

## Learning Objectives: Skills and Competencies

Information Technology, Bachelor of Engineering

This document defines the learning objectives in the degree programs of ICT and Information Technology. The objectives describe the skills and competencies that every engineering graduate should have upon completion of their studies. The skills listed under "ICT Application Skills" below describe the level of competence targeted in the advanced professional studies included in the student's major.

### Objectives for Key Skills and Competencies

Upon completion of the bachelor's degree, the engineer:

#### Mathematics and natural sciences skills

- is capable of logical-mathematical thinking
- is able to apply mathematical principles, methods and tools as well as the laws of physics in technical problem solving

#### Hardware skills

- knows the fundamentals of electrical engineering and electronics
- knows the architecture of a computer and the operation principles of its core components
- understands the role of embedded systems as enabler of digitalization

#### Network engineering skills

- understands the operation of IP based data networks and the operation of their connecting devices
- is able to implement and maintain simple networks
- understands the importance of IT security and is able to identify key security threats

#### Software skills

- understands the logic of programming, is able to interpret the source code and exploit programming in problem solving
- knows the basics of object-oriented design and programming
- masters the basics of designing and implementing databases
- understands the principles of usability and can design and implement user interfaces

#### ICT business skills

- is familiar with the preconditions for profitable business and key tools for financial planning and guidance
- understands the value production chain in ICT as well as the important role of personal contribution to the profitability of the company
- has skills to lead people, processes and projects needed in the multidisciplinary and networked workplace
- has the capacity to set up a company and to act as a technology entrepreneur
- is able to document the results of their work

#### ICT application skills

- masters the theoretical basis for their own field
- knows how to search, critically examine as well as combine and apply the latest technical knowledge in their field
- understands the importance of ICT and their own field as enabler of the development of society and organizations
- knows how to exploit new technologies in their field quickly and how to apply them creatively at work
- observes the principles of sustainable development

#### Communication skills

- is able to communicate with professionals both from the ICT field and from other fields using general as well as professional terminology and concepts
- is able to communicate in Finnish and English both orally and in writing
- is able to use modern communication tools efficiently at work