

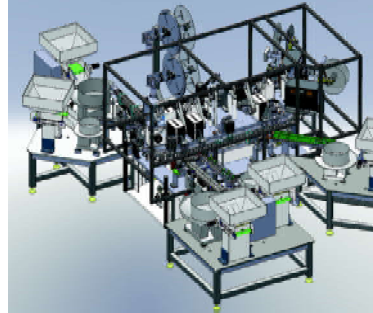
16AG304 MACHINE DESIGN

Hours Per Week :

L	T	P	C
2	1	2	4

Total Hours :

L	T	P	WA/RA	SSH/HSR	CS	SA	S	BS
30	15	30	5	40	5	8	5	-



Course Description and Objectives:

This course deals with the design of different machine elements. The objective of this course is to make the students to familiarize with the various steps involved in designing the shape and dimensions of engineering components with quality functional and strength requirements.

Course Outcomes:

The student will be able to:

- design the components subjected to static and cyclic loading.
- design fasteners such as rivets, bolts and cotter joints.
- design power transmission shafts and couplings.
- calculate stress and load along with deformations of various types of springs.

SKILLS:

- ✓ *Assemble the components of an engine.*
- ✓ *Part drawing of machine elements.*
- ✓ *Design of rivets, bolts and cotter joints.*
- ✓ *Design of spur and helical gears.*

ACTIVITIES:

- *Design of power transmission shafts and couplings.*
- *Design a piston assembly for engine considering stresses.*
- *Part drawing of machine elements.*
- *Design of spur and helical gear.*

UNIT - 1**L-05,T-02**

STEADY STRESSES AND VARIABLE STRESSES IN MACHINE MEMBERS : Introduction to the design process, Factors influencing machine design, Selection of materials based on mechanical properties, Direct, bending and torsional stress equations.

UNIT - 2**L-10,T-03**

DESIGN OF SHAFTS AND COUPLINGS AND DESIGN OF FASTENERS AND WELDED JOINTS: Design of solid and hollow shafts based on strength, Rigidity and critical speed, Design of keys and key ways, Design of rigid and flexible couplings design of knuckle joints, Threaded fasteners, Design of bolted joints including eccentric loading, Design of welded joints for pressure vessels and structures, Theory of bonded joints.

UNIT - 3**L-06,T-03**

DESIGN OF SPRINGS AND BEARINGS : Design of helical, leaf, disc and torsional springs under constant loads, Design of bearings, Sliding contact and rolling contact types, Cubic mean load, Design of journal bearings, Lubrication in journal bearings, Calculation of bearing dimensions.

UNIT - 4**L-06,T-04**

THIN CYLINDERS & THICK CYLINDERS, CLUTCHES & BRAKES : Design principles, Stresses due to internal and external pressures, Design methodology for enhanced pressure, Design of Clutches- Single plate, Multi plate and cone clutches, Design of Brakes-Block and Band brakes, Self-locking of brakes.

UNIT - 5**L-06,T-03**

SPUR & HELICAL GEARS : Spur Gears- Definitions, Stresses in gear tooth, Lewis equation and form factor, Design for strength, Helical Gears- Definitions, Formative number of teeth, Design based on strength.

LABORATORY EXPERIMENTS**LIST OF EXPERIMENTS****Total hours: 30**

1. Conversion of isometric views to orthometric views.
2. Conversion of optometric views to isometric views.
3. Conventions of different materials and standard components.
4. Sectional views.
5. Fasteners, bolts and nuts, locknuts.
6. Keys, couplings.
7. Cotter joint.
8. Stuffing box.
9. Eccentric.
10. Screw jack.
11. Swivel bearing.
12. Connecting rod.
13. Piston assembly.

TEXT BOOK:

1. R. S. Khurmi and J. K. Gupta, "A Text Book of Machine Design", 25th edition, Eurasia Publishing House, New Delhi, 2014.

REFERENCE BOOKS:

1. Joseph, E. Shigley and Charles R. Mischke, "Mechanical Engineering Design", 6th edition, McGraw Hill International, 2003.
2. V.B. Bhandari, "Design of Machine Elements", 3rd edition, Tata McGraw-Hill Publishing, New Delhi, 2010.

WEB LINK:

1. <http://ecoursesonline.iasri.res.in/course/view.php?id=38>