The role of international geomatics organisations in the promotion of continuing professional development (CPD)

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Newcastle University, UK

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Chair, ICA Commission on Education & Training
RMIT University, Australia
General background / context in geomatics

- Changing labour markets
  - sub-discipline blurring
  - ‘de-skilling’
  - experts seeking to maintain status
- Technology development and obsolescence
  - pressures from customers, suppliers
  - globalisation, standards
- Developments in geomatics education
  - high school expectations
  - specialist / vocational training
  - role of college and university education

Fairbairn & Fraser,
ISPRS Commission VI, Mid Term Symposium, Enschede, June 2010
CPD background / context in geomatics

• Employer demands
  • role of in-house training
  • nature of employees
• Impact on geomatics profession
  • manpower planning (figures from Molenaar, 2009)
    • 2.5 – 3 million geomaticians worldwide
    • 40 year career
      • 75,000 new recruits needed per annum
      • 10% re-education (professional development) p.a.
    • => 300,000 students consuming CPD p.a.
The nature of CPD

• Purpose and approach
  • maintaining competencies / introducing new ones
  • showing competencies to the outside world
  • appraisal / personal development / self-interest
  • creating good learning / mentoring opportunities
• delivery
  • online, traditional classroom, distance, hybrid, private seminar, public sessions
• Consumers
• Suppliers
  • commercial companies, educational establishments, international learned societies

Fairbairn & Fraser,
ISPRS Commission VI, Mid Term Symposium, Enschede, June 2010
The international role of CPD in geomatics

• Joint Board of Geospatial Information Societies (JBGIS)
  • primary role: ‘capacity building’

• Examples of members’ approaches to CPD
  • usually supporting national initiatives (FIG, ISPRS)

• Links to certification and accreditation

• The International Cartographic Association

Fairbairn & Fraser,
ISPRS Commission VI, Mid Term Symposium, Enschede, June 2010
ICA and Education & Training

• ICA Commission on Education & Training
  • Terms of Reference 2007-2011
    • reach general aims of the ICA Statutes
    • develop modular programme on the web
    • develop associated CPD programmes
    • offer seminars in developing nations
    • link with other commissions in ICA and in sister societies
    • produce publications
    • develop international projects
    • contribute to international education forums
    • promote competitions in mapping awareness
    • investigate use of emerging technologies

Fairbairn & Fraser,
ISPRS Commission VI, Mid Term Symposium, Enschede, June 2010
The Commission on Education and Training wishes to continue or develop the following projects for 2007-2010. If you would like to be the coordinator for any of the projects listed below then please contact the chair of the commission at david.fraser@rmit.edu.au

<table>
<thead>
<tr>
<th>Project</th>
<th>Co-ordinators name</th>
<th>Contact details</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Web-based teaching programme</td>
<td></td>
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<tr>
<td>Develop the existing ICA-sponsored Internet cartography teaching programme (modules).</td>
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<tr>
<td>2. Undergraduate teaching courses</td>
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<tr>
<td>Update and maintain the listing of undergraduate teaching courses available on the CET website.</td>
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<td>3. Regional workshop</td>
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<tr>
<td>Run a regional workshop for training the teachers.</td>
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<tr>
<td>4. Seminar for developing country</td>
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<tr>
<td>Organise a seminar on cartography and cartographic education in a developing nation.</td>
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<tr>
<td>5. Communication with sister organisations</td>
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<tr>
<td>Establish linkages with the education committees for sister surveying and mapping disciplines.</td>
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<tr>
<td>6. Interact with other ICA commissions</td>
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<tr>
<td>Interact with other ICA commissions and working groups to organize joint workshops.</td>
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<tr>
<td>7. Mailing list</td>
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<td></td>
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<tr>
<td>Establish and maintain a mailing list</td>
<td></td>
<td></td>
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<tr>
<td>8. Projects between nations</td>
<td></td>
<td></td>
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<tr>
<td>Develop and promote joint projects between participating nations represented on the commission.</td>
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<tr>
<td>9. Mapping awareness competitions</td>
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<td></td>
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<tr>
<td>Develop mapping awareness competitions for young enthusiasts of cartography.</td>
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<td></td>
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<tr>
<td>10. Emerging technologies</td>
<td></td>
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<tr>
<td>Investigate the role of emerging technologies for use in education and training.</td>
<td></td>
<td></td>
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<tr>
<td>11. Academic papers</td>
<td></td>
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<tr>
<td>Develop and maintain the repository of academic papers on education and training in cartography.</td>
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<td></td>
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<tr>
<td>12. Cartographic Resources</td>
<td></td>
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<tr>
<td>Develop and maintain a webpage dedicated to teaching and learning resources.</td>
<td></td>
<td></td>
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<tr>
<td>13. Occasional Articles</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Undergraduate cartography courses

*partly based on the results of the European Education in Geodetic Engineering, Cartography and Surveying (EEGECs), Socrates Thematic Network*

**ASIA - AFRICA - CENTRALSOUTH AMERICA - NORTH AMERICA - AUSTRALIA**  
Last updated: 2 April 2006  
coordinator: David Fraser, vice-chairman

<table>
<thead>
<tr>
<th>Country</th>
<th>Institution</th>
<th>Faculty (Department)</th>
<th>Programme (curriculum)</th>
<th>Degree</th>
<th>Specializations</th>
<th>Duration (semesters)</th>
<th>Courses on other languages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>Technical University of Graz</td>
<td>Civil Engineering</td>
<td>Geomatics</td>
<td>Bacht.techn., Dipl.-Ing.</td>
<td>No</td>
<td>6 (B.Sc.) + 4 (M.Sc.)</td>
<td>M.Sc. (eventually)</td>
</tr>
<tr>
<td></td>
<td>Vienna University of Technology</td>
<td>Mathematik und Geoinformation</td>
<td>Surveying and Geoinformation</td>
<td>Dipl.-Ing.</td>
<td>No</td>
<td>9</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>University of Vienna</td>
<td>Earth Sciences, Geography and Astronomy</td>
<td>Geography, Cartography</td>
<td>Mag.</td>
<td>Yes (Cartography and Geoinformation)</td>
<td>9</td>
<td>M.Sc. (planned; in English)</td>
</tr>
<tr>
<td>Belgium</td>
<td>University of Liége</td>
<td>Sciences</td>
<td>Geomatics &amp; Surveying</td>
<td>BSc and MSc, Candidat, Licence</td>
<td>Bachelor in geographical sciences, general orientation, Master in geographical sciences, geomatics and georelief orientation, specialist approach, &quot;Candidat&quot; in geographical sciences (geomatics and georelief orientation)</td>
<td>6 (BSc), 4 (MSc), 2 (candidat), 4 (licence)</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>University of Applied Sciences</td>
<td>Industrial Sciences</td>
<td>Industrial Engineering</td>
<td>Master in industrial sciences in Surveying</td>
<td>No</td>
<td>8</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>KU Leuven</td>
<td>Faculty of Sciences</td>
<td>Geography and Geomatics</td>
<td>BSc and MSc</td>
<td>No</td>
<td>0 (BSc) + 2 (MSc)</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>University of Architecture, Civil Engineering and Geodesy</td>
<td>Faculty of Science</td>
<td>Cartography and GIS</td>
<td>BSc:</td>
<td>Yes (Geotecnischchappen, Stadsstudies of Geo-Informatika)</td>
<td>6</td>
<td>no</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>University of Zagreb</td>
<td>Faculty of Geodesy</td>
<td>Institute of Engineering Geodesy and Spatial Information Management</td>
<td>MSc:</td>
<td>Yes (Geodesy, Applied Geodesy, Photogrammetry and Cartography, Land management)</td>
<td>10</td>
<td>no</td>
</tr>
<tr>
<td>Croatia</td>
<td>Brno University of Technology</td>
<td>Civil Engineering</td>
<td>Geodesy and Cartography</td>
<td>Bc and Ing (dipl)</td>
<td>Engineering Surveying, Cadastre of Real Estate</td>
<td>8 (Bc) and 6 (Ing)</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>Charles University in Prague</td>
<td>Faculty of Science</td>
<td>Department of Applied Geoinformatics and Cartography</td>
<td>(BSc and MSc)</td>
<td>Geography and Cartography</td>
<td>6 (Bc) and 4 (MSc)</td>
<td>no</td>
</tr>
</tbody>
</table>
Educational Establishments for Geodesy

Australia
Centre for Spatial Information Science, School of Geography & Environmental Science, University of Tasmania, GPO Box 252-76, Hobart, Tasmania 7001, Australia Phone: (61)-3-6226-2134 Fax: (61)-3-6224-0282 E-mail: CENSIS.Enquiries@utas.edu.au Internet: http://www.utas.edu.au/spatial/

Department of Civil, Surveying and Environmental Engineering, University of Newcastle, Newcastle, New South Wales 2308, Australia Phone: (61) 2 4921 6058 Fax: (61) 2 4921 6991 E-mail: ccjgf@cc.newcastle.edu.au Internet: www.eng.newcastle.edu.au/cc/

Department of Geomatics, University of Melbourne, Parkville, Victoria 3052, Australia Phone: (61)-3-344-6806 Fax: (61)-3-347-2916 E-mail: geomatics@eng.unimelb.edu.au Internet: www.geom.unimelb.edu.au

Austria
Technical University Graz, Geodetic Institutes, Steyrergasse 30, A-8010 Graz, Austria Phone: (33)-316-873-6331 Fax: (33)-316-827685 E-mail: bt@fphotsg01.tu-graz.ac.at

Vienna University of Technology, Geodetic Institutes, Gusshausstrasse 27-29, A-1040 Vienna, Austria Phone: (43) 222 58801 3814 Fax: (43) 222 5056268 E-mail: pwald@fbgeo1.tuwien.ac.at

Belgium
Hoveniersberg 24, B-9000 Ghent, Belgium http://www.geoweb.ugent.be/

Czech Republik
Czech Technical University in Prague Department of Advanced Geodesy Thakurova 7, 166 29 Prague 6, Czech Republic Internet: http://www.cvut.cz

Czech Technical University in Prague Department of Mapping and Cartography Thakurova 7, 166 29 Prague 6, Czech Republic Internet: http://www.cvut.cz

Czech Technical University in Prague Department of Special Geodesy Thakurova 7, 166 29 Prague 6, Czech Republic Internet: http://www.cvut.cz

Czech Technical University in Prague Department of Geodesy and Land Consolidation Thakurova 7, 166 29 Prague 6, Czech Republic Internet: http://www.cvut.cz

University of West Bohemia Faculty of Applied Sciences Department of Mathematics Univerzitni 22, 306 14 Plzen, Czech Republic Internet: http://www.zcu.cz

Brno University of Technology Institute of Geodesy Veveri 331/95, 602 00 Brno, Czech Republic
Internet Cartography Teaching courses

MODULES SORTED BY THEME

- Data Modelling
- Data Capture
- GIS Systems
- Data Analysis
- Presentation
- Special Themes

Modules sourced from:
- S = Swiss Virtual Campus
- M = The University of Melbourne
- I = International Cartographic Association
- E = ESRI
- B = International Cartographic Association - hardcopy books

DATA MODELLING
- S Introduction to database systems
- S Database system concepts and architecture
- S Logical modelling: the relational data model
- S Relational query language
- M Image data input and conversion to a GIS
- I Graphic file formats and conversion (Laszlo Zentai, Hungary)
- I Map projections (Antal Guszlay, Hungary)
- E Introduction to ArcGIS Data Models
- E Working with Geodatabase Topology
- E Geoprocessing CAD Data with ArcGIS
- B D-Maling - Mathematical cartography

DATA CAPTURE
- S Overview of sources and methods
- S Primary sources and methods
- S Derived sources and methods
- S Metadata and quality
- M Maps: scale, resolution, accuracy
- M Data capture methods
- M Direct data entry including global positioning systems (GPS)
CET CPD activities

- CPD driven by:
  - those who have no access to formal education
  - those experts who wish to maintain competence

- Content from accumulated publications and online material
- Activities from outside formal syllabus
- Workshops given by experts
Outputs from CET CPD activities

- Content
  - syllabus development
  - modules
- Activities
  - graded activities*
  - record of achievement
- Workshops
  - information transfer to aspiring cartographers
  - wide range of topics*

<table>
<thead>
<tr>
<th></th>
<th>CREDIT POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>High</td>
</tr>
<tr>
<td>Conference attendance/ organisation</td>
<td>30</td>
</tr>
<tr>
<td>Award</td>
<td>50</td>
</tr>
<tr>
<td>Prize</td>
<td>20</td>
</tr>
<tr>
<td>Formal Qualification</td>
<td>100</td>
</tr>
<tr>
<td>Participation at seminar</td>
<td>20</td>
</tr>
<tr>
<td>Attainment at training programme (Univ/tech. college/in-house)</td>
<td>30</td>
</tr>
<tr>
<td>Publication</td>
<td>60</td>
</tr>
<tr>
<td>Holding of office in the ICA</td>
<td>50</td>
</tr>
<tr>
<td>Research project undertaken</td>
<td>50</td>
</tr>
<tr>
<td>Industry project undertaken</td>
<td>25</td>
</tr>
<tr>
<td>Technical visit</td>
<td>20</td>
</tr>
<tr>
<td>Other contribution to the employer</td>
<td>30</td>
</tr>
</tbody>
</table>

Fairbairn & Fraser, ISPRS Commission VI, Mid Term Symposium, Enschede, June 2010
Outputs from CET CPD activities

- **Content**
  - syllabus development
  - modules

- **Activities**
  - graded activities*
  - record of achievement

- **Workshops**
  - information transfer to aspiring cartographers
  - wide range of topics*

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Week 2</th>
<th>Week 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geography (Physical/Quaternary)</td>
<td>Geographic Information Systems</td>
<td>Digital Generalization</td>
</tr>
<tr>
<td>Environmental sustainability</td>
<td>Remote sensing</td>
<td>3D maps and Geovisualization</td>
</tr>
<tr>
<td>The Earth’s geometry</td>
<td>Internet mapping</td>
<td>Multimedia products</td>
</tr>
<tr>
<td>Projection systems</td>
<td>Atlas production</td>
<td>Location Based Services</td>
</tr>
<tr>
<td>Cartometry</td>
<td>Prepress and digital printing</td>
<td>Cartographic animation and Dynamic maps</td>
</tr>
<tr>
<td>Cartographic theory</td>
<td>Map Types</td>
<td>Navigational maps</td>
</tr>
<tr>
<td>Topographic maps</td>
<td>Map evaluation</td>
<td>Geovisualization techniques</td>
</tr>
<tr>
<td>Map Design (Symbols and layout)</td>
<td>Usability of cartographic products</td>
<td>Toponymy</td>
</tr>
</tbody>
</table>

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Management of CET CPD activities

• Management
  • clear objectives, assessment regime, flexibility to accredit self-managed learning, some ICA-supplied resources, adaptable model
  • need to assess professional level?
  • need for maintenance, upgrade?
  • enhancing existing national schemes
    • points accumulation => certificate?

• NO formal qualification from ICA
• ICA CPD programme is NOT for member nations with formal academic programmes
ICA conference 2011

25th International Cartographic Conference
Paris - Palais des Congrès
3-8 July 2011

ENLIGHTENED VIEW ON CARTOGRAPHY AND GIS

The French Committee of Cartography (CFC) organises the next international Conference on Cartography and GIS in 2011 in Paris, under the umbrella of the International Cartographic Association (ICA)

EVERYTHING ABOUT CARTOGRAPHY AND GIS IN A WEEK