

Geomatics Engineering Education in Kathmandu University: Issues and Challenges

NARAYAN Bhattarai, Nepal

Key words: Geomatics, Teaching, Education, Capacity building

SUMMARY

Kathmandu University (KU) has started Geomatics Engineering Program (GE) from 2007. This program is a 4 year undergraduate engineering program running in the second year with a batch of 23 students from last year and 27 students in this year. The program has been heavily subsidized by the Ministry of Land Reform and Management (MoLRM), Government of Nepal for four batches of students(for 24 students each year)starting from 2007.Course syllabus is in the process of transformation and KU has been planning to run Graduate degree courses in Geomatics Engineering from 2011 onwards.

The Land Management Training Centre (LMTC) of the MoLRM has provided the venue and the instruments for the lecture and practical classes as well as hostel for residence for the students. However, it is a temporary arrangement as long as the collaboration period lasts. In order to seek help to provide for required trained and qualified human resources to run the program and produce quality batches of students, a mutual dialogue of cooperation and understanding has been going on with International Institute for Geo-Information Science and Earth Observation (ITC)of The Netherlands. In this context, one teaching assistant from KU and two survey officers from LMTC have already gone to ITC for Master of Science Degree course in Geomatics. A three day workshop for the re-designing of the existing course syllabus was organized from 19th -21st November,2008 at KU in collaboration with the LMTC and ITC. Two senior staffs of the ITC also gave their valuation contribution in the workshop.

For the running two years the GE course has been the second highly preferred course for the applying students in the whole of KU. Also this course has the honor of being the first undergraduate engineering course in South Asia.

One leading step for sustainability of the course has been to intake students without government subsidy and has resulted in admitting two additional students for the 2008 batch. This intake will increase to 6(six) for the next batch of 2009 starting in August, 2009. To make it a leader course in Nepal and also within the region in the future, KU has to overcome many pertinent issues which present real challenges. Some issues may be addressed within the country but some require attendance and cooperation from the countries abroad.

Geomatics Engineering Education in Nepal: Issues and Challenges

NARAYAN Bhattarai, Nepal

HISTORY

Information on Land in the form of stone inscriptions, manuscripts, records and maps in Nepal can be traced back to the Lichhabi era. This makes the science of surveying and mapping as old as 1500 years in Nepal.

During early sixties a systematic surveying and mapping of cultivated land within the country began for the purpose of land reform in order to

- Limit the individual land holding size
- Collect land revenue in a scientific ways and
- Identify tenants and establish tenancy rights

In the lack of composite recording systems, a person's individual holdings could not be exactly found. In order to overcome it, MoLRM initiated Land Information System (LIS) Project in 1992.

As the tasks of collecting digital data pertaining to maps and records became astronomical the LIS Project was deemed to be upgraded to the status of a department. Department of Land Information and Archive was established in 2000. This, subsequently, necessitated trained and qualified manpower in the field of

- Geomatics
- Land administration / management and
- Computer science

LMTC, on the other hand, also went through restructuring and was upgraded to status of a Department.

Mean while, development and introduction of new Geomatics hardware and software in the national/international environment had an impact on the performance of the public sectors associated directly / indirectly with the Geomatics. Private sectors involved in infrastructure development projects (such as roads, irrigation, hydropower, and housing) had the natural instincts of using new technology for the economy of their projects.

LMTC, as a public sector institution with its own limitations, had not been able to cater for the entire above scenario. On request of LMTC to KU the Geomatics Engineering Program was evolved and a memorandum of understanding was reached.

Ad hoc subject committee was formed which prepared a preliminary draft syllabus for Geomatics Engineering course.

PRIMARY OBJECTIVES OF THE GE COURSE

1. Produce qualified and competent academics
2. Conduct and Promote research and developments
3. Establish collaborative relationships with similar institutions and organizations
4. Share knowledge and technical know-how with similar institutions and organizations.

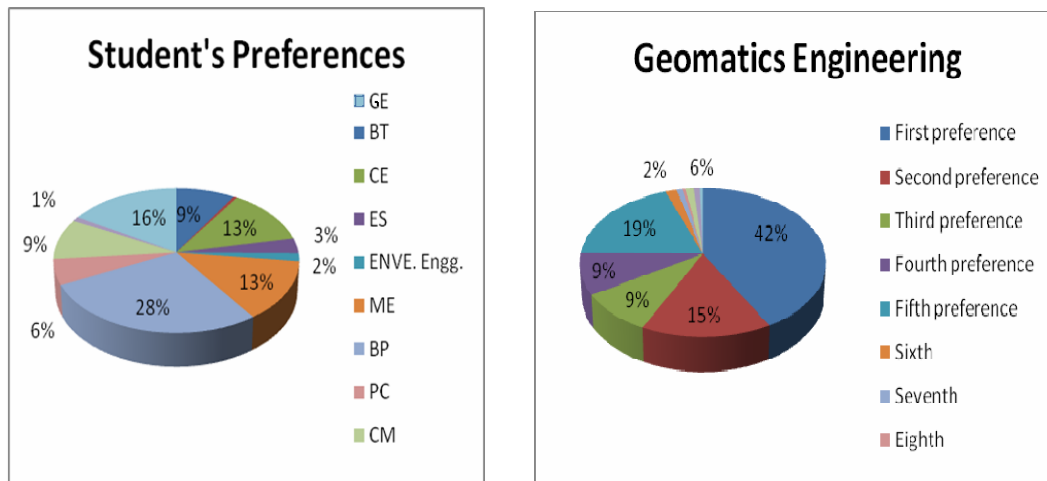
DESIGN PHILOSOPHY AND ENVISAGED OUTPUT OF THE GE COURSE

Geomatics Engineers are trained to manage the global spatial infrastructure. They design, develop and operate systems for collecting, analyzing and utilizing spatial information about land, natural resources and the environment.

Replacement in traditional equipments and methodologies by analytical equipments and digital technology has tremendously demanded increased and enhanced knowledge and skill of GE in the creation of data infrastructure which is very vital for the development and economic stability of geospatial industry and market place. The application areas of GE have also been increasing very fast day by day. Keeping in view of these, GE course has been designed in such a way that after the completion of the course, apart from knowledge and skill for handling new and recent equipments and technology in an optimal way, the students would have acquired skills for

1. Expression of ideas and facts effectively
2. Make efficient use of information resources and technology for personal and professional needs
3. Analyze complex issues and make informed decisions
4. Synthesize information in order to arrive at reasoned conclusions
5. Evaluate the logic validity and relevance of data
6. Solve challenging problems
7. Use knowledge and understanding to generate and explore new questions
8. Meet standards as well as competencies required by the profession
9. Appreciate the “potential” and “limitations” of the current technological practices.
10. Fulfill the vacuum created by the need of qualified GE as required by the ever demanding geospatial industries in Nepal and abroad.

STUDENT PREFERENCE SCENARIO OF THE GE COURSE IN 2008



As it was in 2007, the aspirations of students to join the GE course in 2008 was also very high and encouraging. This trend seems to continue for some more years to come.

ISSUES AND CHALLENGES

As far as the GE course is concerned, it is going to become one of the regular courses of the KU in the near future. Where as, MoLRM may have to be brought into another pact to continue its collaboration after the present Memorandum of Understanding expires. This is largely due to the fact that LMTC has to cater for many more needs of the MoLRM because GE course fulfills only one of them. The present trend of student preference scenario may also be affected due to the stoppage of the subsidy factor. So in order to prevent adverse effects in the GE course it is pertinent to identify issues and challenges that have to be effectively and efficiently tackled. Significantly important and requiring immediate attentions are

CRITICAL ISSUES

1. Government subsidy expires for the students coming after 2010.
 - Continuation of the subsidy
 - Gradual down numbering of numbers of students
 - Scholarship for few more years
2. Kathmandu University is totally dependent on the LMTC infrastructure

3. Kathmandu University is largely depending on the delivery of courses by LMTC and Department of Survey (DoS) staff.

4. There is a lack of human resources in the newer field of Geomatics such as

- Physical Geodesy
- Satellite Geodesy
- Remote Sensing
- Web and multimedia cartography
- Land Administration

5. GE syllabus requires timely updating

MAJOR CHALLENGES

1. Infrastructure use and Development

- Physical facilities
 - Arrangements/ developing another understanding for longer use
 - National/ International assistance for new construction
- Hardware and software
 - Adding new Geo-ICT aids
 - Maintenance and updating
- Logistical supports
 - Teaching support materials
 - Other logistical supports
 - Transportation etc.

2. Delivery of quality education

- Development of compatible Course structure
- Compatible Syllabus contents
- Internet accessibility

3. Delivery of course

- Faculty expansion
 - Full time
 - Part time
 - Visiting experts (Country and abroad)
- Human resource development
 - Specialized trainings
 - Advanced educations such as M.Sc., PhDs.
- Knowledge exchange programs
 - Internship of students
 - Separate Module in different organizations abroad

4. Furthering private-private and private–public understanding and cooperation, both National and International, for running the program
5. Educating stakeholders within and abroad (South Asia region)
6. Expansion of further higher education and job market
 - Opening M.Sc. and PhDs (academic degrees)
 - Opening research and development programs (professional degrees)
 - Introducing appropriate laws, by-laws and rules

DEVELOPMENTS ON THE PIPELINE

1. In collaboration with ITC, M.Sc. Programs in Geomatics to run after 2010 is going to be developed as soon as possible.
2. Academic partnership in Land Administration between KU and UNU-ITC School of Land Administration Studies to start M.Sc. degrees from 2011 is on the move.
3. Continuation of faculty of GE and LMTC to go to ITC for M.Sc. in Geomatics/Land Administration to enhance human resource development.

EXPECTATION FROM THE INTERNATIONAL PLATFORM

KU expects to express its opportunities to gain expert advice and guidelines to prepare strategies in the following areas

- 1) Finding ways to acquire National/International financial support for
 1. Physical infrastructure
 2. Hardware and software
 3. Human resource development for the conduction of undergraduate and graduate courses
 4. Research and development activities
- 2) Suggest ways and means for
 1. Keeping the credibility and timeliness of the GE course
 2. Expansion /continuation of private/public and private/private cooperation (National and International)
 3. Expansion and modernization of job market
 4. Accommodating changes relating to development and needs of its clients
 5. Employer/stakeholder education.

REFERENCES

- 1) A general concept on Human Resource Development for Land Information System in Nepal, a report submitted to the Ministry of Land Reform Management in 2054.
- 2) 2007 International Congress on Geomatics Education in Europe.
- 3) ITC and UNU: Development in Geomatics Education (8)-MundoGEO.
- 4) Kathmandu University Geomatics Engineering brochure.
- 5) Need and relevance of Geomatics education at C-DAC (Ashok Kausal).
- 6) Principles of Undergraduate Learning Objectives, Purdue University, Land surveying and Geomatics Engineering course syllabus, 2006
- 7) Thapa, Dr. Bhola, Dean, School of Engineering, Kathmandu University. Geomatics Engineering Education in Nepal, paper presented in 2007 in KU

BIOGRAPHY

Associate Professor **Narayan Bhattarai**

Kathmandu University

Mobile no- 9741119856

Email - narayanji52@hotmail.com

Address- Dhulikhel, Kavre, Nepal

P.O.Box- 6250

Date of Birth - 3rd January 1950

Sex- Male

Status- Married with two children

Education

- 1991, Master of Science (GIS/Cadastre) International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede, the Netherlands
- 1986, Post Graduate Diploma in Land Information Systems with distinction (cadastre application) International Institute for Aerospace Survey and Earth Sciences (ITC), Enschede, the Netherlands
- 1972, Surveying Engineer (B.E. equivalent): Survey Training Institute, Survey of India, Hyderabad, A.P., India

Other Training

- Modern cartographic techniques and production flow-line and training, Directorate of Overseas Surveys, Tolworth Tower, London, U.K. (Oct. 1975 - Dec. 1976)
- Responsible Management, The Industrial Society, London, U.K. (1976, 2 weeks)
- Strategic Planning and Leadership for Mapping and Land Information Organization, Swede Survey, Gavle, Sweden (1998, 2 weeks)

TS 6C –Capacity Building

NARAYAN Bhattarai, Nepal

Geomatics Engineering Education in Nepal: Issues and Challenges

7th FIG Regional Conference

Spatial Data Serving People: Land Governance and the Environment – Building the Capacity

Hanoi, Vietnam, 19-22 October 2009

- Gender Sensitization in the World of work, Gender Main-streaming Strategy Development, International Labor Organization
- Basic, Fortran, Pascal, C++, Java (jdk 1.3)

Countries Of Work Experience

Nepal and Republic of Liberia

Work Experience

- 1) Present- Associate Professor and Coordinator of Geomatics Engineering Program, **Kathmandu University** (August, 2008 – Till today)
- 2) Past- a) Joint Secretary, **Ministry of Land Reform and Management** (October, 1992 – December, 2007)
 - b) Chief Survey officer, **Department of Surveys** (April 1978–October, 1992)
 - c) Survey officer, **Department of Surveys** (February 1973–October, 1978)

Publication Of Books/Papers

- A) Book: a) Land Information System in Nepal, April 1989 (Coauthored with Mr.R.P.Maratha)
 - b) Cadastre and its Automation, July 1989.
- B) Papers: Published/Presented: Automation of existing LIS in Nepal, Role of DFD in Structured System Analysis, GIS Issues in Nepal, System Development, GIS Structure, Survey Department as a Huge Land Data Bank, Cadastral Survey as the base for LIS, Land Administration and Problems relating to Maps, SIS Issues: An Overview, Digital Mapping, Land Policies as seen from the Nepalese Perspective, etc.

Conferences/ Seminars/ Workshops

Attended various national and international conferences, seminars and workshops.

Travel

- A) National - Traveled extensively throughout Nepal.
- B) International- U.K., The Netherlands, Belgium, Sweden, Finland, Germany, France, Republic of Liberia (West Africa), India, Thailand, Hong Kong, Japan, Singapore and China.

Membership Of Professional Associations

- Life Member, Indian National cartographic Association (LM - 150)
- Life Member, Nepal Engineering Association (LM - 3018)
- Life Member, Netherlands Alumni Association of Nepal (LM - 272)
- Executive Member, Nepal Surveyors Society
- Member, Nepal Engineering Council