

5 th Semester	RAU5C001	Fundamentals of Automotive Design	L-T-P 3-0-0	3 CREDITS
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MODULE - I (08 LECTURES)

Classification of design, Introduction to design procedure, Stages in design, Engineering materials and their physical properties as applied to design, Selection of materials, Endurance limit and factors affecting it, Determination of endurance limit for ductile materials, Notch sensitivity, Fits and Tolerances, Principle of design optimization, Future trends, CAD.

Types of load, Modes of failure, factor of safety concepts, Theories of Failure, concept and mitigation of stress concentration, Fatigue failure and curve, Goodman, Gerber and Soderberg criteria. Use of Data books

MODULE – II (08 LECTURES)

Design of Joints: Rivets, welds and threaded fasteners based on different types of loading, cotter joints and knuckle joints.

MODULE – III (08 LECTURES)

Design of Keys: Classification of keys and pins, Design of keys and pins,

Design of Shafts: Shaft materials and design stresses, design of shafts on the basis of strength, design of shaft on the basis of rigidity, design of hollow shafts.

MODULE – IV (08 LECTURES)

Design of Bearings: Types of bearings, design of journal bearings, ball and roller bearings, types of roller bearings, bearing life, static load capacity, dynamic load capacity, bearing material, boundary lubrication, oil flow and temperature rise.

MODULE – V (08 LECTURES)

Design of Couplings: Introduction, types and uses design procedures for rigid and flexible rubber-bushed couplings.

Design of Springs: Introduction to Design of Helical Springs Design of Helical Springs for Variable Load, Design of Leaf Springs.

Books:

- [1] Design of Machine Elements, V. B. Bhandari, Tata McGraw Hill
- [2] Design of Machine Elements by C. S. Sharma and K. Purohit, PHI
- [3] Machine Design by R. K. Jain, Khanna Publishers, 1992.
- [4] A text book of machine design by R.S Khurmi, J. K Gupta, S Chand publication, New Delhi

[5] Mechanical Engineering Design, J. E. Shigley, C. R. Mischke, R. G. Budynas and K. J. Nisbett, TMH

[6] Machine Design, P. Kanaiah, Sciotech Publications

[7] Fundamentals of Machine Component Design by R.C. Juvinall and K. M. Marshek, John Wiley & Sons

[8] Machine Drawing by N. Sidheswar, McGraw-Hill

[9] Machine Design, P.C. Sharma and D. K. Agrawal, S. K. Kataria & Sons

[10] Machine Design, Pandya and Shah, Charotar Book Stall

[11] Machine Design, Robert L. Norton, Pearson Education Asia.

Design Data Hand Books:

1. P.S.G. Design Data Hand Book, PSG College of Tech Coimbatore
2. Design Data Hand Book, K. Lingaiah, McGraw Hill, 2nd Ed. 2003.
3. Design Hand Book by S. M. Jalaluddin, Anuradha Agencies Publications
4. Design Data Hand Book by K. Mahadevan and B. Reddy, CBS Publishers

Digital Learning Resources:

Course Name: Design of Machine Elements-I
Course Link: <https://nptel.ac.in/courses/112/105/112105124/>
Course Instructor: Prof. G. Chakraborty, Prof. B. Maiti and Prof. S.K. Roychowdhury, IIT, Kharagpur

Course Name: Design of Machine Elements-I
Course Link: <https://nptel.ac.in/courses/112/105/112105125/>
Course Instructor: Prof. S.K. Roychowdhury , Prof. G. Chakraborty, Prof. B. Maiti , IIT, Kharagpur