## **Curriculum at LAB University of Applied Sciences** 2017-2018

# **Bachelor of Engineering, Mechanical Engineering, full-time studies, Lappeenranta**

| Code        | Name   | ECTS total |
|-------------|--|------------|
| KONE17      | Bachelor of Engineering, Mechanical Engineering, full-time studies, Lappeenranta | 240        |
| KONE17-1001 | BASIC STUDIES  | 123        |
| KONE17-1002 | COMMUNICATION  | 17         |
| KSU0065     | Finnish Communication at Work  | 4          |
| KEN0076T    | English Communication at Work  | 3          |
| KRU0042T    | Svenska i arbetslivet  | 3          |
| KRU0054     | Public Administration Swedish, Written Skills                                    | 0          |
| KRU0055     | Public Administration Swedish, Spoken Skills                                     | 0          |
| KSU0064     | Finnish Communication for Mechanical Engineering                                 | 4          |
| KEN0087     | English for Mechanical Engineering   | 3          |
| KONE17-1003 | MATHEMATICS AND NATURAL SCIENCES   | 12         |
| KMA0121     | Mathematical Tools in Technology   | 3          |
| KMA0122     | Basic Mathematics in Technology  | 3          |
| KFK0078     | Physics  | 3          |
| KMA0129     | Differential Mathematics   | 3          |
| KONE17-1004 | INTRODUCTION INTO ENGINEERING  | 14         |
| KTE2066     | Technology as Learning Environment   | 4          |
| KTE2070     | Technology in Practice   | 3          |
| KTE2068     | Materials' Structure and Properties  | 3          |
| KTE2067     | Technical Measurements   | 4          |
| KONE17-1005 | BASICS OF MECHANICAL ENGINEERING   | 12         |
| KTE2069     | Mechanics  | 3          |
| KTE2071     | Manufacturing Methods  | 3          |
| KTE0027     | Project Engineering  | 3          |
| KTE2072     | Materials in Mechanical Engineering  | 3          |
| KONE17-1006 | BASICS OF DESIGN   | 15         |
| KTE2073     | Structural Mechanics   | 3          |
| KTE2074     | Basics of Mechanical Device and Construction Design                              | 3          |
| KTE2075     | Machine Drawing 1  | 6          |
| KTE2076     | Electricity Pneumatics   | 3          |

| KONE17-1007 | PRODUCTION  | 11 |
|-------------|---|----|
| KTE2077     | Maintenance   | 3  |
| KTE2078     | Machine Automation  | 4  |
| KTE2079     | Production Technology                                       | 4  |
| KONE17-1008 | MANUFACTURING   | 15 |
| KTE2080     | Welding and Metal Sheet Technology                          | 5  |
| KTE2081     | Machining   | 3  |
| KTE2082     | Electrical Engineering                                      | 3  |
| KTE2083     | Manufacturing Project                                       | 4  |
| KONE17-1009 | MECHANICAL ENGINEERING                                      | 15 |
| KTE2084     | Machine Dynamics  | 3  |
| KTE2085     | Energy Technology   | 4  |
| KTE2086     | Laboratories in Mechanical Engineering                      | 4  |
| KTE2087     | Hydraulics  | 4  |
| KONE17-1010 | DESIGN  | 12 |
| KTE2088     | Mechanical Device and Construction Design 1                 | 4  |
| KTE2089     | Mechanical Device and Construction Design 2                 | 3  |
| KTE2090     | Machine Drawing 2   | 5  |
| KONE17-1011 | PROFESSIONAL STUDIES  | 45 |
| KONE17-1012 | ADVANCED STUDIES IN MECHANICAL ENGINEERING                  | 30 |
| KTE1288     | Mechanical Vibrations                                       | 3  |
| KTE2091     | Product Design and Material's Selection                     | 4  |
| KTE2092     | Product Development   | 4  |
| KTE0696     | Maintenance Technology                                      | 3  |
| KTE2093     | Machine Elements 1  | 3  |
| KTE2155     | Occupational Safety and Labour Law                          | 3  |
| KTE2095     | Machine Automation Project                                  | 3  |
| KTE2096     | Machine Elements 2  | 3  |
| KTE2097     | Industrial Engineering and Management                       | 4  |
| KONE17-1013 | COMPLEMENTARY STUDIES                                       | 15 |
| KTE1280     | Fluid and Thermo Machinery                                  | 5  |
| KTE2259     | Simulations of Mechanical Engineering                       | 5  |
| KTE2260     | Applications of Mechanical Engineering                      | 5  |
| KONE17-1014 | SPECIALISATION OPTION/ADVANCED PROFESSIONAL STUDIES         | 20 |
| KONE17-1015 | ADVANCED PROFESSIONAL STUDIES IN PRODUCTION AND MAINTENANCE | 20 |
| KTE2102     | Project Learning in Enterprises 1                           | 10 |
| KTE2103     | Project Learning in Enterprises 2                           | 10 |
| KONE17-1016 | ADVANCED PROFESSIONAL STUDIES IN PRODUCT AND MACHINE DESIGN | 20 |

| KTE2098     | Finite Element Method 1          | 4  |
|-------------|----------------------------------|----|
| KTE2099     | Finite Element Method 2          | 3  |
| KTE2100     | Vibration Mechanics              | 3  |
| KTE2101     | Machine Design                   | 5  |
| KTE1285     | Steel Structures                 | 5  |
| KONE17-1017 | ELECTIVE STUDIES                 | 7  |
| KMA0069     | Introduction to Mathematics      | 3  |
| KMA0133     | Differential Mathematics (LUT)   | 4  |
| KIVE0002    | Russian 1                        | 2  |
| KIVE0004    | Russian 2                        | 2  |
| KIRU0008    | Swedish Prep Course              | 3  |
| KONE17-1018 | PLACEMENT                        | 30 |
| TEKUHARJ1   | Placement 1                      | 15 |
| TEKUHARJ2   | Placement 2                      | 15 |
| KONE17-1019 | THESIS                           | 15 |
| KTE2382     | Thesis Process                   | 3  |
| KTE2383     | Thesis Seminars                  | 2  |
| KTE2384     | Thesis Implementation and Report | 10 |

## **KONE17** Bachelor of Engineering, Mechanical Engineering, full-time studies, Lappeenranta: 240 ECTS

**KONE17-1001 BASIC STUDIES: 123 ECTS** 

**KONE17-1002 COMMUNICATION: 17 ECTS** 

**KSU0065 Finnish Communication at Work: 4 ECTS** 

#### **Learning outcomes**

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### **KEN0076T English Communication at Work: 3 ECTS**

#### Learning outcomes

The studentmasters the basics of the industry-specific English language at work. Proficiency levet B2.

#### KRU0042T Svenska i arbetslivet: 3 ECTS

#### Learning outcomes

The student cancommunicate in Swedish in the most usual situations in working life and at leisure. Proficiency levet B1.

#### KRU0054 Public Administration Swedish, Written Skills: 0 ECTS

#### **Learning outcomes**

The written Swedish language test of public administration is completed during the Swedish Communication at Work course.

#### KRU0055 Public Administration Swedish, Spoken Skills: 0 ECTS

#### Learning outcomes

Thespoken Swedish language test of public administration is completed during the Swedish Communication at Work course.

#### KSU0064 Finnish Communication for Mechanical Engineering: 4 ECTS

#### **Learning outcomes**

Proficiency level: C2

The student is able to fluently communicate Finnish texts related to their own field orally and in writing.

#### **KEN0087 English for Mechanical Engineering: 3 ECTS**

#### Learning outcomes

Perehtyä kone- ja tuotantotekniikan ammattikieleen, työpaikan hakumenettely ja opinnäytetyön englannin kielisen tiivistelmän laatiminen.

#### KONE17-1003 MATHEMATICS AND NATURAL SCIENCES: 12 ECTS

#### KMA0121 Mathematical Tools in Technology: 3 ECTS

#### Learning outcomes

After passing the course, a studentknows geometry and vectors in plane, basics of trigonometry, recognises different polynomial functions and can sketch their graphs,knows methods for solving inequalities and special equations.

#### KMA0122 Basic Mathematics in Technology: 3 ECTS

#### Learning outcomes

After passing the course, a studentknows solution method for system of equations and can solve them with mathematical programs,knows basics of geometry and vectors in space and can apply them in professional cases,recognise trigonometric, exponential and logarithmic functions and can solve equations including them,knows basics of derivation.

| Learning outcomes   |
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| KMA0129 Differential Mathematics: 3 ECTS                  |
| Learning outcomes   |
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| <b>KONE17-1004 INTRODUCTION INTO ENGINEERING: 14 ECTS</b> |
| KTE2066 Technology as Learning Environment: 4 ECTS        |
| Learning outcomes   |
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| KTE2070 Technology in Practice: 3 ECTS                    |
| Learning outcomes   |
|   |
| KTE2068 Materials' Structure and Properties: 3 ECTS       |
| Learning outcomes   |
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| KTE2067 Technical Measurements: 4 ECTS                    |
| Learning outcomes   |
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| KONE17-1005 BASICS OF MECHANICAL ENGINEERING: 12 ECTS     |
| KTE2069 Mechanics: 3 ECTS                                 |
| Learning outcomes   |
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| KTE2071 Manufacturing Methods: 3 ECTS                     |
| Learning outcomes   |

KFK0078 Physics: 3 ECTS

| KTE0027 Project Engineering: 3 ECTS                                 |
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| Learning outcomes   |
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| KTE2072 Materials in Mechanical Engineering: 3 ECTS                 |
| Learning outcomes   |
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| KONE17-1006 BASICS OF DESIGN: 15 ECTS                               |
| KTE2073 Structural Mechanics: 3 ECTS                                |
| Learning outcomes   |
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| KTE2074 Basics of Mechanical Device and Construction Design: 3 ECTS |
| Learning outcomes   |
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| KTE2075 Machine Drawing 1: 6 ECTS                                   |
| Learning outcomes   |
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| KTE2076 Electricity Pneumatics: 3 ECTS                              |
| Learning outcomes   |
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| KONE17-1007 PRODUCTION: 11 ECTS                                     |
| KTE2077 Maintenance: 3 ECTS   |
| Learning outcomes   |
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| KTE2078 Machine Automation: 4 ECTS                                  |
| Learning outcomes   |

| KTE2079 Production Technology: 4 ECTS                  |
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| Learning outcomes                                      |
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| KONE17-1008 MANUFACTURING: 15 ECTS                     |
| KTE2080 Welding and Metal Sheet Technology: 5 ECTS     |
| Learning outcomes                                      |
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| KTE2081 Machining: 3 ECTS                              |
| Learning outcomes                                      |
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| KTE2082 Electrical Engineering: 3 ECTS                 |
| Learning outcomes                                      |
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| KTE2083 Manufacturing Project: 4 ECTS                  |
| Learning outcomes                                      |
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| KONE17-1009 MECHANICAL ENGINEERING: 15 ECTS            |
| KTE2084 Machine Dynamics: 3 ECTS                       |
| Learning outcomes                                      |
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| KTE2085 Energy Technology: 4 ECTS                      |
| Learning outcomes                                      |
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| KTE2086 Laboratories in Mechanical Engineering: 4 ECTS |
| Learning outcomes                                      |

| KTE2087 Hydraulics: 4 ECTS  |
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| Learning outcomes   |
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| KONE17-1010 DESIGN: 12 ECTS   |
| KTE2088 Mechanical Device and Construction Design 1: 4 ECTS   |
| Learning outcomes   |
|   |
| KTE2089 Mechanical Device and Construction Design 2: 3 ECTS   |
| Learning outcomes .   |
| KTE2090 Machine Drawing 2: 5 ECTS   |
| Learning outcomes   |
|   |
| KONE17-1011 PROFESSIONAL STUDIES: 45 ECTS   |
| KONE17-1012 ADVANCED STUDIES IN MECHANICAL ENGINEERING: 30 ECTS   |
| KTE1288 Mechanical Vibrations: 3 ECTS   |
| <b>Learning outcomes</b> On completion of this course, students should understand oscillations and be able to calculate one degree-of-freedom oscillations. |
| KTE2091 Product Design and Material's Selection: 4 ECTS   |
| Learning outcomes   |

**KTE2092 Product Development: 4 ECTS** 

Learning outcomes

#### **KTE0696 Maintenance Technology: 3 ECTS**

#### **Learning outcomes**

On completion of this course, students should be familiar with the reliability of production facilities and ways to improve it: have learned the most common condition monitoring methods: be familiar with the maintenance of the most important process equipment and their components.

#### KTE2093 Machine Elements 1: 3 ECTS

Learning outcomes

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#### KTE2155 Occupational Safety and Labour Law: 3 ECTS

Learning outcomes

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#### KTE2095 Machine Automation Project: 3 ECTS

Learning outcomes

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#### KTE2096 Machine Elements 2: 3 ECTS

Learning outcomes

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#### KTE2097 Industrial Engineering and Management: 4 ECTS

**Learning outcomes** 

#### **KONE17-1013 COMPLEMENTARY STUDIES: 15 ECTS**

#### KTE1280 Fluid and Thermo Machinery: 5 ECTS

#### **Learning outcomes**

On completion of this course, students should be familiar with the thermodynamics, functioning, components, characteristics and selection of hydraulic and heating power machines, have learned energy production methods, types of power plant and energy economics and be able to analyse and carry out measurements of machines using modern IT-based methods.

#### KTE2259 Simulations of Mechanical Engineering: 5 ECTS

KTE2260 Applications of Mechanical Engineering: 5 ECTS

KONE17-1014 SPECIALISATION OPTION/ADVANCED PROFESSIONAL STUDIES: 20 ECTS

KONE17-1015 ADVANCED PROFESSIONAL STUDIES IN PRODUCTION AND MAINTENANCE: 20 ECTS

KTE2102 Project Learning in Enterprises 1: 10 ECTS

Learning outcomes

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KTE2103 Project Learning in Enterprises 2: 10 ECTS

Learning outcomes

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KONE17-1016 ADVANCED PROFESSIONAL STUDIES IN PRODUCT AND MACHINE DESIGN: 20 ECTS

KTE2098 Finite Element Method 1: 4 ECTS

**Learning outcomes** 

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KTE2099 Finite Element Method 2: 3 ECTS

Learning outcomes

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**KTE2100 Vibration Mechanics: 3 ECTS** 

Learning outcomes

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KTE2101 Machine Design: 5 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

KTE1285 Steel Structures: 5 ECTS

#### **Learning outcomes**

On completion of this course, students should have learned the basic skills necessary in the design of the most common load-bearing structures.

**KONE17-1017 ELECTIVE STUDIES: 7 ECTS** 

KMA0069 Introduction to Mathematics: 3 ECTS

#### Learning outcomes

On completion of this course, students who have completed only comprehensive school should have brushed up their mathematical skills.

KMA0133 Differential Mathematics (LUT): 4 ECTS

Learning outcomes

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KIVE0002 Russian 1: 2 ECTS

**Learning outcomes** 

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KIVE0004 Russian 2: 2 ECTS

Learning outcomes

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KIRU0008 Swedish Prep Course: 3 ECTS

**Learning outcomes** 

Proficiency level: B1

The student is able to speak and write grammatically and phonetically correct Swedish.

**KONE17-1018 PLACEMENT: 30 ECTS** 

**TEKUHARJ1 Placement 1: 15 ECTS** 

Learning outcomes

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**TEKUHARJ2 Placement 2: 15 ECTS** 

#### **Learning outcomes**

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**KONE17-1019 THESIS: 15 ECTS** 

KTE2382 Thesis Process: 3 ECTS

**Learning outcomes** 

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KTE2383 Thesis Seminars: 2 ECTS

**Learning outcomes** 

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KTE2384 Thesis Implementation and Report: 10 ECTS

**Learning outcomes** 

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