MECH 332  MECHANICS OF MACHINES 3 CR.

A course that deals with the mechanization of motion, kinematics analysis of linkage mechanisms, synthesis of cam-follower mechanisms, gear terminology and types of gears, analysis and synthesis of gear trains, force analysis, and introduction to linkage synthesis; computer aided project. Prerequisite: MECH 230.

Required for all ME students.

Textbook

Additional References

Topics covered
Introduction to mechanism, pairing elements, inversion and transmission of motion.
Position analysis of the four-bar linkage and Grashoff’s Law.
Motion study of the following mechanisms: slider crank, quick-return, Scotch yoke, toggle, straight-line, and pantograph.
Introduction to linkage synthesis, and Freudestein’s Equation.
Cams with radial and flat face followers; displacement curves; analytical design of a disc cam with radial flat-faced and roller follower.
Spur gears: involutometry, characteristics of involute action, interference, backlash and internal gears.
Gear trains: study of regular gear trains and planetary gear trains and their application.
Velocity analysis of linkages: determination of velocity, relative velocity of particles in a common link, relative velocity of coincident particles on separate links and at the point of contact of rolling elements; determination of instantaneous centers of velocity by Kennedy’s Theorem and; determination of velocity by instantaneous centers
Acceleration analysis of linkages: determination of acceleration of particles in a common link, acceleration of coincident particles on separate links; Coriolis Component of acceleration and; relative acceleration of coincident particles at the point of contact of rolling elements.
## Course Learning Outcomes

**At the end of the course, students will:**

| Knowledge of the basic principles of motion of various machine elements such as: linkages, cam and followers, gears and gear trains | e | a, c, i | k, f |
| Ability to determine velocity and acceleration in various mechanisms | a | c, b, e, |
| Ability to apply principles of calculus to model and analyze components (gears, valves, and various mechanisms) to solve engineering problems | | a |
| Knowledge of transmission of motion and Grashof’s Law | e |
| Ability to think critically and creatively to solve engineering problems | e |
| Ability to use techniques, linkage synthesis and design of cams for particular follower motion | e |

*H: High correlation, M: Medium correlation, L: Low correlation.*

## Class schedule
Three fifty minute lectures per week.

## Credits
3.

## Person(s) who prepared this description and date of preparation
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