

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY
DESIGN AND MANUFACTURING (IIITDM) KANCHEEPURAM

INTRODUCTION OF NEW COURSE

Course Title	Failure Analysis and Design	Course Code	MExxxxx			
Dept./ Specialization	Mechanical Engineering / Materials and Design	Structure (LTPC)	3	1	0	4
To be offered for	UG / PG	Status	Core <input type="checkbox"/>		Elective <input checked="" type="checkbox"/>	
Faculty Proposing the course	Venkata Timmaraju Mallina	Type	New		Modification <input checked="" type="checkbox"/>	
Recommendation from the DAC - Yes		Date of DAC	01 – 06 – 2021			
External Expert(s)	Prof. R. Gnanamoorthy, IIT Madras					
Pre-requisite	Materials for Engineers, Mechanics of materials	Submitted for approval			46 th Senate	
Learning Objectives	<p>This course provides</p> <ul style="list-style-type: none"> • knowledge and understanding of material failure mechanisms during service • ideas and methods to identify potential design weaknesses through systematic analysis. • insights on the cause of failures and its effect. 					
Learning Outcomes	<p>At the end of the course the students can</p> <ul style="list-style-type: none"> • identify the possible failures of products during service • perform failure analysis of various product failures • redesign the products with proper life prediction methods, materials and processes 					
Contents of the course <i>(With approximate break-up of hours for L/T/P)</i>	<p>Failure analysis tools and prevention techniques, Physical root causes of failures, major categories of material failures, Design-Materials-Failure prevention, Strength-deformation-fracture of engineering materials. (L12+T3) Static and fatigue failure theories and application to product design, stress and strain life based design, cyclic stress-strain, micro mechanisms of fatigue failure, cumulative damage approaches for fatigue life prediction. Fracture mechanics based design. (L15+T6) Mechanisms of creep, wear, and impact failures. (L9+T3) Case studies: Failure analysis of mechanical and electronic systems. (L6+T2)</p>					
Text Book	1. C. Brooks and A. Choudhury, Failure Analysis of Engineering Materials, 1st edition, McGraw-Hill education, ISBN-13: 978-0071357586.					
Reference Books	<ol style="list-style-type: none"> 1. A. J. McEvily and J. Kasivitanuay, Metal failures: Mechanisms, Analysis and Prevention, 2nd edition, Wiley, 2013, ISBN: 978-1-118-42116-1 2. J. A. Collins, Failure of Materials in Mechanical Design: Analysis, Prediction, Prevention, 2nd edition, John Wiley & Sons, ISBN: 978-0-471-55891-0 3. P. L. Martin, Electronic Failure Analysis Handbook, 1st edition, McGraw-Hill education, ISBN-13: 978-0071626347. 					