1 Name, Scope and Level of the Course
The course is provided by the University of Skövde and is named Alternative Manufacturing Methods A1N. It comprises 6 credits and is on advanced level. The level of progression of the course is A1N.

2 Objectives
After completed course the student should be able to:

- propose various advanced manufacturing methods for various material products based on e.g. a material knowledge,
- argue how different manufacturing methods and automation can minimize costs and environmental impact as well as increase the added value and quality of a product,
- make material selection of a product based on e.g. customer requirements and simulation of the product and the product environment.

3 Course Content
The course includes the following areas:

Basic properties of different material types such as metals, ceramics, plastics and various composite materials, including their overall physical and chemical properties linked to the selection of manufacturing processes. Material selection principles and computerized materials selection of materials linked to, among other things, quality and environmental aspects is also mentioned. Advanced machining processes such as for example, laser technology, electron beam processing, powder technology, chemical and electrical processing, jet processing, hybrid processes, nanotechnology, micro-electronics manufacturing, thermal spraying, polymer composite manufacturing and its equipment forms an important part in the course. Automation of manufacturing processes as well as computer aided production (CAM) and computer aided manufacturing systems (CIM) are also important parts of the course. Furthermore, cost aspects and the environmental impact of certain processes will be presented.

4 Forms of Teaching
The teaching comprises lectures, study visits and individual presentation (oral and written).

The teaching is conducted in Swedish. Some teaching in English may occur.

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>Supervised examination</td>
<td>written</td>
<td>A/B/C/D/E/F</td>
</tr>
<tr>
<td>Individual oral and written presentation</td>
<td>2 credits</td>
<td>G/U</td>
</tr>
</tbody>
</table>

3 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
The prerequisites for this course are a Bachelor degree of at least 180 higher education credits (equivalent to 180 ECTS) within the fields of integrated product development or production engineering or automation engineering or mechanical engineering or information technology or similar.

A further requirement is proof of skills in English equivalent of studies at upper secondary level in Sweden, known as English course 6 / English course B. This is normally demonstrated by means of an internationally recognized test, e.g., IELTS or TOEFL or the equivalent.

7 Subject, Main Field of Study and Disciplinary Domain
The course forms a part of the academic subject area of Virtual Product Realization. The course is a part of the main field of study in Virtual Product Realization 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 5 March 2018. This course syllabus was approved by the Curriculum Committee for Engineering Science on 4 February 2019. It is valid from 1 July 2019.

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
Manufacturing Engineering and Technology