

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme		Bachelor of Technology			Branch/Spec.		ME/MC/Auto/MR/Civil/EE		
Semester		II			Version		2.0.0.0		
Effective from Academic Year			2018-19		Effective from the batch Admitted in			July 2018	
Subject code		2ES105		Subject Name		Elements of Mechanical Engineering			
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total		CE	SEE	Total
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	30	20	50
Pre-requisites:									
Learning Outcome:									
After learning this course, student should be able to: <ul style="list-style-type: none"> • Understand about the working, functions and applications of equipments used in daily life. • Identify the broad context of Mechanical engineering problems, including describing the problem conditions and identifying possible contributing factors • Understand the fundamental elements of Mechanical engineering systems, system components and processes, with a good understanding of associated safety, quality, schedule and cost considerations. • Employ mathematics, science, and computing techniques in a systematic, comprehensive, and Rigorous manner to support the study and solution of Mechanical engineering problems. • Synthesize analysis results to provide constructive and creative engineering solutions that reflect social and environmental sensitivities. • Exhibit good teamwork skills and serve as effective members of multidisciplinary project teams. 									
Theory syllabus									
Unit	Content								Hrs
1	Introduction: I Prime movers, Sources of energy, Types of prime movers, Force and mass, Pressure, Work, Power, Energy, Heat, Temperature, Units of heat, Specific heat capacity, Interchange of heat, Change of state, Mechanical equivalent of heat, Internal energy, Enthalpy, Entropy, Efficiency, Statements of Laws of Thermodynamics, Calorific values Properties of gases: Gas laws, Boyle's law, Charle's law, Combined gas law, Gas constant, Internal energy, Relation between Cp and Cv, Enthalpy, Non flow process, Constant volume process, Constant pressure process, Isothermal process, Poly-tropic process, Adiabatic process.								8
2	Properties of Steam: Introduction, Steam formation, Types of Steam, Enthalpy, Specific volume of steam and dryness fraction of steam, Internal energy, Steam tables, Non-flow process. Measurement of dryness fraction, Throttling calorimeter, Separating calorimeter, Combined calorimeter.								6
3	Steam Boilers: Introduction, Classification, Simple vertical boiler, Cochran boiler, Lancashire boiler, Locomotive boiler, Babcock and Wilcox boiler, Hi-Pressure boiler, functioning of different mountings and accessories.								8

	Internal Combustion Engines: Introduction, Classification, Engine details, otto four-stroke cycle, Diesel-four-stroke cycle, Difference between otto cycle and Diesel cycle, Two-stroke cycle, Difference between two-stroke and four-stroke cycle, indicated power (ip), Brake Power (bp), Efficiencies.	
4	Air Compressors: Introduction, Uses of Compressed air, Reciprocating compressors, Operation of a compressor, multistage reciprocating compressors, Rotary compressors	6
5	Refrigeration & Air Conditioning: Introduction, Refrigerant, Types of refrigerators, Vapour compression refrigerating system, Vapour absorption refrigerating system, Window and split air conditioners.	8
6	Important Engineering Materials: Properties of materials, Ferrous & Nonferrous materials and other important engineering materials such as Timber, Abrasive material, silica.	6
Practical content		
The term work shall be based on experimental and analytical work on topics mentioned above.		
Text Books		
1	S.M. Bhatt, H.G. Katariya "Elements of Mechanical Engineering" Books India publication, 5 th Edition 2017	
2	Dr. D.S. Kumar "Thermal Science and Engineering", S. K. Kataria & sons, Publication New Delhi, 4 th Edition.	
3	P. S. Desai and S. B. Soni "Elements of Mechanical Engineering", Atul Prakashan, 11 th Revised Edition 2010.	
Reference Books		
1	Pravin Kumar "Basic Mechanical Engineering", Pearson Education India, Delhi, 2013	
2	G.S. Sawhney "Fundamental of Mechanical Engineering", PHI Publication New Delhi, 2008.	
3	Sadhu Singh "Elements of Mechanical Engineering", S. Chand Publication, 2010.	
4	B.K. Agrawal "Introduction to Engineering Materials", Tata Mcgrahill Publication, New Delhi, 1998.	
ICT/MOOCs references		
1	https://www.youtube.com/watch?v=_7tE3W0fmOc (Introduction of EME)	
2	https://www.youtube.com/watch?v=vr3RXIba0D4 (Properties of Steam)	
3	https://www.youtube.com/watch?v=txoEqwSxUrQ (Types of Steam boiler)	
4	https://www.youtube.com/watch?v=9eGgTXfyxbg (Fundamental of IC Engine)	
5	https://www.youtube.com/watch?v=p9eFYGIaB4 (Basic of Air Compressor)	
6	https://www.youtube.com/watch?v=zqXgmVnI3L8&list=PLB7848E741209987E (Refrigeration & Air Conditioning)	
7	https://www.youtube.com/watch?v=5cjCgqaRjXU (Importance of Engineering Materials)	