**Research Infrastructure (RI) Name:** Department of Mechanical and Manufacturing Engineering

(University of Cyprus)

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| **LAB** | PAWDER TECHNOLOGY LABORATORY |
| **LOCATION** | LΑ002, 202, 206 |
| **DESCRIPTION OF ACTIVITIES: Synthesis and characterization of Nanostructured Materials Fabricated via Mechanical Methods for Energy and Environmental Applications** | |
| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Glove Box | Mbraun, Labstar |
| Furnaces | Carbolite, box (max temperature 1500oC) and tube (max temperature 1200oC) |
| High Vacuum line | Vacuum line Chemglass / Αdixen turbo pump, ACT200TH |
| Thermal condutivity measuring system | Netzch, LFA457, temperature range -125 to 1100oC |
| Seebeck coefficient and electrical condutivity measuring system | ULVAC, ZEM3, temperature range -RT to 800oC |
| Hot Press | Thermal Technology, HP20, up to 20tons and 2000oC |
| Ball mills | Ball mills, Fritsch, P6 (up tp 600rpm) and P7 (up to 1200rpm) |

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| **LAB** | Biomedical Ultrasound Laboratory |
| **LOCATION** | ΛΑ138 |
| **DESCRIPTION OF ACTIVITIES:**  Diagnostic and therapeutic ultrasound applications in medicine. Contrast-enhanced ultrasound, nonlinear imaging techniques, bubble dynamics, ultrasound-mediated drug delivery. | |
| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| digital oscilloscope | Tektronix, 2GHz |
| Arbitrary function generator | Tektronix, 2 channel, arbitrary waveforms |
| Philips iU22 diagnostic scanner | Premium diagnostic scanner |
| Ultrasound transducers | focused and unfocased 0.2-10 MHz |

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| Needle hydrophones | Precision acoustics |
| Membrane hydrophones | Precision acoustics |
| Tissue flow phantoms | ATS |

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| **LAB** | Robotic Rehabilitation Laboratory |
| **LOCATION** | GP 102 |
| **DESCRIPTION OF ACTIVITIES:**  The activities of the lab focus on the use of robotic devices and haptic interfaces for the functional rehabilitation of upper extremities. The developed rehabilitation systems assist the user during physical therapy, and they are designed to be enjoyable during use while simultaneously providing an efficient therapy. We also work on the development of haptic environments that can be used for training. Our systems are designed (optimized) in order to take full advantage of the robotic system’s capabilities and the physical and neurological potential of the user. The lab is equipped with two haptic interface devices with different workspace sizes, which provide the required range of motion of upper limbs when they are constrained at either the wrist or the elbow. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Haptic Interface | Phantom Premium 1.5 High Force (SensAble Technologies) |
| Haptic Interface | Phantom Omni (SensAble Technologies) |

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| **LAB** | Polymers Laboratory and Polymer Processing Laboratory |
| **LOCATION** | ΛΑ003, 203 |
| **DESCRIPTION OF ACTIVITIES:**  Synthesis, characterization and processing of polymers and polymer-based composites aiming towards their further investigation in biomedical, environmental, energy-related, optoelectronic and other applications. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| **Refrigerators (with freezers)** | **Haier/Sharp** |
| **Size exclusion chromatography system equiped with 3 detection systems** | **Waters 515 HPLC Pump, PDConnect Multi-Channel Signal input/output system, PD2020 Light Scattering Detector, Waters 2414 Refractive Index Detector** |
| **Drying oven** | **Memmert** |
| **Rotary evaporator** | **Heidolph** |
| **High vacuum pumps** | **Edwards RV5** |
| **Vacuum pump** | **KNF** |
| **Laboratory fumehoods** | **Clean Air Limited/Ν. Atmatzidis SA** |
| **Magnetic stirrer hotplate with a digital setup temperature controller** | **ΙΚΑ RET Basic** |

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| **Vacuum line** | **Normag Labor und Prozesstechnik και University of**  **Sussex** |
| **Vacuum oven** | **Binder** |
| **Custom-made electrospinning unit** | **Flow controller: KdScientific, Power Supply: GAMMA** |
| **Spin-coater** | **NOVOSPIN C-series model SCC-200** |
| **pH-meters** | **M.R.C., PH/mv/TempMeter PL-600** |
| **UV-Vis spectrophotometer** | **UV-Jasco V-630 spectophotometer** |
| **High accuracy weight balance** | **ΚΕRΝ, ABT 100-5M** |
| **UV lamb** | **MiniMax UV lamb, Spectroline, UV-5NF 365/254nm** |
| **Vortex** | **IKA Vortex** |
| **Liquid nitrogen storage dewar** | **CRYOLAB 35 ALUMINIUM DEWAR (DWG. C/01870)** |

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| **LAB** | Thermal engines (MMK318) |  |
| **LOCATION** | ΛΑ201, Latsia |  |
| **DESCRIPTION OF ACTIVITIES** | Teaching lab for the needs of the course: Thermal Engines |  |
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| **ΠΕΡΙΓΡΑΦΗ ΕΞΟΠΛΙΣΜΟΥ** | | |
| **Εξοπλισμός** | **Περιγραφή (τύπος / προδιαγραφές)** | **Ποσότητα** |
| Τράπεζα ανάλυσης βενζινοκινητήρα | (ολοκληρωνμένη), κατασκευασμένη από το Τμήμα | 1 |
| Τράπεζα ανάλυσης πετρελαιοκινητήρα | (ολοκληρωνμένη), κατασκευασμένη από το Τμήμα | 1 |
| Κινητήρας | BRIGGS&STRATTON PROMAX AVR 2800WATTS/4200STARTING WATTS/ 6.5HP OHV | 1 |
| Μετρητής ροπής & Στροφών | Αισθητήρας TorgSense RWT410-FB 200Nm/0-5V Minimal shaft length - High shaft stiffness,Low inertia - High Speed capability Non-contact/brushless measurement - simple RF couple for power/signal transmission  High bandwidth 10kHz  300% mechanical safe overload  High accuracy (0.25%) and resolution (0.02%) Excellent noise immunity  Integral digital electronics  Operates both statically and dynamically - Clockwise and anti- clockwise,standard range: 1Nm through to 13000Nm  Sensors to monitor shaft temperature for better compensation and accuracy  LED Status light | 1 |
| Θερμόμετρο | OMEGA |  |
| ΓΕΝΝΗΤΡΙΑ | G89769-C1 DAC5 70890794 / 196956C |  |
| Αισθητήρας πίεση | AutoPSI Pressure Sensor Operating Instructions/AutoPSI- S,A,TC:-20C to 60C/9-18V DC input |  |

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| ΚΑΡΤΑ LabVIEW | NI USB-6009 | 3 |
| Αναλυτής καυσαερίων AUTO4-2plus Kit | Τέσσερις αναλυτές αερίου (αναβαθμίσιμες σε πέντε αέρια με την αναβάθμιση NOX)  με οθόνη LCD, ασύρματη επικοινωνία PC, υδατοπαγίδα, θήκη μεταφοράς, φορτιστή μπαταρίας | 2 |
| **Αναβάθμιση NOX** | Αισθητήρας NO για AUTO4-2plus Kit | 1 |
| **Διάταξη venturi** |  |  |
| [PASCO Venturi](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=56448&amp;Detail=1) [Apparatus - ME-8598](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=56448&amp;Detail=1) | ME-8598 | **3** |

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| **LAB** | Cancer Biophysics Laboratory |
| **LOCATION** | ΛΑ 134, 136, 137, 139 |
| **DESCRIPTION OF ACTIVITIES:** Application of principles from Engineering and Biology to solid tumors for effective delivery of drug | |
| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Cryostat and microtome | Sakura Tissue-Tek Cryo3, Sakura, Accu-Cut SRM200 |
| Real time PCR | Bio-Rad CFX96 |
| Fluoresence microscope | Olympus BX53, Nikon TS100F |
| High precision mechanical testing system | Instron 5944, 2KN load |
| High performance computing system | 10 servers, 20 AMD 16-core processors (320 cores in total) and 64 GB RAM/server |
| Biosafety Level II cabinet | Telstar Bio II Advance |
| Freezers | Panasonic MPR-1014-PA (-4 C), Panasonic MDF-U56VC (- 80 C) |

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| **LAB** | Computational Sciences Laboratory (UCY-COMPSCI) |
| **LOCATION** | Campus FEB B304, Green Park M102 & M109 |
| **DESCRIPTION OF ACTIVITIES:** UCY-CompSci operates as a research and training laboratory in the School of Engineering at the University of Cyprus and it is self-sustained through the external funding, primarily from European and US research grants. UCY-CompSci is active in research projects that span several fields, such as aerodynamics, turbulent fluid and plasma flows, biological fluid flows, environmental flows, controlled thermonuclear fusion and molecular dynamics. | |
| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |

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| 1 Master Node (dromis cluster) | HP DL385 G7 SFF Server |
| 30 Compute Nodes | HP DL165 G7 Server 16 cores at 2.3GHz |
| 10 Compute Nodes | HP DL160 G9 Server 28 cores at 2.4GHz |
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| 1 Master node (merope cluster) | DELL PowerEdge R710 2.8Gz 24-core |
| 6 Compute nodes | HP DL165G7 Server 2.3Gz 16-core |
| 8 Compute nodes | DELL PowerEdge SC1435 2.2Gz 8-core |
| 7 Compute nodes | DELL PowerEdge R210 2.4Gz 4-core |
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| 1 Master node (thetis cluster) | DELL PowerEdge R210 2.4Gz 4-core |
| 9 Compute nodes | DELL PowerEdge R815 2.6Gz 48-core |
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| 1 Storage System (fiber optical) | IBM System Storage DS3524, 24x1Tb hard drives |
| 2 Storage System (NFS) | HP ProLiant DL380p Gen8, 8x4Tb hard drives |
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| Workstation | XEON PHI PowerEdge T620, Intel Xeon Phi 3120A Coprocessor |
| Workstation | HP Z400, AMD FirePro 4800 graphics card |
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| InfiniBand Switch | HP Mellanox |
| Infiniband Switch | HP Voltaire IB 4X QDR 36P Managed Switch |
| Infiniband Switch | Melanox INFINITSCALE III SDR, 24ports, 10GB speed |
| Ethernet Switch | HP 5120-48G SI |
| Ethernet Switch | Catalyst 2960G Cisco, 24port |
| Ethernet Switch | Catalyst 2960-S Cisco, 24port |

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| **LAB** | Nanostructured Materials And Devices Laboratory |
| **LOCATION** | LA205, LA003 |
| **DESCRIPTION OF ACTIVITIES:**  Synthesis and characterisation of nanostructured materials and devices | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| CVD 1 | Atomate 1100 C |
| CVD 2 | Home Built 1500C |
| CVD 3 | Home Built 1200C |

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| **LAB** | ADVANCED COATINGS ENGINEERING LAB |
| **LOCATION** | GP008, A062 |

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| **DESCRIPTION OF ACTIVITIES:**  Research in the Advanced Coatings Engineering (ACE) Laboratory is focused on thin film material engineering and advanced materials, with the goal to contribute towards the basic understanding required to synthesise tailor made functional materials. Examples include the deposition of nanostructured thin films for automotive, biomedical, energy and nanomanufacturing applications. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Ultrasonic cleaner | Branson, capacity 5 and 15 liters, time and temperature control |
| Furnace | Nabertherm, RD tube furnace, maximum temperature 1300oC |
| Physical Vapour Deposition (PVD) system | LEYBOLD HERAEUS, L 560, maximum dimensions ~ 80 mm diameter, maximum temperature ~ 500oC |
| Industrial Physcical & Chemical Vapour Depostion (PVD/CVD) system | Robert Bosch GmbH, maximum dimensions ~ 800 mm x 250 mm, maximum temperature ~ 500oC |
| Vacuum leak detector | Leybold, PhoeniXL300, minimal detectable helium leakage rates in vacuum mode <5x10-12 mbar l/s |
| Optical microscope | Olympus, BX51 fluorescence microscope |
| Micro hardness testing equipment | Clark, CM-700AT, Vickers, Knoop and Brinell measurements |
| Laser acoustic measurement system LAwave | ALOtec Dresden GmbH, modulus of elasticity, thickness and density of thin films |
| Tribology equipment | ACE lab, measurements mainly at room temperatures |
| Thermal conductivity measurement system | LINSEIS, STA PT100, maximum temperature 1600oC |
| X-ray tomography | SkyScan, micro-CT X-Ray scanner |
| Fourier Transform Infrared Spectroscopy (FTIR) | Thermo Scientific, Nicolet 6700 |
| Raman Spectroscopy | Renishaw |
| Centrifuge | Eppendorf 5702, speed 100-4.400 rpm |
| Ultrasonic welding system | Stapla Ultrasonics, Stapla Albatros-35, 35 kHz |
| Ultrasonic welding system | Branson, Ultrasonic Fabric Sealing System |

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| **LAB** | Experimental and Statistical Analysis |
| **LOCATION** | A021 - Kallipoleos |

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| DESCRIPTION OF ACTIVITIES: Introduction to basic experimental techniques, employed for the determination of physical parameters, to the statistical analysis of experimental data, graphical methods for data presentation and to the preparation of laboratory reports. This laboratory course includes the following laboratory exercises: Law of conservation of linear momentum (Newton’s 2nd Law), Determination of gravitational acceleration (g) using a simple pendulum, Constitutive equation – Hooke’s Law, Conservation of Energy: Torque – Work , Torque of Parallel and non-parallel forces, Moment of inertia, Determination of friction coefficient, Thermal expansion, Specific heat capacity, Boyle’s Law, Charles’ law, Determination of viscosity in liquids. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Metallic tracks | Pasco ME-8972 |
| moving carts (500g) | Pasco Dynamics Cart ME-9430 |
| stopwatches | Pasco ME-1234 |
| Pulleys | Pasco |
| weights (of variable masses) |  |
| receptors (5 and 10g), hooks |  |
| measuring tape | LAND JC-386W |
| metallic stands |  |
| metallic rods | Pasco |
| springs |  |
| Dynamometers | Pasco |
| Rotation axes |  |
| Magnetic boards |  |
| Protractors |  |
| Weight balances (2χ) | KERN PFB 6000-1 / KERN FCB 6K1 |
| Vernier caliper | Scala |
| Micrometers | Scala |
| Metallic disk and metallic ring |  |
| Sensor (PASPORT) | PASCO PowerLink PS-2001 |
| Rotational motion sensor | PASCO PassPort Rotary Motion PS-2120 |
| polystyrene mounting base |  |
| Mountign base for rods TD-8578 | PASCO TD-8578 Compact Thermal Expansion |
| Metallic rods (copper, aluminum, brass) | TD-8578 |
| Steam generator TD-8556A | Pasco Steam Generator TD-8556A-220 |
| steam transport tubing |  |
| multimeters | Sinometer MY-60 |
| calorimeters | TD-8557A |
| weights (Al, W, Cu) |  |
| Thermometers |  |
| Hot plates | K-Line |

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| Αbsolute pressure-temperature sensor | Pasco PS-2146 Powerlink |
| PC - Datastudio software | Fujitsu Siemens |
| Θερμική Μηχανή/ Συσκευή Νόμου Αερίων TD-8572 | PASCO TD-8572 Heat Engine/Gas Law Apparatus |
| Aluminum gas chamber |  |
| 2 Plexiglas tubes (of approx. 2 m in length) |  |
| Glass measuring cylinders |  |
| Glycerine, anti-freezing liquid |  |
| glass beakers |  |
| laboratory gloves and protective clothing |  |
| plastic syringes |  |

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| **LAB** | MECHATRONICS ΙΙ |
| **LOCATION** | A021 |
| **DESCRIPTION OF ACTIVITIES:** Mechatronics II covers a range of experiments related to basic principles of constant (DC) and alternatic (AC) current electrical and electronic circuits. In particular students cover constant current circuits, resistances in series, parallel, the potentiometer , charging and discharging of a resistor in series with a capacitor, coils, transformers etc. They use oscilloscopes and also study simple electronic circuits such as the diode under forward and reverse bias, half wave and full wave rectifiers. In addition students study digitial circuits consisting of logic gates and they are also introduced in detail to Labview and programmable Logic Controllers which they subsequently use for their projects. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Η/Υ με λογισμικό LabView | HP / National Instruments |
| Κάρτες επεξεργασίας - DAQ Cards | NI PCI-6221 |
| Παλμογράφοι |  |
| Τροφοδοτικά AC/DC Power Supplies | Unilab |
| NI ELVIS Benchtop Workstation | National Instruments |
| Πολύμετρα | Sinometer MY-60 |
| FluidSim Software | Mech-Labs |

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| Logo! Soft Comfort Software | Siemens |
| Programmable Logic Controller (PLC) | Siemens Logo 12/24RC |
| Σταθμός Μεταφοράς - Conveyor Station | Festo |
| Σταθμός Στοιβάγματος - Stacking Station | Festo |
| Σταθμός Χειρισμού - Handling Station | Festo |
| Αντιστάσεις, Πυκνωτές, Δίοδοι, Επαγωγείς |  |
| Breadboards |  |
| Operational Amplifiers (OpAmps) | LM-741 |
| Πυνεία - με βάσεις |  |
| Σετ καλωδίων - Wiring Kits |  |
| Λαμπάκια - LED bulbs |  |
| Thermistor |  |

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| **LAB** | STRENGTH OF MATERIALS |
| **LOCATION** | A021 - Kallipoleos |
| **DESCRIPTION OF ACTIVITIES:** The activities covered in these laboratory sessions are determination of the behavior of metallic materials under tensile, torsional and bending testing and their mechanical properties, such as Young’s modulus, yield strength, tensile strength, elastic limit, fracture elongation etc. The resistance of metallic materials to indentation, by measuring the permanent depth of the indentation is also performed using Brinell, Vickers and Knoop Hardness Testing. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Microhardness Tester | Clark CM-700AT |
| Microhardness indentations for Brinell, Vickers and Knoop |  |
| Materials Testing Machine for Bending Tests | Gunt Hamburg WP300 |
| PC Data Acquisition | Gunt Hamburg WP300.20 |
| Materials Testing Machine for Tensile Tests | Gunt Hamburg WP300 |
| Elongation meter | Elongation meter |
| Materials Testing Machine for Bending or Compressive Tests | Gunt Hamburg WP300 |
| Aluminium Specimens (Cylindrical) for Tensile Testing | AlMgSi0.5 F22 |
| Bronze Specimens (Cylindrical) for Tensile Testing | CuZn39Pb3 |
| Aluminium, Copper, Bronze and Steel Specimens for hardness testing |  |
| Steel and Aluminium Specimens for Bending Tests |  |
| Measuring Tapes | LAND JC-386W |

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| Vernier caliper | Scala |
| Micrometers | Scala |

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| **LAB** | MATERIALS SCIENCE AND ENGINEERING |
| **LOCATION** | A021 - Kallipoleos |
| **DESCRIPTION OF ACTIVITIES:** The labs cover: crystal structure and defects, impact testing, metallography, phase diagrams, selection of materials. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| balls and sticks for the crystal structures |  |
| Pendulum Impact Tester | Gunt Hamburg WP400 |
| PC Data Acquisition | Gunt Hamburg WP400-20 |
| Polishing | Bitech MP Series |
| Microscope | AccuScope 3004 Microscope Series |
| Microscope | National DC3-163 Digital Microscope |
| furnace | Wenesco |
| thermocouples | Omega |
| amperometer | Sinometer MY-60 |
| Bi and Sn pieces |  |
| CES EduPack | PC - Software CES EduPack |

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| **LAB** | Introduction to Modeling and Analysis of Dynamic Systems |
| **LOCATION** | Kallipoleos Α021 |
| **DESCRIPTION OF ACTIVITIES:**  Modeling of Electromechanical Systems (Model development of mechanical and electrical parts, Parameter identification, Frequency response) | |
| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Support frame | In house development and manufacturing |
| Motor Tachometer | Μ586ΤΕ,Μclennan Servo Supplies |
| Optical Encoder | HENGSTLER 0527253,5V DC=/0.1A RI32-0/1500AR.11DA |
| Amplifier | IP55,TUV,SIRIM/AUX24V |
| Processing card | In house development and manufacturing, filtering of tachometer signal/voltage divider for measuring tachometer voltage & motor current. |
| Multimeter | Fluke 87V/E2 Combo Kit |
| Torque lever | In house development and manufacturing |
| Weights | RVFM Brass Slotted Mass Weight 10-100g |
| Alen key | 3mm-2.5mm |
| LabVIEW card | NIPCI-6221 |

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| **LAB** | Thermal Engines (MMK318) |  |
| **LOCATION** | ΛΑ201, Latsia |  |
| **DESCRIPTION OF ACTIVITIES:** | Dismantling - Gasoline engine assembly  Torque and power measurement of internal combustion engine  Exhaust gas measurement |  |
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| **EQUIPMENT DESCRIPTION** | | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** | **Quant**  **ity** |
| Gasoline Engine Analysis workbench | manufactured by the Department | 1 |
| Diesel Engine Analysis workbench | manufactured by the Department | 1 |
| Engine | BRIGGS&STRATTON PROMAX AVR 2800WATTS/4200STARTING WATTS/ 6.5HP OHV | 1 |

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| Torque measurement | TorgSense Transducer RWT410-FB 200Nm/0-5V Minimal shaft length - High shaft stiffness,Low inertia - High Speed capability  Non-contact/brushless measurement - simple RF couple for power/signal transmission  High bandwidth 10kHz  300% mechanical safe overload  High accuracy (0.25%) and resolution (0.02%) Excellent noise immunity  Integral digital electronics  Operates both statically and dynamically - Clockwise and anti-clockwise,standard range: 1Nm through to 13000Nm Sensors to monitor shaft temperature for better compensation and accuracy  LED Status light | 1 |
| Thermometer | OMEGA |  |
| Generator | G89769-C1 DAC5 70890794 / 196956C |  |
| Pressure sensor | AutoPSI Pressure Sensor Operating Instructions/AutoPSI- S,A,TC:-20C to 60C/9-18V DC input |  |
| LabVIEW data communication card | NI USB-6009 | 3 |
| GAS Analyzer AUTO4-2plus Kit | Kane May Auto 5-2  Four Gas Analyser (upgradable to five gas with the NOX upgrade) with LCD display, rubber boot, wireless PC communication, water trap, carry case, battery charger,  mains lead, high temperature exhaust prove, 230V and 12V adapter cable, spare filters. | 2 |
| NOX Upgrade | NO Sensor for AUTO4-2plus Kit | 1 |

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| **LAB** | Μεταφορά Θερμότητας (MMK217) |  |
| **LOCATION** | ΛΑ005, Λατσιά |  |
| **DESCRIPTION OF ACTIVITIES:** | Μέτρηση συντελεστή θερμικής αγωγιμότητας  Μέτρηση συντελεστή αφετικότητας Μεταβολή θερμικής ακτινοβολίας με την απόσταση |  |
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| **EQUIPMENT DESCRIPTION** | | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** | **Quantity** |
| Thermal conductivity measurement | 3x PASCO TD-8561 | 3 |

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| Steam generator | 6x PASCO TD-8556 | 6 |
| Digital accuracy scales | Digital scale 0,01gr – 500gr Fuzion | 2 |
| Thermopile, heat radiation sensor | PASCO 012-04695D | 3 |
| Radiation Cube | PASCO TD-8554A | 3 |
| Mili voltmeter | Fluke 87V/E2 Combo Kit | 3 |
| Ωhm meter | Excel XL830L Ψηφιακό 3 1/2 LCD | 3 |
| Thermal radiation source | PASCO TD-8555 | 3 |
| Digital voltmeter | Fluke 87V/E2 Combo Kit | 6 |
| Power supply 12V | 100-240V AC 50/60Hz Τάση εξόδου: 12V DC Ρεύμα εξόδου: 8A max /PS12- 8A | 6 |
| **Thermal Expansion** |  |  |
| [PASCO Compact Thermal Expansion](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1645&amp;Detail=1) [Apparatus](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1645&amp;Detail=1) | TD-8578 | **3** |
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| **Calorimetry** |  |  |
| [PASCO Basic Calorimetry Set](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=57934&amp;Detail=1) | TD-8557A | **3** |
| [PASCO Energy Transfer -- Calorimeter](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=54776&amp;groupID=321&amp;page=Manuals) | ET-8499 | **3** |
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| **Conduction** |  |  |
| [PASCO Heat Conduction Apparatus](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=55971&amp;Detail=1) | TD-8513 | **3** |
| [PASCO Thermal Conductivity](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1646&amp;Detail=1) [Apparatus](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1646&amp;Detail=1) | TD-8561 | **3** |
| [PASCO Steam Generator](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1641&amp;Detail=1) | TD-8556A | **3** |
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| **Convection** |  |  |
| [Radiation Cans](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1839&amp;Detail=1) | TD-8570A | **3** |
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| **Radiation** |  |  |
| [PASCO Complete Thermal Radiation](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=57533&amp;Detail=1) [System](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=57533&amp;Detail=1) | TD-8855 | **3** |

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| **LAB** | Energy systems (MMK417) |  |
| **LOCATION** | ΛΑ005, Latsia |  |
| **DESCRIPTION OF ACTIVITIES:** | Construction and Calibration of Thermocouples,  Measurement of Solar Power Density  Measurement of characteristic PV curve |  |
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| **EQUIPMENT DESCRIPTION** | | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** | **Quantity** |

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| Electric heating plate | SH-2Function: Heating And Magnetic StirringMaterial Of The Plate: AluminumPlate Sizes:  120x120mm 170x170mm/ Hot Plate Magnetic Stirrer | 3 |
| Digital voltmeter | Fluke 87V/E2 Combo Kit | 6 |
| Reference thermometer | Θερμοστοιχείο PT100/ Εύρος μέτρησης: -69.99 έως +199.99 °C / Ανάλυσης:0.01 °C/ Υψηλής Ακρίβειας:±0.07°C (-30 έως 149.9°C) στο υπόλοιπο εύρος  ±0.2°C | 2 |
| Thermocouples | various types (K,J,T) | 12 |
| Thermocouple reader | PS-2143 | 6 |
| PV cell | 2.2V, 480mA | 12 |
| light source | (ή ηλιακή ακτινοβολία) | 3 |
| Variable resistance | 100Ωhms max | 6 |
| Voltmeter | Fluke 87V/E2 Combo Kit | 6 |
| Amperometer | Fluke 87V/E2 Combo Kit | 3 |
| Fans | United UUF-663 | 3 |
| **Hydro power** |  |  |
| [ET-8771 Energy Transfer -- Generator](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=53668&amp;Detail=1) |  | **3** |
| [PASCO Energy Transfer – Hydro Accessory](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=53666&amp;Detail=1)  [- ET-8772](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=53666&amp;Detail=1) | ET-8772 | **3** |
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| **Gas laws** |  |  |
| [PASCO Heat Engine/Gas Law Apparatus -](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1611&amp;Detail=1) [TD-8572](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=1611&amp;Detail=1) | TD-8572 | **3** |
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| **Heat pump and heat engine** |  |  |
| [PASCO Energy Transfer – Thermoelectric -](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=54777&amp;Detail=1) [ET-8782](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=54777&amp;Detail=1) | ET-8782 | **3** |
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| **Solar constant set** |  |  |
| [TD-8497 Solar Constant Set](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;Product_ID=54778&amp;Detail=1) | TD-8497 | **3** |
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| [Energy Transfer - Solar](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ET-8593&amp;Detail=1) | [ET-8593](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ET-8593&amp;Detail=1) | 3 |
| [PASPORT Broad Spectrum Light Sensor](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2150&amp;Detail=1) | [PS-2150](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2150&amp;Detail=1) | 3 |
| [Atmospheric Properties Chamber](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ME-6813&amp;Detail=1) | [ME-6813](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ME-6813&amp;Detail=1) | 3 |
| [Adiabatic Gas Law Apparatus](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=TD-8565&amp;Detail=1) | [TD-8565](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=TD-8565&amp;Detail=1) | 1 |
| [Ratio of Specific Heats Experiment,](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=EX-9969&amp;Detail=1) [PASPORT](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=EX-9969&amp;Detail=1) | [EX-9969](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=EX-9969&amp;Detail=1) | 1 |
| [Absolute Zero Sphere](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=TD-8595&amp;Detail=1) | [TD-8595](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=TD-8595&amp;Detail=1) | 1 |
| [PASPORT Weather/Anemometer Sensor](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2174&amp;Detail=1) | [PS-2174](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2174&amp;Detail=1) | 3 |
| [PASPORT Rotary Motion Sensor](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2120&amp;Detail=1) | [PS-2120](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2120&amp;Detail=1) | 3 |
| [Wind Velocity Accessory](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ME-6812&amp;Detail=1) | [ME-6812](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ME-6812&amp;Detail=1) | 3 |

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| [PASPORT Motion Sensor](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2103A&amp;Detail=1) | [PS-2103A](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2103A&amp;Detail=1) | 3 |
| [PASPORT Goniometer Probe](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2138&amp;Detail=1) | [PS-2138](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=PS-2138&amp;Detail=1) | 3 |
| [Energy Transfer - Wind Turbine](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ET-8783&amp;Detail=1) | [ET-8783](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ET-8783&amp;Detail=1) | 3 |
| [Photogate Head](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ME-9498A&amp;Detail=1) | [ME-9498A](http://store.pasco.com/pascostore/showdetl.cfm?&amp;DID=9&amp;PartNumber=ME-9498A&amp;Detail=1) | 4 |

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| **LAB** | X-RAY DIFFRACTION LABORATORY |
| **LOCATION** | LA002B, LA002C |
| **DESCRIPTION OF ACTIVITIES:**  Measurement of structural properties in bulk materials and thin films. Fabrication of thin films using RF/DC sputtering technique. | |
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| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| X-ray diffractometer | RIGAKU SmartLab - X-ray diffractometer with a 9 kW Cu- rotating anode, equipped with two- and four-bounce monochromators for the incident beam and two-bounce monochromator for scatered beam, which allow measurements of medium, high and ultra-high resolution from thin films and bulk materials |
| Sputtering system for thin film deposition | Hummer Turbo sputtering system - equipped with two magnetron sputtering sources (RF and DC type) and a thickness monitor |

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| **LAB** | LABORATORY OF COMPLEX FUNCTIONAL OXIDES |
| **LOCATION** | LA203B |
| **DESCRIPTION OF ACTIVITIES:**  Synthesis of bulk materials in the form of powders using techniques of sol gel and slid state chemistry. Preparation of targets for the deposition of thin films by pulsed laser. Measurements of electrical, thermal and magnetic properties of materials as a function of temperature (2-400 Κ) and magnetic field (0-9 Τ) using various techniques | |
| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| High temperature tube furnace | Lindberg, three-stage tube furnace (maximum temperature 1500°C) |
| Intermediate temperature tube furnace | Homemade, one-stage tube furnace (maximum temperature 700°C) |
| Metal coater | Bal-tec, SCD500, dc sputtering and thermal evaporatin system equipped with a thickness monitor |

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| Low-temperature physical properties measurement system | Quantum Design, PPMS , equipped with instrumentation for measurements of ac/dc electrical resistance, Hall coefficient, magnetoresistance, thermal conductivity, thermoelectric power, and dc-magntization/ac-susceptibility over a  temperature range of 1.9 - 400 K and a range of magnetic field 0 - 9 T |
| Recycling system of liquid helium | Cryomech helium reliquefier equipped with a pulse tube cryocooler and a compressor |
| Bench-top hydraulic press system | Specac, Atlas, 25 Ton manual hydraulic press |

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| **LAB** | LASER-ASSISTED MATERIALS PROCESSING LABORATORY |
| **LOCATION** | LA204 |
| **DESCRIPTION OF ACTIVITIES:**  Deposition of thin and ultrathin films and nanostructured metarials with the pulsed laser deposition technique | |
| **EQUIPMENT DESCRIPTION** | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** |
| Thin film deposition chamber | SURFACE systems + technology GmbH + Co KG - chamber base pressure 6x10-8 Torr, maximum substrate temperature 1000°C, rotating carrousel of 4 targets and in-situ high-pressure reflection high-energy electron diffraction system (30 keV RHEED, R-DEC). |
| Thin film deposition chamber | Excel Instruments - chamber base pressure 1x10-6Torr, maximum substrate temperature 800°C, rotating carrousel of 4 targets and rotating system of LN2-cooled target (77 K) for sensitive materials |
| Nanosecond pulsed laser | Coherent - Model COMPexPro 201 - KrF excimer laser, wavelength=248nm, maximum energy per pulse=700mJ, pulse duration=25ns, pulse repetition rate=1- 10Hz. |
| Picosecond pulsed laser | Time-Bandwidth Products – Model Duetto - wavelength= λ= 1064 nm, 532 nm, 355 nm - pulse duration, FWHM (1064 nm)=  10.0 ps at 200 kHz and 10.2 ps at 8.2 MHz - pulse repetition rate= 200 kHz to 8.2 MHz - average energy per pulse (200 kHz/8.2 MHz)= 52/1.6 μJ, 35.0/0.1 μJ, 19.5/0.01 μJ - average power (200 kHz/8.2 MHz)= 10.4/12.4 W; 7.0/1.0 W; 3.9/0.08 W. |

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| **LAB** | LABORATORY OF THERMOELECTRIC MEASUREMENTS | |  |
| **LOCATION** | LA206 | |
| **DESCRIPTION OF ACTIVITIES:**  Measurement of electrical, thermal and thermoelectric properties as a function of temperature (10 - 300 K) using various techniques. | | |
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| **EQUIPMENT DESCRIPTION** | | |
| **EQUIPMENT** | **DESCRIPTION (MODEL, SPECS)** | |
| Closed cycle Helium cryostat | AS Scientific Products - system consists of a Gifford-McMahon cryogenic cold head and a Sumimoto compressor, and probes for measurements of elelctrical resistance, thermal conductivity and thermoelectric power for a working temperature range 10-300 K. | |
| **LAB** | | Manufacturing Lab |
| **LOCATION** | | A 062 , A 063 , 75 Kallipoleos P.O. Box 20537 1678 Nicosia, Cyprus |
| **DESCRIPTION OF ACTIVITIES:** Undergraduate students are introduced to manufacturing laboratories during the 3rd year of their studies in the MME 347 - Design and Manufacturing and MME 348 - Manufacturing Processes courses. Undergraduate students are trained to use conventional and CNC lathe and milling machines | | |
| **EQUIPMENT DESCRIPTION** | | |
| **EQUIPMENT** | | **DESCRIPTION (MODEL, SPECS)** |
| Lathe (HAAS) (1) | | Computer Numerical control |
| Mill (HAAS) (1) | | Computer Numerical control , table travels XYZ 400 x 250 x 250 mm |
| 3D Printer (Ultimaker) (1) | | Buld volume 120x120x115 mm, material PLA |
| 3D Printer (Markforged) (1) | | Buld volume 320x132x154 mm, materials Nylon, Fiberglass, Carbon fiber, Kevlar |
| Thermoforming centre (1) | | Vacuum forming / Extrusion / Welding |
| Milling and Drilling machine  (1) | | X - axis travel 350mm, Y- axis travel 180mm |
| Electro-Discharge Machining (1) | | table travels X/Y axes 150x100 mm , Z- axes travels with DC motor 180 mm |
| Scanny 3D (1) | | Laser |
| Lathe (7) | | Manual Lathes |