course, learners will be able to:

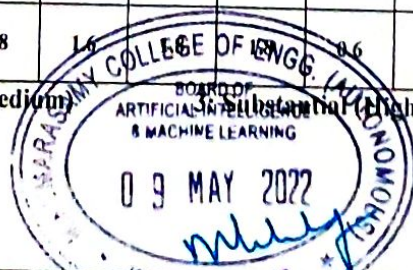
CO1	Understand the meaning of culture, trace the influence and significance of geographical features on Indian culture.
CO2	Develop an awareness of the variety of languages and literatures in India.
CO3	Recognise the characteristics of various religious movements in ancient India.
CO4	Identify the characteristics and various styles of Indian architecture and sculpture at different times.
CO5	Examine various modes through which Indian culture spread abroad.

CO-PO Mapping

Cos	POs												PSOs	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	-	-	-	-	-	2	2	2	2	2	-	2	-	-
CO2	-	-	-	-	-	2	2	1	2	2	1	2	-	-
CO3	-	-	-	-	-	1	1	1	1	1	1	1	-	-
CO4	2	2	2	2	2	2	2	2	2	2	1	2	-	-
CO5	-	-	-	-	-	2	2	2	2	2	-	2	-	-
CO (Avg)	0.4	0.4	0.4	0.4	0.4	1.8	1.8	1.6	1.6	1.6	0.6	1.8	-	-

1: Slight (Low)

2: Moderate (Medium)





UNIT I	HISTORY OF INDIAN CULTURE	2
Characteristics of Indian Culture - Significance of Geography on Indian Culture -Society in India through ages- Ancient Period - Varna and Jati, family and marriage in India - Position of women in ancient India- Contemporary period; Caste system and communalism.		
UNIT II	LITERATURE AND EDUCATION	4
Evolution of script and languages in India : Harappan Script and Brahmi Script, Short History of the Sanskrit Literature: The Vedas, The Brahmanas and Upanishads and Sutras, Epics: Ramayana and Mahabharata & Puranas - History of Buddhist and Jain Literature in Pali, Prakrit and Sanskrit, Sangam Literature and Odia Literature.		
UNIT III	RELIGION AND PHILOSOPHY	4
Religion and Philosophy in India: Ancient Period: Pre-Vedic and Vedic Religion, Buddhism and Jainism, Indian Philosophy - Vedanta and Mimansa school of Philosophy.		
UNIT IV	ART AND ARCHITECTURE	2
Indian Art & Architecture: Gandhara School and Mathura School of Art; Hindu Temple Architecture, Buddhist Architecture, Medieval Architecture and Colonial Architecture, Indian Painting Tradition, Performing Arts: Divisions of Indian classical music: Hindustani and Carnatic, Dances of India, Rise of modern theatre and Indian cinema.		
UNIT V	SPREAD OF INDIAN CULTURE ABROAD	3
Causes, Significance and Modes of Cultural Exchange - Through Traders, Teachers, Emissaries, Missionaries and Gypsies, Indian Culture in South East Asia, India, Central Asia and Western World through ages.		
Reference (s)		
1	Chakravarti, Ranabir: Merchants, Merchandise & Merchantmen, in: Prakash, Om (ed.): The Trading World of the Indian Ocean, 1500-1800 (History of Science, Philosophy and Culture in Indian Civilization, ed. by D.P. Chattopadhyaya, vol. III, 7), Pearson, Delhi, 2012.	

