**Curriculum at LAB University of Applied Sciences
2020-2021**

Bachelor of Engineering, Mechanical Engineering and Production Technology, full-time studies, Lappeenranta

Code	Name	1 y	2 y	3 y	4 y	ECTS total
MEC20SLPR-1006 BASIC STUDIES						**127**
MEC20SLPR-1007 MATHEMATICS AND PHYSICS						**18**
KMA0125	Mathematical Tools	3				3
KMA0126	Basic Engineering Mathematics	3				3
KFK0079	Physics A	3				3
KFK0080	Physics, Laboratories	3				3
KMA0127	Differential Mathematics in Engineering		3			3
KMA0128	Measurement Mathematics		3			3
MEC20SLPR-1008 COMMUNICATION AND LANGUAGES						**13**
KSU0070	Finnish Culture and Language 1	5				5
KSU0071	Finnish Culture and Language 2	5				5
KIEN0013	Meetings and Discussions		3			3
MEC20SLPR-1009 ORIENTATION INTO TECHNICS						**10**
KTE2104	Technology in Practice	4				4
KTE2105	Orientation Studies	3				3
KTE2108	Measurement Methods	3				3
MEC20SLPR-1010 INTRODUCTION INTO ENGINEERING						**12**
KTE0956	Manufacturing, Basics	3				3
KTE0930	Basics of Mechanics	3				3
KTE0967	Sensors	3				3
KTE0952	Materials	3				3
MEC20SLPR-1011 BASICS OF MECHANICAL ENGINEERING						**22**
KTE0957	Machining	3				3
KTE0938	Statics I	3				3
KTE0951	Mechanical Drawings and CAD	6				6
KTE1336	Pneumatics	3				3
KTE0968	Strength of Materials I	3				3
KTE1693	Programmable Logic Controllers	4				4
MEC20SLPR-1012 MANUFACTURING						**15**
KTE1537	Welding		3			3
KTE0942	Design and Planning Softwares		3			3

Code	Name				
KTE1454	Project A	3			3
KTE1536	Automation Laboratories	3			3
KTE0958	Manufacturing, Laboratory Workshops	3			3
MEC20SLPR-1013 MECHANICAL ENGINEERING					**22**
KTE0939	Statics II	3			3
KTE2109	Strength of Materials II	4			4
KTE0932	Dynamics	3			3
KTE1538	Materials Selection	3			3
KTE1463	Project B	3			3
KTE1372	Project C	3			3
KTE1358	Project Work Basics	3			3
MEC20SLPR-1014 DESIGN					**15**
KTE1369	Hydraulics	3			3
KTE1382	Machine Elements	3			3
KTE1051	3D Modelling	3			3
KTE1540	Machine Design	3			3
KTE1354	3D Virtual Models and Animations	3			3
MEC20SLPR-1015 PROFESSIONAL STUDIES					**60**
MEC20SLPR-1016 EXCHANGE STUDIES					**0**
MEC20SLPR-1017 COMPLEMENTARY STUDIES					**11**
KTE2311	Project Related to Mechanical Engineering			8	8
KTE2110	Project (Robotics)			3	3
MEC20SLPR-1019 ELECTIVE STUDIES					**8**
KISA0001	Saksa/German 1	2			2
KISA0003	Saksa/German 2	2			2
MEC20SLPR-1020 PLACEMENT					**30**
MECHHARJ1	Placement 1				0
MECHHARJ2	Placement 2				0
MEC20SLPR-1021 THESIS					**15**
OTMECH	Bachelor's Thesis			15	15

MEC20SLPR-1006 BASIC STUDIES: 127 ECTS

MEC20SLPR-1007 MATHEMATICS AND PHYSICS: 18 ECTS

KMA0125 Mathematical Tools: 3 ECTS

Learning outcomes
After passing the course, a studentcan solve problems concerning geometry and vectors in plane and knows basics of trigonometrycan solve polynomial equations and knows methods for solving inequalities and special equations.recognize different kinds of polynomial functions and can sketch a

graph

KMA0126 Basic Engineering Mathematics: 3 ECTS

Learning outcomes
After passing the course, a studentknows methods for solving systems of equations and solve them with mathematical programs (MathCAD, Matlab)knows basics of vectors in space and can apply them in practical problems,recognize trigonometric, exponential and logarithmic functions and can solve equations including them.knows basics of derivatives and can define basic derivatives symbolically.

KFK0079 Physics A: 3 ECTS

Learning outcomes
To get basic knowledge of engineering physics, like principles of mechanics, thermodynamics, electrostatics and electrodynamics

KFK0080 Physics, Laboratories: 3 ECTS

Learning outcomes
.After passing the course, student　has advanced his/her knowledgle of physical phenomenonscan estimate the reliability of the measuringshas learned writing technical reportshas learned how use spredsheet programs in the aid of calculation

KMA0127 Differential Mathematics in Engineering: 3 ECTS

Learning outcomes
After the course, a student recognize the meaning of differential calculus in professional studies. A student has capacity for using mathematical programs in modelling.

KMA0128 Measurement Mathematics: 3 ECTS

Learning outcomes
After passing the course, a studentcan use SPSS for quantative statistical analysis and can analyse statistical reports,has knowledge in numerical methods,knows, how to read algorithms,can apply them in practical problems

MEC20SLPR-1008 COMMUNICATION AND LANGUAGES: 13 ECTS

KSU0070 Finnish Culture and Language 1: 5 ECTS

Learning outcomes
The student can speak and write Finnish in everyday situations.

KSU0071 Finnish Culture and Language 2: 5 ECTS

Learning outcomes
The student can manage in everyday situations in Finnish.

KIEN0013 Meetings and Discussions: 3 ECTS

Learning outcomes
Students are able to communicate fluently in meetings, negotiations and discussions and they are familiar with meeting documents and proceedings.

MEC20SLPR-1009 ORIENTATION INTO TECHNICS: 10 ECTS

KTE2104 Technology in Practice: 4 ECTS

Learning outcomes
After the course student:Recognizes most common basic mechanical standard partsUnderstands basic things about manufacturing drawingsUnderstands the main differences of manufacturing methods

KTE2105 Orientation Studies: 3 ECTS

Learning outcomes
To be familiar for new learning environment, computer based learning system, the rules of behaviour in Saimia and the principles of project based lerning method

KTE2108 Measurement Methods: 3 ECTS

Learning outcomes
Basic mechanical measurements in theory and in practice consist of length, angle, roundness measurements and calibration methods for measurement equipments.

MEC20SLPR-1010 INTRODUCTION INTO ENGINEERING: 12 ECTS

KTE0956 Manufacturing, Basics: 3 ECTS

Learning outcomes
The student will understand the principles of machining methods (turning, milling) and sheet metal technology as well as the related basics of fastening.Students also get to know the different automation levels in the machine shops and general design for manufacturing -rules.Student canA student will learn to know the most common production methods, equipment and equipment systems used in the manufacture of metal products.The student will be able to compare the different manufacturing methods in the case when choosing the manufacturing process(es) for a certain product.Student becomes aware of the meaning of process planning (and also of product design and production planning) in manufacturing industry.understand the meaning of mechanical joining and methods which are commonly in use to join sheet metalsunderstand the meaning of communication

between designing and manufacturing and how to design with the product specifications, which allow for efficient, trouble free and economical manufacturing and assembly.recognize the modern machine shop technologies and it's requirements in generallyestimate generally different rapid prototyping processes

KTE0930 Basics of Mechanics: 3 ECTS

Learning outcomes
Student can * the principles of mechanics for further studies in mechanical engineering * structural behavior of some basic structures * solve different kind of practical applications of mechanics

KTE0967 Sensors: 3 ECTS

Learning outcomes
The students get a comprehensive knowledge of sensors of machine automation and the use as a part of control systems.

KTE0952 Materials: 3 ECTS

Learning outcomes
Student knowsthe most common material groups used in mechanical engineeringmaterials mechanical propertiesthe most common tests of materialsrepresent relationship between physical metallurgy and material propertiesbehavior of materials in service conditions

MEC20SLPR-1011 BASICS OF MECHANICAL ENGINEERING: 22 ECTS

KTE0957 Machining: 3 ECTS

Learning outcomes
The student knows the different machining methods, their applications and limitations. Also, s/he will know the tools used in the different methods and the demands of the method on the fixing of the unit.Student canRecognize the most common problems in machining (in turning and milling) and in machining productionThe students become familiar with the basic structure of NC-machines and their programming.Understand the main meaning of using cutting fluids and it's affect to chip formation and to environmentStudents know the acts and decrees governing safety at working in machine shop.Recognize how to select a proper cutting insert for turning by using manufacture's cataloguesUnderstand the meaning of automated systems in today's industry.

KTE0938 Statics I: 3 ECTS

Learning outcomes
To provide the ability to understand the behaviour of some basic structures: to simplify the force systems acting on a rigid body and to formulate and solve the equilibrium equations of a structure.

KTE0951 Mechanical Drawings and CAD: 6 ECTS

Learning outcomes

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KTE1336 Pneumatics: 3 ECTS

Learning outcomes
Studentknows the basic elektropneumatic components and drawing symbolscan use Boolean mathematics in control system designcreates electropneumatic control systemscan simulate electro pneumatic control system with help of computer programfinds problems and correct them from electropneumatic systems

KTE0968 Strength of Materials I: 3 ECTS

Learning outcomes
Student can * basic concepts involved in strength of materials * different kind of failure modes of structures * basic design and analysis of simple structures

KTE1693 Programmable Logic Controllers: 4 ECTS

Learning outcomes
Student cancreate PLC programs in Ladder and FUB styledebug and find faults from PLC programs and PLC systemuse Profinet industrial network as communication tools between PC and PLCuse Siemens programming tools like TIA-portal, Simatic Manager and PLC-SIMunderstand Flip-Flops, Timers and Counters as part of program

MEC20SLPR-1012 MANUFACTURING: 15 ECTS

KTE1537 Welding: 3 ECTS

Learning outcomes
Student understandsthe basics of different welding processes and select proper process for typical applicationsgroove preparationconcept of weldabilitydifferencies in weldability of differrent material groupsthe importance of following the standards like SFS-EN-ISO in welding production, quality management etc.the formation of costs in welding production

KTE0942 Design and Planning Softwares: 3 ECTS

Learning outcomes
The students are familiar with different kinds of design software that can be used in mechanical design and engineering calculations.

KTE1454 Project A: 3 ECTS

Learning outcomes
Student canunderstand project processes

KTE1536 Automation Laboratories: 3 ECTS

Learning outcomes
Student get practical design, assembly, connection and data transfer skills from mechatronic device.Testing, simulations and fault finding is part of student daily work.

KTE0958 Manufacturing, Laboratory Workshops: 3 ECTS

Learning outcomes
Practical training allows the student to become acquainted with fundamental activities and tasks undertaken in the machine shop.Student canDescribe the most common functions of machine tools used in machine shop (lathe, milling machine, drilling).Describe the operation principle of NC-machine and recognize the possibilities and limitations of NC-machines.Estimate how the designing is affecting to manufacturing process.

MEC20SLPR-1013 MECHANICAL ENGINEERING: 22 ECTS

KTE0939 Statics II: 3 ECTS

Learning outcomes
Student can * analyze more demanding structures (e.g. trusses and frames, ...) * solve basic 3D problems

KTE2109 Strength of Materials II: 4 ECTS

Learning outcomes
.Student can * analyze beams under bending , determine stresses and deformations * determine stresses and deformations caused by torsion * analyze combined loading (3D structures)

KTE0932 Dynamics: 3 ECTS

Learning outcomes
Student can:Find solutions to dynamics problemsList and explain the assumptions behind the equations of dynamicsUnderstand the physical interpretation of the mathematical terms used in solutions to dynamics problemsApply the principles of dynamics in engineering

KTE1538 Materials Selection: 3 ECTS

Learning outcomes
Student canthe concept and process how to select materials from the standpoint of designer and production engineerselect materials on the basis of strength, toughness, corrosion resistance, wear resistancethe effects of the material selection to the life cycle cost of the productdemands of manufacturing and environment

KTE1463 Project B: 3 ECTS

Learning outcomes
Student can make mechatronics projects in industrial network environment and ©work in team of experts.

KTE1372 Project C: 3 ECTS

Learning outcomes
Student can use project work skillness in the paractical projectsplan, create, test and analyze mechatronic projects understand the cost of project and increase the productivity of mechatronics systemsgive public presentations about the status of project

KTE1358 Project Work Basics: 3 ECTS

Learning outcomes
Student understand the basic rules of project work, its design principles and project management skills

MEC20SLPR-1014 DESIGN: 15 ECTS

KTE1369 Hydraulics: 3 ECTS

Learning outcomes
After the course student:knows basic hydraulic componentscan read and design simple hydraulic circuitscan calculate and select suitable components for simple hydraulic system

KTE1382 Machine Elements: 3 ECTS

Learning outcomes
The students will learn to understand the principles of different types of machine elements. They will also learn to use strength of materials in the design and analysis of various components.

KTE1051 3D Modelling: 3 ECTS

Learning outcomes
The student is able touse 3D software forcreating complex parts and assemblies.make simulations and analyses.apply design skills for solving practical problems.understant benefits of 3d-printing.

KTE1540 Machine Design: 3 ECTS

Learning outcomes
After the course student:can use PDM-systemunderstands the meaning of tolerances and fits in mechanical engineeringknows basic rules of designing products for manufacturing (DFM)understands basic principles of Machinery Directive and safety

KTE1354 3D Virtual Models and Animations: 3 ECTS

Learning outcomes
Studentgets the basic knowledges about 3D Virtual world creation andlearn houw to inteact to VRLM world with help of animation, light and atmosphere

MEC20SLPR-1015 PROFESSIONAL STUDIES: 60 ECTS

MEC20SLPR-1016 : 0 ECTS

MEC20SLPR-1017 : 11 ECTS

KTE2311 Project Related to Mechanical Engineering: 8 ECTS

Learning outcomes
Students will learn how to apply theoretical knowledge into real life engineering case.Target is that after the course student:understands better real life demands for mechanical engineeringcan work in multidisciplinary groupcan apply knowledge of different mechanical engineering areas into one specific project

KTE2110 Project (Robotics): 3 ECTS

Learning outcomes
The students understand the basic knowledge of robotics and its limitations. They can also apply these skills to practical situations. The students can use a robot as a part of automation.

MEC20SLPR-1019 ELECTIVE STUDIES: 8 ECTS

KISA0001 Saksa/German 1: 2 ECTS

Learning outcomes
Proficiency level: A1

The student is able to communicate in simple phrases both orally and in writing.

KISA0003 Saksa/German 2: 2 ECTS

Learning outcomes
Proficiency level: A1

Students are able to
- understand spoken language related to topics discussed during the course,
- use simple sentences to talk about topics of the course,
- write short and simple texts related to topics discussed during the course and

- use polite phrases and expressions typical of the German communication culture.

MEC20SLPR-1020 PLACEMENT: 30 ECTS

MECHHARJ1 Placement 1: 15 ECTS

Learning outcomes
The student is able to
- describe work-related phenomena and use related concepts
- act in a productive way, following the practices of the workplace and the ethical principles of the profession
- use the techniques, work methods, models and processes that they have learnt
- act in a customer-oriented way in interactive situations in the workplace and in the cooperationnetwork
- evaluate and develop their own competence int the work done in practical training

MECHHARJ2 Placement 2: 15 ECTS

Learning outcomes
The student is able to
- describe work-related phenomena and use related concepts
- act in a productive way, following the practices of the workplace and the ethical principles of the profession
- use the techniques, work methods, models and processes that they have learnt
- act in a customer-oriented way in interactive situations in the workplace and in the cooperationnetwork
- evaluate and develop their own competence int the work done in practical training

MEC20SLPR-1021 THESIS: 15 ECTS

OTMECH Bachelor's Thesis: 15 ECTS

Learning outcomes
The student is able to
- apply the acquired theoretical knowledge to the problems and phenomena of the working life
- solve problems, organise and perceive wholes
- work interactively, tenaciously and systematically
- work according to the practices of their own line of trade
- gather information and evaluate sources critically
- report their work orally, in writing and visually