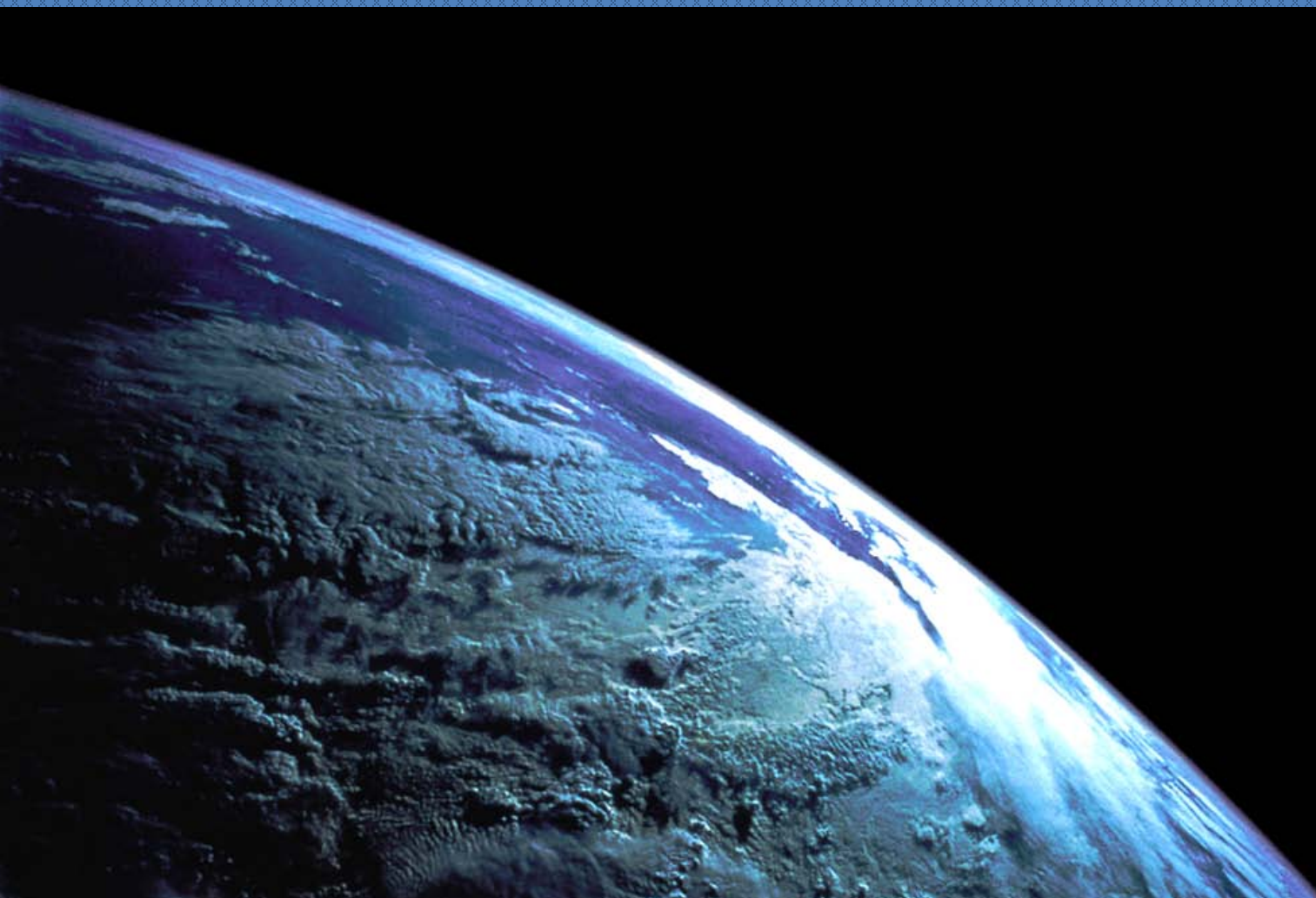


IC2

International Course on management and applied techniques in Geoinformation





The International Course on management and applied techniques in Cartography

IC_Cartotechnology provides a wide range of geoinformation professionals with a capacity-building instrument that covers the basis of advanced and up-to-date techniques, tools and critical thinking in Cartography.

IC_Cartotechnology is built to be a networking platform for attendees, professors, lectures and professionals, a way of exchanging different ideas and experiences.

IC_Cartotechnology integrates all the disciplines, approaches and techniques used to acquire and exploit geospatial data. Such data are a key part of scientific, administrative, legal and technical operations involved in the process of production and management of spatial information. The program is focused on the geo-services project management and applications.

Why another program of cartography?

The common approach to an educative program in Cartography is based on the existent competences at the university or research group: The nature of the programs and professors are, mostly, local (from the same university or region) and normally put the emphasis on theoretical and practical knowledge related to Geomatics and Cartography, excluding the project management issues.

What we propose is:

- A Program based on the identified social needs, with participation of institutes, companies and universities.
- A Program opened to International and European collaborations.
- A Program with emphasis on the geo-services project management and applications.
- A Program certified by the Universitat Politècnica de Catalunya, with international lecturers
- A Program designed as networking platform oriented to professionals.

Objectives

- Educate current Geoinformatics professionals to successfully lead and manage present and future challenges
- Devote ICGC expertise, competences and assets in Cartography issues, to boost and track science, academic and business actors
- Service approach in terms of detecting and transforming country's needs into requirements and solutions to be implemented and managed by a Geo-approach

Program

Methodology

The assistants will participate in an active way in the learning process. They will generate their own knowledge in an increasingly autonomous way. The program includes attended and assisted learning, in order to guarantee the proper knowledge transference between professors and students.

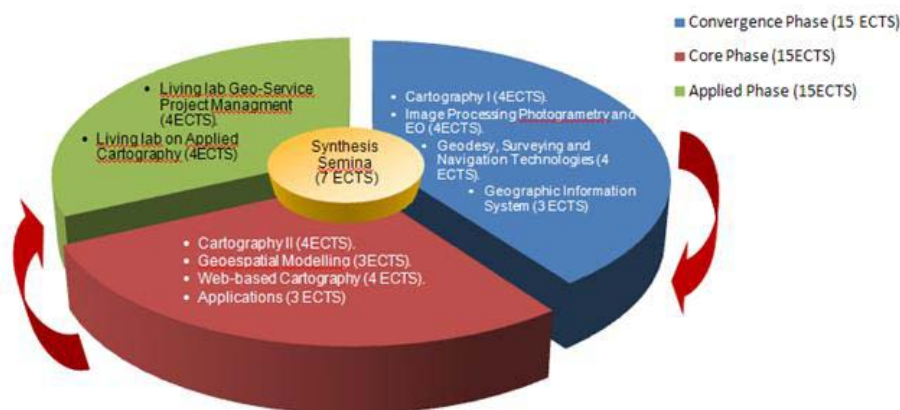
- **Attended learning** corresponds to the lectures and labs, where theoretical and practical concepts are presented, keeping high level of interaction between professors and students. Exercises, real study cases, master classes, key notes and outreach learning activities are the activities included in the attended lessons.
- **Assisted learning** includes the hours the student devotes to study and homework proposed by the professors in the attended sessions. These activities are supervised by the professor in order to solve any doubt arisen during the autonomous homework hours.

The program structure considers and makes the progressive acquirement of autonomy easier to the student, being divided into three phases of 15 ECTS (1 ECTS =25 effort hours) each one: Convergence phase, Core Phase and Applied Phase. The most part of the theory and master classes given are concentrated in the first and second phase, while the last phase is devoted to a much more autonomous work, projects and applications. In this way, the professors will be not only knowledge transmitters but also, and progressively, learning guides. Each phase is divided into modules, which are composed of several subjects.

Duration

From end October 2014 to June 2015, divided in three phases: **Convergence phase** (*attended learning*, October 2014 - December 2014), **Core phase** (*attended learning*, January 2015 - March 2015) and **Applied phase** (*distance learning*, April 2015 - June 2015).

Structure and contents



Program

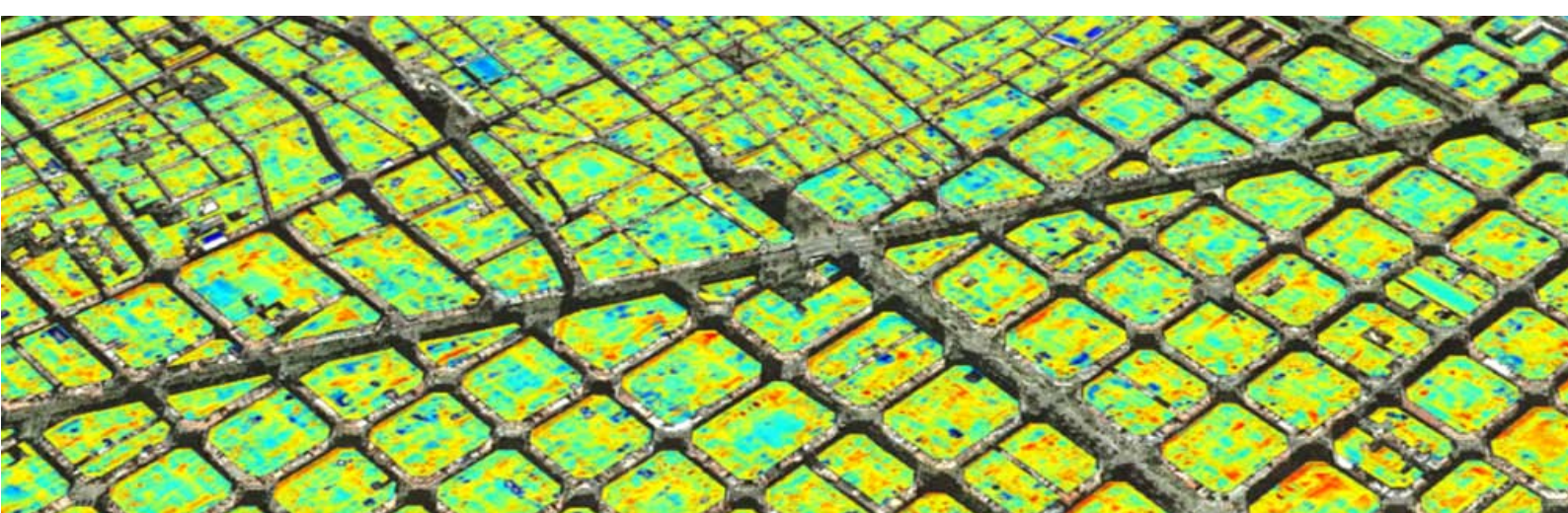
Convergence Phase

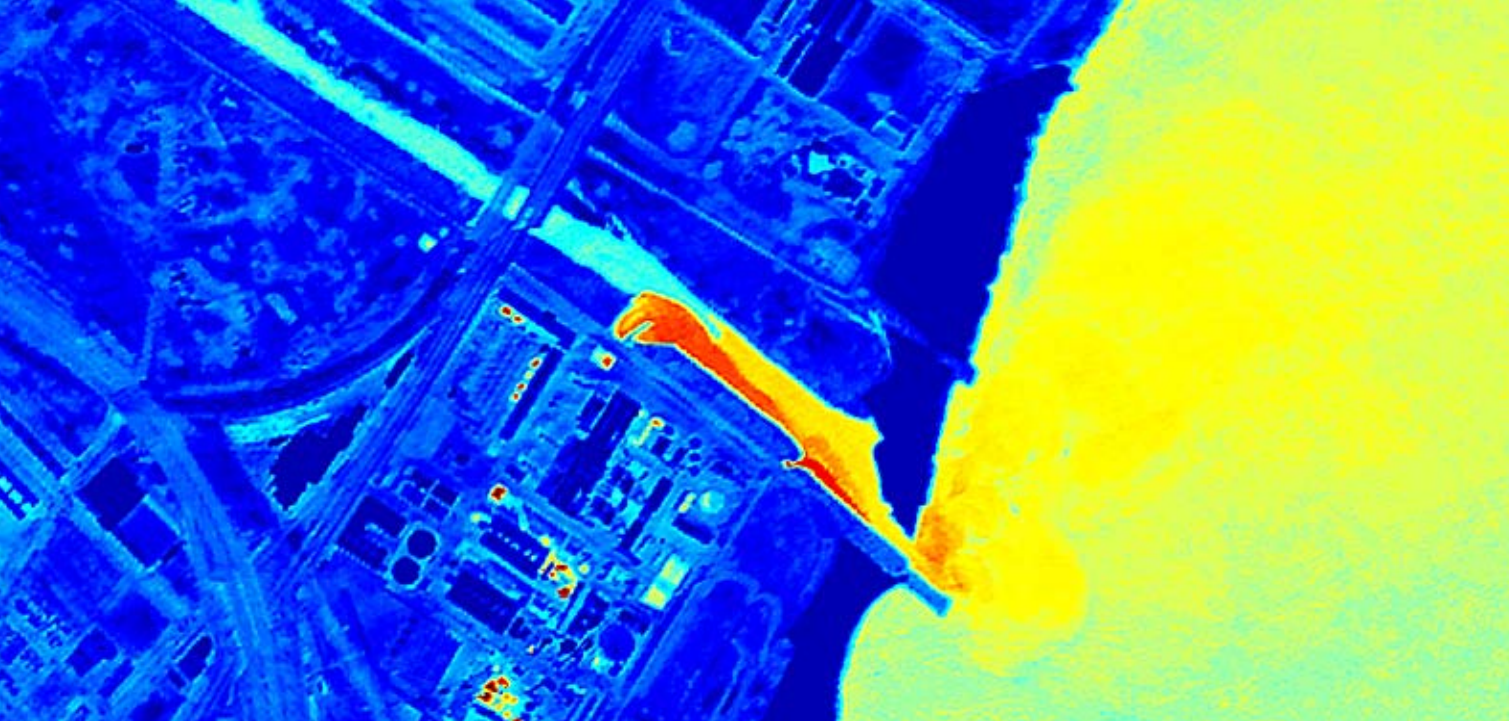
Attended lectures, exercises and outreach activities and assisted learning.

Objective: harmonize and guarantee a common baseline among students.

Module	Subjects
Geoinformation I (Geoinformation foundations) (3 ECTS)	<ul style="list-style-type: none">○ Fundamentals of geoinformation: Principles, developments and governance○ Geoinformation design, conceptualization, semiology, use of color○ Reproduction and visualization systems for Geoinformation○ Formats and standards for digital Geoinformation
Introduction to Image Processing, Photogrammetry and Earth Observation (3ECTS)	<ul style="list-style-type: none">○ Fundamental image processing and computer vision○ Fundamentals of Remote Sensing and Earth Observation○ Sensor modelling geometric aspects and calibration○ Spatial and terrestrial photogrammetric principles
Fundamentals of positioning, surveying and Navigation (3 ECTS)	<ul style="list-style-type: none">○ Positioning technologies○ Coordinate systems, surveying and data integration○ GNSS technologies○ Navigation sensors, systems and architecture integration
Fundamentals of Geographic Information Systems (3 ECTS)	<ul style="list-style-type: none">○ Introduction to Geographic Information Systems and GIS architectures○ Spatial-temporal GIS○ Geospatial technologies and data infrastructures○ Geospatial open source and source integration

Project on Geoinformation and land management feasibility study (3 ECTS)





Core Phase

Attended lectures, exercises and outreach activities and assisted learning.

Objective: analyze in depth the fundamentals of the applied techniques in cartography.

Module	Subjects
Geoinformation II: From data to knowledge (4 ECTS)	<ul style="list-style-type: none"> ○ Topographic and thematic mapping ○ Geology and geoscience added value chain ○ Cartography of risk and rapid mapping ○ National and regional atlases
Geospatial modelling (3ECTS)	<ul style="list-style-type: none"> ○ Geodata modelling, integration and interoperability ○ Geospatial land modelling and network analysis ○ Geospatial ontology and semantic web ○ Geo-sensors networks and scientific models
Web-based geoinformation (4 ECTS)	<ul style="list-style-type: none"> ○ Geovisualization and programming for mobile platforms ○ Encoding languages – GML and geoinformation ○ Principles of web mapping design, implementation and dissemination ○ Neocartography

Project on Design and programming a Geo APP(4 ECTS)

Outreach activities (no mandatory)

- History of Cartography
- Astronomy and navigation
- Supercomputing Centre
- Geocaching
- Energy efficiency
- Art and Geoinformation
- UAV platforms

Applied Phase

Distance learning: online seminars, assisted exercises and projects.

Objectives: promote the needed skills for a competent project management and consolidate the applied cartography concepts learnt focusing them towards smart management.

Module	Subjects
Applications (4 ECTS)	<ul style="list-style-type: none">○ Location based services○ Geoinformation and Smart Cities○ 3-dimensional mapping○ Virtual, Augmented and mixed reality○ Geospatial Business Intelligence, Geospatial data mining
Living lab on Geo-Services Project Management (4 ECTS)	<ul style="list-style-type: none">○ Fundamentals of team and project management Seminar○ Fundamentals of Geo-economics and Geo-social-benefits Seminar○ Introduction to R+D tools, resources and knowledge transfer strategies Seminar○ Living lab on Geo-Services for Smart Cities○ Synthesis Seminar Tutoring

Synthesis Seminar on Smart Cities and social challenges (7 ECTS)



Synthesis seminar- 7 ECTS

The main aim of Synthesis Seminar Project (SSP) is to develop an applied topic, implement it methodically, analyze it critically and evaluate the designed operational plan.

A preliminary SSP proposal, reflecting an applied approach to a problem and spanning 5-8 pages, and accepted by the Course Coordinator and Advisory Board, is required no later than the end of Core Phase. The SSP proposal should include:

1. Description of the problem to be solved
2. Direct and indirect objectives
3. Main risks and contingencies
4. Methodology and procedures
5. Proposed time and content schedule
6. Bibliography and references

A final Oral Examination is scheduled when the SSP is completed. A copy must be submitted to the Course Coordinator and the examining board members at least two weeks before the examination (SSP Defence).



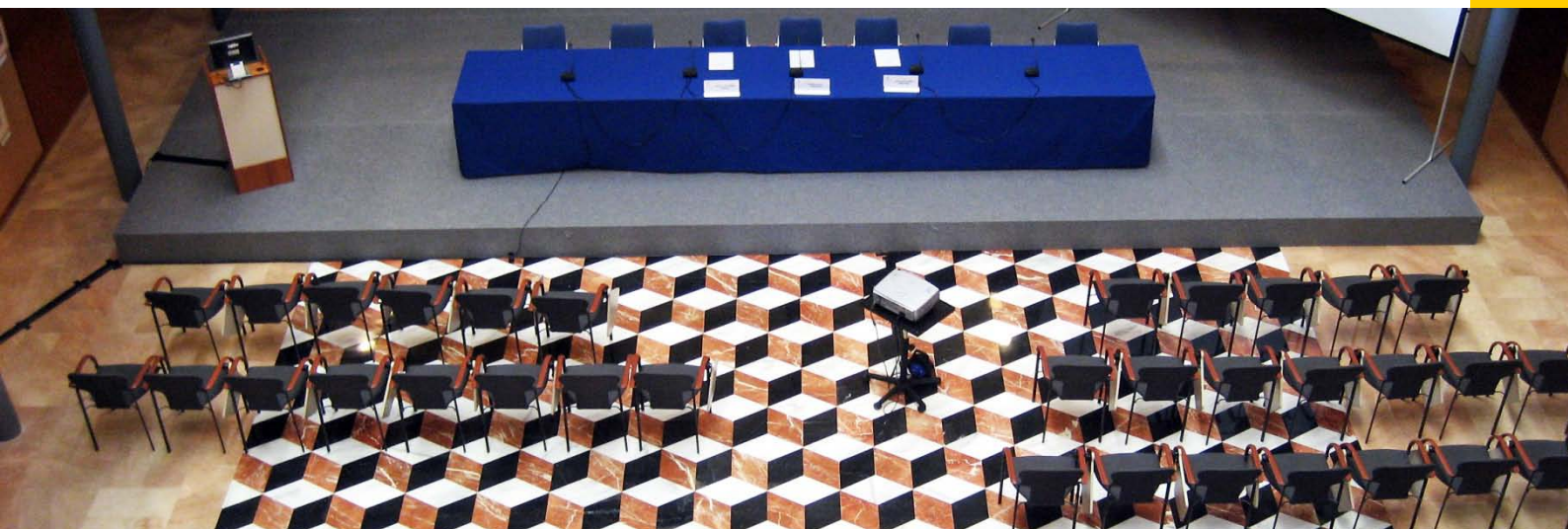
Lecturers

The professors and lecturers of the IC_Cartotechnology are high level well-known professionals and leading researchers coming from University, companies and different institutions.

At the beginning of each phase an opening session will be celebrated: a leading researcher at international level will give an open master key note covering some innovative topics.

Convergence Phase

OPENING MASTER KEY NOTE: George Gartner (ICA)	
Matter	Lecturers 2013-2014 edition
Geoinformation I (Cartographic foundations)	Ms. Carme Montaner (ICGC) Mr. Eng. João Torres (SPUIAGG) Dr. Alexander Kent (Univ. Canterbury)
Introduction to Image Processing , Photogrammetry and Earth Observation	Dr. Petia Ivanova Radeva (UB-CVC) Prof. Dr. Adriano Camps (UPC-RSLAB) Prof. Dr. Antoni Broquetas (UPC-RSLAB) Prof. Dr. Karsten Jacobsen (Leibniz Universität Hannover)
Fundamentals of positioning surveying and Navigation	Dr. Elmar Brockmann (Swisstopo) Dr. Sergio Baselga (UPV) Mr. Joan Carles Olmedillas (INDRA)
Fundamentals of Geographic Information Systems	Dr. Antonio Perez (Universitat Oberta Catalunya) Mr. Javier de la Torre (Vizzuality) Mr. Daniel NUEST (52° North) Mr. Simon Jirka (52° North)





Lecturers

Core Phase

OPENING CORE PHASE KEY NOTE	
Matter	Lecturers 2013-2014 edition
Geoinformation II: From data to knowledge	Dr. Josep M. Rabella (Unibersitat de Barcelona) Prof. Dr. Ferjan Ormeling (Faculty of Geographical Sciences Utrecht University) Mr. Pere Roca (AIRBUS) Mr. Joaquim Calafí (Barcelona Regioanal)
Geospatial modelling	Dr. Bin Jiang (Univ. Gavle -ICA) Dr. Cathérine Roussey (IRSTEA France) Dr. Francesc Campà (UPC-CIMNE)
Web-based Cartography	Dr. Oscar Miralles (SITEM) Prof. Dr. Andreas Koch (Universität Salzburg) Dr. Lassi Lehto (Finnish Geodetic Institute) Dr. Juha Oksanen (Finnish Geodetic Institute) Mr. Sergio Álvarez (Vizzuality)

Applied Phase

OPENING APPLICATION PHASE KEY NOTE	
Matter	Lecturers 2013-2014 edition
Living lab on Geo-Services Project Management	Ms. Pepa Sedo (CTAE) Dr. Marina Martinez (SOS-CDTI) Ms. Agnès Lladós (ICGC) Dr. Jordi Corbera (ICGC)
Applications	Dr. Renato Filjar (University of Rijeka and Technical College, Bjelovar) Mr. Marc Boher (Urbiótica) Dr. Volker Paelke (Univ. Hannover) Dr. Antonio Seoane (Videalab) Dr. Luis Hernández (Viedalab) Mr. Víctor López (IBM)



Admission

Recommended Access Profile

The IC_Cartotechnology Postgraduate is open to attendees with different geo-profiles. IC_Cartotechnology is preferably aimed at students or professionals with certain work experience, competences or charges in the geoinformation and geoservices fields such as Geographic Information Systems, Earth Observation, Environment, LBS among others.

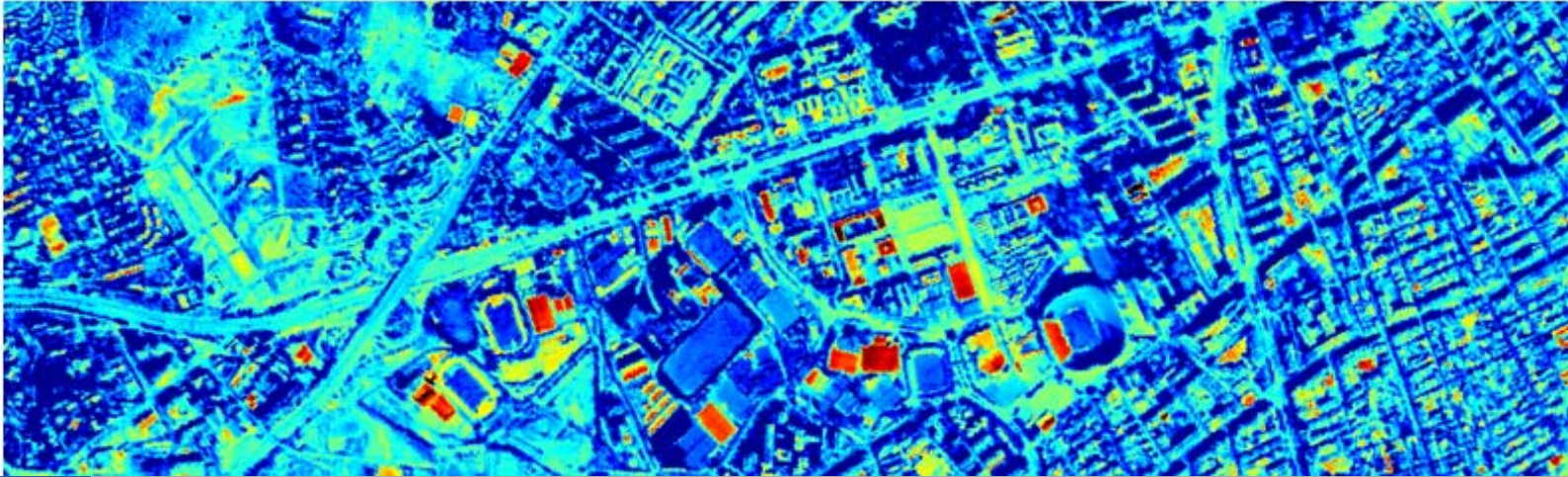
Number of attendees: 15 (max)

Recommended Admission requirements

- Backgrounds in disciplines such as Geoinformation, Geographic Information Systems, Geoservices, Cartography, Geo-informatics or Remote Sensing.
- Undergraduate degree in any area related to Geoinformation and Geoservices: Geography, Physics, Biology, Surveying, Environment, Telecommunications, etc. Other qualifications will be considered in lieu of a relevant undergraduate degree. Officially recognized qualification by Spanish Education Ministry is not required, but the ICC will check if the education level of the qualification degrees is adjusted to the required level for the Postgraduate studies

To apply please email a curriculum vitae (resume) detailing your academic and if applicable your professional experience to ic2_contact@icgc.cat

On receiving the applications, the Admissions Committee will evaluate them according to the admission criteria.



Admission

Registration documents

In case of admission, all documents and diplomas should be in English, Spanish or Catalan. Please attach certified translated copies of all documents written in another language. Your application should consist of the following documentation:

- A completely filled Official Master Application Form.
- A certified copy of your passport or identity card if European Citizenship.
- Three Passport photos of you (format: 3.5 x 4.5 cm colour photo).
- If you want to obtain the UPC Postgraduate Degree, transcript for the degree mentioned in the CV (Bachelor / Graduate / Doctoral Degree) from the university or education institutions you have attended. (See conditions of the degree transcripts in UPC Postgraduate Degree Requirements).

Refund policy

(1) If the Program is cancelled

The Coordination Committee reserves the right to cancel the Program in case if it has not enrolled to an adequate level prior to the beginning of the Program's instruction. In the case of Program cancellation, all enrolled students are notified by email and given a full refund of the Program fee.

(2) If you cancel your enrolment

Students will receive a refund of the whole fee, if fees have already been paid in full. The deadline to cancel registration is the beginning of the Program's instruction.



UPC Postgraduate Degree requirements

Requirements to obtain the Postgraduate Degree issued by the Universitat Politècnica de Catalunya:

- In order to obtain the degree, **class attendance is obligatory in, at least, an 80% of the attending hours** (teaching hours, labs and outreach activities).
- The student **must successfully pass the evaluation tests** (exams, tests, projects, exercises)
- The student must submit to the Coordinator a photocopy of the second-cycle university qualification (degree or similar). The professionals without graduated degrees will get a Course Completion Certificate issued by Fundació UPC if the evaluation and attendance requirements are fulfilled, but they will not get the UPC Postgraduate Degree.

Students of countries of the European Union or signatories of the Agreement on the European Economic Area do not need to authenticate the photocopy of their qualification.

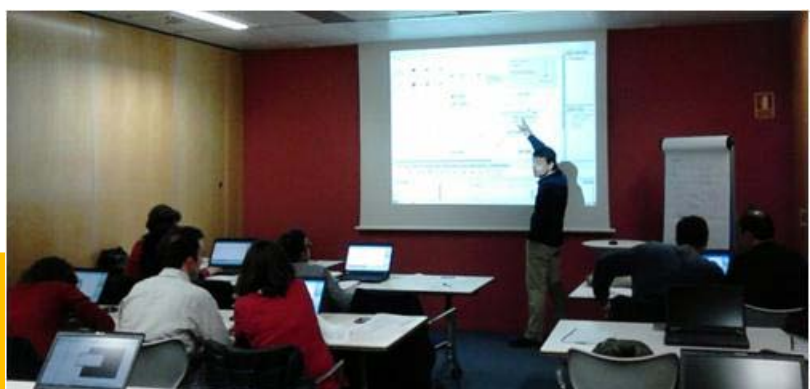
Germany, Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Greece, the Netherlands, Hungary, Ireland, Iceland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Sweden and United Kingdom.

Through a bilateral agreement with the EU, Swiss citizens also do not need to authenticate their qualification. **All other foreign students must obtain the verification of their qualifications, in accordance with the following conditions:**

- Unique verification or "Apostille" issued by the competent authorities of the country if the latter is a **signatory of the Hague Agreement** of 5th October 1961.

Andorra, Antigua and Barbuda, Argentina, Armenia, Australia, Azerbaijan, Bahamas, Barbados, Belize, Belarus, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Colombia*, Croatia, Cyprus, Dominica, El Salvador, Ecuador, United States of America, Russian Federation, Fiji, Grenada, Hong Kong, Honduras, Mauritius, Niue, Marshall Islands, Israel, Japan, Kazakhstan, Lesotho, Liberia, Macao, Former Yugoslav Republic of Macedonia, Malawi, Malta, Mexico, Montenegro, Namibia, New Zealand, Panama*, Puerto Rico, Federal Republic of Yugoslavia, Independent State of Samoa, Saint Kitts and Nevis, San Marino, Saint Lucia, Saint Vincent and the Grenadines, Serbia, Seychelles, South Africa, Surinam, Swaziland, Tonga, Trinidad and Tobago, Turkey and Venezuela*.

Extensions: The Netherlands (the Netherlands Antilles, Aruba); United Kingdom (Anguilla, Bailiwick of Jersey, Bailiwick of Guernsey, Isle of Man, Bermuda, British Antarctic Territory, Cayman Islands, Falkland Islands, Gibraltar, Montserrat, Saint Helena, Turks and Caicos Islands, British Virgin Islands).



Admission

- Verification through diplomatic channels when the qualification has been issued by one of the signatory countries to the Andrés Bello Agreement:

Bolivia, Colombia*, Cuba, Chile, Ecuador*, Panama, Paraguay, Peru, Venezuela*.

(*) When a country is a signatory of the Hague Agreement and the Andrés Bello Agreement, students may follow the process of verification through diplomatic channels, which eliminates the last process of ordinary verification and is simpler.

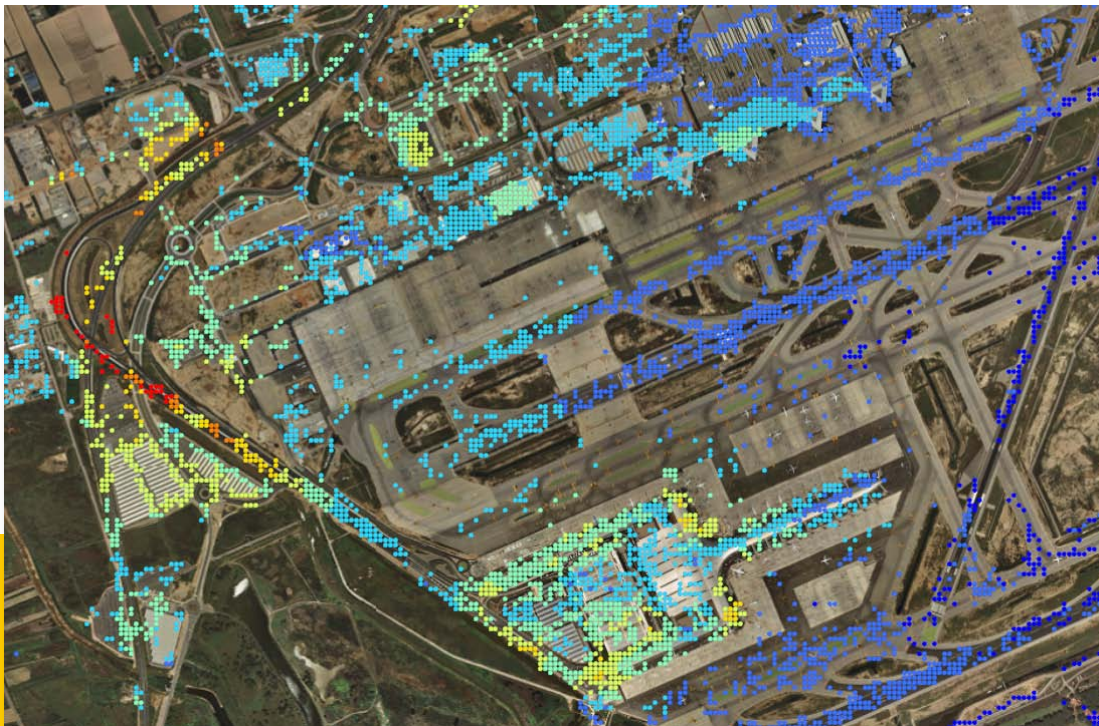
Students must apply for verification to:

The ministry of education of the country of origin; The diplomatic or consular representation of Spain in the country of origin.

- Verification through diplomatic channels, when the qualification has been issued by **any other country**. Students must apply for verification to:

The ministry of education of the country of origin; The foreign ministry of the country in which the qualification was issued; The diplomatic or consular representation of Spain in the country of origin.

- Verification at the foreign ministry when the qualification was **issued in Spain by diplomatic or consular authorities of other countries**.



International Students

Translation of qualification

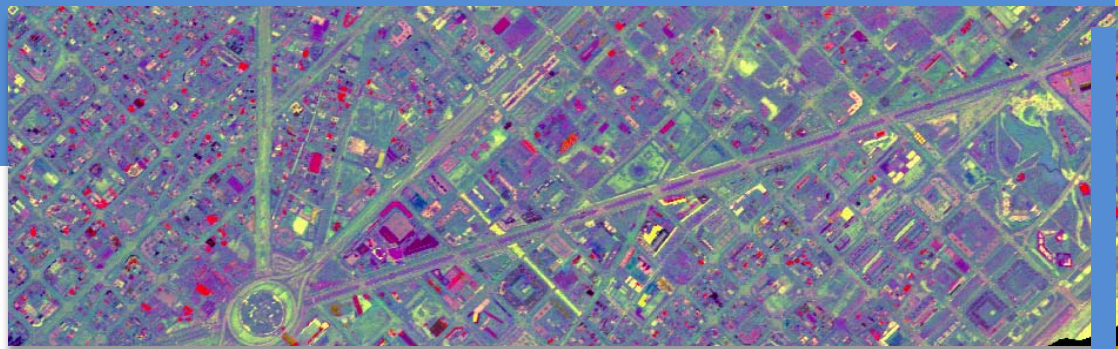
Foreign documents or qualifications in languages other than Spanish must be translated into Spanish according to Article 36.1 of Law 30/1992, of 26 November, regulating public administrations and common administrative procedure.

The following people can perform an official translation:

- a sworn translator, or a translator who is duly authorized or registered in Spain;
- any diplomatic or consular representative of Spain abroad;
- the diplomatic or consular representative of Spain in the applicant's country of origin, or, if necessary, in the country the document comes from.

All the professionals without graduated degrees will get a Course Completion Certificate issued by **Fundació UPC** if the evaluation and attendance requirements are fulfilled, but they will not get the *UPC Postgraduate Degree*.





International Students

International Students Visa

In this section, you will find out whether you need to carry out any formal procedures to legalise your stay in Spain as an international student, and whether you will need to legalise and/or translate your university qualification, which you may need to enrol in a master's degree, postgraduate course or continuing education course in Spain, depending on your country of origin.

If you are a citizen from a **country belonging to the European Union** you will not need to follow any administrative procedure to become a UPC School student.

Students from non-EU countries who wish to study in Spain for a period of more than three months must:

- Apply for a **student visa** at the Spanish embassy or consulate in their home country before coming to Spain. (*)
- Obtain the application forms for the **student card** and the residency number (**NIE**) from the International Relations Service of UPC. The student card will be proof that you are legally residing in Spain.

For further information, contact:

Dolors Barrot
Institut Cartogràfic i Geològic de Catalunya
Parc de Montjuïc
08038 Barcelona
Tel.: (34) 93 567 15 00 ext 3345
dolors.barrot@icgc.cat

- (*) **Each Spanish embassy/consulate in every country has its own procedures and requirements. Please contact the corresponding Spanish embassy or consulate in your home country in order to ask for your student visa.**

Usual documents that are requested are:

- Application form
- Fee
- Admission letter to IC_Cartotechnology
- Criminal records certificate from your home country
- Some certificate or document stating that you have enough economic resources for your stay
- Some certificate or document about your health and/or travel insurance
- Your accommodation in Barcelona

Enrolment

You can enrol in the whole Postgraduate Program, in a single itinerary or in separate modules.

Inscription type	Price	Benefits& Details	Capacity
POSTGRADUATE PROGRAM – 45 ECTS -			
Normal	4500 €	- Full course - All SW licenses - A Laptop including SW programs	12 students
Discount (*)	4000 €	- Virtual campus	
MODULES			
Module of 4 ECTS	500 €	- Enrolment in one module - Module SW license	3 students
Module of 3 ECTS	400 €		

(*) Early bird enrolment: before 30th July 2014

The attended lecturers and labs within the IC_Cartotechnology will be given in the Cartographic and Geological institute of Catalonia.

ICGC: Facilities and Infrastructures

- Classrooms Area
- Laboratory Area
- Lecture and coordinator office
- Networking Area

How to get here

The ICGC is situated in Montjuïc Park, in Barcelona (Spain). See map .

By metro (underground): L3 - Poble Sec, L3 - Espanya, L1 - Espanya

By bus: 55, 121, 193

By train: Barcelona Sants station

Accommodation

The universities of Barcelona have an agreement with Resa Housing, an accommodation service for students, researchers, and university professors that need a place to stay for academic purposes.

Students are advised to contact Resa Housing via Internet, e-mail or fax in order to determine the most suitable type of accommodation available (shared flat, rented apartment or university halls of residence), well in advance of their moving to Barcelona.

The staff at Resa Housing will inform you about the cost of each option. If you decide to use their services, they will ensure that you can go straight to your chosen place of residence when you arrive in Barcelona.

Resa Housing

Website: www.bcn-housing-students.com

E-mail: info@bcn-housing-students.com

Address: C/ Torrent de l'Olla, 219, 08012 Barcelona

ICGC also wants to warn you about an increasing number of alleged housing agencies that require PREVIOUS payment to present you with a list of available apartments

Location: Barcelona

Certification

IC_Cartotechnology is certified by the *Fundació de la Universitat Politècnica de Catalunya* and supported by *Direcció General d'Universitats de la Generalitat de Catalunya*



**UNIVERSITAT POLITÈCNICA
DE CATALUNYA**

School of Professional
& Executive Development



**Generalitat
de Catalunya**
Government
of Catalonia

Assesment

IC_Cartotechnology has been evaluated from Lecturers and Students, under the following criteria and results

From Lecturers

QUESTION	SCORE [1 min – 5 max]
Was IC2 an interesting activity for you?	4,70
Did you receive before your lecture the right information to drive your activity at IC2?	4,40
Were the IC2 assets, rooms etc properly managed to achieve your objectives?	4,80
Was the time allocated for your activity sufficient?	4,40
In your opinion, is IC2 a relevant and well oriented capacity building tool?	4,50
Did you receive enough feedback from students to improve and reinforce your objectives and goals?	4,00

From Students

ISSUE	SCORE [1 min – 5 max]
CONTENTS	4,05
METHODOLOGY AND APPROACH	4,30
TEACHING SKILLS	4,00
GLOBAL APPRAISAL	4,22

July 2014

Version 2.3