University Figures

- 30,000 Students
- 2,222 Academic staff
- 1,210 Administrative and service staff
- 276,275,016€ Budget
- 46 Degrees and diplomas
- 49 Phd programmes
- 9,650 Registered students of continuing education
• Aeronautics
• Architecture
• Civil Engineering
• Economics
• Industrial Engineering
• Computer Science
• Telecommunications
• Sciences
• Nautical Studies
• Farming and Forestry
• Photography and Multimedia
- Second largest Campus (after Barcelona)

Other Associated Schools: Photography, Multimedia & Business
EET Escola d'Enginyeria de Terrassa (4-year degrees and 2-year masters)
• (Diploma) Degree in Electronic Engineering (and Automation)
• (Diploma) Degree in Electrical Engineering
• (Diploma) Degree in Textile Engineering
• (Diploma) Degree in Chemistry Engineering.
• (Diploma) Degree in Sound & Image Engineering

ETSEIAT Escola Tècnica Superior de Enginyeria Industrial i Aeronàutica de Terrassa (4-year degrees and 2-year masters)
• Degree in Industrial Engineering
• Degree in Aeronautic Engineering
• Degree in Automatic Control and Industrial Electronics

PhD Program in Electronic Engineering (subjects)
• AC Power Electronic Converters
• Power Quality in the Electrical Grid
• Renewable Energy
• Electromagnetic Compatibility
Universitat Politècnica de Catalunya (UPC)

Electronic Engineering Department (DEE)

Terrassa Industrial Electronic Group (TIEG)

TIEG Members

| 9 Lecturers, Ph.D. | 7 Ph.D. Students | 6 Technical Staff |
**Current Research Projects**

**Study of Low-Voltage Energy Converters for Cost Reduction and Reliability Improvement in Wind Energy Systems**
- **Sponsor:** Spanish Government
- **Budget** (TIEG, APERT, RBTK): 320,000 € (198,440 € TIEG)
- **Period:** 2007-2010 (three years)

**CITY-ELEC: Electrical Systems for Mobility in Urban Environment**
- **Sponsor:** Spanish Government
- **Budget** (33 companies & technological centers): Aprox. 3 M€ (200,000 € TIEG)
- **Period:** 2009-2012 (four years)

**Consequences of Wind Turbine Integration in the Electrical Grid (EOLO)**
- **Sponsor:** Catalonia Government
- **Budget** (Basque Country, Aquitania, Aragón, Catalonia): 6,000 € (UPC-Catalonia)
- **Period:** 2009-2011 (two years)

**EMI Analysis and Reduction Techniques in Matrix Converters and Multi Converter Systems: Interaction with Power Line Communications (PLC)**
- **Sponsor:** Spanish Government
- **Budget:** 248,171 €
- **Period:** 2007-2010 (four years)

**Convergence and Intelligent Networks Secure Applications Electric Innovating in Environmental Design (CRISALIDA)**
- **Sponsor:** European Union (CENIT)
- **Budget:** 23 M€ (500,000 € TIEG)
- **Period:** 2007-2011 (four years)
Current Research Projects

Wind -Solar Photovoltaic Facility and Preparation of Renewable Energy Teaching Material
- Sponsor: Catalan Government
- Budget: 6,500 €
- Period: 2010-2012 (two years)

Research on Power Electronic Systems for High Voltage and Medium Voltage Direct Current (HVDC-MVDC) Energy Transmission for Marine Farms (SISTER)
- Sponsor: Spanish Government
- Budget applied for (RBTK, TIEG): 180,000 € (98,440 € TIEG)
- Period: 2012-2015 (three years)
Research

- 84 Papers on JCR
- 28 Nacional Journal Papers
- 190 Internatio. Confer. Papers
- 92 Spanish Confer. Papers
- 5 Book Chapters
- 7 Books
- 6 Open Public Research Projects
- 19 Finished Public Research Projects
- 2 Requested Public Research Projects
- 6 Open Private Research Projects
- 11 Finished Private Research Projects
Terrassa Industrial Electronics Group
Electronics Engineering Department

Premises

Renewable, EV & Motion Control Lab.

Future TIEG Lab. ?

EMC Lab.

TIEG Labs
TIEG Offices
• **Renewable, EV and Motion Control Lab.**
  
  - 7.5-kVA Matrix Converter
  
  - 2 x 20-kVA Three-Level NPC Inverters (back-to-back connected)
  
  - 4 x 3-kVA Three-Phase Inverters
  
  - Wind-photovoltaic facility (800W+3kW)
  
  - Multiple Electrical Motors
  
  - Multiple resistive and inductive loads
  
  - 2 x dSpace DS1103
  
  - 6 kVA programmable power supply
  
  - Many oscilloscopes and other general instrumentation
Facilities & Equipment

4Q Motor Drive System
4kW DC – PMSM 1-3 kW

7.5-kVA Matrix Converter
DSP + FPGA
20-kVA Three-Level NPC Inverters

3-kVA Three-Phase Inverter
• **EMC Laboratory**
  - TEM Cell
  - RF Generator
  - Spectrum analyzer
  - Line Impedance Stabilization Network
  - RF power amplifier
  - Vector Network Analyzer
  - EMC clamps
  - EMC Antennas
  - Several Oscilloscopes and power supplies
  - GPIB Control board
  - DAQ multifunction board
Spectrum Analyzer, Tracking Generator, LISN, Arbitrary Waveform Generator, Impedance Analyzer

4-Wire Power Active Filter
• Simulation Laboratory
  – COMSOL multiphysics
  – Agilent Advance Design System (ADS)
    • Momentum
    • EMDS
  – MATLAB
  – LabVIEW
  – ORCAD
  – Protel
  – …..
Antoni Arias (M’03) received the BEng degree in electrical engineering, MEng and PhD degrees in control and electronic engineering from the Universitat Politècnica de Catalunya, Catalonia, Spain, in 1993, 1997 and 2001 respectively. Since 1996 he has been a Lecturer at the Universitat Politècnica de Catalunya and was appointed as an Associate Professor in 2002 at the same University. In 1999 he was a visiting research assistant and part time lecturer at the University of Glamorgan, UK. In 2003 and 2004 he joined as a Visiting Fellow the Power Electronics, Machines and Control Group at the University of Nottingham, UK. In 2011 and 2012 he was at the Laboratoire de Génie Electrique de Paris (France) as a Maître de Conférences invité.

His research interests include sensorless variable-speed drive systems, power electronics converters and control strategies.