The master programme in Applied Mechanics will provide an internationally competitive education and prepare students for a professional career in any area of engineering and development. This requires an advanced knowledge of modelling, computational and experimental issues in applied mechanics. Although the focus is on mechanical engineering problems, the programme is sufficiently general to give a good platform also for working within other engineering disciplines. A systematic view on education, research and innovation is emphasised through collaboration with the industry.
“The master programme in Applied Mechanics gave me an opportunity to realize how mathematical, mechanical, and experimental knowledge of an engineer can be employed to simulate and validate almost every physical and mechanical phenomenon. I believe, with the ever-increasing power of the computational world, this competence gives a mechanical engineer even wider career opportunities than can be imagined nowadays.”


AIMS
The main goal of the programme is to prepare students for a professional career in any area of engineering and development that requires an advanced knowledge of modelling, computational and experimental issues in applied mechanics. Although the focus is on mechanical engineering problems, the programme is sufficiently general to give a good platform also for jobs within other engineering disciplines. Indeed, professionals with a modern education in solid and fluid mechanics form the backbone of almost every industry and engineering activity. To prepare for this, the students will learn how to analyse and solve engineering problems using the most appropriate methods at hand within a wide range of applications, but also to understand and value the pros and cons of different methods of analysis.

CAREER OPPORTUNITIES
A wide range of job possibilities can be listed both for students that follow any of the three profile tracks and for those who wish to choose an individual profile. Typically, job opportunities can be found in research and development within industrial companies and research institutes or with consulting firms. Other examples of careers are technical advisor in the private or public sector, and teaching in science and engineering at different levels. It is also possible to envision a career outside the traditional engineering field, where the acquired skills to systematically understand and solve problems are highly appreciated.

The programme is also a “flying start” for continued studies towards a Ph.D. in applied mechanics and related areas.

RESEARCH CONNECTIONS
The Solid and Fluid Mechanics programme is suitable for continued studies and research within solid and fluid mechanics. Depending on the chosen track the programme qualifies for Ph.D.-studies within the graduate schools in Solid and Structural Mechanics and in Thermo and Fluid Dynamics. Some of the elective courses in the master’s programme are also offered by the graduate schools. A Master’s degree in Solid and Fluid Mechanics might also be appropriate for Ph.D.-studies in other engineering disciplines. Moreover, the master programme goes in line with the Chalmers areas of advance: Materials Science, Energy, Transportation, and Built Environment. The programme curriculum and the research within the competence centres CHARMEC for railway mechanics, SAFER for vehicle safety and SWPTC for wind power technology nutrifies each other in symbiosis.

EDUCATIONAL METHODS
In order to prepare the students for the engineering profession, several of the courses will be taught in project form. Different examination forms will be used, both traditional written examination as well as oral and written presentations of the projects.

COMPULSARY COURSES
Mechanics of solids, 7.5 cu
The course provides an introduction to the mechanics of continuous media and, in particular, solids. Linear elastic solids as well as elastic plates will be studied.

Mechanics of fluids, 7.5 cu
The course provides an introduction to continuum mechanics and turbulent fluid flow.

Computational Fluid Dynamics, 7.5 cu
The aim of the course is that the students should obtain a thorough understanding of the finite volume method and its use in turbulence modeling.

Structural Dynamics, 7.5 cu
The course provides knowledge of structural dynamics and presents current methods for solving dynamic problems, such as response of buildings due to
wind load, machine vibrations, car body vibrations, and earthquakes.

Finite Element Method- structures, 7.5 cu
The aim of the course is to provide a deeper knowledge and increased understanding of how to apply the finite element method (FEM) to more advanced problems in solid and structural mechanics.

Project in Applied mechanics, 7.5 cu
You will practise your ability to solve applied problems using numerical and/or experimental tools in solid and/or fluid mechanics.

ELECTIVE COURSES
A set of recommended courses define three different “Profile tracks”: Computational Solid Mechanics (CSM), Structural Dynamics (SD) and Fluid Dynamics (FD). Two courses from the group of elective courses must be chosen.

PROFILE COURSES, CSM TRACK
Composite mechanics, 7.5 cu
Material mechanics, 7.5 cu
Fatigue and fracture, 7.5 cu
Finite element method-solids, 7.5 cu

The Computational Solid Mechanics track provides knowledge and skills needed to establish mathematical models of the fundamental behaviour of engineering materials and to perform FE-analysis/computer simulations of the material and structural response to various types of loadings.

PROFILE COURSES, SD TRACK
Structural dynamics- model validation, 7.5 cu
Rigid body dynamics, 7.5 cu
Structural dynamics- control, 7.5 cu

In the Structural Dynamics track the students learn how to handle vibration and dynamic motion problems that often occur in the development of new products. State-of-the-art methods for numerical solutions of various problems in structural dynamics as well as the important aspects of model validation by physical observations are given.

PROFILE COURSES, FD TRACK
Compressible flow, 7.5 cu
Turbulence modeling, 7.5 cu
Turbomachinery, 7.5 cu
Gas turbine technology, 7.5 cu
Multiphase flow, 7.5 cu

The Fluid Dynamics track gives an in-depth theoretical knowledge of incompressible and compressible flow, computational methods, turbulence modeling, one-phase and multiphase flow. The students are given a general knowledge in fluid dynamics. Important engineering applications are Gas turbines and Turbomachinery.

MASTER THESIS
In the second year the only compulsory course is the Master thesis which is planned to quarter 3 and 4. Alternative planning of the thesis work is also possible, e.g., half-time during quarter 1 to 4.
CHALMERS UNIVERSITY OF TECHNOLOGY

Chalmers conducts research and education in engineering and natural sciences, architecture, technology-related mathematical sciences and nautical sciences – in close collaboration with industry and society. Chalmers is one of Sweden’s largest universities of technology with about 12 000 students and 2 200 employees.

Approximately 40 percent of Sweden’s graduate engineers and architects are educated here. Chalmers has formed partnerships with major industries mostly in the Gothenburg region such as Ericsson, Volvo and SKF.

The Master’s Programmes at Chalmers are strongly linked to advanced research in areas of particular strength. Upon completion of studies, candidates will be granted a Master’s degree. The programmes are taught in English and open to applicants from the whole world.

Chalmers has eight areas of advance where the aim is to bring together research, education and innovation across departmental boundaries and to co-operate with bodies and organisations outside Chalmers: Materials Science, Production, Information & Communication Technology, Transport, Built Environment, Nanoscience & Nanotechnology, Life Science and Energy. The eight key areas also have a firm foundation in the basic sciences. The pursuit of new knowledge and improved technology has characterized Chalmers ever since its foundation in 1829.

More info at: chalmers.se/en

THE SMALL METROPOLIS – GOTHENBURG

More than 60 000 are currently studying in Gothenburg. In many ways, their decision to choose Gothenburg when the time came to take the next step into the future isn’t surprising. Gothenburg is an attractive major city with a maritime atmosphere and within easy reach of outdoor activities in the rest of West Sweden.

Gothenburg is an uncommonly inviting city for students, with a great deal to offer: You’ll find an exciting cultural and entertainment scene worthy of any major city, as well as a friendly atmosphere that will help you to quickly feel at home.

Founded in 1621, Gothenburg is a young city by European standards. Since formative years it has been an important port of international trade and today it is the largest in Scandinavia. With a population of about half a million, it is both friendly and cosmopolitan.

More info at: goteborg.com

SWEDEN – A CULTURE OF INNOVATION

One of the world’s most modern countries, Sweden is the birthplace of many successful international corporations. Innovative research at Swedish universities and companies has resulted in a number of successful inventions. Some examples are: the computer mouse, Bluetooth for internet mobility, the pacemaker, the ball bearing, the Tetra Pak beverage packaging system, the dialysis machine and internet applications such as the online music streaming service Spotify and the free internet calling service Skype. These fairly recent inventions build on a long history of excellence in academia and research. Sweden is the home of the prestigious Nobel Prize, awarded in Stockholm every year.

Sweden has a number of large multinational corporations, such as telecom supplier Ericsson, automotive companies Volvo and Scania, household appliances corporation Electrolux, bearing manufacturer SKF, and high-tech engineering groups Sandvik and Atlas Copco. The deep-rooted creative environment has made Sweden a strong nation in the areas of design, fashion and music, with well-known international brands such as furniture giant IKEA and clothes retailer H&M. Sweden is also one of the largest music-exporting countries in the world.

More info at: studyinsweden.se