1. Subject name, code: Basic programming skills	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: Compulsory subject	**5. Evaluation:** Mid-term grade
6. Number of lessons per week (lecture+ exercise + lab): 2+0+2 **Number of consultation hours:**	**7. Credit value:** 4
8. Location of the subject: 2. semester	**9. Type of lecture:** Regular course
10. Prerequisites: Technical Mechanics	
11. Department: Department of Computer Science	
12. Subject coordinator: Dr. Pásztor Attila	
13. The teacher of the subject: Irházi Zoltán	

14. Subject description (published in Neptun)

The aim of teaching the subject:

The aim of the course is to familiarize students with the basics of C/C++ programming languages and to enable them to program an independent executable task and to learn the steps and the algorithms of programming through C/C++ languages

The knowledge to be acquired:

Algorithms, variables, program structure, programming steps, keywords, operators, logical operations, type conversion, instruction repetition, loops, preprocessor, arrays, character arrays, text manipulation functions, input output manipulation functions, pointers, indirection, , structure, scope of variables.

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

The student will understand the basics of programing.
Ability to solve calculations on practice given examples in said field.
Is able to evaluate realistically the results of his/her own work. Ability to program at a basic level in C++ in at least one major programming environment and to apply the main algorithms.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

Writing two program, each solving a programming problem on a computer in the lab.

Examination requirements:

16. Study aids, laboratory background:

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

[1] Nagy Sándor: A C/C++ programozási nyelv I. Kecskeméti Főiskola Műszaki Főiskolai Kar, Kecskemét 1993.

1. Subject name, code: CAD techniques	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: Compulsory subject	**5. Evaluation:** Mid-term grade
6. Number of lessons per week (lecture+ exercise + lab): 2+2+0 **Number of consultation hours:**	**7. Credit value:** 2
8. Location of the subject: 2nd semester	**9. Type of lecture:** Regular course
10. Prerequisites: none	
11. Department: Department of Innovative Vehicles and Materials	
12. Subject coordinator: Attila Piros, PhD	
13. The teacher of the subject: Attila Piros, Béla Csorba	

14. Subject description (published in Neptun)

The aim of teaching the subject:

The aim of the course is to prepare students for the computer-aided complex solution of mechanical construction design tasks. The basic aim of the laboratories is to acquaint students with Top-Down design and kinematic simulation of moving structures with the help of the built-in mechanism module.

The knowledge to be acquired:

Student is familiar with the special tools of computer aided design, both in terms of hardware and software. Student is familiar with the basic concepts, principles and methods of mechanical design. It systematizes the basic elements of computer-aided design into shape features. Identifies the geometric features of the component on which the modeling is based. Based on the degrees of freedom of movement, it distinguishes between fixed and indeterminate components. Students are aware of the geometric elements that can be used in 2D sketching. Knows the principles of the top-down structure of complex structures and assemblies consisting of several parts. Student is aware of advanced tools and methods for managing assemblies. Understands the special applications of documenting computer models. Student is informed about the methods of modeling mechanisms and some of their specific applications.

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

Selects computer software and hardware tools that match Top-Down design methods. Selects static or kinematically passive or active constraints for specific purposes when installing components. Able to create computer predecessors based on imaginary geometries. Apply, in a given CAD system, the top-down design technique to create part and assembly models. In the sketching module, you prepare the geometry to create the pre-design model. Able to create parametric, flexible models using special shape features. It uses the top-down principle when designing mechanical assemblies made by connecting several component models. Manages computer models of moving machine structures and mechanisms. Outline complex CAD models based on their master plan, overview, and production-level documentation.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

During the semester, there are two mid-term performance appraisals, which can be corrected or made up once. A satisfactory results in both of appraisals are a prerequisite for obtaining a satisfactory mid- term grade.

Examination requirements:

16. Study aids, laboratory background:

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

Horváth I., et al: Advanced Design Support, Delft University of Technology, 2005.

Stoll, H.W.: Product Design Method and Practices, Marcel Dekker, Inc., 1999.

The short description of the labs can be accessed in the following link: cad-feladatok.c3d.hu

1. Subject name, code: General mechanics	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: Compulsory subject	**5. Evaluation:** exam
6. Number of lessons per week (lecture+ exercise + lab): 2+1+0 **Number of consultation hours:**	**7. Credit value:** 4
8. Location of the subject: 2. semester	**9. Type of lecture:** Regular course
10. Prerequisites:	
11. Department: Department of Innovative Vehicles and Materials	
12. Subject coordinator: László Tóth, PhD	
13. The teacher of the subject: László Tóth, PhD	

14. Subject description (published in Neptun)

The aim of teaching the subject:

Students will get to know the basic theoretical and practical methods required in machine design, the methodology and documentation of machine measurement with a special purpose machine, and the operation of machines with the help of some specific application examples.

The knowledge to be acquired: The concept of the machine, their grouping. Smooth operation of the machine. Physical quantities and their relationships. Concept of mechanical work, power, efficiency. Task (hand winch). Friction and rolling resistance. Modification and transmission of mechanical work (stationary and moving auger). Friction and gear drive, belt drive. Task (friction slope). Belt drive. Compressed coil spring. Task (belt drive, gear drive). The machine operates at a steadily variable speed. Basics of fluid engineering. Hydrostatics, pressure measurement. Task (U-tube, hydraulic power converter). Mechanics of fluids (stationary flow in a tube for an ideal fluid, law of continuity, Bernoulli equation). Impulse theorem. Stationary flow in a tube for a viscous liquid. Task. Basic knowledge of thermology (basic concepts, heat conduction, convection, heat transfer). Flow engineering machines (pumps, fans). Caloric appliances (household refrigerators).

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

Based on the acquired knowledge, students are able to solve simpler construction and machine operation tasks in mechanical practice with independent work. They are able to continue their studies in the field of machine components and thermal and flow engineering machines. Consistent teaching and accountability methods help to take professional responsibility, recognize the importance of continuous learning, and the individual acquisition of the knowledge needed to master the subject.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

During the semester, we check the acquired level of knowledge by writing 2 pieces of 50-50 points written examination papers. If the scores of the booth examinations do not reach 50% of the maximum available score (minimum 25-25 points), we will give opportunity to write an 100-point extra written examination paper. Conditions for admission to the exam: At least 50% of the written examinations (at least 25-25 points) or the extra written examination must be at least 50 points.

Examination requirements:

The exam consists of a written and an oral part. At the request of the student, we accept the written examination papers result as the written part of the exam. In the oral exam, a ticket can be corrected compared to the written result. In the oral examination, at least a sufficient level of knowledge of all major parts of the material is required to obtain a successful exam grade.

16. Study aids, laboratory background:

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

Erik Oberg, Franklin D. Jones, Holbrook L. Horton , and Henry H. Ryffel: Machinery's Handbook 29th Edition, 2012, Industrial Press New York, ISBN 978-0-8311-2901-9

Joseph E. Shigley, Charles R. Mischke: Standard Handbook of Machine Design, second edition, ISBN 0-07-056958-4

1. Subject name, code: Heat Measurement	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: Compulsory subject	**5. Evaluation:** Examination
6. Number of lessons per week (lecture+ exercise + lab): 2+2+0 **Number of consultation hours:**	**7. Credit value:** 4
8. Location of the subject: 2th semester	**9. Type of lecture:** Regular course
10. Prerequisites: Physics	
11. Department: Department of Science and Engineering	
12. Subject coordinator: GÖRBE, Mihály, PhD	
13. The teacher of the subject: GÖRBE, Mihály, PhD, NAGY, Péter, PhD	

14. Subject description (published in Neptun)

The aim of teaching the subject:

Familiarization with the thermal phenomena occurring in technology and the machines that use them.

The knowledge to be acquired:

Summarization of preliminary knowledge in thermodynamics. Thermodynamic systems, interfaces, reversibility of processes. Work, heat, internal energy. The first law of thermodynamics for closed and open systems. Enthalpy. Thermal processes in perfect gases. Gas mixtures. Real gases. Changes of aggregate state, liquids, vapours. Humid air. The Second Law. Entropy and the heat diagram. Cyclic processes. Heat engines, thermal efficiency. The heat pumps, coefficiences of performance. Cycles in internal combustion heat engines: Otto, Diesel, Stirling, Brayton, Rankine and heat pump cycles. Phenomena of heat transfer, heat flow, thermal resistance. Heat conduction. Thermal conductivity of layered wall and thick wall tube. Heat convection. Heat radiation. Newton's law of cooling.

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

Have a comprehensive knowledge of the basic facts, directions and limits of the subject area of engineering.

Knowledge of the general and specific mathematical, scientific and social principles, rules, contexts and procedures necessary for the operation of the field of engineering.

Comprehensive knowledge of the operating principles and structural units of the machines, power tools, mechanical equipment and tools used.

Knowledge of measurement procedures, instruments, apparatus and measuring equipment used in mechanical engineering.

Ability to analyse at a basic level the disciplines making up the knowledge base of the field of engineering, to formulate relationships synthetically and to carry out appropriate evaluative activities.

Ability to identify routine technical problems and to identify, formulate and solve (using standard operations in practice) the theoretical and practical background required to solve them.

Ability to construct basic models of technical systems and processes.

Ability to communicate orally and in writing in his/her mother tongue and at least one foreign language in a professionally appropriate manner in his/her field of specialisation.

Open to understanding, accepting and authentically communicating professional and technological developments and innovations in the field of engineering.

Applies his/her acquired technical knowledge to gain the best possible understanding of observable phenomena and to describe and explain their laws.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

Depending on the evolution of the emergency situation and the decisions/recommendations of the faculty committee for method of assessment, changes may be possible in this point.

Four short tests will be written at the lectures. Only writing utensils and pocket calculators not suitable for storing textual information may be used for writing the short tests. The tests will take 25 minutes and will be worth 25 points. These tests may be fulfilled later only with a medical certificate. Admission to the examination (Article 11 of the Exam Rules): a total score of 50 or more at the start of the examination period.

Examination requirements:

Depending on the evolution of the emergency situation and the decisions/recommendations of the faculty committee for method of assessment, changes may be possible in this point.

The exam is written, lasts 90 minutes and is worth 100 points. It may contain questions regarding the material presented in the lectures and the material given for individual work, and regarding the exercise lessons, including theoretical questions and calculation problems requiring textual descriptions, drawings. Preparation for the theoretical part is aided by the examination thematics, which is published at the end of the semester. The following may be used in the examination: writing utensils, pocket calculators not suitable for storing textual information and a handwritten (not photocopied or printed) one-sided A5 format sheet of formulae written in blue pen. Half of the points above 50 obtained during the period of study will be added to the examination score. The examination mark will be determined in accordance with the table in § 11(2) of the Exam Rules.

16. Study aids, laboratory background:

Video explanations regarding the parts of the material assigned for individual work.
Documents, slides, tables published on Teams and/or Neptun Meet Street.

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

Hudson–Nelson: University Physics, Saunders College Publishing, 1990
Eastop–McConkey: Applied Thermodynamics for Engineering Technologists. Longman, Singapore
Schmidt–Ezekoye–Howell–Baker: Thermodynamics: an Integrated Learning System, Wiley, 2004
Cengel–Boles: Thermodynamics: an Engineering Approach, McGraw-Hill Education, 2018

1. Subject name, code: Mathematics II	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: Compulsory subject	**5. Evaluation:** Exam
6. Number of lessons per week (lecture+ exercise + lab): 2+2+0 **Number of consultation hours:**	**7. Credit value:** 5
8. Location of the subject: 2. semester	**9. Type of lecture:** Regular course
10. Prerequisites:	
11. Department: Department of Science and Engineering	
12. Subject coordinator: Tamás Ladics, PhD	
13. The teacher of the subject: Tamás Ladics, PhD	

14. Subject description (published in Neptun)

The aim of teaching the subject:

The aim of the course is to make the students learn the basic concepts and tools of advanced mathematical analysis that are necessary and required in engineering studies and later on in their profession.

The knowledge to be acquired:

Integral calculus of functions with one variable, methods of determining the indefinite integral. Riemann-Integral, Newton-Leibniz formula, applications: calculating area, surface, volume. Calculus of multivariable functions: partial derivatives, extreme value problems; double integral and its applications. Ordinary differential equations (ODE). Separable ODEs, first order linear ODEs, second order linear ODEs of constant coefficients. Applications of differential equations.

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

The students will become familiar with the basic concepts and tools of advanced mathematical analysis, they know and understand the scientific principles, relations and procedures that are necessary and required in engineering professions. They will be able to recognize a problem of higher mathematics, identify the adequate method to solve it and they can apply the method in a quick and precise manner. They are able to build an adequate mathematical model for a given technical problem, to generalize it for similar cases.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

During the semester two tests will be written, for 30-30 points. At the end of the semester the students can write one test to increase their points by replacing the results by the new one.

Examination requirements:

In the exam period the students write an exam for 40 points. They will be evaluated based on their total points (at most 100 possible) according to the valid TVSZ (regulation of study and examination).

16. Study aids, laboratory background:

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

George B. Thomas, Maurice D. Weir, Joel Hass, Frank R. Giordano: Thomas' Calculus,Pearson, 2009.

1. Subject name, code: Strenght of materials	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: compulsory subject	**5. Evaluation:** exam grade
6. Number of lessons per week (lecture+ exercise + lab): 2+2+0 **Number of consultation hours:** 16	**7. Credit value:** 4
8. Location of the subject: 2nd semester	**9. Type of lecture:** regular course
10. Prerequisites: Statics	
11. Department: Department of Innovative Vehicles and Materials	
12. Subject coordinator:	
13. The teacher of the subject: Papp Klaudia	

14. Subject description

The aim of teaching the subject:

The aim of the course Strenght of materials is to calculate the stresses, strains and deflections in materials of structural members under load in the range of the linear elasticity or the plastical deformation. Check the ability of the material to withstand an applied load without failure.

The knowledge to be acquired Axial, shear stresses in members, pulling, bending, shearing, twisting, stresses caused of combined loading, analysis of beams as buckling case, planar and three dimensional stress and strain cases, energy methods in calculation of deformations.

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

Students will become familiar with the basic facts, interrelationships, limits and boundaries of the knowledge and activity system of the field of modelling, calculations and verification of Strenght of materials. He/she is able to develop critical thinking skills necessary to formulate appropriate approach to problem solution. Ability to recognize and solve basic problems of Strenght of materials. Is able to evaluate realistically the results of his/her own work. He/she can apply the acquired technical scientific principles, rules, contexts and procedures in solving routine tasks in the field of mechanical engineering.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

During the semester, there are one mid-term performance appraisals, which can be corrected or made up once. A satisfactory results in both of appraisals are a prerequisite for obtaining a satisfactory mid- term grade.

Examination requirements:

There is a written exam the same topics but at a higher level than in the mid term grade was. The exam grade result means the final mark exclusively.

16. Study aids, laboratory background:

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

Meriam, J.L., Kraige, L.G. Engineering mechanics - Statics, John Wiley and Sons, 1997.
Nelson, E.W., Best, C.L., Mc Lean, W.G., Schaum's outline of Theory and Problems of Engineering Mechanics, Statics and Dynamics, McGraw-Hill, 1997.
Mc Lean, W.G., Nelson, E.W., Schaum's outline of Theory and Problems of Engineering Mechanics, Statics and Strength of Materials, McGraw-Hill, 1991

1. Subject name, code: Electrical Engineering	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: Compulsory subject	**5. Evaluation:** Mid-term grade
6. Number of lessons per week (lecture+ exercise + lab): 2+2+0 **Number of consultation hours:**	**7. Credit value:** 4
8. Location of the subject: 2. semester	**9. Type of lecture:** Regular course
10. Prerequisites: -	
11. Department: Department of Information Technology	
12. Subject coordinator: Janos Arpad Kosa, PhD	
13. The teacher of the subject: Janos Arpad Kosa, PhD	

14. Subject description (published in Neptun)

The aim of teaching the subject:

The aim of the course Electrical Engineering is to familiarise students with nature and types of electric circuits, basic notions, types of circuit elements regarding DC and AC circuits.

Students will learn about the power system, power-supply, and the theoretical background of its applications.

The knowledge to be acquired:

Types, characteristic and connections of circuit elements (generators, resistors, capacitors, coils).

DC circuit and the behaviour of elements in a DC circuit. Ohm's law. Ideal and non-ideal generators.

DC circuit and the behaviour of elements in a DC circuit. Ohm's law. Ideal and non-ideal generators. Electric power, work. Power fitting. Joule's law. Complex circuits. Kirchhoff's laws. Voltage divider and current divider. Complex voltage divider. Increasing of the measuring limit of instruments. Law of linear superposition, conditions for its applicability. Analysis of complex active circuits by equivalent transformations. Transfer of ideal generators. Thevenin's theorem and Norton's theorem. Determination of the currents of bridge connections by Thevenin's theorem.

AC circuits. Properties and connections of capacitors and coils, impedance. Serial and parallel resonances, filters. Kirchhoff's laws in the frequency domain. AC powers in one- and three-phase systems. Mutual inductance, induction. Induction law. Parameters of transformers and their sizing.

Materials for electrical industry.

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

Students will become familiar with the basic facts regarding electricity, and they study interrelationships, the knowledge, and the system of the field of electricity. They able to apply the acquired technical scientific principles in their professional field, ability to understand and process technical documentation. They are opened to general and specific knowledge underpinning the technical discipline.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

During the semester, one final examination will be written, which can be corrected or made up once. A satisfactory result in the final examination is a prerequisite for obtaining a satisfactory mid-semester grade. The mid-term mark is the final examination mark.

Examination requirements:

16. Study aids, laboratory background:

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

Charles K. Alexander, Matthew N. O. Sadiku: Fundamentals of Electric Circuits, 5th Edition, McGraw-Hill, New York 2013, ISBN: 978-0-07338057-5;

Adel S. Sedra, Kenneth C. Smith: Microelectronic Circuits, 6th Edition, Oxford University Press 2011, ISBN: 978-019-973851-9

1. Subject name, code: Control engineering	
2. Name of course, level of education: Vehicle engineer BSc	**3. Language:** English
4. Subject category: Compulsory subject	**5. Evaluation:** end semester exam
6. Number of lessons per week (lecture+ exercise + lab): 2+0+2 **Number of consultation hours:**	**7. Credit value:** 3
8. Location of the subject: 4. semester	**9. Type of lecture:** Regular course
10. Prerequisites: Physics	
11. Department: Department of Computer Science	
12. Subject coordinator: Dr. Lóránt Kovács	
13. The teacher of the subject: Ivánovics Gergely	

14. Subject description (published in Neptun)

The aim of teaching the subject:

The aim of the course is to introduce students to the basics of control engineering.

The knowledge to be acquired:

Basic concepts of control engineering, ways of describing it, interpretation of the functional and the action diagram. Mathematical methods of describing control processes in terms of time, frequency and Laplace transform. Types of control terms (proportional, differentiating, integrating, PI, PD, PID). Identification of stability problems and ways of correcting them using a computer program.

Professional competences to be acquired (knowledge, skills, attitudes, autonomy and responsibility):

The student knows the terminology related to control engineering. The student will be able to analyse control systems based on the knowledge of the principles. The student is able to build on the basic knowledge acquired to acquire deeper knowledge independently, to study the literature and to solve problems in the field.

15. System of assessment and evaluation (published in Neptun)

Semester requirements:

Continuous learning of basic concepts, continuous processing of parts of the material.

Examination requirements:

The exam is a written exam, which you can prepare for on the basis of the given list of questions and sample papers.

16. Study aids, laboratory background:

17. List of the 2-5 most important compulsory or recommended literature (notes, textbooks) with bibliographic data (author, title, publication details, ISBN) (published in Neptun):

[1] Madarász László: Irányítástechnika. Analóg irányításelmélet. H-247[2] Madarász László: Irányítástechnika példatár. Analóg ismeretek. H-220[3] Vágó I.: Irányításelmélet. Kecskeméti Főiskola GAMF Kar, H-247.[4] Vágó I.: Irányítástechnika példatár. Kecskeméti Főiskola GAMF Kar, H-305.) [5] Nagyné Cséky Zs: Gyakorlati szabályozástechnika példatár. Kjecskeméti Főiskola GAMF Kar, H-402[6] Csáki F.: Szabályozások dinamikája. Akadémiai Kiadó, Budapest, 1966.