1 Name, Scope and Level of the Course
The course is provided by the University of Skövde and is named Industrial Control Engineering G1F. It comprises 9 credits and is on basic level. The level of progression of the course is G1F.

2 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 machine interaction,
- demonstrate knowledge about different solutions for handling and identification of parts in an integrated manufacturing system,
- implement a PLC program to control basic automation components that fulfils a given functionality,
- develop and verify an industrial automated solution through analysis, 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.

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 Forms of Teaching
The teaching comprises lectures, supervision, laboratory sessions and project work.

The teaching is conducted in English.
5 Examination
The course is graded A (Excellent), B (Very good), C (Good), D (Satisfactory), E (Sufficient) or F (Fail).

Registration of examination results:

<table>
<thead>
<tr>
<th>Name of examination</th>
<th>Credits</th>
<th>Grading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs</td>
<td>3 credits</td>
<td>A/B/C/D/E/F</td>
</tr>
<tr>
<td>Project</td>
<td>6 credits</td>
<td>A/B/C/D/E/F</td>
</tr>
</tbody>
</table>

1 Determines the final grade of the course.

Students with a permanent disability who have been approved for special educational support may be offered adapted or alternative examinations.

6 Admission Requirements
Prerequisite courses for this course are: attended IT136G-Procedural Programming for Engineers G1N and passed FY301G-Electricity and Magnetism G1F (or the equivalent).

7 Subject, Main Field of Study and Disciplinary Domain
The course forms a part of the academic subject area of Industrial Engineering. The course is a part of the main field of study in Industrial Engineering at the University of Skövde. The disciplinary domain of the course is Technology.

Every course at the University of Skövde belongs to a subject. The division of subjects is used for follow-up and quality assurance. A main field of study is an area in which a degree can be awarded. Disciplinary domain is a division which is used by the government for the allocation of resources for studies at basic level and advanced level.

8 Approval of Course and Course Syllabus
The course was approved by the Curriculum Committee for Engineering Science on 4 December 2017. This course syllabus was approved by the Curriculum Committee for Engineering Science on 8 October 2018. It is valid from 1 July 2019 and replaces the course syllabus approved 4 December 2017.

9 Overlapping with Another Course
This course cannot constitute a part of a degree also containing a course the content of which is totally or partly equivalent to the content of this course.

10 Additional Information
Further information will be available on the university’s website before a course is given.

National and local regulations for higher education are available on the university’s website.

Upon completion of the course there will be a follow-up. The main purpose of this follow-up is to contribute to improvements of the course. The students’ experiences and views constitute one of the criteria for the follow-up and are gathered by means of course evaluations. The students will be informed of the results of the follow-up and any decisions regarding actions that are to be taken.

11 Course Literature and Other Educational Materials