### Course Syllabus

Möjligheter och fördelar med simulering som beslutsstöd A1N  
Possibilities and Benefits of Simulation for Decision Support A1N  
4 credits

<table>
<thead>
<tr>
<th>Course Code:</th>
<th>VP734A</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Course Syllabus is valid from:</td>
<td>1 January 2020</td>
</tr>
<tr>
<td>Date of Approval:</td>
<td>7 October 2019</td>
</tr>
<tr>
<td>Version Number:</td>
<td>1</td>
</tr>
<tr>
<td>Subject:</td>
<td>Virtual Product Realization</td>
</tr>
<tr>
<td>Main Field of Study:</td>
<td>Virtual Product Realization</td>
</tr>
<tr>
<td>Disciplinary Domain:</td>
<td>Technology</td>
</tr>
<tr>
<td>Academic Level:</td>
<td>Advanced level</td>
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</tbody>
</table>

#### 1 Name, Scope and Level of the Course

The course is provided by the University of Skövde and is named Possibilities and Benefits of Simulation for Decision Support A1N. It comprises 4 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:

- explain and discuss the benefits and possibilities of using simulation and its different paradigms to support decision-making in system design and improvement at strategic and operational levels,
- demonstrate an understanding of the different steps needed to conduct a simulation study,
- analyze and evaluate simulation and optimization results as an input to evidence-based decision support,
- identify and justify suitable projects in a specific organization where simulation can be applied, as well as when it is not appropriate to use, and
- identify and critically discuss how simulation can be introduced as a tool in the existing standards of the organization and support sustainable development.

#### 3 Course Content

The focus of the course is on how to support operational and strategic decision-making in complex systems using simulation with two popular modelling techniques, namely discrete-event simulation and system dynamics. The course will even introduce the additional benefits of using simulation-based optimization.

Rapidly changing markets, mass customization, demographic pressures, globalization and technological advances that Industry 4.0 is bringing, all require the need to effectively manage change. Simulation is a powerful tool to predict changes, allowing virtual testing of potential improvement scenarios, and therefore, supporting their effective implementation. Optimization techniques coupled to simulation, further enhance the knowledge of the model behavior and provide nearly optimal system configurations and policies to support decision-making.

The course targets managers and professionals from SMEs or big organizations interested on understanding how simulation can support their decision-making processes, as well as its limitations and drawbacks, including aspects of how simulation can be integrated in the working standards of the organization (e.g. Lean) and support sustainable development.

Lectures are based on recent advances on operational research and operations management, guest lectures from industry and healthcare, laboratory exercises in which the students will experience how simulation and optimization can inform decision-making in complex systems, as well as peer-discussions among attendees. During the course, the students will work on their own real-world projects/problems/opportunities identifying...
in which cases simulation is an appropriate technique to support them in their organizations.

4 Forms of Teaching
The teaching comprises lectures, seminars, discussions, and laboratory sessions. Laboratory assignments are mandatory. The individual project work consists of a presentation which will be presented at the end of the course.

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

5 Examination
The course is graded G (Pass) or U (Fail).

RegISTRATION OF EXAMINATION RESULTS:

<table>
<thead>
<tr>
<th>Name of examination</th>
<th>Credits</th>
<th>Grading</th>
</tr>
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<tbody>
<tr>
<td>Project presentation¹</td>
<td>2.5</td>
<td>G/U</td>
</tr>
<tr>
<td>Laboratory assignment</td>
<td>1.5</td>
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</tr>
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¹ Determines the final grade of the course.

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Registration of examination results:

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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, and a minimum of 12 months of documented work experience in relevant domain.

A further requirement is proof of skills in Swedish, equivalent of studies at upper secondary level in Sweden known as Swedish course 3/ Swedish course B and English, known as English course 6 / English course B (or equivalent). Skills in English language are normally demonstrated by means of an internationally recognized test, e.g. IELTS or TOEFL or the equivalent.

If you do not fulfill the academic prerequisites, you can apply to be assessed based on work experience.

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 7 October 2019. This course syllabus was approved by the Curriculum Committee for Engineering Science on 7 October 2019. It is valid from 1 January 2020.

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
The material needed in the course will be provided by the teacher. Relevant articles published in renowned journal and conferences will also be employed during the course.

Reference

Brailsford, S., Churilov, L., Dangerfield, B. eds. 2014.
