UNIVERSITY OF SKÖVDE

TRANSLATION FROM SWEDISH

COURSE SYLLABUS

Industrial Control Engineering G1F

9 credits

Course code: PR313G
Version number: 14
Valid from: 1 July 2023
Ratified by: Curriculum Committee for Engineering Science
Date of ratification: 8 December 2022

1. General information about the course

The course is provided by the University of Skövde and is named Industrial Control Engineering G1F (Industriell styrteknik G1F). It comprises 9 credits and is a first-cycle course. The level of progression is G1F.

The course is a part of the main field of study in Industrial Engineering. The disciplinary domain of the course is Technology.

2. Entry requirements

The course has the following entry requirements: (passed IT154G Procedural Programming for Engineers G1N or passed IT120G Programming Fundamentals with C++ G1N) and (passed FY301G Electricity and Magnetism G1F or passed PR324G Basic Electricity Theory G1F) (or the equivalent).

3. Course content

The course covers industrial control technology, with an emphasis on programming PLCs and the integration of different production equipment. It provides the student with knowledge of the underlying theoretical foundations and concepts of PLC programming, different programming languages, using and creating basic functions and user interface (HMI). The course includes different types of material handling devices and systems, including different identification technologies, and show how different solutions can be created by integrating them in different ways.

During the course, students should follow and immerse in the various phases involved in the process to complete an industrial automation projects including identification of failure situations using e.g. failure modes and effect analysis. The students will design and model own automated solutions to fulfill given requirements and learn how to create technical documentation including functional descriptions, drawings and different types of charts.

In the implementation phase, the course has great focus on virtual manufacturing and virtual commissioning. The students will work individually and in groups with a virtual development environment to develop, test and validate industrial solutions.

4. Objectives

After completed course the student should be able to:

- demonstrate knowledge about functionality and design of PLC-based control systems and compare different programming languages and human manchine interaction,
- demonstrate knowledge about different solutions for handeling and identification of parts in an integrated manufcturing system,
- implement a PLC program to control basic automation components that fulfils a given functionality,
- develop and verify an industrial automated solution through analys, modeling, implementation and testing based on a given, requirement specification and provide the technical documentation and drawings of the functions and its architecture,
- plan and work as a team.

5. Examination

The course is graded A (Excellent), B (Very good), C (Good), D (Satisfactory), E (Sufficient) or F (Fail).

The examinations of the course consist of the following modes of assessment:

- **Project**
  6 credits, grades: A/B/C/D/E/F (determines the final grade)
- **Labs**
  3 credits, grades: G/U

Students with a permanent disability who have been approved for directed educational support may be offered adapted modes of assessment.

6. Types of instruction and language of instruction

The teaching is comprised of lectures, laboratory sessions, supervision and project work.

Depending on the study period, the language of instruction may be Swedish or English. Even if the teaching is conducted in Swedish, some English may still occur.

7. Course literature and other educational materials

Hanssen, D. H. (2015). *Programmable Logic Controllers* (1st ed). John Wiley & Sons Inc. ISBN 9781118949245.

8. Student influence

Student influence in the course is ensured by means of course evaluation. The students are informed about the results of the evaluation and potential measures that have been taken or are planned, based on the course evaluation.

9. Additional information

Further information about the course, as well as national and local governing documents for higher education, is available on the website of the University of Skövde.