

Design of Machine Elements I - Video course

Module-1

Lecture-1

Design philosophy

Design-A decision-making process
Machine design
Design of machine elements
Design principle

Lecture-2

Design Procedure

Types and considerations.
Stochastic design principles

Lecture-3

Engineering Materials

Classification and properties

Lecture-4

Engineering Materials

ISO codes.

Module-2

Lecture-5

Stresses in Machine Elements

Types of simple stresses
State of stress at point-implications

Lecture-6

Stresses in Machine Elements

Principal stresses
Compound stresses in machine parts

Module-3

Lecture-7

Design for strength

Static loading
Theories of failures
Allowable stress
Factor of safety

Lecture-8

Strain

Strain components
Stress-strain relationship

Lecture-9

Stress concentration factor

Stress intensity factor

Lecture-10

Design for variable loading

Fluctuating stresses
Fatigue failure
Strain and stress life
Endurance limit
Fatigue strength

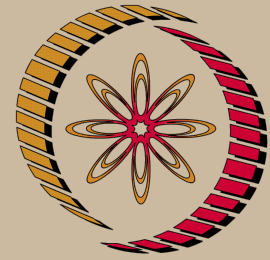
Lecture-11

Fatigue strength and design

Modified Goodman diagram
Gerber Line
Soderberg line

Lecture-12

Design for combined fatigue loading



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Module-4

Lecture-13

Fasteners

Types and uses

Design of pin joints

Lecture-14

Fasteners

Design of cotter and knuckle joints

Lecture-15

Keys

Types and uses

Design of machine keys

Lecture-16

Fasteners

Couplings

Types and uses

General design principle

Lecture-17

Fasteners

Flange couplings

Rigid and flexible

Design procedures

Module-5

Lecture-18

Threaded fasteners

Thread forms

Types of threaded fasteners

Lecture-19

Threaded fasteners

Design of bolted joints

Dynamic loading

Lecture-20

Power screws

Working principles

Lecture-21

Power screws

Design procedure

Module-6

Lecture-22

Riveted joints

Rivets

Types and uses

Riveted joints

Types and efficiency

Lecture-23

Riveted joints

Design procedure

Lecture-24

Welded joints

Types of weldments and symbols

Strength of welded joints

Lecture-25

Welded joints

Design principle

Lecture-26

Eccentric loading of riveted, welded and bolted joints

General Design principle

Module-7

Lecture-27

Mechanical Springs

Helical springs

Stresses and Deflection

Lecture-28

Helical Springs

Stresses and deflection
Design principles

Lecture-29

Leaf springs

Stresses
Design principles

Lecture-30

Levers

General design principles

Lecture-31

Levers

Types and design procedures

Lecture-32

Brackets

Types Design principles

Module-8

Lecture-33 Shafts

Static loading: stresses
Design principle

Lecture-34 Shafts

Fatigue loading

Lecture-35 Shafts

Design principle for fatigue loading

Module-9

Lecture-36 Thin cylinders

Stresses

Lecture-37 Thick cylinders

Design principles
Thick cylinders
Stresses due to internal and external pressures

Lecture-38 Thick cylinders

Design methodology for enhanced pressure