

## **MECHANICS AND DYNAMICS OF MACHINERY – 9 CFU LM**

**Logozzo/Castellani (72 ore)**

### **DYNAMICS OF MECHANICAL DRIVES**

Actuator Systems Design: Fundamental of actuators - Classification and selection of power systems, Kinematic and Dynamic analysis, Mechanical modelling with a multi-degree-of-freedom approach.

Applications of Hydraulic and Pneumatic Systems: Design of hydraulic systems, Basis for power system design and sizing, Control Valves and power units, Introduction to pneumatic systems.

Analysis and Application of Viscous Shock Absorbers: General characteristics and design of mechanical dampers, Tuning and control of damping systems in mechanical applications.

Analysis and Numerical Modelling of Non-Linear Mechanical Systems. Introduction to the State-Space equations, State -Space modelling of LTI Systems, Mathematical modelling of mechanical systems through the State-Space approach, Dynamics of mechanical systems with nonlinear damping, Numerical simulation of nonlinear systems with examples and exercises.

### **MECHANISMS AND DYNAMICS OF MACHINERY**

Dynamics and Balancing of Machines and Mechanisms: Dynamics and balancing of motors, Dynamics of rigid rotors, Dynamics of flexible rotors, Rotor balancing. Examples and exercises.

Study of Transient Regimes of Mechanical Systems: Systems in absolute regime conditions, Systems in periodic regime conditions. Examples and exercises.

Mechanisms' Motion Study and Simulation: Functional 3D design of mechanisms, 3D motion simulation, 3D kinematic study. Examples and exercises.

Lubrication Theory, Mechanical Seals and Wear Evaluation Methods: Fundamentals of tribology, Wear evaluation methods, Hydrodynamic lubrication, Hydrostatic lubrication. Examples and exercises.