

Meenakshi Sundararajan Engineering College

(An Autonomous Institution) Managed by I.I.E.T Society, Approved by AICTE, New Delhi, Affiliated to Anna University, Chennai, Accredited by NAAC with 'A' grade and NBA for programs applied, Recognized by UGC with 2(f) & 12(B) status









INSTITUTION'S INNOVATION COUNCIL (Ministry of Education initiative)





B.E. MECHANICAL ENGINEERING CURRICULUM AND SYLLABUS REGULATIONS 2024 CHOICE BASED CREDIT SYSTEM

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Meenakshi Sundararajan Engineering College

(An Autonomous Institution, Affiliated to Anna University, Chennai)

Prof. K. R. Sundararajan, a well-known educationalist, established the Indian Institute of Engineering Technology (I.I.E.T) society in the year 1947 in Chennai. The total area of 14 acres was purchased with enormous hardship and was donated to the IIET Society for the cause of education. The society's main objective is to provide quality education and it has been ensured since 1951.

The IIET Society has the following to its credit :-

- An uninterrupted and continuous education since 1951 in its premises
- All Colleges run by the institution are ranked among the top 5 top 10 programs in Tamil Nadu
- 350 KW Solar Power Plant Generating upto 70% of its electricity needs
- Significant portion of the students are first generation learners
- Campus holds approximately 7000 plus students from the ages of 4 to 35 plus.
- Large Green Campus in the heart of the city of Chennai, Tamil Nadu
- In existence since 1947 Completed 75 years
- Targeting to be Carbon Neutral from the end of the year 2025

The society currently has the following institutions :-

- Meenakshi Sundararajan Engineering College(MSEC) established in 2001 & affiliated to Anna University offering engineering programs with about 2000 plus students.
- Meenakshi Sundararajan School of Management(MSSM) established in 2000 & affiliated to University of Madras offering MBA programs with about 100 plus students.
- The NEST School (TNS)- established in 2022 offering IB (International Baccalaureate) & CAIE (Cambridge) boards.

All of the institutions have earned an enviable name and are rated as one among Top 10 colleges in the Tamil Nadu state in their respective programs. Efforts are on to make the campus carbon neutral in 2 years (end of 2025) by using our community of staff and students.

Meenakshi Sundararajan Engineering College (MSEC) was established by the IIET Society in 2001. MSEC is defined by two keywords "Industry Ready" & "Vibrancy". Creating a new generation of self- actualized learners is our raison d'etre. If children are our future, then education is the key to their future. When education is shaped around them, and not the other way around, we are laying the foundation for a future/world where creativity, diversity and caring, independent-thinkers thrive. Our curricula thrive on continuous learning while interacting with and incorporating real-world situations and challenges.

MSEC's Hallmark of Quality

- Affiliated to Anna University, Chennai
- Approved by AICTE, New Delhi
- Accredited by NBA for programs in:
 - Civil Engineering
 - Computer Science and Engineering
 - Electronics and Communication Engineering
 - Mechanical Engineering
 - Electrical and Electronics Engineering
 - Information Technology
- Accredited by NAAC with a prestigious "A" grade
- Declared under Section 2(f) and 12(B) of the UGC Act
- Conferred with Autonomous status for 10 years (2024-25 to 2033-34) by the University Grants Commission (UGC) on February 1, 2024
- Meenakshi Sundararajan Innovation and Incubation Centre (MSIIC)
- Meenakshi Sundararajan Career Development Cell (MSCDC)
- MSEC Research Centre (MSEC RC)
- Center of Excellence Industry Tie Up in Specialized Labs
- Industry MOU's 200 Plus

Vision of the Institute

To impart state-of-the-art technical education, including sterling values and shining character, producing engineers who contribute to nation building thereby achieving our ultimate objective of sustained development of an unparalleled society, nation and world at large.

Mission of the Institute

Meenakshi Sundararajan Engineering college, Chennai constantly strives to be a Centre of Excellence with the singular aim of producing students of outstanding academic excellence and sterling character to benefit the society, our nation and the world at large.

To achieve this, the college ensures

- Continuous upgradation of its teaching faculty to ensure a high standard of quality education and to meet the ever-changing needs of the society
- Constant interaction with its stakeholders
- Linkage with other educational institutions and industries at the national and international level for mutual benefit
- Provision of research facilities and infrastructure in line with global trends
- Adequate opportunities and exposure to the students through suitable programs, to mould their character and to develop their personality with an emphasis on professional ethics and moral values.

We offer following courses:

S.No	Course	Intake
	Undergraduate courses in B.E / B. Tech	
01	B.E Civil Engineering	60
02	B.E Computer Science and Engineering	120
03	B.E Electronics and Communication Engineering	120
04	B.E Electrical & Electronics Engineering	60
05	B.E Mechanical Engineering	60
06	B. Tech Information Technology	120
07	B. Tech Artificial Intelligence & Data Sciences	120
	Postgraduate courses in M.E / M. Tech	
08	M.E. Construction Engineering and Management	18
09	M.E. Computer Science and Engineering	18
10	M.E. Embedded System Technologies	18
11	M.E Energy Engineering	18

DEPARTMENT OF HUMANITIES AND SCIENCE

The H&S Department stands out for its commitment to providing a well-rounded academic experience for first-year students. Covering key subjects like Physics, Chemistry, Mathematics, English, and Tamil. The department boasts a high pass percentage in semester exams, a testament to the hard work and dedication of the faculty. This year, the department enhanced offerings with industry and alumni talks, foreign language courses, engaging games, and specialized coaching for AEP and ICS. Additionally, the department introduced an industry-oriented and department-specific syllabus to better prepare students for future challenges and opportunities

DEPARTMENT OF CIVIL ENGINEERING

The Civil Engineering Department at our college, established in 2002, is a beacon of academic excellence and research innovation. Offering both undergraduate program and postgraduate program in M.E. Construction Engineering and Management, the department is committed to integrating advanced technologies and sustainable practices into its curriculum. The department boasts state-of-the-art laboratories and strong industry collaborations. Graduates of the department have made significant contributions to civil engineering, both nationally and internationally, and continue to shape the future of the discipline through unwavering commitment to excellence.

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

The Department of Computer Science and Engineering was established in 2001. It has its mission to inculcate innovative thinking and analytical abilities in addition to imparting quality education in the theory and application of Computer Science and Engineering. The department offers UG and PG programmes with State-of-the-art Computer laboratories equipped with high end hardware and software packages provided with high-speed leased line connectivity. The department takes pride in its academic excellence and outstanding placement records. It has consistently produced 68 university rank holders till 2023 batch and accredited by National Board of Accreditation.

DEPARTMENT OF

ELECTRICALAND ELECTRONICS ENGINEERING

The Electrical and Electronics Engineering Department, established in 2003, is expanding its offerings to M.E. program in Embedded System Technologies from the 2024-25 academic year. With a focus on knowledge - based training, the department faculty empowers students with a deep understanding of concepts and industry - ready skills. The department forged partnerships with 22 companies through MOUs, facilitating collaboration and knowledge exchange.

The Electrical Technocrats Association (ETA) is a vibrant platform for technical activities, including the publication and showcasing of newsletters by staff and students every fortnight. Our mission is to drive technological advancements, foster research, and address industry needs.

DEPARTMENT OF MECHANICAL ENGINEERING

Meenakshi Sundararajan Engineering College inaugurated the Department of Mechanical Engineering in the academic year 2011-12. The department has well qualified faculties with excellent teaching, training and industrial experience. It has state-of-the-art laboratories which include VMC, CNC Wire Cut, Spark Erosion, 3D CMM etc catering to academic, consultancy and research requirements. The department's endeavor is to develop its students to be industry ready when they graduate. Students of mechanical engineering department gain industrial exposure and are prepared to face future challenges by carrying out their Final Year Project work in various PSU/Private sectors as per their field of interest relevant to their program. The department has a memorandum of understanding with various Institutions, Industries and Research organizations for collaborative research and development work. There is a huge potential in the department for Consultancy as well as Technology and Product incubation.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

The Department of Electronics and Communication Engineering, established in 2001, has grown significantly increasing its sanctioned intake from 60 to 120 in 2010. With NBA accreditation, the department is committed to delivering quality education, producing graduates who excel technically, socially, and professionally. Its state-of-the-art infrastructure, featuring ICT-enabled classrooms and advanced laboratories with cutting-edge tools like Cortex M4, Spartan 6, IoT kits, MATLAB, Cadence and PSPICE that supports academic excellence.

The Department's industry linkages with renowned organizations including ISRO, DRDO, NLTVC, and Ericson enhance students' technical skills through interactive events.

The Department's achievements include academic excellence, impressive placement records, and students' accomplishments in sports, arts, and culture, with alumni globally represented in top companies like Intel, Yahoo, and Apple.

DEPARTMENT OF INFORMATION TECHNOLOGY

The department of Information Technology was started in the year 2001 with an intake of 60 students focusing on the area. The department has won laurels to to the college. The department constantly strives with the singular aim of producing students with outstanding academic excellence and sterling character to benefit the society, our nation and the world at large. The department's commitment to high academic standards and successful student placements. It has consistently produced 65 university rank holders till 2023 batch and accredited by National Board of accreditation. Campus Agreement has been signed with leading software and hardware giants like Microsoft, IBM, Adobe and HP. The department has received a certificate partnership as a "Center of Excellence" with Virtusa Technology.

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

The Department of Artificial Intelligence & Data Science was established in 2021 with an initial intake of 60 students, which was subsequently increased to 120 in 2024. Our department boasts a team of highly qualified, experienced, and competent faculty members and features spacious infrastructure with modern amenities, including six well-equipped computer laboratories with backup and internet facilities. We emphasize continuous knowledge enrichment through seminars, guest lectures, workshops, and skill enhancement programs for both students and faculty, and engage in meticulous academic planning to ensure a well-structured approach to each semester. Additionally, our student-driven club, serves as an incubation center, nurturing innovative ideas and fostering creativity.

INTERNAL QUALITY ASSURANCE CELL (IQAC)

MSEC established the Internal Quality Assurance Cell (IQAC) in 2016 to develop and implement quality standards and benchmarks in key performance areas. In alignment with the National Education Policy (NEP) 2020 and subsequent reforms, the IQAC has been further strengthened to ensure compliance with the new policy directives.

Through IQAC, the institute strive to:

- Maintain and enhance the quality of education and services
- Align with our institution's vision and mission
- Foster a culture of continuous improvement and excellence
- Ensure accountability and transparency in institutional functioning
- Promote innovative practices in teaching, learning, and research
- Develop and implement effective quality benchmarks and parameters
- Facilitate student-centered learning and feedback mechanisms
- Enhance faculty development and capacity building
- Strengthen industry-academia partnerships and collaborations
- Ensure efficient governance and administrative processes
- Promote a culture of sustainability and social responsibility
- Facilitate accreditation and ranking processes
- Identify and mitigate quality assurance risks

CONTROLLER OF EXAMINATION

The institution, granted autonomous status by UGC and Anna University from the academic year 2024-2025, has established the Controller of Examinations (COE) office to oversee assessment processes with confidentiality, ensuring quality and standards. The COE conducts fair examinations, declares results, and manages examination activities for Internal Assessment Tests (IATs) and Semester End Examinations (SEE). Their yearly schedule includes planning, coordinating, conducting, evaluating, and reviewing exams, as well as issuing certificates and transcripts. The COE ensures smooth conduct, maintains exam integrity, and coordinates with stakeholders, adapting to the institution's specific needs and exam cycle.

MEENAKSHI SUNDARARAJAN RESEARCH CENTRE(MSRC)

The MSEC Research Centre has a steadfast commitment to fostering a strong research culture. It empowers students and faculties in their intellectual exploration and discovery. The center aims to advance knowledge, drive neoteric innovation, and contribute to the broader academic and industrial fraternity ultimately aimed at uplifting humankind.

THE MEENAKSHI SUNDARARAJAN CAREER DEVELOPMENT COMMITTEE (MSCDC)

The Meenakshi Sundararajan Career Development Committee (MSCDC) is a strategic group dedicated to fostering students' professional growth and development. Our mission is to support students in achieving their career goals, fostering a culture of professional growth and development.

The MSCDC plays a vital role in aligning individual career goals through various initiatives, including:

- 1. Career Pathways
- 2. Specialised Expert Talk & Guidnace on Different Career Pathways
- 3. Higher Education Awareness Sessions on various Geographical Locations
- 4. University Fairs
- 5. Training / Coaching Programs for different Competitive Exams
- 6. Repository / Text Books for various Competitive Exams

By providing a career pathway, we help students understand the opportunities available to them and what is required to achieve their career goals. We encourage students as they navigate their professional journey, providing them with the tools, knowledge, and opportunities needed for successful career development.

OFFICE OF STUDENTS AFFAIRS

Our mission is to create a supportive and inclusive educational environment that empowers students to succeed in their academic, personal, and professional lives. We achieve this by:

- Providing individualized support and responding to student needs
- Fostering a culture of academic integrity and excellence
- Promoting personal hygiene, cleanliness, discipline and sprucing
- Encouraging a moral code of conduct and respect for others
- Cultivating a sense of campus decency and decorum
- Modeling exemplary behavior and attitudes

By fulfilling these responsibilities, the institution aims to inspire students to become responsible, successful, and compassionate individuals who make a positive impact in their communities.

COLLEGE COUNSELING SERVICES

College counseling services are essential in supporting students' overall well-being and academic success. These services often encompass various areas, including healthy mind well-being, career guidance, and academic counseling. Here's a breakdown of the typical counseling services available for college students in the institution: **Individual Counseling:** One-on-one sessions with RCI registered counselors or psychologists to address personal issues such as stress, anxiety, depression, relationship problems, and any other psychological concerns.

Group Counseling: Support groups where students with similar issues can share experiences and strategies for coping in a safe and supportive environment.

Crisis Intervention: Immediate support for students in distress, trauma response, and any emergency psychological concerns.

TRAINING AND PLACEMENT CELL

Meenakshi Sundararajan Engineering College training and placement cell is committed to providing exceptional placement opportunities for its students. The Placement Cell takes meticulous efforts to ensure that students are recruited by topnotch companies in the industry.

The training pathway is established starting from the first semester with 180 Hours of Placement training which includes Communications Skills, Aptitude Training. Specialised Programming, Guidance on Certifications, Projects, Competitions, Grooming, Etiquette, Group Discussion and Mock Interviews.

The Placement Cell functions under the leadership of Placement Officer, Faculty representatives and Coordinators from each department. The Cell's ultimate aim is to achieve 100% placement. Its Other Functions include

- 1. Implementation of the training pathway at appropriate semesters
- 2. Industry Talks
- 3. Alumni Talks
- 4. Arranging Internships & Projects
- 5. Centers of Excellence with Industry
- 6. Industry Specialised training & guidance

This comprehensive training empowers students to face the campus interviews with confidence through enhancing their employability skills for a successful future.

DEPARTMENT OF PHYSICAL EDUCATION

Our college campus boasts an array of sports facilities, including

- Basketball Court
- Badminton Court
- Pickle Ball Court
- Volleyball
- Cricket/FootBall/AthleticsGround
- Tennis Court
- Kho Kho

The institution is much dedicated in nurturing the talent through specific college sports teams :

- Expert coaching and mentorship
- Formation of new sports teams
- Dedicated Sports Hour (1 hour/week)
- Regular Sports Day events that are meticulously planned for maximum student participation.

DEPARTMENT OF SAFETY AND SECURITY

MSEC's Safety Department include the Chief Security Officer (Retd. Lt. Col), Trained & Certified Safety Officers (18) and Chief Safety Officer.

The department ensures a secure and hazard-free environment within the campus through:

- Monitoring all areas of the campus to ensure a secure environment
- Conducting daily reviews and maintaining a register to track and address any safety issues
- Performing maintenance tasks such as securing compound walls, replacing damaged fencing, and ensuring proper drainage
- Educating the community through regular safety awareness programs and training sessions
- Organizing fire drills and evacuation procedures to prepare for emergencies
- Identifying and mitigating potential hazards to prevent accidents
- Developing and implementing comprehensive safety policies to guide the community
- Continuously monitoring CCTV cameras to quickly respond to any security incidents

The department's proactive approach helps to prevent accidents, minimizes risks, and fosters a culture of safety among students, staff, and faculty members.

MEENAKSHI SUNDARARAJAN INNOVATION AND INCUBATION CENTRE (MSIIC)

Meenakshi Sundararajan Innovation and Incubation Centre (MSIIC) is a dynamic and forward-thinking organization dedicated to fostering innovation, entrepreneurship, and skill development etc. Our center serves as a catalyst for a transformative change - providing aspiring entrepreneurs with the resources, mentorship, and support that is needed to turn their ideas into successful ventures. MSIIC is dedicated to promoting entrepreneurship and an innovative mindset among students and entrepreneurs at institutions. Through mentorship MSIIC helps to develop talents and support their initiatives, provide knowledge on market access and funding, and empower individuals to identify opportunities, take risks, and create positive change. The institution solely believes in entrepreneurship as a catalyst for innovation and societal impact, providing resources and a supportive environment for individuals to thrive and make a difference in their communities and beyond. Its activities include

- 1. Managing the 100 Seat Innovation & Incubation Center
- 2. Guidance to both Internal & External Start-ups from Ideation to Funding
- 3. Competitions-Identification & Mentoring
- 4. Conducting Competitions :- 30 Hour Hackathons, All India Hackathons etc.
- 5. Managing Student Clubs
- 6. Art & Music Festival
- 7. Skill Development / Value Added Courses
- 8. Societal Beneficial Projects

MSEC STUDENTS CLUBS

MSEC Students Clubs were initiated with the objective to provide a platform for students to discover, showcase and improve their interests, strengths and passion. There are 7 clubs in our college namely, AI Epoch Club, Eco Design Club, Adyant Coding Club, Renewables Club, Nodenova IOT Club, Dev Dynasty Web App Development Club and Product Development Club. Clubs foster vibrant student community in the campus by conducting variety of events and activities which include workshops, seminars, technical and non-technical events, campus benefit projects, long term projects such as SAE Baja etc that cater to diverse interests. Clubs help the students to collaborate with different disciplines and exchange knowledge with peer groups.





	Vision of the department	Mission of the department
To equ	ip the students with a strong foundation in	• Quality education and knowledge updates provide
Core n	nechanical principles, fostering innovation	a strong foundation to meet the complex
and pro	oducing well-rounded engineers capable of	challenges.
solving	complex challenges to address the evolving	Adopt world-class technology, through digital
neeus (education for fostering innovations.
		 Imparting ethical principles to solve the evolving needs of the society and industry.
	PROGRAM OUTCOMES (PO) and PRO	DGRAM SPECIFIC OUTCOMES (PSO)
PO1	Engineering Knowledge: Apply the kn fundamentals, and an engineering specialization	owledge of mathematics, science, engineering ation to the solution of complex engineering problems
PO2	Problem Analysis: Identify, formulate, re	eview research literature, and analyse complex
	engineering problems reaching substantiate	ed conclusions using first principles of mathematics,
DO1	natural sciences, and engineering sciences	
PO3	Design/Development of Solutions: Design so	t the specified peeds with appropriate consideration
	for the public health and safety, and the cult	ural, societal, and environmental considerations
PO4	Conduct Investigations of Complex Proble	ms: Use research-based knowledge and research
	methods including design of experiments, an	alysis and interpretation of data, and synthesis of the
PO5	Information to provide valid conclusions	any appropriate techniques, resources, and modern
FUJ	engineering and IT tools including prediction	and modelling to complex engineering activities with
	an understanding of the limitations	and modeling to complex origineering detrified with
PO6	The Engineer and Society: Apply reasonin	g informed by the contextual knowledge to assess
	societal, health, safety, legal and cultural is	sues and the consequent responsibilities relevant to
DO7	the professional engineering practice	the impact of the professional angineering colutions
P07	in societal and environmental contexts a	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	· · · · · · · · · · · · · · · · · · ·
PO9	Individual and Team Work: Function effective	vely as an individual, and as a member or leader in
DO10	diverse teams, and in multidisciplinary settin	gs
POIU	communication. Communicate effectively of	being able to comprehend and write effective reports
	and design documentation, make effective p	resentations, and give and receive clear instructions
PO11	Project Management and Finance: Demonst	rate knowledge and understanding of the engineering
	and management principles and apply thes	e to one's own work, as a member and leader in a
	team, to manage projects and in multidiscipl	inary environments
PO12	Life-long Learning: Recognize the need for	, and have the preparation and ability to engage in
DSO1	Independent and lifelong learning in the broa	adest context of technological change
F301	Mechanics to Mechanical engineering Problem	ems
PSO2	Familiarization of modern Design and Analy	tical software such as AutoCAD, CREO, NASTRAN,
	ADAMS, CADEM, FluidSim, Lab view an	d MATLAB for analyzing problems of Mechanical
DSO2	Engineering	machanical systems in sociatel and environmental
F 303	issues	
	100000	



Curriculum for I to VIII Semesters

	SEMESTER I										
S. NO.	COURSE CODE	COURSE TITLE C	CATEGORY T	тср	PERIODS PER WEEK			CREDITS			
					L	Т	Ρ				
	U24IP101	Induction Program -Universal Human Values									
		THEORY									
1	U24EN101	Technical English	HSMC	30	2	0	0	2			
2	U24MA101	Mathematical Foundation for Engineers	BSC	60	3	1	0	4			
3	U24PH105	Physics for Mechanical Engineering I	BSC	45	3	0	0	3			
4	U24CY105	Chemistry for Mechanical Engineering	BSC	45	3	0	0	3			
5	U24TA101	தமிழர்மரபு / Heritage of Tamils	HSMC	15	1	0	0	1			
		THEORY CUM PRACTICAL	(TCP)								
6	U24CS101	Programming in C	ESC	90	2	0	4	4			
7	U24EE105	Basics of Electrical and Electronics Engineering	ESC	75	3	0	2	4			
		PRACTICAL									
8	U24BS101	Physics and Chemistry Laboratory	BSC	60	0	0	4	2			
9	U24TP110	Communication Skills Lab - I	HSMC	30	0	0	2	1			
10	U24ED111	Design Thinking -Building Innovation & Solutioning Mindset	EDIC	15	0	0	1	0.5			
		TOTAL		465	17	1	13	24.5			



	SEMESTER II										
S. NO.	COURSE CODE	COURSE TITLE	COURSE TITLE CATEGORY TO		PE I W	RIC PEF /EE	DS R K	CREDITS			
					L	Т	Ρ				
	U24IP201	Biology for Mechanical Engineers		24							
	THEORY										
1	U24EN201	Professional English	HSMC	30	2	0	0	2			
2	U24MA205	Fourier Series, Complex Analysis and Calculus	BSC	60	3	1	0	4			
3	U24PH205	Physics for Mechanical Engineering II	BSC	45	3	0	0	3			
4	U24TA201	தமிழரும் தொழில்நுட்பமும் / Tamils and Technology	HSMC	15	1	0	0	1			
5	U24CY201	Green and Sustainable Chemistry	BSC	30	2	0	0	2			
		THEORY CUM PRACTIC	AL								
6	U24CS201	Python Programming	ESC	90	3	0	3	4.5			
7	U24CE205	Engineering Graphics for Mechanical Engineering	ESC	75	3	0	2	4			
		PRACTICAL									
8	U24ME101	Engineering Practices Laboratory	ESC	60	0	0	4	2			
9	U24TP210	Communication Skills Lab - II	HSMC	30	0	0	2	1			
10	U24ED211	Design Thinking - Decoding Innovation Opportunity	EDIC	15	0	0	1	0.5			
		TOTAL		450	17	1	12	24			



		SEMESTER III								
S. NO.	COURSE CODE	RSE COURSE TITLE	CATEGORY T		COURSE TITLE CATEGORY TO		PE I W	'ERIODS PER WEEK		CREDITS
					L	т	Ρ			
		VAC		30						
	THEORY									
1	U24MA305	Statistics and Numerical Methods for Mechanical Engineers	BSC	60	3	1	0	4		
2	U24ME301	Engineering Mechanics	ESC	45	3	0	0	3		
3	U24ME302	Engineering Thermodynamics	PCC	45	3	0	0	3		
4	U24ME303	Manufacturing Processes	PCC	45	3	0	0	3		
5	U24MC313	Foreign Language (Japanese / French / German)	MC#	30	2	0	0	0		
		THEORY CUM PRACTIC	AL							
6	U24ME304	Engineering Materials and Metallurgy	PCC	60	2	0	2	3		
7	U24ME305	Fluid Mechanics and Machinery	PCC	75	3	0	2	4		
		PRACTICAL						·		
8	U24ME306	Computer Aided Machine Drawing	ESC	45	0	0	3	1.5		
9	U24TP310	General Aptitude & Logical Reasoning	EEC	30	0	0	2	1		
10	U24ED311	Innovation Tool Kits	EDIC	15	0	0	1	0.5		
11	U24RM312	Research Overview	RMC	15	0	0	1	0.5		
		TOTAL		465	19	1	11	23.5		

[#]Mandatory Course is a Non-Credit Course.



Meenakshi Sundararajan Engineering College (An Autonomous Institution, Affiliated to Anna University, Chennai)

Department : Mechanical Engineering, R2024, CBCS

		SEMESTER IV						
					PE PER	RIC X W	DS EEK	
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	тср	L	Т	Ρ	CREDITS
		VAC		30				
		THEORY						
2	U24ME401	Manufacturing Technology	PCC	45	3	0	0	3
3	U24MC413	Indological Studies	MC#	30	2	0	0	0
	THEORY CUM PRACTICAL							
4	U24ME402	Metrology and Measurements	PCC	75	3	0	2	4
5	U24ME403	Strength of Materials	PCC	75	3	0	2	4
6	U24ME404	Thermal Engineering	PCC	75	3	0	2	4
6	U24ME405	Hydraulics and Pneumatics	PCC	60	2	0	2	3
		PRACTICAL						
7	U24ME406	Manufacturing Technology Laboratory	PCC	60	0	0	4	2
8	U24TP410	Critical and Creative Thinking Skills	EEC	30	0	0	2	1
9	U24ED411	Idea & Simulation Lab	EDIC	15	0	0	1	0.5
10	U24RM412	Conceptualization	RMC	15	0	0	1	0.5
		TOTAL		480	16	0	16	22

[#]Mandatory Course is a Non-Credit Course.



Meenakshi Sundararajan Engineering College (An Autonomous Institution, Affiliated to Anna University, Chennai)

Department : Mechanical Engineering, R2024, CBCS

	SEMESTER V											
					PEI PER	RIC W	DS EEK					
S. NO.	COURSE CODE	COURSE TITLE	CATEGORY	тср	L	Т	Ρ	CREDITS				
		VAC		30								
		THEORY										
1		Open Elective I	OEC	45	3	0	0	3				
2		Professional Elective I	PEC	45	3	0	0	3				
3		Professional Elective II	PEC	45	3	0	0	3				
4	U24ME501	Design of Machine Elements	PCC	45	3	0	0	3				
		THEORY CUM PRACTIO	CAL									
5	U24ME502	Theory of machines	PCC	75	3	0	2	4				
6	U24ME503	Heat and Mass Transfer	PCC	75	3	0	2	4				
		PRACTICAL										
7	U24ME504	CAD /CAM LAB	PCC	60	0	0	4	2				
8	U24TP510	Analytical and Logical Thinking Skills	EEC	30	0	0	2	1				
9	U24ME505	Summer Internship*	EEC					1				
10	U24ED511	Prototype & Market Validation	EDIC	15	0	0	1	0.5				
11	U24RM512	Data Exploration	RMC	15	0	0	1	0.5				
12	U24MC513	Fitness for Life - Yoga, Food Nutrition	MC#	30	0	0	2	0				
		TOTAL		480	18	0	14	25				

*Two weeks Summer Internship carries one credit and it will be done during IV semester summer vacation and same will be evaluated in V semester.

[#]Mandatory Course is a Non-Credit Course.



		SEMESTER VI						
s	COURSE				PERIODS PER WEEK			
NO.	CODE	COURSE TITLE	CATEGORY	тср	L	Т	Ρ	CREDITS
		VAC		30				
		THEORY						
1		Open Elective II	OEC	45	3	0	0	3
2		Professional Elective III	PEC	45	3	0	0	3
4		Professional Elective IV	PEC	45	3	0	0	3
3	U24ME601	Design of Transmission System	PCC	45	3	0	0	3
4	U24MG602	Project Management	HSMC	45	3	0	0	3
5	U24MC613	Integrated Disaster Management	MC#	30	2	0	0	0
		THEORY CUM PRACTIC	AL					
7	U24ME602	Finite Element Analysis	PCC	75	3	0	2	4
		PRACTICAL						
8	U24TP610	Employability Skills & Problem Solving Techniques	EEC	30	0	0	2	1
9	U24ED611	Building a Business Model, GTM & Startup Journey	EDIC	15	0	0	1	0.5
10	U24RM612	Design & Modelling	RMC	30	0	0	2	1
		TOTAL		405	20	0	7	21.5

#Mandatory Course is a Non-Credit Course.



Meenakshi Sundararajan Engineering College (An Autonomous Institution, Affiliated to Anna University, Chennai)

Department : Mechanical Engineering, R2024, CBCS

		SEMESTER VII										
S	COURSE				PEF P W	PERIODS PER WEEK						
NO.	CODE	COURSE TITLE	CATEGORY	тср	L	Т	Ρ	CREDITS				
		VAC		30								
	THEORY											
1		Open Elective III	OEC	45	3	0	0	3				
2		Professional Elective V	PEC	45	3	0	0	3				
3		Professional Elective VI	PEC	45	3	0	0	3				
4	U24MG701	Engineering Economics and Finance Management	HSMC	45	3	0	0	3				
5	U24ME701	Artificial Intelligence for Mechanical Systems	PCC	45	3	0	0	3				
66	U24MC713	Constitution of India	MC#	30	2	0	0	0				
		THEORY CUM PRACTIC	CAL									
7	U24ME702	Mechatronics	PCC	75	3	0	2	4				
		PRACTICAL										
8	U24ME703	Summer Internship*	EEC					1				
9	U24RM712	Testing	RMC	15	0	0	1	0.5				
		TOTAL		345	20	0	3	20.5				

*Two weeks Summer Internship carries one credit and it will be done during VI semester summer vacation and same will be evaluated in VII semester.

#Mandatory Course is a Non-Credit Course.



SEMESTER VIII									
S.	COURSE	COURSE COURSE TITLE CATEGORY T	CATEGORY	ТСР	P PE	ERIC R W	DDS EEK	CREDITS	
NO.	CODE				L	Т	Р		
		VAC		30					
		PRAC	TICAL						
1	U24ME801	Project Work	EEC	240	0	0	16	8	
TOTAL 240 0 0 16								8	
OVERALL TOTAL									



EDIC – Entrepreneurial Development and Innovation Courses

S.	COURSE	COURSE TITLE	CATEGORY	ТСР	PE PEF	RIOD R WEI	CREDITS	
NO.	CODE				L	Т	Р	
1	U24ED111	Design Thinking - Building Innovation and Solutioning Mindset	EDIC	15	0	0	1	0.5
2	U24ED211	Design Thinking - Decoding Innovation Opportunity	EDIC	15	0	0	1	0.5
3	U24ED311	Innovation tool kits	EDIC	15	0	0	1	0.5
4	U24ED411	Idea & simulation lab	EDIC	15	0	0	1	0.5
5	U24ED511	Prototype & Market Validation	EDIC	15	0	0	1	0.5
6	U24ED611	Business Management - Go To Market & Startup Journey	EDIC	15	0	0	1	0.5

Placement Training by EduTech

S.	COURSE	OURSE COURSE TITLE	CATEGORY	ТСР	PERI V	ODS VEEK	CREDITS	
NO.	CODE				L	Т	Р	
1	U24TP110	Communication Skill Lab - I	HSMC	30	0	0	2	1
2	U24TP210	Communication Skill Lab -	HSMC	30	0	0	2	1
3	U24TP310	General Aptitude & Logical Reasoning	EEC	30	0	0	2	1
4	U24TP410	Critical and Creative Thinking Skills	EEC	30	0	0	2	1
5	U24TP510	Analytical and Logical Thinking Skills	EEC	30	0	0	2	1
6	U24TP610	Employability Skills & Problem Solving Techniques	EEC	30	0	0	2	1

RMC – Research Methodology Courses

S.	COURSE	COURSE TITLE	CATEGORY	ТСР	PERI V	ODS VEEK	CREDITS		
NO.	CODE				L	Т	Р		
1	U24RM312	Research Overview	RMC	15	0	0	1	0.5	
2	U24RM412	Conceptualization	RMC	15	0	0	1	0.5	
3	U24RM512	Data Exploration	RMC	15	0	0	1	0.5	
4	U24RM612	Design & Modelling	RMC	30	0	0	2	1	
5	U24RM712	Testing	RMC	15	0	0	1	0.5	



CATEGORY OF COURSES AND CREDIT DISTRIBUTION

S.	Subject Area	Credits per Semester									
No.	Subject Area	1	2	3	4	5	6	7	8	Credits	
1	HSMC	4	4	0	0	0	3	3	0	14	
2	BSC	12	9	4	0	0	0	0	0	25	
3	ESC	8	10.5	4.5	0	0	0	0	0	23	
4	PCC	0	0	13	17	12	11	7	0	60	
5	PEC	0	0	0	0	6	6	6	0	18	
6	OEC	0	0	0	0	3	3	3	0	9	
7	EEC	0	0	1	1	2	1	1	8	14	
8	MC			\checkmark	\checkmark	\checkmark	\checkmark	\checkmark		0	
9	EDIC	0.5	0.5	0.5	0.5	0.5	0.5			3	
10	RMC			0.5	0.5	0.5	1	0.5		3	
	Total	24.5	24	23.5	19	24	25.5	20.5	8	169	

HSMC - Humanities, Social Sciences and Management Courses

- BSC Basic Sciences Courses
- **ESC** Engineering Sciences Courses
- PCC Professional Core Courses
- PEC Professional Elective Courses
- OEC Open Elective Courses
- **EEC** Employability Enhancement Courses
- MC Mandatory Courses / Non-Credit Courses
- EDIC Entrepreneurial Development and Innovation Courses
- RMC Research Methodology Courses



U24IP101	INDUCTION PROGRAM							
	Modules							
1	Universal Human Values I (UHV I)							
To help the st	udent to see the need for developing a holistic perspective of life.							
To sensitize the nature/exister	ne student about the scope of life – individual, family (interpersonal relationship), society and nce.							
Strengthening	Strengthening self-reflection.							
To develop m	ore confidence and commitment to understand, learn and act accordingly.							
2	Physical Health and Related Activities							
To understand	d the basic principles to remain healthy and fit.							
To practice th	em through exercise, games etc.							
Involving heal	th center, staff, sports coaches, faculty, staff, students' sports team etc.							
3	Familiarization of Department / Branch and Innovation							
To get a broa nation, the sta	d perspective about goals of institution, department/branch in the context of the world, the ate, and region.							
To get an ide research, dev	a of how the institution operates to fulfill its goals through various disciplines of education, elopment, and practice.							
To get an idea	a of how students can connect /participate in it.							
4	Visit to a Local Area							
For a student to relate to the social environment of the educational institution as well as the surroundings, a place wherein their most significant year's students will scribble some indelible memories, an absolute necessity is generated for city visits to let students understand the environment through interaction with the people, place and history.								
5	Lectures by Eminent People							
Guest lecture world. Eminer can share the and technolog	s are a great way to help the students gain a perspective on many different things in the ht personalities in different fields of expertise like academics, sports, industry, business etc. ir story and talk about important subjects like career, entrepreneurship, government policies by							
6	Proficiency Modules							
This module includes effort	is to help fill the gaps in basic competency required for further inputs to be absorbed. It is to make the student proficient in interpersonal communication and expression.							
7	Literature / Literary Activities							
To develop the to local, region contemporary	e clarity of humanistic culture and its expression through literature, students may be exposed onal, national, or international literature. It will help them in understanding traditional and values and thought.							
8	Creative Practices							
This module i students can	s to help develop the clarity of humanistic culture and its creative, joyful expression. The choose one skill related to visual arts or performing arts.							
9	Extra-Curricular Activities							
Wellness Ses	sions							
10	Extra Activities							
Anti-Ragging	Briefing							
Informal Intera	actions, Club / Council / Committee/ Scholarship Briefings							



		L T P			С	
024EN101		2	0	0	2	
Course Obj	ectives			L		
1	To improve the communicative competence of learners					
2	To develop the basic reading and writing skills of first year en students.	igineerir	ig and te	chnology	1	
3	To improve understanding of key grammar concepts and app reading and writing tasks.	ly those	concep	ts in both		
4	To help learners use language effectively in professional con-	texts.				
5	To equip students with the skills to write clearly and concisely	/ in a va	riety of c	ontext.		
UNIT 1 EFF	ECTIVE READING AND WRITING COMMUNICATION			6		
Reading: C Writing: Pre Grammar: 7 Vocabulary	omprehension of short technical texts – Skimming and scanni ecis Writing, Email Writing Fenses, Question types: Wh / Yes or No development: Root words – Prefixes & Suffixes, Standard A	ng bbreviat	ions & A	cronyms		
UNIT 2 NAF	RATION AND SUMMATION			6		
Reading: R Writing: Pa Grammar: F Vocabulary	eading biographies, travelogues, newspaper reports raphrasing, Formal and informal Letter Prepositions, Subject-verb Agreement • development: One-word substitution					
UNIT 3 LAN	GUAGE DEVELOPMENT			6		
Reading: R Writing: Wr Grammar: I Vocabulary	eading reviews, advertisements iting Instructions, Report writing (Industrial report, Survey repo Discourse Markers, Degrees of comparison development: Compound nouns, Homophones and homony	ort & Acc	ident re	port)		
UNIT 4 REC	OMMENDATIONS AND TRANSCODING			6		
Reading: N Writing: Wr Grammar: E Vocabulary	on-verbal communication (tables, pie charts etc.) iting recommendations, Transferring information (chart, graph Error corrections development: Fixed and semi fixed expressions	etc.)				
UNIT 5 LAN	GUAGE FOR WORKPLACE			6		
Reading: R Writing: Wr Grammar: S Vocabulary	eading Editorial columns iting minutes of meeting Simple, compound and complex sentences development: Verbal analogies					
	TOTAL PERIODS		3	30		
Course Out	comes					
At the end	of the course, the student will be able to					
CO1	To use appropriate words in a professional context					
CO2	To gain understanding of basic grammatical structures and u	se them	in right	context.		
CO3	CO3 To read and infer the denotative and connotative meanings of technical texts					
CO4	To write definitions, descriptions, narrations and essays on va	arious to	pics			
CO5	O5 To expand vocabulary and technical language competency					



TEXT BOOKS

English for Engineers & Technologists Orient Black swan Private Ltd. Department of English, Anna University, (2020 edition)

English for Science & Technology Cambridge University Press, 2021.

English for Science & Technology Cambridge University Press, 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

REFERENCES

Technical Communication – Principles And Practices By Meenakshi Raman & Sangeeta Sharma, Oxford Univ. Press, 2016, New Delhi.

A Course Book On Technical English By Lakshminarayanan, Scitech Publications (India) Pvt. Ltd.

English For Technical Communication (With CD) By AyshaViswamohan, McGraw Hill Education, ISBN: 0070264244.

Learning to Communicate – Dr. V. Chellammal, Allied Publishing House, New Delhi, 2003.

Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

		CO-PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'													
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	3	3	-	-	2	2	-
CO2	-	-	-	-	-	-	-	-	2	3	-	-	2	2	-
CO3	-	-	-	-	-	-	-	-	1	1	-	-	2	2	-
CO4	-	-	-	-	-	-	-	-	2	3	-	-	1	1	-
CO5	-	-	-	-	-	-	-	2	-	3	-	2	2	2	-
AVG	-	-	-	-	-	-	-	0.4	1.6	2.6	-	0.4	1.8	1.8	-



U24MA101 MATHEMATICAL FOUNDATION FOR ENGINEERS			Т	Ρ	С				
		3	1	0	4				
	Course Objectives								
1	To develop the use of matrix algebra techniques that is needed by engine applications.	ers	for p	racti	cal				
2	To familiarize the students with differential calculus.								
3	To familiarize the student with functions of several variables. This is need branches of engineering.	ed ir	n ma	ny					
4	To make the students understand various techniques of integration.								
5	5 To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.								
UNIT 1 MATRICES									
Introduction - characteristic equation - Eigenvalues and Eigenvectors of a real matrix –Properties of Eigenvalues and Eigenvectors (without proof) – Cayley - Hamilton theorem (statement and applications only) – Diagonalization of matrices by orthogonal transformation –Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms . MAT LAB: to find matrix operations addition, multiplication, transpose and inverse of the matrix and also to find eigen value and corresponding eigen vectors.									
UNIT 2 DIFFERE	ENTIAL CALCULUS			9+3					
Representation of product, quotient Interval of increat of concavity and	of functions - Limit of a function - Continuity - Derivatives - Differentiation ru t, chain rules) - The equations of tangent line and normal line, velocity and sing and decreasing functions-Maxima and Minima of functions of one var convexity. MAT LAB: To determine maxi ma and minima for one variable.	iles acce iable	(sun elera e - In	n, ation Iterva	- als				
UNIT 3 FUNCTION	ONS OF SEVERAL VARIABLES			9+3					
Partial differentiation – Homogeneous functions and Euler's theorem – Total derivative – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Maxima and minima of functions of two variables - Lagrange's method of undetermined multipliers. MAT LAB: To determine maxima and minima for two variable									
UNIT 4 INTEGR	AL CALCULUS			9+3					
Definite and Indefinite integrals - Substitution rule - Techniques of Integration : Integration by parts, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals. MAT LAB: To find the area using single integral.									
UNIT 5 MULTIP	LE INTEGRALS			9+3					
Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed byplane curves – change of variables from Cartesian to polar in double integrals - Triple integrals – Volume of solids. MAT LAB: To find the area and volume using double and triple integral.									
	TOTAL PERIO	DS		60	_				



Meenakshi Sundararajan Engineering College (An Autonomous Institution, Affiliated to Anna University, Chennai)

Department : Mechanical Engineering, R2024, CBCS

Course Outcomes At the end of the course, the student will be able to CO1 Use the matrix algebra methods for solving practical problems CO2 Apply differential calculus tools in solving various application problems. CO3 Able to use differential calculus ideas on several variable functions. CO4 Apply different methods of integration in solving practical problems **CO5** Apply multiple integral ideas in solving areas, volumes and other practical problems TEXT BOOKS 1.Veerarajan.T,"Engineering Mathematics, for semester I and II", Updated second Edition, Tata McGraw Hill Education, private Limited ,2019. 2.Grewal B.S and Grewel J.S. "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 45th Edition, 2020. 3.Won Y.Yang, Young K.Choi, Jaekwon Kim, Man Cheol Kim, H.Jin Kim, Taeho Im, "Engineering Mathematics with MATLAB" CRC Press Publishers, I st Edition, 2017. 4. Engineering Mathematics: First year. Calculus and analytical geometry, volume 2, M.K. Venketaraman, National Publishing company, 1965. REFERENCES 1.Kreyszig Erwin, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2016. 2.Kandasamy.P., Thilagavathy.K and Gunavathy.K., "Engineering Mathematics For First Year B.E/B.Tech, Seventh Edition 2008 S.Chand and Co., New Delhi. 3.Bali. N.P and Manish Goyal, "A Textbook of Engineering Mathematics, semester-I", Ninth Edition, Laxmi Publications Pvt. Ltd, 2016. CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs' PO3 PO4 PO5 PO9 PO10 PSO3 **PO1** PO2 **PO6** PO7 **PO8** PO11 PO12 PSO1 PSO2 3 3 1 1 1 CO1 3 1 -CO2 3 2 2 1 1 ----------CO3 3 3 1 3 1 1 --_ -_ --_ _ CO4 2 2 3 1 1 ---_ -_ --_ _ CO5 3 3 3 1 1 1 ---------3 3 3 1 AVG 1 1 1 --------



U24P	H105	PHYSICS FOR MECHANICAL ENGINEERING I	L 3	T O	P 0	C 3		
Cours	se Obje	ectives	•	U	Ū			
1	Explor such a	e the elastic behavior of materials and the factors that affect thei is stress, strain, and elasticity modulus.	r deforn	nation u	nder loa	d,		
2	Enable domai	e learners to identify and apply the mechanical properties of mate	erials re	levant to	o their fie	eld of		
3	Introdu mecha	uce learners to the concept of heat energy, its measurement, and anisms.	d its trar	nsmissio	n			
4	Introdu amplit	uce learners to the principles of sound waves, including wave pro ude, and wavelength	opagatic	on, frequ	ency,			
5	5 Provide learners with a comprehensive understanding of lasers, including their principles of operation and applications.							
UNIT	1 ELA	STICITY			9			
Elastic Expre modul	city – S ssion fo lus by t	tress, Strain - Hooke's law – Elastic moduli – Poisson's ratio – B or bending moment – Theory of uniform and non – uniform bendi uniform and non- uniform bending methods -Application (Cantilive	eams – ing - De er)	bending terminat	g of bear tion of ye	ms – oung 's		
UNIT	2 SUR	FACE TENSION AND VISCOSITY			9			
Surface tension – definition – Molecular forces – Explanation of surface tension on kinetic theory – Surface energy – work done in increasing the area of a surface – Excess pressure inside a curved liquid surface – Excess pressure inside a liquid drop and soap bubble. Viscosity – Co efficient of viscosity – Streamlined and turbulent motion – critical velocity – Bernoulli's theorem – Proof – Applications – Venturimeter – Pitot tube								
	3 THE	RMAL PHYSICS			9			
Transt condu throug	fer of h ctors-L gh com	eat energy – Heat conduction in solids –Newton's law of cooling- ee's disc method: theory and experiment, Forbe's Method-rectilin bound media (series and parallel)	-Therm near flo	al condu w of hea	uctivity o it - Conc	of bad Juction		
	4 ULTI	RASONICS		9				
Ultras ultraso grating	onics, l onic wa g, Appl	Properties of ultrasonic waves, Piezo-electric & magnetostriction wes by Piezo electric & magnetostriction oscillators, Detection of ications of ultrasonic waves : SONAR, NDT.	effect, ultraso	Producti nic wave	on of es, acou	ıstic		
UNIT	5 LASI	ER & FIBER OPTICS			9			
Chara invers and m angle Comm	cteristi ion – P iedical - Type nunicat	cs of Lasers - Spontaneous and stimulated emission – Einstein's umping – Main components of lasers – Types of lasers: Nd:YAG applications of lasers. Light propagation in optical fibre - Numeric s of optical fibres – Losses in fibres: attenuation, dispersion, ben ion system - Active and passive sensors.	A&B co and Co cal aper ding - F	oefficien O2 laser ture and ibre opti	ts- Popu s – Indu I accept c	ulation Istrial ance		
		TOTAL PE	RIODS		45			
Course Outcomes								
At the	end o	f the course, the student will be able to						
CO1	CO1 Analyze rigid bodies in equilibrium, considering both external forces and internal reactions.							
CO2	Gain i	nsight into the elastic properties of materials, including elasticity,	stiffnes	s, and re	esilience) .		
CO3	Gain i	nsights into the concepts of heat energy and its applications in th	ermal e	ngineer	ing.			
CO4	Acquir	e knowledge about the sound waves and their usage relevant to	engine	ering ap	plicatior	۱S.		
CO5	5 Develop an understanding of laser technology and its applications in communication systems							



TEXT BOOKS

1. Mechanics: D.S. Mathur S. Chand & Co, Edition 2020

2. Elements of properties of matter – D.S. Mathur – S. Chand & Co., 2008

3. Properties of matter - R. Murugesan - S. Chand & Co., 2004.

4.. Lasers: Fundamentals and Applications, - K.Thyagarajan and A.Ghatak Laxmi Publications, (Indian Edition), 2019

REFERENCES

1. Mechanics Part I and Part II, Narayanamoorthy National Publishing Company, 2001

2. Fundamental of Physics, D. Hallidary, Resnick and J Walker, 6th Edition, Wiley, New York 2001

3. Properties of matter – Brijlal and Subramanian S. Chand & Co., 2006.

4.. Physics – Volume 1 & 2, Paul A. Tipler, CBS, (Indian Edition), 2004

		CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	-	-	-	-	-	-	1	1	-	1
CO2	3	2	2	-	-	-	-	-	-	-	-	1	1	-	1
CO3	3	2	2	-	-	-	-	-	-	-	-	1	1	-	1
CO4	3	2	2	-	-	-	-	-	-	-	-	1	1	-	1
CO5	3	2	2	-	-	-	-	-	-	-	-	1	1	-	1
AVG	3	2	2	-	-	-	-	-	-	-	-	1	1	-	1



	11240105		L	Т	Р	С		
	02401105	CHEMISTRT FOR MECHANICAL ENGINEERING	3	0	0	3		
		Course Objectives						
1	To make the stude purposes.	ents aware of various treatment processes of water fo	r potabl	e and i	industria	3l		
2	To familiarize the I	knowledge about Thermodynamics and lubricants use	ed in ind	lustries				
3	To recommend su	itable energy propellant for engineering processes an	d applic	ations.				
4	To develop an unc applications.	lerstanding of the basic concepts of phase rule and N	anomat	erials v	with its			
5	To make the stude	ents aware of the extended applications of polymeric r	naterial	s.				
UNIT	1 WATER TECHN	DLOGY			9			
hardr and fo corros phosp	hardness) –Alkalinity – Determination (problems on alkalinity) – Boiler feed water – Requirements – Priming and foaming, Scales and sludges Caustic embrittlement and Boiler corrosion – Application - External conditioning (Ion Exchange, zeolite) – Internal conditioning (Carbonate, phosphate, calgon, sodium aluminate conditioning) – Brackish water treatment - Reverse osmosis.							
UNIT	2 CHEMICAL THE	RMODYNAMICS AND LUBRICANTS			9			
therm energ Lubric lubric	odynamics - Entro y - work function - cants -Classificatic ations – Physical p	by - Entropy change of an ideal gas & problems - Fre Gibbs Helmholtz equation (derivation & applications) on of lubricants: solid, semisolid and liquid lubrica roperties- viscosity, viscosity index, cloud point, pour	e - Van't nts_witł point.	Hoff ison exam	otherm. nples, T	Type of		
UNIT	3 FUELS AND CO	MBUSTION			9			
Introd Manu petrol biodie Ignitic	uction: Classificatio facture of metallurg (Bergius process)-F sel. Combustion of on temperature: spor	n of fuels; Coal and coke: Analysis of coal (proximate jical coke (Otto Hoffmann method). Petroleum and Die Knocking - octane number, diesel oil – cetane number- A fuels: Introduction: Calorific value - higher and lower calo ntaneous ignition temperature, Explosive range; Flue ga	and ul esel: Ma opplication orific valu s analys	timate), anufacti on - Po ues(pro sis - OR	Carbor ure of s wer alco blems o SAT Me	nization, ynthetic hol and n C.V,)- ethod		
UNIT	4 PHASE RULE A	ND NANOMATERIALS			9			
Phase rule - Introduction, definition of terms - phase, components and degree of freedom - phase diagram- one component system -water system - reduced phase rule - thermal analysis and cooling curves - two component systems - lead-silver system. Nanomaterials-Classification-Properties and uses Synthesis–Top down method (Ball milling)and Bottom up methods –Laser Evaporation method -chemical vapour deposition, - Applications of nanomaterials - Application - A Case Study – Medicine, Agriculture, Industry and Electronics.								
UNIT	5 POLYMER CHEI	MISTRY			9			
Polyn –mec Moulo therm	Polymers and Polymerization: Definition, classification - types of polymerization: addition and condensation -mechanism of addition polymerization (cationic, anionic, free radical and coordination polymerization)- Moulding of polymers into articles-injection-Properties: Glass Transition temperatureThermoplastic and thermosetting polymers-conducting polymers-definition, types and applications.							
		TOTAL PE	RIODS		45			



Course Outcomes At the end of the course, the student will be able to **CO1** Summarize the water quality parameters and their treatment techniques. Understand the basic knowledge on concepts of thermodynamics and lubricants with its CO₂ applications. CO3 Illustrate the quality of fuel by its properties Develop a deep knowledge on understanding of the basic concepts of phase rule and Nanomaterials **CO4** with its applications. **C05** Understand the basic principles and applications of Polymers. **TEXT BOOKS** 1. P. C. Jain and Monica Jain, "Engineering Chemistry", 17th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2018. 2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2008. 3. S.S. Dara, "A Text book of Engineering Chemistry", S. Chand Publishing, 12th Edition, 2018. REFERENCES 1.Gareth Price, Thermodynamics of chemical processes, Oxford university press, 2019 O.G. Palanna, "Engineering Chemistry" McGraw Hill Education (India) Private Limited, 2nd Edition, 2017. 3. D Tabor, Gases, liquids and solids and other states of matter, Oxford University press, 2018 4.F.W. Billmayer, Textbook of Polymer Science, 3rd Edison, Wiley. N.Y. 1991. 5. O.V. Roussak and H.D. Gesser, Applied Chemistry-A Text Book for Engineers and Technologists, Springer Science Business Media, New York, 2nd Edition, 2013. 6.Solar Electricity Handbook- A simple, Practical Guide to Solar energy Resources CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs' PO7 PO8 PO9 PO10 **PO1** PO2 PO3 PO4 PO5 PO6 PO11 PO12 PSO1 PSO2 PSO₃ CO1 3 2 1 _ _ _ _ _ _ 1 -1 _ -1 CO₂ 1 2 2 1 1 1 1 3 _ _ _ _ _ -2 2 1 1 1 1 1 CO3 3 1 -_ -_ _ 1 **CO4** 3 2 1 1 1 2 1 2 1 -_ _ _ _ 1 1 1 1 CO₅ 3 2 2 2 3 1 --_ -AVG 3 1.8 0.8 0.4 1.4 1.5 0.4 1.4 1 0.8 -1 _ --



	தமிழர்மரபு	L	Т	Ρ	С				
0241A101	HERITAGE OF TAMILS	1	0	0	1				
அலகு I மொழி மற்றும் இலக்கியம் UNIT I LANGUAGE AND LITERATURE									
ைதிய வொரிக் குடும்பங்கள் – திராவிட வொரிகள் – கமிம் ஒரு செம்மொரி – கமிம்									

இந்திய மொழிக் குடும்பங்கள் – திரொவிட மொழிகள் – தமிழ ஒரு செம்மொழி – தமிழ செல்விலக்கியங்கள் - சங்க இலக்கியத்தின்சமய சார்பற்ற தன்மை –சங்க இலக்கியத்தில் பகிர்தல் அறம் – திருக்குறளில் மேலாண்மை கருத்துக்கள் – தமிழ்க் காப்பியங்கள், தமிழகத்தில் - சமண பௌத்த சமயங்களின் தாக்கம் - பக்தி இலக்கியம், ஆழ்வார்கள் மற்றும் நாயன்மார்கள் - சிற்றிலக்கியங்கள் - தமிழில் நவீன இலக்கியத்தின் வளர்ச்சி - தமிழ் இளகிய வளர்ச்சியில் பாரதியார் மற்றும் பாரதிதாசன் ஆகியோரின் பங்களிப்பு

Language Families in India - Dravidian Languages – Tamil as aClassical Language - Classical Literature in Tamil – Secular Nature of Sangam Literature – Distributive Justice in Sangam Literature -Management Principles in Thirukural - Tamil Epics and Impact of Buddhism & Jainism in Tamil Land -Bakthi Literature Azhwars and Nayanmars - Forms of minor Poetry - Development of Modern literature in Tamil - Contribution of Bharathiyar and Bharathidhasan

அலகு II மரபு - பாறை ஓவியங்கள் முதல் நவீன ஓவியங்கள்	
வரை - சிற்பக் கலை	3
UNIT II HERITAGE - ROCK ART PAINTINGS TO MODERN ART -	5
SCULPTURE	

நடுகல் முதல் நவீன சிற்பங்கள் வரை - ஐம்பொன் சிலைகள் - பழங்குடியினர் மற்றும் அவர்கள் தயாரிக்கும் கைவினைப் பொருட்கள், பொம்பைகள் - தேர் செய்யும் கலை -சுடுமண் சிற்பங்கள் - நாட்டுப்புற தெய்வங்கள் - குமரிமுனையில் திருவள்ளுவர் சிலை -இசைக் கருவிகள் - மிருதங்கம், பறை, வீணை, யாழ், நாதஸ்வரம் - தமிழர்களின் சமூக பொருளாதார வாழ்வில் கோவில்களின் பங்கு

Hero stone to modern sculpture - Bronze icons - Tribes and their handicrafts - Art of temple car making -Massive Terracotta sculptures, Village deities, Thiruvalluvar Statue at Kanyakumari, Making of musical instruments - Mridhangam, Parai, Veenai, Yazh and Nadhaswaram - Role of Temples in Social and Economic Life of Tamils

அலகு III நாட்டுப்புறக் கலைகள் மற்றும் வீர விளையாட்டுகள் UNIT III FOLK AND MARTIAL ARTS

3

தெருக்கூத்து, கரகாட்டம், வில்லுப்பாட்டு, கணியான் கூத்து, ஒயிலாட்டம், தோல்பாவைக்கூத்து, சிலம்பாட்டம், வளரி, புலியாட்டம், தமிழர்களின் விளையாட்டுகள்

Therukoothu, Karagattam, Villu Pattu, Kaniyan Koothu, Oyillattam, Leatherpuppetry, Silambattam, Valari, Tiger dance - Sports and Games of Tamils.

அலகு IV தமிழர்களின் திணைக் கோட்பாடுகள் UNIT IV THINAI CONCEPT OF TAMILS

தமிழகத்தின் தாவரங்களும், விலங்குகளும் - தொல்காப்பியம் மற்றும் சங்க இலக்கியத்தில் அகம் மற்றும் புறக் கோட்பாடுகள் - தமிழர்கள் போற்றிய அறக்கோட்பாடு - சங்ககாலத்தில் தமிழகத்தில் எழுத்தறிவும், கல்வியும் - சங்ககால



நகரங்களும் துறை முகங்களும் - சங்ககாலத்தில் ஏற்றுமதி மற்றும் இறக்குமதி - கடல் கடந்த நாடுகளில் சோழர்களின் வெற்றி

Flora and Fauna of Tamils & Aham and Puram Concept from Tholkappiyam and Sangam Literature - Aram Concept of Tamils - Education and Literacy during Sangam Age - Ancient Cities and Ports of Sangam Age - Export and Import during Sangam Age - Overseas Conquest of Cholas

அலகு V இந்திய தேசிய இயக்கம் மற்றும் இந்திய	
பண்பாட்டிற்குத் தமிழர்களின் பங்களிப்பு	3
UNIT V CONTRIBUTION OF TAMILS TO INDIAN NATIONAL MOVEMENT	5
AND INDIAN CULTURE	

இந்திய விடுதலைப்போரில் தமிழர்களின் பங்கு - இந்தியாவின் பிறபகுதிகளில் தமிழ் பண்பாட்டின் தாக்கம் - சுயமரியாதை இயக்கம் - இந்திய மருத்துவத்தில், சித்த மருத்துவத்தின் பங்கு - கல்வெட்டுகள், கையெழுத்துப்படிகள் - தமிழ் புத்தகங்களின் அச்சு வரலாறு

Contribution of Tamils to Indian Freedom Struggle - The Cultural Influence of Tamils over the other parts of India – Self-Respect Movement - Role of Siddha Medicine in Indigenous Systems of Medicine – Inscriptions & Manuscripts – Print History of Tamil Books.

TOTAL PERIODS

15

TEXT BOOK CUM REFERENCE BOOKS

1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே கே பிள்ளை (வெளியீடு: தமிழ்நாடு பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)

2.கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)

3.Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)

4. Social Life of the Tamils - The Classical Period (Dr.S. Singaravelu) (Published by: International Institute of Tamil Studies

5. Historical Heritage of the Tamils (Dr.S.V. Subatamanian, Dr.K.D. Thirunavukkarasu) (Published by: International Institute of Tamil Studies)

6.The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: International Institute of Tamil Studies)

7.Keeladi - 'Sangam City Civilization on the banks of river Vaigai' (Jointly Published by:Department ofArchaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

8. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)

9.Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)

10. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) – Reference Book.



112405101		L	Т	Р	С							
02403101		2	-	4	4							
Course Objective	es											
1	1 To understand the structure and syntax of C Language											
2	To develop C programs using arrays and strings	To develop C programs using arrays and strings										
3	To develop modular applications in C using functions											
4	To develop applications in C and apply the concept code reusability using pointers and structures											
5 To do input/output and understand the basics of file handling mechanisms in C.												
UNIT 1 BASICS (DF C PROGRAMMING			6+12								
C Language-Structure of C program -Identifiers-Data Types – Variables-Constants – Keywords – Operators – Input/output statements, Decision making statements - Looping statements - Expressions- Precedence and Associativity – Expressions Evaluation, Type conversions. Practicals: 1.Algorithm, pseudocode, flowcharts for simple scientific and statistical problems 2.I/O statements, operators, expressions and decision-making constructs(if, if-else, break, continue 3.C Programming using Simple statements and expressions												
UNIT 2 ARRAYS	AND STRINGS		6+12									
Calculating the length of the Array – Operations on Array – one dimensional arrays – Two dimensional Arrays –String: Declaring, Initializing, Printing and reading strings, String input and output functions, String handling functions, Arrays of strings. Practicals: 1.Create simple programs for one dimensional and two dimensional arrays. 2. Practice all string handling functions.												
UNIT 3 FUNCTIO		6+12										
Library functions: Math functions, other miscellaneous functions such as getchar(), putchar(), malloc(), calloc(). User defined functions - function definition, functions declaration, function call, scope of variables - local variables, global variables. Function parameters: Parameter passing- call by value & call by reference, function return values, Passing arguments to Functions. Recursive functions. Storage classes- auto, register, static, extern, scope rules. Practicals: 1. Implementation of C Program using user defined functions (Pass by value and Pass by reference). 2. Implementation of Recursion Function												
UNIT 4 STRUCTU			6+12									
 Basics of structures-structure data types, type definition, accessing structures, Structure operations, Complex structures-nested structures, structures containing arrays, Array of structures, Structures and Functions, Unions. Pointers: Understanding Computer Memory –Memory Management-Dynamic memory Allocation-Memory leaks- Introduction to Pointers – declaring Pointer Variables – Pointer Expressions and Pointer Arithmetic – Null Pointers – Generic Pointers - Passing Arguments to Functions using Pointer – Pointer and Arrays –Use of pointers in self-referential structures, notion of linked list Practicals: 1. C Programming using Pointers. 2. Structures: Nested Structures, Pointers to Structures, Arrays of Structures and Unions 												



UNIT	5 MAC	CROS	AND I	FILE P	ROCE	ESSIN	G							6+12	2
 Preprocessor Directives: Introduction to preprocessor directives in Simple macros using `#define`, conditional macros using `#ifdef`, `#ifndef`, `#endif`, `#else`, and `#elif`. Files: Introduction to Files – Opening a file – Reading Data from Files – Writing Data to Files – Detecting the End-of-file –Closing a file – Sequential access file-Random Access Files – Binary Files – Command line arguments. Practicals: 1.Programming using macros and storage classes 2.Implementation of Command line Arguments like argc,argv 3.Files- reading and writing, file operations, random access 4.Develop an application for any one of the following scenarios : Student Management System /Stock Management System/ Banking Application / Ticket Reservation System 															
ΤΟΤΑ	TOTAL PERIODS 90														
Cours	se Out	come	S												
At the	end o	of the	cours	e, the	stude	ent wil	l be a	ble to							
	CO1 Create simple applications in C using basic constructs														
	CO2		Creat	e C pr	ogram	s usin	g arra	ys and	string	IS 					
	CO3		Creat	e mod	ular ap	oplicat	ions in		ng tun	ctions.					
	C04		Creat	e mou o oppl	ular ap				ng sin d filo r		and pol	niers.			
TEYT	BOOL	(9	Cleat	e appi	Icalioi	15 05111	y mac	105 an		100622	ing				
1 Ker	nighar	ים BW	and F	Ritchie	ОМ'	'The C	: Prog	rammi	na lan	unaue.	Second	1 Editio	n Pear	son Edu	cation
2015.	ingria	, 2.11			, 2,		, reg	Girmin	ig ian	94490,			i, i oui		oanon,
2. Reema Thareja, "Programming in C", Oxford University Press, Second Edition, 2016															
REFERENCE BOOKS															
1. Paul Deitel and Harvey Deitel, "C How to Program with an Introduction to C++", Eighth edition, Pearson Education, 2018.															
2. Yashwant Kanetkar, Let us C, 17th Edition, BPB Publications, 2020															
3. Byron S. Gottfried, "Schaum's Outline of Theory and Problems of Programming with C", McGraw-Hill Education, 1996.															
4 Pradip Dey, Manas Ghosh, "Computer Fundamentals and Programming in C", Second Edition, Oxford University Press, 2013.															
5. Anita Goel and Ajay Mittal, "Computer Fundamentals and Programming in C", 1st Edition, Pearson Education, 2013.															
CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'															
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	1	-	-	-
CO2	2	2	-	-	-	-	-	-	-	-	-	1	-	-	-
CO3	2	2	2	2	-	-	-	1	-	1	-	1	-	-	-
CO4	2	2	2	-	1	1	-	-	1	-	1	1	-	-	-
CO5	2	-	2	2	1	1	-	1	1	1	1	1	-	-	-
AVG	2	2	2	2	1	1	-	1	1	1	1	1	-	-	-



U24FE105	BASICS OF ELECTRICAL AND ELECTRONICS	L	Т	Р	С						
02422100	ENGINEERING	3	0	2	4						
Course Objectives											
1	1 To introduce the basics and its analysis of electric circuits										
2	To impart knowledge in the basics of working principles and application of electrical machines										
3	To introduce analog devices and their characteristics										
4	To educate on the fundamental concepts of digital electronics										
5 To introduce the functional elements and working of measuring instruments and transducers											
UNIT 1 ELE	CTRICAL CIRCUITS				9+6						
–Independent and Dependent Sources – Simple problems- Nodal Analysis, Mesh analysis with Independent sources only (Steady state). Introduction to AC Circuits and Parameters: Waveforms, Average value, RMS Value, Instantaneous power, real power, reactive power and apparent power, power factor – Simple problems in RLC circuits.											
Practical											
1. Verificatio	n of Kirchhoff's Law.										
UNIT:2 ELE	CTRICAL MACHINES				9+6						
Construction and Working principle, - DC Separately and Self Excited Generators, EMF equation of Dc machines. Working Principle of DC motors, Torque Equation, Types and Applications Construction, Working principle and Applications of Transformer - Three phase Alternator - Three Phase Induction Motor - BLDC motor											
Practical											
1. Load test	on DC Shunt motor.										
2. Load test	on Single Phase Transformer.										
Unit - 3 ANALOG ELECTRONICS 9+6											
Semiconductor Materials: Silicon & Germanium – PN Junction Diodes, Zener Diode –Characteristics and Applications – Bipolar Junction Transistor, SCR, MOSFET, IGBT – Types, V-I Characteristics and Applications - Rectifier and Inverters.											
Practical											
1. Character	istics of PN , Zener Diode.										
2. Characteristics of BJT.											
3. Characteristics of SCR.											
4. Characteristics of MOSFET.											
5. Half wave and Full wave Rectifiers.											
UNIT: 4 DIGITAL ELECTRONICS											
Review of number systems, Binary codes, Error detection and correction codes, Combinational logic - representation of logic functions-SOP and POS forms, K-map representations - minimization using K maps (Simple Problems only)											
Practical											
1. Study of Logic Gates.											


UNIT: 5 ME	ASUREMENTS AND INSTRUMENTATION	9-	-6
Functional e	lements of an instrument, Standards and calibration, Operating Principle, types- Mov	ving C	oil
and Moving	Iron meters, Measurement of three phase power, Energy Meter, Classification of transformed upper Piezoelectric Hell off	nsduc	ers –
optical trans	ducers.	ectan	u
	TOTAL PERIO	DS	75
LIST OF EX	PERIMENTS		
1	Verification of Kirchhoff's Law.		
2	Load test on DC Shunt motor.		
3	Load test on Single Phase Transformer.		
4	Characteristics of PN , Zener Diode.		
5	Characteristics of BJT.		
6	Characteristics of SCR.		
7	Characteristics of MOSFET.		
8	Half wave and Full wave Rectifiers.		
9	Study of Logic Gates.		
Course Out	comes		
At the end	of the course, the student will be able to		
CO1	Compute the electric circuit parameters for simple problems		
CO2	Explain the working principle and applications of electrical machines		
CO3	Analyze the characteristics of analog electronic devices		
CO4	Explain the basic concepts of digital electronics		
CO5	Explain the operating principles of measuring instruments and transducers.		
TEXT BOO	KS		
1. Kothari D Education, 2	P and I.J Nagrath, "Basic Electrical and Electronics Engineering", Second Edition, Mo 2020	cGrav	v Hill
2. S.K. Bhat 2017.	tacharya "Basic Electrical and Electronics Engineering", Pearson Education, Second	Editio	on,
3.Sedha R.S	S., "A text book of Applied Electronics", S. Chand & Co., 2017		
4. A.K. Saw Instrumenta	hney, Puneet Sawhney , "A Course in Electrical & Electronic Measurements & tion", Dhanpat Rai and Co, New Delhi, 19th edition 2019.		
5. D.P Kotha	ari, J.S Dhillon, "Digital Circuits & Design", Pearson India Education, 2015		
REFERENC	ES		
1. James A.	Svoboda, Richard C. Dorf, "Dorf's Introduction to Electric Circuits", Wiley, 2018		
2. Kothari D	P and I.J Nagrath, "Basic Electrical Engineering", Fourth Edition, McGraw Hill Educa	tion, 2	2019.
3.Thomas L	. Floyd, 'Digital Fundamentals', 11th Edition, Pearson Education, Tenth Impression 20)23	
4.Albert Mal	vino, David Bates, 'Electronic Principles, McGraw Hill Education; 7th edition, 2017		
5.H.S. Kalsi	, 'Electronic Instrumentation', Tata McGraw-Hill, New Delhi, 2010		



			(3/2/ P	/1 indio rogran	cates t n Outc	he stre omes	CO/F ength o (POs)	PO, PS of corre and P	O Ma elation rogran	p ping) 3-Stro n Speci	ong 2-M fic Outo	ledium, comes F	1-Weał 'SOs'	κ	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	1	-	-	2	2	-	-	2	1	-	-
CO2	3	3	2	1	1	-	-	2	2	-	-	2	1	-	-
CO3	3	3	2	1	1	-	-	2	2	-	-	2	1	-	-
CO4	3	3	2	1	1	-	I	2	2	-	-	2	1	-	-
CO5	3	3	2	1	1	-	-	2	2	-	-	2	1	-	-
AVG	3	3	2	1	1	-	-	2	2	-	-	2	1	-	-



112406101		L	ТР	С						
02463101	PHISICS & CHEMISTRY LABORATORY	0	0 4	2						
	Course Objectives									
1	This session aims to provide the learners hands-on-training on the practic concepts learnt in the theoretical sessions on bending of beams,application will also train the learner to observe good lab practices, record readings a interpret the results.	al applicati n of laser,. nd analyse	ons of t The co and	he ourse						
2	This session aims to provide the learners hands-on-training on the practic concepts learnt in the theoretical sessions on water treatment, electrocher composites and nanomaterials using simple chemical methods. The cours learner to observe good lab practices, record readings and graphically rep well as analyse and interpret the influence of reaction conditions on the re	al applicati mistry, lubr se will also present the esults.	ons of t icants, train th results	.he e , as						
LIST OF EXP	ERIMENTS									
	PHYSICS LABORATORY									
1	Torsional pendulum - Determination of rigidity modulus of wire and mome and irregular objects	nt of inertia	of regu	ular						
2	Simple harmonic oscillations of cantilever.									
3	Uniform bending – Determination of Young's modulus									
4	Laser- Determination of the wave length of the laser using grating									
5	Ultrasonic Interferometer-Determination of compressibility of given liquid									
6	 a) Optical fibre -Determination of Numerical Aperture and acceptance ang b) Compact disc- Determination of width of the groove using laser. 	le								
7	Non-uniform bending - Determination of Young's modulus									
	CHEMISTRY LABORATORY									
	Any seven experiments									
1	Estimation of mixture of acids by conductometric titration									
2	Estimation of iron by potentiometric titration									
3	Conductometric titration of barium chloride against sodium sulphate (prec	pitation titr	ation)							
4	Determination of alkalinity in a water sample									
5	Estimation of hardness of water by EDTA method									
6	Estimation of hydrochloric acid by pHmetric method									
7	Determination of chloride content of water sample by Argentometric method	bd								
8	Determination of viscosity of a polymer using Ostwald's viscometer									
9	Estimation of iron content using spectrophotometer.									
	TOTAL	PERIODS	30)						
At the end of	the course, the student will be able to									
	Gain knowledge about torque and rigidity modulus of a material and unde simple harmonic motion and bending of beams	rstand the	orinciple	es of						
C01	Estimate the strength of given mixture of acids using conductance measu principle of conductometric titration and Estimate the strength of given iron measurements with the help of potentiometer and have a knowledge on re	rements un n using EM edox reacti	der the F on	;						
	Comprehend the principles of stress, strain & elasticity of the given materia about diffraction of laser light.	als & Gain I	knowled	dge						
CO2	Estimate the strength of given salt using conductance measurements under the principle of precipitation titration and Determine and estimate the amount of different types of alkalinities in water.									



CO3 Understand how sound waves are traveling in liquid medium and comprehend the light accepting power of given optical fibre and its transmission

Employ complexometric titrations to estimate total hardness of a water sample and Determine the amount of chloride present in water using Argentometric method.

TEXTBOOKS

1. Mechanics Part I and Part II, Narayanamoorthy National Publishing Company, 2001

2. Optics -Dr.Murugesan

3. J. Mendham, R. C. Denney, J.D. Barnes, M. Thomas and B. Sivasankar, Textbook of Quantitative Chemical Analysis.

REFERENCES

1. Engineering physics Visvesvaraya Technological University

2. Vogel's Textbook of Quantitative Chemical Analysis (2009)

		CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'														
	PO1	01 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3														
CO1	3	-	2	-	-	-	-	-	-	-	-	3	1	-	-	
CO2	3	-	2	-	-	-	-	-	-	-	-	3	1	-	-	
CO3	3	-	2	-	-	-	-	-	-	-	-	3	1	-	-	
AVG	3	-	2	-	-	-	-	-	-	-	-	3	1	-	-	



		L	Т	Р	С
02417110	COMMONICATION SKIELS LAB I	0	0	2	1
Course Obj	ectives				
1	To improve the communicative competence of learners				
2	To help learners use language effectively in academic /work contexts	S			
3	To develop various listening strategies to comprehend various types lectures, discussions, videos etc.	of a	udio ma	aterials	like
4	To use language efficiently in expressing their opinions via various m	nedia			
5	To build on students' English language skills by engaging them in list activities that are relevant to authentic contexts.	tenin	g and s	peaking	g
UNIT I				6	5
Listening: L Introduction Speaking: N to polite requ	istening as a key skill- its importance -Listening for general information to classmates – Audio / video (formal & informal) Making telephone Calls, Introducing a friend, Making polite requests, puests - Understanding basic instructions for filling out a bank application	on-sp polite on	ecific c	letails - and rep	lying
UNIT II				6	;
Listening: L Speaking: S	isten to a process information Small talk on general topics and current scenario				
				6	;
Listening: L	isten to event narration and stories				
				6	i
Listening: L Speaking: F	istening to discussions and debates Role Play				·
				6	5
Listening: L Speaking: F	istening/watching documentaries Formal and informal talk -making predictions- talking about a given top	oic-gi	iving op	oinions	
	ΤΟΤΑΙ	- PE	RIODS	3	0
At the end o	of the course, the student will be able to				
CO1	To listen and comprehend complex academic texts				
CO2	To speak fluently and accurately in formal and informal communicati	ve co	ontexts		
CO3	To express their opinions effectively in both oral and written medium	of co	ommun	ication	
CO4	Ability to listen/view and comprehend different spoken discourses/ex and to speak clearly in simple language	cerp	ts differ	ent acc	ents
CO5	Ability to read and evaluate texts critically				
List of expe	riments				
1	Self-Introduction / Introducing a friend				
2	Small talk				
3	Narrating an event or story				
4	Discussion/debate on a given topic				
5	Listening to TED Talks (Being an active listener: giving verbal and no	on-ve	erbal fe	edback))



ASSESSMENT PATTERN

End Semester speaking & Writing will be conducted in the classroom

TEXT BOOKS

1. Brooks, Margret. Skills for Success. Listening and Speaking. Level 4 Oxford University Press, Oxford: 2011.

2. Richards, C. Jack. & David Bholke. Speak Now Level 3. Oxford University Press, Oxford: 2010

REFERENCES

1. Bhatnagar, Nitin and Mamta Bhatnagar. Communicative English for Engineers and Professionals. Pearson: New Delhi, 2010

2. Hughes, Glyn and Josephine Moate. Practical English Classroom. Oxford University Press: Oxford, 2014

3. Ladousse, Gillian Porter. Role Play. Oxford University Press: Oxford, 2014

4. English and Soft Skills, Dr. S.P. Dhanavel, Orient Black Swan, 2013

5. Vargo, Mari. Speak Now Level 4. Oxford University Press: Oxford, 2013.

			(3/2 F	2/1 indi Prograi	icates m Outo	the str	CO/ rength (POs)	PO, P of cor) and f	SO Ma relatio ^{>} rogra	apping n) 3-Str m Spec	ong 2-N :ific Out	ledium, comes l	1-Weal PSOs'	ĸ		
	P01	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3														
CO1	-	-	-	-	-	-	-	-	2	3	-	3	2	2	-	
CO2	-	-	-	-	-	-	-	-	2	3	-	3	2	2	-	
CO3	-	-	-	-	-	-	-	-	2	3	-	3	2	2	-	
CO4	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	
CO5	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	
AVG	-	-	-	-	-	-	-	-	1.2	3	-	1.8	1.2	1.2	-	



Meenakshi Sundararajan Engineering College (An Autonomous Institution, Affiliated to Anna University, Chennai) Department : Mechanical Engineering, R2024, CBCS

U24ED111	DESIGN THINKING - BUILDING INNOVATION	L	Т	Ρ	С
	SOLUTIONING MINDSET	0	0	1	0.5
	Course Objectives				
1	Expose the students to the fields of innovation and entrepreneurs interest in these fields.	hip ar	d stre	ngthe	n their
2	To discuss the relevance and importance of innovation and entrep students to improve their everyday life and future careers.	orene	urship	to the	
3	Illustrate the macro perspective of innovation in entrepreneurship	•			
4	To Design the entrepreneurship process.				
5	Develop innovation and entrepreneurship processes to improve s	tuden	ts to th	ne skil	l set .
UNIT 1				1	
What is innova	ation/	proce	SS		
UNIT 2		2			
Introduction to importance of	Problem Solving-The role of problem - solving in innovation and pr real-time problem statements- Problem Identification and Definition	oduct	devel	opmer	nt -The
UNIT 3				2	
What is entr -The Human	epreneurship (and how is it different from innovation) -Type	es of	entre	eprene	eurship
UNIT 4				2	
Misconception entrepreneurs	s about entrepreneurship -The process of developing entreprener hip mindset- Developing a solution thinking mind set to identify tool	urship s and	- Mo techn	dule b iques	uilding
UNIT 5				8	
 5 Hour Collabo 0 0 3 Hour 	s: 60 Students * 5 Minutes Each – Team of Three Students (1) prative Work To Research & Present 20 Case Studies: Design Thinking (8 Case Studies), Innovation (4 Case Studies) & Entrepreneurship (8 Case Studies) s: Faculty Facilitated `Design Thinking' Case Studies	5 Min	utes I	Per Te	eam) –
	TOTAL PERIC	DDS		15	
	TOTAL PERIC Course Outcomes	DDS		15	
At the end of	TOTAL PERIC Course Outcomes the course, the student will be able to	DDS		15	
At the end of CO1	TOTAL PERIC Course Outcomes the course, the student will be able to Understand basic concepts in the fields of innovation and entrepre	DDS eneurs	ship	15	
At the end of CO1 CO2	TOTAL PERIC Course Outcomes the course, the student will be able to Understand basic concepts in the fields of innovation and entrepre Understand what a business model is and the process of problem)DS eneur:	ship ng.	15	
At the end of CO1 CO2 CO3	TOTAL PERIC Course Outcomes the course, the student will be able to Understand basic concepts in the fields of innovation and entrepre Understand what a business model is and the process of problem Summarize the learning in developing an entrepreneurial idea, for practices.	DDS eneurs solvin	ship ng. hroug	15 h inno	vative
At the end of CO1 CO2 CO3 CO4	TOTAL PERIC Course Outcomes the course, the student will be able to Understand basic concepts in the fields of innovation and entrepre Understand what a business model is and the process of problem Summarize the learning in developing an entrepreneurial idea, for practices. Model the correct problem solving methodologies with tools and te	DDS eneurs solvin med t echnic	ship ng. hroug jues.	15 h inno	vative



TEXTBOOKS

1 Lorraine Marchand, "The Innovation Mindset: Eight Essential Steps to Transform Any Industry", Columbia Business School Publishing (13 September 2022)

REFERENCES

1. Peter F. Drucker," Innovation and Entrepreneurship" .

2.Martha Corrales-Estrada "Innovation and Entrepreneurship: A New Mindset for Emerging Markets", Emerald Publishing Limited (27 September 2019)

		CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'														
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3	
CO1	2	1	-	2	-	1	1	1	-	-	-	2	2	-	1	
CO2	2	1	1	-	1	-	1	-	-	-	2	2	2	-	1	
CO3	2	1	1	2	-	-	-	1	-	-	-	2	2	-	1	
CO4	-	1	1	2	2	-	-	-	-	-	-	2	2	-	1	
CO5	-	1	1	2	3	1	-	-	1	1	2	2	2	-	1	
AVG	2	1	1	2	2	1	1	1	1	1	2	2	2	-	1	



11	2410201		L	Т	Р	С
0.	2416201	BIOLOGT FOR MECHANICAL ENGINEERS	3	0	0	0
		Course Objectives				
1	To introduce	e basic biological concepts and their significance in engined	ering ap	plication	s.	
2	To explore of	orthopaedics, biomechanics and the mechanical properties	of biolo	gical sys	stems.	
3	To understa biological or	nd cardiology, biomechanics of heart function and fluid dyr ganisms.	namics c	of blood	flow in	
4	To study bio	ological sensors, feedback mechanisms, and their engineer	ing app	ications	•	
5	To apply bio	ological principles to real-world mechanical engineering cha	llenges	through	case st	udies.
UNIT	1 INTRODU	CTION TO BIOLOGY FOR ENGINEERS			5	
Impor Natur Inspir	tance of Biol al Materials a ed Design ar	ogy in Engineering Biological Structures: Cells, Tissues, and Their Engineering Applications Systems Biology and nd Innovation in Engineering	and Org Mechai	jans E nical Ana	Biomater alogs	ials: Bio-
UNIT	2 ORTHOP	AEDICS - BONES AND JOINTS			5	
Introd Move	uction to Ort ment - Bone	hopaedics and Skeletal Structure - Biomechanics of Bones Healing and Repair Mechanisms - Bio-Inspired Engineerin	s - Joint g Applic	Mechan ations	ics and	
UNIT	3 CARDIOL	OGY - HEART AS A PUMP			5	
Introd Dynar	uction to Ca nics of Blood	rdiovascular System and Heart Anatomy - Biomechanics of d Flow - Heart Valve Mechanics and Function - Bio-Inspired	f Heart F d Engine	unction	- Fluid Pump [Design
UNIT	4 BIOLOGIO	CAL SENSING AND CONTROL SYSTEMS			4	
Senso (e.g., Syste	ory Systems Homeostasis ms and Thei	in Biology: Vision, Hearing, and Touch Biological Feedba s) Bio-Inspired Sensors for Engineering Applications No r Engineering Analogs	ack and eural Ne	Control etworks	Mechan in Biolog	isms jical
UNIT	5 Case Stud	lies and Real-World Applications			5	
Biomi Drone Susta	micry in Arch s Biomech inable Engin	nitecture and Structural Design Bio-Inspired Robotics: Ex nanics in Sports Equipment Design Medical Devices Insp eering Solutions Based on Natural Models	amples ired by	of Soft F Biologic	Robots a al Syste	เnd ms
		TOTAL PE	RIODS		24	
		Course Outcomes				
At the	e end of the	course, the student will be able to				
CO1	Understand	and explain the relevance of biology to mechanical engine	ering.			
CO2	Apply ortho	paedics, biomechanics and the mechanical properties of bio	ological	systems	3.	
CO3	Relate cardi organisms.	ology, biomechanics of heart frunction and fluid dynamics	of blood	flow in l	oiologica	al
CO4	Utilize biolog	gical inspiration for the design of sensors and control syste	ms.			
CO5	Analyze rea	I-world case studies where biology and mechanical engine	ering int	ersect.		
TEXT	BOOKS					
1	Biomimicry:	Innovation Inspired by Nature, Janine M. Benyus, Harper G	Collins, 2	2009		
2	Biomechani	cs: Mechanical Properties of Living Tissues, Y. C. Fung, S	oringer I	New Yor	k, 2007	
REFE	RENCES					
1	Biological P Science, 20	hysics: Energy, Information, Life, Philip Nelson, Kevin Che 20	n, Sarina	a Bromb	erg, Chi	iliagon
2	Introduction Shu Chien,	to Bioengineering - Volume 2 of Advanced series in biome World Scientific, 2001	chanics	, Yuan-o	cheng F	ung,
3	Nature's Ma Press, 2017	chines: An Introduction to Organismal Biomechanics, Davi	d E. Ale	xander,	Academ	nic



	CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'														
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02 PS														
CO1	1	1	1	-	-	1	-	-	-	-	-	-	1	-	1
CO2	2	2	1	-	-	1	-	-	-	-	-	-	2	-	1
CO3	2	2	1	-	-	1	-	-	-	-	-	-	2	-	1
CO4	2	2	1	-	-	1	-	-	-	-	-	-	2	-	1
CO5	2	2	2	-	-	1	-	-	-	-	-	-	2	-	1
AVG	1.8	1.8	1.2	-	-	1	-	-	-	-	-	-	1.8	-	1



	0/EN201		L	Т	Р	С
04		FROI ESSIONAL ENGLISH	2	0	0	2
	1	Course Objectives				
1	To engage l	earners in meaningful language activities to improve their re	eading a	and writi	ng skills	
2	To enhance more effecti	learners' vocabulary with a focus on technical terms and e vely in both technical and professional contexts.	nabling	them to	commu	nicate
3	To master k communicat	ey grammar concepts and apply those concepts to produce ion	e clear a	ind corre	ect writte	n
4	To help lear	ners understand the purpose, audience, contexts of different	nt types	of writin	ıg.	
5	To demonst	rate an understanding of job applications and interviews for	interns	hip and	placeme	ents.
UNIT	1 APPLIED	LANGUAGE SKILLS		(6	
Read Writin Gram Voca	ing: Reading ng: Review \ mar: Tense bulary Deve	g user manuals, brochures, posters, pamphlets Vriting (Book Review and Movie Review) s, Prepositional phrases Iopment: Technical vocabulary (synonyms and antonyms)				
UNIT	2 PRACTIC	AL WRITING AND GRAMMAR SKILLS		(6	
Read Writii Gram Voca	ing: Reading ng: Writing ro nmar: Active bulary Deve	g longer technical texts esponse to a complaint letter and passive voice, Infinitives and Gerunds lopment: Sequence words, Misspelled words				
UNIT	3 PROFESS	SIONAL WRITING AND ANALYTICAL READING		e	6	
Read Writii Gram Voca	ing: Case S ng: Letter to mar: If Cond bulary Deve	tudies, Excerpts from literary texts, news reports etc. the Editor, Checklists ditionals, Articles lopment: Collocation, Cause and effect expression				
UNIT	4 DEVELOP	ING WRITING AND LANGUAGE SKILLS		(6	
Read Writii Gram Voca	ing: Reading ng: Essay wi imar: Repor bulary Deve	g for detailed comprehension, newspaper articles iting ed speech, Modals lopment: Conjunctions				
UNIT	5 LANGUA	GE SKILLS FOR CAREER SUCCESS		(6	
Read Writii Gram Voca	ing: Compaing: Job / Intennet: Ing: Job / Intennet: Relative Intennet:	ny profiles, Statement of purpose, an excerpt of interview w ernship application – Cover letter & Resume re Clauses, Numerical adjectives lopment: Single sentence definition	ith profe	essional	S	
		TOTAL PERIODS		3	0	
Cour	se Outcome	s				
At the	e end of the	course, the student will be able to				
CO1	Read and control information	omprehend various forms of technical and informational tex for application or analysis.	ts and e	extract th	ne neces	sary
CO2	Improve voo	abulary to articulate ideas clearly and effectively in profess	ional an	d acade	mic con	texts.
CO3	Use gramm	ar accurately in written communication.				
CO4	Demonstrat documents	e proficiency in writing clear, structured responses, reviews using appropriate tone, format, and language.	, essays	s, and pi	ofessior	nal
CO5	Create profe ensuring su	essional documents as well as communicate effectively in p ccess in job and internship applications.	rofessic	onal scei	narios,	



TEXT BOOKS

English for Engineers & Technologists Orient Black Swan Private Ltd. Department of English, Anna University, (2020 edition)

English for Science & Technology Cambridge University Press, 2021.

English for Science & Technology Cambridge University Press, 2021. Authored by Dr. Veena Selvam, Dr. Sujatha Priyadarshini, Dr. Deepa Mary Francis, Dr. KN. Shoba, and Dr. Lourdes Joevani, Department of English, Anna University.

REFERENCES

1. Raman. Meenakshi, Sharma. Sangeeta (2019). Professional English. Oxford university press. New Delhi.

2. Improve Your Writing ed. V.N. Arora and Laxmi Chandra, Oxford Univ. Press, 2001, New Delhi

3. Learning to Communicate – Dr. V. Chellammal. Allied Publishers, New Delhi, 2003

4. Business Correspondence and Report Writing by Prof. R.C. Sharma & Krishna Mohan, Tata McGraw Hill & Co. Ltd., 2001, New Delhi.

5. Developing Communication Skills by Krishna Mohan, Meera Bannerji- Macmillan India Ltd. 1990, Delhi.

			(3/2	2/1 ind Progra	licates	the st	CO- rength	• PO, P of cor) and	SO Ma relatio Progra	apping n) 3-Str	ong 2-N	ledium,	1-Weak	ζ.	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
CO2	-	<u> </u>													
CO3	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
CO4	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
CO5	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
AVG	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-



U24MA205	FOURIER SERIES, COMPLEX ANALYSIS AND CALCULUS	L 3	T 1	P 0	C 4				
Course Obje	ctives								
1	To introduce Fourier series analysis this is vital to many applications in engin from its use in solving boundary value problems.	eeri	ng a	apart					
2	To Understand the mathematical principles on transforms and partial differen would provide them the ability to formulate and solve some of the physical pro- engineering.	tial e oble	equ ems	ation of	S				
3	To acquaint the knowledge of Analytic functions and conformal mapping.								
4	To make the students to understand the methods of complex analysis be use solving the problems that occur in various branches of engineering disciplines	d fo 3.	or ef	ficien	ıtly				
5	To familiarize the students with Gradient, divergence and curl of a vector poir related identities	າt fu	ncti	on ar	าd				
UNIT 1 FOUF				9+3	}				
Dirichlet's cor Parseval's ide	nditions – General Fourier series – Half range series – Complex form of Fourie entity – Harmonic analysis.	r se	erie	s —					
UNIT 2 APPL	ICATION OF PARTIAL DIFFERENTIAL EQUATION			9+3	}				
Classification One dimension excluded).	of Partial Differential Equations - Fourier series solutions of one dimensional onal heat equation - Steady state solution of two dimensional heat equation (Ir	wav ısula	'e e ateo	quati d edg	on - es				
UNIT 3 ANAL	YTIC FUNCTIONS			9+3	}				
Analytic functions - Necessary and Sufficient conditions (excluding proofs) - Harmonic and orthogonal properties of analytic functions - Harmonic conjugate - Construction of analytic functions - Conformal mapping: w= z+c, cz, 1/z and bilinear transformation.									
UNIT 4 COM	PLEX FUNCTION			9+3	}				
Line integral - Singularities - Applications of	Cauchy's integral theorem - Cauchy's integral formula - Taylor's and Laurent Residues - Residue theorem - Application of residue theorem for evaluation of of circular contour and semicircular contour (with poles NOT on real axis).	s se of re	ərie: al i	s - ntegr	als -				
UNIT 5 VECT	OR CALCULUS			9+3	3				
Differentiation Volume Integ involving rect	o of vectors: Gradient, Divergence, Curl and Directional derivatives – Line, Sur rals - Statement of Green's, Gauss divergence and Stokes" theorem - Simple angular parallelepiped and cubes.	face app	e ar Nica	าd เtions					
	TOTAL PERIC	DS		60					
Course Outo	omes								
At the end of	the course, the student will be able to								
CO1	Evaluate Fourier series of periodic Functions								
CO2	Apply the method of separation of variables to find the solution of heat and w	ave	equ	Jatior	าร				
CO3	CO3 Identify and construct analytic function and application of conformal mapping.								
CO4	Apply complex integration to evaluate contour integrals.								
CO5	Estimate vector identities and interpret some integral theorems in a vector fie	ld							
TEXT BOOK	S								
1. Grewal.B.S	B. Higher Engineering Mathematics, 45th Edition, Khanna Publications, Delhi,	202	0.						
2. Erwin Krey	szig, Advanced Engineering Mathematics, 10th Edition, Wiley India, 2017.								
3.Won Y.Yang Mathematics	, Young K.Choi,Jaekwon Kim,Man Cheol Kim, H.Jin Kim,Taeho Im, ""Enginee with MATLAB"" CRC Press Publishers , Ist Edition , 2017	ring							



REFERENCES

1. Bali.N.P. and Manish Goyal, A Textbook of Engineering Mathematics, 10th Edition, Laxmi Publications Private Limited, 2018.

2. Jain.R.K. and Iyengar.S.R.K., Advanced Engineering Mathematics, 5th Edition, Narosa Publishing House Private Limited, 2016

3. Ramana B.V, Higher Engineering Mathematics, Tata Mc-Graw Hill Publishing Company, New Delhi, 2017.

4. Michael D .Greenberg, Advanced Engineering Mathematics, 2nd Edition, Pearson Education, 2021.

			(3/2	2/1 ind Progra	icates m Out	the st	CO/ rength	PO, P of cor	SO Ma relatio Progra	apping on) 3-Str	ong 2-N	/ledium, comes l	1-Weał PSOs'	¢	
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO2	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO3	3	3	2	1	-	-	-	-	-	-	-	-	1	-	-
CO4	3	2	2	1	-	-	-	-	-	-	-	-	1	-	-
CO5	3	2	2	1	-	-	-	-	-	-	-	-	1	-	-
AVG	3	2	2	1	-	-	-	-	-	-	-	-	1	-	-



U24PH205	PHYSICS FOR MECHANICAL ENGINEERING II	L 3	Т 0	P 0	C 3					
Course Objec	tives	•	-	-						
1	Instill knowledge about the laws of gravity and gravitational force, as descri Newton's law of universal gravitation.	bed	by Is	aac						
2	Provide learners with a comprehensive understanding of statics, including e forces, and moments acting on bodies at rest.	equil	ibriu	m,						
3	Introduce learners to the concept of rigid bodies and their mechanical proper mass distribution, center of gravity, and moments of inertia	erties	s, su	ch a	S					
4	Provide learners with insights into the fundamental laws governing linear m Newton's laws of motion.	otior	n, inc	ludir	ıg					
5	Enable learners to identify and apply the mechanical properties of materials field or domain.	s rele	evan	t to t	heir					
UNIT 1 GRAV	ITATION			9						
Newton's law o altitude, depth potential – Gra	of gravitation – Mass and density of earth – Acceleration due to gravity – Va and rotation of earth - Value of g at poles and equator. Gravitational field – avitational potential due to spherical shell	riatio Grav	on of /itati	g wi onal	th					
UNIT 2 DYNA	MICS OF SYSTEM OF PARTICLES			9						
Multiparticle dy momentum of collision-kinetic	ynamics: Center of mass (CM) – CM of continuous bodies – motion of the C the system– law of conservation of linear momentum –Collision – Elastic an c energy of system of particles. Newton's second law,-d'Alembert's principle	M - I d in	inea elas	r tic						
UNIT3 KINET	ICS OF RIGID BODY			9						
Dynamics of rigid body - Centre of gravity-Moment of inertia – Theorems of perpendicular and parallel axes , MI of flywheel, angular velocity, angular momentum and K.E of rotation – – rotational dynamics of rigid bodies – conservation of angular momentum – rotational energy state of a rigid diatomic .Torque and angular acceleration – Relation between them – Expression for a acceleration of a body rolling down an inclined body without slipping.										
UNIT4 LAWS	OF LINEAR MOTION			9						
Newton's laws Newton's law o impact betwee velocities of th	of motion – Force, Forces in 1d,2d- Impulse of a force - – (Fundamental law of impact – coefficient of restitution – Impact of a smooth sphere on a fixed p on two smooth spheres – Oblique impact between two smooth spheres – Ca e spheres – Loss of K.E due to impact.	vs of plane Icula	f imp e – D ation	act) 9irect of fir	– : nal					
UNIT 5 MECH	ANICAL PROPERTIES AND DEFORMATION MECHANISMS			9						
Mechanisms of tension, comp	of plastic deformation, slip and twinning – Types of fracture – Testing of mate ression and shear loads – Hardness tests (Brinell, Vickers and Rockwell), ha and charpy, fatigue and creep failure mechanisms-application(impact test	erials ardn)	s unc ess t	ler ests	,					
Course Outco	omes									
At the end of	At the end of the course, the student will be able to									
CO1 Gain insights into gravitational fields and their applications in engineering problems										
CO2	O2 Gain a foundational understanding of static forces, including concepts such as Newton's laws of motion, equilibrium, and the calculation of forces acting on stationary objects.									
CO3	Learn to calculate and analyze dynamic forces exerted on rigid bodies in m	otior	۱.							
CO4	Acquire knowledge on the principles governing motion and the forces acting including concepts such as velocity, acceleration, and the laws of motion.	g on	bodi	es,						
CO5	CO5 Gain insight into the elastic properties of materials, including elasticity, stiffness, and resilience.									



TEXT	BOO	BOOKS													
1. Me	chanic	s: D.S	. Math	ur S. C	Chand	& Co,	Editio	n 2020)						
2. Ele	ments	of pro	perties	s of ma	itter –	D.S. N	1athur	– S. C	hand	& Co., 2	8008				
3.Eng	ineerir	ng mec	hanics	s : Sha	nkara	Subra	mania	ın G ar	nd Raj	asekara	n S				
4. Pro	perties	s of ma	atter –	R. Mu	rugesa	an – S	. Char	nd & Co	o., 200)4.					
REFE	RENC	ES													
1. Fur	ndame	ntal of	Physic	cs, D. I	Hallida	ary , Re	esnick	and J	Walke	er, 6th E	dition, V	Viley, N	ew York	2001	
2. Pro	perties	s of ma	atter –	Brijlal	and S	ubram	anian	S. Cha	and &	Co., 200)6.				
3. Phy	siscs ·	– Volu	me 1 8	& 2, Pa	aul A. T	Tipler (CBS, (Indian	Editio	n), 2004	1				
4.Mec	4.Mechanics Part I and Part II, Narayanamoorthy National Publishing Company, 2001														
	CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	2	-	-	-	-	-	-	-	-	1	2	-	
CO2	3	2	2	-	-	-	-	-	-	-	-	1	2	-	
CO3	3	2	2	-	-	-	-	-	-	-	-	1	2	-	
CO4	3	2	2	-	-	-	-	-	-	-	-	1	2	-	
CO5	3	2	2	-	-	-	-	-	-	-	-	1	2	-	
AVG	3	2	2	-	-	-	-	-	-	-	-	1	2	-	



U24CY201	GREEN AND SUSTAINABLE CHEMISTRY	L 2	T	P	C 2			
Course Objectives		2	U	0	-			
1	To give the basic knowledge on role of chemistry to mitigate env global challenges.	iron	mer	ital :	and			
2	To understand the global climatic change and the necessity for the preservation of ecosystem.	he						
3	To become familiar with the safe design of synthesis and to mini generation of hazardous substances.	mize	e the	;				
4	To understand the need of various energy resources for sustaina development.	able						
5	To integrate the chemistry with environment, technology and put	olic ł	neal	th.				
UNIT 1 ROLE OF CHEMIS DEVELOPMENT	TRY - CURRENT CHALLENGES FOR SUSTAINABLE			(6			
Role of chemistry in address Nexus among biosphere en conservation of bio-diversity goals(SDG),clean developm	sing the challenges for sustainable development and solving glob nvironment, human and animal health. Introduction to bio-diversity y. Millenium development goals (MDG) and sustainable development ment mechanism(CDM).	oal is ∕-thr nent	ssue eats	⊮s. ≩an	ıd			
UNIT 2 SUSTAINABLE EN	IVIRONMENTAL CHEMISTRY			(6			
Climate change – greenhou layer depletion, Elnino and environmental protection, c corals, mangroves, wetland	use effect - gobal warming - sea level rise - intrusion and inundati LaNina – carbon credits, carbon trading, carbon foot print, legal p oastal zone management-soft and hard measures, Ecosystem – Is, sand dunes etc.	on, o provi estu	ozor isior ıarie	าe า for es -	r			
UNIT 3 PRINCIPLES OF S	USTAINABLE GREEN CHEMISTRY			(6			
Sources, reactions and effe Hazards-Design of green p Organic Insecticides – Cark gel,rotenone- synthesis pro and improved product perfo	ect of chemicals in environments – Factory effluent and treatment esticides for agriculture Introduction to Biocides: types and appl pamates, Chlorinated hydrocarbons, cypermithrin, Pyrethrin,silica perties and practical applicationsreduction of toxicity, improved prmance.	, Ha icati l rec	ndli ons yclir	ng מ י וg	of			
UNIT 4 SUSTAINABLE EN	IERGY				6			
Present energy challenges heater-solar heat collector a disadvantages-applications Geothermal energy – Produ	and the possible energy solutions - Solar energy- Solar Panel-So and applications- Wind energy- Types – production - advantages . Nuclear energy – production - advantages and disadvantages- uction and applications – Bio fuels.	olar v and appl	wate licat	∍r ions	5.			
UNIT 5 GOOD HEALTH AI	ND WELL BEING -WATER-SOIL-AIR			(6			
Ground water contamination and contamination of water bodies. The role of chemistry in developing appropriate technological solutions for water treatment using Electrodialysis, Forward osmosis and advanced oxidation using photocatalysis and waste water treatment. Reclamation of soil. Current air pollution situation and trends. Factors responsible for air pollution. Air pollution assessment, monitoring mitigation.								



Course Outcomes															
At the	e end o	of the	cours	e, the	studen	t will k	be able	e to							
	CO1		Ur ch	ndersta iemistr	and the y.	e abilit	y to fa	ce the	currer	nt challe	nges ac	ross glo	be with	the aid c	of
	CO2	2	Ide	entify t	he clin	natic c	hallen	ges ar	nd to c	ontribute	e for sus	stainable	e transfo	rmation.	
	CO3	5	Ur	ndersta	and the	e safe	desigr	n of pro	oducts	with the	e princip	les of gi	reen che	emistry.	
	CO4	Ļ	Ur	ndersta	and to	analyz	ze the	energy	/ challe	enges fo	or sustai	nable re	source	manage	ment.
	CO5	5	Int	tegrate	e chem	istry v	vith en	vironm	nental	science	and put	olic heal	th.		
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produ	icts:Gl	obal r	ecom	menda	e and itions a	and im		entation	n in US	SEtox"Th	ne interr	national	iournal o	of life cv	cle
asse	ssmen	t,26.5	(2021):899-9	915.								Je ee		
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Ltd. 2	2013.														
			(- (- ()				CO/P	O, PSC	О Мар	ping					
			(3/2/1 Progr	indica	ates th	e strei mes (l	ngth of POs) a	t correl	lation) Darami	3-Stron	g 2-Mec	dium, 1-\ comes l	Weak PSOs'		
	PO1	P02	PO3	PO4	P05	PO6	P07	PO8	PO9	PO10	PO11	PO12	PS01	PSO2	PSO3
CO1	3		1	-	1	1	2	2	1	2	-	3	-	-	
CO2	3	1	1	-	1	1	3	1	2	2	-	2	-	_	-
CO3	3	1	1	-	1	. 1	2	1	2	2	-	2	-	_	-
CO4	3	_	1	-	2	2	3	2	2	2	-	3	-	-	-
CO5	3	1	1	-	2	2	3	2	1	2	-	3	-	-	-
AVG	3	1	1	-	1.4	1.4	2.6	1.6	1.6	2	-	2.6	-	-	-
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	U24TA201	தமிழரும் தொழில்நுட்பமும் /TAMILS AND TECHNOLOGY	L 1	Т 0	P 0	C 1			
芽ங்க காலத்தில் நெசவுத் தொழில் - பானைத் தொழில்துட்பம் - கருப்பு சிவப்பு பாண்டங்கள் - பாண்டங்களில் கீறல் குறியிடுகள் Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries. 3 அல்கு II வடிவமைப்பு மற்றும் கட்டிடக் தொழில்துட்பம்: UNIT II DESIGN AND CONSTRUCTION TECHNOLOGY 3 சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் மற்றும் பிற வழிபாட்டுத் தலங்கன் கோவில்களும் - சோழர் காலத்துப் பெருங்கோவில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கன் - நாயக்கர் கால கோவில்கள் - மாதிரி கட்டமைப்புகள் பற்று அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாடு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சரோசெனிக் கட்டிடக் கலை Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple) - Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period. 3 ஆல்து III உற்பத்தித் தொழில் தட்டம் 3 பல் கன் - களைவிகல் - இரும்புத் தொழிற்சாலை - இரும்பை கன் கன் தான்றுகள் - செறுவன்கள் - சங்கு மணிகள் - எலும்புத் தன்லலியல் சான்றுகள் - சிலப்புதிகாரத்தில் மணிகளின் வகைகள் Att of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads - G	அலகு I நெசவு ப UNIT I WEAVING	ற்றும் பானைத் தொழில்நுட்பம்: AND CERAMIC TECHNOLOGY		<u> </u>	3	•			
Weaving Industry during Sangam Age – Ceramic technology – Black and Red Ware Potteries (BRW) – Graffiti on Potteries. 3 Appleted Inductor Intercestion 3 Appleted Intercestion 3 Primes annozásio auquamouciu u pópujú aci (purmaritasán & ertias annozásio auquamouciu) – ertias annozásio aci (purmaritasán e transozásio auquamouciu) – ertias annozásio aci (purmaritasán e un unavio) 3 Primes annozásio auquamouciu – ertias annozásio aci (purmaritasán e unavio) annot (purmaritasán e unavio) 3 Primes annozásio - Gerupi annozásio u (purmaritasán e unavio) annozásio (purmaritasán e unavio) 3 Annozásio - Gerupi annozásio u (purmaritasán e unavio) annozásio (purmaritasán e unavio) 3 Annozásio - Gerupi annozásio u (purmaritasán e unavio) Annozásio (purmaritasán e unavio) 3 Annozásio - Gerupi and Structural construction House & Designs in household materials during Sangam Age - 3 Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - 3 Sculptures and Temples of Mamallapurman - Great Temples of Cholas and other worship places - Temples 4 Alouse Brido	சங்க காலத்தில் பாண்டங்கள் - ப) நெசவுத் தொழில் - பானைத் தொழில்நுட்பம் - கருப்பு சிவப்பு பாண்டங்களில் கீறல் குறியிடுகள்							
அலகு II வடிவமைப்பு மற்றும் கட்டிடக் தொழில்துட்பம்: 3 பார II DESIGN AND CONSTRUCTION TECHNOLOGY 5 சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் 6 பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - 6 சிங்க காலத்தில் மடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், 6 லில்களும் - சோழர் காலத்தில் பெருங்கோவில்கள் மற்றிய பிற வழிபாட்டுத் தலங்கன - - நாயக்கர் கால கோவில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்சி அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாடு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தா-சரோசெனிக் கட்டிடக் கலை Designing and Structural construction House & Designs in household materials during Sangam Age - 8 Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - 1 Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple) - Thirumalai Nayakar Mahal - Chetti Nadu 1 Houses, Indo - Saracenic architecture at Madras during British Period. 3 ஆல்கு பி கலை - உலோகவியல் - இரும்புத் தொழிற்ச்சாலை - இரும்பை உருகள், கண்ணாடி மணிகள் - சிலம் விகள் - சங்கு மணிகள் - எலும்றிகள், கன் கள் கண்ணை கள் - கல்மணிகள், கண்ணாடி மணிகள் - சிலம் மணிகள் - சங்கு மணிகள் - எலும்றிகள் - வறும்றிகள், கன் வரைகள் - கிருமன் மணிகள் - சங்கு மணிகள் - எலும்றிகள், கண்ணாடி மணிகள் - சிலம்னிகள் - சங்கு மணிகள் - வரும்றிகள் - வெதுமனிகள் -	Weaving Industry of Graffiti on Potteries	Juring Sangam Age – Ceramic technology – Black and Red Ware Potteries	s (B	RW)	—				
சங்க காலத்தில் வடிவமைப்பு மற்றும் கட்டுமானங்கள் & சங்க காலத்தில் வீட்டுப் பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லும் - லில் பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களும், கோவில்களும் - சோழர் காலத்துப் பெருங்கோவில்கள் மற்றும் பிற வழிபாட்டுத் தலங்கள் - நாயக்கர் கால கோவில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீனாட்டு அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாடு வீடுகள் - பிரிட்டிஷ் காலத்தில் சென்னையில் இந்தோ-சரோசெனிக் கட்டிடக் கலை Designing and Structural construction House & Designs in household materials during Sangam Age - Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathikaram - Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - Temples of Nayaka Period - Type study (Madurai Meenakshi Temple) - Thirumalai Nayakar Mahal - Chetti Nadu Houses, Indo - Saracenic architecture at Madras during British Period. அல்கு III உற்பத்தித் தொழில் நட்டம் : 3 UNIT III MANUFACTURING TECHNOLOGY 3 கண்ணாடி மணிகள் - சிலம் இன்றுவாக்கும் தொழிற்சாலை - இரும்மை 3 வனிகள் - சிலமன் மணிகள் - சங்கு மணிகள் - வையன்கள் - தொல்லியல் சான்றுகள் - கிலமணிகள் - தொல்லியல் சான்றுகள் - கிலமனிகள் - சங்கு மணிகள் - வலமனிகள் - கல்மணிகள் - கல்மணிகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகள் - வுனிகள் - வலக்கள் Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting,	அலகு II ഖடிഖன UNIT II DESIGN A	மப்பு மற்றும் கட்டிடக் தொழில்நுட்பம்: ND CONSTRUCTION TECHNOLOGY			3				
அலகு III உற்பத்தித் தொழில் நட்பம் : UNIT III MANUFACTURING TECHNOLOGY3கப்பல் கட்டும் கலை - உலோகவியல் - இரும்புத் தொழிற்ச்சாலை - இரும்பை உருகுக்குதல், எஃகு - வரலாற்றுச் சான்றுகளாக செம்பு மற்றும் தங்க நாணயங்கள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள் - நாணயங்கள் அச்சடித்தல் - மணி உருவாக்கும் தொழிற்சாலைகள் - கல்மணிகள் , கண்ணாடி மணிகள் - சுடுமண் மணிகள் - சங்கு மணிகள் - எலும்புத்துண்டுகள் - தொல்லியல் சான்றுகள் - சிலப்பதிகாரத்தில் மணிகளின் வகைகள்Art of Ship Building - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and gold- Coins as source of history - Minting of Coins – Beads making-industries Stone beads -Glass beads - Terracotta beads -Shell beads/ bone beats - Archeological evidences - Gem stone types described in Silappathikaram.3அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நட்பம்: UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY3அனை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித் தாம்பின் முக்கியத்துவம் - கால்நடை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மேனால் முத்துல் வளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீன் வனுக்கம் - மன்றைய் மன்றைக்கது - மன்றைகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்த் செயல்பாடுகள் - கடல்சார் அறிவு - மீத்துன் - மன்றையி மன்றிக்கு - மன்றைக்கது - மன்றைகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீத்து - கால்நடை கள் கள் - தல் தல் - மன்றல் கள் - தல் தல் - மன்றையி - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - மீத்து - கால்நடை என்றையி மன்றைகள் - கடல்சார் அறிவு - வீத்து - மன்றல் மன்றன் - கடல்சார் அறிவு - மீத்து - கால்நடைகள் கள் - வைற்றல் மன்றல் - கைன்றன் - கடல்சால - வைன்றல் - கைன்றன் - கைன்றல் - கைல் - வைன்றல் - கைன்றல் - கைன்றன் - கைல் - கைல் - கைல் - வைன்னை - கைல் - வைக்கள் - வைல் - கைல்சால - வைல் - கைல்சால்	பொருட்களில் வடிவமைப்பு - சங்க காலத்தில் கட்டுமான பொருட்களும் நடுகல்லு சிலப்பதிகாரத்தில் மேடை அமைப்பு பற்றிய விவரங்கள் - மாமல்லபுரச் சிற்பங்களு கோவில்களும் - சோழர் காலத்துப் பெருங்கோவில்கள் மற்றும் பிற வழிபாட்டுத் த - நாயக்கர் கால கோவில்கள் - மாதிரி கட்டமைப்புகள் பற்றி அறிதல், மதுரை மீன அம்மன் ஆலயம் மற்றும் திருமலை நாயக்கர் மஹால் - செட்டிநாடு வீடுகள் - பிரிட காலத்தில் சென்னையில் இந்தோ-சரோசெனிக் கட்டிடக் கலை Designing and Structural construction House & Designs in household materials during Sangam Ag Building materials and Hero stones of Sangam age – Details of Stage Constructions in Silappathil Sculptures and Temples of Mamallapuram - Great Temples of Cholas and other worship places - of Nayaka Period - Type study (Madurai Meenakshi Temple)- Thirumalai Nayakar Mahal - Chetti N Houses, Indo - Saracenic architecture at Madras during British Period.								
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அலகு IV வேளாண்மை மற்றும் நீர்ப்பாசனத் தொழில் நட்பம்: UNIT IV AGRICULTURE AND IRRIGATION TECHNOLOGY 3 அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித் தாம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு -	Art of Ship Building source of history - beads -Shell beads Silappathikaram.	J - Metallurgical studies - Iron industry - Iron smelting, steel -Copper and go Minting of Coins – Beads making-industries Stone beads -Glass beads - T s/ bone beats - Archeological evidences - Gem stone types described in	old- erra	Coir	ns a a	IS			
அணை, ஏரி, குளங்கள், மதகு - சோழர்காலக் குமிழித் தூம்பின் முக்கியத்துவம் - கால்நடை பராமரிப்பு - கால்நடைகளுக்காக வடிவமைக்கப்பட்ட கிணறுகள் - வேளாண்மை மற்றும் வேளாண்மைச் சார்ந்த செயல்பாடுகள் - கடல்சார் அறிவு - யீன்வனம் - முக்குமற்றும் முக்குக்கு விக்கல் - பெருக்குமற்று விக்கு பண்ணைய வரிவ	அலகு IV வேளால UNIT IV AGRICUL	ண்மை மற்றும் நீர்ப்பாசனத் தொழில் நுட்பம்: TURE AND IRRIGATION TECHNOLOGY			3				
மல்லையை - முத்து மற்றும் முத்துக்குள்துதல் - பெருங்கடல் குறுத்த பண்டைய அறிவு - அறிவுசார் சமூகம் Dam, Tank, ponds, Sluice, Significance of Kumizhi Thoompu of Chola Period, Animal Husbandry - Wells designed for cattle use - Agriculture and Agro Processing - Knowledge of Sea - Fisheries – Pearl - Conch	he								



அலகு V அறிவியல் தமிழ் மற்றும் கணித்தமிழ் : UNIT V SCIENTIFIC TAMIL & TAMIL COMPUTING	3						
அறிவியல் தமிழின் வளர்ச்சி - கணித்தமிழ் வளர்ச்சி - தமிழ் நூல்களை மின்பதிட் செய்தல் - தமிழ் மென்பொருட்கள் உருவாக்கம் - தமிழ் இனையக் கல்விக்கழகம் மின் நூலகம் - இணையத்தில் தமிழ் அகராதிகள் - சொற்குவைத் திட்டம்	பு - தமிழ்						
Development of Scientific Tamil - Tamil computing – Digitalization of Tamil Books – Developmer Software – Tamil Virtual Academy – Tamil Digital Library – Online Tamil Dictionaries – Sorkuvai	t of Tamil Project.						
TOTAL PERIODS	15						
TEXT BOOKS							
1. தமிழக வரலாறு - மக்களும் பண்பாடும் - கே. கே. பிள்ளை (வெளியீடு: தமிழ்நா பாடநூல் மற்றும் கல்வியியல் பணிகள் கழகம்)	Ъ						
2. கணினித் தமிழ் - முனைவர் இல. சுந்தரம் (விகடன் பிரசுரம்)							
3. கீழடி - வைகை நதிக்கரையில் சங்ககால நகர நாகரிகம் (தொல்லியல் துறை வெளியீடு)							
4. பொருநை - ஆற்றங்கரை நாகரிகம் (தொல்லியல் துறை வெளியீடு)							
5. Social Life of Tamils (Dr.K.K.Pillay) A joint publication of TNTB & ESC and RMRL – (in print)							
6. Social Life of the Tamils - The Classical Period (Dr.S.Singaravelu) (Published by: Internationa Tamil Studies	Institute of						
7. Historical Heritage of the Tamils (Dr.S.V.Subatamanian, Dr.K.D. Thirunavukkarasu) (Publisher International Institute of Tamil Studies)	d by:						
8. The Contributions of the Tamils to Indian Culture (Dr.M.Valarmathi) (Published by: Internation of Tamil Studies)	al Institute						
9. Keeladi - 'Sangam City C ivilization on the banks of river Vaigai' (Jointly Published by:DepartmofArchaeology & Tamil Nadu Text Book and Educational Services Corporation, Tamil Nadu)Stud History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Published by: The Author)	ient lies in the						
10. Studies in the History of India with Special Reference to Tamil Nadu (Dr.K.K.Pillay) (Publishe Author)	d by: The						
11. Porunai Civilization (Jointly Published by: Department of Archaeology & Tamil Nadu Text Bo Educational Services Corporation, Tamil Nadu)	ok and						
12. Journey of Civilization Indus to Vaigai (R.Balakrishnan) (Published by: RMRL) - Reference E	Book.						



112	405201		L	Т	Р	С						
02	403201	FITTON FROGRAMMING	3	-	3	4.5						
Cour	se Objective											
1	To understa	and the basics of python programming .										
2		yunon functions and sunnys.		lata								
3 1	To porform	file operations in Python	inplex o	iala.								
5	To learn & i	ise python libraries										
					9 + 9							
Pytho	n interpreter	and interactive mode, debugging; values and types; int floa	it boole	an strin	and I	ist [.]						
variat	oles, express	ions, statements, tuple assignment, precedence of operator	s. comm	nents: II	lustrativ	e						
progra	ams: circulat	e the values of n variables, distance between two points.	-,	,		-						
Pract	icals:	, i i										
1.Imp	lement a pyt	hon program to print an Electricity Bill .(for domestic usage.)										
2.Implement a Python program to exchange the values of two variables. (using simple statements and												
expre	ssions)											
UNIT	2 CONTRO	DL FLOW, FUNCTIONS, STRINGS			9 + 9							
Cond	itionals: Bool	ean values and operators, conditional (if), alternative (if-else	e),chaine	ed cond	itional (i	f-elif-						
else);	Jise); iteration: state, while, for, break, continue, pass; Fruitful functions, return values, parameters, local and Jobal scope, function composition, Lambda functions, recursion; Strings: string slices, immutability, string											
globa	I scope, func	tion composition, Lambda functions, recursion; Strings: string	g slices,	immuta	ibility, st	ring						
TUNCT	ons and met	nods, string module; illustrative programs: square root, sum	of indivi	duai dig	jits of a							
Pract	icale:											
Practicals: 1.Implement a Python program to print a Number series & Number Patterns.(using Iterative loops).												
1.Implement a Python program to print a Number series & Number Patterns.(using Iterative loops).												
2. Implement a Python program to find Factorial and largest number in a list(using Functions.).												
3. Implement a Python program to perform operations on strings like string reverse, string concatenation & substring . (use switch case).												
UNIT 3 - LISTS, TUPLES, DICTIONARIES 9 + 9												
Lists:	list operation	ns, list slices, list methods, list loop, mutability, aliasing, cloni	ing lists,	list para	ameters	;						
Tuple	s: tuple assię	gnment, tuple as return value; Dictionaries: operations and n	nethods;	; advano	ced list							
proce	ssing - list co	omprehension; Illustrative programs:Students marks stateme	ent,Linea	ar Searc	ch, Bina	ry						
Searc	sh.											
Pract	icals:		.		``							
1.Imp	lement a Pyt	non program using Lists & Tuples. (operations of list & tuple	S - BOOM		gue)							
2.imp	iement a Pyt	non program using Sets, Dictionaries. (operations of Sets -	Produc	t Categ	ories,							
					0 + 0							
Files	and excention	ns: text files reading and writing files format operator: com	mand lin	e araun	nents e	rrors						
and e	and exceptions has	andling exceptions modules packages Python Itertools & fi	unctools	module	nenis, e 29 Illust	rative						
progra	ams: Marks i	ange validation.		modul		laire						
Pract	icals:											
1.Imp	lement a Pyt	hon program to perform file operations (copy from one file to	anothe	r, word	count,							
longe	st word).											
2.Implement a Python program to handle Exceptions.(voter's age validity).												
UNIT	5 LIBRARI	ES,PACKAGES			9 + 9							
Pytho	n libraries - l	NumPy -Array manipulations, numeric ranges, Slicing, index	ing, Sea	rching,	Sorting,	, and						
splittir	ng, Pandas -	Data Analysis, Data-frame, Data selection, group-by, Series	s, sorting	g, searc	hing, ar	id also						
statis	ucs, aask (pa	andas wrapper) ,ivialplotlib- Data visualization , Line plot, Sty	ne prope	erues, m	iuiu iine	piot,						
Scalle Dract	scatter plot											
1 Imn	1. Implement a Python program to create a weather data chart using Python Standard Libraries (pandas,											
numn	v. Matolotlih	SCIDV).			o (panu	u0,						
	<u>,</u>	TOTAL PER	RIODS		90							

TOTAL PERIODS	
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Cours	se Ou	tcome	s												
At the	e end	of the	cours	e, the	stude	nt will	be ab	le to							
CO 1	l D	evelop	and ex	xecute	simple	e Pytho	on pro	grams							
CO2	2 Le	earn to	handle	e string	js and	functio	ons in	python).						
COS	B R	eprese	nt com	npound	l data (using F	Python	lists, t	uples,	dictiona	aries				
CO4	R	ead an	d write	e data f	rom/to	files i	n Pyth	on pro	grams						
COS	i P	erform	basic	operati	ons us	sing py	thon L	.ibrarie	S						
TEXT	BOO	KS													
1. Allen B. Downey, "Think Python: How to Think like a Computer Scientist", 2nd Edition, O'Reilly															
Publishers, 2016.															
2.Karl Beecher, "Computational Thinking: A Beginner's Guide to Problem Solving and Programming", 1st Edition BCS															
1 Paul Deitel and Harvey Deitel "Python for Programmers" Pearson Education 1st Edition 2021															
1. Paul Deitel and Harvey Deitel, "Python for Programmers", Pearson Education, 1st Edition, 2021															
2. G Venkatesh and Madhavan Mukund, "Computational Thinking: A Primer for Programmers and Data															
Scientists", 1st Edition, Notion															
S. JUI Comr	3. John V Guttag, "Introduction to Computation and Programming Using Python: With Applications to Computational Modeling														
4 Fric	Matth	es "P	/thon (Crash (Course	AHa	nds -	on Pro	iect Ba	ased Int	roductic	on to Pro	ogramm	ina"2n	d
Editio	n, No	Starch	Press	, 2019.		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,			J001 D1				granni		a
5.Mar	tin C.	Brown,	"Pythe	on: The	e Com	plete F	Refere	nce", 4	th Edit	tion, Mc	-Graw H	- Hill, 201	8.		
						<u>.</u>	CO/F	PO, PS	SO Ma	oping					
			(3/2	2/1 indi	cates	the stro	ength	of corre	elation) 3-Stro	ng 2-Me	edium, '	1-Weak		
		1	Proç	gramm	e Outo	comes	(POs)	and P	rogran	nme Sp	ecific O	utcome	s PSOs'		
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	2	-	-	-
CO3	2	-	2	2	-	-	-	-	-	-	-	2	-	-	-
CO4	2	3	2	2	-	-	-	-	2	1	1	2	-	-	-
CO5	2	3	2	2	2	1	1	1	2	1	1	2	-	-	-
AVG	2	3	2	2	2	1	1	1	2	1	1	2	-	-	-



U24CE205	ENGINEERING GRAPHICS FOR MECHANICAL ENGINEERING	L	Т	Ρ	С							
		3	0	2	4							
Course Obj	ectives											
CO1	To learn the construction of engineering curves and projection techniques conic curves, points, and lines.	s for cor	struc	ting								
CO2	To understand the techniques for projecting and visualizing surfaces and orientations.	solids ir	n vari	ous								
CO3	To determine the true shape of sectioned solids and develop their lateral	surface	s.									
CO4	To develop skills in 3D projection and perspective projection techniques f	or simp	le sol	ids.								
CO5	To explore advanced 3D modeling techniques in Autodesk Fusion 360 fo and manufacturing applications.	r comple	ex mo	odels								
UNIT 1 PLA	NE CURVES, PROJECTION OF POINTS AND LINES		6 + 9	9								
Basic Geometrical constructions, Curves used in engineering practices: Conics — Construction of ellipse, parabola and hyperbola by eccentricity method. Orthographic projection- principles-Principal planes-First angle projection-projection of points and straight lines inclined to both the principal planes.												
UNIT 2 PLA	UNIT 2 PLANE SURFACE AND PROJECTION OF SOLIDS 6 + 9											
Projection of planes inclined to both the principal planes Projection of simple solids like prisms, pyramids, cylinder, and cone. When the axis is inclined to one of the principal planes and parallel to the other by rotating object method.												
UNIT 3 PRO LATERAL S	UNIT 3 PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF LATERAL SURFACES 6 + 9											
Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other —obtaining true shape of section. Development of lateral surfaces of simple and sectioned solids — Prisms, pyramids cylinders and cones.												
UNIT 4 ISOI	METRIC AND PERSPECTIVE PROJECTION		6 + 9	9								
Principles of sketching of pyramids an	isometric projection — isometric scale — isometric projections of simple multiple views from pictorial views of objects. Perspective projection of sir d cylinders by visual ray method.	solids - I nple sol	Freeh ids-P	and rism	З,							
UNIT 5 FUN	DAMENTALS OF ADVANCED 3D MODELING TECHNIQUES		6 + 9)								
Fundamenta Basics of cre modeling tee	als of advanced modeling techniques in 3D Modeling Software (Autodeske eating complex 3D models using multiple tools and techniques - Applicatic chniques in various industries - Exporting 3D models for prototyping and m	Fusion Ins of action	3600 dvanc turing	®) - ed 3	D							
	TOTAL PE	RIODS		75								
Course Out	comes											
At the end	of the course, the student will be able to											
CO1 Understand various concepts like dimensioning, conventions and standards related to Engineering Drawing to construct Conic curves, Projection of Points & straight lines.												
CO2	CO2 Impart knowledge on the projection of plane surfaces and Rolling solids.											
CO3	CO3 Improve the visualization skills for better understanding of Section of solids and Developments of surfaces											
CO4	Develop the imaginative skills of the students required to understand Isor Orthographics projections-Freehand sketching	netric pi	oject	ion o	f&							
CO5	CO5 Explore advanced 3D modeling techniques in Autodesk Fusion 360 for complex models and manufacturing applications.											



TEXT BOOKS

Bhatt N.D. and Panchal V.M., "Engineering Drawing", Charotar Publishing House, 53 Edition, 2019.

Natrajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2018.

Parthasarathy, N. S. and Vela Murali, "Engineering Drawing", Oxford University Press, 2015

Autodesk Fusion 360: A Power Guide for Beginners and Intermediate Users by John Willis, Sandeep Dogra, and Cadartifex, 4e, CADArtifex

REFERENCES

Basant Agarwal and Agarwal C.M., "Engineering Drawing", McGraw Hill, 2nd Edition, 2019.

Gopalakrishna K.R., "Engineering Drawing" (Vol. I&II combined), Subhas Publications, Bangalore, 27th Edition, 2017.

Luzzader, Warren.J. and Duff, John M., "Fundamentals of Engineering Drawing with an introduction to Interactive Computer Graphics for Design and Production, Eastern Economy Edition, Prentice Hall of India Pvt. Ltd, New Delhi, 2005.

Parthasarathy N. S. and Vela Murali, "Engineering Graphics", Oxford University, Press, New Delhi, 2015.

Shah M.B. and Rana B.C., "Engineering Drawing", Pearson Education India, 2nd Edition, 2009.

Venugopal K. and Prabhu Raja V., "Engineering Graphics", New Age International (P) Ltd, 2008.

Autodesk Fusion 360 For Beginners: Part Modeling, Assemblies, and Drawings – Tutorial Book

	CO-PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'														
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3													
CO1	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO2	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO3	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO4	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
CO5	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-
AVG	3	1	2	-	2	-	-	-	-	3	-	2	2	2	-



		L	Т	Р	С
		0	0	4	2
Course Ob	jectives				
The main le	arning objective of this course is to provide hands on	training to	the studen	ts in:	
1	Draw pipe line plan; layout and connect various pipe plumbing work	e fittings use	ed in comm	on househ	old
2	To make wood joints commonly used in household v	wood.			
3	To make various electrical connections in typical how	usehold ele	ctrical wirir	ig installatio	ons.
4	Weld various joints in steel plates using arc welding like turning, drilling, tapping in parts; Assemble simp household equipment; Make a tray out of metal shee	work; Macl le mechani et using she	nine various cal assemb eet metal w	s simple pro bly of comm ork.	ocesses Ion
5	Solder and test simple electronic circuits; Assemble PCB.	and test si	mple electro	onic compo	nents on
PART I CIV	IL ENGINEERING PRACTICES				
PLUMBING	WORK				
	Theory				
1	Connecting various basic pipe fittings like valves, tap other components which are commonly used in hour	os, coupling seholds.	g, unions, re	educers, ell	oows and
2	Connecting pipes of different materials: Metal, plasti	c and flexib	ole pipes		
	Experiment				
1	Preparing plumbing line sketches.				
2	Laying pipe connection to the suction side of a pump	C			
3	Laying pipe connection to the delivery side of a pum	р.			
	Demo				
1	In-Campus - - Water supply lines (RO plant) - Drainage systems - Water Harvesting				
	Self-Study				
1	Household Appliances pipes of different materials: in various applications, such as: - Water supply lines - Drainage systems - Gas lines(if any) - Heating and cooling systems - Solar water heating (if any) - Chimney	Metal, plas	tic and flex	ible pipes a	are utilized
WOOD WO	RK				
	Theory				
1	Tools used in Carpentry & safety measures.				
2	Studying common industrial trusses - https://www.yo	outube.com	/watch?v=-	<u>1w4_4Sr2k</u>	<u>(g</u>
	Experiment				
1	Sawing,				
2	Planing and				
3	Making joints like T-Joint Mortise joint and Tenon joi	nt and Dov	etail joint.		
	Demo				



1	Studying joints in door panels and wooden furniture
2	Study of truss in workshop
	Self-study
1	In house- Types of joints used in window, door, chair, table, specific type of furniture or fixture
ELECTRIC	AL ENGINEERING PRACTICES 15
	Theory
1	Electrical Installation tools, equipment & safety measures.
2	Introduction and application of switches, fuses, boards, indicators and lamps - Basic switch board wiring with lamp, fan and three pin socket
	Demo
1	Hands-on session of basic electrical connections for Fuses, Miniature Circuit Breakers and Distribution Box,
2	Electrical wiring system from the Electricity Board (EB) to a classroom on a campus
3	Earth Pit & its maintenance in campus
4	Hands-on session of electrical connections for Motors & Uninterruptible Power Supply.
5	Bringing Renewable Energy to the Classroom: A Solar Smart Grid Demonstration
	Experiment
1	Fluorescent Lamp wiring with introduction to CFL and LED types.
2	Energy meter wiring and related calculations/ calibration
3	Iron Box wiring and assembly
4	Fan Regulator (Resistor type and Electronic type using Diac/Triac/quadrac)
5	emergency lamp wiring/Water heater
	Self-Study
1	House - electrical wiring system from the Electricity Board (EB) to a dining Room
2	Building (Common area)- electrical wiring system from the Electricity Board (EB) to a staircase of the building & water pump
3	Types of fuse / MDB/ MCB/RCD/CU/Switchboard
4	Earth Pit at house
MECHANIC	AL ENGINEERING PRACTICES
	Theory
1	Tools and its handling techniques & safety measures.
2	Welding Procedure, Selection & Safety Measures.
3	types of Welding joints Butt Joints, Lap Joints, and Tee Joints
4	Basic of foundry operations- Various types of casting processes Types of patterns used in casting processes Types of moulding sand and materials used for pattern making
5	Making of a cone using sheet metal
	Demo
1	Demonstrating basic foundry operations Mold Cavity, Air Vents, Liquid Passages Gates, Runners, Sprues
2	Demonstrating components made out of casting at workshop
3	Demonstration of shaft in gearbox of lathe machine
4	Demonstration of screws RH, LH (Turning, Facing and Thread)
5	Demonstration of Bolted joint



6	Demonstration of sheet metal fabricated components
7	Making of a cone using sheet metal
	Experiment
1	Dis-assembly and assembly of a centrifugal pump.
2	Dis-assembly and assembly of a household mixer /Grinder Mixer
3	Dis-assembly and assembly of an air conditioner.
4	Dis-assembly and assembly of a Ceiling Fan/Table Fan
5	Simple Turning using Lathe machine
6	Drilling & Tapping in Plate (Simple Bolted joint)
7	Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
8	Making of a square tray
1 2 3 4 ELECTRO	Self-Study List examples of sheet metal fabricated component used in house Application of shaft List examples of welded components commonly used in a house List components made by foundry - casting process NIC ENGINEERING PRACTICES 15
1	Electronic components, equipment & safety measures
2	Soldering simple electronic circuits and checking continuity.
_	Demo
1	Study an elements of smart phone
2	Assembly and dismantle of LED TV
	Experiment
1	Soldering simple electronic circuits and checking continuity.
2	Hands-on session of Soldering Practices in a Printed Circuit Breaker.
3	Assembling and testing electronic components on a small PCB
4	Assembly and dismantle of computer/ laptop
5	Hands-on session of integration of sensors and actuators with a Microcontroller.
6	Hands-on session of Bridge Rectifier, Op-Amp and Trans impedance amplifier.
	Self-Study (mini Project)
1	Sensor-based projects: Create projects using sensors like temperature, humidity, or motion sensors
2	Automatic Fan Controller: Create a system that turns on a fan when the temperature exceeds a certain limit
3	Automatic Night Light: Design a circuit that turns on an LED light when it gets dark.
4	Water Level Indicator
5	Door Alarm: Create a simple alarm system that triggers when a refrigerator door is open for a more than a one minute



Upon completion of this course, the students will be able to:															
CO1	To pr	actice	and e	experie	ence t	he plu	Imbing	g work	Ĺ						
CO2	To ga	ain pra	ctical	exper	ience	in car	pentry	/ by cr	afting	a varie	ty of joi	nts.			
CO3	To ac	To acquire knowledge in the methodology and techniques of wiring for electrical connections.													
CO4	To ga	To gain knowledge in welding, sheet metal fabrication, and lathe operations.													
CO5	To le: codin	To learn about electronic components, equipment, and their functions—such as resistors, color coding, measuring AC signal parameters, gates, circuits, and more.													
		CO-PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'													
	P01	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO2	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO3	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO4	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
CO5	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1
AVG	3	2	-	-	1	1	1	-	-	-	-	2	2	1	1



112470210		L	Т	Ρ	С						
02417210		0	0	2	1						
	Course Objectives										
1	To enhance their ability to understand spoken English in various con effective discussions in a professional context.	ntexts	and take	e part in							
2	To enhance speaking and presentation skills										
3	To identify varied group discussion skills and apply them to take pail a professional context.	rt in eff	ective d	iscussio	ons in						
4	To develop students' critical thinking skills										
5	To prepare for real-life communication situations and workplace disc practice of mock interviews.	cussior	ns throu	igh the							
	UNIT I			6)						
Listening: Speaking:	.istening: Listening to voicemail & messages, Audio texts, for writing short answers peaking: Conversation between the interlocutor and each candidate										
	UNIT II										
Listening: Speaking:	ning: Listening to podcasts, anecdotes and identifying topics, context etc king: Presentation on any given topic (Non - Technical)										
	UNIT III										
Listening: videos	tening: One extended conversation or monologue - interview, discussion, lectures and educational										
Speaking:											
l istenina:	Listening to presentation and 5 min informal talk			0							
Speaking:	Presentation on any given topic (Technical)										
	UNIT V			6							
Listening: Speaking:	Listening to interview skills Mock interview										
	тот	AL PE	RIODS	3	D						
	At the end of the course, the student will be able	to									
CO1	Understand accurately and respond to a variety of spoken content to capture both main ideas and supporting details.	o show	case th	eir abilit	y to						
CO2	Enhance the students to make effective presentations.										
CO3	Speak effectively in group discussions held in a formal/semi-formal	contex	t.								
CO4	Ability to interpret different genres of texts, infer implied meanings a well as for methods of presentation relevant in different situations	nd eva	luate it	for idea	s as						
CO5	Motivate and prepare the students to attend job interviews and be s	uccess	ful in th	eir purs	uit.						
	List of experiments										
1	Conversation										
2	Presentation on any given topic (Non - Technical)										
3	Group Discussion										
4	Presentation on any given topic (Technical)										
5	Mock interview										



Meenakshi Sundararajan Engineering College

(An Autonomous Institution, Affiliated to Anna University, Chennai) Department : Mechanical Engineering, R2024, CBCS

ASSESSMENT PATTERN

End Semester speaking & Writing will be conducted in the classroom

TEXT BOOKS

1. Debra Daise, CharlNorloff, and Paul Carne Reading and Writing (Level 4) Oxford University Press: Oxford, 2011

2. Gramer F. Margot and Colin S. Ward Reading and Writing (Level 3) Oxford University Press: Oxford, 2011

REFERENCES

1. E. Suresh Kumar and et al. Enriching Speaking and Writing Skills. Second Edition. Orient Black swan: Hyderabad, 2012

2. Withrow, Jeans and et al. Inspired to Write. Readings and Tasks to develop writing skills. Cambridge University Press: Cambridge, 2004

3. English and Soft Skills, Dr. S.P. Dhanavel, Orient BlackSwan, 2013

4. Butterfield, Jeff Soft Skills for Everyone. Cengage Learning: New Delhi, 2015

5. Interact English Lab Manual for Undergraduate Students,. OrientBalckSwan: Hyderabad, 2016

6 E. Suresh Kumar et al. Communication for Professional Success. Orient Blackswan: Hyderabad, 2015

7. Raman, Meenakshi and Sangeeta Sharma. Professional Communication. Oxford University Press: Oxford, 2014

8. S. Hariharanetal. Soft Skills. MJP Publishers: Chennai, 2010.

		CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Program Outcomes (POs) and Program Specific Outcomes PSOs'													
	PO1	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PS01 PS02 PS03													
CO1	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
CO2	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
CO3	-	-	-	-	-	-	-	-	3	3	-	2	2	2	-
CO4	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
CO5	-	-	-	-	-	-	-	-	-	3	-	2	2	2	-
AVG	-	-	-	-	-	-	-	-	1.8	3	-	2	2	2	-



U24ED211		L	Т	P	С							
	OFFORTONITY	0	0	1	0.5							
Course Ob	jectives											
1	Understand and apply the five phases of the Stanford Design Thi Define, Ideate, Prototype, and Test) to identify user needs and cr	nking F eate inr	ramewo novative	rk (Emp solution	athize, IS.							
2	Gain knowledge of the five stages of the IDEO Design Thinking F Ideate, Experiment, and Evolve) and explore how to iteratively re human-centered approach.	ramew fine sol	ork (Diso utions th	cover, In rough a	iterpret,							
3	Learn the application of Design Thinking tools such as visualization chain analysis, brainstorming, and rapid prototyping to generate a customer needs.	on, jour and refi	ney map ne ideas	ping, va that me	alue et							
4	Apply Design Thinking methodologies to identify opportunities for conduct research, generate ideas, and create business case stud world problem-solving.	innova dies and	ition, sco d prototy	pe proje pes for i	ects, real-							
5	 Analyze and clarify innovation opportunities by understanding the problem, stakeholders, and solution context through frameworks like Doblin's Ten Types of Innovation and RACI, focusing on the 'Who', 'What', 'How', and 'Why' aspects of problem-solving. 											
UNIT – 1: S	STANFORD DESIGN THINKING FRAMEWORK			3								
How How How How How How	/ To `Define' / To `Ideate'? / To `Prototype'? / To `Test'?											
UNIT – 2: II				3								
 How How How How How How 	/ To `Discover'? / To `Interpret'? / To `Ideate'? / To `Experiment'? / To `Evolve'?											
UNIT – 3: C	ESIGN THINKING & DESIGN DOING			2								
 `Wł Map `Wh `Wh `Wh 	nat Is'? - Overview About Visualization, Journey Mapping, Value O pping at If'? - Overview About BrainStorming & Concept Development at Wows'? - Overview About Assumption Testing & Rapid Prototy at Works'? - Overview About Customer Co-Creation & Learning L	Chain Ai rping Launch	nalysis &	& Mind								
UNIT – 4: D Becoming	DESIGN THINKING IN PRACTICE – Identify An Opportunity & Aware Of Next Steps For Innovation – Overview			2								
 Before You `Wh What `Wh `Wh `Wh On- 	 Before You Begin: Identify An Opportunity – Scope Your Project – Draft Your Design Brief – Make Your Plans `What Is' Focus: Do Your Research – Identify Insights – Establish Design Criteria What If' Focus: BrainStorm Ideas – Develop Concepts – Create Business Case Studies `What Wows' Focus: Surface Key Assumptions – Make Prototypes `What Works' Focus: Get Feedback From Stakeholders – Run Learning Launches – Design The On-Ramp 											
UNIT – 5: C IDENTIFYII	CLARIFYING PROBLEM STATEMENT & PRIORITIES BY NG & DECODING THE INNOVATION OPPORTUNITY			5								
 Ove Opp Opp 	rview Of Doblin's Ten Types Of Innovation With Brief-Cases Tow ortunity & Clarifying Problem Statement and Priorities ortunity / Problem Clarity About `Who'? (Who're we solving the pr	ards Ide roblem f	entifying for?)	Innovati	ion							



- Opportunity / Problem Clarity About `What'? (What is the Problem Or EGO Expectation, Goal & Objective?)
- Opportunity / Problem Clarity About `HOW'? (How's the Overall Problem Solving Approach Help Highlighting RACI – Who's Responsible, Accountable, Consulted & Informed?)
- Opportunity / Problem Clarity About `WHY'? (Why's this Solution or Product or Service or Process beneficial to the stakeholders?)

TOTAL PERIODS

15

Course Outcomes

At the	end	of the	cours	se, the	stude	ent wi	ll be a	ble to							
C	01	Apply oppor	Desig tunitie	n Thin s for in	king fr inovati	amew ion and	orks, t d crea	ools, a ting ef	ind teo fective	hniques solutior	s to real [,] ns.	-world p	roblems	s, identify	/ing
CC	02	Empa solutio	thize v	with us eet cus	ers, de stomer	efine p needs	roblen s and a	ns, ide are fea	ate so sible,	lutions, viable, a	prototyp and des	be, and irable.	test, ens	suring th	at
CC	03	Analyz Types proble	ze prol of Inn m-solv	olems, ovatio /ing.	stake n and	holder RACI,	s, and focusi	solutio	on con the 'W	itexts us /ho', 'Wł	sing fran nat', 'Ho	neworks w', and	ike Do 'Why' as	blin's Te spects of	'n
cc)4	Generate and refine ideas using Design Thinking tools like visualization, journey mapping, value chain analysis, brainstorming, and rapid prototyping, creating innovative solutions that meet customer needs.													
CC	05	Develop effective problem-solving skills, including the ability to scope projects, conduct research, generate ideas, and create business case studies and prototypes, preparing them to tackle complex real-world problems													
TEXT	BOO)KS													
1		Tim Brown, "Change by Design: How Design Thinking Transforms Organizations and Inspires Innovation", Harper Publications, 2009													
2	2	Don N	lorma	n, "The	e Desig	gn of E	veryd	ay Thi	ngs", E	Basic Bo	oks, 20	13			
3	}	Tom ł All", C	Kelley, Currenc	David cy, 201	Kelley 3	y, "Cre	ative (Confid	ence:	Unleash	ing the	Creative	e Potent	ial Withi	n Us
REFE	RENO	CES													
1		Hasso Apply	o Platti (Unde	ner, Ch erstanc	hristop ling In	h Meir novatio	nel, La on)", S	rry Lei Springe	fer, "D er, 201	esign T 1	hinking:	Unders	stand – I	mprove	_
2		Jakob John '	Schn Wiley	eider, & Sons	Marc S s, 201	Stickdo 1	orn, "Tl	his Is S	Service	e Desigr	n Thinkii	ng: Basi	ics, Tool	s, Case	s",
3	6	Tom Firm,	Kelley Currer	, The / ncy, 20	Art of I)01	nnova	tion: L	esson	s in Cr	eativity	from ID	EO, Am	erica's L	eading	Design
						(CO/PC), PSC) Map	ping					
			(3/2/1 Pro	indica ogram	ates th Outco	e strer mes (F	ngth of POs) a	f correl and Pro	lation) ogram	3-Stron Specific	g 2-Meo c Outcor	dium, 1- nes PS	Weak Os'		
	P01	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	P011	PO12	PSO1	PSO2	PSO3
CO1	2	3	3	3	1	3	2	1	3	3	3	3	1	-	1
CO2	2	3	3	3	1	3	2	1	3	3	3	3	1	-	1
CO3	2	3 3 3 1 3 2 1 3 3 3 1 - 1										1			
CO4	2	3	3	3	1	3	2	1	3	3	3	3	1	-	1
CO5	2	3	3	3	1	3	2	1	3	3	3	3	1	-	1
AVG	2	3	3	3	1	3	2	1	3	3	3	3	1	-	1



1124MA205		L	Т	Ρ	С						
024IVIA305	STATISTICS AND NUMERICAL METHODS MECHANICAL ENGINEERS	3	1	0	4						
Course Obje	ectives										
1	This course aims at providing the necessary basic concepts of a few statistical methods and give procedures for solving numerically different kinds of problem engineering and technology.	l and ns o	d nu ccu	mer rrinç	rical g in						
2	To acquaint the knowledge of testing of hypothesis for small and large sample an important role in real life problems.	s wł	nich	play	ys						
3	To introduce the basic concepts of solving algebraic and transcendental equat	ions									
4	4 To introduce the Interpolation operators and numerical techniques of interpolation in various intervals, numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.										
5	5 To acquaint the knowledge of various techniques and methods of solving ordinary differential equations.										
UNIT 1 TESTING OF HYPOTHESIS											
Sampling dis Normal distri distributions	tributions - Estimation of parameters - Statistical hypothesis - large sample test bution for single mean and difference of means -Tests based on t, Chi-square a for mean, variance and proportion - Contingency table (test for independent) -C	ts ba and Good	asec F dnes	l on ss o	f fit.						
UNIT 2 DES	GN OF EXPERIMENTS			9+3	•						
One way and square desig	t two-way classifications - Completely randomized design – Randomized block n - Two Square factorial design.	des	ign	–La	tin						
UNIT 3 SOL	UTION OF EQUATIONS AND EIGEN VALUE PROBLEMS			9+3							
Solution of al method - Sol method – Ite method.	lgebraic and transcendental equations - Fixed point iteration method – Newton ution of linear system of equations - Gauss elimination method – Pivoting - Gau rative methods of Gauss Jacobi and Gauss Seidel - Eigenvalues of a matrix by	Rap uss Pov	ohsc Jorc wer	n lan							
UNIT 4 INTE	RPOLATION, NUMERICAL DIFFERENTIATION AND NUMERICAL			9+3	5						
Interpolation backward dif interpolations Numerical sin	Interpolation operators (Forward, Backward, shifting operators and its properties) Newton's forward and backward difference interpolation for equal intervals Lagrange's and Newton's divided difference interpolations for unequal intervals - Approximation of derivates using interpolation polynomials										
UNIT 5 NUM	ERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS			9+3							
Single step n Runge-Kutta predictor cor	nethods: Taylor's series method - Euler's method - Modified Euler's method – F method for solving first order equations - Multi step methods: Milne's and Adar rector methods for solving first order equations.	ourl ns-	th oi Bas	der h fo	rth						
	TOTAL PERIO	DS		60							



Course Outcomes															
At the end of the course, the student will be able to															
CO1	Apply	the co	oncept	of testi	ng of h	ypothe	esis for	small a	and lar	ge sam	nples ir	ı real lif	e probl	ems	
CO2	Apply	the ba	sic co	ncepts	of clas	sificatio	ons of	design	of exp	erimen	its in th	e field	of agric	culture.	
CO3	Appre techn	eciate t iques d	he nun of differ	nerical entiatio	technio on and	ques of integra	f interp ation fo	olation or engir	in vari neering	ious int proble	ervals ems.	and ap	ply the	numer	ical
CO4	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.														
CO5	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.														
TEXT	EXT BOOKS														
1.Grewal. B.S. and Grewal. J.S., "Numerical Methods in Engineering and Science ", 11th Edition, Khanna Publishers, New Delhi, 2015.															
2.Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 9th Edition, Jan 2020.															
3.Won Y.Yang,Young K.Choi,Jaekwon Kim,Man Cheol Kim, H.Jin Kim,Taeho Im, ""Engineering Mathematics with MATLAB"" CRC Press Publishers , Ist Edition , 2017															
REFE	RENCI	ES													
1. Buro	den, R	L and	Faires	, J.D, "	Numer	ical An	alysis"	, 9th Eo	dition,	Cenga	ge Lea	rning, 2	2016.		
2. Dev	ore. J.	L., "Pro	obabilit	y and \$	Statisti	cs for E	Engine	ering a	nd the	Scienc	ces", Co	engage	e Learn	ing, Ne	w
Deini, S	ald C	$\frac{1000, 1}{5}$	St OCt 2	2020.) "Anr	lied Nu	umeric	al Anal	veie" D	earson	Educe	otion 7	th Editi	on Asi	2
New D	elhi, 2	009.	viieai	юу. г.С	у. " үү		umenca		y515 F	caison		ation, <i>1</i>		011, 751	а,
4. San	kara R	ao. K.	, "Num	erical N	lethod	s for S	cientis	ts and	Engine	ers", F	Prentice	e Hall o	f India	Pvt. Lto	l, 4th
Edition	, New	Deini,	2018.	ы м	vore S		Vo K	"Drot	ability	and St	atistics	for En	aineer	and	
scienti	sts" 9t	h editic	on, Pea	rson E	ducatio	on, Asia	a, 2010	., FIUL).	ability		ausuca		gineer	sanu	
						(CO/PO	, PSO	Маррі	ng					
			(3/2/2 Progr	l indica amme	tes the Outco	e strenç mes (P	gth of o Os) ar	correlat	ion) 3- Iramme	Strong e Spec	, 2-Me ific Out	dium, 1 comes	-Weak PSOs'	1	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	1	-	1	-	-	-	-	-	1	1	1	-
CO2	3	3	2	1	-	-	-	-	-	-	-	-	1	1	-
CO3	3	3	2	1	-	-	-	-	-	-	-	-	1	1	-
CO4	3	2	2	1	-	-	-	-	-	-	-	-	1	1	-
CO5	3	2	2	1	-	1	-	-	-	-	-	-	1	1	-



U24ME301	ENGINEERING MECHANICS	L 3	T 0	P 0	C 3						
Course Obje	ctives	•	•	U							
1	Determining the resultant forces acting on a particle in 2D and 3D an of equilibrium on a particle in 2D and 3D.	id for a	applyir	ng met	hods						
2	Evaluating the reaction forces for bodies under equilibrium, for detern force, moment of a couple, for resolving force into a force-couple sys trusses	mining stem a	g the m Ind for	nomen analy:	t of a zing						
3 Assessing the centroids of 2D sections / center of gravity of volumes and for calculating area moments of inertia for the sections and mass moment of inertia of solids.											
4 Evaluating the frictional forces acting at the contact surfaces of various engineering systems and for applying the work-energy principles on a particle.											
5 Determining kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.											
UNIT 1 STATICS OF PARTICLES 9											
Fundamental Concepts and Principles - Law of Mechanics - Systems of Units - Method of Problem Solutions - Statics of Particles - Forces in a Plane - Resultant of Forces - Resolution of a Force into Components - Lami's Theorem - Rectangular Components of a Force - Unit Vectors - Equilibrium of a Particle - Newton's First Law of Motion - Space and Free-Body Diagrams - Forces in Space - Equilibrium of a Particle in Space - Principle of Transmissibility											
UNIT 2 RIGID) BODY ANALYSIS			9							
Equivalent Fo Theorem - Re Triple Produc Equivalent Co Further Redu Supports and	Arces - Vector Product of Two Vectors - Moment of a Force about a Po ectangular Components of the Moment of a Force - Scalar Product of t of Three Vectors - Moment of a Force about an Axis - Couple - Mom puples - Addition of Couples - Resolution of a Given Force into a Forc ction of a System of Forces - Equilibrium in Two and Three Dimension Connections - Analysis of Trusses - Method of Joints and Method of	Two \ Two \ ent of e - Cc ns - R Sectic	/arigno /ectors a Cou ouple s eactio ons	on's s - Mix uple - system ns at	ed -						
UNIT 3 Analy	vsis of forces			9							
Centroids - Fi areas - Recta section by usi Rectangular, using standar inertia of plan prismatic, cyli	rst moment of area - Second moment of area and centre of mass - Congular, circular, triangular areas by integration - T section, I section, A ing standard formula - Theorems of Pappus - Area moments of inertia circular, triangular areas by integration - T section, I section, Angle set formula - Parallel axis theorem and perpendicular axis theorem - Pre areas - Principal axes of inertia-Mass moment of inertia - mass moment and spherical solids from first principle - Relation to area moment	entroi ngle s of pla ction, rincipa ment o nents o	ds of li sectior ane ar Hollov al mom of iner of iner	nes ar n, Hollo eas - v secti nents c tia for tia	າd ວw on by ວf						
UNIT 4 FRIC	TION AND WORK PRINCIPLES			9							
The Laws of I systems with Force - Kineti Impact - Meth	Dry Friction - Coefficients of Friction - Angles of Friction - equilibrium a sliding friction - Wedges - Wheel Friction - Rolling Resistance - Ladde c Energy of a Particle - Principle of Work and Energy - Principle of Im nod of Virtual Work - Work of a Force - Potential Energy - Potential En	analys er frict pulse iergy a	is of s ion - V and M and Ec	imple Vork of Iomen quilibriu	f a tum - um						
UNIT 5 DYNA	AMICS OF PARTICLES			9							
Kinematics and kinetics - displacements - velocity and acceleration - equations of motion - Rectilinear Motion and Curvilinear Motion of Particles - Kinetics - Uniform Acceleration - Varying Acceleration - projectiles - angle of projection - range - time of flight and maximum height - kinematics of rigid bodies - Newton's Second Law of Motion - Equations of Motions - Dynamic Equilibrium - Energy and Momentum Methods - Work of a Force - Kinetic Energy of a Particle - Principle of Work and Energy - Principle of Impulse and Momentum - Impact of bodies											
	TOTAL PER	IODS		45							



Cour	Course Outcomes														
At th	At the end of the course, the student will be able to														
CO1	To determine the resultant forces acting on a particle in 2D and 3D and to apply methods of equilibrium on a particle in 2D and 3D														
CO2	Evaluate the reaction forces for bodies under equilibrium, to determine moment of a force, moment of a couple, to resolve force into a force-couple system and to analyze trusses														
CO3	Assess the centroids of 2D sections / center of gravity of volumes and to calculate area moments of inertia for the sections and mass moment of inertia of solids.														
CO4	Evalua the wo	ate the ork-ene	e frictio ergy pi	nal for	ces ac es on a	cting a a partic	t the c cle. ev	ontact aluate	surfac the ki	ces of va netic an	arious e d kinem	engineer natic par	ing syst ameters	ems and s of a pa	d apply rticle.
CO5	Determine kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.														
TEXT	ΓΒΟΟΚS														
1	Beer, F.P and Johnston Jr. E.R, Cornwell and Sanghi., "Vector Mechanics for Engineers (In SI Units): Statics and Dynamics", 12th Edition, McGraw-Hill Publishing company, New Delhi (2018).														
2	Rajasekaran S and Sankarasubramanian G., "Engineering Mechanics Statics and Dynamics", 3rd Edition, Vikas Publishing House Pvt. Ltd., 2005														
3	Engineering Mechanics, R.S. Khurmi, S.Chand Publishing														
4	A Textbook of Engineering Mechanics, R.K. Bansal. Laxmi Publications														
5	Engineering Mechanics, D.S. Bedi, Khanna Book Publishing Co. (P) Ltd.														
REFE		CES									. ,				
1	Meriam J.L. and Kraige L.G., "Engineering Mechanics- Statics - Volume 1, Dynamics- Volume 2", 7th Edition, Wiley India, 2018.														
2	Bhavikatti S S, Engineering Mechanics, New Age International Publishers, 2016														
3	Vela Murali, "Engineering Mechanics", Oxford University Press 2010														
4	Irving H. Shames, Krishna Mohana Rao G, Engineering Mechanics – Statics and Dynamics, 4 th Edition, Pearson Education Asia Pvt. Ltd., 2005.														
5	Timoshenko S, Young D H, Rao J V and Sukumar Pati, Engineering Mechanics, 5thEdition, McGraw Hill Higher Education, 2013.														
	CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Programme Outcomes (POs) and Programme Specific Outcomes PSOs'														
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO2	3	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO3	3	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO4	3	3	2	3	-	-	-	-	-	-	-	-	2	-	-
CO5	3	3	2	3	-	-	-	-	-	-	-	-	2	-	-
AVG	3	3	2	3	-	-	-	-	-	-	-	-	2	-	-


112	ME302	ENGINEERING THERMODYNAMICS	L	Т	Ρ	С						
02			3	0	0	3						
Cours	se Objective	9S										
1	To study the	e fundamentals of thermodynamics and zeroth law.										
2	2 To provide the knowledge on first law of thermodynamics.											
3	To impart th	e knowledge on second law of thermodynamics and entro	ру.									
4	To study the	ase cha	nge proo	cesses.								
5	To learn abo	out gas power cycles and properties of gas mixtures.										
UNIT	1 INTRODU		9									
Macro prope perfec	oscopic and rties, functio ct gas scale.	Microscopic approaches - energy, heat, work - Thermodyn ns, states, processes and cycle Zeroth law of thermodyr	amic sy namics -	stem - T Tempei	ypes, ature so	cale -						
UNIT	2 FIRST LA	W OF THERMODYNAMICS			9							
Thern P-V d law –	nodynamic s iagram. The application t	ystems, Properties and processes - Thermodynamic Equil mal equilibrium - Zeroth law - Concept of temperature and o closed and open systems - steady and unsteady flow pro	ibrium - I Tempe ocesses	Displac rature S	ement v cales	vork - First						
UNIT	3 SECOND		9									
Heat I Carno diagra	Engine – Re ot cycle - Rev am - Tds Equ	frigerator - Heat pump. Statements of second law and thei /ersed Carnot cycle - Performance - Clausius inequality. C /ations -Entropy change for a pure substance, Principle of	r equiva oncept increas	lence & of entrop e in entr	corollar by - T-s opy.	ies.						
UNIT	4 PROPERI	ES OF PURE SUBSTANCES, IDEAL AND REAL GASES			9							
Stean Deter non-fl comp Comp	n - formation mination of c ow and flow arison Equ pressibility fa	and its thermodynamic properties - p-v, p-T, T-v, T-s, h-s of Iryness fraction of wet and very wet steam. Calculation of processes using Steam Table and Mollier Chart. Propertie lations of state for ideal gas Real Gas, Vander Waal's re- ctor - Principle of Corresponding states - Generalized Com	liagrams work do s of Ide lation - I npressib	s. PVT s ne and l al gas, r Reduced ility Cha	urface. neat trai eal gas d proper irt	nsfer in - ties -						
UNIT	5 GAS MIX	URES AND THERMODYNAMIC RELATIONS			9							
Thern press - Tds Clape	nodynamics ure, Amagat Equations - yron equatic	and properties of ideal gas mixture and perfect gas mixture s law. Psychrometric properties and processes - Psychron heat capacities relations - Energy equation, Joule-Thomso n.	e - Dalto netric ch n exper	on's law hart, Max iment - (of partia kwell rel Clausius	। ations ३-						
		TOTAL PE	RIODS		45							
Cours	se Outcome	S										
At the	e end of the	course, the student will be able to										
CO1	Exemplify the	ne basic concepts and zeroth law of thermodynamics.										
CO2	Apply the fire	st law of thermodynamics to closed and open systems										
CO3	Solve the p	oblems related to cycles and cyclic devices using second	law of t	nermody	/namics	•						
CO4	Determine the thermodynamic properties of pure substances and its phase change processes											
CO5	Evaluate the	e air standard performance of heat engines and properties	of gas	mixtures	6							



TEXT	BOO	KS													
1	Y. Cer Publis	ngel a shing (nd Bol Compa	es, Th any Pv	ermoo t. Ltd,	lynami New D	ics - A Delhi, 2	n Engi 2019.	ineerin	ng Appro	bach, Ta	ata McG	raw Hill		
2	P.K. Nag, Engineering Thermodynamics, Tata McGraw Hill Publishing Company Pvt. Ltd, New Delhi, 2018.														
3	J.P.Holman, Thermodynamics, Tata McGraw Hill Publishing Company Pvt Ltd., New Delhi,2016.														
4	R.K. Rajput, Engineering Thermodynamics, Laxmi Publications Pvt.Ltd., New Delhi, 2017.														
5	Gordon J. Van Wylen, Richard E. Sonntag, Fundamentals of Classical Thermodynamics, John Wiley & Sons, 1978.														
REFE	ERENCES														
1	Chattopadhyay, P, "Engineering Thermodynamics", 2nd Edition Oxford University Press, 2016.														
2	Gordon Rogers, Yon Mayhew, "Engineering Thermodynamics: Work and Heat Transfer, 4th Edition, Pearson, 2002.														
3	Claus Easte	Borgr rn, 20	nakke 09.	and R	ichard	E. So	nntag,	"Func	lamen	tals of T	hermoo	dynamic	s", 7th I	Edition, V	Wiley
4	Venka	atesh.	A, "Ba	sic En	gineer	ring Th	ermo	dynam	ics", U	Iniversit	ies Pres	ss (India	a) Limite	d, 2007	
5	De Di Scien	dier Fo tific Pu	ontain ublicat	e, "Prii ions, 2	nciples 2022	s of cla	issical	Thern	nodyna	amics: /	Applied	to Mate	rial Scie	nce", W	orld
	•					C	:O/PO	, PSO	Марр	oing					
		(F	(3/2/1 Progra	indicat mme (es the Dutcon	e streng nes (P	gth of Os) ar	correland Pro	ation) (gramn	3-Strono ne Spec	g 2-Mec ific Out	lium, 1- comes l	Weak PSOs'		
	PO1	PO2	PO3	PO4	PO5	PO6	P07	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	3	2	1	1	1	1	-	-	-	-	1	2	-	1
CO2	2	3	2	1	1	1	1	-	-	-	-	1	2	-	1
CO3	2	3	2	1	1	1	1	-	-	-	-	1	2	-	1
CO4	2	3	2	1	1	1	1	-	-	-	-	1	2	-	1
CO5	2	3	2	1	1	1	1	-	-	-	-	1	2	-	1
AVG	2	3	2	1	1	1	1	-	-	-	-	1	2	-	1



U24ME303	T 0	P 0	C 3								
Course Objectives	S	U	U	U							
1	To illustrate the working principles of various metal casting process	es.									
2	To learn and apply the working principles of various metal joining p	roces	sses								
3	To analyse the working principles of bulk deformation of metals.										
4	To learn the working principles of sheet metal forming process.										
5	To study and practice the working principles of plastics moulding.										
UNIT1 METAL CAS		9									
Sand Casting - Sand Mould - Type of patterns - Pattern Materials - Pattern allowances - Mould types, Properties and testing - Metal mould casting basics, Moulding machines, Types and app Melting furnaces - Blast and Cupola Furnaces - Principle of special casting processes - Shell, Ceramic mould - Pressure die casting - Centrifugal Casting Continuous casting - Vacuum mou Evaporative pattern casting - Hybrid and vacuum, CO2 process - Stir casting - Defects in San full moulding - micro casting - casting techniques for single crystal components UNIT2 METAL JOINING PROCESSES											
Introduction, weldin and its nomenclatu welding (MIG) - Su Resistance welding Friction welding an soldering - Weld de	Introduction, welding types and equipment, operating principle, merits and applications: electrode types and its nomenclatures, Fusion welding processes - Gas Tungsten arc welding (TIG) - Gas metal arc welding (MIG) - Submerged arc welding - Electro slag welding - Operating principle and applications: Resistance welding - Plasma arc welding - Thermit welding - Electron beam welding - Laser welding - Friction welding and Friction Stir Welding, Spot welding, seam welding, projection welding Brazing and soldering - Weld defects: types, causes and rectifications process										
UNIT3 BULK DEF	ORMATION PROCESSES			9							
Hot, cold and warm Open, impression a process, defects in drawing and wire d rolling operations, r	n forming - working principle of forging equipment - forging process, and closed die forging extrusion: types-hot and cold extrusion, mach extrusion, drawing-tube drawing, operating procedure of drawing m rawing, drawing defects: rolling: types - Flat strip rolling, contour roll rolling defects	types hinerio hachir form	s and es foi neries ning, s	defe r extru s, rod shape	cts, usion e						
UNIT4 POLYMER	MANUFACTURING PROCESSES			9							
Polymers: Classifications of polymers. Thermoplastic Properties and applications (Polyethyle propylene, Polystyrene, Poly vinyl chloride, Acrylic, Nylon and Teflon). Thermoset Properties applications (Polyester, Epoxy, Phenolic, Urea and Phenol formaldehydes). Manufacturing p working - Injection moulding, Compression moulding, Blow Moulding, Extrusion- practical ap Principle, operations and applications. Rotational moulding - Film blowing - Thermoforming - Thermoplastics- duff moulding.											
UNIT5 SHEET ME			9								
Sheet metal characteristics - Typical shearing, bending and drawing operations - Stretch forming operations - Formability of sheet metal - Test methods - special forming processes - Working principle and applications - Hydro forming, Hemming and seaming - Rubber pad forming - Metal spinning - Introduction of Explosive forming, magnetic pulse forming, peen forming, Super plastic forming, Micro forming, ncremental forming. cup forming, embossing, coining, type of dies-simple, compound, progressive, punch and die clearance											
	TOTAL PERIO	DDS		45							



Cour	se Ou	tcome	es												
At th	t the end of the course, the student will be able to														
CO1	Expla	in the	princip	ole of v	rarious	castir	ng pro	cesses	S.						
CO2	Descr	ribe the	e differ	rent joi	ning te	echniq	ues.								
CO3	Understand the different bulk deformation processes.														
CO4	Apply the various sheet metal forming process.														
CO5	λ Apply suitable moulding technique for manufacturing of plastics components.														
TEXT	T BOOKS														
1	Kalpakjian. S, "Manufacturing Engineering and Technology", Pearson Education India,4th Edition, 2013														
2	P.N.Rao Manufacturing Technology Volume 1 Mc Grawhill Education 5th edition,2018.														
REFE	FERENCES														
1	Roy. A. Lindberg, Processes and materials of manufacture, PHI / Pearson education, 2006.														
2	S. Gov	wri P. I	Iariha	ran, A	Sures	h Bab	u, Mar	nufactu	uring T	echnolo	gy I, Pe	earson E	Educatio	n, 2008	
3	Paul D Manuf	Degarn facturii	na E, E ng, Eig	Black J ght Edi	J.T and tion, P	d Rona rentice	ald A. I e – Ha	Koshei III of In	r, Eigh dia, 19	t Editior 997.	n, Mater	ials and	l Proces	ses, in	
4	Hajra Media	Choule	dhary oters a	S.K ar and Pu	id Hajr blishe	ra Cho rs Priv	udhur ate Lir	y. AK., mited,	Eleme Mumb	ents of v pai, 1997	vorkshc 7	p Techr	nology, N	/olume l	and II,
5	Sharm	na, P.C	с., А Те	ext boc	k of pi	roducti	ion Te	chnolo	gy, S.	Chand a	and Co.	Ltd., 20	04		
		F	(3/2/1 ^{>} rogra	indica mme (tes the Outcor	e stren nes (P	CO/PC gth of Os) a), PSC correland Pro	Map ation) ogramr	oing 3-Strong ne Spec	g 2-Mec cific Out	lium, 1- comes	Weak PSOs'		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	2	-	-	2	3	1	1	-	-	1	2	-	1
CO2	3	-	2	-	-	2	3	1	1	-	-	1	2	-	1
CO3	3	-	2	-	-	2	3	1	1	-	-	1	2	-	1
CO4	3	-	2	-	-	2	3	1	1	-	-	1	2	-	1
CO5	3	-	2	-	-	2	3	1	1	-	-	1	2	-	1
AVG	3	-	2	-	-	2	3	1	1	-	-	1	2	-	1



	ENGINEERING MATERIALS AND METALLURGY	L	Т	Р	С						
0241112004		2	0	2	3						
Course Object	ctives										
1	Construct the iron-iron carbide phase diagram and estimat micro-structure.	e the ph	ases pre	sent in th	ıe						
2	Design a suitable heat treatment process for ferrous alloys	based o	on the rea	quiremen	ıts.						
3	Suggest suitable ferrous and non-ferrous alloys for specific	c engine	ering app	lications							
4	To illustrate the different polymer, ceramics and composite field.	s and the	eir uses i	n engine	ering						
5	Describe testing procedures and failure mechanisms										
UNIT1 - CON	STITUTION OF ALLOYS AND PHASE DIAGRAMS			9 + 3							
Constitution of alloys - Solid solutions - substitutional and interstitial phase diagrams - Isomorphous, eutectic, eutectoid, peritectic, and peritectoid reactions - Application of lever rule for phase calculation – Iron-Iron carbide equilibrium diagram Lab Components											
		515.		0+3							
Dofinition Full	appeoling stress relief respectablication and appercidizing	normo	licing ho	g+J	and						
Definition-Full annealing, stress relief, recrystallisation and spheroidizing - normalising, hardening and tempering of steel. Isothermal transformation diagrams - TTT diagram - continuous cooling Transformation (CCT) diagram - cooling curves superimposed on I.T. diagram CCR - Hardenability, Jominy end quench test hardening Lab Components 1. To the study of Microstructure Heat treated steels 2. Microscopic Examination of (i) Hardened samples and (ii) Hardened and tempered samples 3. To find out and compare the hardenability of a given steel, in the uniformly variation of uni-axial											
UNIT 3 - FER	ROUS AND NON-FERROUS METALS			9 + 3							
Effect of alloyi steels - types precipitation s Lab Compon 1. To the	ng additions on steel (Mn, Si, Cr, Mo, V Ti & W) - stainless of CI - Copper and Copper alloys - Brass, Bronze and Cup trengthening treatment - Shape memory alloys - Properties ents study of Microstructure Cast Irons. (Grey cast Iron & White	and tool ronickel and App cast Iro	steels - Aluminiu Aluminiu plications n)	HSLA ma m and Al	araging -Cu -						
UNIT 4 - NON	-METALLIC MATERIALS			9 + 3							
Polymers type PI, PAI, PPO, Al2O3, SiC, S Composites Lab Compon 1. Mouldi	es of polymers - Properties and applications of PE, PP, PS, PPS, PEEK, PTFE Polymers - Engineering Ceramics - Pro iC, Si3, N4, PSZ and Sialon - Fibre and particulate reinforc ents ng of a cap using Injection Moulding Machine	PVC, PM operties a ed comp	/IMA, PE and appli posites - /	T, PC, P/ cations o Applicatic	A, ABS, if ons of						
UNIT 5 - MEC	HANICAL PROPERTIES AND TESTING			9 + 3							
Mechanism of plastic deformation - slip and twinning - Types of fracture - Testing of materials under tension, compression and shear loads - Hardness tests (Brinell, Vickers and Rockwell) Micro and nano- hardness tests - Impact test Izod and Charpy, fatigue and creep test. Lab Components 1. To investigate and compare the Mechanical Properties of a given specimen (Steel) under Various Heat treatment process such as 1 Annealing 2 Case Hardening 3 Tempering 4 Normalizing											
	TOTAL	PERIO	DS	60							



At the end of the course, the student will be able to														
CO1 Explain alloys and phase diagram, Iron-Iron carbon diagram and steel classification.														
CO2 Explain isothermal transformation, continuous cooling diagrams and different heat tre processes.	Explain isothermal transformation, continuous cooling diagrams and different heat treatment processes.													
Clarify the effect of alloying elements on ferrous and non-ferrous metals.														
Summarize the properties and applications of non-metallic materials.														
5 Explain the testing of mechanical properties.														
TBOOKS														
Kenneth G.Budinski and Michael K.Budinski "Engineering Materials" Prentice-Hall of India Private Limited, 4th Indian Reprint 2002														
Williams D Callister, "Material Science and Engineering" Wiley India Pvt Ltd, Revised Indian edition 2007.														
EFERENCES														
1 William D Callsber "Material Science and Engineering", John Wiley and Sons 1997.														
2 Raghavan.V "Materials Science and Engineering", Prentice Hall of India Pvt., Ltd., 19	99.													
3 Sydney H.Avner "Introduction to Physical Metallurgy" McGraw Hill Book Company, 19	94	-												
4 G.S. Upadhyay and Anish Upadhyay, "Materials Science and Engineering", Viva Bool Delhi, 2020.	s F	Pvt.Ltd,	New											
CO/PO, PSO Mapping														
(3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak														
Programme Outcomes (POS) and Programme Specific Outcomes PSOS	1	DSU3	DSU3											
	/ 1		2											
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AVG 3 3 2 2 - 1 1 1 2			2											



U24ME305	L 3	Т 0	P 2	C 4							
Course Obie	ctives	U	U	-							
1	To introduce the students about properties of the fluids, behaviour of flu conditions.	uids u	nder s	tatic							
2	To impart basic knowledge of the dynamics of fluids and boundary laye	er con	cept.								
3	To expose to the applications of the conservation laws to a) flow measu through pipes (both laminar and turbulent) and c) forces on pipe bends	ureme	ents b)	flow							
4	To exposure to the significance of boundary layer theory and its thickne	esses	-								
5	To expose the students to basic principles of working of hydraulic mach Pelton wheel, Francis and Kaplan turbine, centrifugal and reciprocating	ninerie pum	es and ps.	to des	sign						
UNIT 1 FLUI	D PROPERTIES AND FLOW CHARACTERISTICS		9	9 + 6							
Fluid statics - floatation - Fluid system - Rey equation - Ap Lab Compon 1. Detern 2 Detern	Fluid - Properties of fluids - Newtonian and Non Newtonian Fluids - Uni Fluid Pressure and its Measurements - Newtonian vs Non-Newtonian ow characteristics - Eulerian and Lagrangian approach - Concept of con nold's transportation theorem - Continuity equation, energy equation an plications. Nents mination of coefficient of discharge of an orifice meter mination of coefficient of discharge of a venturi meter	fluids fluids ntrol v d mor	- Buoy olume nentur	vancy and m	and						
UNIT 2 FLOV		9+6									
equation - Da and energy g layer thicknes Lab Compon 1. Detern 2. Detern	rcy Weisbach equation - friction factor - Moody diagram - Major and mir radient lines - Pipes in series and parallel - Boundary layer concepts - T is. i ents mination of metacentric height mination of forces due to impact of jet on a fixed plate	or lo: ypes	sses - of bou	Hydra ndary	ulic						
UNIT 3 DIME	NSIONAL ANALYSIS AND MODEL STUDIES		ę	9 + 6							
Fundamental Dimensionles Applications of Lab Compon 1. Deterr	dimensions - Dimensional homogeneity - Rayleigh's method and Bucki s parameters - Similitude and model studies - Distorted and undistorted of dimensionless parameters, scaling factors and law. nents mination of friction factor for flow through pipes	nghar I mod	n Pi th els	eorem	1 -						
UNIT 4 TURE	BINES		9	9+6							
Impact of jet Working prin Draft tube - S Lab Compon 1. Chara 2. Chara	Impact of jets - Velocity triangles - Theory of rotodynamic machines - Classification of turbines - Working principles - Pelton wheel - Modern Francis - Kaplan turbine - Work done - Efficiencies - Draft tube - Specific speed - Performance curves for turbines - Governing of turbines Lab Components 1. Characteristics of Pelton wheel turbine										
UNIT 5 PUM	P\$		9	9 + 6							
Classification triangles - Wo principle - Ind Pumps conne Lab Compon 1. Chara	Classification of pumps - Centrifugal pumps - Working principle - Heads and efficiencies– Velocity riangles - Work done by the impeller - Performance curves - NPSH - Reciprocating pump working principle - Indicator diagram and it's variations - Work saved by fitting air vessels - Rotary pumps - Pumps connected in series and parallel. Lab Components 1. Characteristics of centrifugal pumps										
	TOTAL PERI	ODS		75	. <u></u>						



Cours	se Out	comes	\$												
At the	At the end of the course, the student will be able to														
CO1	Under laws a	stand t pplical	the pro ble to f	perties luids a	and bond its a	ehavio pplicat	ur in st ion thr	atic co ough fl	ndition uid kin	s. Also, ematics	, to und s and c	derstan dynami	d the c cs	onserva	ation
CO2	Estima conne thickne	ate los: cted in ess on	ses in p series the fla	pipeline and pa t solid	es for b arallel. surface	oth lan Also, t e.	ninar a o unde	nd turb rstand	ulent o the co	conditio ncept c	ons and of boun	d analy: Idary la	sis of p yer and	ipes d its	
CO3	Formu predic	llate th t the p	e relati erforma	ionship ances (among of proto	g the p otype b	arame y mode	ters inv el studi	olved es	in the g	jiven fl	uid phe	nomer	ion and	to
CO4	Explain the working principles of various turbines and design the various types of turbines.														
CO5	Explain the working principles of centrifugal, reciprocating and rotary pumps and design the centrifugal and reciprocating pumps														
TEXT	Г BOOKS														
1	Modi P.N. and Seth, S.M. Hydraulics and Fluid Mechanics, Standard Book House, New Delhi, 22nd edition (2019)														
2	Jain A	. K. Flu	uid Me	chanics	s includ	ling Hy	draulic	Machi	nes, K	hanna	Publisl	hers, N	ew Del	hi, 201	4.
3	Kumai	r K. L.,	Engin	eering	Fluid M	lechan	ics, Eu	irasia F	Publish	ing Hou	use(p)	Ltd. Ne	w Delł	ni, 2016	j.
REFE	RENC	ES								-					
1	Fox W 2011.	.R. an	d McDo	onald A	A.T., Int	roducti	on to F	Fluid M	echani	cs Johi	n-Wiley	y and S	ions, S	ingapor	e,
2	Pani B	S, Flu	uid Meo	chanics	s: A Co	ncise Ir	ntroduc	ction, P	rentice	e Hall o	f India	Private	Etd, 2	016.	
3	Cenge	el Y A a	and Cin	nbala J	M, Flu	id Mec	chanics	, McGi	raw Hil	l Educa	ation P	vt. Ltd.	, 2014.		
4	S K So Tata M	om; Ga lcGrav	autam I v Hill E	Biswas ducatio	and S on Pvt.	Chakra Ltd., 2	aborty, 012.	Introd	uction	to Fluid	l Mech	anics a	nd Flui	d Mach	nines,
5	Street	er, V. L	and \	Nylie E	. B., Fl	uid Me	chanic	s, McG	Fraw H	ill Publi	ishing	Co., 20	10.		
		,			,	CO/	PO, PS	SO Ma	pping			,			
		(3 Pr	3/2/1 in ogram	dicates me Ou	s the st tcomes	rength s (POs)	of corr) and F	elation Progran) 3-Str nme Si	ong 2-N pecific	Mediun Outcor	n, 1-We nes PS	eak 60s'		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	3	3	2	1	1	1	2	1	1	1	2	2	-	1
CO2	3	3	3	2	1	1	1	2	1	1	1	2	2	-	1
CO3	3	3	3	2	1	1	1	2	1	1	1	2	2	-	1
CO4	3	3	3	2	1	1	1	2	1	1	1	2	2	-	1
CO5	3	3	3	2	1	1	1	2	1	1	1	2	2	-	1
AVG	3	3	3	2	1	1	1	2	1	1	1	2	2	-	1



ι	J24ME306	COMPUTER AIDED MACHINE DRAWING	L	T	P 2	C					
		Course Objectives	U	U	3	1.5					
1	Applying standa	ard drawing practices using fits and tolerances.									
2	Modelling ortho	gonal views of machine components.									
3	Modelling orthogonal views of assembled components.										
4	Preparing stand	lard drawing layout for modelled parts or assemblies with	n BoM.								
5	Gaining practica	al experience in handling 2D drafting software systems.									
List o	f Experiments				45						
	 PAF	RT – I DRAWING STANDARDS & FITS AND TOLERAN	CES –	12							
	Code of practice riveted joints, ke like bolts, nuts, Specification of drawings, basic	e for Engineering Drawing - BIS specifications – Thread eys, fasteners - Reference to hand book for the selection screws, keys etc. Limits, Fits, Tolerancing of individual d Fits, Preparation of production drawings and reading of principles of Geometric Dimensioning & Tolerancing.	forms, of stai imensio part an	Welding ndard co ons - IS Id asser	g symbo ompone 919 - nbly	ols, ents					
Dra	wing, Editing, I	PART– II 2D DRAFTING – 33 Dimensioning, Layering, Hatching, Block, Array, Deta	iling, l	Detaile	d Drawi	ing.					
1	Bearings – Bus	h Bearing									
2	Valves – Safety	and Non-return Valves.									
3	Couplings – Fla	nge, Oldham's couplings.									
4	Joints – Universal, Knuckle, Gib & Cotter										
5	Engine parts –	Piston, Connecting Rod, Crosshead (vertical and horizor	ntal), St	tuffing b	ох						
6	Machine Comp	onents – Screw Jack, Lathe Tail Stock, Lathe Chuck, Plu	mmer l	Block							
Total: must k softwa	20% of classes t be done manuall are. The above ta	or theory classes and 80% of classes for practice Note: y and remaining 75% of assembly drawings must be dor asks can be performed manually and using standard con	25% of ne by u nmercia	assem sing ang al 2D C/	bly drav y CAD AD soft	vings ware.					
Cours	e Outcomes										
At the	end of the cou	rse, the student will be able to									
CO1	Practice drawin	g standards using fits and tolerances.									
CO2	Model orthogon	al views of machine components									
CO3	Model orthogon	al views of assembled components.									
CO4	Prepare standa	rd drawing layout for modelled parts or assemblies with l	BoM.								
CO5	Create standard	d drawing for modelled parts or assemblies using modelli	ing soft	ware.							
TEXT	BOOKS										
1	Gopalakrishna Bangalore,2003	K.R., "Machine Drawing", 17th Edition, Subhas Stores Be B.	ooks C	orner,							
2	N. D. Bhatt and	V.M. Panchal, "Machine Drawing", 51st Edition, Charate	or Publi	shers,2	022.						
REFE	RENCES										
1	K. L Narayana, International Ρι	P.Kannaiah, K.Venkata Reddy, Machine Drawing , 15 Ec blication	lition , l	New Ag	е						
2	Goutam Pohit,	Goutam Ghosh, "Machine Drawing with AutoCAD", 1st E	dition,	Pearso	n, 2004						
3	Junnarkar, N.D.	, "Machine Drawing", 1st Edition, Pearson Education, 20	04								
4	N. Siddeshwar, P. Kanniah, V.V.S. Sastri," Machine Drawing", Tata McGrawHill,2006										
5	S. Trymbaka M Delhi, 2007	urthy, "A Text Book of Computer Aided Machine Drawing	", CBS	Publish	ers, Ne	:W					



	CO/PO, PSO Mapping (3/2/1 indicates the strength of correlation) 3-Strong 2-Medium, 1-Weak Programme Outcomes (POs) and Programme Specific Outcomes PSOs'														
	PO1 PO2 PO3 PO4 PO5 PO6 PO7 PO8 PO9 PO10 PO11 PO12 PSO1 PSO2 PSO3														
CO1	3	3	3	-	3	-	-	1	1	2	1	3	1	2	-
CO2	3	3	3	-	3	-	-	1	1	2	1	3	1	2	-
CO3	3	3	3	-	3	-	-	1	1	2	1	3	1	2	-
CO4	3	3	3	-	3	-	-	1	1	2	1	3	1	2	-
CO5	3	3	3	-	3	-	-	1	1	2	1	3	1	2	-
AVG	3	3	3	-	3	-	-	1	1	2	1	3	1	2	-

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