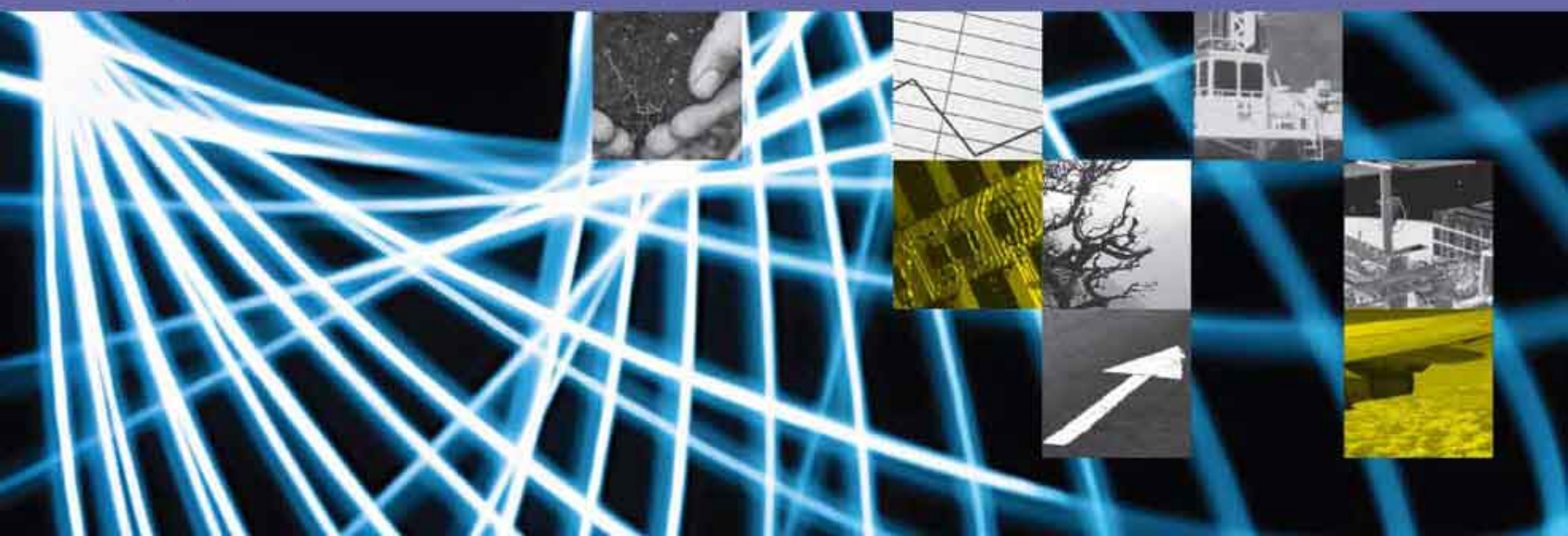
Laboratory Guide

Technical University of Crete

LIAISON OFFICE OF THE TECHNICAL UNIVERSITY OF CRETE



Technical University of Crete Laboratory Guide

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Abbreviations:

Assist.:	Assistant (Professor)
Assoc.:	Associate (Professor)
URL:	Uniform Resource Locator, the unique address of a specific page on the internet. If not otherwise indicated, a complete address should have: "http://" (no quotation marks) in front of it, in case it starts with "www"
Prof.:	Professor
EEDIP:	Adjunct faculty members
email:	electronic mail
ETEP:	Laboratory instructors
T.U.C.:	Technical University of Crete

The project "Liaison Office of the Technical University of Crete" is co-funded by the European Union (75%) and by the Hellenic State (25%) through the Action 4.2.3 "Liaison Offices – Technology Brokers" of the Measure 4.2 "New Knowledge Intensive Business Inbubators and Technological Parks and Research Centres with the Participation of Enterprizes" of the Operational Programme "Competitiveness 2000 – 2006".

Contents

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Forward

The Technical University of Crete (TUC), in parallel with its educational role is also a cradle of production of innovation, where the ideas are transformed into innovative products and services, aiming at the fulfilment of needs of the economy and production, as well as the society in general.

The Liaison Office (GFDM) of Technical University of Crete acts as an interface between the academic community of the Institution and the Productive and Social Bodies, in order to utilise and promote the research and creative work of its researchers and make it available to the public.

Emphasis is given to the promotion of research and know-how transfer of innovative products, services and cutting edge technologies that will create new work places and will contribute to the improvement of competitiveness.

The main objectives of our office are:

- The encouragement of cooperation between the researchers of TUC and the industry and the creation of a feedback mechanism for the advisable research directions and their likely/ possible applications.
- The effective promotion and commercial exploitation of research products of the laboratories of TUC by technology and know-how transfer to enterprises for the import of innovations and the improvement of their competitiveness in the international markets.
- The networking with other Technology Transfer Centres, Research Institutes, Technology and Science Parks, Incubators, etc., while aiming at the projection and consolidation of mature research products, technology transfer, as well as the enhancement of the university and industry relation and creation of a strong long term link between them.
- The growth of new mechanisms for the Transfer of Technology and the Management and Protection of Industrial and Intellectual Property.

The Laboratories' Guide that you have in your hands aims to contribute to the wider distribution and exploitation of products and services that are based on academic research, by presenting in a concise way the profile of the Laboratories of Technical University of Crete, their research activities, the main results of the research programs in which they participate and the services that they provide.

Finally, we would like to thank the Directors of Laboratories for their collaboration and their contribution to the materialization of this publication.

Prof. Nikolaos Varotsis
Scientific Coordinator
of the Liaison Office

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Laboratories of Department of Sciences

Analytical and Environmental Chemistry Laboratory

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RESEARCH ACTIVITIES

1. Development and Applications of Instrumental Methods of Analysis (XRF, TXRF, mobile XRF, Atomic Absorption Spectrometry, HPLC, γ-ray spectrometry, IR)
2. Production of new membranes for trace elements analysis, preconcentration techniques
3. Chemical Speciation
4. Environmental Analyses (heavy metals, aerosol, anions, environmental radioactivity)
5. Archaeometry, mortar analysis and characterization
6. Surface analysis (paints, plated metals etc)

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- X-Ray Fluorescence (Energy Dispersive) (XRF, EDXRF), tube excitation (Ag, Mo, Cu, W) and radioisotope excitation (Fe-55, Cd-109, Am-241)
- Total Reflection X-Ray Fluorescence (TXRF).
- Mobile XRF
- Atomic Absorption Spectrometry (AAS).
- Liquid Chromatography, Ion Chromatography (HPLC, IC), chemical suppressor.
- Gas Chromatography (GC)
- UV-visible apectrophotometry (UV-Vis) with Diffuse and Specular Reflectance
- Gamma ray spectrometry
- Infra red spectrometry (IR, FTIR)
- Microwave and high temperature furnaces, freeze drying
- Liquid nitrogen production plant
- High purity water production (18 MΩ)
- High Vacuum Pump System
- Classical methods chemical Lab., standard samples etc.

RESEARCH AND DEVELOPMENT PROJECTS

1. Production of new membranes for X-Ray heavy metal analysis (financial support: Greek Ministry of Education (75% European Social Funds), 2005 – 2006)
2. Chemical analysis of mortars and stones (Stone conservation 2005 –)
3. No destructive analysis of corroded metal samples from New Kydonia ancient cemetery (financial suppory: Cretan Municipality (75% European Social Funds), 2006)
4. Improvement of minimum detection limits in X-Ray trace element analysis X (financial support: Greek Ministry of Education (75% European Social Funds), 2002 – 2006)
5. Radioactivity measurement in imported products
6. Heavy metal analysis in drinking water and wines (Greek-slovenian collaboration, financial support Greek Secretariat of Research and Development, 2003-2005)
7. Study of a Cyclotron installation for radioisotope production (financial support: Biokosmos company, 2003)
8. Nuclear Techniques in Analytical Chemistry (financial support: International Atomic Energy Agency, IAEA, 1996)
9. Analysis of ancient silver coins from Great Alexander period (financial support Greek Secretariat of Research and Development, 1993-1995)

RESEARCH RESULTS/PRODUCTS

1. New membrane production for heavy metal analysis
2. Ink production for authentication reasons

SERVICES OFFERED TO THIRD PARTIES

1. Trace element analysis in various samples (liquids, metals, geological, mortars)
2. Anion analysis
3. Potassium, sodium, sulphur and trace element analysis in fuels
4. Archaeometry
5. Surface, paintings, and surface plated metal analysis
6. Environmental Radioactivity
7. In site heavy metal analysis
8. Chemical analysis information

Applied Mathematics and Computer Laboratory (AMCL)

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RESEARCH ACTIVITIES

1. Numerical Analysis.
2. Numerical Linear Algebra.
3. Numerical Methods for Solving Boundary and Initial Value Problems.
4. Iterative Methods for Solving Linear Systems.
5. Parallel processes - Parallel Algorithms.
6. High Performance Scientific Computing.
7. Shared and Distributed Memory Computing.
8. Cluster and Grid Computing.
9. Numerical Methods for Simulation Models of Brain Tumor growing.
10. Numerical Methods for Models in Hydrodynamics and Conservation Laws.
11. Stochastic Optimization Algorithms.
12. Atmospheric Turbulence Simulation Models.
13. Cellular Automata.
14. Data Bases applications.
15. Classical and quantum soliton automata.
16. Quantum computing Algorithms.
17. Quantum Algorithms for Data Base Search.
18. Quantum theory in Informatics and Communications.
19. Research for the development of Quantum Computer Architectures and Communication Systems based on Quantum Physics.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

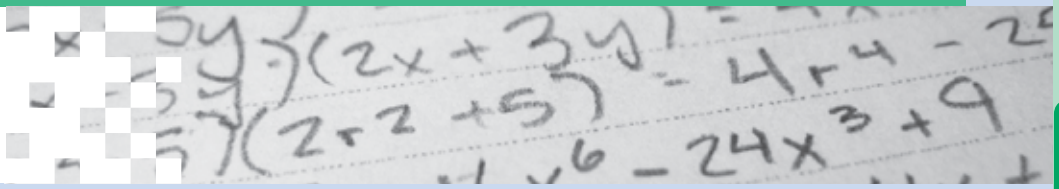
- SGI Origin 350 multiprocessor system with eight (8) processors.
- Four clustered SUN Fire V240 with two processors each.
- SUN Fire V880 multiprocessor system with four (4) processors.
- SUN Fire V280 server with two (2) processors.
- A heterogeneous network of five (5) Unix workstations with RISK architecture models of Hewlett-Packard, Sun and Silicon Graphics.
- Software: MATLAB, MAPLE, COMSOL, Grid Engine.

RESEARCH AND DEVELOPMENT PROJECTS

1. "Development, upgrade and Enrichment of the library of the Technical University of Crete", EPEAEK II (2.1 / Action 2.1.3). Funded by the E.U. and the Greek Ministry of Education.
2. "Iterative Methods and Cluster/Grid Computing for the innovative Solution of Elliptic PDEs", EPEAEK II Action «Herakleitos», Funded by the E.U. and the Greek Ministry of Education.
3. "Quantum Computing and Quantum Information", EPEAEK II Action «Pythagoras», Funded by the E.U. and the Greek Ministry of Education.
4. "Support the Reforming of Undergraduate Courses by using Information Technology and apply e-learning to the Technical University of Crete", EPEAEK II Action 2.2.2.α, Funded by the E.U. and the Greek Ministry of Education.
5. "Stochastic Optimization Algorithms for Adaptive optics in Astronomy". PENED 96ΕΔ1431 (in collaboration with University of Crete and FORTH). Funded by the General Secretariat of Research and Technology of Greece.
6. "Stochastic Optimization Algorithms for Adaptive optics in Astronomy". PENED 99ΕΔ107.527 (in collaboration with University of Crete and FORTH). Funded by the General Secretariat of Research and Technology of Greece.
7. "High Performance Computing for Scientific and Multimedia Applications". PENED 99ΕΔ 566 (in collaboration with MUSIC/TUC and the University of Patras). Funded by the General Secretariat of Research and Technology of Greece.

RESEARCH RESULTS / PRODUCTS

1. Development the "terminology and typology vocabulary for ancient folklore Cretan pottery" CD-ROM, in cooperation with the Archaeological institute of Crete.
2. Applied stochastic optimisation algorithms for adaptive optics to the Skinaka observatory in Crete, in cooperation with the University of Crete and the Foundation for Research and Technology-Hellas (FORTH).
3. High Performance Computation for Scientific and Multimedia Applications.



SERVICES OFFERED TO THIRD PARTIES

1. Software development for archaeological applications
2. Methodology, software and hardware development for driving adaptive optics systems in observatories.
3. Application, adaptation and evaluation of new parallel software systems development technologies for satisfying real-world applications with high performance computing requirements, both in computational power and memory capacity, in two different parallel computing platforms: a) cache coherent Non Uniform Memory Access architecture, and b) Distributed Memory architecture.

Applied Mechanics Laboratory

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ACTIVITIES

1. Antiseismic Protection (Antiseismic Design, Seismic Isolation Techniques, GIS methodologies for the antiseismic protection of civil planning and construction).
2. Quality control of structural materials, pavements, subways, piles wind generators etc by the use of destructive and non-destructive (NDT) in-situ testing.
3. Failure inspection of Lifelines by the use of ultrasonics.
4. Historical monuments (Rehabilitation studies, photogrammetric landing and strengthening methodologies).
5. Production of new composite materials.
6. Structural Modeling, Design and Optimization

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Equipment for the Quality control of structural materials:

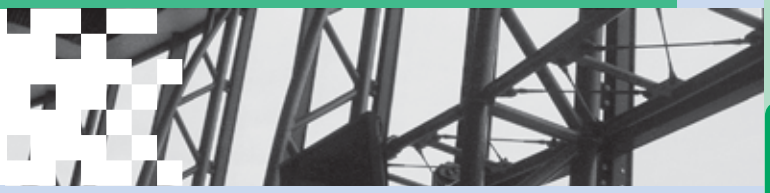
- Servo-hydraulic machine for strength and fatigue testing of metallic material
- Servo-hydraulic machine for compression strength testing of concrete.
- Servo-hydraulic machine for tension strength testing of concrete reinforcement bars.
- Ultrasonic equipment for quality control of metallic materials.
- Ultrasonic equipment for quality control of concrete.
- Eddy current equipment for quality construction testing of common structural works
- Equipment of corrosion testing for concrete reinforcement bars.
- Core drilling machine for in-situ testing.
- Vacuum autoclave for new composite and advanced material production.
- Hopkinson's bar for high strain rate testing of metals.
- Digital accelerometers for the structural dynamic characteristic estimation.
- Process Lathes, Milling Machine, Drilling machine and general purpose machine tools.
- Single Screw Extruder for polymer melt and composite compounding
- Uniaxial Elongational flow rheometer for polymer melts

Computers and Software:

- Three Workstations of high demand and computational power.
- PC network.
- Digitizers, Plotters, Scanners, Photogrammetry software.
- Software for modelling and analysis of structures (NASTRAN, PATRAN, MARC, COMSOL)

RESEARCH AND DEVELOPMENT PROJECTS

1. Project Title: «A Computer aided reduction of Seismic Risk in existing cities, planning and construction: Case study in the city of Chania», Programme ENVIRONMENT AND CLIMATE PROGRAM, Funding: EC 5th FRAMEWORK, Start -End: 1998-2002.
2. Project Title: «EU-Japan Joint Research in Seismic Risk», Programme: COPERNICUS PROGRAM, Funding, EC 5th FRAMEWORK, Start - End: 1998-1999.
3. Project Title: «Fatigue and Abrasion Mechanisms in Fabric Reinforced Rubber Belting», Programme BRITE_EURAM, Funding, EC 5th FRAMEWORK, Start - End: 1997-2001.
4. ProjectTitle: «ReS-MiSeRi: Performance Based rehabilitation Strategies for Mitigation of seismic Risk», Programme EESD,Funding, EC 5th FRAMEWORK, Start - End: 2002-2004.
5. Project Title: «Static and Dynamic Integrity of the Lighthouse and Breakwater of the Venetian Port of Chania», Programme RE.CIT.E-ROC-NORD, Funding, OANAK, Start - End: 1995-1997.
6. Project Title: «Seismic Analysis of Structures in Crete», Programme ROP of Crete , Funding Region of Crete, Start - End: 1994-1995.
7. Project Title: «Monitoring and Evaluation of the structural condition and antiseismic integrity of monuments and application of structural rehabilitation and conservation», Programme ROP of Crete, Funding Region of Crete, Start - End: 1994-1995.
8. Project Title: «Analysis and optimum design of pavements», Programme PENED 1995, Funding G.S.R.T, Start - End: 1995-1997.



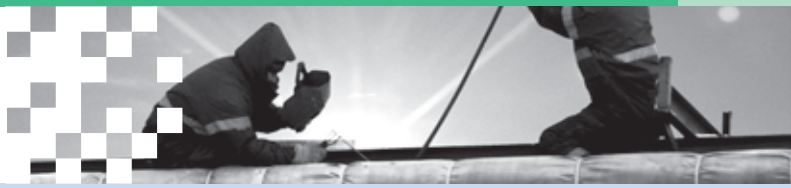
RESEARCH RESULTS/PRODUCTS

1. Antiseismic Protection of the city of Chania
2. Techniques for damage detection in materials and structures.
3. Technbiques for rehabilitation and strengthening of masonry walls.
4. Advanced composite materials (FRP and CFRP)
5. Smartdamper – Smart seismic damper
6. Brake system for motorcycles
7. Modification of linear polypropylene for the economical production of structural foam.
8. Composites consisting of short fibres connected into a continuous network within a polymeric matrix.

SERVICES OFFERED TO THIRD PARTIES

1. Technical consultancy and support of working teams and organizations in quality control of materials and structures
2. Study of special problems in strengthening of historical monuments
3. Health monitoring of structural integrity with in-situ testing (accelerometers, PZT actuators/sensors, strain gages, ultrasonics, pulse-echo etc.).
4. In-situ Qualification of structural integrity
5. GIS management of of physical disasters
6. Study on the effect of the molecular structure on the extensional rheology and processability of polymer melts.
7. Polymer compounding and polymer matrix composites

Applied Socio-Economic Research Laboratory



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ACTIVITIES

1. Study of the socio-economic prerequisites and impacts arising from the development and transfer of technology.
2. Study of the primary sector development mechanisms.
3. Study regarding the financial management of the environment and natural resources.
4. Actions pertaining to the formulation of technological development policies.

RESEARCH AND DEVELOPMENT PROJECTS

Socio-economic Research of the Primary Sector in Crete: Co-operatives and Technological Development. Regional Operational Programme of Crete. Source of Funding: Region of Crete, 1994-1999.

RESEARCH RESULTS / PRODUCTS

1. Input-output model for the primary sector of Crete
2. Model of basic principles for the restructuring of Agricultural Co-operatives
3. Proposed measures for the development and dissemination of technology/know-how in the primary sector.

SERVICES OFFERED TO THIRD PARTIES

1. Studies about the development of the agricultural sector
2. Applied research on socio-economic and technological development
3. Socio-economic research pertaining to the environment

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ACTIVITIES

Basic Research:

1. Study of nonlinear optical effects.
2. Study of multiphoton phenomena (i) in atomic physics (ii) photoelectric effect (iii) measurement of electron relaxation time with crystal lattice.
3. Study of the production and the dynamics of clusters composed by a large number of atoms (103 – 106).
4. Generation of high harmonics by ultra–short laser pulse interaction.
5. Ultra–short laser pulse propagation under atmospheric pressure conditions and its application in the study and detection of pollutants.
6. Nuclear physics using ultra–short laser pulses.

Applied Research:

1. Application of lasers in medicine and in the environment.
2. Laser spectroscopy for quantitative and qualitative analysis using different types of mass spectrometers.
3. Laser applications in the development of new materials emphasizing on (i) surface deposition of new materials (ii) surface ablation (iii) processing of surfaces.
4. Development of pulsed sources: X rays, electrons, ions, lasers.
5. Development of pulsed sources of coherent Electromagnetic radiation in the spectrum region of VUV for microlithography.
6. Development of photochemical pumped Excimer laser systems.
7. Development of detectors and detecting systems within the ISO standardisation.
8. Development of laser systems for industrial applications.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Applied & Basic Research Equipment:

- Solid state laser Ti: Sapphire 20fs ($20x10^{-15}$ sec) 80MHz.
- Excimer laser.
- Dye laser (tuneable wavelength).
- Time–of–flight mass spectrometer for the analysis of solid, liquid, gas and samples of big biological macromolecules.
- High vacuum systems (10^{-7} mbar).
- Optical elements and optical systems for optical absorption and emission measurements of materials covering the spectrum region from infrared to ultraviolet.
- Optical spectrometer of high resolution in UV and VUV.
- Double grating optical spectrometer of high–resolution for visible and ultraviolet measurements.
- Optical systems measuring the physical parameters of ionised matter (plasma), detectors for electron and ion measurement (micro–channel–plates) and photomultipliers (in the spectral region covering from the visible to ultraviolet).
- Electronic and digital systems for the support of experiments (power supplies, multipliers, A/D converters etc).

Educational Equipment (Undergraduate & Postgraduate level): The Institute has a large collection of experimental set–ups for experiments on classical mechanics, aerodynamics, thermodynamics, optics, electricity, magnetism, atomic & nuclear Physics. The more important part of the Institute's collection equipment and experimental set–ups are mentioned below.

- Air ducts, air blowers, calorimeters, optical boards, collection of optical elements (e.g. lenses, prisms & grattings), He–Ne lasers, spectrometers, spectral calibration lamps, oscilloscopes, power supplies, ballistic galvanometers, stroboscopes, Geiger–Muller detector, X–ray generation device, PC controlled detectors and devices etc. In addition to the above:
- Hall Effect device.
- Device for the measurement of sound velocity in liquids (ultrasounds).
- Quincke interferometer.
- Spectrometer for visible light wavelength measurement.
- Michelson interferometer.

- Frank Hertz experiment.
- X–ray generator and experimental set–up.
- Adiabatic process study device.
- Diffraction & interferometer experimental set–up.
- Pressure, temperature and lighting measurement sensors.
- Hydrogen technology fuel cells.
- Viscosimeter.
- Hydraulic pressure experimental set–up for material tests
- Spectrometer in the visible.

Machine Engineering Equipment:

- High precision lathe.
- High precision numerically controlled (NC) 1500 mm lathe.
- High precision lathe and milling machine.
- Numerically controlled (NC) shaping lathe.
- Drilling machine.
- Electric welding (Argon using the TIC method etc).
- Variety of electric and hand machine tools.
- Drawing table.

Computer Hardware & Software:

- Computer network, plotter, scanner, CAD software.

Audiovisual Facilities

- Full equipment for oral presentations and multimedia facilities.

RESEARCH AND DEVELOPMENT PROJECTS

1. "Development of a time–of–flight mass spectrometer for medical & biomedical applications for the analysis of solids, liquids and gases". Funding: GSRT (ΓΓΕΤ), a Greek–German cooperation project (1995–1999).
2. "Design and development of a robotic device for micrometric displacement on x–y–z axes, 10^{-6}m precision", (1993–1994).
3. «Ionization and dissociation studies of molecules in liquid and high density media». Funding: EEC (ENVIRONMENT STEP), 1991–1993.
4. "Multiphoton ionisation of CFCs and other harmful gases [O3] in the presence of other gases and in different temperatures. Funding Reinforcement Program of Human Research Manpower. ΠΕΝΕΔ. Funding: GSRT (1996–1998).
5. «Non-linear propagation of Ultrashort laser Pulses». Human Potential Program. 2002-2005.
6. «Use of short pulse lasers». Human Potential Programme (Three cooperation programmes with the IESL of FORTH, the Imperial College (GB) and the Laboratoire d'Optique Appliquee (FR)
7. "Pythagoras" program. Funding by the Ministry of Education, concerning the detection of pollutants in the atmosphere [like O3, NOX, etc] using the propagation effect of ultra–short laser pulses.
8. "Unistep–University Student Entrepreneurship. Action 1 & Action 2, Training of students, from theory to practice". A synergy between the Technical University of Crete, the Technological Park of Heraklion, the University of Crete and the Region of Crete.
9. "Ulysses synergy project. Development of models of experimental physics", Mobility programmes, Action 1.3.d., ΕΠΕΑΕΚ, Funding: Greek Ministry of Education, 1998–2000.

RESEARCH RESULTS/PRODUCTS

1. Development of a time–of–flight mass spectrometer for the analysis of solids, liquids and gases
2. Design and development of a robotic device for micrometric displacement on 3 axes.
3. Development of Unmanned Autonomous Vehicles (UAV), multi-purpose platforms and GPS based applications
4. Development of laser based Ion Guns for TOFMS and ion implantation (application in semi-conductors)

SERVICES OFFERED TO THIRD PARTIES

1. Study, design and development of laboratory and industrial prototype systems
2. Studies related to the Institute's research activities.
3. CPD Services (Continuous - Professional-Education), concerning:
   - Laser systems and applications in medicine and in the industry,
   - Instruments & Measurement techniques using optical systems,
   - Laser spectroscopy using mass spectrometers & optical Spectrometers,
   - Vacuum techniques,
   - Automation for the control, operation & processing of experimental measurements,
   - Training on teaching experimental physics.
4. Training of students and technicians on issues of experimental physics and laser technology.
5. Production of educational material (multimedia, simulation of experiments on PCs.

Physical Chemistry and Chemical Processes Laboratory

Department:	Sciences
Division:	Chemistry
Head:	Assoc. Prof. Ioannis Yentekakis
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ACTIVITIES

1. Catalysis and Electrocatalysis. Development of innovative highly active and selective catalysts and electrocatalysts.
2. Conventional Promotion and Electrochemical Promotion. The NEMCA effect. Industrial applications.
3. Protection and Restoration of the Environment. Automotive and Industrial emissions control.
4. Development of clean (non-pollutant) chemical technologies.
5. Fuel Cells. Electrical energy production.
6. Natural gas utilization and valorization. Development of new exploitation methods.
7. Analysis, design and optimization of chemical-electrochemical reactors and chemical processes.
8. Hydrogen production from hydrocarbons, biogas, biomass and water.
9. Analysis of surfaces and interfaces. Physiochemical properties characterization of materials.
10. Biomass utilization. Wastewater treatment.
11. Renewable sources of energy.
12. Consulting: Physiochemical characterization of materials. Design, analysis and optimization of chemical reactors, fuel cells and chemical processes. Development of specific methods for chemical analysis.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Fourier Transform Infrared Spectroscopy (FTIR).
- UV-VIS Spectroscopy with Diffuse and Specular Reflectance.
- Gas Chromatography (GC).
- Mass Spectrometry (MS).
- Surface and porous materials characterization by chemisorption and physical (BET) absorption.
- Interfaces analysis by electrochemical methods. Potentiometry, Cyclic Voltmametry.
- Continuous flow apparatuses and several kinds of Reactors.
- High precision balance.
- Chemiluminescence NOx analyzer.
- Mass Flow Controllers.
- Air purifier.
- Chemical reagents, glasses and machine-works stock.
- Planetary ball-mill.

RESEARCH AND DEVELOPMENT PROJECTS

1. «Development of new, innovative catalysts for vehicles for the atmospheric pollution control». "Aiding Program for new Researchers". Financial support by ELKE, Technical University of Crete (2003-2004).
2. «Kinetic, electrokinetic performance and electrodic phenomena of novel electocatalysts in fuel cells under reactions related to emissions control». "EPEAEK-HERAKLEITOS" program. Financial support by the National Ministry of Education and Religious Affairs and the European Union (2003-2006).
3. «A novel process for electrical energy and hydrogen production from municipal and high COD industrial wastewater treatment». "PENED-03" program. Financial support by the GSRT (2005-2008).
4. «Development and application of novel bi-metallic anodic electrodes for direct hydrocarbon Solid Oxide Fuel Cells (SOFCs)». "Scientific and Technological cooperation between RTD organizations in GR and USA" program. Financial support by the GSRT (2006-2008).
5. «Development of novel, highly active, selective and easily recyclable catalytic converters for automotive emissions control». "PENED-03" program. Financial support by the GSRT (2005-2008).
6. «Study of the usage of Greek lignite for the adsorption of pollutant cages». Program ΕΠΑΝ, Ι.Γ.Μ.Ε. Financial support by the EU (2003-2005).

7. «Fused metal anode solid oxide fuel cells for simultaneous coal gasification and production of electrical energy». Program "KARATHEODORI". Financial support by the University of Patras, ELKE (2000-2003).

RESEARCH RESULTS/PRODUCTS

1. Municipal and Industrial wastewater treatment and simultaneous production of electrical power with an environmentally friendly manner.
2. Novel automotive catalytic converters.
3. A novel method for the conversion of Natural Gas to Ethylene with high yield >85%.
4. Intermediate and high temperature biogas fuel cells.
5. Catalytic filters for industrial gaseous emissions control.

SERVICES OFFERED TO THIRD PARTIES

1. Chemical analysis and physiochemical characterization of materials, surfaces and interfaces. Chemical analysis of gas pollutants (hydrocarbons, NOx, SOx, VOCs etc.)
2. Consulting for the design, control and optimization of chemical reactors and physico-chemical processes.
3. Design and engineering of physical and chemical processes. Development of novel chemical and power production technologies.
4. Chemical Engineering matters.
5. Consulting for the efficient utilization and valorization of Natural Gas.
6. Consulting for the development and operation of natural gas, hydrogen, biogas fueled solid oxide fuel cells
7. Consulting for selecting and developing the appropriate equipments apparatuses and technologies for the control of industrial and power units' emissions. Construction of specialized catalytic filters.

2

Laboratories of Department of Production Engineering & Management

Cognitive Ergonomics & Industrial Safety (CEIS) Laboratory

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Division:	Management & Administration
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LABORATORY STAFF

- Chalkidou Anastasia, Production & Management Engineer
- Giannakakis Nikolaos, Electronic & Computer Engineer
- Kokkinos Konstantinos, Production & Management Engineer
- Ksifaras konstantinos, Production & Management Engineer
- Machaira Paschalia, Production & Management Engineer
- Stampouli Maria, Production & Management Engineer
- Vaggeloglou Evaggelos, Production & Management Engineer

email: *insafety@dpem.tuc.gr*

ACTIVITIES

1. Ergonomic design of workplaces
2. Ergonomics design of information technology products
3. Computer-based training in occupational safety
4. Industrial training in fault diagnosis
5. Stress effects on human reliability and decision making
6. Human error modelling and quantification
7. Simulation of man-machine systems
8. Emergency response planning
9. Accident analysis
10. Industrial Risk Analysis
11. Control of Major-Accident Hazards (SEVESO)
12. Occupational Risk Assessment
13. Safety Management Systems
14. Modeling of organizational factors

SPECIAL EQUIPMENT & INFRASTRUCTURE

Measuring apparatus – devices for:

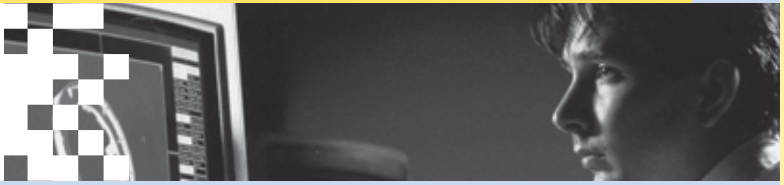
- noise and vibrations
- thermal environment
- lighting
- electromagnetic radiation
- airborne solids - contaminants
- explosive atmospheres
- toxic gases
- volatile hydrocarbons

Software:

- SAMMIE CAD (anthropometrics and design of workplaces)
- Authorware and Toolbook (computer-based training design)
- Microsaint and WorkFlow Modeler & Simulator
- Artifex & DesignCPN (Petri net modeling of workflows and manufacturing systems)
- Effects 6.0 / TNO (release scenarios, gas dispersion, risk assessment/ consequences analysis for accidents involving dangerous substances)
- Socrates / Greek National Research Center Demokritos (Individual Risk evaluation)
- Derisp (training package for consequence assessment of accidents involving dangerous substances)
- ASTRA FTA / JRC EC (Fault Tree Analysis and training package)

RESEARCH AND DEVELOPMENT PROJECTS

1. Decision making in small- medium size enterprises (ESPRIT, 1990-1992)
2. Ergonomic design of complex systems (Human Capital and Mobility, 1993-1996)
3. IDEALS: Distance learning with multi media (ESPRIT, 1996-1999)
4. TRAIMWE: Maintenance training with virtual reality (ESPRIT, 1998-2002)
5. VIRTHUALIS: Virtual reality applications to safety and risk analysis (FRAMEWROK 6, 2005-09)
6. EDFORSA: Occupational Health & Safety - Course for adult learning (2003-2005)
7. National Guidelines for Authority Inspections in Greek Refineries and oil production according the requirements of 'SEVESO II' Directive (2003-2005)
8. Study of Noise Level in ELPE refineries, (2004-2005)
9. Report of Occupational Risk Assessment in ELPE refineries, Aspropyrgos site (2004-2005)
10. Pollution Control according to Directive 96/61/EE, in ELPE refineries, site of Elefsina (2005)
11. Environmental Impact Assessment Study, new units of MOTOR OIL Refinery (2004-05)



12. SEVESO II Directive Safety Report, MOTOR OIL Refinery new units & storage tanks (2004-05)
13. Occupational Risk Assessment Report of Chania Solid Waste Treatment plant, DEDISA (2006)
14. Assessment of Safety Reports of Chemical Industry, Ministry of Development Greece (2004-06)
15. Occupational Risk Assessment Report in 9 LPG filling stations, PETROGAZ (2004-2006)

RESEARCH RESULTS/PRODUCTS

1. Accident investigation techniques
2. Modeling and simulation of man-machine systems
3. Fault diagnosis training for process control industries
4. Control room design
5. Safety Reports (SEVESO II) in Refineries,LPG and liquid fuel sites
6. Occupational Risk Assessment Reports (Greek Presidential Order 17/96)
7. Assessment of Safety Reports in Chemical Industrial Sites on behalf of Ministry of Development of Greece
8. Adult course learning for Safety Auditors
9. Modeling of organizational factors in Safety Management Systems in Airports
10. Environmental Impact Assessment in Oil Production
11. Safety Management Systems in Small & Medium Enterprises
12. Transportation Safety in pipelines conveying dangerous substances

SERVICES OFFERED TO THIRD PARTIES

1. Occupational safety
2. Design of electronic operating procedures
3. Computer based training
4. Accident investigation
5. Ergonomic design of consumer products
6. Safety and risk analysis

Computational Mechanics and Optimization Laboratory

Department:	Production Engineering & Management
Division:	Decision Science
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RESEARCH ACTIVITIES

1. Nonsmooth mechanics and optimization. Variational and hemivariational inequalities (theory, numerical approximation and applications).
2. Unilateral contact problems, impact, friction. Applications (structures, machines, robotics, as well as virtual reality).
3. Research and development in the field of computational mechanics (finite elements, boundary elements and combinations).
4. Optimal structural design of materials, products and structures. Shape and topology optimization.
5. Composite materials and structures. Numerical homogenization. Auxetic materials and applications.
6. Dynamics, vibration and control of structures. Optimal structural control (active, semi-active or passive). Mechatronics and applications. Acoustics.
7. Structural identification and health monitoring.
8. Soft computing in mechanics (neural networks, fuzzy inference, genetic and evolutionary algorithms, hybrid methods).
9. Software development for all above applications.

RESEARCH AND DEVELOPMENT PROJECTS

1. European Union, Cooperative Research COST C14 C14 Impact of wind and strom on city life and built environment. (From 2001 – 2004 second National Greek Representative in Management Committee and research work).
2. DFG German Research Foundation, Research Project entitled: Inverse problems in mechanics using neuroinformatics and soft computing. December 1999 (for two years, extension for the next two years has already been applied). Financial support of mainly one PhD Student and research support of graduate students.
3. DFG German Research Foundation, Research Project entitled: Auxetic problems and numerical homogenization in dynamics. September 2001 (Main investigator PD Dr. M. Schanz, TU Braunschweig, the rule is that the principal investigator must have his main position in Germany, which is not the case with G.E. Stavroulakis at this time).
4. Greek Ministry of Education and German Directorate for Scientific Cooperation, Greek-German Bilateral scientific cooperation project IKYDA 2001, with Prof. H. Antes, TU Braunschweig, for three years (2002-2004).
5. Heraklitos research project on material mechanics problems (University of Ioannina, 2003-2005).
6. Greek Ministry of Industry and Italian Ministry of Education, Greek-Italian Bilateral Scientific and Development cooperation project, with Prof. G. Toraldo, Univ. of Naples, for two years (2002-2003).
7. European Union, High Performance Research Network Smart Systems. New Materials, Adaptive Systems and Their Nonlinearities. Modeling, Control and Numerical Simulation From September 2002, four years (Greek Group of Prof. C.C. Baniotopoulos, Aristotle University, Thessaloniki
8. SMART SYSTEMS, High Performance Research Network of the European Union on Smart Systems. New Materials, Adaptive Systems and Their Nonlinearities. Modeling, Control and Numerical Simulation, (2003-2006).
9. Arhimidis research project on Structural control in civil engineering in collaboration with TEI Crete, Funding: Greek Ministry of Education, 2005-2007.
10. European Union, ALFA Project, Cooperation Europe-Latin America, From March 2003, three years (Greek Group Leader).

11. ELBENET European Union – Latin America Boundary Element Network, Cooperation project within the ALFA scheme (2003-2007).
12. Greek Ministry of Industry and Hungarian Ministry of Education, Greek-Hungarian Bilateral Scientific and Development cooperation project, with Prof. M. Kurutz, for two years (2005-2007).
13. Bilateral cooperation projects with Germany (Prof. H. Antes on inverse problems 2001-2003, Prof. F-J. Barthold on material mechanics and structural optimization 2004-2006), with Italy (Prof. G. Toraldo on optimization 2003-2005) and with Hungary (Prof. M. Kurutz on nonsmooth thermomechanics and biomechanical applications 2004-2006).

RESEARCH RESULTS/ PRODUCTS

1. Software development for computational mechanics (finite elements, boundary elements.
2. Statics and dynamics. Emphasis on unilateral joints with applications on monuments, robotics and virtual reality.
3. Optimal design of materials, products and structures
4. Dynamics, vibrations and control of structures – applications on smart structures, aseismic design, vibration isolation and acoustics.
5. Statics and dynamics of structures

SERVICES TO THIRD PARTIES

1. Static and dynamic analysis for structures. Consulting for structural analysis in the civil and mechanical engineering sectors.
2. Development and consulting for scientific and engineering software.
3. Vibration suppression studies and design of smart materials and structures.
4. Optimal design of materials, products and structures

Computer-Aided Design (CAD) Laboratory

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Division:	Production Systems
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- Anastasia Katsamaki, Dipl. Industrial Engineer, M.Sc NTUA, Ph.D. Candidate
- Kiriaki Maniadaki, Physics, M.Sc. UniCre, Ph.D. Candidate
- Panos Kiratsis, Dipl. Mechanical Engineer, M.Sc. Cranfield, Pd.D Candidate
- Emmanuel Alvizos, Dipl. Industrial Engineer TUC
- Thomas Kestis, Dipl. Industrial Engineer TUC
- Chistos Anastasopoulos, Dipl. Industrial Engineer TUC, Postgraduate student.
- Dr. Emmanuel Maravelakis, Dipl. Electrical Engineer AUTH, M.Sc. TUC, Ph.D. TUC, Lecturer TEI Crete.

ACTIVITIES

1. Virtual Prototyping and Virtual maufacturing.
2. Product and Process Design using FEM
3. End of Life product Modelling.
4. Reverse Enginnering and applications in Medicine.
5. Industrial Excellence
6. Innovation Management and New Product Development, application in SMEs.
7. Rapid Prototyping and Rapid Tooling.
8. Development of specialized design applications for electro-mechanical products and fashion products.
9. Product Innovation Profiling, applications in SMEs
10. Product Life Cycle Management
11. Development of New Tools for Training

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Rapid Prototyping, (3D-Printer STRATASYS).
- Rapid Tooling (MK Tools).
- Virtual Prototyping Equipment (HMD-VR6, Pohlemus ISOTRACK 2 Tracking system, 3D-Mouse, 5DT Glove)

IT Infrastructure:

- Pc's (>20 Workstations).
- Peripherals (printers (laser, ink jet, plotter ink jet), scanners, video conference)
- Software: Case Tool
- CAD Software:
  - PTC-ProENGINEER,
  - CATIA V5
  - SolidWorks
  - AUTOCAD, AUTODESK DESIGNER
  - d/VISE - DIVISION
  - INTERGRAPH MICROSTATION, MODELLER, MICROSTATION/J
  - SOLIDWORKS-PHOTOWORKS
  - PATHTRACE EDGECAM

RESEARCH AND DEVELOPMENT PROJECTS

1. 1993. "DELTA-CIME". GSRT. Hellenic Esprit Special Action, EP7511/C18.
2. 1995. "AIMING-Automating Information and Material Flow in Garment Industry", GSRT. EPET II.
3. 1996. "ANTISXEDIA – Product Reverse Engineering ", PEP Crete.
4. 1996. "Factory Modeling with Exact Generalized Models", GSRT. YPER94.
5. 1995. "ISEFI-Information System for the European Footwear Industry", IMPACT2, Υποκατασκευαστής σε INTPACOM.
6. 1997. "TELEPROMET - Telematics based Delivery of Courses on Modern production Management Methods for Textiles", EEC-LEONARDO.
7. 1997. Microblow, GSRT-PAVE96
8. 1998. «Design & Delepoment of a Pilot System For Automated Storage and Retrieval of Products, using Robotic Systems». GSRT - PAVE97.
9. 1998. CONTINUOUS TRAINING – "Certification of Vocational Training", YPEPTH- EPEAEK.
10. 1998. «Automation of Cuttng Process in sewing» GSRT - PAVE97.
11. 1999. «Pro-Real. Development of a Virtual Environment for Simulation Critical Processes which require Human Involvement» GSRT - EPET2.
12. 1999. «Supply Chain Management of Heterogenous Products"

13. 2000. «HERMITAGE - Hellenic Enterprise Resourse Management and Information Technology Advancement Group of Experts», GSRT – Ανθρώπινα Δίκτυα.
14. 2001. "Product Innovation Profile Score" – PIP Score, CEC - INNOVATION.
15. 2001. "MERIT-TEX, Manufacturing Excellence in Textiles" CEC - LEONARDO2.
16. 2003. "Simulation of Manufacturing Processes using Design tools in a Virtual Environment", EPEAEK-IRAKLEITOS.
17. 2003. "E-merit. An Integrated E-Collaborative Environment for Product and Process Modelling Using 3D Models and Avatars " GSRT – E-BUSINESS.
18. 2003. "E-Papermaker - Automation of Basic Business Processes in the Paper Industry through E-business Technologies", GSRT – E-BUSINESS.
19. 2005. "Contemporary methods for Traffic Measurement and their Use by ECO-ELDA)", ECO
20. 2006. "IntelliPaper – Business Intelligence Solutions for the Paper Industry" - GSRT – Int. DSBEPRO

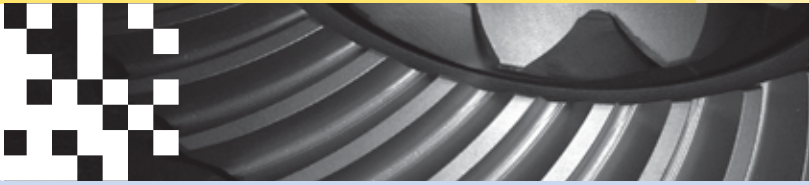
RESEARCH RESULTS/PRODUCTS

1. New Product Development Toolbox
2. Benchmarking Industrial Excellence
3. Integrated system for Production Planning and Control for Sewing
4. Product Data Exchange for Fabric production
5. SCADA System for Viscose Production
6. SCADA System for MDF Production.
7. Reverse Engineering

SERVICES OFFERED TO THIRD PARTIES

1. New Product Development Procedures Manual.
2. Product Design and Conceptual Design
3. Organization for Industrial Excellence.
4. SCADA system design and development
5. Virtual Prototyping and Virtual Manufacturing.
6. Rapid Prototyping and Rapid Tooling
7. Reverse Engineering

Computer-Aided Manufacturing (CAM) Laboratory



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COLLABORATORS

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ACTIVITIES

1. Analysis, simulation, and optimization of production networks.
2. Control of queuing networks.
3. Manufacturing flexibility.
4. Control of stochastic systems.
5. Environmental systems: sustainability, recycling, and sustainable development.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

1. Flexible manufacturing system (FMS) for educational purposes.
2. Three axis Johnford mill.
3. Boxford lathe.
4. HAAS MiniMill machining center.
5. Software: SIMSCRIPT II.5 simulation package.
6. Computational facilities.

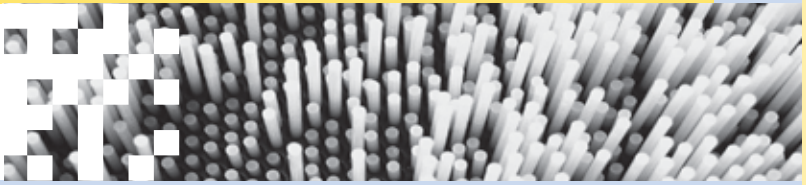
RESEARCH AND DEVELOPMENT PROJECTS

1. "Design of inventory systems and analysis of queuing systems," Technical University of Crete, 1989.
2. "Software tools for scientific management," Greek Ministry of Education and Religious Affairs, 1989-1991.
3. "Application of novel approaches for the analysis and design of production systems to the Greek industry," Technical University of Crete, 1991-92.
4. "Integrated tool for the analysis and optimization of production systems," PENED 91 ΕΔ 355, Greek Ministry of Development, 1993-95.
5. "A fuzzy logic system for the measurement of manufacturing flexibility,"PENED 95 489, Greek Ministry of Development, 1996-98.
6. "Fuzzy control of production systems," ΥΠΕΡ 94 132, Greek Ministry of Development, 1996-99.
7. "Botanical Park - Park for the preservation of the flora and fauna," Technical University of Crete.
8. "Intelligent and adaptive techniques for the measurement of manufacturing flexibility," Greek Ministry of Development, 1999.
9. "Fuzzy scheduling and control of simple production and communication networks," Greek Ministry of Development, 2001.
10. "Coordinated inventory and admission control in production systems," HERAKLEITOS, Greek Ministry of Education and Religious Affairs, 2003-04.
11. "Sensitivity analysis and optimization of sustainability indicators using fuzzy logic," HERAKLEITOS, Greek Ministry of Education and Religious Affairs, 2003-2006.

RESEARCH RESULTS/PRODUCTS

1. Hybrid simulation models of production networks (book, Kluwer)
2. Intelligent system for the measurement of manufacturing flexibility
3. Fuzzy control of queuing system (book, Springer)
4. Sustainability assessment by fuzzy evaluation
5. Measurement of materials recyclability

Data Analysis and Forecasting Laboratory



Department:	Production Engineering & Management
Division:	Management & Administration
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ACTIVITIES

1. Development of forecasting models
2. Market research
3. Quality Systems
4. Innovation diffusion and Technology transfer
5. Chaotic modeling theory and applications
6. Tourist system: Data analysis and forecasting.
7. Technological forecasting.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- 15 computers systems, servers and workstations servers and workstations (Pentium II, 450 MHz, 256 MB RAM, 8,5 GB hard disk and zip drives).
- Statistical data analysis software.
- Market research software.
- Quality control software according to ISO.
- Software for graphics/video digital processing, digital video, digital camcorders, scanner, Edit adapter, etc).

RESEARCH AND DEVELOPMENT PROJECTS

1. Market research for Production and Management Engineering
2. Management plan of the prefecture of Chania.
3. ERASMUS ICP-95-G 5018/06
4. Erasmus 1996-1997
5. Leonardo Da Vinci Project (1995-1996) GR/95/I/18/P/1.1.b/FPC
6. ECOS-OVERTURE SME
7. TEMPUS Phare JEP-11494-96 Universities' Delivery of Continuing Education (36.400 ECU)
8. TEMPUS Phare CME-02111-96 A Quality Assurance System for the Romanian Technical Universities(39.200 ECU)
9. TEMPUS Phare JEP-07324-94 Building Development Production Management College in Romania
10. Research on incubators in Biopa Chania.
11. Business plan of Cretan Tourism Company.
12. INNOREGIO project.

RESEARCH RESULTS/PRODUCTS

1. Market research software.
2. Non-linear forecasting software.
3. 'National election research 2000 and 2004
4. Prefecture and municipality elections research 2002
5. Research for the use of alcoholic and beverages in Greece

SERVICES OFFERED TO THIRD PARTIES

1. Consulting (Marketing, Market research, Data analysis, Forecasting, Organization and administration, Quality).
2. Advertising creation.
3. Multimedia applications.

Decision Support Systems Laboratory (ERGASYA)

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ACTIVITIES

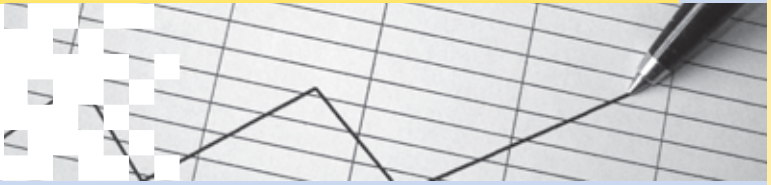
1. Operation Research
2. Combinatorial Optimization
3. Communication Networks
4. Routing and Network design
5. Distribution Optimization
6. Multi-criteria Analysis
7. Information Systems
8. Geographical Information Systems
9. Parallel and Distributed Algorithms
10. Global Optimization
11. Large Scale Optimization
12. Data Warehouses
13. Distributed Artificial Intelligent
14. Multi-Agent Systems
15. Heuristic and Evolutionary Algorithms
16. E-commerce / E-government
17. Tele-work and Tele-education
18. Web-based Applications
19. Supply Chain
20. Behavior Analysis and Consumers Satisfaction
21. Game Theory with Transport Applications in the Supply Chain
22. Non Linear Programming
23. Hierarchical Decisions
24. Open Source software

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- 1 parallel computer-Linux Clusters (5 κόμβοι, 10 possessors Xeon, 1GB memory/node)
- 3 mail & web servers
- 2 file servers
- 27 personal computers
- 20 personal computers for common use for the students
- 11 laser & inkjet printers
- 1 colored laser printer
- 2 scanner
- 1 video projector
- 1 multi-machine
- 1 photocopy machine
- Software for design and development of information systems
- Open Source software

RESEARCH AND DEVELOPMENT PROJECTS

1. "Market research, supported by specialized software: Applications for products in Crete", Funding: GSRT -Mills of Crete S.A. (Co-funding), Duration: 1990-1991
2. "Development of a multicriteria system for supporting companies' financial decisions", Funding: GSRT- Greek Bank of Industrial Development Duration: 1991-1992
3. "Development of a multicriteria system for supporting companies financially", Funding: Ministry of Education, Duration: 1992-1993
4. "Software design and development for scientific management", Funding: Regional Operarional Programme of Crete– ΕΤΠΑ I, Duration: 1992-1993
5. "Management and development of agricultural products exports in Crete", Funding: Regional Operarional Programme of Crete– ΕΤΠΑ I, Duration: 1992-1993
6. "Management and development of agricultural products exports in Crete with destination countries in east Europe", Funding: ETEBA – Programme MENTOR, Duration: 1993-1994
7. "Network development and business plan for industrial unit establishment", Funding: GSRT (PENED Progarmme), Duration: 1996-1998
8. "Model development evaluating consumers satisfaction", Funding: EC-General Affairs of Education and Compilation, Programme Leonardo da Vinci, Duration: 1998-1999
9. "System Development for decisions support based in knowledge for diversified agricultural products", Funding: Ministry of Labour: Programme Horizon, Duration: 1998-1999
10. "Research for Consumers' satisfaction of commercial bank in west Crete", Funding: Ministry of Education, -EPEAEK II, Duration: 2003-2005



11. "Consumers' satisfaction analysis of pallet industrial production in CHEP France", Duration: 2004-2005
12. "Office of supporting the internationalization of small-medium enterprises (SME-ISO)", Funding: European Commission-Enlargement, PHARE /2003/076-446/12, Duration: 2004-2005
13. "Alternative models of integration and labor employment for people with special needs and mental hysteresis", Funding: Ministry of Labour: Programme Horizon, Duration:1998-1999
14. "Consumer, personnel and supplier satisfaction analysis, Adidas Japan", Funding: Adidas Japan, Duration:1998-1999
15. "Education program reformation for the post graduate students, department of Environmental Enginneering", Funding: Ministry of Education, Programme EPEAEK II, Duration: 2003-2005
16. "Q-Label . Qualifying LABor for EnLargement", Funding: European Commission-Enlargement PHARE /2003/076-446/12, Duration: 2004-2006
17. "PYTHAGORAS – Research Group supporting in Technical University of Crete", Funding: Ministry of Education, Programme PYTHAGORAS EPEAEK II, Duration: 2004-2006

RESEARCH RESULTS/PRODUCTS

1. Supporting systems of multicriteria decisions – MINORA
2. Software of solving linear problems
3. Intelligent system of supporting marketing decisions and product design– MARKEX
4. Multimedia CD with historical and environmental for traveling in south Crete
5. Multimedia CD for education in traditional professions– ΙΑΣΩΝ
6. MUSA (software of measuring and analyzing consumers satisfaction)
7. Web-based, Integrated systems of supporting decisions for the development and design of the agricultural products – DIMITRA
8. Interacting system of supporting decisions– MIIDAS
9. Software of evaluating informatics qualifications - ASTROLAVOS
10. E-government System for local authorities "Prometheus"
11. System development of supporting decisions and the vehicle rooting problem for enterprises - ΔΙΟΔΟΣ
12. Softawre for solving and display of the solution of the vehicle routing problem - VRPGIS
13. Electronic system of commerce and products, promotion-POECOM

SERVICES OFFERED TO THIRD PARTIES

1. Marketing
2. Market Research
3. Data Analysis
4. Vehicle Routing
5. Quality Management
6. Projects and information systems for the management and support of decisions in enterprises and organizations
7. Markets Research
8. Staff education

Dynamic Systems & Simulation Laboratory

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LABORATORY STAFF

- PhD Candidates: Konstantinos Aboudolas, Diamantis Manolis, Mattheos Protopappas
- About 10 MSc Candidates
- External Collaborators: Ass. Prof. Dr. Vaya Dinopoulou (ATEI of Western Macedonia), Lecturer Dr. Apostolos Kotsialos (University of Durham, UK), Dr. Albert Messmer (Germany)

ACTIVITIES

1. Theory, Methods, and Algorithms
2. Traffic Flow Modelling and Control
3. Modelling and Control of Water Systems
4. Artificial Life
5. Mobile Robotic Systems
6. Forecasting and Logistics
7. Automatic Control Applications

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Workstation: 5 Sun, 3 HP, 2 X-terminals
- Computers: 22 Computers, 2 Notebooks και 15 Τερματικά, 1 webserver
- Printers: 7 Laser, 2 Desk-Jet, 1 Laser Color
- 1 overhead projector, 1 LCD Panel

RESEARCH AND DEVELOPMENT PROJECTS

1. EUROCOR (V2017): funded by the European Commission (DG XIII), R&D Programme Advanced Transport Telematics.Scope: Integrated modelling and control of traffic flow in corridor networks with application and implementation in Paris and Amsterdam (1992-1995).
2. QUO VADIS (V2042): funded by the European Commission (DG XIII), R&D Programme Advanced Transport Telematics. Scope: Application and implementation of route guidance and driver information algorithms to the highway network of Scotland and to a network in Aalborg, Denmark (1992-1995).
3. OBERE ILLER: funded by the German Federal Ministry for Education and Research (BMBF). Scope: Development of a central control system for distributed retention reservoirs with application and implementation to the sewer network Obere Iller (1994-1999).
4. TABASCO (TR1054): funded by the European Commission (DG XIII), R&D Programme Transport Telematics. Scope: Integrated Urban Traffic Control with Applications to the Networks of Glasgow and Belfast (1996-1998).
5. COMFORTABLE: funded by the European Commission (DG VII), Directorate General for Transport. Scope: Surveillance tools for maritime traffic (1996-1998). PENED: funded by the Greek Ministry for Research and Technology. Scope: System Reliability and Related Problems (1996-1998).
6. DACCORD: funded by the European Commission (DG XIII), R&D Programme Transport Telematics. Scope: Coordinated Dynamic Traffic Management with Applications to the Ile-de-France Network, the Ville de Paris Network, the Amsterdam Periurban Network, and the Venice-Padua Motorway (1996-1999).
7. DELPHI: funded by the European Commission (DG III), ESPRIT Programme. Scope: Sales Forecasting and Integrated Logistics Operations (1998-2000).
8. CHANIASYN: funded by the Greek Ministry for Research and Technology. Scope: Central, Real-Time Traffic Control in Urban Networks with application and implementation in the city of Chania (1999-2001).
9. PENED: funded by the Greek Ministry for Research and Technology. Scope: Stochastic Control of Optical Systems for Observatories (2000-2001).
10. OMNI: funded by European Commission (DG XIII), R&D Programme Information Society Technologies. Scope: Integrated architecture for urban traffic control and development of an internet information system with implementation in Chania (2000-2003) plus additional funds by the Greek Ministry for Research and Technology.
11. SMART NETS: funded by the European Commission (DG XIII), R&D Programme Information Society Technologies (C100). Scope: Implementation and Field-Evaluation of the Urban Traffic Control Strategy TUC in Southampton (U.K.), Munich (D) and Chania (GR) (2001-2004) plus additional funds by the Greek Ministry for Research and Technology.

12. RHYTHM: funded by the European Commission (DG XIII), R&D Programme Information Society Technologies. Scope: Motorway Traffic Surveillance and Control Employing Video Sensor Technology (2001-2004) plus additional funds by the Greek Ministry for Research and Technology.
13. EYE IN THE SKY: funded by the European Commission (DG XIII), R&D Programme Information Society Technologies. Scope: Advanced Data Fusion for Traffic Monitoring and Prediction (2001-2004) plus additional funds by the Greek Ministry for Research and Technology.
14. WWT & SYSENG: funded by the European Commission (DG Research), Human Potential Programme, Research Training Networks. Scope: Getting systems engineering into regional wastewater treatment strategies (2002-2006) plus additional funds by the Greek Ministry for Research and Technology.
15. EURAMP: funded by the European Commission (DG INFSO), R&D Programme Information Society Technologies. Scope: Ramp Metering for Motorway Networks. Funds: 425.000 € over 3 years (2004-2007) plus 13.000 € additional funds by the Greek Ministry for Research and Technology.
16. CONNECT: funded by the European Commission (DG TREN), FP6-2002-Transport. Scope: Network of excellence for Coordination of concepts for new collective transport. (2004-2006) plus additional funds by the Greek Ministry for Research and Technology.
17. ETNITE: funded by the European Commission (DG EDUC), Leonardo da Vinci Programme. Scope: European network for training and education in Intelligent Transportation Systems (2004-2007).
18. RFC-Research Support 2004: funded by the TUC Research Funds Commitee (RFC). Scope: Development of a user-friendly environment for the optimal parameter selection in an adaptive control system (2004-2005).
19. PYTHAGORAS: funded by the Greek National Education Ministry. Scope: Development of an integrated motorway network control system and its evaluation via microscopic simulation (2005-2006).
20. PENED: funded by the Greek Ministry for Research and Technology. Scope: Development and evaluation of a new real-time traffic signal control strategy for urban road networks (2005-2008).
21. PENED: funded by the Greek Ministry for Research and Technology. Scope: Development and evaluation of a central flow control strategy for sewer networks with emphasis on special needs and potential applications in Greece (2005-2008).

RESEARCH RESULTS/PRODUCTS

1. Macroscopic motorway traffic simulation tool METANET and METANET-DTA.
2. Macroscopic urban traffic and mixed urban/motorway traffic simulation tool METACOR.
3. Integrated motorway traffic control strategy AMOC.
4. Traffic control strategy TUC for urban traffic control and public transport priority provision
5. Mixed urba/motorway traffic control strategy IN-TUC
6. Local motorway ramp metering strategy ALINEA.
7. Coordinated motorway ramp metering strategies METALINE and HERO.
8. Sales forecasting software
9. RENAISSANCE, a real-time tool for motorway traffic supervision, estimation and prediction.

SERVICES OFFERED TO THIRD PARTIES

1. Implementation of motorway traffic control strategies (Paris, Holland's and Scotland's motorway network, Glasgow, Aalborg, Munich, Israel)
2. Implementation of urban traffic control strategies (Chania, Munich, Southampton, Glasgow)
3. Implementation of public transport priority strategies (Tel Aviv, Jerusalem, Southampton, Athens)
4. Internet systems for on-line real-time traffic information provision (Chania)
5. Development and implementation of an advance optimal control strategy for flow control in sewer networks (Obere Iller, Germany)
6. Sales forecasting (Sigikid and DaimlerChrysler, Germany)

Financial Engineering Laboratory

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ACTIVITIES

1. Development of new methodologies and tools for financial decision making
2. Providing expert knowledge on fields related to financial analysis and planning
3. Applications of multicriteria decision making techniques to financial management
4. Applications of artificial intelligence methods (neural networks, expert systems) to financial risk assessment, and development of multicriteria knowledge based decision support systems for financial decision making
5. Credit risk assessment and bankruptcy prediction
6. Country risk assessment
7. Portfolio selection and management
8. Value at Risk measurement
9. Corporate mergers and acquisitions
10. Venture capital investments
11. Bank braches evaluation
12. Falsification of financial statements
13. Asset-liability management
14. Mutual funds appraisal
15. Evaluation of public services

SPECIALTY EQUIPMENT & INFRASTRUCTURE

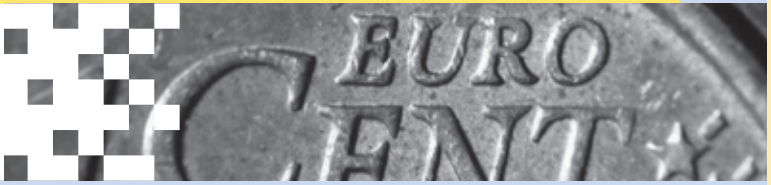
- Multicriteria decision support system FINCLAS for credit risk assessment
- Multicriteria decision support system INVESTOR for portfolio construction
- Multicriteria knowledge based decision support system FINEVA for financial analysis
- Multicriteria decision support systems PREFDIS and MHDIS for the development of classification models
- Linear/non linear optimization software CPLEX
- Econometric software LIMDEP

RESEARCH AND DEVELOPMENT PROJECTS

1. Designing a DSS for financing firms by an industrial development bank in Greece (Funded by the ETEVA, National Investment Bank for Industrial Development and the Secretariat General of Research and Technology)
2. An Integrated Decision Support System for the Analysis and Evaluation of Bankruptcy Risk (Funded by the Technical University of Crete).
3. A Financial Classification System for the Evaluation of Credit Risk (Funded by the Ionian and Popular Bank of Greece).
4. Youthstart: The Green Enterprises (funded by the European Union and the Hellenic Ministry of Labour and Social Affairs)
5. Education of Financial Analysis through a Financial Decision Support System (funded by the Technological Institute of Heraclion)
6. Development and Validation of Credit Risk Models (funded by ICAP Hellas)
7. Multiple Criteria for the evaluation of competitiveness and growth of EU, (Pythagoras II project), funded by Ministry of Education
8. Development of decision support system for optimal ship routing (Funded bv ANEK SA)
9. Development of decision support system for the evaluation of baking risks (Funded bv The Bank of Greece).

RESEARCH RESULTS/PRODUCTS

1. Credit risk assessment systems
2. Portfolio construction systems
3. Country risk assessment
4. Evaluation of bank performance
5. Credit card assessment
6. Asset/liability management
7. Mutual funds appraisal
8. Development of decision support systems for financial decision making problems, such as:
   - Credit risk analysis and bankruptcy prediction



- Rating of financial institutions
- Portfolio selection and management

9. Design of multicriteria decision support systems, such as the PREFDIS for classification problems.
10. Development of new multicriteria and intelligent methodologies (support vector machines, evolutionary methods, etc.) for pattern classification, with emphasis on financial applications.

SERVICES OFFERED TO THIRD PARTIES

1. Financial analyses
2. Financial planning and investment decisions
3. Portfolio management
4. Financial risk assessment
5. Projects on portfolio decisions, corporate evaluation, and financial risk management.
6. Consulting and seminars on the new regulatory framework of Basel II.
7. Projects on the evaluation and optimization of business services.

Industrial Systems Control Laboratory

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- N. Arnaoutakis, Lab Assist., email: *nec@dpem.tuc.gr*
- A number of postgraduate students pursuing MSc. and Phd. degrees

ACTIVITIES

The Industrial Systems Control Laboratory is built around a team of experts and specializes, amongst others, in the areas of:

1. Automatic control.
2. Fault diagnosis.
3. On-line quality control.
4. On-line health condition monitoring.
5. E-learning.
6. Intelligent energy systems.
7. Intelligent building systems (BEMS).
8. Renewable energy sources.
9. Transportation and public utility networks (water, sewage).

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- EIB (European Installation Bus) protocol.
- MATLAB® software package.
- Also, the laboratory has the following experimental apparatus:
- Control device for the water level in a tank.
- Control device for the position and the velocity of a servomotor.
- Control device of an inverted pendulum.
- Magnetic levitation device.
- Lego robot.

RESEARCH AND DEVELOPMENT PROJECTS

1. Research project (duration 1/1/94-1/1/96) supported by G.S.R.T. (General Secretary of Research and Technology), for the development of a computer toolbox (FaultLab I) for strategy selection of fault monitoring of dynamical systems. This is a first attempt at collecting the most important fault detection algorithms into a user-friendly software package.
2. Research project (duration 1/11/91-1/11/92) supported by Research Fund of Technical University of Crete for the development of a computer toolbox (FaultLab II) for strategy selection of fault monitoring of dynamical systems.
3. MEDEA: Quality control for household appliances by on-line evaluation of mechanical defects. A research program in the framework of EC's Standards, Measurements and Testing. This project aimed at developing a fully automatic on-line quality control system of washing machines. The project was chosen amongst the top ten in the Industrial Processes field of SMT (4th Framework). Duration 1/1/96-31-12-98. (for details see http://europa.eu.int/comm/research/success/en/ind/0318e.html)
4. MEDEA II: A follow-up to the previous program for on-line quality control of electrical motors and compressors. Duration 1/4/2000-1/10/2001.
5. ENERGY MANAGEMENT TRAINING PROGRAMME IN THE P.R. OF CHINA, Project No. XVII/A4/96-01, EUROPEAN COMMISSION, Directorate General for Energy - DG XVII.
6. BUILTECH: 'Development of an Integrated Building Energy Management System'; project in the framework of the Joule program (JOE3-CT97-0044). Design and Implementation of an Integrated Intelligent Building Indoor Environment Management System using Fuzzy Logic, Advanced Decision Support Techniques, Local Operating Network capabilities and Smart Card Technology.
7. SMART-BE: 'Developing distance training courses for SMART Buildings Energy Management'; funded in part by the Commission of the European Communities in the framework of the LEONARDO Programme.
8. PRAXE 71: 'Creation of a smart node for indoor environment and energy management in buildings, by the development of a knowledge-intensive company. Funded by 'Measure 4.1: Support of research units for the standardisation and commercial exploitation of research results. Location and use of research results by the creation of new enterprises (spin-off)' of the "Competitiveness" Operational Programme of the Greek General Secretariat for Research and Development (GSRT).
9. SAVE 4.1031: "Sensor fault detection in smart buildings", funded by the Network of Excellence "Smart-Accelerate-Acceleration of Smart Buildings Technologies and Market Penetration".
10. Restructuring of the undergraduate curriculum of the Dept. of Production and Management Engineering, in the framework of EPEAEK II (in progress).

11. 'E-learning infrastructure for higher education institutions' funded by the Greek Operational Programme 'Information Society' of the 3rd Community Support Framework of the EU (in progress).

RESEARCH RESULTS/PRODUCTS

1. FaultLab I and FaultLab II: computer toolboxes for strategy selection of fault monitoring of dynamical systems.
2. Development of a fully automatic on-line quality control system of washing machines.
3. Development of a fully automatic on-line quality control system of electrical motors and compressors.
4. Design and Implementation of an Integrated Intelligent Building Indoor Environment Management System.

SERVICES OFFERED TO THIRD PARTIES

1. Development of computer toolboxes for automatic control and fault diagnosis.
2. Development of fully automatic on-line quality control systems.
3. Design and implementation of integrated intelligent building management systems and energy systems.
4. Design of control systems for transportation and public utility networks.

Intelligent Systems & Robotics Laboratory

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ACTIVITIES

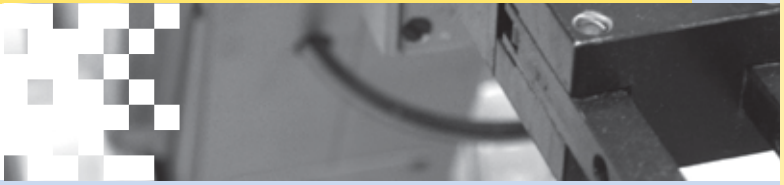
1. Design and Construction of Robotic Vehicles
2. Navigation of Robotic Vehicles using Computational Intelligence
3. Production Automation
4. Intelligent Methods of Optimization
5. Applications of Fuzzy and Neuro Fuzzy Logic, Genetic Algorithms and Neural Networks

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- ATRV- Mini Robotic Vehicles.
- HELLENAK Automated Guided Vehicle
- ALE Robotic Vehicle
- Helots Multi Robots Team
- Scara Hitachi A4410S Robotic Arm
- SCORBOT-ER 2u Robotic ARM
- Inertial Measurement Unit, Distance and Compass Sensors, GPS and Autonomous Micro Controllers.

RESEARCH AND DEVELOPMENT PROJECTS

1. INNOVATIVE ACTION UNISTEP, 2nd phase: Construction of an Autonomous Navigation System for an Unmanned, Innovative Action 'INCUBATOR OF IDEAS OF UNIVERSITY STUDENTS' - UNISTEP, Regional Program of Innovative Actions 'CRINNO - Crete Innovative Region', European Union 65%, National grants 25%, 4/2005 – 11/2005.
2. 'INNOVATIVE ACTION UNISTEP, 1st phase: Construction of an Autonomous Robotic Vehicle', Innovative Action 'INCUBATOR OF IDEAS OF UNIVERSITY STUDENTS' - UNISTEP, Regional Program of Innovative Actions 'CRINNO - Crete Innovative Region', European Union 65%, National grants 25%, 7/2004 – 3/2005.
3. 'Automation of Olive's Stone Drying Process', International Cooperation Project on Scientific and Technological Developments, GSRT, COOPERATIVE INDUSTRY «ANATOLI» S.A, 6/2004 – 5/2006.
4. 'Hierarchical Intelligent Control of Production Systems: A Fuzzy Logic Perspective', Greek-Slovenian Research and Technology Cooperation, GSRT, 6/2003 – 6/2005
5. 'Development of a VTOL Unmanned Aerial Vehicle – Phase I', PEPER PROJECT, GSRT, EADS-3SIGMA A.E., 7/2002 – 1/2003.
6. 'Development of a Turbo-Jet Engine for an Unmanned Aerial Platform', PEPER PROJECT, GSRT, EADS-3SIGMA A.E., 7/2002 – 1/2003.
7. 'Modeling, Analysis, Synthesis and Performance Evaluation of Random Topology Production Systems with Petri Nets', Greek-Slovenian Research and Technology Cooperation, GSRT, 7/2002 – 1/2003.
8. 'Development of an Integrated Airborne Fire Detection System', PAVE PROJECT 2000, GSRT, EADS-3SIGMA A.E., 9/2001 – 3/2003.
9. 'Development of an Intelligent Autonomous Navigation System for Unmanned Aerial Vehicles', PAVE PROJECT, GSRT, STN ATLAS-3-SIGMA A.E., 4/2000 – 9/2001.
10. 'Robust Methodologies for the Integration of a Fleet of Commercially Available Mobile Robots: Application to the Inspection and Security of Office Buildings', PENED PROJECT, GSRT.
11. 'Intelligent and Adaptive Techniques for the Measurement of Manufacturing Flexibility', Greek-Slovenian Research and Technology Cooperation, GSRT.
12. 'Development and Construction of an Unmanned Surface Vehicle', PEPER PROJECT, GSRT, 10/2006 – 10/2007



RESEARCH RESULTS/PRODUCTS

1. ΑΛΕ – Robotic Vehicle
2. Autonomous Navigation System for a VTOL
3. Daedalus, software for Airfoils Design
4. Automation of Olive's Stone Drying Process
5. Hierarchical Intelligent Control of Production Systems
6. Design of a VTOL Unmanned Aerial Vehicle
7. Design of a Turbo-Jet Engine
8. Modeling of Random Topology Production Systems with Petri Nets
9. Development of an Intelligent Autonomous Navigation System for Unmanned Aerial Vehicles
10. Development of an Integrated Airborne Fire Detection System
11. Methodologies for the Integration of a Fleet of Commercially Available Mobile Robots: Application to the Inspection and Security of Office Buildings
12. Intelligent and Adaptive Techniques for the Measurement of Manufacturing Flexibility
13. Design of FireBo: a Fire Robot
14. Multi Robots Team

SERVICES OFFERED TO THIRD PARTIES

Static and Dynamic Analysis of a Catapult for UAVs.

Management Systems Laboratory (ManLab)

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RESEARCH ACTIVITIES

1. Data mining.
2. Modeling of organizational entrepreneurial and innovation processes.
3. Business process modeling
4. Logistics
5. Clinical decision support, microarray data analysis and pathway modeling.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Data mining software
- Business process modeling software
- Business excellence and organizational innovation assessment tools
- Business plan services and tools

RESEARCH AND DEVELOPMENT PROJECTS

1. Desing of a Customer Relationship Management (CRM) system at Thrace Mills, S.A. Project: CustomPaper. Co-funded by the General Secretariat of Research and Technology, GSRT (2006 – 2007).
2. RFID enabled inventory and warehouse management. Project: STREAM. Co-funded by the General Secretariat of Research and Technology, GSRT (2005 – 2006).
3. Digital platform for the support of livestock sales at the VIVARTIA Company (former DELTA SA). Project: FARMBROKER (e-business). Co-funded by the General Secretariat of Research and Technology, GSRT (2004 – 2006).
4. Modeling of aircraft maintenance procedures and development of digital contracting process system. Project: WACOM. Co-funded by the General Secretariat of Research and Technology, GSRT (e-business) (2004 – 2006).
5. Continuous education and learning in medical informatics and health-care management. In Serbia and Montenegro. Project SCE-MIN. Funded by the European Training Foundation. (2006 – 2007).
6. Entrepreneurship and Innovation in the public sector. Co-funded by the General Secretariat of Research and Technology, GSRT (2004 – 2007).
7. Activity Based Costing in LPG production and distribution. Funding Innovation Center of Crete (2005).

RESEARCH RESULTS/PRODUCTS

1. Data mining software
2. Digital e-procurement platform
3. Logistics support systems

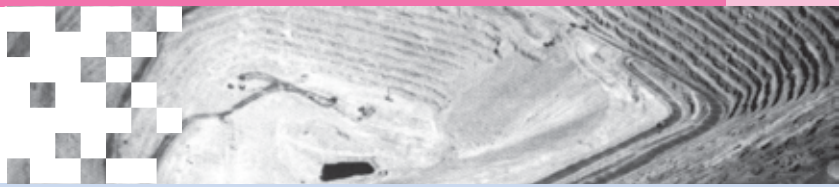
SERVICES OFFERED TO THIRD PARTIES

1. Business plans
2. Assessment of industrial excellence and innovative organizational profile

3

Laboratories of Department of Mineral Resources Engineering

Applied Geology Laboratory



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RESEARCH ACTIVITIES

1. Engineering properties of soils.
2. Study of geotechnical problems related to surface mining.
3. Groundwater research and management.
4. Development of exploitation methods of coastal kastric aquifers.

EQUIPMENT & INSTRUMENTATION

- Apparatus for the measurement of soil properties (triaxial, direct shear and unconfined strength, consolidation, permeability etc) and the shear strength of rock discontinuities.
- Field equipment for slope stability monitoring.
- Apparatus for surface and ground-water level reading and recording.
- Equipments for Hydro chemical analyses.

RESEARCH PROJECTS

1. "Development of exploitation methods of the underground water in West Crete".
2. "Geological and geotechnical investigation of landslides at Ano Meros Village (Amari, Rethimno)".
3. "Quality control and rational use of the water resources of Crete".
4. "Exploitation of Almiros River springs (Iraklion)".
5. "Solid waste disposal site of East Selino area".
6. "Water supply of Rethimno municipal: Management of existing and prospection for new water resources".
7. "Geotechnical Investigation in «MAKRO's store» foundation area (Iraklio, Crete)".
8. "Geotechnical investigation and slope stability analysis of «Tomeas 6» (Open Pit Lignite Mine in Ptolemais area)".

RESEARCH RESULTS

1. Optimal exploitation of the coastal karstic aquifers in order to control saline water intrusion.
2. Determination and evaluation of the parameters that influence the kinetic behavior of the geological formations due to mining.

PROVIDED SERVICES

1. Investigation of soil geotechnical parameters.
2. Investigation of the geological and geotechnical parameters for civil works (foundations, road construction, dams, tunnels and mining).
3. Groundwater research and management.
4. Investigation of the environmental impacts into fresh water formations due to human activities.

Applied Geophysics Laboratory

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ACTIVITIES

1. Magnetic, Gravity, Electromagnetic and Electrical mapping
2. Electrical sounding and tomography
3. Seismic refraction and reflection
4. Multichannel Analysis of Surface Waves (M.A.S.W.)
5. Seismic tomography
6. Ground Penetrating Radar (G.P.R.)
7. Geographical Information Systems (G.I.S.) in geophysics
8. Classification of geophysical data
9. Non – Destructive Testing
10. Geotechnical parameters estimation using geophysical methods

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Equipment:

- 24channel digital seismograph (GEOMETRICS ES 2401)
- 12 two-channel recorders DMT for seismic data
- SeisGun seismic source (Winchester, Betsy M3)
- Ground penetrating radar (GPR) with 5 antennas (PulseEkko 1000)
- Unit for electromagnetic profiling and mapping CM 031 (GF Instruments)
- VLF (WADI of ABEM)
- Unit for electrical tomography (Sting R1-Swift)
- Unit for electrical sounding and mapping (ABEM Terrameter + Booster)
- Proton magnetometer (GEOMETRICS)
- Differential magnetometer (GeoScan)
- Gravity meter Lacoste-Romberg, Model D –206
- Array of 12 hydrophones MP 25-250 SW (GeoSpace)
- Multichannel geophone cables
- Geophones
  - 14 Hz, vertical and horizontal component geophones
  - 4.5 Hz, vertical component geophones

Hardware:

- 2 work stations Suns (Unix-Solaris 2.5)
- 1 work station Sun-Blade (Unix-Solaris 2.8)
- 7 personal computers (Windows)
- 2 personal computers (Linux)
- 1 Laptop
- 2 laser printers
- 2 inkjet printers
- 1 plotter HP 750C
- 2 Scanners

Software:

- Software for seismic data processing, PROMAX 2D and 3D(LANDMARK)
- Software for geophysical data processing, OASIS- montaj (GEOSOFT)
- Software for geophysical data processing, Neosys 1.3 (FORTNER)
- Software for inversion of electrical soundings, RESIX (INTERPREX)
- Software for processing G.P.R data, Pulse ekko, (SENSORS & SOFTWARE)
- Software for electrical tomography data, 2D and 3D, (RES2DINV & RES3DINV, ADVANCED GEOPHYSICAL)
- Software-Geographical Information System ArcView GIS 3.2

RESEARCH AND DEVELOPMENT PROJECTS

1. «Hybrid geophysical survey for imaging the saline water front at Stilos, Chania Perfecture, Greece». Funded by the Ministry of Education. Scientific Leader: Prof. A. Vafidis. (2005-2006)
2. «Integrated geophysical methods for the detection of the saline water front at Stilos, Chania Perfecture, Greece. Funded by the General Secretariat of Research and Development, Greece». (2004 – 2005).
3. «Monitoring of hydrocarbon pollution using modern geophysical methods». Funded by the General Secreteriat of Research and Development, Greece. Scientific Coordinator: Prof. A. Vafidis. 06/2004-11/2006.
4. «Hybrid Geophysical technology for the Evaluation of Insidious contaminated Areas» European R&D project (HYGEIA/EVK4-2001-00046) Funded by E.U., 1/12/2001-31/11/2004.
5. «Passive and active seismics in Western and Central Crete, Greece». Funded by the German Science Foundation. Scientific Leader: Prof. Hans-Peter Harjes. (1996 – 2006).

6. «Geophysical survey in the archaeological site of Itanos, Crete». Funded by the French School of Archaeology in Athens. Scientific Leader: Assist. Prof. A. Vafidis. (1996-2001).
7. «Seismic Imaging and Tomography of Oil Sands». Funded by Alberta Oil Sands Technology and Research Authority, Canada. Scientific leader: Prof. E.R. Kanasewich. 1986-1996.
8. «Lithoprobe - Seismic reflection study of the lithosphere in Western Canada». Funded by the government of Canada. Scientific leader: Prof. E.R. Kanasewich.
9. «Development of groundwater exploitation methods in Western Crete». Funded by the General Secreteriat of Research and Development, Greece. Scientific Leader: Assoc. Prof. D. Monopolis.
10. «Geotechnical survey of Ano Meros village landslides». Funded by Rethymnon Perfecture Scientific Leader: Assoc. Prof. D. Monopolis.
11. «Geological and geophysical survey at Almiros river». Funded by the Heraklion Municipality. Scientific Leader: Assoc. Prof. D. Monopolis.
12. «3-D Asymptotic seismic imaging». JOULE. Funded by the European Union. Scientific Leader: Assist. Prof. J. Louis. 1993 – 1995.
13. «Automated scientific program to predict-reduce seismic risk at high seismicity cities in the frame of microzoning studies». EPET II. Funded by the General Secretariat of Research and Development, Greece. Scientific Coordinator: Prof. V. Papazachos.
14. «3D Seismic Imaging of the complex structure of the Western Hellenides». JOULE-Thermie. Funded by the European Union. Scientific Leader: Assist. Prof. A. Vafidis. 1995-1998.
15. «Imaging of the subsurface using the ground penetrating radar». Funded by the Crete Region Authority. Scientific Leader: Assist. Prof. A. Vafidis.
16. «Geophysical survey at the Monastiraki Subway Station». Funded by Olympic Metro. Scientific Leader: Prof. J. Drakopoulos.
17. Geophysical survey at Alexandria, Egypt. Funded by the Foundation of Research and Technology, Greece. June 2001.
18. Geophysical survey for hydrogeological purposes at Kalimnos island. Funded by the Kalimnos Municipality. Scientific Leader: Prof. G. Tsokas. October 2001.
19. «Pilot Study of Geophysical Methods to a Construction Site in the TUC» funded by E.C., of program CRINNO.

RESEARCH RESULTS/PRODUCTS

1. Combined geophysical research for the delineation of salination zones in coastal aquifers and the management of underground water
2. Pilot study of geophysical methods to a construction site in the Technical University of Crete campus

SERVICES OFFERED TO THIRD PARTIES

1. Mapping of bedrock
2. Delineation of salination zones in coastal aquifers
3. 3D representation of geological formations at landfills
4. Soil and water contamination monitoring
5. Mapping of aquifers
6. Estimation of spatial distribution of geotechnical parameters
7. Non destructive testing of foundations and armed concrete
8. Carst and cave mapping beneath of roads and constructions
9. Buried pipes and cable networks mapping
10. Tanks and pipes leakage delineation
11. Buried ancient ruins mapping
12. Mineral resources research

Applied Mineralogy Laboratory

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LABORATORY STAFF

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ACTIVITIES

1. Mineralogical investigations related with:
   - Rocks, ores, minerals, soils and any solid (for example cement, mortar, plaster, ceramics and other industrial materials and products like structural ceramics, etc).
   - Fly ashes that are produced from the combustion of lignite at the electricity power stations in relation of their constitution to the environmental problems. Beneficiation of fly ashes.
2. Determination and study of physical and technological properties of industrial minerals and rocks, such as clays, bentonites, perlites, etc. in relation to their beneficiation.
3. Analysis of microstructure (phases, texture, etc) materials that are produced after the transformation of the raw materials during the processes of the industrial production of structural ceramics, cement, refractories and other industrial products.
4. Study of chemical reactions of solid materials at high temperatures (development of laboratory experimental techniques, determination and study of crystalline phases)

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Equipment for phase analysis:

- 2 X-ray Diffractometers (Siemens D500 as well as Bruker D8 Advance).
- Differential Thermal Analyser up to temperature of 1600°C.
- Polarizing and ores microscopes.
- Sedimentograph.
- Particle size separators.
- ß-rays detector.
- Micronising Mill and Sample Preparation kit
- Equipment for crushing, sieving and preparing samples for mineralogical and other analysis.

Equipments for the determination of physical-chemical and technological properties of the industrial rocks, minerals and structural ceramics:

- Heating microscope for temperatures up to 1650°C.
- High temperature laboratory furnaces for temperatures up to 1600°C.
- Digital microhardness tester
- Apparatus for measuring of the bending strength of ceramics etc.
- Apparatus for the determination of the workability of ceramic raw materials.
- Apparatus for the determination of the viscosity of ceramic raw materials slurries.
- Apparatus for the determination of the density of mineral raw materials.
- Abrasion tester.
- Extruder.
- Apparatus for the determination of the grindability of coals.
- Calcimeter BERNARD.

RESEARCH AND DEVELOPMENT PROJECTS

1. Integrated beneficiation slurryfication process for capacity and emissions improvement of lignite power plants, 1991-1994. Project STRIDE HELLAS, No. 386 (in collaboration with Aristotle University of Thessaloniki).
2. Comments to the statement by the board of experts on the erosion wear in Amyntaeon power plant, 1994. Funded by Greek P.P.C.
3. Mineralogical composition of alunit of Milos and Lesbos, 1994. (In collaboration with the Laboratory of Mineral Processing in N.T.U.A.).
4. Investigation and evaluation of Cretan clays usage feasibility for the production of structural ceramics, 1996-2000. Project R.O.P.-Crete.
5. Composition and technological uses of the lignitic ashes of the electricity power plants of the Ptolemais-Amynteon district, 1996. Funded by P.P.C.
6. Mineralogical study of galenite and sphalerite concentrates from Olympias (Chalkidiki), 1996-1997. Funded by TVX HELLAS SA
7. Mineralogical study of pyrite-arsenopyrite concentrates from Olympias (Chalkidiki), 1997. Funded by TVX HELLAS SA
8. Mineralogical investigation of lignite, peat and boiler slags, 1999. Funded by P.P.C.
9. Mineralogical investigation of slags of the boiler of Unit III of the Megalopolis power plant, 2002-2003. Funded by P.P.C.

10. New casting process for the applications: The protections of the ceramic coating, 2002-2004. Project CRAFT of U.U. (Scientific coordinator "BOYLBIS GEORG Co").
11. Investigation of the composition of the lignitic power plant fly ashes of the P.P.C., 2003-2004. Research Project funded by P.P.C.
12. Determination of the mineralogical composition of the dust producing by the processing of perlite in the island of Yali, 2004. Funded by the company "PERLITES AEGEAN".
13. Investigation of clay raw materials of brick factory of Rethymnon, 2007. Funded by the company "RETHYMNIAN BRICKS".

RESEARCH RESULTS/PRODUCTS

1. Solutions of problems appearing by the operation of electricity power stations, related to the inorganic components of the lignites.
2. Evaluation of Cretan clays for the production of structural ceramics.
3. Possibilities of the beneficiation of the fly ashes producing from the Greek electricity power plants.
4. Contribution to the beneficiation of various ores and industrial minerals of Greece.
5. Contribution to the management of environmental matters, related to minerals and rocks.

SERVICES OFFERED TO THIRD PARTIES

1. Mineralogical analysis of rocks, ores, minerals, soils and other solids (i.e. cement and construction materials).
2. Determination of physical-chemical and technological properties of industrial minerals and rocks as well as of structural ceramics.
3. Prospecting and exploitation of ores and industrial minerals.
4. Topics related to the interaction of mineral matters with the environment.

Laboratory of Ceramics and Glass Technology

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- Eleni Roussi, Mineral Resources Eng, Msc, (Collaborating Researcher)

ACTIVITIES

1. Advanced ceramics processing (ceramic filters and membranes, engineering ceramics, bioceramics, solid electrolytes, ceramic superconductors).
2. Ceramic micropowders development through chemical methods.
3. Development of ceramics with tailor made properties (porous ceramics of controlled pore structure, graded structures, ceramics of high thermal shock resistance).
4. Ceramic shaping and sintering techniques.
5. Powder consolidation methods.
6. Investigation of ceramic properties (microstructure, pore structure, mechanical properties)
7. Refractories

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Mercury Porosimeter (Micromeritics, Autopore IV)
- Dilatometer (Netschz,DIL402C)
- DTA/TG (Perkin Elmer, Diamond TG)
- Spray Dryer (Buchi, B-290)
- Laboratory Z-blade mixer
- Piston extruder
- Ball milling
- High Temperature Furnace (-1750oC) (Nabertherm LHT 08/17)

RESEARCH AND DEVELOPMENT PROJECTS

1. Improvement of ceramic substrate of three way catalysts (TWC) to develop a regeneration and/or reactivation procedure of used catalysts (REGENCATS)». Laboratory was the subcondructor of CERECO company. EU funding GROWTH GRDI-2000-25605. Duration: 1/02/01-31/3/04
2. GROWTH GRD2-2000-30072: "Organic/inorganic hybrid membranes based on novel molecular nanosponges for water purification (NANOSPONGE)". European Union research project concerning the development of a hybrid filter polymer/ceramic for the production of ultra pure water. The laboratory participates as Scientific Coordinator of the project with the aim to develop ceramic substrates and to coat them with the polymeric nanosponge materials. We have developed ceramics with controlled pore structure and then we have examined the deposition of polymers with nanocavities such as cycrodextrines or dendrimers into the ceramic pore surface. We have a good loading of polymers onto the ceramic substrates and we achieve aromatic hydrocarbons removal from water in the order of 99% or more. EE- funding. Duration: 1/10/01-31/3/06.
3. CRAFT CRAF-1999-70727: "New casting process for Ti dental applications: the protection efficacy of a ceramic coating (CATIPRO)". Approved European Union funded research project concerning the development of an improved methodology for the casting of Ti alloys for dental applications. The laboratory participated as RTD performer with the aim to develop suitable ceramic coatings on investment materials employed for Ti casting. The final objective was to avoid Ti contamination due to reactions with investment materials during casting. A zirconia coating that protects the reaction of molten Ti with the ceramic mould during casting has been developed. EE-funding. Duration: 1/01/02-31/3/04.
4. NMP2-CT-2004-505885: "Superhigh energy milling in the production hard alloys, ceramic and composite materials (ACTIVATION)". The laboratory participates as Scientific Coordinator of the project. The main objective of the project is the development of improved performance materials and of superior cost-performance and process versatility technologies. This goal will be pursued through the use of novel milling equipment that delivers dramatically higher energy density than currently available mills for commercial use. EU funding. Duration: 1/07/04-30/6/07.

RESEARCH RESULTS/PRODUCTS

1. Development of ceramics with controlled pore structural characteristics
2. Development of hybrid porous filter for the production of ultra pure water for pharmaceutical or electronic industries
3. Development of nano materials with the use of the sol-gel process
4. Development of ceramic coatings that protect the reaction of molten Ti with the ceramic mould during casting.

SERVICES OFFERED TO THIRD PARTIES

1. Development of ceramics with tailor made properties.
2. Investigation of ceramic properties (microstructure, pore structure, mechanical properties).

Geodesy & Geomatics Enigineering Laboratory

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ACTIVITIES

1. High precision satellite navigation and geodetic positioning
2. Establishment of permanent GNSS arrays (operated since 1996),
3. Monitoring of the tectonic and geodynamic motion of the earth's crust, etc.,
4. Satellite altimetry calibration and validation,
5. Sea level changes and extreme events analysis,
6. Statistical analysis and quality control of remote sensing and geodetic data.
7. Development of a System for Oil Spill and Environmental Monitoring in the Eastern Mediterranean Using Remote Sensing and related Technologies.
8. Development of a Remote Sensing System for wild and forest fires.
9. Use of satellite and airborne sensors and images for environmental applications.
10. Exploration and positioning of mineral resources, etc.
11. Creation of databases using Geographical Information Systems (GIS).
12. Map digitising and production of Digital Elevation Models (DEM) of the terrain.
13. Development of seafloor geodetic techniques using GPS and precision acoustics for precise underwater positioning.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- 8 state-of-the-art geodetic GPS receivers.
- 2 GPS receivers for conventional applications.
- 2 hand held GPS receiver.
- 2 radio-communication units for the transmission of differential GPS corrections.
- 2 total geodetic stations (EDM).
- 2 Levels.
- Several computers run on UNIX/Linux platforms for the processing and archiving GPS data and satellite images.
- GPS Data processing software (Ashtech Office Suite, GAMIT/GLOBK, TEQC, etc.).
- GIS data and satellite image processing software (Envi, Ermapper, Arc Info).
- Radar image processing software (Diapason).
- 10 personal computers.
- Scanners, Laser printers, color printers.
- Digital images from the following satellites: Landsat, Spot, KVR 1000, ERS1, ERS2, QuickBird, Heperion, etc.

RESEARCH AND DEVELOPMENT PROJECTS

1. Co-investigator with NASA-University of Maryland Baltimore County- Joint Center for Earth Systems Technology. Title: "Dynamics of Eastern Mediterranean, Sea Level, and Altimetry Calibration-Validation (DynMSLAC)" Funded by the National Aeronautics and Space Administration, Ocean Surface Topography Science Team, SOT/ST-03-0026-0046, Start on 1-1-2005. Duration 4 years.
2. (Geo-Alert): Principal Investigator, "Development of Algorithms for Quality Control of Measurements in deformation monitoring, Collaboration with the Aristotle University of Thessaloniki, (2005-2007).
3. KASTELI Cal-Val: Principal Investigator: Extension of the Gavdos permanent calibration/validation facility for radar satellite altimetry and development of a new facility on mainland Crete, Greece», Collaboration with NASA/ Joint Center for Earth Systems Technology, Washington DC, USA (2006-2008). Supported by the General Secretariat for Research and Technology.
4. FALASSARNA: Title, Enhancement of Geophysical and Geodetic Networks for an automatic system of warnings for earthquakes and tsunamis, Collaboration with National Observatory of Athens, 2006-2008. Supported by the General Secretariat for Research and Technology.
5. ESA: Principal Investigator, Observing ground subsidence due to over-exploitation of water resources in Crete, European Space Agency, Earth Observation, Category-1, collaboration with University of Wisconsin, Department of Geology & Geophysics (USA).

6. ESA AO4496: Cryosat-2 Cal/Val Principal Investigator, Monitoring, Calibration and Validation for Cryosat-2 satellite altimeter measurements, and absolute sea-level determination by the permanent satellite facility on the island of Gavdos, Crete, European Space Agency, Earth Observation, Category-1, collaboration with University of Graz & Space Research Institute of Austrian Academy of Sciences, Austria.

RESEARCH RESULTS/PRODUCTS

1. Installation and operation of permanent stations using Global Navigation Satellite Systems
2. GPS data and support to the Permanent European Reference Frame Network
3. Software development for the quality control of satellite measurements
4. Calibration/ Validation of satellite radar altimeters, such as Jason-1 , Envisat, etc.
5. Image data fusion for monitoring the development of previously mined areas.
6. Analysis of sea level data and extremes
7. Seafloor geodetic techniques using GPS and precision acoustics for underwater precise positioning.

SERVICES OFFERED TO THIRD PARTIES

1. Precise positioning for geodynamic, navigation, kinematic applications using Global Navigation Satellite Systems.
2. Analysis of satellite remote sensing images for environmental applications (detection of active geological faults, oil spills at sea, reclamation of mined areas, over pumping of water recourses, forest fire management, etc.)
3. Analysis of satellite radar images using interferometry for deformation determination and digital elevation models.
4. Quality control of geodetic GPS measurements.
5. Calibration/ Validation of satellite radar altimeters.
6. Underwater precise positioning with GPS and acoustical techniques
7. Analysis of structural deformation using satellite positioning

Inorganic & Organic Geochemistry & Organic Petrography Laboratory

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RESEARCH ACTIVITIES

1. Geochemistry of lignite and lignitic ashes.
2. Soil remediation / reclamation:
   - Concentrations of heavy and toxic metals in landfill soils and bearing plants.
   - Behaviour of various soil lithologies on the relative absorption of olive oil mill wastewater
   - Soil contamination from pesticides
   - Relationship between lithological and mineralogical characteristics of soils derived from diverse parent material. Impact on available nutrients.
3. Geochemical analysis of pigments and plasters

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Atomic Absorption Spectrometer with graphite furnace and hydride generator
- Energy Dispersive X-ray fluorescence Spectrometer
- Coal petrographic microscope.
- Carbon analyser
- Sulfur analyser
- C, H, N analyser
- Calorimeter
- U.V. – visible Spectrometer
- Freeze drier, rotary evaporator, sohxlets, centrifuges, furnaces, ovens, pH meters, etc.

RESEARCH AND DEVELOPMENT PROJECTS

1. Relationship between lithological and mineralogical characteristics of soils derived from different parent material. Impact on available nutrients.
2. Soil contamination from pesticides
3. Behaviour of various soil lithologies on the relative absorption of olive oil mill wastewater
4. Monitoring soil fertility in landfills developed on abandoned lignite mines in the wider area of Ptolemaida-Amynteon Western Macedonia/Greece.
5. Monitoring heavy and toxic metals leached from fly ash piles
6. Geochemical analysis of soils from the Kozani prefecture, northern Greece.
7. Trace elements in Greek lignites
8. Study of oil source rocks in Northern Aegean and Western Greece (Epirus).
9. Properties and geochemistry of lignites in Ptolemaida area.

The above research programs have been contracted to the Geochemistry laboratory by the Public Power Corporation (DEI), National Research Council, Public Petroleum Company of Greece, North Aegean Petroleum Corporation (NAPC) and the Institute of Geology and Mineral Exploration, while the scientific results have been published in international scientific Journals and international Congresses.

RESEARCH RESULTS/PRODUCTS

1. Study of ancient and resent wall painting pigments and plasters
2. Study of soil contamination by pesticides
3. Geochemical soil analysis in prefecture of Kozani
4. Study of trace elements in Greek lignites
5. Fertility study and monitoring of reclaimed soils in exploited lignite mines in Ptolemaida area.
6. Leaching tests of heavy and toxic metals from fly ash piles.
7. Study of rock and oil mill waste interaction

SERVICES OFFERED TO THIRD PARTIES

1. Geochemical analysis of major and trace elements in rocks, sediments, ores, soils and plants
2. Analysis of C, S, H, N in coal, biomass and sediments
3. Soil analysis: Grain size analysis, pH, conductivity, ion exchange capacity, nutrient analysis
4. Analysis of pigments and plasters in wall paintings
5. Leaching tests of heavy and toxic metals from soils and fly ashes
6. Investigation for pesticides contamination
7. Study of rock and soil interaction with oil mill waste water
8. Study of soils fertility and interrelation with rock parent material.

Mine Design Laboratory

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- Tsolakis Antonios, Dr. Mechanical Engineer, External Assoc.

ACTIVITIES

1. Stability analysis of underground and surface geotechnical works (tunneling, rooms & pillars, slopes, drilling etc.).
2. Design of Surface & Underground Mining Operations, Quarrying, Coal Mining, calculation of deposit reserves and deposit exploration with Geostatistical analysis (krigging), excavation techniques etc. with the use of CAD and Web-Driven Data Bases.
3. Design of Underground and Surface Geotechnical Constructions (tunnels, slopes etc.).
4. Characterization of Mechanical Properties and Damage of Natural & Artificial Rocks and Cements (application to monuments, buildings etc.).

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Electronic Units (PC, printers, scanner).
- Computing algorithms for Geomechanics (FLAC, 3DEC and PFC (Itasca), Geoslope).
- Designing programs for 3D modeling and Data Base Management of Mining Operations (AutoCAD, SURPAC 2000 and GEMCOM).
- Integrated tool for in situ and laboratory characterization of effectiveness and durability of conservation techniques in buildings and historical structures.
- Analogical Devices for modeling the stability of slopes, creation of faults and underground constructions in low depth

RESEARCH AND DEVELOPMENT PROJECTS

1. «Characterization of mechanical properties and damage of natural building stones in historical monuments» (1997-2000).
2. «Environmentally friendly construction technologies» (1997-2001).
3. «Big Depth Geodynamic Laboratory in the Gulf of Corinth-PLOUTON» (2000-2002).
4. «Theoretical modelling and experimental implementation of nonlinear acoustic techniques for microscale damage diagnostics-NATEMIS» (2000-2005).
5. «Materials with Microstructure: Constitutive Modeling and Computational Techniques» (2000-2001).
6. «Faults, Fractures and Fluids-3F Corinth». Πρόγραμμα: EC/ENVIRONMENT. Funded by EC, 2001-2003.
7. «Effects of the weathering on stone materials: Assessment of their mechanical durability-(McDUR)» (2001-2004).
8. Integrated Tool For In Situ Characterization of Effectiveness and Durability of Conservation Techniques In Historical Structures (DIAS). Funded by EC, 2002-2005.
9. Pythagoras II: Reinforcement of Research Teams of TUC, subcontract: Development of integrated method for modeling the mechanical behavior of underground constructions in faulted rockmasses.
10. Technology Innovation in Underground Construction (TUNCONSTRUCT). Funded by EC, 2005-2009.

RESEARCH RESULTS/PRODUCTS

1. Standardization, Web-Driven Data Base, and adjustment techniques for constitutive mechanics of laboratory and in situ tests of rocks and stones
2. Computational modeling of stress and strain analysis for tunnels and slope stability.
3. Computational modeling of thermoporomechanics of geometerials (e.g. moisture diffusion and heat transfer in porous media).
4. Modeling of mechanical behavior of materials with microstructure (e.g rocks, cements etc.).
5. Modeling of the distribution of dolomite content in aggregates quarries (TITAN) with the use of CAD.

SERVICES OFFERED TO THIRD PARTIES

1. Non-catastrophic characterization of buildings, structures & historical monuments
2. Design of Geotechnical Constructions, Mining Operations, Quarrying, Coal Mining, calculation of deposit reserves and deposit exploration with Geostatistical analysis etc.
3. Back analysis of stresses, displacements and failures in slopes and tunnels
4. Standardization and Consulting on mechanical tests on rocks and natural or artificial stones
5. Modelling of geological maps in 3D graphic models and Data Bases.

Mineral Processing Laboratory

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ACTIVITIES

1. Mineral processing methods, study and development.
   - Optimization of existing methods.
   - Application of Mineral Processing methods to specific minerals.
   - Development of new methods for specific applications
2. Washability study of various ores with known mineral processing methods.
   - Gravity separation.
   - Magnetic separation, wet and dry.
   - Electrostatic separation.
   - Selective grinding.
   - Flotation.
   - Leaching, chemical, biological.
3. Study of ore and mineral mechanical properties.
   - Particle size analysis with screens.
   - Hydroclassification.
   - Laser diffraction analysis.
   - Specific surface area measurement.
   - Brittleness.
   - ζ potential.
4. Feasibility study.
   - Processing plant design.
   - Technical-economical study.
   - Environmental study.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Crushers and Grinding mills: Jaw crusher, Cone crusher, Rotating disc crusher, Rod mill, Ball mill.
- Classification: Screens, Hydrocyclone, cyclosizer, Air classifier and dust collector
- Instruments for the measurement of physical properties: Laser diffraction analysis Mastersizer S, Specific surface area and porosity measurement NOVA 2200 and Chemebet, Electrophoresis for ζ potential
- Magnetic separators: Belt Roll magnetic separator, Inducled Roll Magnetic separator, Wet High Gradient , Magnetic separator,
- Electrostatic separator, Triboelectrostatic separator,
- Gravity separators: Spiral Concentrator, Shaking table, Jig, Heavy liquids
- Centrifugal separator, Falcon Bowl
- Flotation Machines
- Pelletizing: Mixer, rotating disc

RESEARCH AND DEVELOPMENT PROJECTS

1. Mathematical model development of specific energy and particle size relationship in comminution.
2. Bio-leaching of Gold bearing sulphide ores. Financed by TVX
3. Gold leaching by cyanidation.
4. Flotation of sulphide ores.
5. Flotation of silicates from magnesite ore.
6. Mineral Processing of laterite from Euboea and Kastoria, for FeNi production.
7. Mining acid water neutralization for environmental deposits.
8. Mineral Processing of chromite, boxite, manganese ore.
9. Sulfur extraction from volcanic ash.
10. Mineral Processing of pegmatite for feldspar production by flotation method and electrostatic separation. Financed by ELVIOR
11. Mineral Processing of phosphate ore.
12. Mineral Processing of lignite.
13. Pelletizing of fine particles.

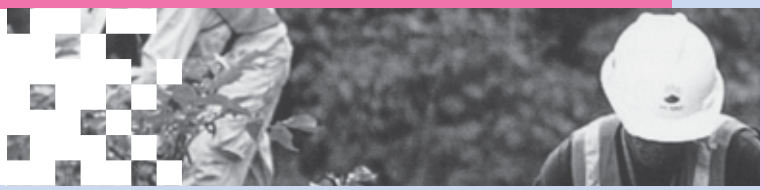
RESEARCH RESULTS/PRODUCTS

1. Patent 60511, "Method for the separation of minerals with different magnetic susceptibility using a belt magnetic separator" E.Stamboliadis, Z.Fragiskos for Fimisco, Athenns, 10 April 1978
2. Patent 63004, "Flotation of alunite using alkylphosphate collectors" E.Stamboliadis, for Fimisco, Athenns, 18 June 1979
3. Patent 1005319, "Composting of municipal sludge by the method of pelletizing E.Stamboliadis, Athenns, 6 October 2006

SERVICES OFFERED TO THIRD PARTIES

1. Measurements of physical properties of the minerals particle size, specific surface area, specific energy, ζ potential
2. Mineral and ore Processing with physical methods.
3. Chemical and biological ore leaching
4. Disposal of wet and dry industrial waste, mining and municipal
5. Plant design
6. Mineral Processing methods design.
7. Feasibility study for mining and processing projects

Petrology & Economic Geology Laboratory



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ACTIVITIES

1. Characterization, quality control and application features of mineral raw materials for building purposes, concrete production, coating of non-slip asphalt carpets (paving) and rock suitability control for industrial applications i.e. fillers, production of lime and ecological hydraulic binders.
2. Field research of rock quarry sites as raw/building materials for restoration purposes of monuments, historical buildings and archaeological sites.
3. Study, synthesis and compatibility requirements of mortars for intervention purposes during restoration works on archaeological sites.
4. Chemical and mineralogical analysis for the characterization of inorganic materials (XRF, Flame photometry, XRD techniques).
5. Micro-structural study of materials using scanning electron analysis and chemical microanalysis (EDS techniques).
6. Geothermal research activities and applications.
7. Research study of artificial ageing of materials and simulation of various environmental conditions.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- X-ray Fluorescence Spectrometer (XRF).
- Scanning Electron Microscopy (SEM).
- Electron Dispersive Spectrometry (EDS) microanalysis device.
- Gold sputter coater device.
- Apparatus/instruments for testing & quality evaluation of raw materials (aggregates, binders) as well as mortar production:
  - Micro-Deval apparatus (determination of the resistance to wear)
  - AIV & ACV apparatus
  - Grinding, crushing and granulometric size analysis machinery for aggregates
  - Blaine's air permeability apparatus
  - Apparent density unit
  - Vicat's apparatus
  - Slaking rate machine
  - ASTM & CEN standard sieves
  - Furnace operated with program controller
  - Laboratory mortar mixing machine.
- Flame Photometer.
- Optical Stereo and Polarizing microscopes.
- Cutting, smoothing and polishing machine for minerals and rocks (cutting, grinding mounted specimens and preparing of thin and polished sections).
- Climatic Chamber, simulating environmental conditions for artificial ageing purposes (testing of resistance to freeze - thaw impact and CO2, NO2 atmospheric pollutants).
- Salt Spray Chamber (coastal environment applications).

RESEARCH AND DEVELOPMENT PROJECTS

1. "Geothermal Energy with vitrinite reflectance in Greek geothermal fields".
2. "Exploration positioning and evaluation of Greek industrial minerals with emphasis in the industrial minerals and rocks of Crete".
3. "Evaluation of graphite outcrops in Makri area of Evros Prefecture and Livadi area of Thessaloniki Prefecture".
4. "Analysis of rocks and mortars of Chania Archeological Museum".
5. "Development of new materials for restoration of monuments according to their constituent materials and the erosion mechanisms". Programme: EPET II. Funding: GSRT.
6. "Erosion of rocks of the Venetian walls of Heraklion City".
7. "Study for the economic viability of the Technological Park of Chania". Programme: SPRINT Funding: E.U.
8. "Study for the suitability of building stones for the construction of Coastal Walls of Kastelli".

9. "Organization and restoration of the Archaeological Park of Rome". Programme: RAPHAEL-P.A.R.C.O. Funding: E.U.
10. "Exploration and utilization of aggregates, white carbonate rocks and dimension stone of Crete Island. Programme: PEP-Minerals of Crete.
11. "Investigation of the qualitative characteristics of coating mortars in the external perimeter of the restaurant of Asklepeion of Epidauros and proposals for their restoration."
12. ''Evaluation of carbonate raw materials of Crete for production of ecological hydraulic mortars." Pythagoras II Action 2.6.1γ 2005-2006.
13. "Evaluation of carbonate raw materials of Crete for production of low cost ecological hydraulic mortars. Control of compatibility and endurance of produced mortars with building stones of monumental, neoclassic and conventional constructions." PENED-2003. Action 8.3.1. Funding: GSRT.

RESEARCH RESULTS/PRODUCTS

1. Mortar synthesis (recipes - production and evaluation - with respect to their compatibility with the original building materials) for monument conservation and restoration works.
2. Determination, identification, indication of quarry sites for raw and building materials supply in situ during monumental intervention works with respect to the archaeological site or the historical building location (geological mapping research).
3. Production of hydraulic lime mortars.

SERVICES OFFERED TO THIRD PARTIES

1. Chemical and mineralogical analysis of mineral raw materials and various mineral products.
2. Micro-structural study using scanning electron microscopy and EDS chemical microanalysis.
3. Laboratory evaluation of aggregates and building materials.
4. Aggregate suitability control for road construction works and paving.
5. Evaluation and production of mortars for restoration and conservation works of old and historical buildings. Compatibility studies of the produced mortars, with the original structural materials of the building constructions.
6. Determination, identification, indication of quarry sites of industrial minerals, aggregates and building materials.
7. Study of artificial ageing and simulation environmental effects upon materials.
8. Geothermal field researches.
9. Potable water and waste water treatment with mineral raw materials, for water supply purposes.

PVT and Core Analysis Laboratory

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ACTIVITIES

1. Phase equilibria and thermodynamic behaviour (PVT) studies of mixture of multiphase fluids at high pressures and temperatures.
2. Compositional analysis and characterization of gas and liquid petroleum samples.
3. Reservoir Core analysis studies.
4. Measurements of Physical properties of Petroleum and its Fractions.
5. Catalytic processing of hydrocarbon mixtures.
6. Asphaltenes deposition studies.
7. Phase equilibria simulation of hydrocarbon mixtures
8. PVT properties simulation models based on EOS and ANN.
9. High pressure experimental determination of gas hydrate equilibrium at three (V-L-H) and two (L-H) phase region of the phase envelope.
10. Experimental determination of GH formation curve of a gas azeotrope mixture of Xe – HFC 134a.
11. Experimental study of host formations containing gas hydrate at high pressures. As host formations both berea sandstone cores and clayish sediments have been studied. Permeability values as low as 0.3 μDarcy were measured.
12. Compressibility study of clay sediments which contain gas hydrates at high pore pressures.
13. CT-scan of pressurized natural sediment cores containing gas hydrates

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Equipment for evaluating phase equilibria and thermodynamic behaviour (PVT) of multiphasic mixtures at high pressures and temperatures, including a dual visual cell connected to a Hg pump, installed in a thermostatically controlled airbath
- Gas Chromatograph-Mass Spectrometer (GC-MS) Fisson MD-800
- Gas Chromatographs (GC), HP5890 and Perkin-Elmer-8700
- Liquid Chromatograph (HPLC) Waters
- Infrared Spectrometer (FT-IR) Perkin-Elmer Spectrum 1000
- Isco syringe pump model 500D, max working pressure 259bar
- A multi-port core holder, biaxial loading, model Temco DCHH-1.5 max working pressure 690bar.
- Autoclave reactor model Parr 4565M (volume 100ml, max working pressure 210bar at 350°C), equipped with magnetic stirrer.
- Gas booster model Haskel AGT 62/152H, max working pressure 1720bar.
- Solid phase microextraction device (SPME)
- Solid phase extraction unit (SPE)
- Purge & Trap device for sample injection in GC ή GC-MS
- Pyrolysis gas chromatography unit (Py-GC)
- Thermal desorption device for sample injection GC ή GC-MS
- Rock-Eval II pyrolysis system for the characterization of organic matter in rocks and soils

RESEARCH AND DEVELOPMENT PROJECTS

1. "Determination of reservoir wetability. Study of surface effects in oil-water-rock systems and of their effect in oil production". Funded by: Research Committee, Technical University of Crete
2. "Geochemical study of the oil produced in exploratory well PN-2 in North Prinos reservoir". Funded by: Wintershall AG, Kassel
3. "Experimental study of the rock properties of the exploratory well PN-2 in North Prinos reservoir", Funded by: North Aegean Petroleum Corporation (NAPC)
4. "Experimental study of the fluid properties of the exploratory well PN-2 in North Prinos reservoir", Funded by: North Aegean Petroleum Corporation (NAPC)
5. "Experimental and theoretical study of the behaviour of gas condensates PVT mixtures fluid properties in the North Sea", Funded by: Delft University
6. "Evaluation of the fluid of the production well PN-2 in North Prinos reservoir", Funded by: North Aegean Petroleum Corporation (NAPC)
7. "Experimental study of asphaltenes composition and development conditions for the oil produced in North Prinos reservoir", Funded by: North Aegean Petroleum Corporation (NAPC)
8. "Increase of the domestic capacity recycling used mineral oils" Funded by: General Secretary of Research and Technology
9. "Development of a neural network model for the determination of PVT properties of hydrocarbons" Funded by: Schlumberger
10. "Development and pilot application of a completed system for the optimization of lubricants production in the refinery of MOTOR OIL Hellas" Funded by: General Secretary of Research and Technology
11. "Experimental study of the fluid properties of the exploratory well Epsilon-1", Funded by: KAVALA OIL
12. "Physical bioremediation of organic pollutants in the subsoil and in water reservoirs" Funding by the General Secretary of Research and Technology
13. Feasibility study for the determination of the mud filtrate contamination of reservoir fluid samples» Funded by: OILPHASE
14. "MOREOIL , Evaluation of the Miscible Gas Injection In Oil Reservoirs by Monitoring the Asphaltenes Concentration", Funded by: EU
15. «ANAXIMANDER, Exploration and Evaluation of the Eastern Mediterranean Sea Gas hydrates and the Assoc.d Deep Biosphere», Funded by: EU
16. "Experimental study and modeling of GH formation conditions and migration mechanisms in marine sediments and the associated release of the enclathrated gas in marine environment" Funded by: European Social Fund & National Resources EPEAEK II _ PYTHAGORAS.II.
17. "Development of a novel process for seawater desalination and condensation of water solutions and waste water effluents by using GH". Funded by: European Social Fund & National Resources EPEAEK II _ ARCHIMIDIS II.
18. "Study of the influence of mineralogy and overburden pressure on the phase behavior and formation kinetics of structure II gas hydrates contained in marine sediments.". Funded by: EU Research Access to the European infrastructure for energy reserve optimization, EIERO.
19. "Hydrate Autoclave Coring Equipment System". Funded by: EU, Sustainable Marine Ecosystems MAST3 (EVK3-2000-00549).

RESEARCH RESULTS/PRODUCTS

1. ANN based models for the prediction of PVT properties
2. Optimization of the base lubricants unit in an oil refinary
3. Algorithms for the determination of quality indices of fuels and lubricants

SERVICES OFFERED TO THIRD PARTIES

1. Phase Equilibria and Thermodynamic Behaviour (PVT) Studies of Mixtures of Multiphasic Fluids at High Pressures and Temperatures
2. Determination of the composition of gas and liquid mixtures for the oil industry and refineries
3. Studies of the properties of oil reservoirs rocks for the oil industry
4. Measurements of physical properties of oils and oil fractions for refineries
5. Studies of catalytic conversion of hydrocarbon mixtures for the industry
6. Development and utilization of models for the simulation of gas-liquid phase equilibrium
7. Development and utilization of models for the prediction of fluid equilibrium of hydrocarbons reservoirs based on Artificial Intelligence methods
8. Research and technical studies on gas hydrate stability conditions of hydrocarbon and non-hydrocarbon mixtures at high pressures
9. Measurement of sediment compressibility and permeability at high pressures in the presence of gas hydrates.
10. Assessment of the dynamic behavior of drilling muds on core samples and core permeability during drilling and backflush operation.

Rock Mechanics Laboratory

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RESEARCH ACTIVITIES

1. Measurement of mechanical properties (uniaxial compressive strength, strength under triaxial conditions, indirect tension test, elastic modulus, deformation modulus, Poisson's ratio, strain field, bending strength, strains, anisotropy, etc) of rocks and other natural or manmade materials.
2. Measurement of mechanical properties of concrete (uniaxial compressive strength, elastic modulus, etc) for quality control in construction projects.
3. Simulation of stress / strain and displacement fields in geomechanics.
4. Stability analysis of structures in geomechanics (tunnels, slopes, etc).
5. Quality control in laboratory testing.
6. New technologies in mine design
7. Software development for stress and strain calculations
8. Software development for mine planning
9. Development of database applications in mining

LABORATORY INFRASTRUCTURE

- Laboratory core drilling machine.
- Laboratory rock sample cutting machine.
- Laboratory rock sample grinder.
- Stiff loading frame by MTS with a capacity of 160 ton or 1600kN in compression.
- Sphearically seated loading platens.
- Electronic microconsole for test control (displacement and load control testing).
- Strain gage and extensometer subsystems.
- External Load cell by Maywood.
- Integrated system of digital data recording with a 16bit resolution connected to all testing systems for real time data acquisition and processing.
- Loading frame with a capacity of 50kN in compression by Triscan.
- Triaxial loading cylinder with a maximum lateral pressure of 14MPa by Wykeham Farrance.

RESEARCH AND DEVELOPMENT PROJECTS

1. ΥΠΕΡ '97-homogenization of Greek lignites (research, GSRT).
2. ΔΙΑΥΛΟΣ 1996 – (technology transfer, GSRT).
3. ΠΕΝΕΔ 2003 – Methodology for standardized geotechnical investigations combining geological, geophysical, drilling and experimental data (research, GSRT).
4. ΕΠΕΑΕΚ – Practicum, MRED (development, Greek Ministry of Education).
5. ΕΠΕΑΕΚ – Undergraduate Program MRED (development, Greek Ministry of Education).
6. ΕΠΕΑΕΚ – Graduate Program MRED (development, Greek Ministry of Education).
7. ΕΠΕΑΕΚ – TUC Library (development, Greek Ministry of Education).
8. CRINNO – Measurements of mechanical properties and correlation with insitu properties (research).
9. Laboratory measurements for third parties.

RESEARCH RESULTS / PRODUCTS

1. Standardization of measurements of mechanical properties of rocks
2. Optimization of testing procedures
3. Numerical modeling in geomechanics
4. Software development for mining applications
5. Software for blasting applications (BLASTWIN)
6. Software for basic rock mechanics problems (ROCKWIN)

SERVICES TO THIRD PARTIES

1. Planning and design of mining / quarrying projects
2. Laboratory measurements of properties of rocks and / or manmade materials
3. Feasibility studies for mining / quarrying projects
4. Geotechnical and geomechanical studies
5. Software development in mining and rock mechanics
6. Support of software systems
7. Support for instrumentation selection and setup.

Solid Fuels Beneficiation and Technology Laboratory

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ACTIVITIES

1. New clean technologies for solid fuels. Pyrolysis, combustion and gasification in fixed and fluidized bed.
2. Kinetic studies of pyrolysis, combustion and gasification by thermogravimetric analysis (TGA/DTG) and product analysis
3. Mathematical modeling of pyrolysis, combustion and gasification processes
4. Development of methods for the reduction of slagging and fouling in boilers (ash reduction, desulphurization, ash leaching, use of absorbent materials, use of additives, solid fuel mixtures)
5. Development of methods for the reduction of pollutant emissions from pyrolysis, combustion and gasification processes (ash reduction, desulphurization, use of absorbent materials, use of catalysts, use of active carbon, solid fuel mixtures)
6. Characterization via physicochemical and chemical analyses. Proximate analysis –moisture, ash, volatiles, fixed carbon. In cooperation with other laboratories: Ultimate analysis (C, H, N, O, S), calorific value measurement, chemical and mineralogical analysis of ash, trace element analysis, fluid temperatures of ash, petrographic analysis, specific area measurements.
7. Qualitative upgradement by physical and chemical beneficiation methods (selective grinding, heavy liquids, flotation, spherical agglomeration, chemical leaching, chemical comminution)
8. Exploitation of residues from pyrolysis, combustion and gasification processes (absorbent materials, additives for cement industries, catalysts)

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Crushing and grinding equipment (jaw crusher, cutting mill, ball mill, rifflers)
- Dry and wet sieving equipment
- Proximate analysis equipment (programmable furnaces for moisture and ash analysis, TGA for volatiles analysis)
- High speed centrifuge
- High speed homogenizer
- Leaching extra equipment
- Fixed-bed/ fluidized-bed reactor (cold-model)
- Fixed-bed/ fluidized-bed system (hot model)
- Mass spectrometer
- IR gas analyzers
- Thermogravimetric analyzer (TGA/DTG)
- Pre-pilot plant for heat production from biomass
- Auxiliary equipment (top loading balance, analytical balance, condensers, ultrasonic bath).

RESEARCH AND DEVELOPMENT PROJECTS

1. Development of improved hydrogenation catalysts for coal-derived liquids (Joule, EC, 1989-1990)
2. Development of partial catalytic oxidation of methane for the production of C2 hydrocarbons (Joule, EC, 1990-1991)
3. Qualitative upgradement of carbonaceous seams from Komanos mine by selective grinding (ELKE TUC, 1993-1994)
4. Study on combustion of pulverized coal and plastic wastes under conditions simulating blast furnace injection (COMMET STAND BC, EC, 1994)
5. Increase of the local potential for the recycling of used oils (EPET II, GSRT, 1995-1998)
6. Rational use of energy in agriculture- The case of olive oil residues (Save, EC, 1996-1998)
7. Combustion behavior of clean fuels in power generation (Energy, EC, 2000-2003)
8. Advanced coal demineralization (ECSC, EC, 2000-2004)
9. Study on the use of Greek lignites as adsorbing materials of gaseous pollutants (EPAN, GSRT, 2003-2006)
10. "Nuclear" Energy from Peaches (CRINNO, EC and Region of Crete, 2005)

RESEARCH RESULTS/PRODUCTS

1. Methods of upgrading and controlling the quality of lignite
2. Qualitative upgradement of solid fuels. Application at the Komanos mine lignite deposits
3. New technologies for solid fuels - Energy from peaches
4. Rational energy exploitation from the agricultural residues in Crete

5. Non-electrical uses of solid fuels- Utilization of residuals from scrap automobiles in the iron industry
6. Clean technologies for solid fuels - Combustion behavior of clean fuels in power generation

SERVICES OFFERED TO THIRD PARTIES

1. Pyrolysis, combustion and gasification experiments of solid fuels in fixed-bed, fluidized-bed and thermobalance systems
2. Mathematical models and kinetic studies of the above processes
3. Slagging and fouling studies
4. Studies for the exploitation of the residues of the above processes
5. Measurements of emissions from the above processes
6. Physicochemical and chemical characterization of solid fuels
7. Beneficiation of solid fuels by physical or chemical methods

Drilling Engineering and Fluid Mechanics Research Unit

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COLLABORATORS

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ACTIVITIES

1. Research and development of drilling fluids for oil and gas drilling and for shallow well drilling (water-wells, coring, wells for environmental purposes, geothermal wells)
2. Hydraulics of drilling fluids
3. Rheology of water suspensions
4. Single and multi-phase flow of non-Newtonian fluids in annuli
5. Cuttings transport and settling of solids through non-Newtonian fluids

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Flow system with horizontal annulus, 40mm by 70mm and 5m long, made of plexiglass equipped with cooling system
- Mass flow meter (Rheonik) for 0-650 kg/min flow rates, with temperature and density measurement
- Differential pressure sensor (Validyne) 0-0,125 psi και 0-6 psi.
- Water tank (750 l) with pvc piping (50mm)
- Centrifugal pump (10hp) giving 700-lpm at 4.4 bar, equipped with inverter for flow regulation
- 2 hp agitator for fluid preparation equipped with impellers
- Two filter presses, a low and a high temperature (LPLT & HPHT, API), for studying filtration characteristics of drilling fluids
- Couette viscometer with rotating outer cylinder, from Grace Instruments, 0.01-600 rpm, with thermal container to get to temperatures up to 80°C, 1 atm.
- Yield stress rheometer with a vane (Brookfield Instruments

RESEARCH AND DEVELOPMENT PROJECTS

1. ΑΙΓΕΟ, Analysis of properties of drilling fluids, Study for minimization of permeability of cores by drilling fluids in oil-wells with addition of Greek lignite, Funding: Ministry of Education, Pythagoras II, Duration 2005-2006.
2. Study for use of Greek lignite as additive for high temperature drilling fluids, Funding: IGME/EPAN, Duration 2002-2005 (completed).
3. Incubator of Ideas of University students (UNISTEP), EC & Region of Crete, Innovative Actions, Duration 2003-2005.
4. Network of Technology Supply - RENTS', EC & Region of Crete, Innovative Actions, Duration 2003-2005.
5. Regional Innovation Pole of Crete & UNISTEP+, EPAN & GSRT & Region of Crete, Duration 2007-2008.

RESEARCH RESULTS/PRODUCTS

Development of drilling fluid additive with lignites for use in high temperature wells

SERVICES OFFERED TO THIRD PARTIES

1. Measurements of rheology of slurries
2. Studies of rheological and filtration properties of non-Newtonian fluids
3. Fluid flow in annuli, pressure drop measurements and predictions
4. Studies of cuttings transport
5. Innovation promotion / Development of Technology Parks

Geostatistics Research Unit

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ACTIVITIES

1. Development of Spartan Spatial Random Field Models and applications in the analysis of spatial information
2. Development and solution of physical-statistical models of mechanical properties for heterogeneous materials
3. Calculations of macroscopic effects of heterogeneity on the elastic and transport properties of porous media
4. Development and solution of diffusion models for sintering and grain growth
5. Analysis of tall structure wind Response from GPS measurements
6. Investigations of time series models for the analysis and management of groundwater resources in the Messara valley of Crete.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Personal Computers (Windows XP) and peripherals.
- Software for scientific programming, simulation, geostatistical analysis and visualization of the results.

RESEARCH AND DEVELOPMENT PROJECTS

1. Principal Investigator: STREP: «INTAMAP: INTeroperability and Automated MAPping», in negotiation with EC.
2. Coordinator: Pythagoras II: «Development and Application of Novel Geostatistical Methods in Environmental Pollutant Mapping». Duration: 2005-2006.
3. Επιστημονικός Υπεύθυνος: Χρηματοδότηση ΕΛΚΕ της Βασικής Έρευνας 2004: «Spartan Random Field Models for Geostatistical Applications». Duration: 2005-2006
4. Scientific Coordinator: FP6 014135 Marie Curie TOK action: «Development of Spartan Spatial Random Field Models for Geostatistical Applications» (SPATSTAT, FP6). Duration: 2005-2008.
5. Principal Investigator: NMP2-CT-2004-505885-1 STREP: «Super High Energy Milling in the Production of Hard Alloys, Ceramic and Composite Materials» (ACTIVATION FP6). Duration: 2004-2007.
6. Principal Investigator: Pythagoras II: «Laboratory Studies and Modeling of the Transport Mechanisms of Gas Hydrates in Underwater Sediments, the Conditions of Formation and the Natural-Gas Emission Rates in the Environment». Duration: 2006-2007.
7. Principal Investigator: Program of Scientific and Technological Collaboration between Greece and China: «Integrated Remediation System in Polluted Areas and Waste Disposal Areas using Novel Technological Approaches». Duration: 2004-2006.

RESEARCH RESULTS/PRODUCTS

1. Development of the Novel Geostatistical Method of "Spartan Spatial Random Fields"
2. New Methodology for the automatic detection of anisotropy in spatial data

SERVICES OFFERED TO THIRD PARTIES

1. Geostatistical Analysis of Spatial Data
2. Statistical Analysis

Hydrocarbons Chemistry and Technology Research Unit

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ACTIVITIES

1. Instrumental analysis and characterization of fossil fuels (petroleum, natural gas, coal, etc)
2. Chemometric applications on analytical data. Development of corellations between chemical compositon and physicochemical properties of hydrocarbon mixtures. Prediction of properties.
3. Organic Geochemical applications in fossil fuels positioning, production and exploitation.
4. Identification and characterization of organic pollutants in the environment produced during production and use of fossil fuels, Fingerprinting.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Gas Chromatograph-Mass Spectrometer (GC-MS) Fisson MD-800
- Gas Chromatographs (GC), HP5890 and Perkin-Elmer-8700
- Liquid Chromatograph (HPLC) Waters
- Infrared Spectrometer (FT-IR) Perkin-Elmer Spectrum 1000
- Solid phase microextraction device (SPME)
- Solid phase extraction unit (SPE)
- Purge & Trap device for sample injection in GC ή GC-MS,
- Pyrolysis gas chromatography unit (Py-GC)
- Thermal desorption device for sample injection GC ή GC-MS
- Rock-Eval II pyrolysis system for the characterization of organic matter in rocks and soils

RESEARCH AND DEVELOPMENT PROJECTS

1. "Evaluation of possible source rock in Greece using organic geochemistry methods" Basic Research 2007, Financed by ELKE TUC, 2007
2. "Simulation of Epsilon oil reservoir using specialized software" PEP Eastern Macedonia 2000-2006, Financed by GSRT, KAVALA OIL, 2006- present.
3. "Evaluation of biogas from neogene formations in Central Crete", PEPER Crete 2000-2006, Financed by GSRT, Municipality of Arkalohori, 2006- present.
4. "Evaluation and monitoring of oil spills in the subsurface using modern geophysical methods", Financed by GSRT "Competitiveness", GEOTEK, 2004-present
5. "Pilot study of lubricant oil extraction", Financed by ELKE TUC, 2004-2007
6. "Characterization of oil spills in the Aspropirgos refinery (Athens)", Financed by Hellenic Petroleum, 2003-2006
7. "Development of low cost adsorbent for gas cleaning using activated Greek lignites", Financed by IGME, 2002- 2006.
8. "Geochemical study of Greek lignites. Origin determination using characteristic biomarkers", Financed by IGME, 1998

Management of mining/ Metallurgical wastes and rehabilitation of contaminated soils Research Unit

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ACTIVITIES

1. Soil decontamination
2. Clean up of solid and liquid wastes and offgases
3. Waste stabilization
4. Secondary and environmental uses of wastes (slags, fly ash, red mud etc.)
5. Geopolymer synthesis
6. Pollution mapping
7. Risk assessment
8. Sustainable development in the mining and metallurgical sector
9. Life cycle analysis
10. Environmental impact assessment studies
11. Bio-hydrometallurgical applications

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Fully equipped analytical laboratory
- Various reactors, Precision pumps, Water baths, Ovens, Various portable meters, Cooling devices, GPS, PCs, Scanners, Printers

RESEARCH AND DEVELOPMENT PROJECTS

1. Aug '04–Jul. '07. Integrated treatment of industrial wastes towards prevention of regional water resources contamination (INTREAT), INCO C.1 Environment STREP, funded by the EC, scientific co-ordinator TUC, Webpage: http://www.labmet.ntua.gr/intreat/
2. Sep '04 – Aug '06. Integrated industrial solid waste management in Albania (INSWAM – AL), INCO C.1 Environment, SSA, funded by the EC, scientific co-ordinator TUC, Webpage: http://www.mred.tuc.gr/projects/inswab/index.htm
3. Mar.'04 - Sep.'06. Innovative technologies for the management of hazardous mining wastes towards prevention of groundwater contamination, funded by the Greek Ministry of Education, PYTHAGORAS program, scientific coordinator TUC.
4. Sep. '05 – Aug. '07. Management and remediation of hazardous industrial wastes in the Western Balkan Countries (INDUWASTE). INCO C.1 Environment, SSA, funded by the EC.
5. Jan. '06 – Dec. '07. Strategic plan for prevention of regional water resources contamination from mining and metallurgical activities in Western Balkan Area (PREWARC), INCO C.1 Environment, SSA, funded by the EC, scientific co-ordinator TUC. webpage: http://www.labmet.ntua.gr/prewarc/index.htm
6. Jan. '06 – Dec. '07. Integrated system for the rehabilitation of contaminated areas in waste disposal sites with the use of innovative technologies, Bilateral Sino-Greek cooperation project, funded by the Greek General Secretariat of Research and Technology, scientific co-ordinator TUC.
7. June '06 – May '08. Optimization of the permeable reactive barriers performance for the decontamination of leachates and groundwater, bilateral Greek-Canada cooperation project, funded by the Greek General Secretariat of Research and Technology, scientific co-ordinator TUC.
8. Apr. '06 – Dec. '06. Risk assessment study at the Somika plant, Katanga province, Kongo, Contrat No 48/Copirep/SE/03/2006, funded by COPIREP, consultancy.

RESEARCH RESULTS/PRODUCTS

1. Soil decontamination and soil waste clean up technologies
2. Liquid waste / leachate clean up technologies
3. Offgas clean up technologies
4. Waste stabilization technologies
5. Contaminated soil and waste phytoremediation technologies
6. Risk assessment
7. Permeable reactive barriers
8. Geopolymers
9. Life cycle analysis of processes and products
10. Treatment of poor ores

SERVICES OFFERED TO THIRD PARTIES

1. Environmental impact assessment studies in mining, metallurgical and waste disposal sites
2. Risk assessment studies and Life cycle analysis studies
3. Waste utilization studies
4. Hydro- and bio-hydrometallurgical treatment of poor ores

Microscopy methods for minerals and industrial products Research Unit

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The research unit of Microscopy methods for Minerals and Industrial Products belongs to the Laboratory of Applied Mineralogy. Its research activities cover specialized subjects of Applied Mineralogy, while the used equipment is in common with the above Laboratory.

ACTIVITIES

1. Mineralogical investigations related with:
   - Rocks, ores, minerals, soils and any solid (for example cement, mortar, plaster, ceramics and other industrial materials and products like structural ceramics, etc).
   - Fly ashes that are produced from the combustion of lignite at the electricity power stations in relation of their constitution to the environmental problems. Beneficiation of fly ashes.
2. Determination and study of physical and technological properties of industrial minerals and rocks, such as clays, bentonites, perlites, etc. in relation to their beneficiation.
3. Analysis of microstructure (phases, texture, etc) materials that are produced after the transformation of the raw materials during the processes of the industrial production of structural ceramics, cement, refractories and other industrial products.
4. Study of chemical reactions of solid materials at high temperatures (development of laboratory experimental techniques, determination and study of crystalline phases)

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Equipment for phase analysis:

- 2 X-ray Diffractometers (Siemens D500 as well as Bruker D8 Advance).
- Differential Thermal Analyser up to temperature of 1600°C.
- Polarizing and ores microscopes.
- Sedimentograph.
- Particle size separators.
- ß-rays detector.
- Micronising Mill and Sample Preparation kit
- Equipment for crushing, sieving and preparing samples for mineralogical and other analysis.

Equipments for the determination of physical-chemical and technological properties of the industrial rocks, minerals and structural ceramics:

- Heating microscope for temperatures up to 1650°C.
- High temperature laboratory furnaces for temperatures up to 1600° C.
- Digital microhardness tester
- Apparatus for measuring of the bending strength of ceramics etc.
- Apparatus for the determination of the workability of ceramic raw materials.
- Apparatus for the determination of the viscosity of ceramic raw materials slurries.
- Apparatus for the determination of the density of mineral raw materials.
- Abrasion tester.
- Extruder.
- Apparatus for the determination of the grindability of coals.
- Calcimeter BERNARD.

RESEARCH AND DEVELOPMENT PROJECTS

1. Integrated beneficiation slurryfication process for capacity and emissions improvement of lignite power plants, 1991-1994. Project STRIDE HELLAS, No. 386 (in collaboration with Aristotle University of Thessaloniki).
2. Comments to the statement by the board of experts on the erosion wear in Amyntaeon power plant, 1994. Funded by Greek P.P.C.
3. Mineralogical composition of alunit of Milos and Lesbos, 1994. (In collaboration with the Laboratory of Mineral Processing in N.T.U.A.).
4. Investigation and evaluation of Cretan clays usage feasibility for the production of structural ceramics, 1996-2000. Project R.O.P.-Crete.
5. Composition and technological uses of the lignitic ashes of the electricity power plants of the Ptolemais-Amynteon district, 1996. Funded by P.P.C.
6. Mineralogical study of galenite and sphalerite concentrates from Olympias (Chalkidiki), 1996-1997. Funded by TVX HELLAS SA.
7. Mineralogical study of pyrite-arsenopyrite concentrates from Olympias (Chalkidiki), 1997. Funded by TVX HELLAS SA.
8. Mineralogical investigation of lignite, peat and boiler slags, 1999. Funded by P.P.C.
9. Mineralogical investigation of slags of the boiler of Unit III of the Megalopolis power plant, 2002-2003. Funded by P.P.C.

10. New casting process for the applications: The protections of the ceramic coating, 2002-2004. Project CRAFT of U.U. (Scientific coordinator "BOYLBIS GEORG Co").
11. Investigation of the composition of the lignitic power plant fly ashes of the P.P.C., 2003-2004. Research Project funded by P.P.C.
12. Determination of the mineralogical composition of the dust producing by the processing of perlite in the island of Yali, 2004. Funded by the company "PERLITES AEGEAN".
13. Investigation of clay raw materials of brick factory of Rethymnon, 2007. Funded by the company "RETHYMNIAN BRICKS".

RESEARCH RESULTS/PRODUCTS

1. Solutions of problems appearing by the operation of electricity power stations, related to the inorganic components of the lignites.
2. Evaluation of Cretan clays for the production of structural ceramics.
3. Possibilities of the beneficiation of the fly ashes producing from the Greek electricity power plants.
4. Contribution to the beneficiation of various ores and industrial minerals of Greece.
5. Contribution to the management of environmental matters, related to minerals and rocks.

SERVICES OFFERED TO THIRD PARTIES

1. Mineralogical analysis of rocks, ores, minerals, soils and other solids (i.e. cement and construction materials).
2. Determination of physical-chemical and technological properties of industrial minerals and rocks as well as of structural ceramics.
3. Prospecting and exploitation of ores and industrial minerals.
4. Topics related to the interaction of mineral matters with the environment.

Quality Control – Health and Safety in the Mineral Industry Research Unit

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ACTIVITIES

1. Quality control for the mineral industry. Sampling, laboratory testing, statistical quality control and quality assurance.
2. Health and Safety in Mining (underground/surface mines and quarries) and in underground constructions (tunnels, excavations etc.).
3. Application of simulation techniques, including statistical and geostatistical methods, neural networks, fuzzy and expert systems, in diverse sectors of the mineral industry (exploration, exploitation, quality control, assessment of occupational and environmental risk).
4. Mine planning and design.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Laboratory equipment for Quality Control:

- Schmidt hammers (analogue and digital) suitable for testing concrete, cement mortars and rocks. Anvil for calibration of Schmidt hammers.
- Curing cabinet for concrete and cement mortar specimens.
- Air entrainment meter for cement mortar specimens.
- Bulk cement sampler.
- Compression devices for cubes 50mm and broken prisms.
- Flexure device for 40X40X160mm prisms.
- Blaine air permeability (fineness) apparatus.
- Vicat apparatus for time and consistency.
- Electronic balance (dual range).
- Three gang moulds for cubes 50mm and prisms 40X40X160mm.
- Three desktop computers (Pentium 4), 1 laptop computer, 2 laser printers and 2 scanners.

Laboratory equipment for the Health and Safety:

- System for sampling and measurement of airborne pollutants (particulates, gases and vapour) consisting of air sampling pumps with adequate accessories (Particulate Samplers, Dust Samplers, Cyclones, Impactors, and IOMs chargers, Calibrators, Filters).
- Integrating sound level meter, personal sound exposure meter and dual level calibrator.
- Digital light (lux) meter, multi-meter and portable broadband (electric/magnetic, radio/microwave) meter.
- Vane-thermo-anemometer, temperature/humidity meter for the measurement of WBGT.
- Real-time aerosol/datalogger with aerodynamic sizing for PM10, PM2.5, PM1.

RESEARCH AND DEVELOPMENT PROJECTS

1. Characterization and evaluation of quarry dust. Founded by Asphaltiki A.E. ELKE No 956204. Duration: 2001-2002.
2. Investigation of the possibility of production of building stones. Founded by Asphaltiki AE. ELKE No 956213. Duration: 2002-2003.
3. Statistical analysis of the on-line analysers' measurements in the mines of Ptolemaes region. Founded by PPC, program "On-line analysis of coal, Coal Research of RFCS", ELKE No 9505. Duration: 2002-2003.
4. Estimation of the reliability the on-line ash analysers in the mines of Megalopolis area. Founded by PPC, program "On-line analysis of coal, Coal Research of RFCS", ELKE No 956224. Duration: 2003-2005.
5. Quality improvement of mortars and building materials produced by FHL Kyriakidis company by using experimental factorial design. Program CRINNO–RENTS. Duration: 2005.
6. Investigation of the effect of lignite ash composition to the accuracy of the on-line ash analyser and development of techniques for the improvement of its accuracy. Founded by ELKE No 132:007. Duration: 2005-2006.
7. Utilization of ultra fine quarry dust for the production of ecological building elements. Founded by GSRT, Program 05PAVET167. Duration: 2006-2007.

RESEARCH RESULTS/PRODUCTS

1. Quality control systems for quarries
2. Development of a process for the production of building structural elements from quarry by-products
3. Development of software for the on-line analysers, used for the quality control of coal
4. Product improvement by using factorial experimental design
5. Methodology for the estimation of occupational risk in mines-quarries
6. Development of electronic educational material for health and safety in mines, quarries and underground works

SERVICES OFFERED TO THIRD PARTIES

1. Mine plan and design
2. Laboratorial assessment of quality characteristics of rocks and minerals and development of quality assurance systems
3. Estimation of occupational risk in mines-quarries and underground works
4. Occupational health and safety measurements (dust, noise, temperature, humidity, radiation, electric dangers etc).

Economic Geology-Industrial Mineralogy Research Unit

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ACTIVITIES

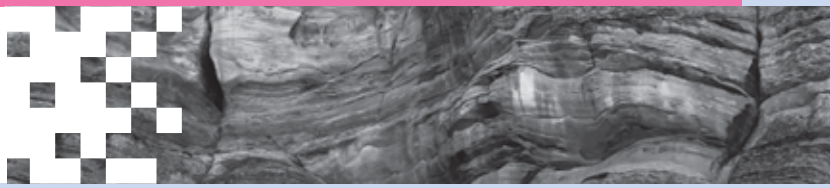
1. Genesis of bentonite and zeolite deposits, formation and growth of smectites in bentonites of various geological environments, layer charge of smectites.
2. Physical and chemical properties and applications of industrial minerals and rocks, evaluation of bentonite, zeolite limestone-dolomite, talc, kaolin, perlite diatomite and common clay and shale deposits.
3. Modification of physical and chemical properties of industrial clays with inorganic and organic reagents.
4. Environmental applications of industrial rocks and minerals.
5. Synthesis of pure high added value zeolites (zeolite A, X and Y) from natural raw materials and waste materials.
6. Application of clays in geoarcheology.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Inconel autoclave 450 ml capacity for hydrothermal synthesis of zeolites and clay minerals in alkaline-caustic environments.
- Viscometer Fann 35S and laboratory equipment for evaluation of clays.
- Instruments for simulation of hydrothermal alteration and spherical reactors for low temperature experiments (<100°C).
- Specialized software for geochemical data processing (Geochemists' Workbench 6.0), processing of XRD diagrams and XRD-modeling (Newmod, LayerCharge) and presentation (Origin 7.5).
- Computing and printing units (PC's, laser printers, scanner).
- Moreover the research unit has access in scientific instruments in other laboratories of the Department of Mineral Resources Engineering (XRD, SEM, XRF, AAS, FTIR, mercury porosimeter, instrument for measurement of BET specific surface area and micro and meso-porosity, laser diffraction unit, optical microscopes).

RESEARCH AND DEVELOPMENT PROJECTS

1. "Distribution of magnitude and heterogeneity of layer charge of smectites in Greek bentonites and influence on physical properties and applications" Programme: PENED 2003. Funding: GSRT 2005-2008.
2. "An Explanation for emergent complex society at the sites of Lerna and Kolonna, Greece" Programme: NEH (USA) Funding: NEH 2004-2007.
3. "Zeolite modification and application study for nuclear waste water treatment (ZEOMAPS)". Programme: INCO-COPERNICUS. Funding: EU (2000-2004).
4. Phyllosilicates as indicators of low temperature metamorphism: comparison of the Permotriassic volcano-sedimentary sequence in the external Hellenides, Greece and the Paleo-Mesozoic rocks of the Bükk tectonic unit, Hungary. Programme: Greece-Hungary Funding: GSRT 2000-2002.
5. Research Projects in collaboration with industry (S&B Industrial Minerals S.A, Akrolithos S.A., Hellenic Mining Company Ltd (Cyprus).



RESEARCH RESULTS/PRODUCTS

1. Distribution of layer charge of smectites in bentonites
2. Influence of layer charge of smectites in physical properties of benotnites
3. Influence of ß- and γ-radiation on the cation exchange capacity of zeolites.
4. Modification of physical and chemical properties of industrial clays with inorganic and organic reagents.
5. Application of TTT diagrams in geoarcheology
6. Synthesis of pure high-added value industrial minerals from natural raw materials and from waste materials from mining activity.
7. Determination of the nature of mixed K, Na micas in metamorphic rocks of very low temperature. Introduction of "paragonite index".

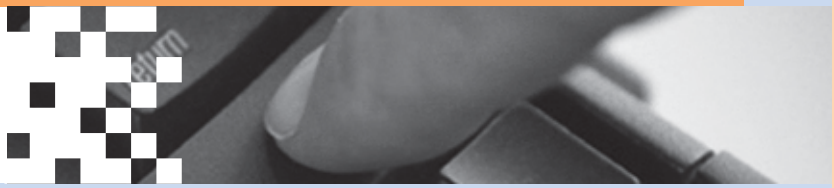
SERVICES OFFERED TO THIRD PARTIES

1. Evaluation of industrial mineral and rock deposits (clays, zeolites, industrial fillers, perlite, diatomite, limestones, dolomites, building materials and aggregates)
2. Determination of layer charge and cation exchange capacity of bentonites and related clays and soils.
3. Evaluation of health-risk of industrial minerals (asbestos, fibrous zeolites and clay minerals and SiO_2-polymorphs).
4. Determination of quantity, nature and crystal size of SiO_2-polymorphs in natural raw materials.

4

Laboratories of Department of Electronics & Computer Engineering

Automation Laboratory



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ACTIVITIES

1. Automatic and Intelligent Control
2. Industrial applications
3. Neural Networks
4. Biomedical systems
5. Robotics and applications in surgical planning
6. Industrial Process Control
7. Process Scheduling
8. Quality control
9. Transportation system control

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Industrial robot
- Two robotic arms for surgical planning
- Oscillators
- Systems and modeling tools for education in Automatic control

RESEARCH AND DEVELOPMENT PROJECTS

1. «Development of Robotic pilot system for oil pipe fusion».
2. «Automatic Control using Neural Networks».
3. «Development of dynamic control system for traffic monitoring»
4. «Hierarchical control and management of industrial processes»
5. «Set-up of robotic arm system for surgical planning and operation».

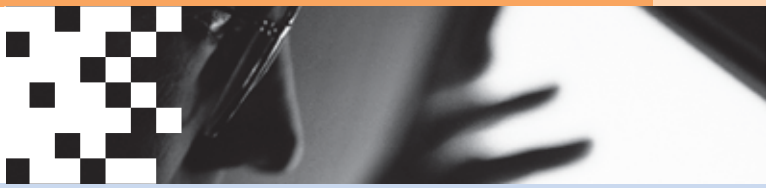
RESEARCH RESULTS/PRODUCTS

1. Industrial Process Scheduling
2. Control of systems with high uncertainty
3. Quality control
4. Biomedical systems

SERVICES OFFERED TO THIRD PARTIES

1. Industrial Process Scheduling
2. System Automation
3. Quality control.

Digital Image and Signal Processing Laboratory



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ACTIVITIES

1. Image Processing and Analysis
2. Biomedical data Processing
3. Multimedia Information Systems
4. Spatial Access methods, Access Methods for images and Video
5. Video Processing and Compression
6. Nonlinear Identification using Neural Networks and Fuzzy Systems
7. Biomedical Image Processing
8. Time-Series Processing
9. Fault Monitoring
10. Product Inspection and Quality Control

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- 3D-Scanner
- Specialized camera systems with multiple sensors
- Data and image acquisition systems and frame-grabbers
- Robotic arm for Laparoscopic surgeries
- Pressure distribution system for gait analysis (PEDAR)

RESEARCH AND DEVELOPMENT PROJECTS

1. "TOWL: Time-determined ontology based information system for real time stock": STREP IST, FP6.
2. "Computational Intelligence for biopattern analysis in Support of eHealthcare (BIOPATTERN)": IST FP6.
3. "Training Centre for Health Care, Prophylactic and Rehabilitation Services": LEONARDO DA VINCI Community Vocational Training Action, 2nd phase
4. "Improving airport Efficiency, Security and Passenger Flow by Enhanced Passenger Monitoring (OPTAG)".
5. "High Performance Industrial Vision (HIPER)": BRITE-EURAM III.
6. "Advanced Tomographic Sensors for Industrial Multiphase Imaging": Thematic Network, BRITE-EURAM III.

RESEARCH RESULTS/PRODUCTS

1. Software for image restoration and enhancement
2. Integrated hardware for image/signal acquisition and processing using digital signal processors (DSPs)
3. Color image transformation techniques
4. Stitching methods for panoramic image generation
5. Microcontroller software for multiple sensor camera control
6. Non-stationary methods for analysis and processing of diagnostic signals using wavelets
7. EEG analysis tools for segmentation and diagnosis
8. Analysis of Retinal Images
9. Clustering and classification of high-dimensionality data with applications in genome analysis
10. Pattern recognition methods using neural networks and support vector machines with applications in cancer diagnosis and prognosis
11. 3D space reconstruction software

SERVICES OFFERED TO THIRD PARTIES

1. Biomedical data processing: Development of software for the analysis of biomedical data for diagnosis and prognosis
2. Industry: Integrated systems for monitoring and automation
3. Environment: Monitoring of environmental processes and crisis avoidance (fire, pollution)
4. Archaeology: Non destructive imaging methods and analysis tools for verification of Statue condition
5. Information Fusion techniques for coupling information from different sources
6. Motion Estimation to derive improved motion vectors from MPEG sequences
7. Object modelling using deformable models (active contours) for the description and tracking of objects in videos
8. Video analysis technique for compressed and uncompressed video. Enables the detection of drastic or eventual changes in video.
9. Content based indexing techniques for image and video retrieval
10. Frame interpolation and dynamic range expansion from different cameras for the creation of high-quality videos
11. Real-time image acquisition and processing using microprocessors
12. High dynamic-range (16-bit) image processing algorithms

Distributed Multimedia Information Systems and Applications (MUSIC) Laboratory

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ACTIVITIES

1. Development of web applications and services
2. Distributed Multimedia Information systems
3. Data Bases
4. Computer Graphics, Rendering and Simulation Technologies
5. Information Retrieval Systems
6. Digital Libraries Technologies
7. Internet search engines and agent technologies
8. Interactive multimedia systems and applications
9. Distributed collaborative environments and workflow management systems
10. Human-Computer Interaction technologies, virtual environments, 3D User Interfaces
11. Applications for tourism, culture, ecommerce and distance learning
12. Office automation, digital business ecosystems.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Servers: 2 IBM xSeries, 1 Sun Fire
- Workstations: 30 PCs, peripherals
- Photocopier: 1 Ricoh

RESEARCH AND DEVELOPMENT PROJECTS

1. Contract No027451, LOGOS (Knowledge-On-Demand for Ubiquitous Learning), Funding Unit: EU/IST/FP6, February 2006-January 2009, Lab.
2. Network of Excellence G038-507618, DELOS (A Network of Excellence on Digital Libraries), Funding Unit: EU/IST/FP6, January 2004-December 2007, Lab.
3. Integrated Project Contract No 507953, DBE (Digital Business Ecosystems), Funding Unit: EU/IST/FP6, November 2003-January 2007, Lab.
4. Leonardo Da Vinci CHIRON (New Media Knowledge Village for Innovative e-Learning Solutions), Funding Unit: EU/Education and Culture/FP6, October 2004-September 2006, Lab.
5. Leonardo Da Vinci ADONIS (Advanced On-the-job e-Training Solutions in e-Business for SMEs), Funding Unit: EU/DG Education and Culture, February 2002-January 2004, Lab.
6. Leonardo Da Vinci KNOSOS (New Media Knowledge Village for Innovative e-Learning Solutions), as Coordinator, Funding Unit: EU/DG Education and Culture, December 2002-May 2004, Lab.
7. IST-1999-20751, UP-TV (Ubiquitous Personalized Interactive Multimedia TV Systems & Services) as Technical Leader, Funding Unit: EU/IST/FP5, December 2000-May 2003, Lab.
8. IST-2000-25131, UWA (Ubiquitous Web Applications), Funding Unit: EU/IST/FP5, January 2001-February 2003, Lab.
9. ESPRIT CAMPIELLO (Interacting in collaborative environments to promote and sustain the meeting between inhabitants and tourists), Funding Unit: EU/ESPRIT-LTR/FP5, September 1997-August 2000, Lab.
10. Contract No 98006361, NET_QUALITY (Networking, Multimedia and Quality Of Tourist Information: a Training Project for Small and Medium Tourism Enterprises within Europe), Funding Unit: EU/DG XXIII Enterprise Policy, Distributive Trades, Tourism & Cooperatives, May 1999-May 2001, Lab.
11. Contract No PL961060, INCO-COPERNICUS ARCHIMED (Advanced Multimedia System Architectures and Applications for Educational Telematics), as Coordinator, Funding Unit: EU/DG XIII Multimedia Applications for Education and Training, March 1998-August 2000, Lab.
12. SME Community Initiative TOURnet (Integrated and Complete Support for the Tourism-Related SMEs of the Region of Crete through Interactive Media and Networks), Funding Unit: EU/SME Community Initiative, January 1998-March 2000, Lab.
13. PENED 99ΕΔ 56, HiPerSciMA (High Performance Computing for Scientific and Multimedia Applications), as Coordinator, Funding Unit: GSRT, Greek Ministry of Development, January 2000-June 2001, Lab.
14. ESPRIT HERMES (Foundations of High Performance Multimedia Information Management Systems), as Coordinator, Funding Unit: EU/ESPRIT-LTR, April 1995-March 1998, Lab.

15. Contract No EP 22160 - ESPRIT HYNODE (Hypermedia News On Demand), Funding Unit: EU/ESPRIT, June 1996-November 1998, Lab.
16. Contract No 20772 - ESPRIT MILLION (Multimedia Interactive Leading Life-giving Initiative On Net), Funding Unit: EU/ESPRIT, October 1995-September 1997, Lab.
17. Leonardo Da Vinci NORTH SOUTH (Network of ORTHodontics Specialists and Universities for the Telematic cHallenge), Funding Unit: EU/DG Education and Culture, January 1997-December 1999, Lab.
18. Leonardo Da Vinci ORTHO ICON (International Courses for Orthodontists Networking), Funding Unit: EU/DG Education and Culture, January 1998- December 2000, Lab.
19. Contract No 071 - ACTS SICMA (Scalable Interactive Continuous Media Server Design and Application), Funding Unit: EU /ACTS, September 1995-August 1998, Lab.
20. ESPRIT SIMOS (Supporting Multimedia On-line Services Working Group), Funding Unit: EU/ESPRIT, September 1996-August 1999, Lab.
21. ESPRIT VENIVA (VENetIan Virtual Archive), Funding Unit: EU/ESPRIT, November 1995-October 1997, Lab.
22. AIM MILORD (Multimedia Interaction with Large Object-oriented Radiological and Clinical Databases), Funding Unit: EU/AIM-RACE, January 1992-June 1995, Lab.
23. PENED 95, MDBA (Multimedia Data Bases and Applications), as Coordinator, Funding Unit: GSRT, Greek Ministry of Development.
24. STRIDE MULTIMEDIA (Hellenic Action for Multimedia Information Systems) as Coordinator, Funding Unit: Hellenic Action for Multimedia Information Systems, January 1992-June 1994, Lab.
25. SPA PROMOTION (Multimedia Information System for the Tourist Promotion of Crete), Funding Unit: Multimedia Information System for the Tourist Promotion of Crete, July 1992-December 1994, Lab.
26. ESPRIT KIWIS (Advanced Knowledge Based Environments for Large Data Bases), Funding Unit: EU/ESPRIT, September 1989-September 1992, Lab.
27. ESPRIT MINERS (An Editorial Platform for Electronic and Traditional Publishing), Funding Unit: EU/ESPRIT, January 1993- June 1995, Lab.
28. ESPRIT MAGIC TOUR (Tourism Information Systems Support for Tourism Enterprises), Funding Unit: EU/ESPRIT, May 1994-October 1996, Lab.
29. HORIZON PRISONER (Development of a Computer-Assisted Training Center for Prisoners), Funding Unit: ELKEPA/HORIZON, July 1992-July 1994, Lab.
30. ESPRIT DAIDALOS (EU and USA cooperation for basic research on Distributed Multimedia Systems), Funding Unit: EU/ESPRIT, January 1993-December 1995, Lab.

RESEARCH RESULTS/PRODUCTS

1. Ubiquitous Personalized Interactive Multimedia TV Systems & Services
2. Multimedia Data Server offering services for multimedia streaming and delivery of delay-sensitive data
3. A knowledge management platform for supporting digital business ecosystems based on p2p and SOA technologies
4. A system for managing semantic metadata for audio-visual digital libraries
5. A platform for ubiquitous learning and managing educational content
6. Platform and methodology for interactive GIS applications

SERVICES OFFERED TO THIRD PARTIES

1. Distributed multimedia information systems
2. Tourism and cultural applications
3. Data base design and development
4. Office Automation and Digital Business Ecosystems
5. Development of web applications
6. Provision of End-to-End Internet services
7. Distance-learning systems
8. Multimedia Interaction Systems

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ACTIVITIES

1. Sensors, transducers and measurement units based on new techniques (fuzzy, neural, data fusion)
2. WECS (grid interconnection, autonomous systems)
3. Photovoltaic arrays applications
4. Design and development of inverters and converters with maximum power tracking (MPPT) for renewable energy sources applications
5. Development of fuzzy logic, neural networks and genetic algorithms based electronic systems for industrial control applications
6. Energy management and optimization Systems comprising renewable energy sources (EMS)
7. Energy Management and saving systems for buildings (BMS)
8. Power stations dispatch, interconnected with renewable energy sources
9. Bioengineering and biomedical systems
10. Development of water desalination systems powered by renewable energy sources
11. Development of electronic systems for agricultural applications

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Design and development equipment for analog and digital circuits
- Digital oscilloscope with FFT module, logic analyzer, digital multimeters, function generators, measurement bridges
- Design and development equipment for microcontroller and microprocessor systems
- DSP development system (Texas Instruments)
- PROM, EEPROM and FLASH programmers
- Measurement equipment for renewable energy sources
- Power quality meter
- Meteorological data acquisition station
- Data acquisition and processing systems (A/D-D/A units, Labview, κλπ.)
- CAD software- [Protel PCB development]
- PCBs development system
- Soldering - desoldering station for conventional devices and SMD

RESEARCH AND DEVELOPMENT PROJECTS

1. "Technology of Thin Layer Silicon Solar Cells and Applications to Power Systems", contract No ESC-R-079- GR(B)/30-3-1982, European Communities.
2. "Development of an Electronic Sphygmomanometer", contract No 80023/29-4-1984, Research and Technology Department of Greece.
3. "Study for the Parallel Operation of Wind-Solar-Conventional Power Station of the island of Kythnos", contract No 6005 (ERE) 527/27-6-1986, EEC, Greek-German collaboration.
4. "Hierarchical Intelligent Control of Industrial Processes - A In-Parallel Lime Kiln Application", contract No DE-AC05-86ER-80394 of the US Department of Energy.
5. "Feasibility Study for the Reliable Integration of a 4.5MW Wind Park to the Power System of the island of Crete, in the area of Sitia", carried out for the municipality of Sitia, Greece in 1988.
6. "Exert System for the Control of the Environmental Conditions in the Holds of Ships", funded by the Greek Research Dept., 1992.
7. "Study and Design of a Digital Control System for the Environmental Conditions in the Interior of a Greenhouse", funded by the Technical University of Crete, 1993.
8. "A Study for the Development of Wind Energy Conversion System in the Technical University of Crete", funded by the Technical University of Crete, 1993.
9. "Study for the Electric Supply with Solar Cells of four Observatories in the National Gorge of Samaria" funded by the Forest Service of Chania, 1993.
10. "Applications on Virtual Reality", funded by E.E.C. as a part of the STRIDE program, 1994.
11. "Development and Application of a System for the Automatic Control of Combustion Conditions in Industrial Ovens, by means of a Central Computer", funded by the Greek Research Dept. 94 BE 37, 1994.
12. "Wind Park Combined with a Pump Storage Unit in the Eastern Crete Region", funded by E.E.C. RE.CI.TE. Program, ROC-NORD network, 1995.

13. "Innovative Biological Indicators to Improve the Efficiency of Water and Nitrogen Use and the Fruit Quality in Tree Crops", funded by EEC, 1996.
14. "Advanced Control Advice for Power Systems with Large Scale Integration of Renewable Energy Sources", funded by the EEC, CARE program, Contract JOR3-CT96-0119, 1996.
15. "Development of an Autonomous Hybrid System for the Energy Support of a 1.5kW Rated Power Local TV Repeater", funded by the EEC PRP CSF II, contract No. 423-1591/17-9-96, 1996.
16. "Combining Smart Card and Local Operating Network Technologies with Advanced Decision Support Techniques to Develop an Intelligent Industrial Energy Management System for Buildings", funded by the EEC Joule program, 1997.
17. "Developing distance training courses for SMART Buildings Energy Management", funded by the EEC in the "Leonardo Da Vinci, Community Vocational Training Action Program" framework, 2001.
18. "Education of European Companies Engineers in Low Power Consumption Circuits and Systems Design", funded by the EEC in the framework of "INTRALED – Industry driven training for low power European engineers" (IST-2001-34631), 2002.
19. "Development of a Smart Nodes System for the Indoor Environment and Energy Management in Buildings in the Frame of a Spin-Off Company", funded by the Greek Ministry of Development, 2002.
20. "Smart Accelerate - Acceleration of Smart Buildings' Technologies and Market Penetration", funded by the EEC in the SAVE (SAVE-2002-094) framework, 2002.

RESEARCH RESULTS/PRODUCTS

1. Heart pressure measuring device not based on Korotkoff sounds
2. Algorithms for the reliable integration of renewable energy sources into the power system
3. Algorithms for installation of photovoltaic systems supplying autonomous loads under limited sunlight conditions
4. Industrial control system based on microprocessor running fuzzy/neural algorithms
5. System design and implementation procedures for optimum energy management of wind generators and photovoltaic arrays
6. Sensor-actuator-computer interconnection techniques in new and existing buildings
7. Automated tree and plant irrigation device based on plant physiology for better growth and water saving
8. Professional training Web platform for engineers about new technologies for "intelligent buildings" and building energy saving systems
9. Intelligent method and completed electronic layout for information management in buildings management systems.

SERVICES OFFERED TO THIRD PARTIES

1. Design & implementation of digital and analog circuits
2. Microcontroller system design & implementation base on fuzzy logic and neural networks techniques
3. Studies related with renewable energy sources (wind generators, photovoltaic arrays, etc.)
4. Sensors-actuators-microcontrollers (in local network or over the Internet) applications development
5. Biomedical systems
6. Training on wind generators, photovoltaic arrays and building energy management topics

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ACTIVITIES

1. Biophotonics-Molecular Imaging
2. Development of biophotonic methods and technologies for non invasive diagnosis of precancerous lesions
3. Development of specialized imaging systems
4. Development of Hyper-Spectral Imaging systems
5. Non destructive analysis-remote sensing
6. Optical spectroscopy
7. Electronic characterization of semiconductor integrated devices and circuits
8. Compact modeling of micro- and nanoelectronic semiconductor devices (CMOS, HVMOS, BJT)
9. Design and evaluation of analog low-power and RF integrated circuits (RFICs).
10. CAD tool development for design automation of analog integrated circuits
11. Design and development of power electronic systems (DC/DC and DC/AC converters, battery chargers, UPS)

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Hyperspectral camera
- Multispectral camera
- Lasers
- Visible-Infrared spectrometer
- DSPs
- Light sources
- Oscilloscopes
- Power supplies
- FPGAs
- CAD software for the design of wireless systems and RFICs (Cadence Design System, Advanced Design System, Mentor Graphics, Dolphin Integration) and semiconductor device model development (IC-CAP)
- Equipment for the characterization of semiconductor devices and RF integrated circuits:
  - Probe station Cascade Summit 10600 with 6' ThermoChuck and MicroChamber, semi-automatic
  - Signal generator Rohde&Schwarz 250kHz-6GHz (SMJ-100A) with Internal Baseband Generator
  - Network analyzer HP8510C (50MHz-26.5GHz)
  - Spectrum analyzer Tektronix RSA2208A (10MHz – 8 GHz)
  - Semiconductor parameter analyzer HP4145A
  - Precision system DC power supply HP6625A dual channel
  - Digital multimeter Agilent 34410A, 6.5 digit
  - DC power supply Agilent E36310A triple output

RESEARCH AND DEVELOPMENT PROJECTS

1. ENTER- Development of a novel optical imaging system for quantitative measurement of skin histological parameters" GSRT, 04EP72, 10/2006-10/2008
2. TARGET – Top Amplifier Research Groups in a European Team. Network of Excellence under FP6 on wireless power amplifier research.
3. ΠΕΝΕΔ2003 – Research programme sponsored by the Greek Secretariat of Science and Technology on WiMAX (802.16a) power amplifier development.
4. RF CMOS INFINEON – Research programme with Infineon Technologies, Munich, Germany, for RF modeling of 120nm, 90nm, and 65nm CMOS technologies.
5. RF CMOS TOSHIBA - Research programme with Toshiba Semiconductor, Tokyo, Japan, for modeling of 140nm, 110nm, and 90nm CMOS technologies for DC, CV and RF aspects.
6. RF CMOS ATMEL - Research programme with Atmel Semiconductor, Heilbronn, Germany, in cooperation with University of Dresden, Germany, aiming at RF modeling of an 180nm BiCMOS technology.

7. CMOS CYPRESS – Research programme with Cypress Semiconductor, Santa Clara, California, with emphasis on investigating technology-related aspects in DC and CV scaling of an 150nm CMOS technology.

RESEARCH RESULTS/PRODUCTS

1. Development of a new behavioral model for wireless power amplifiers
2. Development of a CAD tool for the optimization of RFICs in the Cadence Design System using genetic algorithms
3. Development of a nonlinear circuit simulator based on Volterra Series
4. Development of a complete compact MOSFET model for advanced analog/RFIC design (EKV MOSFET model) for sub-100nm CMOS technology and its implementation in CAD tools
5. Development of educational web-based, analog CMOS design oriented CAD tools
6. Development of a characterization and parameter extraction CAD tool for MOSFET compact models
7. Development of Laser scanners for tissue treatment
8. Development of IR camera based on linear sensor array and scanning system
9. Development of panoramic imaging system

SERVICES OFFERED TO THIRD PARTIES

1. Design of integrated circuits, for low-power and wireless applications (OTAs, filters, smart sensors, power amplifiers, mixers, VGAs and drivers, VCOs, LNAs)
2. Compact transistor model development (CMOS, HVMOS, BJT)
3. DC to RF on-wafer characterization of active and passive semiconductor devices
4. Parameter extraction for active and passive device compact models
5. Remote sensing-non destructive analysis.

Information and Computer Networks Laboratory

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ACTIVITIES

Computer Communication Networks:

1. Design, modeling and performance analysis of digital wireless cellular personal communication networks.
2. Packet ratio multiple access communication networks.
3. Broadband high speed local and metropolitan area networks.
4. High speed wide area ATM networks.
5. Digital communication systems.
6. Signal and parameter estimation theory.

Speech processing:

1. Speech Recognition.
2. Speech coding.
3. Acoustic and language modeling.
4. Robust Speech recognition and adaptation.
5. Telephony and internet applications of speech recognition.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Five (5) Sun Sparc workstations running Solaris.
- Thirteen (13) workstations (six with double core), based on Intel PentiumPro/II/III running Solaris.
- Sixteen (16) PC running Windows 98/NT.
- Full network equipment, (Fast Ethernet Switches, ATM to Ethernet Switches).
- Firewall (CheckPoint 4.0) installed in PC with ATM card.
- Hard drives with total capacity over 300 Gigabytes.
- High resolution video projector.
- High quality digital video camera.
- Video processing platform with card.
- High-quality preamplifier, microphone and headphones all used for speech recordings and on-line speech recognition.
- Specialized software in network communication system simulation.
- Specialized panels and microwave antennas
- Specialized Software for the simulation of communication networks systems.

RESEARCH AND DEVELOPMENT PROJECTS

1. The Spoken Language Translator Project.
2. ESPRIT Program: «Long Term Research Project HERMES no.9141» (Scientific Coordinator: Prof. S. Christodoulakis).
3. "LOGOTYPOGRAFIA- Creation of a system that allows the dictation of vocabulary text through the use of automatic speech recognition in Greek and implementation in the Program: EPET II, Speech Technology, (in collaboration with Speech Intitute and Eleftherotypia Newspaper). Funding: GSRT.
4. "Wireless Architecture Study in IP Texhnology", Programm PENED '99, (in collaboration with University of Athens and TEI of Athens). Funding: GSRT.

RESEARCH RESULTS/PRODUCTS

1. Auto Attendant System for the TUC Campus using Speech Recognition
2. "Logotypografos", a tool that allows the dictation of vocabulary text through the use of automatic speech recognition in Greek

SERVICES OFFERED TO THIRD PARTIES

1. Development of Speech recognition system with large vocabulary, speaker independent.
2. Design, formation and validation of an Auto Attendant System for the TUC Campus using Speech Recognition
3. Methodology for speech recognition via internet
4. Adaptation algorithms of a speech recognition system to speaker and dialect
5. Algorithms for speech coding and recognition via mobile networks.
6. Development of wireless network protocols capable of supporting time sensitive information transmission.
7. Design, modeling, simulation of large scale networks
8. Research, evaluation and functionality improvement of centralized and distributed systems of multimedia information distribution over IP networks.
9. Time scheduling methods for multimedia servers.

Intelligent Systems Laboratory

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ACTIVITIES

1. Artificial Intelligence,
2. Intelligent Agents,
3. Intelligent Agents for Information Retrieval from World Wide Web,
4. Intelligent Agents and Implementation in e-Commerce,
5. Computer Vision,
6. Peer-to-Peer and Grid Computing
7. Bioinformatics
8. Data and Knowledge-base Systems
9. Constraint Programming
10. Databases, Computer Vision and their applications to the retrieval of images and video by content
11. Indexing of image and video databases
12. Machine Learning
13. Decision Making under Uncertainty
14. Multi-Agent Systems
15. Autonomous Robotic Systems

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Up-to-date PCs and software.
- Robots (4 SONY AIBO ERS-7, 1 LynxMotion Hexapod, 2 RoboSapien Humanoids, 1 Bioloid Kit).

RESEARCH AND DEVELOPMENT PROJECTS

1. "Intelligent Camera Systems supporting Automated Motion Detection", Funding Agency: Ministry of Development, General Secretariat for Research and Technology (2006 - 2008)
2. «RLvSL: Reinforcement Learning using Supervised Learning» Funding Agency MR-IRG FP6 (2006-2008)
3. «TOWL (Project No 026896): Time-determined ontology based information system for real time stock», Funding Agency: IST-STREP FP6 (2006 - 2008)
4. «OPTAG: Improving Airport Security and Passenger Flow by Enhanced Passenger Monitoring», Funding Agency IST-STREP FP6 (2004 - 2007)
5. «Getting Cretan Businesses On-Line and Doing E-Business», Funding Agency: Ministry of Development, General Secretariat for Research and Technology, 2006 - 2008
6. «Getting Cretan Businesses On-Line and Doing E-Business» Funding Agency: Ministry of Development, General Secretariat for Research and Technology (2002 - 2006)
7. «MedSearch: Semantic Similarity for Knowledge Discovery in Medical Archives» Funding Agency: BIOPATTERN NoE, Fp6 (2006 - 2007)
8. «BIOPATTERN (Project No 508803): Computational Intelligence for Biopattern Analysis in Support of eHealthcare», Funding Agency: EC, eHealthcare, FP6, IST (2004 - 2008)
9. «OntoGrid: Paving the way for Knowledgeable Grid Services and Systems», Program STREP, Funding Agency: EC, 2004-2007 (September 2004 - August 2007)
10. «Evergrowing Global Scale-Free Networks: their Provision, Repair and Unique Functions (EVERGROW)», Program "IST/FET Complex Systems Initiative" Funding Agency: EC 2004- 2007)

11. «DIET-Decentralised Information Ecosystem Technologies». Program "Information Society Technologies, Future and Emerging Technologies", Funding Agency: EC, 2000 –2003.
12. «BRIDGE-MAP -Bridging Genomes: An Integrated Genomic Approach Towards Genetic Improvement of Aquacultured Fish Species». Program Quality of Life. Funding Agency: EC, 2001 –2005.
13. «The Digital Library of the Technical University of Crete », Program EPEAEK II, Funding Agency: Ministry of Education, EPEAEK II, 2002 -2006
14. «MULTI_MINE: Multimedia Data Management and Mining», Χρηματοδότηση Ministry of Development, General Secretariat for Research and Technology, 2003 - 2005
15. «HIPER: Design and Development of New Generation CMOS Digital Cameras», Funding Agency: BRITE-EURAM, F55, 1998 - 2002

RESEARCH RESULTS/PRODUCTS

1. Technology for knowledge distribution and information searching
2. The Knowledge Representation Language Telos
3. The Scheme of Indefinite Constraint Databases
4. Spatial and Temporal Database Management
5. RoboCup Team "Kouretes" (four-legged and simulation leagues)

SERVICES OFFERED TO THIRD PARTIES

1. Intellisearch: Semantic Information Retrieval System for the Web
2. Semantic Similarity: Semantic Similarity Methods on WordNet and MeSH
3. MedSearch: Information Retrieval System for MedLine and Medical Information
4. WebSummarization: Web Summarization by Image Content

Microprocessors and Hardware Laboratory

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ACTIVITIES

1. Computer architecture.
2. Hardware.
3. Design and implementation of digital microelectronic systems.
4. Rapid Systems Prototyping (RSP).
5. High level integration design (VLSI, FPGA's, PLD's, etc).
6. Development of CAD tools.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- CAD tools for microelectronic system design. Using them full systems can be designed.
- Logical analyzer for error tracing in microelectronic systems.
- Full PACE station (SMT-Surface Mount Technology)
- Equipment for constructing two side printed circuits.
- Equipment for prototyping.

RESEARCH AND DEVELOPMENT PROJECTS

1. «PRO3-Hardware design/development and consulting services agreement». Funding: Lucent Technologies, 2000-2002.
2. «Reconfigurable Input Device for Kinetically Challenged Persons» Collaboration with the ALGOTRONIX Company in Scotland. Funding: GSRT – British Council, 1999 - 2000.
3. «Active Networks Development Platform capable of Protocol Boosting, in ATM Networks». Program PENED 99 (in collaboration with: ITE Intitute, TEI of Chania). Funding: GSRT, 2000-2001.

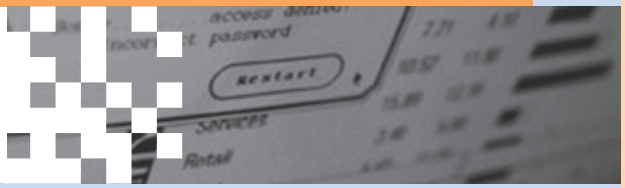
RESEARCH RESULTS/PRODUCTS

1. Boosting protocol card for active networks ATM
2. Real time continuous speech processing system
3. Method and apparatus for kinetically challenged persons
4. Golomb rules recovery system
5. Fully implemented wheeled robot with ultrasound system for avoiding obstacles
6. Area access system based on smart cards

SERVICES OFFERED TO THIRD PARTIES

1. Training in last generation CAD tools (e.g. XILINX, ALTERA, VIEW-LOGIC, PROTEL, etc.) for microelectronic system design (VHDL, system coficuration, PAL/GAL/FPGA technology, etc.)
2. Microelectronic systems design and/or implementation (consulting)
3. Hardware technology evaluation
4. Full design and/or implementation of integrated microelectronic systems, microprocessor/microcontroller systems and special architectures (e.g. for speech processing).
5. Technology transfer in specific areas where the laboratory has proven results (eg robot design)

Software Technology and Network Applications Laboratory



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ACTIVITIES

1. Content collection and distribution in World Wide Web
   - Modeling of large scale peer-to-peer networks
   - Peer-to-peer architectures for large scale content distribution and storage
2. Algorithms for modern applications
   - Algorithms for mass data organization in external memory
   - Quantum computers simulation techniques
3. Information Management Software Systems
   - Network Management Systems architectures
   - Distributed Database Systems

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- 25 workstations, PC Pentium IV
- 1 server providing basic services (file storage, web, email, etc.).
- 2 high performance computers (compute servers, 4 CPU/8 GB RAM) for supporting research
- 2 shared printers, 1 color laser printer

RESEARCH AND DEVELOPMENT PROJECTS

1. "Integrated Environment for Selective Service Provision via Web", PYTHAGORAS, Funding: EPEAEK, 2004-2007
2. "Intelligent Storage Systems (EXAPSYS)", PENED, (in cooperation with University of Patras and University of Ioannina). Funding: GGET, 1999.

RESEARCH RESULTS/PRODUCTS

1. EMIL (External Memory Infrastructure Library). High-performance C++ framework for the management of massive data in external memory.
2. JbossConnect. A middleware platform and RAD (Rapid Application Development) tools for JavaEE-based, large-scale interoperable applications.
3. Pvec. A scalable, high-performance simulation framework for large quantum systems.

SERVICES OFFERED TO THIRD PARTIES

1. Systems for content collection and distribution in World Wide Web
2. Consulting services for distributed information systems.
3. Consulting and development of Distributed Database Systems
4. Algorithms for modern applications

Telecommunications Laboratory

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ACTIVITIES

1. Signal Processing for Communications
   - Using convex optimization and particle filtering tools
   - Frequency Hopping communications
   - Time-varying spectrum analysis
   - Blind channel equalization
   - Subspace methods, sensitivity analysis
2. Antenna Array Processing for Communications
   - Downlink beamforming for multiuser and PHY-layer multicast scenarios
   - Multidimensional harmonic retrieval
   - Direction finding and beamforming
3. Cross-layer network design
   - Joint multiplexing and scheduling
   - Node localization in sensor networks
   - Multi-access protocols and queueing, including stability analysis
4. Linear Algebra for Multi-way Arrays
   - Uniqueness theory
   - Fitting algorithms
   - Applications in communications and blind speech separation
5. MIMO xDSL
   - Transceiver design
   - Joint transmit precoding and receive decoding
   - Crosstalk modeling and characterization
6. Information Theory
   - Channel capacity
   - Capacity degradation under channel mismatch
   - Information-theoretic aspects of opportunistic and cooperative communications
7. Multiuser Communications
   - DS-CDMA code design based on generalizations/extensions of the Welch bound
   - DS-CDMA receiver design
   - Channel estimation and adaptive equalization

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- State-of-art computing & networking equipment, including three compute servers and associated software tools
- Experimental MIMO Software Defined Radio (SDR) system
- Educational COM DSP card system

RESEARCH AND DEVELOPMENT PROJECTS

1. "U-BROAD": Ultra high bit rate over copper technologies for broadband multi-service access. Programme: 6th Framework Programme, IST STREP. Funded by: EC, 2004-2006.
2. Transmit Bemaforming for Wireless Networks. Programme: U.S. – GR bilateral collaborative research. Funded by: GSRT, 2004-2006.
3. "COOPCOM": Cooperative and Opportunistic Communications in Wireless Networks. 6th Framework Programme, FET. Funded by: EC, 2006-2009.
4. "PREMIUM": Power and Rate Efficient Modulation in UHF-SHF Multicarrier Communications. Marie Curie International Reintegration Grant (MG-IRG). Funded by: EC, 2007-2008.
5. "NEWCOM": Network of Excellence in Wireless Communications. Programme: 6th Framework Programme, IST NoE. Funded by: EC, 2004-2006 (contributing through CERTH).
6. "WIP": An All-Wireless Mobile Network Architecture, 6th Framework Programme, IST STREP. Funded by: EC, 2006-2009 (contributing through CERTH).

RESEARCH RESULTS/PRODUCTS

1. *www.telecom.tuc.gr/~nikos*
2. *http://www.telecom.tuc.gr/Greek/Liavas/index.htm*
3. *www.telecom.tuc.gr/~karystinos*

SERVICES OFFERED TO THIRD PARTIES

1. Design, modeling, simulation, and deployment of custom wireless links and networks
2. Development of custom-made signal processing and optimization algorithms
3. Consulting in military communications
4. Consulting in frequency hopping and xDSL system engineering.

5

Laboratories of Department of Environmental Engineering

Air, Water and Solid Waste Management Laboratory

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- Economopoulou Anastasia, B.Sc. Math. (Systems analysis & programming)
- Despotakis Vassilis, Surv. Eng, Ph.D. (GIS, Remote sensing, GPS)
- Tsagarakis Konstantinos, Civil Eng., Ph.D. (Wastewater treatment)

ACTIVITIES

1. Development of software models for performance analysis, optimal design and cost estimation of:
   - Solid waste management facilities
   - Wastewater treatment plants
   - Air pollution control systems
2. Development of leading software packages for the:
   - Integrated management of solid wastes
   - Integrated management of municipal and industrial wastewaters
   - Global management of air emissions.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Computer Infrastructure:

- Computers, printers (including an HP DesignJet 800PS), scanners, digitizer etc.
- Applications development software, including compilers, graphic libraries, ArcGIS, digital maps, etc.
- Computer packages for the analysis of pollution problems and development of optimal integrated management plans:
  - System for the optimal management (collection / transfer / treatment / disposal) of domestic solid wastes over large areas.
  - Expert system for optimal management (treatment, reuse for irrigation / disposal) of wastewaters from urban areas.
  - Software System for computerized implementation of I&M programs for space heating boilers:
  - Programs for effective management of air pollution from distributed (area) and point sources.
- US EPA programs for water, air and land pollution: QUAL2, VISUAL PLUMES, BASINS etc. / OZIPM, RAM, ISIC, TANKS, MOBILE5, etc./ HELP3, BEIS, LandGEM etc.

Instruments for Monitoring Emissions and Ambient Air Quality:

- TSP emissions with isokinetic sampling (SICK, SHC-501);
- Gaseous emissions (SO2, NO, NO2, CO, CO2 and O2) with NDIR, chemilu-minescence and galvanic cells (HORIBA, PG-250);
- Gaseous emissions with electrochemical electrodes (EUROTRON);
- Emissions from external combustion sources (BRIGON Test Kits);
- Atmospheric concentrations of PM2.5, PM10 and TSP (ESM, FH62 I-R3).

Instruments for Monitoring Water and Wastewater Quality:

- Atomic Absorption Spectrophotometer with graphite oven (Shimadzu, AA-6800);
- TOC (Shimadzu, TOC-5000A) and ultra pure water system (Barnstead);
- G.C. with FID, ECD and NPD analyzers (Shimadzu GC-17Aaf ver. 3);
- Spectrophotometer with double beam and Visual/UV light (Shimatzu, V-1601pc);
- Temperature regulator (Chemicals Electronics) for COD and Total Phosphorus measurement;
- BOD5 measuring system (Incubator WTW TS 606-G/4 with Oxitop IS 6);
- Coliforms measuring system:
  - Incubator furnaces (Termak and Binder),
  - Wet sterilization oven (Raypa),
  - Vacuum pump (Gelman),
  - Colony counter (IUL Instruments),
  - Vertical laminar flow chamber (FASTER Biohazard BH 2006)
- Solids (TS, TSS, TDS, VSS) measuring system:
  - Scale (SCALTEC, SBC 31),
  - Drying oven (Memmert),
  - High temperature oven (Galli G.& P.);
- Portable instruments:
  - Flow meter (Global water FP 201),
  - Spectrophotometers (3) (Orbeco-Hellige, Analyst 975 MP-02),
  - DO meters (2) (METTLER Toledo),
  - pH-meters (2) (WTW, pH 330 / Set-2),
  - Conductivity meter (WTW, LF 330 / Set),
  - Opacity meter (Orbeco-Hellige, 966),
  - Secchi Disk,
  - Sampler (Windaus).

RESEARCH AND DEVELOPMENT PROJECTS

- Projects for the optimal management of the domestic solid wastes in the region of Crete (to be assigned):

1. Sitting of the central treatment and landfill installation and development of the optimal transportation system.
2. Optimal configuration of the waste transfer stations and analysis of economic viability.

- Projects for the optimal management of the domestic solid wastes in the region of Attica:

1. Candidate sites for waste transfer stations (served as background study for law 3164/2003).
2. Optimal design of the municipal solid waste transportation system and sensitivity analysis (optimization of alternative scenarios).
3. Optimal configuration of the waste transfer stations through the use of an expert computer system.

- Cooperation with International Organizations for teaching and promoting the application of management methodologies developed by the laboratory.

RESEARCH RESULTS/PRODUCTS

1. Development of methodologies and software for the design of transfer stations, treatment installations and landfills and for the formulation of optimal regional solid wastes management plans.
2. Development of methodologies and software for the formulation of integrated plans for managing the wastewaters from small to medium sized urban areas and compatible industrial effluents.
3. Development of methodologies and software for the design of selected air pollution control systems, the analysis of air pollution problems and the synthesis of rational air pollution abatement plans.

SERVICES OFFERED TO THIRD PARTIES

1. Development of optimal regional plans for the management (collection, transport, transfer, treatment and disposal) of domestic solid wastes and bulky wastes.
2. Development of integrated plans for the optimal management of wastewaters from small urban areas with simultaneous consideration of the treatment / reuse for irrigation / and disposal problem
3. Development of optimal regional plans for the management of infectious hospital wastes.
4. Computerized implementation of Inspection and Maintenance (I&M) programs for space heating boilers over large urban areas
5. Analysis of air pollution problems in urban and industrial areas and formulation of rational abatement strategies
6. Technical and laboratory support to wastewater treatment plants owned by municipalities, hotels and other tourist installations

Atmospheric Aerosols Laboratory

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ACTIVITIES

1. Basic study in aerosol dynamics and application in the atmosphere. Heterogeneous chemical reactions on the surface of aerosol.
2. Development of 3D air pollution models.
3. Study of dispersion, physical and chemical processes of aerosol pollutants in the troposphere using air pollution models.
4. Measurement of air pollutant concentrations and meteorological parameters in the atmosphere.
5. Modelling air pollutants in indoor environments. Modelling transportation of air pollutants in the human body.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Field Equipment:

- 3 Ozone analyzers, Model 8810 (Monitor Labs).
- 2 Nitrogen Oxides analyzers, Model 8840 (Monitor Labs).
- Ozone analyzer, suitable for calibration, Model 1008 PC (Dasibi).
- Ozone analyzer (Horiba).
- Aerosol analyzer (PM10, PM2,5 και TSP), Model FH 62 I-R (Andersen).
- 5 Collectors for temperature and humidity data (Preservation Equipment Ltd).
- Analyzer for UV and visible radiation, model 764 (Preservation Equipment Ltd).
- Meteorological station.
- Aerosol concentration analyzer (DustTrak, TSI).
- Aerosol analyzer (particles/cc) (P-Trak, TSI).
- Non-Viable ambient particle sizing sampler for gravimetric analysis, (Andersen).
- Assay balance (Sartorius).
- Aerosol sampler. (Sequential Particulate Sampler, FH 95 SEQ, Andersen).
- Ultrafine particle's counter. Condensation Particle Counter (CPC) with Differential Mobility Analyser (DMA) (Grimm).
- Ultrasonic bath (Electron Microscopy Sciences).
- Radiation counter (FH 40 G Dose Rate Measuring Unit, Thermo Electron Corporation).
- Electronic Radon Dosimeter (DOSEman, SARAD).

Software:

- ISC3 short term
- ISC3 long term
- RAM
- Caline3
- CONSX
- CONDEP
- UAM-Aero
- IDL
- FDM
- Logger manager
- Environmental Logger Controller/Data Viewer
- LUDEP
- RPM-Aero
- MapObjects ESR

RESEARCH AND DEVELOPMENT PROJECTS

1. "Development of technology for improving Air Quality in industrial buildings". GSRT
2. "Characterization of indoor air quality with microenveronmental models use". Project "Heraklitos", E.U.
3. "Human Exposure to Particulate Matter and Source To Internal Dose Relationships:, "PM DOSE", E.U. – Technical University of Crete (Marie-Curie fellowship).

4. "Complete odour management in sewage systems and in centers of waste processing. Application of this program in waste processing centers of Chania and Rethimno". In collaboration with the Prof. N. Kalogerakis. GSRT, 2005-2008.
5. Quantitative estimate of emissions of atmospheric aerosols from natural sources and their impact on the quality of atmosphere in Greece.

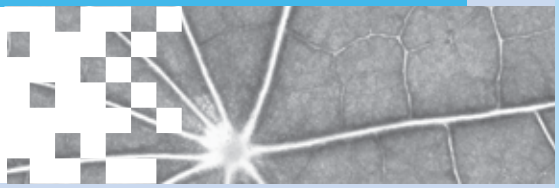
RESEARCH RESULTS/PRODUCTS

1. Software use in environmental studies and evaluation of the environmental pollutants trajectories in the atmosphere for the study of their environmental effects.
2. Process of meteorological data and pollutants concentration (PM, Ozone) in the Technical University of Crete area.
3. Microenvironmental model for estimating indoor air quality

SERVICES OFFERED TO THIRD PARTIES

1. Environmental Studies and evaluation of air quality in indoor environments.
2. Software use in Environmental Studies.
3. Supply of meteorological data in the Technical University of Crete area.
4. Supply of data concerning ozone, nitrogen oxides and aerosol concentrations in the Technical University of Crete area.

Biochemical Engineering & Environmental Biotechnology Laboratory



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ACTIVITIES

1. Technology development for biological treatment of gas emissions and wastewater
2. Bio-remediation of contaminated sites and marine ecosystems
3. Biochemical process development, analysis, design, automatic control and optimization
4. Phytoremediation (organic pollutants and heavy metals).
5. Development and design of enzyme processes for toxicity control.
6. Environmental microbiology and biotechnology.
7. Applications of software on the design of environmental processes.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- HPLC with DAD and Fluoresence detectors and autosampler (Shimadzu)
- GC/MS QP-5050 (Shimadzu)
- GC/FID (Shimadzu)
- UV-Vis Spectrophotometer (UNICAM model Helios Delta)
- Roto-Vap (Buchi)
- PCR and electrophoresis equipment (Eppendorf)
- Phase contrast microscope (DMLS Leica and Nikon) with video & photomicrography equipment
- Epifluorescence microscopes (Leica and Nikon) for FISH
- BIOENGINEERING bioreactors (3.7 and 5 L)
- New Brunswick Sc. bioreactors (2 L and 3 L)
- Custom made Electrolytic cells, data acquisition systems.
- Ultra sound, photocatalytic, and ozonation equipment
- BOD measurement system (WTW Oxi-top IS 12)
- Bioaerosol sampler (Merck MAS-100)
- Bioaerosol filtration & impinging jet based collection systems.
- pH meter (MP226 - METTLER TOLEDO, WTW, etc.)
- Analytical and general laboratory balances (SDC 21 and SDC61 SCALTEC)
- Automated Soxhlet apparatus (Gerhardt S306AK)
- Autoclave (Raypa AES-75), furnace (Memmert ULM500)
- Centrifuges (MSE Sanyo and Eppendorf), Fridges (Sanyo), water-baths (WB22 Memmert), Stirrers (MR 3001K8, Reax 2000), Homogenizers, drying ovens, vacuum pumps, custom made sampling systems for soil, etc.
- Phytoremediation green house

RESEARCH AND DEVELOPMENT PROJECTS

1. «Environmentally friendly techhnologies for rural development». Programme: LIFE 05 /ProjEEt: ENV/GR/000245 – EnviFriendly. Assigned by: EC, 2005-2008.
2. «Integrated management of odour control at wastewater treatment Plants - Application to Chania and Rethymno WWTPs». Programme: PENED. Assigned by: GSRT, 2005-2008.
3. «Treatment of micro-pollutants in secondary treatment effluents through the use of advanced oxidation processes». Programme: EPEAEK II – PYTHAGORAS II. Assigned by: Ministry of Education, 2005-2006.
4. «Protection of Fishing Resources in the Area of Laconia Pref. from Incidents of Marine Pollution». Programme: Perfecture of Peloponnisos - FISHERIES. Assigned by: Perfecture of Peloponnisos, 2005-2006.
5. «Characterization of the capabilities of Mediterranean plants to Remove Pb and As from Contaminated Soils». Programme: EPEAEK II - HERAKLEITOS. Assigned by: Ministry of Education 2004-2006.
6. «Protection of Groundwater from Salt Water Intrusion through Injection of Treated Industrial Wastewater and Development of Technology for the Sustainable Management of Sludge from Industrial Wastewater Treatment Plants». Programme: EPAN-Wnvironment - SMILES. Assigned by: GSRT, 2003-2006.
7. «Exploration and Evaluation of the Eastern Mediterranean Sea Gas Hydrates a nd the Assoc.d Deep Biosphere». Programme: ANAXIMANDER-FP5 RTD Programme. Assigned by: EC, 2002-2005.

8. «Characterisation of active microbial communities degrading petroleum waste sludge for remediation of contaminated soils» (In collaboration with GBF, Braunschweig, Germany). Programme: EPAN – Intergovernmental collaboration between Greece and Germany. Assigned by: GSRT, 2003-2005.
9. «Indoor/Outdoor Bioaerosol Measurements» Programme: URBAN-AEROSOL-FP5 RTD Programme. Assigned by: EC, 2001-2004.
10. «Pilot Plant for Municipal Wastewater Using the Novel PULSAR static aerators at Metamorphosis, Attika». Assigned by: ΕΥΔΑΠ, 2001-2003.
11. «Phytoremediation of Contaminated Soils And Groundwater Using Mediterranean Plants» Programme: IHP - Development Host Marie-Curie Fellowship. Assigned by: EC, 2002-2004.
12. «Ex-situ Bioremediation of Petroleum-Contaminated Sands Using Hydrocarbon-Degrading Marine Microbes (control of oilspills)». Programme: IHP - Development Host Marie-Curie Fellowship. Assigned by: EC, 2002-2005.
13. «Production of Bioinceticides at pilot plant scale» Programme: ΕΠΕΤ ΙΙ – Agricultural Biotechnology. Assigned by: GSRT, 2000-2001.
14. «Enhanced biodegradation of polluted costal sites in Greece » (In collaboration with GBF, Braunschweig, Germany): EPAN – Intergovernmental collaboration between Greece and Germany. Assigned by: GSRT, 2000-2002.
15. «Microbial Biotechnology Network» Programme: ΕΠΕΤ ΙΙ - Human Networks. Funding: 740.000 GRD. Assigned by: GSRT, 2000-2001.
16. «Management of Olive Mill Wastewater through Technological Upgrade of Pomace Oil Plants». Programme: ΕΠΕΤ ΙΙ – Industrial Waste. Assigned by: GSRT, 1999-2001.
17. «Biodegradation of Polycyclic Aromatic Hydrocarbons & Sulphate heterocyclic compounds in the Corinth Refinery». Programme: ΕΠΕΤ ΙΙ – Repatriation of Greek Scientists. Assigned by: GSRT, 1999-2001.

RESEARCH RESULTS/PRODUCTS

1. Enhanced bioremediation of open sea and near shore oil spills utilizing lipophilic fertilizers combined with biosurfactants to biostimulate indigenous crude oil-degrading marine microorganisms.
2. Odour control in wastewater treatment plants
3. Combined wastewater treatment and energy generation by environmentally benign processes
4. Design of olive mill wastewater treatment units
5. Odour control in wastewater treatment plants and pumping stations
6. Oil spill remediation technologies.
7. Tertiary wastewater treatment
8. In situ and ex situ soil bioremediation.
9. Consulting services for Environmental Assessment and Risk Analysis

SERVICES OFFERED TO THIRD PARTIES

1. Environmental sample analysis (liquids and soils)
2. Characterization of indoor and outdoor bioaerosols
3. Ecotoxicological testing

Chemical Processes & Wastewater Treatment Laboratory

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LABORATORY STAFF

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ACTIVITIES

1. Treatment of industrial wastewaters by advanced oxidation processes (Fenton oxidation, ozonation, photocatalysis, sonochemical degradation).
2. Treatment of agro-industrial effluents by physical and chemical processes.
3. Integrated physical, chemical and biological wastewater treatment.
4. Identification, quantification and treatment of micro-pollutants in waters.
5. Alternative (natural) wastewater treatment systems.
6. Water recycle and reuse.
7. Environmental catalysis.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Experimental:

- Horn-type sonicator operating at 80 kHz, 150 W (Labplant).
- Horn-type sonicator operating at 24 kHz, 300 W (Hielscher).
- Ozone generator (Ozonia).
- Several fully equipped reaction vessels.
- Four computer-controlled fermenters (New Brunswick & Bioengineering AG).

Analytical:

- HPLC with diode array (DAD) and fluorescence detectors (Shimadzu).
- GC/MS (Shimadzu).
- UV/Vis spectrophotometers (Shimadzu & Hach).
- COD analyzer (Hach).
- BOD analyzer (Hach).
- Toxicity analyzer (Dr Lange).

RESEARCH AND DEVELOPMENT PROJECTS

1. «Treatment of wastewaters from textile industries by chemical and biological processes» EPEAEK II-PYTHAGORAS. Source of funding: GSRT, 2004-2006.
2. «Advanced oxidation processes for wastewater and gas emissions». Operational Programme Competitiveness (In co-operation with: Aristotle University, University of Patras, NTUA, NCSR-Demokritus). Source of funding: GSRT, 2003-2005
3. «Treatment of olive mill effluents by chemical and biological processes». Source of funding: Technical University of Crete, 2003.
4. Catalytic ultrasonic degradation of organic pollutants in aqueous effluents (In co-operation with: University of Leeds). Source of funding: The Engineering & Physical Sciences Research Council (EPSRC, UK) & GlaxoSmithKline, UK. 2001-2004.
5. «Ultrasonic removal of toxic wastes» Sponsor: The Royal Society, UK, 2001-2002.
6. «Treatment of halogenated phenol-containing wastewaters by combined chemical and biological oxidation» (In co-operation with: University of Leeds). Source of funding: The Engineering & Physical Sciences Research Council (EPSRC, UK), 2000-2003.

RESEARCH RESULTS/PRODUCTS

Combined wastewater treatment and energy generation by environmentally benign processes

SERVICES OFFERED TO THIRD PARTIES

Water and wastewater treatment

Ecology and Biodiversity Laboratory

Department:	Environmental Engineering,
Division:	Environmental Hydraulics and
	Geoenvironmental Engineering
URL:	*www.enveng.tuc.gr/Labs/eob_lab.htm*

ACTIVITIES

1. Structure and dynamics of biological communities.
2. Effects of natural and anthropogenic disturbance on communities and ecosystems.
3. Development of uni- and multivariate mathematical techniques for the analysis of ecological data.
4. Development of indicators for the assessment of biodiversity and level of health/disturbance of ecosystems.
5. Optimization of monitoring methods and methodology improvement for the assessment of anthropogenic effects on ecosystems.
6. Integrated coastal zone management.
7. Environmental training and development of training material. Simulation models of ecological processes.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- 4 laboratory units
- analytical equipment for marine geochemistry
- microscopy equipment for identification of fauna
- various types of sampling equipment
- one field station in the conservation park of Akrotiri, Chania.
- EBL has access to large experimental facilities and to departmental lab facilities of environmental chemistry, GIS and modelling.

RESEARCH AND DEVELOPMENT PROJECTS

1. «AQCESS: Aquaculture and Coastal Economic and Social Sustainability» Programme: Quality of Life. Source of Funding: EU-DG XIV.
2. «MERAMED Modelling environmental response to Aquaculture in the Mediterranean». Programme: Quality of Life. Source of Funding: EU-DG XIV.
3. «MEDVEG: Effects of nutrient release from Mediterranean fish farms on benthic vegetation in coastal ecosystems». Programme: Quality of Life. Source of Funding: EU-DG XIV.
4. «BIOFAQs: Biofiltration and Aquaculture: an evaluation of hard substrate deployment performance within Mariculture developments». Programme: Quality of Life. Source of Funding: EU-DG XIV.
5. «MAMA: Mediterranean network to Assess and upgrade Monitoring and forecasting Activity in the region». Programme: EESD. Source of Funding: EU-DG XII.
6. «COST-IMPACT: Costing the impact of demersal fishing on marine ecosystem processes and biodiversity». Programme: Quality of Life. Source of Funding: EU-DG XIV.
7. «Sediment Profile Imaging: Evaluation and Inter-calibration». Programme: Intergovermental cooperation GR-DE R&T. Source of Funding: GSRT.
8. «MARAQUA: Monitoring and Regulation of Marine Aquaculture». Programme FAIR: Source of Funding: EU DG-XIV.
9. «ERMS: European Register of Marine Species». Programme: MAST-3. Source of Funding: EU DG-XII.
10. «Indicators of the state of benthic communities affected by anthropogenic inputs». Source of Funding: Intergovernmental Oceanographic Commission - UNESCO/IOC.

SERVICES OFFERED TO THIRD PARTIES

1. Design and implementation of environmental monitoring projects.
2. Development of indicators for environmental management.
3. Development of policy on environmental impact assessment and mitigation.
4. Biodiversity mapping and monitoring
5. Consultants on water desalination

Environmental Engineering and Management Laboratory

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	Environmental Processes
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ACTIVITIES

Development and application of technologies for the appropriate management and treatment of water and wastewater.

INFRASTRUCTURE

Analytical Equipment:

- GC-MS
- GC equipped with Purge-and-trap apparatus for the analytical determination of volatile organic compounds
- HPLC
- Ion Chromatography Unit
- Total Organic Carbon Analyzer
- Atomic Absorption Spectrometer equipped with graphite furnace
- Toxicity meter (Microtox)
- UV-Vis Spectrophotometer
- Equipment for all standard analysis in water and wastewater (BOD, COD, Nitrogen, Phosphorus, Dissolved Oxygen, Conductivity, Turbidity, etc)

Laboratory-scale Pilot Units:

- Activated sludge unit
- Anaerobic Upflow Sludge Bed Reactor
- Coagulation Unit
- Filtration Unit
- Ozonation system
- Reactor Furnace for the Incineration and Gasification of Solid Wastes

Semi-industrial-scale Pilot Units:

- Constructed wetland unit
- Anaerobic Upflow Sludge Bed Reactor

Specialized Software:

- STOAT - Software for the dynamic simulation of wastewater treatment plants

RESEARCH AND DEVELOPMENT PROJECTS

1. «Production of high added-value materials from clean coal gasification by-products (HIVALUE).» Source of Funding: European Union (ECSC, 2002).
2. «Training on efficient water use technologies for environment educators using virtual application sites (ED-WAVE)». Source of Funding: European Union (Asia-Link Curriculum Development, 2003).
3. «Networking perspectives of transnational co-operation and participatory planning for integrated water resources management through the promotion of new forms of spatial governance (NETWET 2)» Source of Funding: European Union (Programme INTERREG III B/CADSES, 2003).
4. «ERIS - Environmental Inteligent Systems - Application in olive oil mill wastewater.» Source of Funding: General Secretariat of Research and Technology (2003).
5. «Immersed Membrane Bioreactor Technology for Municipal Wastewater Treatment in Greece (IMBioTech)» Source of Funding: General Secretariat of Research and Technology (2003).
6. «Production of high added value products for environmental applications from agricultural by-products in India: Activated carbon production from bagasse and rice husks (HARMONICA)» Source of Funding: European Union (Programme EU-India Cross Cultural Programme, 2003).
7. «Disinfection of ballast water through in situ electrolytic generation of chlorine (BALLAST WATER)» Source of Funding: General Secretariat of Research and Technology (Programme: PENED, 2005).

RESEARCH RESULTS/PRODUCTS

Co-treatment of urban wastewater with olive oil wastewater in high speed anaerobic reactors

SERVICES OFFERED TO THIRD PARTIES

1. Drinking water analysis
2. Analysis of municipal and industrial wastewater
3. Process development and design for water and wastewater treatment
4. Technical consulting on matters concerning water and wastewater treatment

Geoenvironmental Engineering Laboratory

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	Geoenvironmental Engineering
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ACTIVITIES

1. Environmental Fluid Mechanics
2. Geology-Hydrogeology-Fluid flow in porous media
3. Soil and groundwater pollution
4. Technologies for ground water remediation
5. Water intake works
6. Groundwater and pollutants transport simulation
7. Optimized design for groundwater management
8. Salt water intake of groundwater aquifers.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Laboratory infrastructure:

- Groundwater flow pilot unit
- Pilot model of groundwater, small scale
- Model of groundwater flow and pollutants transport
- Portable Unit GPS ColorTrak - Magellan
- Geological logger
- Hydraulic bench
- Pressure meter/control apparatus
- Flow meter above regulatory dam
- Bernoulli's theorem demo apparatus
- Channel flow simulation apparatus
- Flow meter apparatus

Software:

- FEFLOW
- MODFLOW
- PTC
- ARGUS -ONE
- VISUAL GROUNDWATER
- MT3D
- PEST
- RAM
- PRZM-3
- TECPLOT

Hardware:

- Intel Pentium III, 600MHz computers, UNIX -Sun Computer

RESEARCH AND DEVELOPMENT PROJECTS

1. «Monitoring, forcasting and best practices for FLOOD Mitigation and prevEntion in the CADSES region (FLOODMED)». Programme: INTERREG III B CADSES NEIGHBOURHOOD PROGRAMME -–Measure 4.3. Source of funding: EC, 2006.
2. «Contribution of geophysics survey to the determination of the saltwater/water front and the management of groundwater in the area of Stylos, Chania». Programme: PENED. Source of funding: GSRT, 2005.
3. «Combined geophysics survey for the identification of the saltwater front and the management of groundwater in the area of Stylos, Chania». Programme: PYTHAGORAS. Source of funding: Ministry of Education, 2005.
4. «Protection of groundwater aquifers from saltwater intake using treated industrial waste and tools development for the sustainable treatment of sludge from industrial wastewater treatment plants». Programme Networks/clusters for Research and Development in sectors of national priority (In co-operation with: NTUA and ETBA VI.PE S.A.). Source of funding: GSRT, 2003.
5. «Groundwater flow modelling/simulation-Restrain saltwater intrusion». Operational Programme Competitiveness. Source of funding: GSRT, 2003.

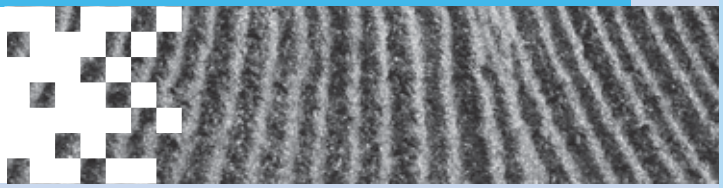
RESEARCH RESULTS/PRODUCTS

1. Determination of saltwater intrusion zone and remediation
2. Groundwater flow modeling in carstic aquifers
3. Groundwater management using neural networks and genetic algorithms

SERVICES OFFERED TO THIRD PARTIES

1. Studies on pollutants transport in the subsoil and remediation techniques
2. Studies on the flow and quantitative analysis of groundwater aquifers
3. Modelling of underground systems
4. Software for optimized management of groundwater

Hydrogeochemical Engineering and Soil Remediation Laboratory



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ACTIVITIES

1. Water quality management at the watershed scale.
2. Development and of hydrogeochemical watershed, surface and ground water models.
3. Pollution prevention and sustainable development of water resources.
4. Assessment and remediation of soils polluted by heavy metals.
5. Impact of organic pollutants on the fate and transport of heavy metrals in the environment.
6. Development of new technologies and use of existing ones for the remediation of soils and aquatic ecosystems from inorganic pollutants.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Field equipment:

- Soil moisture measurement device.
- Groundwater sampling device that does not expose the water to the atmosphere.
- Field meters that measure pH, DO, Eh, T, conductivity, και Bromide using electrode probes.
- Flow meter (Global water).
- Leveloggers, scale 0-29 m with accuracy of 1.0 cm, datalogger with software and IR interface with Barologger (SOLINST).
- Peristaltic pump for groundwater sampling (SOLINST).
- Level meter 200 m (SOLINST).
- Soil sampler.
- Drive-Point-Profiler (SOLINST).
- Standpipe Piezometers (SOLINST).
- Drive-Point Profiler (SOLINST).
- Manual Slide Hammer & Manual Drive Head Assembly.

Software:

- BASINS.
- WinHSPF.
- QUAL2EU.
- WASP6.0.
- Visual MODFLOW.
- MINEQL+.
- ARCVIEW GIS 3.1, SPATIAL ANALYST and 3D ANALYST.
- Enhamced Trickle Down Model (ETD).
- Nutrient Transport and Transformation Model (NTT).
- Heavy Metal Model (HM-1D).

Computer hardware:

- HP omnibook xe4500.
- PC PLATO Pentium 4 2.2 Ghz.
- Printers Lazerjet 2200D, HP deskjet 990 cxi & EPSON N2050+.
- Scanners Benq S2W5300U and HP Scanjet.
- Notebook Dell Inspiron 7500.

Laboratory equipment:

- 2 AsRT pilot units to remove arsenic from groundwtater.
- 2 peristaltic pumps.
- Field spectrophotometer Hach.
- Aeration unit (Air Charger).
- Slow sand filter.
- Plastic and glass columns for kinetic experiments.
- Shaking table (Stuart).
- Trace Detect Explorer System (Nano-Band Explorer) - Anodic Stripping Voltametry (for arsenic determination at the ppb level).

RESEARCH AND DEVELOPMENT PROJECTS

1. «Environmental Friendly Technologies for Rural Development». EnviFriendly. Source of Funding: E.E. LIFE05-Environment, 12/1/05 – 30/4/09.
2. «Water Resources Cyber-Management of Temporary Rivers». Collaboration with third Countries (University of Iowa). Source of Funding: Ministry of Development - GSRT, 1/1/06 – 31/12/07.

3. «Protection of Mediterranean Temporary Ponds». Subcontracting from HCMR. Source of Funding: LIFE-NATURE, 1/4/05 – 31/7/06.
4. «Evaluation and improvement of water quality models for application in temporary rivers of Southern Mediterranean countries». tempQsim. Source of Funding: E.E., 1/11/02 – 30/4/06.
5. «Application of the AsRT and sorption technologies for the removal of arsenic from groundwaters of northern Greece and Hungary». Greek-Hungarian Collaboration (in co-operation with: University of Vesprem). Source of funding: Ministry of Development –GSRT, 1/7/02-30/6/04.
6. «Arsenic remediation of water and contaminated soils with iron filings: Mechanism identification». HRAKLEITOS. Source of Funding: Ministry of Education, 8/11/02 – 31/12/06.
7. «European catchments - Changes and Impacts to the coastal zone» EUROCAT (in co-operation with: NCMR). Source of funding: EC, 1/1/2001- 31/12/2003.
8. «Environmental Impacts of E.U. legislature on 3 catchments (Greece, Poland, U.K.) - Implementation of the water framework directive to Acheloos river catchment» (in co-operation with: NCMR). Source of funding: E.C. - Joint Research Centre, Environment Institute, ISPRA (IT), 1/1/2001 – 31/12/2002.
9. «Evaluation of hydrochemical data of Acheloos and estimation of the contribution of agriculture to aquatic pollution». Acheloos River project (in co-operation with: NCMR). Source of funding: Ministry of Agriculture, 1/1/2000 – 31/12/2001.
10. «Health Effects and Geochemistry of Arsenic and Lead – Pilot application of AsRT technology to Bangladesh and Vineland corporation, New Jersey to remove arsenic from groundwater» (in co-operation with: University of Columbia). Source of funding: NIEHS - Superfund Hazardous Substances Basic Research, 1/9/98 – 31/8/2003.

RESEARCH RESULTS/PRODUCTS

Arsenic Remediation Technology (AsRT)

SERVICES OFFERED TO THIRD PARTIES

1. Water quality management studies at the watershed scale.
2. Studies using environmental models
3. Pollution prevention and sustainable development of water resources studies
4. Assessment and remediation of soils polluted by heavy metals studies.
5. Use of the arsenic removal technology (AsRT).
6. Development of new technologies and use of existing ones for the remediation of soils and aquatic ecosystems from inorganic pollutants
7. Measurement of arsenic species in water and soil samples using anodic stripping voltametry
8. Heavy metal sorption studies using column and batch experiments

Renewable and Sustainable Energy Systems (ReSEL) Laboratory

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LABORATORY STAFF

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- Kouloumbis Victor, Management & production engineer, MSc, PhD Candidate
- Gouskos Zacharias, Environmental Engineer, MSc

ACTIVITIES

1. Management of Renewable Energy and Energy Saving Systems
   - Regional/local energy planning
   - Sustainable management of natural sources
   - Technology Transfer
   - Life Cycle Assessment
   - Technical / Economic / Environmental Assessment
2. Biofuels
   - Exploitation of agrofood residues
   - Production of liquid biofuels
   - Biofuel heating of Buildings
   - Assessment of the technical and economically available potential
3. Solar Cooling
   - Design of active solar cooling systems
   - Technical and economic assessment
4. Sustainable Energy Systems
   - Environmental Impact Assessment of Energy Systems
   - Renewables and environment
   - Renewables' project appraisal under uncertainty
   - Sustainable energy development
   - Analysis of the renewable energy sectors

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Lab Infrastructure for biofuels:

- Experimental unit for bioethanol fermentation
- Biodiesel production Unit; 40L biodiesel per batch
- Reflexmeter, RQflex 10/Merck
- Water resistant mobile Ph-meter HANNA
- Various wet lab apparatus

RES Equipment for training and demonstration

- Autonomous Training Study System; includes photovoltaic generator 40 W, windgenerator 60 W
- Photovoltaic pilot system
- Implementation of electric car in mocroscale; with flexible F/B for solar car model of Silicon Solar Inc. & specific electronic/ mechanical components of an electric car
- Demonstartion renewable systems
- Exhibition showroom with demo RES applications – under development

Software – ITC infrastructure:

- SimaPro® 7; Ecoinvent Database Licence for SimaPro® 7
- SimCAD 1.3 for TRNSYS
- RETSCREEN full suit
- ENERGY PLUS
- Arcview

RESEARCH AND DEVELOPMENT PROJECTS

1. Integration of Renewable Energy Technologies in Rural Insular Areas - RERINA Project; European Energy Framework Programme, Intelligent Energy for Europe, 2005-2007, project coordination, Other Participants: Islenet - European islands energy and environment network (EU), Cyprus Institute of Energy (CY), Municipality of Armenous (GR), Comune di Cabras – Area Marina Protetta Penisola del Sinis - Isola di Mal di Ventre (IT), World Wide Fund for Nature - WWF Greece (GR).
2. Use of Photovoltaic Systems in the Urban Environment through Demo Relay Nodes – PURE Project; European Energy Framework Programme, Intelligent Energy for Europe, 2005-2007, Other Participants: Fundacion ROBOTIKER (συντονιστής, ES), EVE-Ente Vasco de la Energía (ES), Instituto Superior Técnico (PT), Scheuten Solar Technology (DE), PROVINCIA DI SAVONA (IT), Energy Centre Bratislava (SK).
3. Environmental Impact Assessment of Thermal Power Stations - Application in Public Power Corporation Stations in Crete; Prefecture contract, 2005.
4. Desalination Systems in Greece; ARCHIMEDES programme, 2005-2007, in collaboration with Technology Educational Institute of Piraeus.
5. Networks in the Energy field: Technology Transfer and Innovation –NETTI Project; European Regional Development Fund INTERREG IIIC, East Zone Regional Framework Operation enercy'regio, 2006-2007, Cooperation with the Regional Energy centre of Crete,

Other participants: ASTER SC pA (IT), NOMISMA (IT), Regionförbundet I Kalmar län (SE), Technologie- und Gründerzentrum Bautzen GmbH (DE), ZTS-Zentrum für Technologiestrukturentwicklung Region Riesa-Großenhain GmbH (DE), Business and Innovation Centre (BIC) Zwickau GmbH (DE).

6. Life Cycle Assessment of Liquid Biofuels, Basic Research Programme of the Technical University of Crete, 2006-2007.
7. Removal of the non-technological barriers to soar cooling technology across southern European islands – SOLCO Project; European Energy Framework Programme, Intelligent Energy for Europe, 2006-2008, Other participants: APEA- Agenzia Provinciale Energia Ambiente (IT), ITC-Instituto Tecnolígico de Canarias, Islenet - European islands energy and environment network (EU), Cyprus Institute of Energy (CY), ESCO Sardenia (IT).
8. Training Program for the Renewable Energies Promotion Association of Cyprus; Human Resource Development Authority of Cyprus (HRDA), 2006-2008.

RESEARCH RESULTS/PRODUCTS

1. Software of biomass district heating plant design
2. Kinetic study of fuel bioethanol production
3. Quantitative analysis of the Visual Impacts from the development of Wind parks
4. Solar map (thermal and PV potential), for Crete
5. Remote control solar vehicle, under scale
6. Design of biodiesel reactor with solar energy autonomy

SERVICES OFFERED TO THIRD PARTIES

1. Software application of energy design of large and prototype buildings
2. Environmental Impact Assessment of Power stations conventional and renewable
3. Simulation of reactors for liquid biofuels production
4. Estimation of renewable energy potential in insular systems
5. Energy and environmental planning in insular systems
6. Life Cycle Assessment of energy systems
7. Technical and economic analysis of energy systems
8. Study of biosystems
9. Optimum siting of renewable energy systems in insular and ecological sensitive areas
10. Study of solar cooling systems

Toxic and Hazardous Waste Management Laboratory

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ACTIVITIES

1. Toxic and hazardous waste treatment using biological, thermal and physicochemical techniques and safe disposal in sanitary landfills.
2. Recycling and management of hazardous waste (control at source & end-of-pipe) and design of complete solid waste management programs.
3. Remediation of contaminated soils from inorganic (primarily heavy metals) and organic (primarily petroleum products) pollutants, using electrochemical procedures and innovative technologies.
4. Implementation of innovative groundwater and soil remediation technologies (Bioventing, Bioslurping, Air Sparging) from hazardous pollutants and leakage monitoring systems.
5. Environmental field assessment studies at asbestos mines, sampling and analyses methods, use of innovative remediation technologies for asbestos contaminated soil, development of asbestos waste and polychlorinated diphenyls (Clophen) stabilization - solidification technologies.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Field Equipment:

- Portable Sensor for in-situ measurements of free oil phase thickness on water tables.
- Bail-Down-Test and In-Situ Respiration Test portable systems
- Soil remediation systems (Bioventing, Air Sparging)
- Free Phase pump system (Bioslurping)
- Groundwater samplers
- Portable air sampling system for sanitary landfills
- Industrial gas analyzer (PG-250-Horiba)
- Industrial gas sampling system (DS-200-Horiba)
- Gas sampling system (Bernt)
- Air samplers for asbestos sampling

Laboratory Equipment - Substratum:

- Calorimeter
- Element analyzer
- Solid sample homogenizing unit
- High Temperature Kiln (30-1200°C)
- Dry Kiln
- Cyclone
- Phase Contrast Microscope for asbestos fiber counting
- Industrial gases -exhaust quality analyzer for
- Toxicity evaluation Unit TCLP
- Waste process bioreactor
- Spectrophotometer
- Flash point determination apparatus
- Incubation chamber

Computer hardware:

- 5 PC Pentium 4 2.6 GHz.
- 2 PC ACS Pentium 4 2.0 GHz.
- Printers Laserjet 2200D, HP Deskjet 990 cxi, HP Deskjet 5150, HP Colour Laserjet 3550
- Scanners HP Scanjet 7400C and HP Scanjet 2400
- Notebook Dell Latitude C380 P4.

RESEARCH AND DEVELOPMENT PROJECTS

1. «Utilization of MABE Asbestos Mine as a Disposal Site for Hazardous Wastes» Programme LIFE. Source of funding: European Union 2003-2006, Duration: 2005-2006.
2. «Leakage, pump and subsoil remediation prevention program / Implementation of innovative technologies». , Source of funding: Hellenic Petroleum S.A., Duration: 2003-2006.
3. «Creation of optimum knowledge bank for efficient E-waste management» Program Asia Pro ECO , Source of funding: European Union, Duration: 2005-2006.
4. «Quality and Quantity waste analyses of the Crete Region», Source of funding: United Association of waste Management of Crete (ESDAK), Duration: 2003-2004.
5. «Evaluation of the pollution from asbestos at the refinery of the Eleusinas' Industrial Facilities». Source of funding: Hellenic Petroleum S.A.Duration: 2005.
6. «Remediation of heavy metals (with emphasis on Cadmium) contaminated soil» Program Marie Curie (in co-operation: Technical University of Harburg - Hamburg, Germany). Source of funding: European Union. Duration: 2003-2005.

7. «Remediation Study and exploitation of the Mesomouri region at the foreland of Chania» (in co-operation: Technical University of Harburg - Hamburg, Germany). Source of funding: Municipal Enterprise for the Management of the Solid Waste. Duration: 2005-2006.
8. «Integration of by products in the solid wastes compost unit of Chania». Source of funding: Municipal Enterprise of Water Supplies and Sewage of Chania (DEYAX).Duration: 2005.
9. «Investigation of heavy metals (Cd) sorption and distribution in soil and electrokinetic's technology application for their remediation». PYTHAGORAS II – Operational Programme for Education and Initial Vocational Training. Source of funding: Ministry of National Education and Religious Affairs. Duration: 2005-2007.
10. «Integrated Environmental Investigation of a Municipal Landfill using modern techniques». ARXIMEDES - Operational Programme for Education and Initial Vocational Training II. Source of funding: Ministry of National Education and Religious Affairs. Duration: 2004-2005.
11. «Development of asbestos waste Stabilization – Solidification technology for the future Asbestos Mines of Northern Greece remediation». Source of funding: Research Committee of the Technical University of Crete. Duration: 2005.

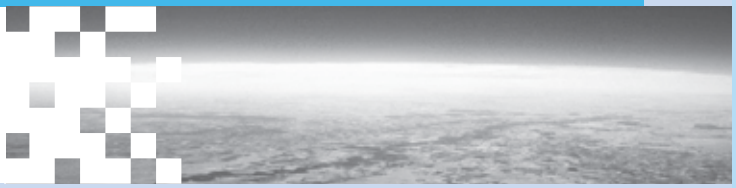
RESEARCH RESULTS/PRODUCTS

1. Implementation of bioslurping technique on a petroleum refinery site.
2. Implementation of air sparging technique on a petroleum refinery site.
3. Development of Solidification/ Stabilization technology for asbestos wastes and remediation of the broad area of the Asbestos Mine of Northern Greece

SERVICES OFFERED TO THIRD PARTIES

1. Complete waste management studies
2. Groundwater and soil remediation from hazardous polluters
3. Toxicity evaluation of asbestos contaminated soil and asbestos waste management
4. Hospital waste management studies

Transport Phenomena & Applied Thermodynamics Laboratory



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ACTIVITIES

1. Energy and Aqueous Resources:
   - Environment - friendly Thermodynamic cycles, combined cycles, Renewable Energy Sources (RES).
   - Pressure drop and heat transfer in the Stirling regenerator.
   - Water desalination in combination with RES.
2. Desertification and restoration methods of desertified areas:
   - Scientific desertification criteria.
   - Desertification ratios.
   - Energy/desertification relation.
   - Abiotic/biotic environment relation in desertification.
   - Crops for the avoidance of desertification.
3. Foods/Environment Interface:
   - Strategies followed during the agro-food waste treatment.
   - Food industry wastes exploitation.
   - Olive Mill Waste (OMW).
   - Dairy industry wastes.
4. Separation Processes:
   - Fixed and Fluidized Bed using activated lignite.
   - Membrane operations (Ultrafiltration, Nanofiltration, Microfiltration).
   - Recovery of valuable components from wastes.
5. Basic study of fundamental mass transfer equations

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Pilot Plant:

- Ultrafiltration Pilot plant, DSS-20 and Nanofiltration Pilot Plant, Lab-Stak M20 Module DSS A/S .
- Reverse Osmosis and Nanofiltration Apparatus, INTERACQUA.

Bench-Scale:

- Model Sedimentation Tank W7, ARMFIELD.
- Permeability Fluidization apparatus W3, ARMFIELD.
- Diffusion of a liquid apparatus CERb, ARMFIELD.
- Diffusion of gas apparatus CERa, ARMFIELD.
- Heat pump, compressor PHYWE 04370.93
- Fixed and fluidized bed unit operation rig, own construction, TRANSPATH,
- Test rig for the STIRLING regenerator - pressure drop & heat transfer measurements, own design & construction, TRANSPATH,
- Stirred Cell , Model 8200, Amicon/Millipore.
- Laboratory Flocculator - Jar Test, Model 3000833 SELECTA.
- Centrifugal pump demonstration unit FM20, ARMFIELD

- RAYFLOW ultrafiltration module RAYN0021, TECH-SEP.

Analytical Devices:

- Water Quality Monitoring System (Multi-Probe), W22-XD.23XD HORIBA.
- UV-Spectrophotometer,UV-mini 1240 SHIMADZU.
- Electronic Precision Balances, SPB 52 SCALTEC.
- Portable Conductivity meter, CRISON 524.
- Laboratory Oxygen meter, WTW OXI-597.
- Portable pH meter, CRISON 507.
- Apparatus for BOD Manometric determination, VELP SCIENTIFICA.
- Apparatus for the determination of COD, SELECTA.
- General purpose interface device, IFD3 ARMFIELD.
- Syringe filters 25mm easy pressure, 4320 GELMAN SCIENCES.
- Turbidity meter Microprocessor based, TU7685.
- Hand Refractometer ATAGO.
- Water quality monitoring system with spectrophotometer C100 and C214 for total nitrogen and COD, HANNA INSTRUMENTS.
- Apparatus of analysis of total nitrogen Kjeldahl SELECTA.
- Centrifuge,SIGMA 2-5.

Pumps: MASTERFLEX pump COLE-PARMER IMSTRUMENT, Capture Centrifugal Pump FM20 ARMFIELD, Vacuum Pump MZ 2C VACUUBRAND, Peristaltic Pump, N-M # 3001300 PERCOM. Peristaltic Pumps Behrotest PLP 330

Software:

- MATLAB 7
- SuperPro Designer 5.0
- Diff Pack
- FEMLAB
- Reaction Engineering Lab

RESEARCH AND DEVELOPMENT PROJECTS

1. «Safety & Environmental Issues of Foods- Working Group 1: Harmonization of Studies in Food science & Food engineering». ISEKI (Implementing of Safety and Environmental Knowledge Into Foods), (the continuation of the FOODNET project), Source of funding EC, (2000 -).
2. «Improving Human Resources- Access to research infrastructures», Coordination: Plataforma Solar de Almeria. Source of funding EC, 2000-2003.
3. «Exploration of non energy applications of Greek-lignite». Source of funding IGME (Institute of Geological and Mineral Research) & GSRT, 2003-2005.
4. «CHARMME - Characterization and Harmonization of Measurement Methods of Membranes». Measurements, Testing and Standards. Source of funding EC, 1998-2001.
5. «DOPPOF - Data Base of Physical Properties of Foods». FAIR. Source of funding EC, 1996-1999.
6. «Novel methods of management of olive mill wastes through qualitatively improved kernel oil factories» Operational Program for Research & Technology II. Source of funding GSRT, 1999-2001.
7. Program: Crete Innovative Region-CRINNO. Project: RENTS. Action: Know -How Transfer from Technical University of Crete to interested Companies/Public Authorities. «Santorini. First Approach to water resource problem. Feasibility of a Reverse Osmosis plant driven by wind energy». Source of funding EC & Crete Region Authorities, (20/03/05-15/10/05).
8. «Educational Evaluation of Environmental Engineering Department of Technical University of Crete», Source of funding ΕΠΕΑΕΚ, (1/1/1999 -28/2/2000).
9. «Training Stages of students of Environmental Engineering Department of Technical University of Crete -Β΄Phase» Source of funding EPEAEK II, (1/10/2001 - 31/12/2004).
10. Enzymatic Starch Hydrolysis Kinetics and Environmental Behaviour study of the Swedish Company CEBA AB, Source of funding CEBA, (1/1/2006 -).
11. Recovery study of tomato juice for the UNILEVER S.A Company, Source of funding UNILEVER (1/1/2006 -).

RESEARCH RESULTS/PRODUCTS

1. Use of Greek lignite filters in wastewater treatment
2. Design of an optimum size incineration unit for the treatment of solid wastes and activated sludge

SERVICES OFFERED TO THIRD PARTIES

1. Consulting support on maters of treatment/recycle of the food industry wastes
2. Consultation on the environmental impact from energy production units
3. Dissolved oxygen measurements and multi-meter measurements in aqueous receivers (lakes, rivers).
4. Consulting support on the application of solar-thermal power stations
5. Consulting support on maters of water desalination
6. Consultants on treatment of solid wastes and activated sludge.

Treatment technology of Gas Waste Laboratory

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Division:	Environmental Management
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- Yiannis Chachladakis, Chemical Engineer MSc, Tel.: +30 28210 37819

ACTIVITIES

1. Catalysis. Use of novel electrocatalytic systems for effective gas emission treatment
2. Electrocatalysis. Apply of Electrochemistry and novel electrochemical cells on gas emission treatment
3. Study of Electrochemical Promotion of Catalysis and Metal-support interactions
4. Study of the performance of low and high temperature fuel cells (SOFC, PEMFC, DAFC)
5. Gas waste treatment using photocatalysis

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Gas Chromatography (GC)
- Interfaces analysis by electrochemical methods (potentiometry, cyclic voltammetry)
- Chemical Reactors (CSTR)
- Low and High temperature fuel cells
- CO2 Infrared Analyzers
- Mass Flow Controllers
- Electrically controlled Furnace for catalyst preparation
- Chemical reagents, glasses and machine-works stock

RESEARCH AND DEVELOPMENT PROJECTS

«Catalytic Treatment of carbon (soot) coming from DIESEL engines", financially supported from ELKE, Technical University of Crete (2007-2008).

RESEARCH RESULTS/PRODUCTS

1. Catalytic systems for air waste treatment
2. Low temperature PEM fuel Cell with Hydrogen feed

SERVICES OFFERED TO THIRD PARTIES

1. Electrochemical characterization of metal surfaces and interfaces
2. Air waste (H/C, SOx, VOCs, etc) chemical analysis
3. Consulting for the design, control and optimization of fuel cells under hydrogen or bio-fuels feed.
4. Consulting for type selection and installation of particulate matter collectors.

Water Resources Management and Coastal Engineering Laboratory

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ACTIVITIES

1. Water Resources Management.
2. Application of hydrologic models in modelling surface and ground water in basins.
3. Development of new technologies of neural networks for estimating and forecasting the groundwater level.
4. Evaluation and remediation of aquifers.
5. Application of GIS/Remote Sensing Technologies for the determination of hydraulic parameters like land use, soil type and Digital Terrains.
6. Determination of flood level and estimation of impacts of flood events.
7. Collection and organization of environmental data with the use of geographic information systems.
8. Planning of urban networks for sewerage and irrigation.
9. Mathematical simulation of diffusion and dispersion of pollutants in water bodies (rivers, lakes, coasts). Alternative planning of acceptable liquid effluent for reduction of their negative impacts in the environment and in human health. Environmental flow impacts in surface and coastal waters.
10. Mathematic models of wave propagation. Coastal Effects on waves, coastal sediment transport, coastal morphology, environmental impact of coastal structures.

SPECIALTY EQUIPMENT & INFRASTRUCTURE

Software:

- ArcIMS 4.0.
- ERDAS Imagine PRO 9.0 + extensions.
- ARCGIS 9.2 + extensions.
- ArcIMS 4.0.
- HYMOS 4.0.
- RIBASIM 6.03.
- GMS – Modflow.
- Hec-HMS, HEC-GeoHMS, Hec-, HEC - GeoRAS.
- Fortran G77.

Hardware – Digital data:

- Two laboratories (Phd + postgraduate and undergraduate student laboratories).
- Two Servers for the support of internal network of the laboratory and the dynamic web pages.
- Computers: 11 PCs.
- Printers: 6
- Scanners: 2
- GPS LEICA GS20
- Satellite images of Crete
- GIS data
- 1 flow – level meter for underground flow

Measuring equipment:

- 3 automatic precipitation stations
- 1 heated telemetric precipitation station
- 5 automatic flow – level meters

RESEARCH AND DEVELOPMENT PROJECTS

1. «HARMONIRIB: Harmonized Techniques and Representative River Basin Data for Assessment and Use of Uncertainty Information in Integrated Water Management» European Community EC-RS (Energy, Environment and sustainable development Key Action I: Sustainable Management and Quality of Water). Source of Funding: EC, 2003-2006.
2. «BEWARE: Best Water Use Innovative Practices towards a sustainable Water Resources Management».Regional Program of Innovative Shares for Crete CRINNO, Greece. Source of Funding: Ministry of Development, 2003-2005.
3. Environmental Data Base Chania (pjlot network base of environmental data on the prefecture of Chania). Source of Funding: Local Union of Municipalities and Communities of Chania Prefecture, Crete, 2002-2003.

4. ENCORA, European Network on Coastal Research Coordination Action (2005-2008).
5. SIMFLOOD: High Resolution Satellite Imagery for Floodplain Mapping, European Space Agency (ESA) (2007-2009).
6. Flash Flood Forecasting with the Use of C-Band Radar in the Island of Crete: General Secretariat for Research and Technology, International S & T Cooperation Directorate - Bilateral Relatio ns Division, Scientific and Technological Cooperation between RTD Organizations in Greece and RTD Organizations in USA & Canada (2007-2008).
7. SCENES: Water Scenarios for Europe and for Neighbouring States (Integrated Project), Sub-Priority 6.3 – Global Change and Ecosystems, Sub-priority research area - II.4. Scenarios of water demand and availability, Topic - II.4.1 Water scenarios for Europe and for neighbouring countries (2007-2010).
8. WATCH: WATer & global CHance (Integrated Project) Sixth Framework Programme – Global Change and Ecosystems Priority – 4th Call Paragraph II.1.1 Global Water Cycle, Water Resources and Droughts) (2007-2010).
9. HYDRATE: Hydrometeorological data resources and technologies for effective flash flood forecasting Sixth Framework Programme – Global Change and Ecosystems Priority – 4th Call Paragraph II.1.2 "Flash Flood forecasting (2007-2009).

SERVICES OFFERED TO THIRD PARTIES

1. Water resources management with use of geographic information systems
2. Hydrologic - hydraulic studies
3. Evaluation and remediation studies for aquifers
4. Development of new technologies of neural networks for the optimization of hydrologic models, the determination and forecasting of precipitation and the estimation of groundwater level
5. Use of GIS/Remote Sensing technologies for evaluation and mapping of surface parameters as land use, surface humidity and soil type
6. Flood control studies for protection and estimation of losses in cases of extreme weather phenomena
7. Web design for projection of dynamic maps based on geographic information systems
8. Flood Environmental Impact studies
9. Studies of diffusion and dispersion of pollutants in water bodies (rivers, lakes, coasts). Alternative planning of acceptable pollutants for reduction of their negative impacts in the environment and in human health
10. Environmental impact assessment in surface and coastal waters.
11. Coastal sediment transportation, coastal morphology, environmental impact assessment of coastal structures.

6

Interdepartmental Laboratories

Machine Tools Laboratory

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ACTIVITIES

1. Mechanical engineering applications
2. New technologies development and optimization of product construction processes

SPECIALTY EQUIPMENT & INFRASTRUCTURE

- Lathes TOS (TOS Trencin), model SN 32,
- 1 Lathe ZMM, model CU 401,
- 1 Lathe NARDINI, model ECO 14,
- 1 Vertical Milling Machine SUNLIKE, model 3 H,
- 1 Horizontal Milling Machine JAFO, model FWF 32,
- 1 Horizontal Milling Machine PBM (PHOEBUS), model PBM G 150,
- 1 Plane INFRATIRER, model SH 450,
- 1 Ripsaw FOSEN, model MH 916 JA,
- 1 Drilling Machine METALIK, model PK 203,
- 1 Drilling Machine METALIK, model PF 01,
- 1 Plasma Cutting Machine HARRIS, model System 100,
- 1 Tungsten Inactive Gas Welding Machine (TIG) FRONIUS, model MagicWave 2000,
- 1 Material Inactive Gas Welding Machine (MIG) MERKLE, model M 284 K,
- Electro Welding Machines KEMPPI, model Master 2200,
- 1 Oxygen - Acetylene Welding & Cutting Machine HARRIS

RESEARCH AND DEVELOPMENT PROJECTS

'Development and Construction of an Unmanned Surface Vehicle', PEPER PROJECT, GSRT, Duration: 10/2006 – 10/2007

RESEARCH RESULTS/PRODUCTS

Frame Research Autonomous Unmanned VTOL (ΠΕΠΕΤ 2000 - Phase A)

SERVICES OFFERED TO THIRD PARTIES

1. Clad Materials (Titanium), Research of Construction Mechanical Limbs
2. Research and Construction of the Frame for a Robotic Unmanned Vehicle
3. Research and Construction of the Landing System for an Autonomous Unmanned VTOL
4. Static and Dynamic Analysis of a Catapult for UAVs. (EADS – 3 Sigma S.A.).

Annex A

Laboratories of Technical University of Crete by Department and Division

Department	Laboratory	Division	Page
Sciences	Analytical and Environmental Chemistry	Chemistry	7
Sciences	Applied Mathematics and Computer (AMCL)	Mathematics	8
Sciences	Applied Mechanics	Mechanics	10
Sciences	Applied Socio-Economic Research	Social Sciences	12
Sciences	Materials Structure and Laser Physics	Physics	13
Sciences	Physical Chemistry and Chemical Processes	Chemistry	15
Production Engineering & Management	Cognitive Ergonomics & Industrial Safety (CEIS)	Management & Administration	18
Production Engineering & Management	Computational Mechanics and Optimization	Decision Science	20
Production Engineering & Management	Computer-Aided Design (CAD)	Production Systems	22
Production Engineering & Management	Computer-Aided Manufacturing (CAM)	Production Systems	24
Production Engineering & Management	Data Analysis and Forecasting	Management & Administration	25
Production Engineering & Management	Decision Support Systems (ERGASYA)	Decision Science	26
Production Engineering & Management	Dynamic Systems and Simulation	Decision Science	28
Production Engineering & Management	Financial Engineering	Management & Administration	30
Production Engineering & Management	Industrial Systems Control	Production Systems	32
Production Engineering & Management	Intelligent Systems & Robotics	Production Systems	34
Production Engineering & Management	Management Systems Laboratory (ManLab)	Management & Administration	36
Mineral Resources Engineering	Applied Geology	Mining Technology	38
Mineral Resources Engineering	Applied Geophysics	Exploration and Positioning	39
Mineral Resources Engineering	Applied Mineralogy	Mineral Exploitation	41
Mineral Resources Engineering	Ceramics and Glass Technology	Mineral Exploitation	43
Mineral Resources Engineering	Geodesy & Geomatics Enigineering	Exploration and Positioning	44
Mineral Resources Engineering	Inorganic & Organic Geochemistry & Organic Petrography	Exploration and Positioning of Mineral Resources	46
Mineral Resources Engineering	Mine Design	Mining Technology	47
Mineral Resources Engineering	Mineral Processing	Mineral Exploitation	49
Mineral Resources Engineering	Petrology & Economic Geology	Exploration and Positioning	51
Mineral Resources Engineering	PVT and Core Analysis	Mining Technology	53
Mineral Resources Engineering	Rock Mechanics	Mining Technology	55
Mineral Resources Engineering	Solid Fuels Beneficiation and Technology	Mineral Exploitation	56
Mineral Resources Engineering	Drilling Engineering and Fluid Mechanics Research Unit	Mining Technology	58
Mineral Resources Engineering	Geostatistics Research Unit	Exploration and Positioning	59
Mineral Resources Engineering	Hydrocarbons Chemistry and Technology Research Unit	Mining Technology	60
Mineral Resources Engineering	Management of mining / metallurgical wastes and rehabilitation of contaminated soils Research Unit	Mineral Exploitation	61

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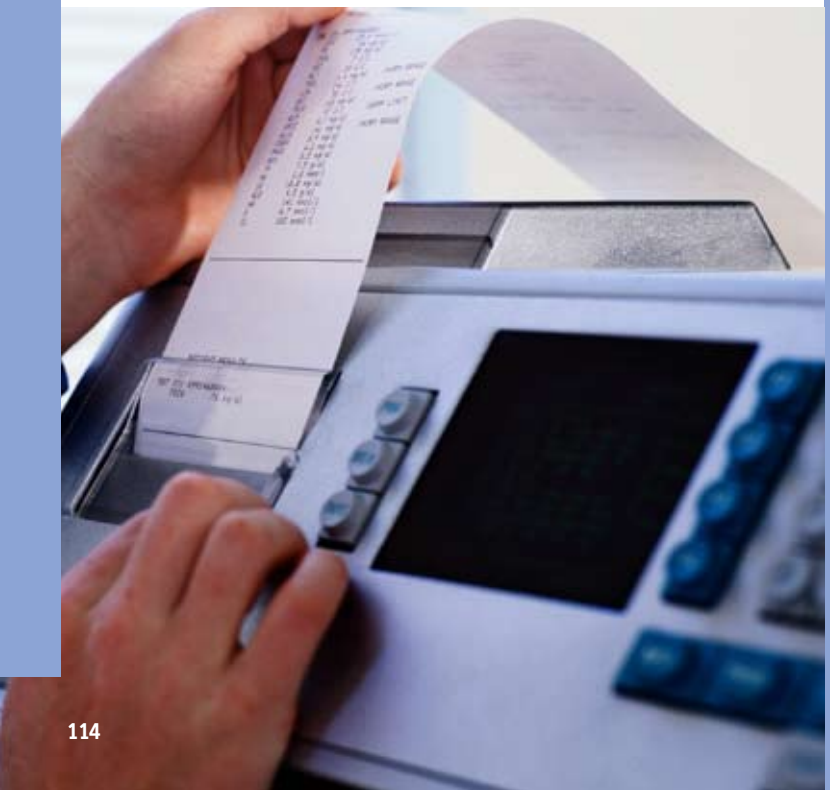
Department	Laboratory	Division	Page
Mineral Resources Engineering	Microscopy methods for minerals and industrial products Research Unit	Mineral Exploitation	62
Mineral Resources Engineering	Quality Control – Health and Safety in the Mineral Industry Research Unit	Mining Technology	64
Mineral Resources Engineering	Economic Geology-Industrial Mineralogy Research Unit	Exploration and Positioning	66
Electronics & Computer Engineering	Automation	Systems	69
Electronics & Computer Engineering	Digital Image and Signal Processing	Telecommunications	70
Electronics & Computer Engineering	Distributed Multimedia Information Systems and Applications (MUSIC)	Computer Science	71
Electronics & Computer Engineering	Electric Circuits and Renewable Energy Sources	Electronics and Computer Architecture	73
Electronics & Computer Engineering	Electronics	Electronics and Computer Architecture	75
Electronics & Computer Engineering	Information and Computer Networks	Telecommunications	77
Electronics & Computer Engineering	Intelligent Systems	Computer Science	78
Electronics & Computer Engineering	Microprocessors and Hardware	Electronics and Computer Architecture	80
Electronics & Computer Engineering	Software Technology and Network Applications	Computer Science	81
Electronics & Computer Engineering	Telecommunications	Telecommunications	82
Environmental Engineering	Air, Water and Solid Waste Management	Environmental Management	85
Environmental Engineering	Atmospheric Aerosols	Environmental Process Design and Development	87
Environmental Engineering	Biochemical Engineering & Environmental Biotechnology	Environmental Process Design and Development	89
Environmental Engineering	Chemical Processes & Wastewater Treatment	Environmental Management	91
Environmental Engineering	Ecology and Biodiversity	Environmental Hydraulics and Geoenvironmental Engineering	92
Environmental Engineering	Environmental Engineering and Management	Design and Development of Environmental Processes	93
Environmental Engineering	Geoenvironmental Engineering	Environmental Hydraulics and Geoenvironmental Engineering	95
Environmental Engineering	Hydrogeochemical Engineering and Soil Remediation	Environmental Hydraulics and Geoenvironmental Engineering	97
Environmental Engineering	Renewable and Sustainable Energy Systems (ReSEL)	Environmental Process Design and Development	99
Environmental Engineering	Toxic and Hazardous Waste Management	Environmental Management	101
Environmental Engineering	Transport Phenomena & Applied Thermodynamics	Environmental Processes Design and Development	103
Environmental Engineering	Treatment technology of Gas Waste	Environmental Management	105
Environmental Engineering	Water Resources Management and Coastal Engineering	Environmental Hydraulics and Geoenvironmental Engineering	106
Interdepartmental	Machine Tools	Interdepartmental	109

Annex B

Alphabetical registration of the Laboratories of Technical University of Crete

B



If not otherwise indicated, all Telephone and Fax numbers (those not of mobile networks) must be preceeded by the numbers **+30 28210** or in case of mobile networks just with **+30**. If you are calling from within Greece, you add only **28210**.

All internet addresses starting with «**www**» (with no quotation marks) must be preceeded by the characters «**http://**» (with no quotation marks) in order to be complete.

Laboratory	Department	Page	Head	Position	Tel.	Fax	email	Website
Air, Water and Solid Waste Management	Environmental Engineering	85	Economopoulos Alexander	Prof.	37776, 37778	37845	eco@otenet.gr	http://eco.tuc.gr
Analytical and Environmental Chemistry	Sciences	7	Kallithrakas-Kontos Nikolaos	Prof.	37666	37841	kalli@mred.tuc.gr	www.science.tuc.gr/che_lab.html
Applied Geology	Mineral Resources Engineering	38	Agioutantis Zacharias	Prof.	37654, 37645	37646	zach@mred.tuc.gr	www.mred.tuc.gr/p013205.htm
Applied Geophysics	Mineral Resources Engineering	39	Vafidis Antonios	Prof.	37643	69554, 37643	vafidis@mred.tuc.gr	www.mred.tuc.gr/p013202.htm
Applied Mathematics and Computer (AMCL)	Sciences	8	Saridakis Yiannis	Prof.	37740	37842	yiannis@science.tuc.gr	www.amcl.tuc.gr
Applied Mechanics	Sciences	10	Providakis Costas	Assoc. Prof.	37637	37866	cpprov@mred.tuc.gr cpprov@mechanics.tuc.gr	www.mechanics.tuc.gr
Applied Mineralogy	Mineral Resources Engineering	41	Kostakis George	Prof.	37605	37840	kostakis@mred.tuc.gr	www.mred.tuc.gr/p013209.htm
Applied Socio-Economic Research	Sciences	12	Liodakis George	Prof.	37317	37843	liod@science.tuc.gr	www.science.tuc.gr/soc_lab.html
Atmospheric Aerosols	Environmental Engineering	87	Lazaridis Mixalis	Assist. Prof.	37813	37846	lazaridi@enveng.tuc.gr	www.enveng.tuc.gr/pwp/Lazaridhs_lab/index.htm
Automation	Electronics & Computer Engineering	69	Zervakis Michalis	Prof.	37206	37542	michalis@danai.systems.tuc.gr	http://dilos.systems.tuc.gr/AutomationLab/news.htm
Biochemical Engineering & Environmental Biotechnology	Environmental Engineering	89	Kalogerakis Nicolas	Prof.	37794	37852	nicolas.kalogerakis@enveng.tuc.gr	www.beeb.enveng.tuc.gr
Ceramics and Glass Technology	Mineral Resources Engineering	43	Kostakis George	Prof.	37605	37840	kostakis@mred.tuc.gr	www.mred.tuc.gr/p013210.htm
Chemical Processes & Wastewater Treatment	Environmental Engineering	91	Mantzavinos Dionissios	Assist. Prof.	3779	37847	mantzavi@mred.tuc.gr	www.enveng.tuc.gr/Labs/ecdeya_lab.htm
Cognitive Ergonomics & Industrial Safety (CEIS)	Production Engineering & Management	18	Kontogiannis Tom	Assoc. Prof.	37320, 37316	69410	konto@dpem.tuc.gr	www.dpem.tuc.gr
Computational Mechanics and Optimization	Production Engineering & Management	20	Stavroulakis George	Prof.	37418	69410	gestavr@dpem.tuc.gr	www.dpem.tuc.gr http://users.isc.tuc.gr/~gestavroulakis
Computer-Aided Design (CAD)	Production Engineering & Management	22	Bilalis Nikolaos	Assoc. Prof.	37247, 37256, 37254	37554	bilalis@dpem.tuc.gr	www.cadlab.tuc.gr
Computer-Aided Manufacturing (CAM)	Production Engineering & Management	24	Phillis Yiannis	Prof.	37321	37538	phillis@dpem.tuc.gr	www.dpem.tuc.gr

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Data Analysis and Forecasting	Production Engineering & Management	25	Skiadas Christos	Assoc. Prof.	37252	37535	skiadas@ermes.tuc.gr	www.dpem.tuc.gr
Decision Support Systems (ERGASYA)	Production Engineering & Management	26	Migdalas Athanasios	Prof.	37288	37540	migdalas@ergasya.tuc.gr samig@verenike.ergasya.tuc.gr	www.ergasya.tuc.gr www.opt.tuc.gr
Digital Image and Signal Processing	Electronics & Computer Engineering	70	Zervakis Michalis	Prof.	37206	37542	michalis@danai.systems.tuc.gr	www.display.tuc.gr
Distributed Multimedia Information Systems and Applications (MUSIC)	Electronics & Computer Engineering	71	Christodoulakis Stavros	Prof.	37399	37567	stavros@ced.tuc.gr	www.music.tuc.gr
Drilling Engineering and Fluid Mechanics Research Unit	Mineral Resources Engineering	58	Kelessidis Vassilios	Assist. Prof.	37621	37874	kelesidi@mred.tuc.gr	http://drillinglab. mred.tuc.gr
Dynamic Systems and Simulation	Production Engineering & Management	28	Papageorgiou Markos	Prof.	37289	37584, 69410	markos@dssl.tuc.gr	www.dssl.tuc.gr
Ecology and Biodiversity	Environmental Engineering	92			37796	37845		www.enveng.tuc.gr/Labs/eob_lab.htm
Economic Geology-Industrial Mineralogy Research Unit	Mineral Resources Engineering	66	Christidis George	Assoc. Prof.	37622	37888	christid@mred.tuc.gr	www.mred.tuc.gr/
Electric Circuits and Renewable Energy Sources	Electronics & Computer Engineering	73	Kalaitzakis Kostas	Prof.	37213	37530	koskal@elci.tuc.gr	www.elci.tuc.gr
Electronics	Electronics & Computer Engineering	75	Kalaitzakis Kostas	Prof.	37213, 37201	37530, 37542	koskal@electronics.tuc.gr	www.electronics.tuc.gr
Environmental Engineering and Management	Environmental Engineering	93	Diamadopoulos Evangelos	Prof.	37795	37847	diamad@dssl.tuc.gr	www.enveng.tuc.gr/Labs/leem_lab.htm
Financial Engineering	Production Engineering & Management	30	Zopounidis Constantin	Prof.	37236	69410	kostas@dpem.tuc.gr	http:www.dpem.tuc.gr/fel
Geodesy & Geomatics Engineering	Mineral Resources Engineering	44	Mertikas Stylianos	Prof.	37629, 37633	37872	mertikas@mred.tuc.gr	www.mred.tuc.gr/p013204.htm
Geoenvironmental Engineering	Environmental Engineering	95	Karatzas George	Prof.	37792	37846	karatzas@mred.tuc.gr	www.enveng.tuc.gr/Labs/egm_lab.htm
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Hydrogeochemical Engineering and Soil Remediation	Environmental Engineering	97	Nikolaidis Nikolaos	Prof.	37785	37846	nnikolai@mred.tuc.gr	www.herslab.tuc.gr
Industrial Systems Control	Production Engineering & Management	32	Pouliezos Anastasios	Prof.	37313	69410	tasos@dpem.tuc.gr	www.dpem.tuc.gr
Information and Computer Networks	Electronics & Computer Engineering	77	Digalakis Vassilis	Prof.	37226	37202	vas@telecom.tuc.gr	www.telecom.tuc.gr
Inorganic & Organic Geochemistry & Organic Petrography	Mineral Resources Engineering	46	Perdikatsis Vassilis	Prof.	37618	69554	vperdik@mred.tuc.gr	www.mred.tuc.gr/p013201.htm
Intelligent Systems	Electronics & Computer Engineering	78	Petrakis Euripides	Assoc. Prof.	37229	37542	petrakis@intelligence.tuc.gr	www.intelligence.tuc.gr
Intelligent Systems & Robotics	Production Engineering & Management	34	Tsourveloudis Nikos	Assoc. Prof.	37285	69410	nikost@dpem.tuc.gr	www.dpem.tuc.gr/robolab
Machine Tools	*	109	Tsourveloudis Nikos	Assoc. Prof.	37285	69410	nikost@dpem.tuc.gr	www.dpem.tuc.gr/machinetoollab
Management of mining / metallurgical wastes and rehabilitation of contaminated soils Research Unit	Mineral Resources Engineering	61	Komnitsas Kostas	Assoc. Prof.	37686	69554	komni@mred.tuc.gr	www.mred.tuc.gr/home/komni.html
Management Systems Laboratory (ManLab)	Production Engineering & Management	36	Moustakis Vassilis	Assoc. Prof.	37241, 37251	69410	moustaki@dpem.tuc.gr	www.logistics.tuc.gr
Materials Structure and Laser Physics	Sciences	13	Moustaizis Stavros	Assoc. Prof.	28450, 28451, 37868	28453	moustaiz@science.tuc.gr	www.physics.tuc.gr
Microprocessors and Hardware	Electronics & Computer Engineering	80	Dollas Apostolos	Prof.	37228	37542	dollas@mhl.tuc.gr	www.mhl.tuc.gr
Microscopy methods for minerals and industrial products Research Unit	Mineral Resources Engineering	62	Alevizos George	Lecturer	37604	69554	alevizos@mred.tuc.gr	http:// www.mred.tuc.gr/
Mine Design	Mineral Resources Engineering	47	Exadaktylos George	Prof.	37690	37891	exadakty@mred.tuc.gr	http://minelab.mred.tuc.gr www.mred.tuc.gr/p013208.htm
Mineral Processing	Mineral Resources Engineering	49	Stamboliadis Elias	Assoc. Prof.	37601	37884	elistach@mred.tuc.gr	www.mred.tuc.gr/p013212.htm
Petrology & Economic Geology	Mineral Resources Engineering	51	Markopoulos Theodoros	Prof.	37614	69554	markopou@mred.tuc.gr	www.mred.tuc.gr/p013203.htm
Physical Chemistry and Chemical Processes	Sciences	15	Yentekakis Ioannis	Assoc. Prof.	37752	37843	yyentek@science.tuc.gr	www.science.tuc.gr/CPPC_lab.html

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PVT and Core Analysis	Mineral Resources Engineering	53	Varotsis Nikos	Prof.	37668	37886	varotsis@mred.tuc.gr	www.mred.tuc.gr/p013207.htm
Quality Control – Health and Safety in the Mineral Industry Research Unit	Mineral Resources Engineering	64	Galetakis Michael	Assist. Prof.	37616	69554	galetaki@mred.tuc.gr	www.mred.tuc.gr/p013216.htm
Renewable and Sustainable Energy Systems (ReSEL)	Environmental Engineering	99	Tsoutsos Theocharis	Assist. Prof.	37825	37847	theocharis.tsoutsos@enveng.tuc.gr	www.enveng.tuc.gr/Labs/abes_lab.htm
Rock Mechanics	Mineral Resources Engineering	55	Agioutantis Zacharias	Prof.	37654, 37644	37880, 69554	zach@mred.tuc.gr	www.mred.tuc.gr/p013206.htm
Software Technology and Network Applications	Electronics & Computer Engineering	81	Christodoulakis Stavros	Prof.	37399	37567	stavros@ced.tuc.gr	www.softnet.tuc.gr
Solid Fuels Beneficiation and Technology	Mineral Resources Engineering	56	Vamvuka Despina	Assoc. Prof.	37603	69554	vamvuka@mred.tuc.gr	www.mred.tuc.gr/p013211.htm
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Toxic and Hazardous Waste Management	Environmental Engineering	101	Gidarakos Evangelos	Assoc. Prof.	37789	37850	gidarako@mred.tuc.gr	www.enveng.tuc.gr/Labs/edtea_lab.htm
Transport Phenomena & Applied Thermodynamics	Environmental Engineering	103	Gekas Vassilis	Prof.	37779	37846	vgekas@enveng.tuc.gr	www.enveng.tuc.gr/Labs/efmtfd_lab.htm
Treatment technology of Gas Waste	Environmental Engineering	105	Katsaounis Alexandros	Lecturer	37819	37847	alex.katsaounis@enveng.tuc.gr	www.enveng.tuc.gr/katsaounis/lab.html
Water Resources Management and Coastal Engineering	Environmental Engineering	106	Tsanis Ioannis	Prof.	37799	37849	tsanis@enveng.tuc.gr	www.hydromech.tuc.gr/

Annex C
Heads of the Laboratories of Technical University of Crete

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Agioutantis Zacharias	Prof.	37654, 37645 37644	37646 37880, 69554	zach@mred.tuc.gr	http: /www.mred.tuc.gr/p013205.htm www.mred.tuc.gr/p013206.htm	38, 55
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Bilalis Nikolaos	Assoc. Prof.	37247, 37256, 37254	37554	bilalis@dpem.tuc.gr	www.cadlab.tuc.gr	22
Christidis George	Assoc. Prof.	37622	37888	christid@mred.tuc.gr	http:// www.mred.tuc.gr/	66
Christodoulakis Stavros	Prof.	37399	37567	stavros@ced.tuc.gr	www.music.tuc.gr www.softnet.tuc.gr	71, 81
Diamadopoulos Evangelos	Prof.	37795	37847	diamad@dssl.tuc.gr	www.enveng.tuc.gr/Labs/leem_lab.htm	93
Digalakis Vassilis	Prof.	37226	37202	vas@telecom.tuc.gr	www.telecom.tuc.gr	77
Dollas Apostolos	Prof.	37228	37542	dollas@mhl.tuc.gr	www.mhl.tuc.gr	80
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Exadaktylos George	Prof.	37690	37891	exadakty@mred.tuc.gr	http://minelab.mred.tuc.gr, www.mred.tuc.gr/p013208.htm	47
Galetakis Michael	Assist. Prof.	37616	69554	galetaki@mred.tuc.gr	www.mred.tuc.gr/p013216.htm	64
Gekas Vassilis	Prof.	37779	37846	vgekas@enveng.tuc.gr	www.enveng.tuc.gr/Labs/efmtfd_lab.htm	103
Gidarakos Evangelos	Assoc. Prof.	37789	37850	gidarako@mred.tuc.gr	www.enveng.tuc.gr/Labs/edtea_lab.htm	101
Hristopoulos Dionissios	Assoc. Prof.	37688	69554	dionisi@mred.tuc.gr	www.mred.tuc.gr/p013221.htm	59
Kalaitzakis Kostas	Prof.	37213, 37201	37530, 37542	koskal@elci.tuc.gr koskal@electronics.tuc.gr	www.elci.tuc.gr www.electronics.tuc.gr	73, 75
Kallithrakas-Kontos Nikolaos	Prof.	37666	37841	kalli@mred.tuc.gr	www.science.tuc.gr/che_lab.html	7
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Karatzas George	Prof.	37792	37846	karatzas@mred.tuc.gr	www.enveng.tuc.gr/Labs/egm_lab.htm	95
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Kostakis George	Prof.	37605	37840	kostakis@mred.tuc.gr	www.mred.tuc.gr/p013209.htm www.mred.tuc.gr/p013210.htm	41, 43
Lazaridis Mixalis	Assist. Prof.	37813	37846	lazaridi@enveng.tuc.gr	www.enveng.tuc.gr/pwp/Lazaridhs_lab/index.htm	87
Liodakis George	Prof.	37317	37843	liod@science.tuc.gr	www.science.tuc.gr/soc_lab.html	12
Mantzavinos Dionissios	Assist. Prof.	3779	37847	mantzavi@mred.tuc.gr	www.enveng.tuc.gr/Labs/ecdeya_lab.htm	91
Markopoulos Theodoros	Prof.	37614	69554	markopou@mred.tuc.gr	www.mred.tuc.gr/p013203.htm	51
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Moustakis Vassilis	Assoc. Prof.	37241, 37251	69410	moustaki@dpem.tuc.gr	www.logistics.tuc.gr	36
Nikolaidis Nikolaos	Prof.	37785	37846	nnikolai@mred.tuc.gr	www.herslab.tuc.gr	97
Papageorgiou Markos	Prof.	37289	37584. 69410	markos@dssl.tuc.gr	www.dssl.tuc.gr	28
Pasadakis Nikos	Assist. Prof.	37669	69554	pasadaki@mred.tuc.gr	http:// www.mred.tuc.gr	60
Perdikatsis Vassilis	Prof.	37618	69554	vperdik@mred.tuc.gr	www.mred.tuc.gr/p013201.htm	46
Petrakis Euripides	Assoc. Prof.	37229	37542	petrakis@intelligence.tuc.gr	www.intelligence.tuc.gr	78
Phillis Yiannis	Prof.	37321	37538	phillis@dpem.tuc.gr	www.dpem.tuc.gr	24
Pouliezos Anastasios	Prof.	37313	69410	tasos@dpem.tuc.gr	www.dpem.tuc.gr	32
Providakis Costas	Assoc. Prof.	37637	37866	cpprov@mred.tuc.gr, cpprov@mechanics.tuc.gr	www.mechanics.tuc.gr	10
Saridakis Yiannis	Prof.	37740	37842	yiannis@science.tuc.gr	www.amcl.tuc.gr	8
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Tsanis Ioannis	Prof.	37799	37849	tsanis@enveng.tuc.gr	www.hydromech.tuc.gr/	106
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Tsoutsos Theocharis	Assist. Prof.	37825	37847	theocharis.tsoutsos@enveng.tuc.gr	www.enveng.tuc.gr/Labs/abes_lab.htm	99
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Varotsis Nikos	Prof.	37668	37886	varotsis@mred.tuc.gr	www.mred.tuc.gr/p013207.htm	53
Yentekakis Ioannis	Assoc. Prof.	37752	37843	yyentek@science.tuc.gr	www.science.tuc.gr/CPPC_lab.html	15
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Zopounidis Constantin	Prof.	37236	69410	kostas@dpem.tuc.gr	http:www.dpem.tuc.gr/fel	30

Annex D

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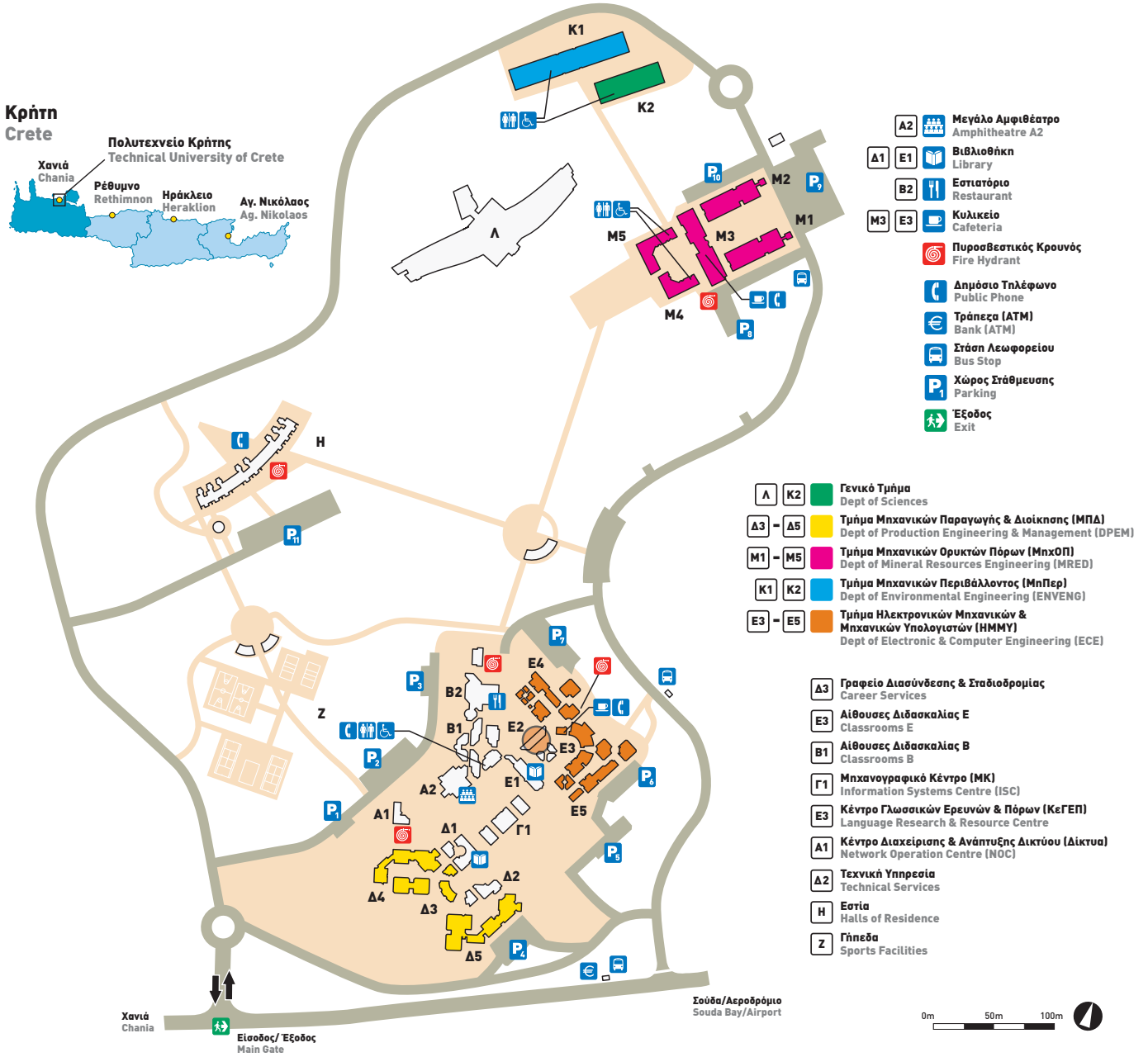
Technical University of Crete Campus Map



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