Programme Description

International Mechanical Engineering

TGMEC – Spring 27

Decision taken by	Department board
Document contact	Ebrahim Harati, Head of Programme
Version	1
Adopted	2026-06-03

This template for programme descriptions was adopted by the Research and Education Board, HV 2022/508, 21 September 2022, editorial change 25 October 2022. Programme description is a supplement to the programme syllabus which is the legally binding document.

Basic data

Department	Institutionen för Ingenjörsvetenskap
Division	Avdelningen för svetsteknologi
Name of Programme, Swedish	Internationell maskiningenjör
Name of Programme, English	International Mechanical Engineering
HE credits (number of credits)	180
Level (1st Cycle, 2nd Cycle)	1st Cycle
Entry requirements, Swedish	Grundläggande behörighet Du behöver också: Fysik 2, Kemi 1 och Matematik 3c eller Matematik D.
Entry requirements, English	General entry requirements You also need: Chemistry 1, Mathematics 3c or Mathematics D and Physics 2.
Main field of study, Swedish	Maskinteknik
Main field of study, English	Production Technology
Degree, Swedish	Teknologie kandidatexamen med huvudområdet maskinteknik
Degree, English	Degree of Bachelor of Science with a major in Mechanical Engineering
Rate of study (full-time, part-time)	Full-time
Type of instruction (on campus, distance teaching)	Campus
Language of instruction (Sw, Eng)	English

General programme information

The foundation and existence of University West has been tightly linked to the need for mechanical engineers in the local industry (i.e., SAAB, GKN -former Volvo Aero). Therefore, undergraduate studies in mechanical engineering have been offered and developed in synergy with the industry since University West was founded in the nineties. This international undergraduate program is a 3-year education program (180 credits) given in English. It was established in the spring of 2022 based on our experience in educating engineers in collaboration with the industry. Work Integrated Learning, WIL, is University West' profile. We have the vision to educate future generations of mechanical engineers today by offering them a multidisciplinary program that prepares them for a smooth transition and adaptability to the future work market, which is in a rapid and constant change.

The programme combines mechanical engineering fundamentals with advanced manufacturing, additive manufacturing, welding technology, robotics and automation, materials engineering, programming, numerical analysis, and engineering communication. Through laboratory-based learning, project work, and industrial collaboration, students develop competencies required for future production systems and modern manufacturing industries.

This educational program is part of the Complete Academic Environment called Production Technology (KAM-PT). This complete academic environment includes both education and research within materials and manufacturing and production systems. Therefore, after finalizing this program, the students can either go to the industry or choose from a wide offer in Magister and Master programs in the field, and eventually continue with PhD studies within the Production Technology environment.

Programme contents, structure, and progression

The students will receive their Degree of Bachelor of Science with a major (main field of study) in Mechanical Engineering. The program meets the objectives of the Higher Education Ordinance, and conceptually speaking, it is built on four pillars of knowledge. The first pillar consists of fundamental courses in mechanics that build the core of mechanical engineering competence. This includes courses such as statics, dynamics, strength of materials, and thermodynamics. These are introduced early in the program and provide students with the theoretical and analytical tools needed to understand and solve basic mechanical engineering problems. The second pillar includes general engineering and interdisciplinary skills that support students in

becoming versatile engineers. It combines courses in mathematics, technical writing and communication, programming, robotics and automation, basics of electronics and sensors, and numerical analysis. These courses enable students to navigate engineering challenges in a broad context and develop skills for teamwork, problem-solving, and communication across technical domains. The third pillar focuses on manufacturing technologies, with an emphasis on areas closely tied to the university's research strengths. This includes manufacturing technology, welding technology, additive manufacturing, machine elements, and material characterization and lab. The aim is to provide students with deep knowledge of both conventional and advanced manufacturing methods, linking theory to industrial practice. The fourth pillar is the thesis work, conducted in the final semester. Here, students independently apply their acquired knowledge to a real-world engineering problem, often in collaboration with industry. This final project demonstrates their ability to plan, execute, and evaluate engineering tasks and solutions critically and creatively. The thesis works are mainly conducted in collaboration with the surrounding industry, and they are carried out by the students in the last year. The program offers 30 credits of optional courses within the field (e.g., supply chain management, deformation and fracture mechanic and Industrial Placement) so that students can either follow our offer or attend optional courses abroad or in other Swedish universities. The list of courses can be found in the program syllabus.

To support the students in their achievement of the national educational goals, we use a variety of pedagogical methods. Overall, we use traditional but also flipped-classed lectures, we have problem-solving sessions industrially and practically oriented, industry-based assignments, use industrial software in problem-solving tasks, projects developed in companies, we have guest lecturers, study visits, and virtual and industrially equipped laboratories among other methods. These methods are well aligned with our forms of examination, as most of our courses contain practical tasks (laboratory, projects, problem-solving, industry-based assignments) as part of the examination.

The research basis for the programme

Most of the teachers in the program are also doing research within the KAM-PT environment. Therefore, output from research is made available to the undergraduate students in several ways during the lectures in different courses, and it is common that research papers are used as literature sources for our students.

The laboratories that KAM-PT environment has in the Production Technology center building (PTC) are used in some courses in the program. Therefore, students have access to research facilities and can also establish contact with other researchers and companies supporting research projects there. In most cases, the thesis work is supervised and examined by our teachers/researchers, and it is framed in collaboration with projects that are under development at the PTC environment.

The labour market, collaboration, and work-integrated learning[1]

Traditional educational programs in Mechanical Engineering are far from the industry needs. Nowadays, there are new competences expected for the new engineers: factory of the future, industry 4.0, lifelong learning, future production, additive manufacturing, big data management, among others, are hot topic concepts, and we need to prepare multidisciplinary engineers to cope with the current and future industrial needs and to be flexible to adapt to changes. That is the reason for our multidisciplinary focus in the program.

The prediction of some websites such as "framtid.se" shows that in five to ten years the job hunting for mechanical engineers will increase in Sweden, meaning that there is a good job market. The important issue about this program is that the job market is expected to be global. It means that the students may find the job in other countries too. Therefore, we expect that the employment rate for our mechanical engineering program will be high.

The job market for mechanical engineers is extremely good. Multidisciplinary, high-skilled engineers such as graduates from this programme are very sought after. As an example, Sweden's need for engineers with a background in electric vehicles will be 30,000 in the next coming years. There is a very high demand for mechanical engineers in Sweden. With training in this rapidly expanding field of technology where innovation is prioritised, you will have the choice between advanced studies or a career in industry, both in Sweden and abroad..

[1] Work-integrated learning is a pedagogical practice in which students' learning takes place through the integration of theoretical and practical knowledge and experience, derived from an educational context within the framework of both higher education as a work environment and civil society.

The connection between theory and practice is a common thread fully integrated into the design and delivery of the courses in the program: the laboratory works, the assignments based on industrial problems, the use of industrial equipment/software in the labs, the use of virtual laboratories, the presence of industrial guest lecturers, study visits and course projects or thesis projects developed in collaboration with companies are clear examples of learning activities in the program tightly related to the WIL principles. Among other WIL elements, industrial involvement is described for example in the design of the education plan, in the teachers' profile and background, or the co-supervision of thesis works. We also arrange events during the year in collaboration with the industry to boost the networking of our students (e.g., InWest, Primus Day, Automation Day, Elmia fair).

Sustainable development

Sustainability is a strategic focus at University West, embedded in the mechanical engineering program across environmental, economic, and social dimensions. Environmental sustainability is integrated through courses like materials science and engineering, where students learn resource-efficient design and production. Economic sustainability is addressed in manufacturing, supply chain management, and machine elements, which focus on optimizing costs and minimizing waste. Courses such as strength of materials and welding technology support technological sustainability through safe, durable, and low-impact engineering solutions. Social sustainability is promoted through engineering communication, technical writing, and ethics for engineers, which build skills in teamwork, ethics, and responsible practice. Students collaborate with Swedish peers in joint courses with the TGMTK program, gaining intercultural competence and fostering respect for diversity. International exchanges and internships further enhance global awareness. Finally, sustainability is reinforced through industry collaboration particularly in thesis work where students tackle real-world challenges with an emphasis on sustainable and ethical engineering.

Internationalisation

It is part of the study plan the possibility that our students can have study periods abroad during the 3rd year. We also bring the opportunity to international students to study with us. Eleven courses in the program are offered by the International Office to students around the world, giving the opportunity to exchange students to participate in the program too. In addition, in our program, we have international teachers, and the activities running at PTC are mainly given in English. Overall, our

students are exposed to an international environment that supports social sustainability skills in addition to promoting their employability.