
The University Program to foster Surveying & Mapping Professionals with Creativity

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Abstract:

This paper specifically focuses on the fundamental 4-year undergraduate program. It will give you a general introduction to the development of the program. It will also discuss the objective, characteristics, curricula and extracurricular activities of the program.

1.A General Introduction to the Development of the Program.

Since 1956, the undergraduate program in our university for surveying & mapping has been working as 4 different programs with quite different fixed objectives, namely Geodesy□Engineering Surveying, Photogrammetry & Remote Sensing, and Cartography & GIS. This is based on the fine technological divisions of labor in surveying & mapping. It allows cartographers or surveyors not to know photogrammetry very well and vice versa. The program for Geodesy does not have much more courses about cartography. The program of Engineering Surveying mainly concerns topographic analysis, construction of control network and construction layout, deformation monitoring and disaster analysis & prediction within the whole engineering construction process. The program of Geodesy mostly deals with the shape and size of the earth, the gravity field model, geodynamics procedure, land control points and the position information and physical information of moving objects on the land, in the ocean and space. The program of photogrammetry & Remote Sensing is mainly concentrated on acquiring image information by untouching sensor, and doing image processing. And the one of Cartography & GIS lays stress on systematically using all kinds of geoinformation to compile and design various maps and Geography Information System, and their applications.

But with the development of science and technology, especially information technology based on computer technique, science and technology of surveying & mapping are coming to synthesize and integrate at a higher level. They can be briefly described as those of information obtaining, information processing and analyzing, information representing and information application. The courses of these 4 programs are mixed and overlapped. And the graduates are required to be able to deal with all these things throughout the whole process of data obtaining, processing, analyzing, representing and application.

So the undergraduate program is reformed this year based on the reorganization of the courses to cultivate the general professionals of integrated knowledge of surveying & mapping, under the guidance of the newly integrated specialty - surveying & Mapping Engineering as is required by China National Ministry of Education.

2. Objective of the Program

It is more and more clearer to realize that higher education does not only teach students how to do things, do some special work, but also need to teach them how to be a well-qualified professional, i.e, to be easy to get along with and cooperate, with to be good at learning, and to be bold in overcoming difficulties, etc..

So our program objective is to produce more and more well-qualified professionals or flexible professionals with attitude of life long learning and ability to develop according to the need of practical work life required by our society with the development of surveying and mapping and attribute of being good at dealing with human beings, environment and society. In other words, we can describe the well-qualified professionals as having extensive knowledge and solid foundation, strong ability and good quality. With regard to surveying & mapping, it has some special meanings. Extensive knowledge and solid foundation stand for awareness of the basic theories and techniques of engineering surveying, geodesy, photogrammetry & RS, Cartography & GIS and their integration and application. Strong ability is referred to flexible professional ability dealing with data obtaining, analyzing, processing, representing and application, ability of using computer, management ability, self-study ability and social ability. Good quality represents firmness of spirit and optimism, being practical, realistic and careful, and being good at cooperating with others, etc..

We do hope to realize this objective through all kinds of educational processes, mainly curricular activities and extracurricular activities.

3. Characteristics of the Program

Aiming at the objective of producing well-qualified professionals, we are concentrated on bringing every positive factor into the program. The program obviously presents the following characteristics:

- (1) Laying stress on developing knowledge, strengthening foundation, training ability, and improving quality, especially focusing on creative ability of the undergraduates.

Theory courses and practices, curricular activities and extracurricular activities are well designed in the matter of contents and forms. We pay more attention to motivating the thirst for knowledge. More questions, more discussions and learning by doing are very helpful to cultivate the creative ability.

- (2) Paying more attention to developing individuality/ personality, building up features and superiority based on the generality of the qualified professionals. 15%(out of total teaching hours in 4 years - 2500h) selective courses are designed for students to develop their own knowledge and ability. They are all required to take part in extracurricular activities. They can chose some according to their own interests and attributes in order to build up their superiority.

- (3) Putting emphasis on combining theory with practice, especially with some real engineering projects of technique application. It is very important to give some real chances to students for educate their sense of responsibility

and the ability of analyzing and solving problems. Let them experience success by making great efforts.

- (4) Attaching importance to multi-means and multi-processes to educate the undergraduates, particularly with regard to the curricular and extracurricular activities.

The curricular activities are main processes and required to give academic records to students. The contents and the names of courses are very important for students to demonstrate their knowledge and ability. The qualities of the text books and teachers are guaranteed. Extracurricular activities are organized into groups which are directed by some qualified staff.

All students are encouraged to take part in some research work, especially related to their specialty.

- (5) giving prominence to the interaction between teaching staff and students at different levels and in various aspects.

Instructional and supervisory effects of all teaching staff (different position, age, specialty and superiority etc) on educating students in all kinds of activities should be brought into full play.

- (6) taking the advantage of our favorable factors to create a wonderful environment for education.

4. Curricula

In 4 years, we have about 2500 teaching hours for courses and about 32 weeks for practices and graduation paper (design).

For courses, we distinguish them as compulsory courses and selective courses. The structure of courses is as following:

- (1) Common and basic courses, such as Math's, Physics, Philosophy, Basic laws, Computer science and technology, and English etc. (compulsory course, 45% out of total teaching hours).
- (2) Kernel specialty courses, including 12 basic courses covering the whole process of data acquiring, data analyzing, data processing, data representing and data application (compulsory course 22%). They are An Introduction To Surveying & Mapping, Surveying, Geography, Error Theory & Adjustment Calculation, Photogrammetry & Remote Sensing, Geodesy, Cartography, Principle of Globe Positioning System and its Application, Computer Graphs, Cadastral Surveying & Land Management, Geography Information System, and Management of Surveying & Mapping.
- (3) Courses for the specific directions of the original specialty such as Geodesy, Engineering Surveying and Cartography etc. (auxiliary selective or selective courses, 16%). For the Cartography direction, we select several courses such as Art Design of Maps, Thematic Mapping Engineering, Map Projection and Map Analysis etc..
- (4) Courses for widening the application scope of the techniques of surveying

and mapping, and some relevant supporting techniques and methodology (selective course, 10%).

- (5) Courses for improving some quality, such as resources & environment and their sustainable development, social intercourse and literature works appreciation etc.. (auxiliary selective or selective course, 7%).

For practices, we have 24 weeks for common bases, such as Digital Terrestrial Surveying (4W), Computer Operation (1W), Data Processing (1W), Photogrammetry & RS (2W), GPS (2W), Mapping (2W), and 8 weeks for the special directions, such as for Photogrammetry & RS, intending Special Photogrammetry (2 W), 4D Production (4W), Dada Base Design (1W), and Digital image Processing (1W). 10 weeks are specially for the graduation paper (design).

We are encouraged to have some real engineering projects of integrated techniques for practice.

5. Extracurricular Activities

All Kinds of extracurricular activities which are helpful to develop personality, features and superiority of students are encouraged and instructed by staff. According to their achievements in the activities, they can get the corresponding special credits - standing for some personality. All students will be required to get 5 special credits within 4 years from now on.

- (1) Competitions such as English Speech, Mathematic Modeling and Electronic Design are organized by China National Ministry of Education, or Hubei Provincial Commission of Education, or our university.
- (2) Research work is very important, especially combined with their specialty. All staff are encouraged to accept students to take part in their research work. And students can also get their own project supported by students Research Funds of our university. All students are encouraged to publish at least one academic paper, especially for post graduate candidates.
- (3) Composition, oral presentation, editing newspapers, panel discussion, broadcasting programs, social investigation and practice are very useful for students to develop their abilities of organization, management and social intercourse.
- (4) Picture drawing, photo-taking, calligraphy, artistic performance, sports activities, cultural, recreation activities are also useful for enhancing their physical and mental health, and molding their temperament.

In 1999, we have more than 600 new students in Surveying & Mapping. We are sure that they will become qualified professionals in Surveying & mapping Engineering with creativity in the program.