TEP-250 Mechanical and Energy Engineering

Coordinator: Dr. Fernando Antonio Cruz Peragón (fcruz [arroba] ujaen [punto] es)

The “Mechanical and Energy Engineering (INGEMER)” research group comprises researchers belonging to the fundamental areas of Mechanical and Thermal Engineering. They work specifically on structural and mechanical analysis and on energy savings and efficiency systems. They boast extensive experience in the renewable energies and automotive fields and in the aerospace industry.

In carrying out its work, the group has the following equipment in place:

- Instron universal materials testing machine with 30 kN load force capacity
- Gunt transmission polariscope
- Reflection polariscope (Photostress Plus) - Vishay Measurement Group
- Oven with maximum temperature of up to 300ºC
- Extensometry equipment for measuring unitary deformations
- Mechanics workshop for making prototypes (CN lathes and milling machines, universal lathes and milling machines, welding equipment)
- Kistler dynamometer for measuring shear forces in tooling machines
- Instruments for dimensional measurements: profile projector, industrial microscope, roughness tester, etc.
- FDM 3D printers: two Cartesian desktop-type printers and one Delta printer for a workload of 240 mm in diameter and 500 mm in height
- CCD cameras (monochrome and color) with different resolutions and frame rates
- Testo 335 smoke analyzer for determining smoke volume and composition, excess air and combustion performance
- Solid-sample drying oven

Website for the group

Website for the Mechanical and Energy Engineering Research Group

Research lines

- Energy sustainability and efficiency
- Thermal systems modeling
- Alternative internal combustion engines
- Vibration analysis
- Contact and impact analysis
- Fracture and fatigue mechanics
- Numerical study of structural problems
- New optical methods for analyzing deformations
- Analysis of mechanical behavior of new materials
- Experimental and numerical analysis of manufacturing processes

Related services and products

- Micro-crystallographic reactor
- Bidirectional microflow sensor
- Characterization method of orujo olive waste for optimizing olive oil extraction, and installation for its implementation
- Solar tracking system for solar energy collectors
- Solar radiation sensor
- Device for performing work on railway tracks
- Roller device for heavy equipment on a railway track
- Adapter for attaching equipment or instruments to swivel-head tripods
- Adapter element for attaching equipment or instruments to swivel-head tripods
- Pressure center measuring device and associated procedure

- Adaptable system for applying phytosanitary products
- Portable device for measuring displacement maps of surfaces in the three spatial directions
- Universal base for topographic targets and prism holders
- Hydropneumatic system for mixed phytosanitary application on leaf mass and soil
- Device for applying phytosanitary products
- Device for continuous injection of fertilizer in the soil
- Coupling device between a manual bicycle and a wheelchair
- Consultancy in energy-related and mechanical aspects
- Projects for thermal and mechanical facilities
- Energy audits
- Design and analysis projects for machines and mechanisms
- Optimization of energy systems
- Optimization of mechanical systems
- Structural mechanical analysis
- Projects for industrial plants and processes
- Safety studies in machines and CE marking
- Numerical simulation of manufacturing processes
- Mechanical testing
- Vibration analysis
- Characterization of materials
- Study of dynamic events by means of high-speed cameras
- Thermal testing
- Experimental stress analysis
- Structural integrity testing
- Specialization courses in Mechanical and Energy Engineering

Spanish website: http://bit.ly/2SefK2h