

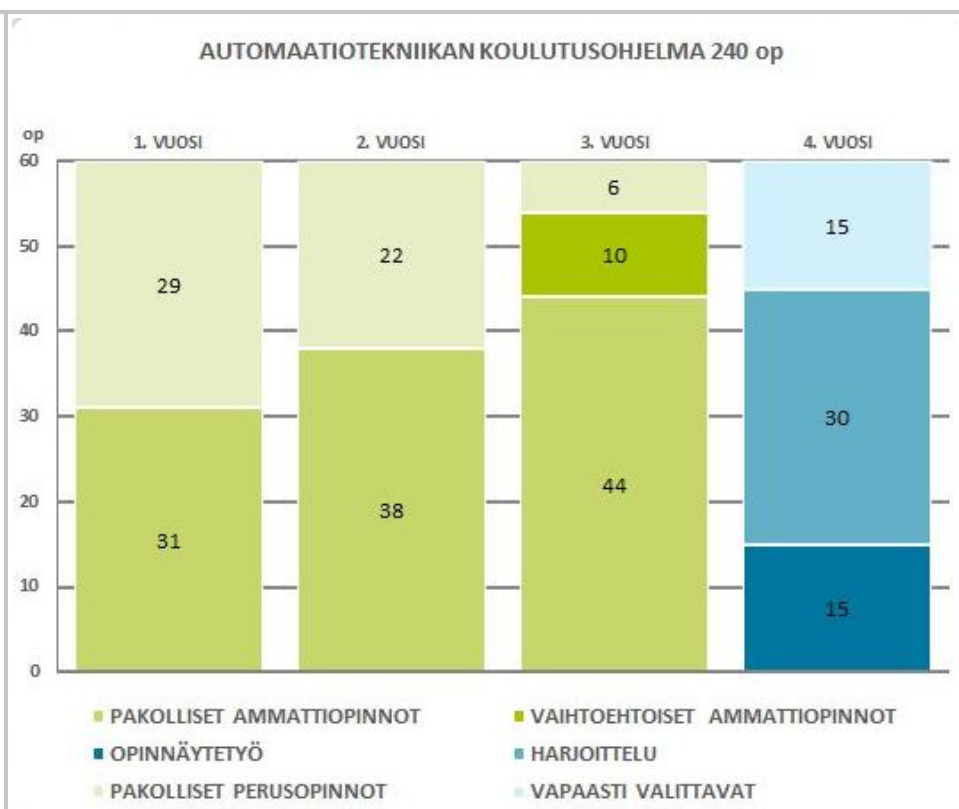


GENERAL INFORMATION	
DEGREE PROGRAMME	Degree Programme in Automation Engineering
PERIOD OF EXECUTION	2013-2017
SCOPE	240 ECTS credits
DESCRIPTION	In the Degree Programme in Automation Engineering, students may focus either on automation engineering (process automation, cargo automation, automation design) or electrical power engineering (electrical design) and develop into an expert in their selected field.
LANGUAGE OF STUDY	Finnish
CODE	IIA13S1
DEGREE	Bachelor of Engineering
DEGREE LEVEL	National Qualifications Framework level 6.
TARGET GROUP AND ADMISSION CRITERIA	See: http://www.jamk.fi/koulutus/hakijanoppaat
STUDIES	
KEY LEARNING OUTCOMES	<p>Upon completion of the Degree Programme in Automation Engineering:</p> <ul style="list-style-type: none">- students are capable of continuous self-development, a wide range of communication and information retrieval in various work and cultural environments, as well as a strong ethical foundation in their own field.- students are capable of technical computing and understand technical documentation, as well as being able to take advantage of both domestic and foreign publications in the acquisition of knowledge and applying it to their own work.- students understand the importance of automation in the industry and know different levels of automation implementation in an industrial plant and are able to design and implement a simple control system with electrical safety requirements in mind.- students are able to take into account the aspects of overall economic efficiency where they act within a company, either from the perspective of an employee or as someone who is self-employed.- students understand the theoretical basis of electrical engineering, as well as the importance of electrical safety. Students are familiar with basic electrical components, basic quantities and basic applications. They are able to solve a variety of direct and alternating current circuits. They master electrical machines and drives, so that they are able to apply them on industrial processes and machines. The students also master electrical drawing symbols and know how to set up the necessary planning documents.- students are familiar with the key sub-processes of the process industry and are able to evaluate different options for command and control solutions in typical process industry applications.- students have basic knowledge of equipment, control systems and application programming tools used in the automation of piece goods production. They know how to make techno-economically feasible sensor and actuator choices and to design controls for piece goods production.- students are familiar with the various automation system entities, consisting of programmable logic controllers, field buses, factory networks, distributed digital automation systems, and user interfaces. They master the key automation design tools by which they are able to design applications for conventional industrial control applications.



	<ul style="list-style-type: none">- students master the basic skills necessary for automation design. They know the principles and practices in accordance with the field of equipment design, automation design, and instrument electrical design standards. Using them, students will also be able to carry out the tasks of industrial design in regard to conventional control points in accordance with the requirements of international customers.- students master the power transmission and distribution infrastructure, operating principles, functions of the network components, and power generation technologies. They will know the different phases of the design process and master the use of design methods and tools. Students are able to design and select devices from a technical and economical point of view, taking into account the standards used in the field of electric design and implement the documentation according to them. The students have also developed an understanding of the practical implementation of the installation.- students are able to acquire, apply and evaluate their own field data from domestic and international sources. Students are familiar with the research and development techniques and know how to apply them in accordance with ethical principles. They are able, in a responsible manner, to work in multi-sectoral work groups, communities and networks that are related to research and development. The students are able to communicate on an expert level.
PROFILE	<p>In the Degree Programme in Automation Engineering, students may focus either in automation engineering (process automation, piece goods automation, and automation design) or electrical power engineering (electrical design) and develop into an expert in their field. Students have the opportunity to develop international skills by performing part of their studies (for example, one semester of similar studies) in the English language in their own educational institution or at an institution abroad. They can obtain entrepreneurial skills by performing the enterprise-orientated joint module to the desired extent. Guest lecturers invited from companies bring to students a practical knowledge of entrepreneurship. A significant proportion of vocational studies are carried out in more practical laboratory work and projects which develop student group work and communication skills. Diverse laboratory and learning environments offer the opportunity to develop into a high-tech professional.</p>

COURSE STRUCTURE



(the figure is explained for students in English)

COURSE CONTENT AND PERFORMANCE

The course includes basic and vocational studies, elective studies, specialization training, and a graduation thesis.

The basic studies include eg. the studies of mathematics and physics, languages and communication, core subjects in electrical and automation engineering such as electronics, electrical engineering, digital technology, information technology, and automation engineering. In addition, the basic studies include study areas which preparing students for entrepreneurship and innovation activities.

According to one's specialisation, vocational studies focus either on automation systems and automation design or electrical drives, power distribution and electrical design.

The course shall be completed within two semesters from its beginning. The exception is the graduation thesis, practical training, special working life oriented project studies, as well as extensive courses implemented in a number of semesters. In cases where a course remains incomplete, the student shall re-start it.

In the first contact lesson of a course, a review is carried out of the course's learning objectives and content, along with the different procedures and evaluation criteria; additionally, the possible examination date is agreed upon (the immediate time at which this will be carried out) and the course completion date is announced, after which no further attempts are accepted. Students have the opportunity to try to complete a course a total of three times: during the immediate performance of the course or in two specially determined resit exam times.



LEARNING ASSESSMENT	<p>Learning outcomes are assessed in relation to the course's learning objectives. Assessment decisions are based on the evaluation criteria provided in the course descriptions. Courses are assessed on the assessment scale that is specified in the course description. According to its purpose, the scale may be one of five steps: 5 (excellent), 4 (very good), 3 (good), 2 (satisfactory) and 1 (adequate) or a pass (P) or fail (0). The course has been failed (with a fail (0)) if the student does not achieve the minimum outcomes that are set for the completion of the course.</p> <p>Students have the right to know how the evaluation criteria are applied to their skills. Course performance is recorded in the transcript of records no later than one month after the declared point of completion for the course and always before the end of the academic year.</p>
ACCREDITATION AND RECOGNITION OF PRIOR LEARNING (RPL)	<p>The procedures for accreditation are described in the Degree Regulations and in the Study Guide.</p>
MODE OF STUDY	<p>A significant part of the studies are carried out as laboratory work and exercises, and as business-orientated project work. Part of the studies may also be carried out abroad.</p>
PROFESSIONAL GROWTH AND KNOW-HOW	<p>The degree programme curriculum is built on competence areas as well as on common and degree programme specific competencies. The learning process is performed by competence areas which consist of courses. General and degree programme specific competencies are attached to competence areas and courses in which the development of competence throughout the student's education takes place. Competencies are described as process charts on three development levels: the basic level of competence, the developing level of competency, and the advanced level of competency. On the basis of those development levels, the learning objectives and contents of the competence areas and courses are formed. Competency develops in the competence areas from the student at the basic level to the student at the advanced level, which provides the skills for the expertise of a developing engineer in working life.</p> <p>The competence areas for the degree programme are: learning skills and transferable skills, the basics of engineering, automation engineering, electrical engineering, process automation, piece goods automation, automation systems, automation design, electrical design, and research and development activities.</p> <p>The studies also include 15 ECTS credits of elective studies supporting the development of expertise which the students include in their competence areas according to their own personal learning objectives. The competence areas include specialization training at 30 ECTS credits, as well as the graduation thesis at 15 ECTS credits.</p>
QUALIFICATION REQUIREMENTS AND REGULATIONS	<p>The profession does not have specific eligibility requirements based on legislation.</p>
ADDITIONAL INFORMATION	<p>Students may be charged separately for the cost of materials where such costs correspond to real life acquisitions or production costs in terms of teaching materials, tools, equipment, or supplies that remain in the student's possession after their education has been completed. If a student obtains similar materials from other sources, he or she is not charged for the cost of materials (Government Decree 1230/2009 2 §).</p> <p>Bachelor's degree programme is free for students.</p>



GRADUATION	<p>The requirement for the receipt of the certificate of Bachelor degree is that students complete the studies for their degree programme during the study period in accordance with the personal learning plan (PLP).</p> <p>JAMK University of Applied Sciences provides students with a certificate of completion of the Bachelor's degree (210, 240 or 270 ECTS credits). A transcript is attached to the certificate.</p>
EMPLOYMENT AND FURTHER STUDIES	
EMPLOYMENT OPPORTUNITIES	<p>The degree programme prepares students for industrial automation or electrical design, as well as management and specialist positions.</p> <p>Automation engineers are working more and more in international automation projects from their start, as project team members and after having acquired sufficient experience, as project team leaders. Some of the graduates have included entrepreneurship studies in their degree programme with the aim of establishing their own business, either immediately after receiving the degree or having first worked for a company in their field.</p>
OPPORTUNITIES FOR POST-GRADUATE STUDIES	<p>After graduation and after about three years of a working life phase, the students of a Bachelor's degree programme can continue their studies in a Master's degree programme. The Master's degree at the University of Applied Sciences is a university level Master's degree. Students can also continue their studies by applying for courses such as, for example, the Master's degree programmes at universities or for an equivalent training course. After the completion of Bachelor's studies it is, of course, also possible to continue in foreign institutions of higher education on the Master's level degree programmes.</p> <p>The University of Applied Sciences also offers continuing education opportunities for specialisation studies, learning agreement type in-service training, as well as in working life based continuing education. If a student graduates from the Master's degree programme, he or she can get the opportunity to continue their studies in the scientific or artistic studies at universities (37 §/558/2009). All further studies must be applied for separately.</p> <p>An engineer graduating from the Degree Programme in Automation Engineering may choose to apply for a Master's-level degree programme in Automation Engineering after acquiring three years of relevant work experience subsequent to graduation.</p>
OTHER INFORMATION	
HEAD OF THE DEGREE PROGRAMME	Seppo Selosmaa, programme coordinator, seppo.selosmaa@jamk.fi, 040 5581755
PROGRAMME PLANNING PROCESS	<p>The aim of the Degree Programme in Automation Engineering is to produce engineers who meet the needs of business life. Based on this, the learning objectives in the degree programme have been defined on the basis of the current and future needs of business life, benefiting from the staff of companies, experts in the field, and public and prospective studies. Head of Department together with the programme coordinator is responsible for monitoring progress in terms of planning the learning objectives for the Degree Programme in Automation Engineering and for the management of resources.</p> <p>The preparation of learning objectives is performed by the working group, which consists of the teachers of the degree programmes. Members of the working group will negotiate with the representatives of business life in their competence area when it</p>



	<p>comes to the requirements of working life skills. The working group collects the learning objectives needed and determines them for the degree programme.</p> <p>Learning objectives are divided into competence areas and the competencies therein and included into the structure of the degree programme in the form of various courses. Learning objectives are reviewed by the Advisory Committee, which consists of business life representatives, a student member, Head of Department, and programme coordinator.</p>
SCHOOL	<p>JAMK University of Applied Sciences School of Technology, Degree Programme in Automation Engineering Rajakatu 35, 40200 Jyväskylä</p>
QUALITY MANAGEMENT	<p>JAMK University of Applied Sciences is using the quality management system that has been audited by the Finnish Higher Education Evaluation Council (FINHEEC). Education is developed on the basis of course feedback collected from students. In addition to course feedback policy, the School of Technology is using mid-course feedback, on the basis of which the teacher can take the necessary corrective measures during the implementation of the course.</p> <p>Feedback from theses, project work and practical training is requested of client company representatives.</p> <p>The principles of the curriculum are approved by the JAMK University of Applied Sciences Academic Board and by the Vice Rector of the degree programme specific curriculum.</p>
PEDAGOGICAL PRINCIPLES	<p>The degree programme is implemented in accordance with the pedagogical principles established by the University of Applied Sciences Academic Board. For more information: http://www.jamk.fi/english/aboutus/facts/pedagogical-principles</p>
ETHICAL PRINCIPLES	<p>The students and employees of JAMK University of Applied Sciences operate jointly according to the accepted (by JAMK Academic Board on 15.12.2010) ethical principles. For more information: http://www.jamk.fi/english/aboutus/facts/ethicalprinciples</p>
LAST UPDATE	<p>20.12.2012</p>
CURRICULUM APPROVED	<p>21.12.2012 Heikki Malinen, Vice Rector</p>