

Instrumentation and Measurements for Electromagnetic Compatibility (EMC) Testing

2020 Faculty Course Development Award
of the IEEE Instrumentation and Measurement Society

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UNIVERSITAT POLITÈCNICA
DE CATALUNYA
BARCELONATECH

Campus d'Excel·lència Internacional



Departament
d'Enginyeria
Electrònica



Grup de Compatibilitat Electromagnètica
UNIVERSITAT POLITÈCNICA DE CATALUNYA



Introduction - 10 min

- UPC - An institutional overview
- Grup de Compatibilitat Electromagnètica

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UPC

Universitat
Politécnica de Catalunya
BarcelonaTech

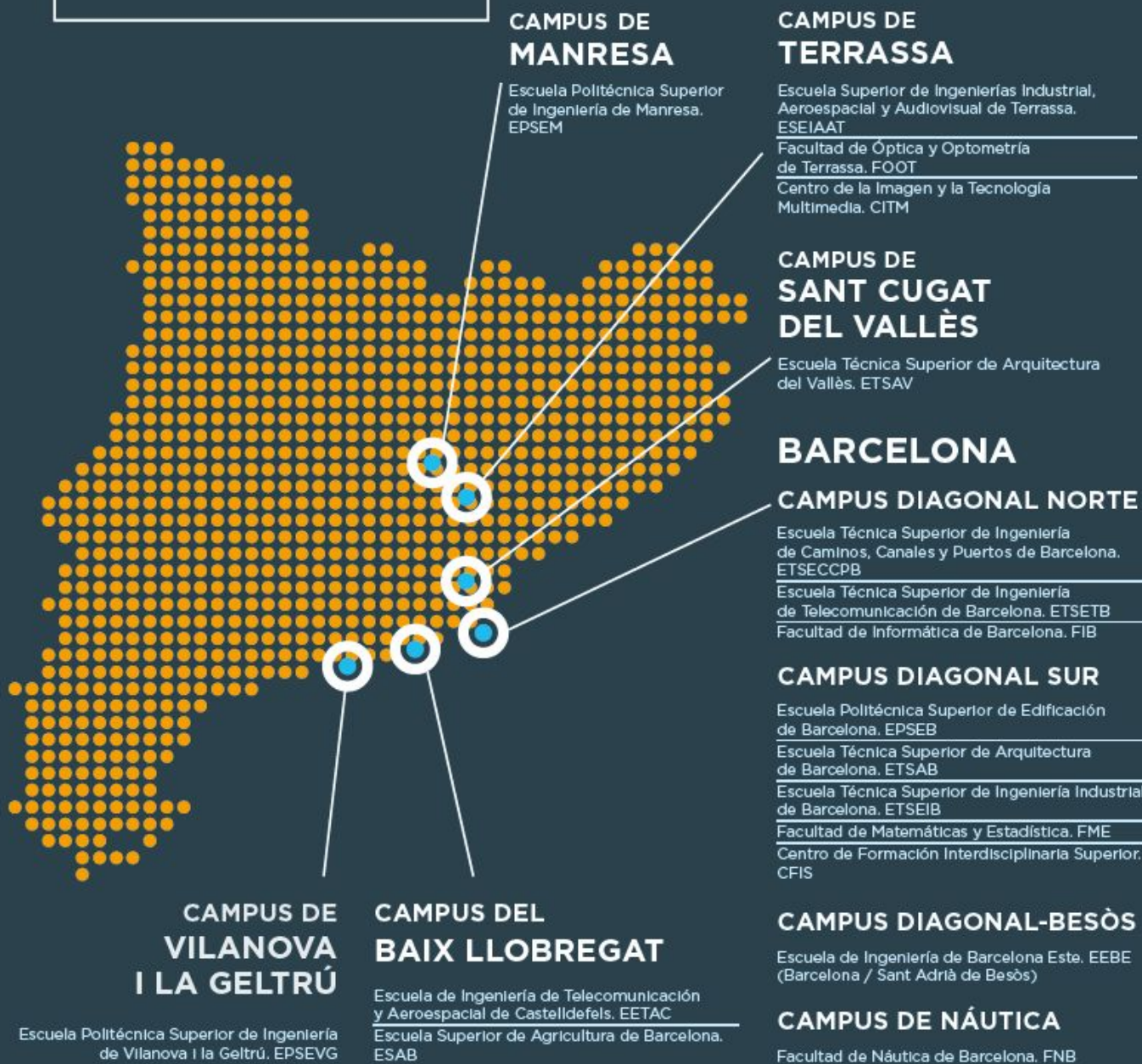
CURSO 2019-2020





TERRITORIO UPC

La UPC es una universidad de gran implantación territorial, que actúa en un escenario de capilaridad con su entorno más inmediato. Está ubicada en siete ciudades de Cataluña: Barcelona, Sant Adrià de Besòs, Terrassa, Castelldefels, Vilanova i la Geltrú, Manresa y Sant Cugat del Vallès. Con estos municipios, la Universidad mantiene una alianza destinada a profundizar en su rol como institución transformadora, que mejora las capacidades del tejido productivo y que ejerce como motor del progreso social. En este escenario, la UPC organiza anualmente una jornada titulada "Ciudad y Universidad" para debatir la interacción de los campus con las ciudades que los acogen.





LÍDERES EN INSERCIÓN LABORAL DE CALIDAD

Al año de titularse, el 93 % de las personas que han cursado sus estudios en la UPC, trabaja. Un 86 % tardó menos de seis meses en encontrar un empleo. La mayoría inició su carrera profesional haciendo prácticas en empresas, que en un 96 % realizó de forma remunerada.

(Fuente: AGU Catalunya)

28.000

estudiantes de grado
y máster

2.200

doctorandos
y doctorandas

2.000

personal de administración
y servicios

5.500

titulados y tituladas
de grado y máster

59.000

alumni

3.100

personal docente
e investigador

SOMOS UPC



18

centros docentes

206

grupos
de investigación

46

programas
de doctorado

58 M€

ingresos por
proyectos
de I+D+i (2018)

64

grados

67

másters

2.900

estudiantes
de formación
permanente

228

programas
de formación
permanente

654

nuevos convenios
y proyectos
de investigación

295 M€

presupuesto 2019



Group of Electromagnetic Compatibility - GCEM

We are located in the Campus Nord
(Campus Diagonal Norte)



VISION:

- To be a reference centre on electromagnetic compatibility (EMC) to develop research projects with companies and government.

MISSION:

- To participate in national and international research projects in the EMC area
- To maintain a fully operational university EMC testing lab
- To train and employ engineers and scientist with large expertise in EMC

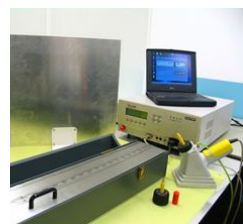
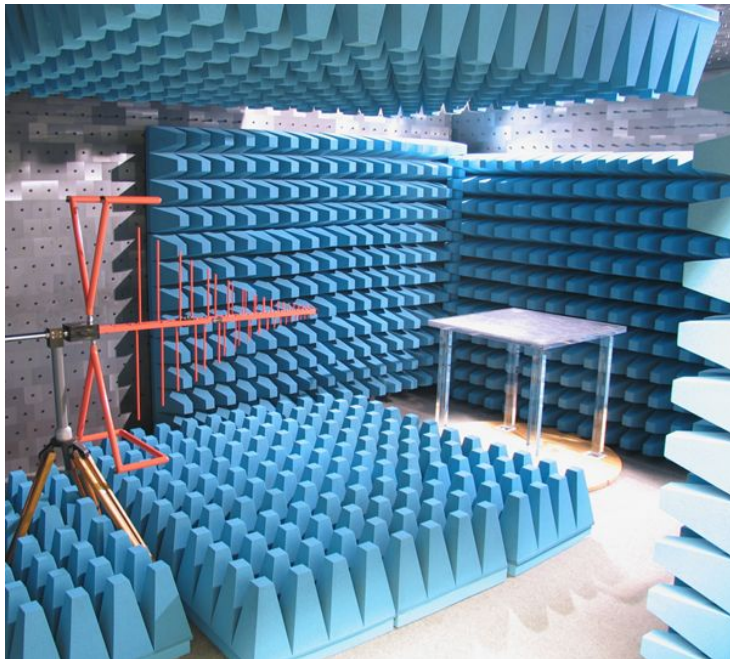
Working on Electromagnetic Compatibility since 1993



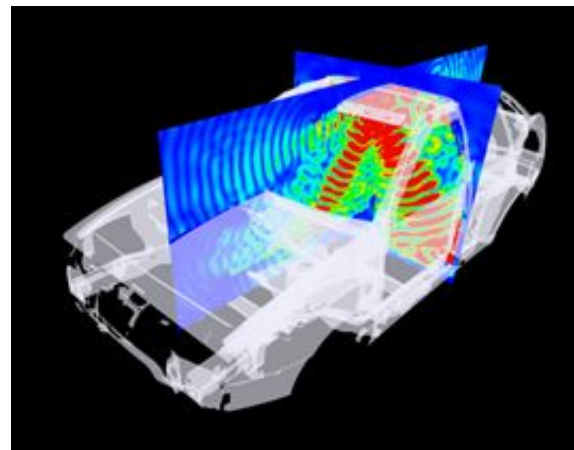


Nowadays, GCEM-UPC is one leading research group in the field of EMC at national and European Level

Lab & Testing Services



Tailor made Developments



Training & Events



On-site EMC assessments





GCEM-UPC is continuously working in several **research projects**:

MAIN RESEARCH AREAS:

- Full Time-domain measurements
- Near field measurements
- Numerical simulation for EMC

MAIN APPLICATION AREAS:

- Automotive
- Aerospace
- Railway
- Electro-medical
- EMC instrumentation and Metrology
- Standards development

- [MeterEMI](#) - Electromagnetic Interference on Static Electricity Meters
- [ADVENT](#) - Metrology for advanced energy-saving technology in next-generation electronics applications
- [IC1407](#) - Advanced characterisation and classification of radiated emissions in densely integrated technologies (ACCREDIT)
- UAVE3 - EVALUACIÓN NUMÉRICA Y EXPERIMENTAL DE EFECTOS ELECTROMAGNÉTICOS AMBIENTALES EN AVIONES NO TRIPULADOS
- [RFMicrowave](#) - Development of RF and microwave metrology capability
- [UAVEMI](#)-Numerical and Experimental EM immunity Assessment of UAVs
- [IND 60](#) Improved EMC Test Methods in Industrial Environments
- [PHitEH](#)-Sondas para la medida simultánea de campos eléctricos y Magnéticos en campo próximo y en el dominio del tiempo
- [VERDE](#)-EMC in Electrical and Hybrid Vehicles
- [HIRF SE](#)-High Intensity Radiated Field Synthetic Environment
- [NET-EMC](#)-NETwork Tool for ElectroMagnetic Compatibility
- [CARDIAN](#) -CÁlculo de Radiación electromagnética en presencia de Dieléctricos mediante Análisis Numérico
- [DPI2007-63878](#) -Electromagnetic Interferences in PLC Communication Systems based on Low Voltage DC supply lines
- [DPI2004-07865-C02-01](#) -Models electromagnetic Immunity in Vehicles.
- [COST 286](#) -EMC in diffused communications systems
- [RED PUCARA](#)-Red de Certificación i calificación de componentes y sistemas microelectrónicos.
- [DPI2001-0897-C02-01](#)-Electromagnetic Interferences in the Power Distribution on automotive vehicles
- [AE98-0065](#)-Electromagnetic emissions measurements in the Oceanographic Ship Hesperides
- [2FD97-0226](#)-Development of instruments and methods to measure electromagnetic fields in the near-field





Faculty Course Development Award



The Faculty Course Development Award gives annual grants of up to \$10,000 (U.S.) each, with \$20,000 (U.S.) maximum available funds. It is to support and encourage faculty members to develop a new course or significantly revise an existing course with specific focus on Instrumentation and/or Measurement, taught in an accredited (in accordance to the accepted rules of the country of applicant) engineering/physics/science curriculum.



Timetable/Selection Process

- The complete electronic application package must be submitted to the I&M Society Course Development Grant Selection Committee chair **no later than midnight (CST) on February 1 (grant year)**. The Selection Committee will meet virtually.
- Grant recipients will be announced at the annual **I2MTC Conference Awards Ceremony**. Formal notification of the grant will be sent to the recipients, department and university administrators by **May 15 (grant year)**.
- The grant check will be sent to the recipient's institution on or about **September 1 (grant year)**, which also serves as the official starting date of the grant.

Conditions of the Grant

- The faculty applicant must be a member of the IEEE and the Instrumentation and Measurement Society.
- Nominees must exhibit actions that reflect positively on and enhance the reputation of the I&M Society
- The recipient must submit a short (no more than 2 single-spaced pages) progress report by February 1 of the following year (following year).





Conditions of the Grant

The faculty recipient must submit a final report (not to exceed **twenty single-spaced pages**, additional documents may be added as Appendices), by no later than **December 1** (following year). The report must at minimum include:

- a. Details of the developed course
- b. The additional I&M body of knowledge gained by the students
- c. A summary of all textbooks, audio-visual materials, etc., used
- d. Any “Lessons Learned” or course modifications that will be implemented the next time the course is offered;
- e. Brief summary of the expenditures from the grant.

The report must be submitted to the I&M Society Course Development Grant Selection Committee chair. The chair may request further information, if necessary, and such information must be provided by the faculty recipient within six weeks of receiving the request. Upon the approval of the report by the selection committee, the recipient will be notified by the committee chair.



Conditions of the Grant

- Within three months of having received the final report approval notice, the faculty recipient must submit an article to the IEEE Instrumentation and Measurement Society describing the course development, success metrics (if any), etc. **The recipient must work closely with the EIC of the I&M Magazine regarding the format of the article. The article should be clearly relevant to the field of I&M.**
- The faculty winner will submit a **video tutorial**, commensurate with the requirements for the I&M Website video tutorials, outlining the course.
- No more than one proposal, per institution, per year may be funded. Previous grantees are not eligible for another grant for a full two years after the completion of the previous course development and the satisfactory submission of its final report.



Selection Procedure

The selection procedure includes the following assessment criteria:

- Relevance of the topics...
- Alignment of learning outcomes to updated I&M body of knowledge (e.g. modern measurement uncertainty approach vs measurement error approach);
- Level of novelty of the course;
- Clarity and overall organization of the proposal;
- Level of disseminated I&M knowledge;
- Budget soundness;
- Level of support by other Organizations, like University or Industries (e.g. suitable equipment, cost-sharing, ...).

Q&A

