Graduate School of Telecommunications – GST
(in collaboration with KTH, MH and HiG)
Swedish degree: Telecommunication

Study Plan

Description of the subjects and goals

The main goal of of the Graduate School of Telecommunications (GST) at Blekinge Institute of Technology (BTH) is to prepare students for future employment in the telecommunications sector and related areas where in-depth knowledge of the subjects studied is required. The scientific focus of GST is on mobile and wireless communications; students are thus given the opportunity to study a wide variety of subjects within the telecommunications sector. As a result, students acquire the relevant expertise within the field at the same time as they are able to choose between different combinations of subjects. All research is carried out within the Department of Telecommunications and Signal Processing at Blekinge Institute of Technology.

Students graduating from GST shall:

- Possess general knowledge of telecommunications and related subjects as well as detailed knowledge within specific areas;
- Demonstrate the ability to carry out independent research, i.e. solve theoretical and practical problems by themselves using scientific methods;
- Possess good communication skills both orally and in writing.
- Establish a national and international network of contacts in the science community.

GST is the result of a collaboration between the Royal Institute of Technology (KTH), Mid Sweden University (MH) and the University of Gävle (HiG).

Entry requirements

To be accepted by GST students must possess a Master of Science degree in one of the following subjects: Telecommunication Systems, Signal Processing, General Electrical or Electronics Engineering, Physics, Computer Science or Industrial Economics. Students must also have a good command of the English language, both spoken and written.

Recommended prerequisites

Applicants should have a good knowledge of Mathematics, Statistics and Probability Theory, Telecommunications, Signal Processing, Computer Programming and other related subjects.

Criteria for acceptance and selection

Applicants who satisfy the above criteria for acceptance will also be assessed on the basis of the following: previous results in the specialised and advanced courses at bachelor and master's level or in an independent academic project; relevant industrial or practical

experience (this is advantageous but not essential); non-academic merits and potential ability to take a leading role in industry, society or the academic community subsequent to completion of a Ph.D degree.
All applicants are interviewed before being accepted.

Plan of the Programme

GST offers two degrees: the Ph.D and Licentiate. Both programmes comprise courses and research assignments leading to the completion of a thesis.

- **Licentiate**: two years' full-time study (80 credits). Minimum course points 30; maximum, 40.
- **Doctoral**: four years full-time study (160 credits). Minimum course points 50; maximum 80.

The Licentiate degree may be integrated into a Ph.D degree; not all students will continue to Ph.D level.
Students are awarded one of two grades: Pass or Fail.

Courses

A minimum of 50 and maximum of 80 course credits are required for the award of a Ph.D degree. A minimum of 30 and maximum of 40 course credits are required for the award of a Licentiate degree.

Courses are offered in the following areas:

- **Information and Telecommunications Theory**
  Information Theory, Advanced Modulation and Coding, Space-Time processing for Wireless Communication, Communications Theory. Mobile Communication Systems.
- **Signal Processing**
  Optimal Filters, Stochastic and Optimal Signal Processing, Matrix Algebra for Wireless Communication, Linear Systems, Adaptive Systems, Signal Processing for Multimedia, Speech Processing.
- **Antenna Systems and Wave Propagation**
  Antenna Array Signal Processing, Antenna Technology, Electronic Communication, Wave Propagation.
- **Internet and Networking**
  Wireless and Mobile Networking Architectures, Wireless Access Protocols, Computer Networks, Wireless Networks, Queuing Theory, Protocol Implementation, Stochastic Traffic Modelling, Multi-user Protocols.
- **Telecommunication Services and Telecommunication Economy**
  Tele-Economy, Human-Machine Interface, Security, Service Platforms, Regulations and Standards.

All basic courses are given on a regular basis. Courses offered in the different subject areas can vary from year to year. GST students may also take advanced courses at any of the universities collaborating with BTH or at another Swedish university.

Summer School

The summer school takes one of three forms:

- One or two weeks' intensive study in an area of general interest.
- Working in a project with participants from different science disciplines.
- Activities aimed at stimulating students to build personal networks.

GST students take courses from several of the above-mentioned subject areas and specialise in the field which forms the subject of their thesis. Students are also required to take part in the summer school.

A minimum of 15 credits in three different subject areas (minimum of four credits from each subject area) is required for the award of a Licentiate degree. An additional 15 credits in three different subject areas (minimum of four credits in each) are required for the award of a Ph.D degree.

Courses not related to the subject of the thesis should be chosen primarily from the above list of subjects and from the summer school courses. Once a student is accepted and his/her graduate preparatory programme is completed he/she is assigned a main supervisor; the latter is responsible for drawing up an individual study plan for each student. The individual plan specifies the courses required to complete the thesis. The individual study plan is revised on an annual basis. In addition to a main supervisor, students may be allocated one or two assistant supervisors.

Seminars and Conferences

The Graduate School of Telecommunications requires active participation in Departmental research seminars. All students are expected to present their research results at a research seminar (at least once a year) and are expected to be present at other students' presentations. Students are also required to participate in and present their research findings at international conferences.

Thesis

Students are required to complete a thesis for a Licentiate and a Ph.D degree. A thesis may take the form of a monograph or a collection of scientific papers. Where the latter form is chosen a special summary must be included. Theses must be written in English. The Licentiate thesis may be integrated into a Ph.D thesis.

A Licentiate thesis should apply existing scientific knowledge to a new area developed by the student by means of theoretical, empirical or experimental research. It should also contain a summary of previous work in the area and relate results to existing knowledge. A Licentiate thesis should be of such quality that its results are publishable in a reputable journal.

A Ph.D thesis should contain new theoretical, empirical or experimental research results in the area of telecommunications; these results should be developed by the student him-/herself. A Ph.D thesis should also contain a summary of previous work in the area and also relate results to existing knowledge. The Ph.D thesis should be of such quality that its results are publishable in a reputable journal.