Faculty of Social and Life Sciences

PROGRAMME STUDY PLAN

Surveying and Mapping

Programme Code	TGMKT
Programme Approval	The Programme Study Plan was approved by the Faculty Board of Social and Life Sciences on 22 February 2012 (Dnr FAK3 2012/42), and is valid from the autumn semester of 2012 at Karlstad University.
Programme Title	Study Programme in Surveying and Mapping
Credits	120 ECTS
Language of Instruction	Swedish
Degree Level	Bachelor
Degree Type	University Diploma
Prerequisites	General admission requirements, plus either - field-specific eligibility A8 (Physics 2, Chemistry 1, Mathematics 3c) with the exception of Physics and Chemistry, and with Mathematics 3b instead of 3c, or - field-specific eligibility 8 (Physics B, Chemistry A, Mathematics D) with the exception of Physics and Chemistry, and with Mathematics C instead of D.

General Information
The programme prepares students for engineering jobs in the surveying and cartography field, such as geodetic surveying, land surveying, geographic data collection and cartography.

Trained technicians in the field are employed by consulting firms, municipalities, the county surveyor's office, construction firms, energy companies, and other organisations that rely on geographical information.

A University Diploma is awarded to students who complete the two-year programme of 120 ECTS credits, which, together with some additional qualifications depending on previous studies, gives eligibility for continued studies towards a Bachelor's degree in GIS engineering.

Aims
For a University Diploma, students should demonstrate the knowledge and skills required to work as a surveyor and cartography technician.

In addition to technical skills, students should demonstrate knowledge of measuring technique applications in such areas as building construction, land surveying, and the construction of basic geographic databases.

Students should develop ability to:
- make independent and critical assessments,
- independently define, formulate and solve problems, and
- handle changes in working life.

In the main field of study, students should, in addition to knowledge and skills, develop ability to:
- seek and assess scientific knowledge,
- upgrade knowledge continuously
- exchange information with others including non-experts in the field.

(Higher Education Law: Ch.1 sect. 8, SFS 2006:173,

General requirements: The general requirements for a University Diploma are specified in the Higher Education Ordinance, SFS 2006:1053 as follows:

Knowledge and understanding
For a University Diploma, students must
- demonstrate knowledge and understanding of their main field of study, including an awareness of the scientific basis of the field and knowledge of some applicable methods in the field.

Competence and skills
For a University Diploma, students must
- demonstrate an ability to seek, gather and critically interpret relevant information so as to formulate answers to well-defined questions in their main field of study,
- demonstrate an ability to present their knowledge and discuss it with different groups, and
- demonstrate the skills required to work independently with certain tasks in the field concerned.

Judgement and approach
For a University Diploma, students must
- demonstrate knowledge of and capacity to deal with ethical issues in their main field of study.

Independent project (diploma project)
For a University diploma students must have completed an independent project (diploma project) in their main field of study of at least 7.5 ECTS cr.

Local requirements: In addition to these general requirements, students on the surveying and cartography programme at Karlstad University should demonstrate ability to:

- use societal infrastructures for geographic information,
- apply and choose different methods for geographical data collection to solve surveying tasks in different organisations,
- use modern geodetic instruments and software for geographical data collection,
- work in projects,
- process geodetic measurement data
- present surveying information in an accessible way to different target groups,
- apply the theories of the structure, adaption and use of the reference systems available in Sweden,
- apply the basics of real estate law in a future job,
- demonstrate understanding of the function of community planning in society.

Programme Structure
In the first year the students study courses basic to the training. The second year has a focus on application and specialisation in the areas geodesy, GNSS (Global Navigation Satellite Systems**)** and MBK (measuring, calculating and mapping) in social planning.

The educational progression is achieved through the broadening and successive development of knowledge.

The examination form of the programme courses varies depending on character and aims. There are written and oral exams, as well as hand-in assignments and oral presentations. A degree project, which ideally is carried out in conjunction with a private or public organisation, concludes the study programme.

In the course of study, there are many opportunities to establish professional contact: field trips, conferences and guest lectures. There is also a practical training period in the form of an elective course in the second year.

The form of instruction varies. Theory and practice alternate throughout and reinforce learning. Students develop the ability to take responsibility for their studies, to work in groups and to develop knowledge actively. It is also important that they progressively develop skills in written and oral communication with different target groups.

Programme Curriculum
A course of study leading to a University Diploma must include a main field of study of at least 60 ECTS cr, including a degree project of at least 7.4 ECTS credits (Higher Education Ordinance 1993:100, Karlstad University's System of Qualifications). The main field of study is Surveying and Mapping, a field of study established at Karlstad University.

Surveying and mapping is the science and technique of determining positions, remote analysis, collecting, processing, storing, presenting and using geographic information. The knowledge is normally applied in physical community construction processes, planning and implementing construction and designing infrastructure. The main field of study comprises 82.5 ECTS credits of programme content.

Programme courses are clearly labelled to indicate progression as follows:

- level A = basic courses
- level B = continuation courses
- level C = specialisation courses

The education includes the following courses:

Title of course	***ECTS cr***	***Progression level***
Introductory Mathematics	7.5 ECTS cr.	A
Introduction to Geographic, Information Technology Engineering and Surveying and Mapping	7.5 ECTS cr	A
Cartography	7.5 ECTS cr	A
Introduction to Estate Law	7.5 ECTS cr	A
Database Design	7.5 ECTS cr	A
Basic Geodetic Measuring Techniques	15 ECTS cr	A
Geographic Information Systems I	7.5 ECTS cr	A
Global Navigation Satellite Systems	7.5 ECTS cr	B
Geographic Information Systems II	7.5 ECTS cr	B
Applied geodesy	7.5 ECTS cr	B
Remote sensing and digital photogrammetry	7.5 ECTS cr	B
Geodesy for GIS	7.5 ECTS cr	C
Engineering surveying	7.5 ECTS cr	B
Diploma Project	7.5 ECTS cr	B
Elective courses		
Practical training	7.5 ECTS cr.	B

Degree
University Diploma. Major: Surveying and Mapping

Credit Transfer
According to the *Higher Education Ordinance* (Ch 6, § 12-14), students may transfer credits from previously completed university courses subject to approval. Transfer of credits for a course module, or university studies generally, is subject to the approval of the course examiner. Transfer of credits for a full course is subject to the approval of The Office of Student Services on behalf of the Vice-Chancellor. The purpose and aim of the education as a whole must be considered in the assessment of equivalence.

Additional Information
Scope of the Education
The scope of the education is to be indicated in higher education credits (ECTS credits), with full-time studies for a normal 40-week academic year corresponding to 60 higher education credits (ECTS cr.).

Moving Up
In order to move up to the next level, students on the programme must have completed 75% of the credits in the previous year. Students are not allowed to start working on their Diploma projects until they have completed 75% of the previous programme credits.

Local Regulations
The local regulations for undergraduate studies at Karlstad University stipulate the obligations and rights of students and staff.

SURVEY: Programme in Surveying and Mapping 120 ECTS credits

Term 1 (30 ECTS cr.)	
Introduction to Geographic Information Technology Engineering and Surveying and Mapping 7.5 cr	Basic Geodetic Measuring Techniques 15 cr.
Introductory Mathematics 7.5 cr.	

Term 2 (30 ECTS cr.)		
Database design 7.5 cr.	Geographic Information Systems I, 7.5 cr.	Cartography 7,5 cr.
		Geographic Information Systems II, 7.5 cr.

Term 3 (30 ECTS cr		
Applied Geodesy 7.5 cr	GPS, Global navigation satellite systems 7.5 cr.	Remote sensing and digital Photogrammetry 7,5 cr.
		Introduction to Estate Law 7.5 cr. (including MBK)

Term 4 (30 ECTS cr.)			
Geodesy for GIS 7,5 cr.	Engineering surveying 7.5 cr.	Elective courses, for example: Practical training 7.5 cr.	Diploma project 7.5 cr