



MECHANICAL ENGINEERING BSC

UNIVERSITY OF DUNAÚJVÁROS

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DESCIPTION OF THE DEGREE STUDY PROGRAM

| Med | hanical Engineering BSc |
|---|---|
| (N | Aechanical Engineering) |
| The higher educational institution responsible for | University of Dunaújváros |
| the study program: | |
| Identification number of higher educational | FI60345 |
| institution: | |
| Address of higher educational institution: | Táncsics Mihály utca 1/A, 2400 Dunaújváros |
| Authorized head of the institution | Dr. István András, Rector |
| Responsible persons for the study program | |
| Responsible institute: | Institute of Engineering Sciences |
| Director of institute: | Dr. habil. Róbert Sánta, PhD |
| Responsible person for the study program: | Dr. Szabó Attila, PhD, college associate professor |
| Specializations (majors) and responsible | |
| persons: | |
| Machine Maintenance and Technical Diagnostic | Dr. Szabó Attila, PhD, college associate professor |
| Green Transformation | Dr. Kovács-Bokor Éva, PhD, college associate professor |
| Nuclear Energy | Dr. Wizner Krisztián, PhD, college associate professor |
| Main aspects of the study program: | |
| Precondition of student application acceptance: | General Certificate of Education or a certificate of secondary school |
| | final exam, that certificate, which is required to start a higher |
| | educational study program in the home country of the student, the level |
| | of the required English language knowledge to start bachelor studies: |
| | IELTS 5.5 |
| Level of educational program: | undergraduate |
| Level of qualification: | bachelor (BSc) |
| Description of qualification in the | gépészmérnök |
| diploma in Hungarian | |
| Description of qualification in | Mechanical Engineer |
| the diploma in English | |
| Scheme of Study: | 7 semesters |
| Credit points to be acquired: | 210 |
| The objectives of the training and the professional | The aim of the training is to train mechanical engineers who are capable |
| competencies to be acquired | of operate machinery and mechanical equipment and |
| | and maintenance of machinery and equipment, the introduction of |
| | engineering technologies, and the organisation and management of |
| | work, the technical and technical |
| | the tasks of technical development, research and design of average |
| | complexity the requirements of the labour market; and |
| | a sufficient depth of theoretical knowledge for the second stage of |
| | training a second cycle of training. |
| Criteria for choosing a specialisation | Completion of 90 credits |
| | In the semester specified in the curriculum, at least one specialization is |
| | started, which most students choose. Starting more than one |
| | specialization is only possible if at least 15 people have chosen it. |
| Practical training | In the 7th (last) semester, at least 6 weeks of organized practice at a |
| | professional practice location |
| Final certificate (diploma) | Nftv. § 108.47. paragraph 47: "The successful completion of the |
| as a condition for the issue of | examinations prescribed in the curriculum and - with the exception of the |
| | preparation of the thesis (diploma thesis) - the fulfilment of other study |
| | requirements and the acquisition of the credits prescribed in the training |
| | and outcome requirements, which certifies that the student has fully met |
| | the study and examination requirements prescribed in the curriculum |
| | without grading and assessment." |
| | The University makes the award of the diploma (diploma) conditional on |
| | the completion of the foreign language requirement, which is the |
| | and completion of the foreign language requirement, which is the |

| | completion of a professional subject in a foreign language, as required by |
|--|--|
| | the institution responsible for the course. |
| Diploma work | The diploma work consists in the solution of a mechanical engineering task or elaboration of a research task arising in a specific professional field that, relying on the knowledge acquired by the student during his/her studies, can be completed during a semester by means of |
| | studying additional special literature and under the management of internal and industrial consultants. By means of the diploma work, the candidate certifies that he/she obtained adequate skill in the practical application of the knowledge acquired, is capable of performing |
| | mechanical engineering tasks and, in addition to the curriculum, is also familiar with and capable of applying other professional literature in a value crating way. Formal requirements: the size of diploma work shall be 50 to 70 pages. |
| Final examination | the final examination is a test and assessment of the knowledge, skills and abilities required to obtain a diploma, during which the student must also demonstrate that he or she can apply the knowledge acquired. The final examination consists of the defence of a thesis and an oral examination in the subjects specified in the curriculum. |
| Nuclear Energy specialisation final examination subjects | ZV1: Fluid machinery DUEN (L)-MGT-212; Heat engines DUEN(L)-MGT-151 Basics of Atomenergetics DUEN(L)-MGT-118. |
| | ZV2: Basics of nuclear safety DUEN(L)-MGT-117; Equipments of Nuclear Power Plants DUEN(L)-MGT-152; Ensuring the integrity of equipment DUEN(L)-MGT-119; |
| Machine Maintenance and Technical Diagnostic specialisation final examination subjects | ZV1: Maintenance strategy DUEN(L)-MGT-254, Maintenance technologies 2.DUEN(L)-MGT-253 Tribology DUEN(L)-MUG-118 |
| | ZV2: Industrial drive technology DUEN(L)-MGT-251; Technical Diagnostics 1. DUEN(L)-MUG-157 Technical Diagnostics 2. DUEN(L)-MUG-219 |
| Green Transformation specialisation final examination subjects | ZV1: Fluid machinery DUEN (L)-MGT-212; Heat engines DUEN(L)-MGT-151 Basics of energy saving and conservation DUEN(L)-MGT-153 |
| | ZV2: Energy management DUEN(L)-MGT-114; Renewable energy DUEN(L)-MGT-115 Novel techniques of environmental protection DUEN(L)-MGT-216 |
| Diploma average | The result of diploma shall be calculated as follows: $(SE + D + TA)/3$. Arithmetical mean of marks for final examination subjects (SE), Mark for diploma work (D) awarded by the Final Examination Committee, weighted study average (TA) related to the total number of credits acquired during the full study period except the preparation of diploma work |
| Qualification of diploma | excellent 4.51 – 5.00; good 3.51 – 4.50; average 2.51 – 3.50; acceptable 2.00 – 2.50 |
| Conditions for the award of a diploma | Successful completion of the final examination is a prerequisite for the award of a diploma certifying the completion of higher education. |
| Language education | English |

| Physical Education | Over 4 semesters, 2 hours per week (full-time only) |
|--------------------|---|
| Study order: | Full-time course |

Expected engineering competencies

a) knowledge

- Has a comprehensive knowledge of the basic facts, directions and boundaries of the subject

of the technical field.

- Knows the general and specific mathematical, natural and social science principles, rules,
- connections and procedures necessary for the operation of the technical field.
- Knows the conceptual system, the most important contexts and theories related to his / her field.
- Comprehensive knowledge of knowledge acquisition and problem solving methods of the main theories of his / her field.
- Comprehensive knowledge of basic economic, business and legal rules and tools.
- Has an in-depth knowledge of the structural materials used in the field of mechanical engineering, the methods of their production and the conditions of their application.
- Basic knowledge of machine design principles and methods, machine building technology, control engineering procedures and operational processes.
- Has a comprehensive knowledge of the operating principles and structural units of the applied work and power machines, mechanical equipment and devices.
- Comprehensively knows the measurement procedures used in mechanical engineering, their tools, instruments and measuring equipment.
- Familiar with the expectations and requirements of the fields of work and fire protection, safety technology and occupational health required for his / her field of expertise, as well as the relevant regulations of environmental protection.
- Comprehensive knowledge of the basics of logistics, management, environmental protection, quality assurance, information technology, law, economics, their boundaries and requirements, which are integral to the field of mechanical engineering.
- Has an in-depth knowledge of the learning, knowledge acquisition and data collection methods of the field of mechanical engineering, their ethical limitations and problem-solving techniques.
- Knowledge of methods and tools for cost-benefit analysis in the corporate economy and on a technical basis.
- Can interpret, characterize and model the structural units of mechanical systems, the structure and operation of their elements, the design and connection of the applied system elements.
- Can apply the number of objectives, modeling principles and methods of mechanical product, process and technological design.

b) skills

- Is able to perform a basic analysis of the disciplines that make up the knowledge system of the technical field, to formulate the connections synthetically and to perform adequate evaluation activities.
- Is able to apply the most important terminologies, theories and procedures of the given technical field when performing the tasks related to them.
- Ability to plan, organize and perform independent learning.
- Ability to identify routine professional problems, to explore, formulate and solve (using practical operations in practice) the theoretical and practical background needed to solve them.
- Is able to understand and use the typical literature, computer and library resources of his / her field.
- Is able to apply the acquired IT knowledge in solving the tasks arising in his / her field.
- Ability to create basic models of technical systems and processes.
- Able to use his knowledge in a creative way to effectively manage the resources of his workplace.
- Able to apply and comply with safety, fire protection and hygiene rules and regulations in the course of his work.
- Ability to communicate orally and in writing in his / her mother tongue and at least one foreign language in a professionally adequate manner, in accordance with his / her field of expertise.
- Able to apply technical regulations related to the operation of mechanical systems, the principles of setting up and operating machines and mechanical equipment, and economic contexts.
- Ability to manage and control technological production processes, keeping in mind the elements of quality assurance and quality control.
- Able to diagnose mechanical failures, select remedial operations, solve repair technology tasks

c) attitude

- Undertakes and authentically represents the social role of its profession, its fundamental relationship with the world.
- Open to getting to know and accept professional, technological development and innovation in the technical field, and to mediate it authentically.

- Strives to make self-education a means of achieving its professional goals.
- Makes its decision in full compliance with legal and ethical standards, even in situations that require a complex approach or in unexpected decision-making situations.
- Strives to solve problems as much as possible in collaboration with others.
- Strives for its self-education in the field of mechanical engineering to be continuous and in line with its professional goals.
- Strives to solve its tasks and management decisions by getting to know the opinions of the supervised employees, preferably in cooperation.
- Has adequate endurance and monotony tolerance to perform practical activities.
- Open to the use of IT tools, seeks to learn and apply software belonging to the field of mechanical engineering, knows and manages at least one such program at a skill level.
- Open and receptive to the application of new, modern and innovative procedures and methods related to organic farming and health awareness.
- Applying the acquired technical knowledge, he strives to get to know the observable phenomena as thoroughly as possible, to describe and explain their laws.
- In the course of his work, observes and complies with the relevant safety, health protection, environmental protection and quality assurance and control requirements.

d) Autonomy and responsibility

- Even in unexpected decision-making situations, independently considers and develops comprehensive, fundamental professional issues on the basis of specific sources.
- Recognizes and represents the values of the engineering profession responsibly, openly accepts professionally grounded critical remarks.
- In the course of performing professional duties, he/she also cooperates with qualified specialists in other fields (primarily technical, as well as economic and legal).
- Identifies the shortcomings of the applied technologies, the risks of the processes and initiates the measures to reduce them.
- Monitors legislative, technical, technological and administrative changes in the field.
- On the basis of the instructions of his/her workplace manager, he/she manages the work of the assigned personnel, supervises the operation of the machines and equipment.
- Evaluates the efficiency, effectiveness and safety of the work of subordinates.
- Pays attention to the promotion of the professional development of its subordinates, to the management and assistance of their efforts in this direction, and to the application of the principle of equal access.
- Share your experiences with your co-workers, thus helping their development.
- Takes responsibility for the consequences of your technical analyzes, proposals based on them, and decisions made.

CURRICULUM TABLES

| Full time | | | Mechani | cal | En | gin | eer | ing | , BS | с | | | | | | | | | | | | | | | |
|--------------|---|--------|------------|----------|----------|----------|-----------|-----------|----------|----|---------|-----------|-----|---------|-----------|---------------|---------------|----|---|---|----------|---------------|----|----|-----------------------|
| | | | | | | - | | | - | Se | mes | ster | - C | las | ses | per | we | ek | | | | | | Т | |
| Subject code | Subject name | Credit | Requiremen | \vdash | 1 | | Τ | 2 | | | 3 | | | 4 | | · · · | 5 | | | 6 | | | 7 | | Prerequisite |
| | | | t | Т | P | L | Т | Ρ | L | Т | Р | L | Т | Р | L | Т | Р | L | Т | P | L | Т | P | L | • |
| DUEN-IMA-152 | Engineering Mathematics 1. | 5 | Е | 0 | 3 | 0 | \square | | | | | | | | | | | | | | | | + | - | - |
| DUEN-ISF-010 | Informatics | 5 | М | 0 | | 3 | | \square | | | | | | | | | | | | | | | + | - | - |
| DUEN-MGT-111 | Engineering representation | 5 | М | 1 | 2 | 0 | \square | | | | | | | | | | | | | | | - | + | - | - |
| DUEN-MUG-152 | | 5 | E | 1 | 2 | | | | | | | | | | | | | | | | | | + | - | - |
| DUEN-MUG-212 | | 5 | М | 0 | 0 | 3 | \vdash | \square | | | | | | | | | | | | | | | + | 1 | - |
| | Engineering Physics | 5 | E | 1 | 1 | _ | \vdash | \vdash | | | | | | | | | - | | | | | - | + | -† | - |
| DUEN-IMA-212 | <u> </u> | 5 | M | - | | - | 0 | 0 | 3 | | | | | | | \neg | \neg | | | | | | + | - | DUEN-IMA-152 |
| | Industrial materials | 5 | М | | | \vdash | 1 | 0 | | | | | | | | | | | | | | - | + | -† | - |
| | | - | | | | \vdash | 1 | - | - | | | | | | | \neg | \neg | - | | | | - | + | -† | DUEN-MUG-212 |
| DUEN-MUG-222 | Basics of machine design | 5 | м | | | | 2 | 1 | 0 | | | | | | | | | | | | | | | | DUEN-MUG-152 |
| | busies of interime design | - | | | | | - | - | | | | | | | | | | | | | | | | | DUEN-MGT-111 |
| DUEN-MUG-257 | Mechanics 2 | 5 | Е | | | 1 | 1 | 2 | 0 | | | \vdash | | | \square | + | + | - | | | + | + | + | ┥ | DUEN-MUG-15 |
| | Heat and Fluid Dynamics | 5 | E | | | - | 1 | 1 | | | | \square | | | | + | + | | | | \neg | + | + | ┥ | DUEN-MUT-151 |
| | Entrepreneurship | 5 | M | | | \vdash | 1 | 2 | 0 | | | | | | | | | - | | | | - | + | -† | - |
| DUEN-IMA-110 | | 5 | M | | | + | Ľ | - | Ť | 0 | 3 | 0 | | | | + | + | - | | | | + | + | + | DUEN-IMA-152 |
| | Engineering construction | 5 | M | \vdash | | \vdash | ⊢ | + | | 1 | 2 | | | | | + | + | - | | | | - | + | + | DUEN-MGT-111 |
| | Technology of Structural Materials | 5 | M | ⊢ | - | + | ⊢ | + | | 1 | 0 | 2 | | _ | | + | + | - | | | | + | + | + | - |
| DUEN-MUG-153 | | 5 | E | ⊢ | - | + | ⊢ | + | | 1 | 2 | | | | \vdash | + | + | - | | | | + | + | + | DUEN-MUG-152 |
| | Human Resource Managment | 5 | M | \vdash | \vdash | \vdash | \vdash | - | | 1 | 2 | ŏ | | | | - | - | - | | | | - | + | + | Debit Med 15 |
| DUEN-TVV-114 | <u> </u> | 5 | M | ⊢ | - | + | ⊢ | + | + | 1 | 2 | 0 | | | \square | + | + | - | | | | + | + | + | - |
| - | Optional course | 5 | - | ⊢ | - | + | ⊢ | + | | - | ~ | Ť | | | | + | + | - | | | \neg | + | + | + | - |
| | Basics of energetics | 5 | M | - | - | + | \vdash | + | | | | | 2 | 0 | 1 | + | + | - | | | | -+ | + | + | - |
| DUEN-MGT-212 | | 5 | M | \vdash | - | + | ⊢ | + | + | | | | 2 | 0 | | + | + | - | | | | + | + | + | DUEN-MUT-250 |
| | | | 141 | \vdash | \vdash | \vdash | \vdash | - | | | | | | | | + | - | - | | | | - | + | + | DUEN-MUG-152 |
| DUEN-MGT-251 | Industrial drive technology | 5 | E | | | | | | | | | | 2 | 1 | 0 | | | | | | | | | | DUEN-MUG-222 |
| DUEN_MGT_252 | Industrial automatics | 5 | Е | \vdash | \vdash | \vdash | \vdash | + | | | | | 1 | 2 | 0 | - | - | - | | | | - | + | + | DUEN-IMA-152 |
| | Production Technology | 5 | E | \vdash | \vdash | \vdash | \vdash | \vdash | + | | | | 2 | 1 | | + | + | - | | | + | + | + | + | DUEN-MUG-152 |
| - | Specialisation | 20 | - | - | - | + | ⊢ | + | | | | | ~ | 1 | - | + | - | - | | | \neg | + | + | + | - |
| - | Optional course | 5 | - | \vdash | \vdash | \vdash | \vdash | + | + | | | | | | | - | - | - | | | | + | + | + | - |
| DUEN-MGT-151 | • | 5 | E | ⊢ | - | + | ⊢ | + | + | | | | | | \square | 2 | 1 | 0 | | | \neg | + | + | + | DUEN-MGT-212 |
| DUEN-MOI-151 | Specialisation | 20 | - | ⊢ | - | + | ⊢ | + | | | | | | _ | | - | | - | | | \dashv | \rightarrow | + | + | DUEN-MOI-212 |
| - | Optional course | 5 | - | - | - | + | ⊢ | + | | | | | | _ | | + | + | - | - | - | - | + | + | + | - |
| - | Optional course | 5 | - | - | - | + | ⊢ | - | | | | | | | | - | \rightarrow | - | - | - | - | - | + | + | - DUEN-MUG-257 |
| DUEN-MUG-213 | Metrology | 5 | M | | | | | | | | | | | | | | | | 2 | 0 | 1 | | | | DUEN-MUG-222 |
| | Optional course | 5 | | - | - | + | ⊢ | + | | | - | | | _ | \square | \rightarrow | \rightarrow | - | | | \neg | \rightarrow | + | + | DUEN-MUG-222 |
| - | Optional course | 2 | - | - | - | + | ⊢ | - | + | | | | | _ | | \rightarrow | \rightarrow | - | | | | - | - | - | - |
| | | | | | | | | | | | | | | | | | | | | | | 0 | 9 | 0 | finishing all subject |
| DUEN-MUG-091 | Thesis project | 15 | S | | | | 1 | | | | | | | | | | | | | | | ۷ | " | | of the 1-6 semeste |
| DUEN-MUG-093 | Professional Practice | 0 | S | - | - | - | | + | \vdash | | | \vdash | | | \vdash | + | - | _ | | | \dashv | 0 | + | 0 | - |
| | Quality Management | 5 | M | - | - | - | - | - | | | | | | | | \rightarrow | \rightarrow | - | | | \neg | 2 | + | 0 | |
| | Environmental protection and energy management | 5 | M | - | - | - | - | - | | | | | | | \vdash | - | \rightarrow | - | | | - | 2 | + | - | - |
| DUEN-MUT-110 | | - | 1/1 | 2 | | - | | | | - | | | | | 2 | ~ | - | _ | 2 | | | | | | - |
| | Number of Theoretical/Practice/Lab classes per week | - | | 5 | 18 | 7 | 0 | 6 18 | 6 | > | # 18 | | | 4 15 | | 2 | 1 3 | 0 | 2 | 3 | 1 | | # | 1 | |
| | Total number of classes per week | - | | \vdash | 18 | • | | 19 | , | | 19 | | | | | | 3 | | | 3 | | | 15 | _ | |
| | Total credit points | | | | | | | | | | | | | 210 | | | | | | | | | | | |

| | MACHINE M | AINTE | NANCE AND | TEC | н | IC. | AL | DLA | GN | OST | ICS | | | | | | | | | | | | | |
|--------------|---|--------|-----------------|-----|---|-----|----|-----|----|-------|------|-------|------|------|-----|------|----|---|----|---|---|---|---|---------------|
| | | | Requiremen | | | | | | 5 | em | este | r - (| Clas | sses | pei | r we | ek | | | | | | | |
| Subject code | Subject name | Credit | Kequiremen t | | 1 | | | 2 | | 1 | 3 | | 4 | | | 5 | | | 6 | | | 7 | | Prerequisite |
| | | | | Т | P | L | Т | P | L | r 1 | P L | Τ | P | L | Τ | Р | L | Τ | P | L | Т | P | L | |
| DUEN-MGT-113 | Maintenance technologies 1. | 5 | M | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | DUEN-MUG-222 |
| DUEN-MUG-111 | Production planning, CAM | 5 | M | | | | | | | | | | | | 2 | 0 | 1 | | | | | | | DUEN-MUG-252 |
| DUEN-MUG-118 | Tribology | 5 | M | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | DUEN-MUG-222 |
| DUEN MUC 167 | Technical Diagnostics 1. | | Е | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | DUEN-MUG-153, |
| DUEN-MUG-137 | Technical Diagnostics 1. | 5 | <u>ь</u> | | | | | | | | | | | | - | 1 | 0 | | | | | | | DUEN-IMA-110 |
| DUEN-MGT-253 | Maintenance technologies 2. | 5 | E | | | | | | | | | | | | | | | 2 | 1 | 0 | | | | DUEN-MGT-113 |
| DUEN-MGT-254 | Maintenance strategy | 5 | E | | | | | | | | | | | | | | | 2 | 1 | 0 | | | | DUEN-MGT-113 |
| DUEN-MUG-216 | Complex Machine Designing | 5 | M | | | | | | | | | | | | | | | 0 | 0 | 2 | | | | - |
| DUEN-MUG-219 | Technical Diagnostics 2. | 5 | M | | | | | | | | | | | | | | | 2 | 0 | 1 | | | | DUEN-MUG-157 |
| | Number of Theoretical/Practice/Lab classes per week | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 0 |) 0 | 0 | 0 | 0 | 8 | 3 | 1 | 6 | 2 | 3 | 0 | 0 | 0 | |
| | Total number of classes per week |] | | | 0 | | | 0 | | (|) | | 0 | | | 12 | | | 11 | | | 0 | | |
| | Total credit points | | | | | | | | | | | | 40 | | | | | | | | | | | |

| | | GRI | EEN TRANSF | OR | MA | TIC |)N | | | | | | | | | | | | | | | | | | |
|--------------|--|--------|-----------------|----|----|-----|----|---|---|-----|------|----|------|-----|------|-----|----|----|---|---|---|---|---|---|--------------|
| | | | Requiremen | Γ | | | | | | Sen | iest | er | - Cl | ass | es j | per | we | ek | | | | | | | |
| Subject code | Subject name | Credit | kequiremen t | | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | | 7 | | Prerequisite |
| | | | | Τ | P | L | Т | Ρ | L | Т | Р | L | T | P | L | Т | P | L | Т | Ρ | L | T | Ρ | L | |
| DUEN-MGT-114 | Energy management | 5 | M | | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | - |
| DUEN-MGT-115 | Renewable energy | 5 | M | | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | DUEN-MUT-250 |
| DUEN-MGT-153 | Basics of energy saving and conservation | 5 | E | | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | - |
| DUEN-TGT-252 | Sustainable Finance and Bigtech Companies in Finance | 5 | E | | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | - |
| DUEN-MGT-215 | Practical application of renewable energy sources | 5 | E | | | | | | | | | | | | | | | | 0 | 0 | 3 | | | | - |
| DUEN-MGT-216 | Novel techniques of environmental protection | 5 | E | | | | | | | | | | | | | | | | 2 | 0 | 1 | | | | - |
| DUEN-MGT-257 | Basic Priciples of Hydrogen Technology | 5 | E | | | | | | | | | | | | | | | | 2 | 1 | 0 | | | | - |
| DUEN-MGT-258 | Basics of the circular economy | 5 | E | | | | | | | | | | | | | | | | 2 | 1 | 0 | | | | - |
| | Number of Theoretical/Practice/Lab classes per week | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 | 4 | 0 | 6 | 2 | 4 | 0 | 0 | 0 | |
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| | | | NUCLEAR E | NEF | (G) | ζ | | | | | | | | | | | | | | | | | | |
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| | | | Beeninemen | | | | | | 5 | Sem | este | r - C | Clas | ses | per | we | ek | | | | | | | |
| Subject code | Subject name | Credit | Requiremen | | 1 | | | 2 | | 3 | ; | | 4 | | | 5 | | | 6 | | | 7 | | Prerequisite |
| | | | t | Τ | Ρ | L | Т | P | L | ΤI |) L | Т | P | L | Т | Ρ | L | Т | Р | L | Т | Ρ | L | _ |
| DUEN-MGT-117 | Basics of nuclear safety | 5 | M | | | | | | | | | | | | 2 | 0 | 1 | | | | | | | - |
| DUEN-MGT-118 | Basics of Atomenergetics | 5 | M | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | - |
| DUEN-MGT-119 | Ensuring the integrity of equipment | 5 | M | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | - |
| DUEN-MGT-152 | Equipments of Nuclear Power Plants | 5 | E | | | | | | | | | | | | 2 | 1 | 0 | | | | | | | - |
| DUEN-MGT-213 | Industrial knowledge | 5 | M | | | | | | | | | | | | | | | 2 | 0 | 1 | | | | - |
| DUEN-MGT-214 | Operation and maintenance practice | 5 | M | | | | | | | | | | | | | | | 0 | 0 | 3 | | | | - |
| DUEN-MGT-255 | Radiation protection and environmental policy | 5 | E | | | | | | | | | | | | | | | 2 | 1 | 0 | | | | - |
| DUEN-MGT-256 | NPP measurements and NDT | 5 | E | | | | | | | | | | | | | | | 2 | 1 | 0 | | | | - |
| | Number of Theoretical/Practice/Lab classes per week | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 (| 0 (| 0 | 0 | 0 | 8 | 3 | 1 | 6 | 2 | 4 | 0 | 0 | 0 | |
| | Total number of classes per week |] | | | 0 | | | 0 | | (|) | | 0 | | | 12 | | | 12 | | | 0 | | |
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| Subject code | Subject name | Credit | t | | 1 | | - | 2 | - | | 3 | _ | | 4 | _ | | 5 | _ | _ | 6 | _ | | 7 | _ | Prerequisite |
| | | | | Т | - | L | | Р | L | Т | Р | L | Т | Р | L | Т | Р | L | T | Р | L | Т | Р | L | |
| | Engineering Mathematics 1. | 5 | E | 0 | | 0 | | _ | - | | | _ | | _ | + | | _ | + | _ | _ | | | | | - |
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| DUEL-MUG-152 | | 5 | E | 5 | | 0 | | | | | | _ | _ | _ | + | | _ | + | _ | _ | | | | | - |
| DUEL-MUG-212 | | 5 | M | 0 | | 15 | | | | | | _ | | _ | + | | _ | + | | _ | | | | | - |
| | Engineering Physics | 5 | Е | 5 | 5 | 5 | + | | | | | _ | | _ | \rightarrow | | _ | + | | _ | | | | | - |
| | Engineering Mathematics 2. | 5 | M | | | | 0 | | 15 | | | _ | | | \rightarrow | | | \perp | | _ | | | | | DUEL-IMA-15 |
| DUEL-MST-210 | Industrial materials | 5 | M | | | | 5 | 0 | 10 | | | | | | | | | | | | | | | | - |
| DUEL-MUG-222 | Basics of machine design | 5 | М | | | | 10 | | 0 | | | | | | | | | | | | | | | | DUEL-MUG-2 DUEL-MUG-1 DUEL-MGT-1 |
| DUEL-MUG-257 | Mechanics 2. | 5 | E | | | | 5 | 10 | 0 | | | | | | | | | | | | | | | | DUEL-MUG-1 |
| DUEL-MUT-250 | Heat and Fluid Dynamics | 5 | Е | | | | 5 | 5 | 5 | | | | | | | | | | | | | | | | DUEL-MUT-1 |
| DUEL-TVV-122 | Entrepreneurship | 5 | М | | | | 5 | 10 | 0 | | | | | | | | | | | | | | | | - |
| DUEL-IMA-110 | Mathematics 3. | 5 | М | | | | | | | 0 | 15 | 0 | | | | | | | | | | | | | DUEL-IMA-15 |
| | Engineering construction | 5 | М | | | | \square | | | | | 0 | | | | | | \top | | | | | | | DUEL-MGT-11 |
| | Technology of Structural Materials | 5 | М | | \square | | \square | | | 5 | 0 | 10 | | | | | | + | | | | | | | - |
| DUEL-MUG-153 | | 5 | Е | \square | \square | | \vdash | | | | 10 | | | | + | | | + | | | | | | | DUEL-MUG-1 |
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| - | Optional course | 5 | - | \vdash | \vdash | | \vdash | \vdash | | - | | - | - | - | - | | | + | | | | | | | - |
| DUEL-MGT-211 | Basics of energetics | 5 | М | | \vdash | | \vdash | - | | | | | 10 | | 5 | | - | + | | - | | | _ | | |
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| | Industrial drive technology | 5 | Е | | | | | | | | | | 10 | 5 | 0 | | | | | | | | | | DUEL-MUG-22 |
| | Industrial automatics | 5 | E | | | | | | | | | | 5 | 10 | 0 | | | | | | | | | | DUEL-IMA-15 |
| DUEL-MUG-252 | Production Technology | 5 | Е | | | | | | | | | | 10 | 5 | 0 | | | | | | | | | | DUEL-MUG-1 |
| - | Specialisation | 20 | - | | | | | | | | | | | | Т | - | - | - | | | | | | | - |
| - | Optional course | 5 | - | | | | | | | | | | | | | - | - | - | | | | | | | - |
| DUEL-MGT-151 | Heat engines | 5 | Е | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | DUEL-MGT-2 |
| - | Specialisation | 20 | - | | | | | | | | | | | | | | | \top | - | - | - | | | | - |
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| DUEL-MUG-213 | • | 5 | М | | | | | | | | | | | | | | | 1 | 10 | 0 | 5 | | | | DUEL-MUG-22 DUEL-MUG-22 |
| - | Optional course | 5 | - | | | | | | | | | | | | T | | | | | | | - | - | - | - |
| DUEL-MUG-091 | Thesis project | 15 | s | | | | | | | | | | | | | | | | | | | 0 | 45 | 0 | finishing all subj of the 1-6 semes |
| DUEL-MUG-093 | Professional Practice | 0 | S | 1 | | 1 | \vdash | 1 | | | | | | + | + | | | + | | | | 0 | 0 | 0 | - |
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| 2022 1101 110 | Number of Theoretical/Practice/Lab classes per semes | | | # | 40 | 35 | 30 | 30 | 30 | # | 55 | 10 | 45 | 20 | 10 | 10 | 5 | 0 1 | 10 | 0 | 5 | 20 | | | |
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| | MACHINE | MAIN | TENANCE AN | D 1 | EC | HNI | CA | L D | IAG | NO | STI | CS | | | | | | | | | | | | | |
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| | | | Requiremen | | | | | | 1 | Nun | nbe | r of | cla | sses | рег | r se | mes | stei | r | | | | | | |
| Subject code | Subject name | Credit | kequiremen t | | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | 6 | | 7 | | Prerequisite |
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| DUEL-MGT-113 | Maintenance technologies 1. | 5 | М | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | DUEL-MUG-222 |
| DUEL-MUG-111 | Production planning, CAM | 5 | М | | | | | | | | | | | | | 10 | 0 | 5 | | | | | | | DUEL-MUG-252 |
| DUEL-MUG-118 | Tribology | 5 | М | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | DUEL-MUG-222 |
| DUEL MUG 157 | Technical Diagnostics 1. | 5 | E | | | | | | | | | | | | | 10 | 5 | | | | | Τ | | | DUEL-MUG-153, |
| DUEL-MUG-157 | recinical Diagnostics 1. | 2 | E | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | DUEL-IMA-110 |
| DUEL-MGT-253 | Maintenance technologies 2. | 5 | E | | | | | | | | | | | | | | | | 10 | 5 | 0 | | | | DUEL-MGT-113 |
| DUEL-MGT-254 | Maintenance strategy | 5 | E | | | | | | | | | | | | | | | | 10 | 5 | 0 | | | | DUEL-MGT-113 |
| DUEL-MUG-216 | Complex Machine Designing | 5 | M | | | | | | | | | | | | | | | | 0 | 0 | 1 | | | | - |
| DUEL-MUG-219 | Technical Diagnostics 2. | 5 | М | | | | | | | | | | | | | | | | 10 | 0 | 5 | | | | DUEL-MUG-157 |
| | Number of Theoretical/Practice/Lab classes per semes | | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | # | 5 | 30 | 10 | 0 1 | 5 (|) (| 0 | |
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| | | G | REEN TRAN | SFO | ORM | IAT | ION | i i | | | | | | | | | | | | | | | | | |
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| | | | Requiremen | | | | | | 1 | Nun | nbe | r of | cla | sses | pe | : sei | nes | ter | | | | | | | |
| Subject code | Subject name | Credit | Requiremen | | 1 | | | 2 | | | 3 | | | 4 | | | 5 | Т | | 6 | | | 7 | | Prerequisite |
| | | | | Т | Р | L | Т | Р | L | T | Ρ | L | Т | P | L | T | Ρ | L | Т | Р | L | T | Ρ | L | |
| DUEL-MGT-114 | Energy management | 5 | М | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | - |
| DUEL-MGT-115 | Renewable energy | 5 | М | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | DUEL-MUT-250 |
| DUEL-MGT-153 | Basics of energy saving and conservation | 5 | E | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | - |
| DUEL-TGT-252 | Sustainable Finance and Bigtech Companies in Finance | 5 | E | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | - |
| DUEL-MGT-215 | Practical application of renewable energy sources | 5 | Е | | | | | | | | | | | | | | | | 0 | 0 | 15 | | | | - |
| DUEL-MGT-216 | Novel techniques of environmental protection | 5 | E | | | | | | | | | | | | | | | | 10 | 0 | 5 | | | | - |
| DUEL-MGT-257 | Basic Priciples of Hydrogen Technology | 5 | E | | | | | | | | | | | | | | | | 10 | 5 | 0 | | | | - |
| DUEL-MGT-258 | Basics of the circular economy | 5 | Е | | | | | | | | | | | | | | | | 10 | 5 | 0 | | | | - |
| | Number of Theoretical/Practice/Lab classes per semes | i i | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | # | 0 | 30 | 10 | 20 | 0 | 0 | 0 | |
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| | | | NUCLEAR | R EN | ER | GY | | | | | | | | | | | | | | | | | | | |
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| | | | Desertement | | | | | | 1 | Nun | abeı | of : | clas | sses | pei | : sei | nes | ter | | | | | | | |
| Subject code | Subject name | Credit | Requiremen | | 1 | | | 2 | | | 3 | | | 4 | | | 5 | | | 6 | | | 7 | | Prerequisite |
| | | | L. | Τ | Р | L | Т | Р | L | Τ | Р | L | Т | Р | L | T | Р | L | Т | Р | L | T | Ρ | L | |
| DUEL-MGT-117 | Basics of nuclear safety | 5 | М | | | | | | | | | | | | | 10 | 0 | 5 | | | | | | | - |
| DUEL-MGT-118 | Basics of Atomenergetics | 5 | М | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | - |
| | Ensuring the integrity of equipment | 5 | М | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | - |
| DUEL-MGT-152 | Equipments of Nuclear Power Plants | 5 | Е | | | | | | | | | | | | | 10 | 5 | 0 | | | | | | | - |
| DUEL-MGT-213 | Industrial knowledge | 5 | М | | | | | | | | | | | | | | | | 10 | 0 | 5 | Γ | | | - |
| DUEL-MGT-214 | Operation and maintenance practice | 5 | м | | | | | | | | | | | | | | | | 0 | 0 | 15 | | | | - |
| DUEL-MGT-255 | Radiation protection and environmental policy | 5 | E | | | | | | | | | | | | | | | | 10 | 5 | 0 | | | | - |
| DUEL-MGT-256 | NPP measurements and NDT | 5 | Е | | | | | | | | | | | | | | | | 10 | 5 | 0 | | | | - |
| | Number of Theoretical/Practice/Lab classes per semes | i i | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 40 | # | 5 | 30 | 10 | 20 | 0 | 0 | 0 | |
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| | Total credit points | | | | | 40 | | | | | | | | | | | | | | | | | | | |

SUBJECT DESCRIPTIONS

Engineering Mathematics 1.

| Enginee | ering Ma | themati | cs 1. | | | | | | | | | | | | |
|--------------------------|------------------|----------------------|---------------------|--|-----------|----------------------|----------|------------------|------------|-------------------------|--|--|--|--|--|
| Name of th | ha subject | in Hunga | | Mérnöki ma | ıtematika | 1. | | | Level | BSc | | | | | |
| Name of th | le subject | in Englisł | 1 | Engineering | g Mathem | atics 1. | | | Code | DUEN(L)-IMA-152 | | | | | |
| Responsib | le educatio | onal unit | | Institute of I Science | Informati | on Technolo | ogy, Dej | partment of M | athematic | s and Computer | | | | | |
| Name of co DUEN(L)- | | prior lear | ning | | | | | | | | | | | | |
| Туре | | Presentati | ion | Practice | | Laboratory | | Requirement | Credit | Language of education | | | | | |
| Full time Part time | 150/39 150/15 | per week per term | 0 | per week per term | 3 15 | per week per term | 0 | Е | 5 | english | | | | | |
| Teacher re | | 1 | - | Name | 15 | Antal Joós, | | | schedule | Associate Professor | | | | | |
| Training o | | | 0 | Goals, deve | lopment | | | | | | | | | | |
| | | | | | | | undatio | ns necessary | to master | the subjects, and to | | | | | |
| the curricu | | Julpul, 100 | | | | | | | | the subjects, and to | | | | | |
| | | | | broaden mathematical knowledge for the study of the literature. Presentation | | | | | | | | | | | |
| | | | | Practice | | ables, comp | utations | levercises | | | | | | | |
| Typical delivery methods | | | | - | Sman | ables, comp | utationa | u excicises. | | | | | | | |
| | | | Laboratory Other | | | | | | | | | | | | |
| | | | | Other Vnorvladas | | | | | | | | | | | |
| | | | | Knowledge | | 1 1 | • •• | | • | 1 1 1 | | | | | |
| | | | | | | | | | | and social principles, | | | | | |
| | | | | rules, contexts and procedures necessary for the operation of the technical field. Ability to plan, organise and carry out independent learning. | | | | | | | | | | | |
| . . | | | c | | | | | | | | | | | | |
| Requireme | | ssed in ter | ms of | Attitude Open to learning about and embracing mathematically based, applied mathematical | | | | | | | | | | | |
| learning ou | utcomes) | | | | | | | | | | | | | | |
| | | | | developments and innovations related to their qualifications and areas of expertise. Interested in new methods and tools related to the field. | | | | | | | | | | | |
| | | | | | | | ols rela | ted to the field | • | | | | | | |
| | | | | Autonomy | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |
| | | | | Operations with complex numbers. Set theory, the concept of a function. Number sequences limit, convergence criteria. Basic properties of univariate real functions | | | | | | | | | | | |
| | | | | | | | | | | variate real functions, | | | | | |
| | | | | | | | | | | nction, differential of | | | | | |
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| Short desc | ription of t | the subject | | | | | | | | her order differentia | | | | | |
| content | | | | | | | | | | of Riemann integral, | | | | | |
| | | | | | | | | | | ean value theorem of | | | | | |
| | | | | | | | | | | nction, the indefinite | | | | | |
| | | | | | | | | | | methods. Improprius | | | | | |
| | | | | integral. Basic properties of multivariate real functions, differential calculus, calculation of extremal values. | | | | | | | | | | | |
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| Types of st | tudent acti | vities | | Independent | | | | aterial 30% | | | | | | | |
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| Required li | iterature a | nd contact | details | | | | | al Textbook F | | | | | | | |
| • | | | | | | | | I. M. (in Hung | | | | | | | |
| | | | | | | | | | | jváros College, 2010. | | | | | |
| | | | | P. Horváth: Multiple choice exercises for mathematics exercises. 2nd revised edition. Dunaújváros, Publishing Office of Dunaújváros College, 2008. | | | | | | | | | | | |
| Recommer | nded litera | ture and co | ontact | | | | | | | | | | | | |
| details | | | | | | | | | | revised edition. | | | | | |
| | | | | D | unaújváro | os, Publishir | ig Offic | e of Dunaújvá | ros Colleg | ge, 2009. | | | | | |
| Description submitted/ | | | 5 | | | | | | | | | | | | |
| Description | | | | | | | | | | | | | | | |
| workshops | | | | | | | | | | | | | | | |
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| Informa | | in Hungar | ian | Informatika | | Level | BSc | | | | | | | |
|--|----------------|----------------------|---|---|---|---|--|---|--|---|--|--|--|--|
| Name of th | he subiect | in English | | Informatics | | | | | Code | DUEN(L)-ISF-010 | | | | |
| Responsib | le education | nal unit | | Institute of l | Informatio | cs, Departm | ent of S | oftware Devel | lopment a | nd Applications | | | | |
| Name of c DUEN(L)- | ompulsory - | prior learn | ing | | | | | | <u>, </u> | 1 | | | | |
| Туре | | Presentatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | | | |
| Full time Part time | | per week per term | 0 | per week | english | | | | | | | | | |
| | | 1 | | per term 0 per term 15 N 5 english Name Nagy Bálint, PhD schedule Associate professor | | | | | | | | | | |
| Teacher responsible for the subject Training objective and justification of the course (content, output, location ir the curriculum) Typical delivery methods Requirements (expressed in terms of learning outcomes) | | | | The students The students create spread The students | s should b s should b s should b dsheet by s should b be able t b I be able t I be able t I be able t | be able to m be able to br using sprea be able to pr o prepare si rooms with al tasks on | owse the epare do dsheet epare an mple pu the use the con | program. nd manage sim resentations as | send ema a word pr nple datab well. nd comput programs, | ils. ocessing program and ases. ter, students solve with teacher | | | | |
| | | | | rules, relation technology. specific tool Ability Students are complex sy procedures of Attitude Students are consider the understand a area. Autonomy Students str | miliar with onships a They ha ls for sele e able to stem prol efficiently e interest ir own pr and accor and resp | h the gener nd procedur ve adequate cting tools a perform p blems. They in expertly ed in new ofessional c nmodate pro onsibility efficient an | al and res of t e exper and to c artial a 7 apply tasks method ompete offession | specific mathe he user progra tise in the IT arry out its tas ctivities indep their studied ds and tools r nces and activ al, technologie | ematics, in ams in the field spe ks. pendently problem related to ities on re cal develo | nformatics principles e field of information ecialist knowledge of during solving more solving methods and IT section. Students flective way. Open to pment and innovation | | | | |
| Short desc content | ription of tl | he subject | | Confident use of operating system: managing files and folders. Goal-oriented use of the Internet, knowledge of NETiquette. Targeted search on the Internet. Use of email programs. Word processing with MS Word word processor program: Basic text editing operations, creating tables, applying styles, creating a table of contents and other lists, and creating mail merges. Spreadsheet management with MS Excel spreadsheet program: Creating, uploading and formatting tables, using cell references, formulas, functions, charts as data visualization, applying simple database operations, managing and visualizing data. Making a presentation with MS PowerPoint or Prezi: basic slide editing and formatting operations, using the slide master, slide templates, applying styles, slideshow settings and presentation techniques. Independent, creative use of any kind of innovative IT tools and applications | | | | | | | | | | |
| Types of s | tudent activ | vities | | Heard inform | mation pr | ocessing by | creatin | | natization | of information has | | | | |
| Required l | iterature an | id contact o | WORD 2010 All-In-One for Dummies by Doug Lowe with Ryan Williar Wiley Publishing Inc., 2010, Indianapolis, Indiana (free pdf on Internet) EXCEL 2010 All-In-One for Dummies by Greg Harvey, Wiley Publishin Inc., 2010, Indianapolis, Indiana (free pdf on Internet) ACCESS 2010 All-In-One for Dummies by Margaret Levine Young, Alison Barrows, and Joseph C. Stockman, Wiley Publishing Inc., 2010, Indianapolis, Indiana (free pdf on Internet) | | | | | | | | | | | |

| | POWER POINT 2010 All-In-One for Dummies by Doug Lowe, Wiley Publishing Inc., 2010, Indianapolis, Indiana (free pdf on Internet) The Internet for Dummies 12th edition by John R. Levine – Margaret Levine Young, Wiley Publishing Inc, Indiana (free pdf on Internet) OFFICE 2010 All-in-one for Dummies by Peter Weverka, Wiley Publishing, Inc. Indiana (free pdf on Internet) |
|---|--|
| Recommended literature and contact details | • Electronic literature in Moodle or in Neptun. Microsoft Office Tutorial and examples (Internet). |
| Description of tasks to be submitted/measurement reports | The student has the opportunity to solve a Word and Excel tasks on a topic of his or her own choice that match and are consistent with the learning materials of the semester. The extra point will be included in the final grade. It is necessary to discuss |
| Description and timetable of the workshops | At the end of each topic, students write closed papers, typically: - Week 5: Word processing computer-based test - Week 11: Spreadsheet management computer-based test In case of any computer-based tests, the opportunity for replacement and correction is |

| Enginee | ering rep | resentat | ion | | | | | | | | | | | |
|---|------------------|----------------------|---------|---|---|--|---|---|--|--|--|--|--|--|
| Name of t | he subiect | in Hungar | | Műszaki áb | | | Level | BSc | | | | | | |
| | ne subject | in English | 1 | Engineering | | | | | Code | DUEN(L)-MGT-111 | | | | |
| | le educatio | | | Institute of ' | Technolo | gy, Departn | nent of M | Mechanical En | gineering | and Energy | | | | |
| Name of c DUEN(L) | ompulsory - | prior learr | ning | | | 1 | | 1 | 1 | 1 | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | | | |
| Full time Part time | 150/39 150/15 | per week per term | 1 5 | per week per term | 2 10 | per week per term | М | 5 | english | | | | | |
| Teacher re | esponsible f | for the sub | ject | Name | | | | | | | | | | |
| | | | | Goals, development objectives The student should be able to perform any variation of the basic constructions found in descriptive geometry. Recognise the elementary constructions needed to solve various complex problems and be able to determine their correct sequence. Be able to selec the optimal solution for a given situation from a range of possible solutions. The studen should be familiar with the theory and practice of technical drawing projections and sections. The student should be able to edit technical drawings of machine parts using conventional tools, to read technical drawings. The student should be able to construc dimensional drawings of machine parts. | | | | | | | | | | |
| | | | | Presentation | ¹ projecto | or | 0 | | | r Point and overhead | | | | |
| Typical de | elivery metl | hods | | Practice Laboratory | Small g | roup exerci | ses for u | up to 25 people | e, sketchi | ng and editing | | | | |
| Requirements (expressed in terms of learning outcomes) | | | | You have a methods in Basic know technology, Comprehen- machines, p Understand, and elemen components Ability Performs th Ability to pl Ability to pl Abil | he termin compref your field ledge of r control p sive know ower tool characte ts of mec used. e job acco an, organ lentify rou standard ming abo ifications e field. and resp onsibility | nensive kno nachine des rocedures a vledge of the s, mechanical system ording to histice and carri- time profestions operations ut and embra and area of onsibility for your ov | wledge ign prin nd oper- he oper- cal equip del the tems, the s/her qua- y out in sional p in practi- racing de experti- wn work | ciples and met ating processe ating principle oment and tool structure and a design and alifications. dependent lea roblems, to ide ice) against a t evelopments in se. Interested i | theories a thods, may s. es and str ls used. operation interrelat rning. entify, for heoretica n machine in new me of others | ind problem-solving chine manufacturing ructural units of the of the structural units ionship of the system rmulate and solve l and practical e design related to ethods and tools | | | | |
| Image plane, coordinate system, projection. Representation of a point, real line point image. Law of projection and of change of view. Mutual positions of spa elements. Projections dependent on the positions of a straight line, lines of devia and intersection. Transversals, notable lines of a plane. True magnitude of the pla- constructions with rotation. Intersection of two planes, angles of inclination, distan Solving problems with basic constructions. Basic standards of technical draw design. Theoretical overview of projection systems in engineering practice. Applica of views, views. Use of sections and sections. Dimensioning on engineering drawin Grids of dimensions.Theoretical processing with guidance 20 % Theoretical processing with guidance 20 | | | | | | | | | al positions of spatial ine, lines of deviation agnitude of the plane inclination, distances of technical drawing g practice. Application engineering drawings | | | | | |
| Types of s | tudent activ | vities | | % Problem Laboratory | solving w measuren | vith guidanc nents with g | e 20 % uidance | Problem solving - Preparation | ng with g of labora | uidance 40 % tory reports - | | | | |
| Required 1 | literature ar | nd contact | details | Za • La | ahola) | h- Tamás Za | | | • | ical exercises, Tamás Zahra Zahola. | | | | |

Engineering representation

| Recommended literature and contact details | Károly Koffán: 15 lectures. 15 lectures. Főiskolai Kiadó. Koffán Károly: 15 exercises. College notes. College Publishing House. |
|---|--|
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

Mechanics 1.

| Mechani | | in Hungari | an | Mechanika | 1. | | | | Level | BSc | | | |
|--|----------------------------------|------------------------------|---------|---|--|---|--|--|---|--|--|--|--|
| Name of the | e subject | in English | | Mechanics 1 | | | | | Code | DUEN(L)-MUG- 152 | | | |
| Responsible | e education | nal unit | | Institute of 7 | Fechnolog | gy, Departm | ent of I | Mechanical En | gineering | - | | | |
| Name of co DUEN(L)- | | | ing | | | | | | 0 0 | <u>C</u> y | | | |
| Туре | | Presentatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | | |
| Full time | 150/39 | per week | 1 | per week | E S english | | | | | | | | |
| Part time | | per term | 5 | per term | 10 | per term | 0 | - | | | | | |
| the curricul | jective and content, o um) | d justificati utput, loca | ion of | structures by | lopment ill learn y applying eparation of mater All stud projecto | the mecha g the concep . You will le ials. lents in a lar or. | nical pots and earn the ge lectu | contexts prese concepts and ure, using lectu | nted in the practical i ire, Power | Profesor emeritus simple engineering e lectures to exercises relationships of statics Point and overhead | | | |
| Typical deli | ivery metr | lods | | Laboratory Other | | ible for up t | o 25 pe | ople, calculati | on exercis | es | | | |
| Requiremer learning out | | ssed in tern | ns of | subject area Knowledge rules, contex You know t You have a methods in y Ability Ability to pl Ability to pl Ability to bu Ability to bu Attitude Open to lear qualification field. Autonomy Taking resp | aprehensiv of engine of the ger of the ger ts and pr he termin a compre- your field an, organ dentify ro s standard nild basic m about a as and are and responsibility | ering. heral and spo ocedures ne ology, key of hensive kno ise and carr utine profe- d operation models of t nd embrace a of experti- onsibility for your ow | ecific m cessary oncept: owledge y out in ssional s in pr echnica develo se. Inter yn work | athematical, s for the operat s and theories of the main dependent leas problems, to actice) agains l systems and pments in mec rested in new r | cientific a ion of the related to theories rning. identify, f t a theore processes. thanics rel nethods an of others. | and problem-solving formulate and solve etical and practical ated to his/her nd tools related to the | | | |
| Autonomy and responsibilityTaking responsibility for your own work and the work of others.Statics of a material point: concept of vector, operations that can be performed vectors. Force, force system, equilibrium. Statics of rigid bodies: concept of rigid body Concept of momentum. Equivalence of force systems, reduction. Concept of for Equilibrium of rigid body. Ideal constraints. Determination of force systems for sp and planar force systems. Statics of supports: support elements, supports constraints, concepts and principles of determination of internal forces and stress relationships between stresses. Fundamentals of strength of materials: basic concer subdivision, methods of strength of materials, purpose of strength tests, requirem for structural elements, the tensile diagram and mechanical properties that can derived from it. Determination of stress state. Evaluation of stress state, principal stress principal stress directions. Elements of strain state: specific strains and ang distortions. Evaluation of strain state. Relationship between strain and stress state | | | | | | | | | concept of rigid body on. Concept of force rece systems for spatia ments, supports and al forces and stresses erials: basic concepts th tests, requirements roperties that can be ble loading conditions te, principal stresses strains and angular | | | | |
| Types of stu | udent activ | vities | | | processin | g with guida | ance/ind | dependent: 15/ dent: 15/35 % | 35 % | | | | |
| Required lit | terature an | d contact | letails | | | | | College notes | | | | | |
| Recommendetails | ded literat | ure and co | ntact | ₩ • E1 | orking G | roup, Dunai g Mechanics | ijváros, | ME DFK Pub | lishing O | kbook, Departmental ffice, 1994. rkbook, Dunaújváros, | | | |

| | Dr Vigh S Engineering Mechanics IV. Cross-sectional Characteristics. college note, Dunaújváros, DF Kiadó, Dunaújváros, 1998.Engineering Mechanics I. Exemplar: part 1, Dunaújváros, DF Kiadói Hivatal, 2000. Technical Mechanics II. Manual: II/A, , Dunaújváros , DF Publishing Office, 2000. |
|----------------------------------|---|
| Description of tasks to be | |
| submitted/measurement reports | |
| Description and timetable of the | |
| workshops | |

CAD

| CAD | | | | | | | | | | | <u>.</u> | | | |
|--|---|----------------------|---------|---|--|--|--|--|--|--|--|--|--|--|
| | | in Hungar | ian | CAD | | | | | | Level | BSc | | | |
| Name of the | he subject | in English | l | CAD | | | | | | Code | DUEN(L)-MUG- 212 | | | |
| | le educatio | | | Institute o | of Techno | logy, l | Departn | nent of M | Mechanical Er | ngineering | and Energy | | | |
| Name of c DUEN(L)· | ompulsory - | prior learr | ning | | | | | | | | | | | |
| Туре | | Presentati | on | Practice | Practice Laboratory Requirement | | | | Requirement | Credit | Language of education | | | |
| Full time Part time | 150/39 150/15 | per week per term | 0 | per week per term | 0 | - | week term | 3 15 | М | 5 | english | | | |
| Teacher re | sponsible f | for the subj | ject | Name | • | Gáł | or Vizi | , PhD | | schedule | Assistant professor | | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | able to but incorporate for the tast able to but of composition | nt should hild param te design i sk at hand ild an asso ponents and | be far netric intent. d from embly | niliar w geometr Be able a varie from th | to selected to selected ty of policy the parts of | els of parts tha et the optimum ossible model created. Be abl | at "surviv modeling ing seque le to produ | ometric modelling. Be e" design changes and g sequence and method nces and methods. Be ace technical drawing ents of the applicable | | | |
| Typical delivery methods | | | | Presentati Practice | Laboratory Computer laboratory exercise | | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | | Knowledge Apply the related computational and modelling principles and methods of engineering product, process and technology design. Ability Ability to plan, organise and carry out independent learning. Ability to build basic models of technical systems and processes. Attitude Open to learning about and embracing developments in CAD related to your qualifications and area of expertise. Interested in new methods and tools related to the field. Autonomy and responsibility Taking responsibility for your own work and the work of others. | | | | | | | | | | |
| Short desc content | ription of t | he subject | | The student will learn the practice of computer geometric modelling through computer laboratory sessions using a modern parametric modelling system (SolidWorks). You will learn the use of commands to create machine parts. You will learn how to build assemblies. You will be able to create technical drawing documentation that best complies with current standards in your engineering work, based on the component and assembly models you have already built. | | | | | | | | | | |
| Types of s | tudent activ | vities | | Processing theoretical material with guidance 20 % Independent processing of theoretical material 20 % Task solving with guidance 20 % Independent processing of tasks 40 % Laboratory measurements under supervision | | | | | | | | | | |
| Required 1 | iterature ar | nd contact | details | Preparation of laboratory reports SolidWorks Online Help | | | | | | | | | | |
| Recommendetails | nded literat | ture and co | | | | | | | ion for the So | lidWorks | software system | | | |
| submitted/ | n of tasks t measurement n and time | ent reports | | | | | | | | | | | | |
| workshops | | | | | | | | | | | | | | |

Engineering Physics

| Linginic | ering Phy | T | | | | | | | ь. | | | | |
|--|--|----------------------|--------|--|--|---|---|---|---|---|--|--|--|
| Name of t | he subject | in Hungar | | Mérnöki fiz | | | | | Level | BSc | | | |
| | , U | in English | 1 | Engineering | | D (| | <i>I</i> 1 1 1 D | Code | DUEN(L)-MUT-151 | | | |
| | ble educatio compulsory - | | ning | Institute of | Technolog | gy, Departn | nent of M | Mechanical En | igineering | and Energy | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | | |
| Full time Part time | 150/39 150/15 | per week per term | 1 5 | per week per term | <u>1</u> 5 | per week per term | 1 5 | Е | 5 | english | | | |
| Teacher re | esponsible f | or the sub | ject | Name | | Miklós Hoi | rváth, Pl | hD | schedule | College professor | | | |
| 0 | objective an e (content, o ulum) | 5 | | Goals, development objectives The aim of the course is to learn the mechanics of the material point, electrodynamics the statics and dynamics of liquids and gases, thermodynamics, as well as the basics o optics, quantum mechanics and semiconductors and modern physics, the following subjects preparation for the subsequent modules | | | | | | | | | |
| Typical delivery methods | | | | preparation for the subsequent modules. Presentation Projector, ppt presentation Practice Projector, ppt presentation Laboratory Laboratory presentations and experiments Other Image: Construction of the subsequence of the s | | | | | | | | | |
| Requirem learning o | ents (expres utcomes) | ssed in terr | ns of | including ki vibrations a know the pr application. expansion a knows the l networks, an concepts of physics and Ability The ability theme, to dr Attitude Collaborate Open to lean Strives for a Autonomy Solve tasks Independen measuremen | knows the nematics, nd can solo operties of He/she H nd phase basics of nd can solo geometry quantum to recogn aw conclu- with class ning and ccuracy i and resp independent ty set up a nt errors nt results a | dynamics, lve problem f ideal fluid cnows the l transitions, electrostatic ve simple pi v and physic mechanics. ise and und usions and t smates and applying m <u>n both num</u> onsibility ently using and carry ou and estima and calculat | momen s related s and th aws of the first cs, DC is roblems cal optic erstand o under the teac odern in erical ar the reso the reso the reso the reso | tum, work, en- d to these theo e most importa state changes t and second la networks, mag with these. Yo es, their applic physical phen stand and solv her to develop nvestigative te nd laboratory of urces and mat rements in lab | ergy outp rems at a ant laws o of gases aws of the gnetism a ou will kn ations and omena in e problem oknowled chniques. exercises. erials pro- oratory exes. Can i | vided. xercises, can recognise ndependently process | | | |
| measurement results and calculate errors. Mechanics of material point, kinematics, dynamics. Uniformly accelerating mot uniform and accelerating circular motion, momentum, work, energy, power, and rel laws. Statics of ideal fluids, Pascal's law, Archimedes' law, buoyancy. Ideal gases, laws, 1st and 2nd laws of thermodynamics, entropy, thermal expansion, pl transitions. Electrostatics, DC networks, magnetism and electromagnetic induct Calculation of alternating current networks. Geometric and physical op photometry. Fundamentals of atomic physics and quantum mechanics. | | | | | | | | | gy, power, and related vancy. Ideal gases, gas nal expansion, phase romagnetic induction. and physical optics, | | | | |
| Types of s | student activ | vities | | laboratory e | xercises, | taking notes | 5. | | | | | | |
| Endre Kiss: Text-based learning material based on the engineering physic: textbook in Moodle Physics working group; edited by Dr. Miklós Horváth: Exercises based on the physics textbook in the Moodle system Kelemen A. :Measurement descriptions based on Physics Laboratory Exercises I in Moodle Hartai J. Kiss E. Spissák L.: Measurement descriptions based on Physics Laboratory Exercises II in Moodle | | | | | | | | | Exercises based on sics Laboratory | | | | |
| Recomme details | nded literat | ure and co | ontact | • Á H | goston Bi ouse, Buc | ıdó: Experii lapest, 1997 | mental I ') | Physics 1., 2., | | al Book Publishing , Budapest, 1986) | | | |

| Description of tasks to be submitted/measurement reports | Measurement reports from laboratory exercises |
|---|--|
| Description and timetable of the workshops | Examination papers in weeks 7 and 13: The papers contain 10 test questions, 2 theoretical questions to be explained and 2 problems to be solved, for which a total of 100 points can be awarded. |

Engineering Mathematics 2.

| Engineering | | | | 1 | | | | | | | | | |
|--|--------------------------|-------------|---------|---|---|--|--|---|--|---|--|--|--|
| Name of the subj | | in Hungar | | Mérnöki ma | | | | Level | BSc | | | | |
| | | in English | | Engineering | | | D | () () () (| Code | DUEN(L)-IMA-212 | | | |
| Responsible educ | | | | Institute of I Science | Informati | on Technolo | gy, De | partment of Ma | athematic | s and Computer | | | |
| Name of compuls DUEN(L)- | sory | prior learn | ing | IMA-152 | | T | | | T | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | | |
| Full time 150/3 | | per week | 0 | per week | 0 | 5 | english | | | | | | |
| Part time 150/1 | | per term | 0 | per term Name | 0 | per term | 15 | | schedule | College professor | | | |
| Teacher responsible for the subject Training objective and justification of the course (content, output, location the curriculum) | | | | Goals, deve The purpose statistical m objective of analysing da | NameLászló Bognár, PhDscheduleCollege professorGoals, development objectivesThe purpose of the course is to make the students familiar with analysing data using statistical methods and tools. Having covered this course students understand the objective of probability and statistics, they know the different ways of gathering data, analysing datasets with statistical software and they can make inferences for real world situations based on samples of data. | | | | | | | | |
| | | | | Presentatior Practice | These formal lectures mostly aim at transferring information. Presentation Students are expected to take personal notes in addition to the course text, slides or transparencies. | | | | | | | | |
| | Evnical delivery methods | | | | ~ 1 | | | | | | | | |
| Typical delivery methods | | | | Laboratory | exercis | es, feedback s with softw | on an a | | practicing | ether it is about statistical data always be | | | |
| | | | | Other | | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | | described by Students wi appropriate from their n Students wi communicat presentation Students wi related to fu Ability Students wi the related f Attitude Collaborate Open to least Strives for a Autonomy Taking resp | y quantita Il demons level and najor to re Il demons ting critic is. Il acquire ture care ll be able rield. with class rning and accuracy i and resp onsibility | ative data. strate their a demonstrate eal world mo strate master cally reasone e up-to-date : er choices. to read, inter- applying m in both nume onsibility of for your ov | bility to e their a odels. y of dat d analy skills an erpret, a odern in erical ar n work | her to develop nvestigative tea nd laboratory e and the work | s in other knowledg statistical itten and o ons of con nalyse jour knowledg chniques. exercises. of others. | fields at an ge acquired l concepts by oral nputer use rnal articles in ge. | | | |
| Short description content | of tl | he subject | | During the course students will be engaged in the following topics: introduction, descriptive statistics, probability, random variable, method of estimation, test of hypotheses, simple linear regression | | | | | | | | | |
| Types of student | activ | vities | | Frontal wor Individual o Testing 20% | or group v | vork 50% | | | | | | | |
| Required literatur | re an | d contact o | details | • D Pr | usiness aı ouglas C. | nd Economi Montgome for Enginee | cs. Ed 1 ry Geor | Benson, Terry 2th. Pearson E ge C. Runger : 5th. John Wile | Education, | Inc. 2014. Statistics and | | | |
| Recommended li details | terat | ure and co | ntact | • Ja | mes T. M | | George | dex.html Benson, Statis fo Tech, Inc., | | | | | |

| Description of tasks to be | |
|----------------------------------|--|
| submitted/measurement reports | |
| Description and timetable of the | |
| workshops | |

| Ind | lustrial | materials |
|-----|----------|-----------|

| Industrial mater | | • | A (" 1 ' | • | | | | T 1 | D.C. | |
|--|------------------------|---|---|--|--|---|--|--|---|--|
| Name of the subject | in Hunga in English | | Műszaki an Industrial m | | et | Level Code | BSc DUEN(L)-MST-210 | | | |
| Responsible education | | 1 | Institute of | | av Departm | | DUEN(L)-WIST-210 | | | |
| Name of compulsory DUEN(L)- | | ning | | Technolog | gy, Departir | | | giity | | |
| Туре | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time150/39Part time150/15 | per week per term | 1 5 | per week per term | 0 | per week per term | 2 10 | М | 5 | english | |
| Teacher responsible | for the sub | ject | Name Zsolt Csepeli, PhD schedule College professo | | | | | | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | through wh shell structu determine analysis of c about the re | the cours ich they v ure that d macroscop lifferent ty lationship | se is to pro will become etermines n pic properti ypes of mate s between th | familia naterial es, and rials (m ne struct | r with the stru properties, th the microsco letals, ceramic | acture of a e types of opic struc s, polyment rties of ma | wledge of chemistry, materials, the electron f chemical bonds that ture and methods of rs). Students will learn aterials, enabling them nple cases. | |
| Typical delivery methods | | | Presentation Practice Laboratory | | | | ming materials | | e in moodle. | |
| Requirements (expre learning outcomes) | ms of | Other Knowledge Have a com area of engi social princ of engineeri the methods Ability Ability to p Attitude Open to lea to their qua related to th Autonomy It takes its responsibili | prehensiv neering. K iples, rule ing. Thoro s of their r lan, organ rning and alification <u>e field.</u> and resp decisions ty for thei | e knowledge (nowledge of s, contexts a ough knowle nanufacture ise and carr absorbing s and areas onsibility independen n. | e of the f the ge und proc edge of and the y out in knowled of exp tly, in d | basic facts, din neral and spec sedures necess the materials conditions of dependent lea lge related to pertise. Interes | rections ar ific mathe ary for the used in the their use. rning. chemistry sted in ne | and materials related w methods and tools disciplines, and takes | | |
| Short description of content | | Atomic structure. The structure of the periodic table. Electron configuration. Types and characteristics of chemical bonding. Electron affinity, electronegativity, oxidation number. Strong bonds. Weak bonds. General characterisation of metals, reactivity. Basic knowledge of organic chemistry. Grouping of carbon compounds, nomenclature. Isomerism. Main reactions of organic substances. Interconnection of macromolecules as a basis for polymer production. Basic knowledge of silicate chemistry. Basic knowledge of colloid chemistry. State change in solid phase processes. Polymorphic transformation. Types of engineering materials. Structure - processing - properties interaction. Crystal structure, crystal systems. Crystal, crystallite. Crystal lattice defects. Movement of atoms in matter, diffusion. Phases and constituents of metallic materials. Significance, definition of equilibrium phase diagrams. Rules for reading two and three component equilibrium phase diagrams. Basic types of two-element equilibrium phase diagrams. | | | | | | | | |
| Types of student act | ivities | | | material to f measur | tests 30%. ements, pre | paration | of report 20% | | | |
| Balázs Verő, Éva Dénes, Zsolt Csepeli:Introduction to the Engin Materials Science, Főiskolai Kiadó, Dunaújváros Éva Dénes, Péter Farkas, Zsoltné Fülöp, Zoltán Szabó. | | | | | | 0 0 | | | | |
| Recommended litera details | | ontact | • D | r. Tamás ' | Tóth: Mech | anical p | | aterials ar | nd methods of their | |
| Description of tasks submitted/measurem Description and time | ent reports | | The student shall draw up a measurement report on the measurements carried out. | | | | | | | |
| workshops | | | A final paper in weeks 6 and 12 from the lectures and laboratory classes. | | | | | | | |

| Basics (| of machi | ne desig | n | | | | | | | | |
|--|------------------------|-------------|-----------|--|---|--|---|--|---|---|--|
| | | in Hungar | ian | Géptervezés | s alapjai | | | Level | BSc | | |
| Name of t | he subject | in English | | Basics of m | Basics of machine design Code DUEN(L)-MUG- 222 | | | | | | |
| Responsit | le educatio | nal unit | | Institute of | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | |
| Name of c DUEN(L) | compulsory - | prior learn | ing | MUG-212 MUG-152 MGT-111 | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time | 150/39 | per week | 2 | per week | 1 | per week | 0 | М | | english | |
| Part time Teacher re | 150/15 esponsible f | per term | 10 ect | per term Name | College assoc | | | | | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | The student components select stand associated of traditional a acquired in | Goals, development objectives The student should know the construction and operation of typical machine parts, omponents, assemblies and sub-assemblies used in engineering practice. Be able to elect standard parts for such units, determine the main dimensions, and design the ssociated components. Be able to prepare drawing documentation of units using raditional and computer tools. The student will be able to apply the knowledge cquired in Mechanical Engineering I, CAD and Mechanics I to the construction of imple structures and assemblies. | | | | | | |
| Typical delivery methods | | | | Presentation Practice Laboratory Other | ¹ projecto | or roup of up t | - | ure, using lectu ople, sketching | | r Point and overhead g, calculation | |
| Requirements (expressed in terms of learning outcomes) | | | | subject area You know t You have a methods in Basic know technology, Comprehen machines, p In-depth kn their ethical Understand, and element components Apply the ro product, pro Ability Performs th Ability to p Ability to p Ability to p Routinely ic and practica standard op Attitude Open to leas to his/her qu related to th Autonomy | of engine he termin a compreh your field ledge of m control p sive know ower tool owledge limitation character ts of mech a used. elated com- beess and e job acco lan, organ dentify ro g standard uild basic lentifies p l backgro erations in rning and ialificatio e field. and resp | eering. ology, key of nensive kno nachine desi rocedures an vledge of th s, mechanic of learning, ns and problection ise and mooth hanical system nputational system ording to his ise and carry outine profest d operational models of the professional nund necessar opractice. | soncepts wledge gn prin nd oper- al equip , knowl em-soly lel the s ems, the and mo- design. /her qua- y out in ssional s in pr echnica problem ry to so- nowled of expe | s and theories is of the main t ciples and met ating processes ating principle oment and tool ledge acquisiti ving technique structure and op e design and in delling princip alifications. dependent lean problems, to is actice) agains I systems and ns, explores an olve them, and ge related to n rtise. Intereste | related to theories a hods, made s. es and str s used. on, data s in mech peration o nterrelatio les and m rning. identify, f t a theore processes ad formula solves the mechanica d in new p | nd problem-solving chine manufacturing uctural units of the collection methods, anical engineering. of the structural units onship of the system tethods of engineering formulate and solve etical and practical ates the theoretical em by applying l engineering related methods and tools | |
| Short desc content | cription of t | he subject | | Taking responsibility for your own work and the work of others. Repetitive parts or units of machinery performing the same function and having a similar design - machine components. Definition, grouping, description, description, representation, strength dimensioning, correct construction, operation and maintenance of machinery parts. The main machine components or groups to be discussed in detail | | | | | | | |

Basics of machine design

| | are: drive and connecting screws, shafts, shaft couplings, couplings, bearings, belt drives, gears. In the discussion of the subjects, the emphasis is on the illustration and overview of the parts/assemblies. |
|--|--|
| Types of student activities | Processing theoretical material with guidance 20 % Independent processing of theoretical material 20 % Task solving with guidance 20 % Independent processing of tasks 40 % Laboratory measurements under supervision Preparation of laboratory reports. |
| Required literature and contact details | László Tóth- Tamás Zahola: Mechanical Engineering. Zahra Zahola. Főiskolai Kiadó Dr. Péter Szendrő and co-authors, Mechanical Engineering BSc. textbook, 2007. Mezőgazda Kiadó, Budapest, 758 p. |
| Recommended literature and contact details | Dr. József Őze: Mechanical Elements I/2. I/3. I/4. I/5. I/6. I/7. I/8. manuscripts.1. Árpád Zsáry:Machine Elements II., Budapest, 1991. György Diószegi: Mechanical Engineering Handbook. Technical Book Publishing House, Budapest, 1988. István Majdán: Technical Pocketbook. Technical Book Publishing House, Budapest, 1995. Géza Nagy: Atlas of Mechanical Engineering. GTE ME Machine Elements Department, Budapest, 1991 4000 SKF Bearing Master Catalogue |
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

Mechanics 2.

| Mechanics 2. | - | in Hungari | on | Mechanika |) | | | | Laval | BSc | |
|---|-------|-------------|-----------|--|---|--|--|---|---|--|--|
| Name of the subject | ct [| | | | | | Level | DUEN(L)-MUG- | | | |
| |] | in English | | Code 257 | | | | | | | |
| Responsible educa | | | • | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of compulso DUEN(L)- | ory [| prior learn | ing | MUG-152 | | | | | | | |
| Туре |] | Presentatio | on | Practice | Practice Laboratory Requirement | | | Credit | Language of education | | |
| Full time 150/39 Part time 150/15 | | per week | 1 5 | per week | $\frac{2}{10}$ | per week | 0 | Е | 5 | english | |
| Teacher responsibl | | per term | - | per term Name | 10 | per term Béla Palotá | | | schedule | Professor emeritus | |
| Training objective and justification of | | | ion of | Goals, deve The student applying the preparation. | Goals, development objectives The student will learn the mechanical principles of complex structure design by applying the concepts and contexts presented in the lectures to exercises and home preparation. You will learn about the statics of structures, limit states of use, the basics of the finite element method. | | | | | | |
| | | | | Presentation | projecto | or. | - | are, using Pow | | | |
| Typical delivery m | neth | ods | | Practice | | | | ople, calculatio | | es nd finite elements | |
| | | | | Laboratory Other | 12-pers | un ladoratoi | y exerc | ase in solid me | echanics a | nu ninte elements | |
| | | | | Knowledge | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | subject area Knowledge rules, contez You know t You have a methods in Ability Ability to pl Ability to pl Ability to bu Ability to bu Ability to bu Ability to bu Attitude Open to lean qualification field. Autonomy | of engine of the ger sts and pr he termin a compre- your field an, organ dentify ro g standard nild basic m about a ns and are and resp | erring. heral and sp ocedures ne ology, key of hensive kno ise and carr nutine profe d operation models of t nd embrace a of experti onsibility | ecific m cessary concept: owledge y out in ssional s in pr echnica develo se. Inter | athematical, so for the operat s and theories : e of the main dependent leau problems, to actice) agains <u>l systems and</u> pments in mec | cientific a ion of the related to theories rning. identify, f t a theore processes hanics rel nethods an | and problem-solving formulate and solve etical and practical | |
| Short description of the subject content | | | | Statics of structures: classification of supporting structures. Articulated multi-girder, triple-jointed frame, truss and additional support structures - strength analysis, determination of support forces and loads. Rope structures. Friction, slip connections and their application in engineering. Applied strength of materials: working principles of strength of materials. Their application to the determination of displacements of rod structures. Approximate methods for determining displacements. Basic concepts of the finite element method. Solution of statically indeterminate structures by force method. Stability problems of flexible bodies: in-plane and spatial rod deflection, buckling. Flexible-ductile deformations, dimensioning of rod structures using ductile principles. Fatigue phenomenon, control. Phenomenon of ridge fracture, checking. | | | | | | | |
| Types of student a | ctiv | ities | | Task comple Laboratory | etion with work und | guidance/i er supervisi | ndepend on: 20 9 | | | | |
| Required literature | e and | d contact d | letails | St • D: K | ructures l r. Vigh S. iadó, Dun | /A, Budape ed.: Techni aújváros, 20 | st, Nem ical mec 003. | zeti Tankönyv chanics II/B co | vkiadó 199 ollege note | es, Dunaújváros, DF | |
| Recommended lite details | eratu | are and con | ntact | • D | Workbook, Dunaújváros, ME DFK Publishing Office, 1994. | | | | | | |

| | Dr. Sándor Vigh - Béláné Szlávik - Dr. Gyula Izsák: Technical Mechanics I. Manual Part 2, Dunaújváros, DF Publishing Office, 2000. Dr. Vigh S.ed.: Engineering Mechanics II. Tutorial II/B, college notes. DF Kiadó, Dunaújváros, 1998. |
|----------------------------------|--|
| Description of tasks to be | |
| submitted/measurement reports | |
| Description and timetable of the | |
| workshops | |

Heat and Fluid Dynamics

| Heat an | d Fluid I | Dynamio | | - | | | | | | | | | | | | | |
|------------------------|------------------------|----------------------|----------|---|--|------------------------------|-----------|-----------------|-------------|--|--|--|--|--|--|--|--|
| Name of t | he subject | in Hungar | | Hő- és áran | | | Level | BSc | | | | | | | | | |
| | U | in English | 1 | Heat and Fl | | | | | Code | DUEN(L)-MUT-250 | | | | | | | |
| | educatio | | | Institute of | Technolo | gy, Departn | nent of M | Mechanical Er | igineering | and Energy | | | | | | | |
| DUEN(L) | compulsory - | prior learr | ning | MUT-151 | | 1 | | 1 | 1 | | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | - | Requirement | Credit | Language of education | | | | | | | |
| Full time Part time | 150/39 150/15 | per week per term | 1 5 | per week per term | | | | | | english | | | | | | | |
| Teacher re | esponsible | 1 | ject | Name | | Endre Kiss | , PhD | | schedule | College professor | | | | | | | |
| | bjective an | | | Goals, deve | elopment | objectives | - | | | | | | | | | | |
| the course | e (content, o ulum) | output, loca | ation in | ¹ The study o | The study of the practical problems solutions in heat and fluid dynamics. | | | | | | | | | | | | |
| | | | | Presentation | | students, us verhead proj | | rge speaker, a | board pres | sentation, a projector | | | | | | | |
| Typical de | elivery met | hods | | Practice | For eve | ry students, | probler | n solving in sı | mall group | 08 | | | | | | | |
| | | | | Laboratory | Measur | ements in p | airs | | | | | | | | | | |
| | | | | Other | | | | | | | | | | | | | |
| | | | | Knowledge | | | | 1 | 1 | 1.1 | | | | | | | |
| | | | | Have a con subject area | | | lge of th | he basic facts | , direction | ns and limits of the | | | | | | | |
| | | | | | | | specifi | ic rules cont | exts and | procedures for the | | | | | | | |
| | | | | operation of | | | speem | le fules, com | exts and | procedures for the | | | | | | | |
| | | | | | | | concepts | s and theories | related to | your field. | | | | | | | |
| | | | | | | | | heories in the | field of kn | owledge acquisition | | | | | | | |
| | | | | | and problem solving your methods. | | | | | | | | | | | | |
| | | | | He/she knows the measuring procedures used in mechanical engineering, their instruments, instruments and measuring equipment. | | | | | | | | | | | | | |
| | | | | Understand, characterise and model the structure and operation of the structural units | | | | | | | | | | | | | |
| | | | | and elements of mechanical systems, the design and interrelationship of the system | | | | | | | | | | | | | |
| | | | | components used. | | | | | | | | | | | | | |
| | | | | Ability | | | | | | | | | | | | | |
| | | | | The ability to analyse at a basic level the disciplines that make up the knowledge base | | | | | | | | | | | | | |
| | | | | of the technical field, to synthesise relationships and to make appropriate evaluations. | | | | | | | | | | | | | |
| | | | | Ability to apply the most important terminology, theories and procedures of the | | | | | | | | | | | | | |
| | | | | technical field in the performance of related tasks. Ability to plan, organise and carry out independent learning. | | | | | | | | | | | | | |
| | | | | Ability to identify routine professional problems, and the principles and techniques | | | | | | | | | | | | | |
| | | | | needed to solve them to explore, formulate and (standard operations in practice). | | | | | | | | | | | | | |
| - · · | ents (expre | ssed in terr | ns of | Ability to understand and use literature, computer and library resources specific to their field. | | | | | | | | | | | | | |
| learning o | utcomes) | | | The acquired IT knowledge can be used to perform tasks in the field of apply it in your solution. | | | | | | | | | | | | | |
| | | | | | | models of t | echnica | l systems and | processes | | | | | | | | |
| | | | | | | | | | | y appropriate manner, | | | | | | | |
| | | | | orally and in | n writing, | according t | o their f | ield of special | lisation. | | | | | | | | |
| | | | | Attitude | | | | | | | | | | | | | |
| | | | | | | | | | ole of its | profession and its | | | | | | | |
| | | | | fundamenta | | | | | authontica | lly communicating | | | | | | | |
| | | | | | | | | and innovatio | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | It tries to solve problems in cooperation with others, where possible. Sufficient stamina and tolerance of monotony to carry out practical activities has. | | | | | | | | | | | | | |
| | | | | | Using his/her technical knowledge, he/she strives to understand the observable | | | | | | | | | | | | |
| | | | | phenomena as thoroughly as possible, to describe and explain their laws. | | | | | | | | | | | | | |
| | | | | Autonomy and responsibility | | | | | | | | | | | | | |
| | | | | In unexpected decision situations, he/she independently thinks through and develops comprehensive substantiating professional questions on the basis of given sources | | | | | | | | | | | | | |
| | | | | comprehensive, substantiating professional questions on the basis of given sources. In carrying out his/her professional duties, he/she will also cooperate with qualified | | | | | | | | | | | | | |
| | | | | In carrying out his/her professional duties, he/she will also cooperate with qualified professionals in other fields (primarily technical, economic and legal). | | | | | | | | | | | | | |
| | | | | | is experie | nce with his | s colleag | gues, helping t | hem to de | velop. | | | | | | | |
| | | | | | | for the con | isequen | ces of its tech | nical analy | yses, its proposals and | | | | | | | |
| | | | | its decisions | 5. | | | | | It takes responsibility for the consequences of its technical analyses, its proposals and its decisions. | | | | | | | |

| Short description of the subject content | The basics of fluid dynamics and thermodynamics. Euler and Bernoully equations, Haagen-Poiseuille equations, viscosity, laminar and turbulent flow, pressure drag in turbulent flow. Pressure drop in fittings. Impulse theorem. Similarity. Solid body in viscous substance. Intensive and extensive quantities. Uneversal and unified gas law. The mechanical work and the heat, and the firstlaw of thermodynamics. Isochoric, isobaric, isotherm and adiabatic processes. The politropic process. Cycles. Otto and Diesel cycles. Enthalpy, entropy, the second law of thermodynamics. Real gases. Thermal energy transport, conductance. convection and radiation. Heat pump and refrigerator. |
|---|---|
| Types of student activities | Lecture: Written text processing with note-taking 40%, theoretical material self- processing 20%, task solution 40%. Labor: Heard text processing with note-taking 10%, home preparation for measurement 20%, measurement 40%, minutes preparation 30%. |
| Required literature and contact details | Kiss E. Heat and Fluid Dynamics Electronic notes (Moodle) Kiss E. Heat and Fluid Dynamics Problem solving Electronic notes (Moodle) Kiss E. Laboratory syllabuses Electronic notes (Moodle) |
| Recommended literature and contact details | Dr Gruber, Dr Blahó: Mechanics of Fluids, Tankönyvkiadó, Budapest, 1973 Grósz Gy. Thermodynamics, BME 1996 |
| Description of tasks to be submitted/measurement reports | Full time: 5 measurement reports Part time: 3 measurement reports |
| Description and timetable of the workshops | There are two tests during the semester. the first is in the 6th, and the second in the 13th week. The test is consisting of 10 freechoise questions (max. 30 points), two assay questions (max 20 points), and two problems tos olve for 50 points. If the res |

| р | | | | | | | | | | |
|--|--|---|--|--|---|---|--|---|--|--|
| in Hungari | an | Vállalkozás | tan | | Level | BSc | | | | |
| in English | | | | | | Code | DUEN(L)-TVV-122 | | | |
| nal unit | | Institute of | Social So | ciences, Depa | artment | of Manageme | nt and En | trepreneurship | | |
| prior learni | ng | | | | | | | | | |
| Presentatio | n | Practice Laboratory Requirement | | | | Credit | Language of education | | | |
| per week | 1 5 | 1 | | per week | 0 | М | 5 | english | | |
| • | - | 1 | 10 | 1 | Ç | Enorádia | schadula | | | |
| Training objective and justification of | | | Goals, development objectives The learning material gives board knowledge in entrepreneurial skills such as stablishing, operating and transforming firms, handling their assets and financial ssues. By the end of the course the students will be able to use their managerial, ntrepreneurial and business legal knowledge in practice. Presentation In a classroom with the use of projector or computer in each lecture. Practice Flipchart, blackboard and other multimedia equipment in smaller | | | | | | | |
| ssed in term | is of | Other Knowledge Students w mechanisms and externa Ability Students wi to identify a to understar relevant lite Attitude They are op opinion, but their own co Autonomy Students fee cooperate w | ill know s of oper- <u>l environ</u> Il be able und deter nd the ste rature. een and w t without ompany. and resj el respon <i>i</i> th each | ting firms, k ments, know to use terms mine the reso ps of compa villing to disc disclosing a They have so consibility sibility for bo other. They | now the v the ecc s of this purces of ny aims cuss all ny impo ensibilit | e legal backgro onomic system field professia of companies, and strategies points of the c ortant informat y to find poten r development | and of constant of | mpanies, their internal ad strategies of firms. estand and use the rell as express their the circumstances of levelopment. ronment. They | | |
| Short description of the subject content | | | | The value chain and creation of double value both for buyers and suppliers. The technical and economic connections of value chain. The customer value and logistic buyer satisfaction. The customer value and the internet. The supply chain: system (network) of business relationships. The role of suppliers. Potential suppliers and the internet. Evaluation of suppliers, the criteria of supplier evaluation in internet. Strategic procurement. The methods and importance of demand anticipation in production logistics. Resource planning systems with buyer's cooperation. Management of customer relationship (CRM). The criteria of CRM systems (soft wares). The importance of services and its logistic problems. International transport. Competitiveness and supply chain management. Integration of supply chain. Measurement of supply chains. Tendencies in supply chain management | | | | | | |
| vities | | | <u> </u> | Presentation | ns, Indiv | idual work. Fi | ontal clas | s work, Essav writing | | |
| | etails | • W | /illiam D | . Bygrave | Andrew | Zacharakis (2 | 014): Ent | repreneurship, 3rd | | |
| ure and con | itact | Jerome Katz, Richard Green (2014) Entrepreneurial Small Business. 4th ed. McGraw-Hill International Ed., ISBN: 978-0078029424, DUE Library | | | | | | | | |
| o be ent reports | | Processing and analysis of 1 chosen case study (On week 8th) | | | | | | | | |
| able of the | | Midterm tests on weeks 7th and 12th. Supplementary test on week 13th | | | | | | | | |
| | in Hungari in English nal unit prior learni Presentatio per week per term or the subje d justificati utput, locat nods ssed in term he subject he subject | in Hungarian in English nal unit prior learning Presentation per week 1 per term 5 for the subject d justification of utput, location in he subject seed in terms of he subject //ities d contact details ure and contact o be ent reports | in Hungarian Vállalkozás in English Entrepreneu nal unit Institute of j prior learning Institute of j Presentation Practice per week 1 per week per term 5 per term for the subject Name Goals, deve d justification of utput, location in utput, location in otds The learnin establishing issues. By entrepreneu nods Practice Laboratory Other Nowledge Students wi to identify a to understar relevant lite Ability Students wi to identify a to understar relevant lite Attitude They are op opinion, but their own comportunitie he subject The value component they are op opinion, but their own comportunitie he subject The value component they are op opinion, but their own component they are op opinion, but they are op opi | in Hungarian Vállalkozástan in English Entrepreneurship nal unit Institute of Social Sc prior learning Institute of Social Sc Presentation Practice per week 1 per week 1 per term 5 per term 5 or the subject Name Goals, development d justification of The learning mater utput, location in establishing, operati nods Presentation In a cla Practice Flipch semina Laboratory Other nods External environ Ability Students will know Students will know mechanisms of opera and external environ Ability Students will be able to identify and deter to understand the ste relevant literature. Attitude They are open and wo opinion, but without their own company. Autonomy and resi Students feel respon cooperate with each opportunities for procureme production logistics. Manageme | in Hungarian Vállalkozástan in English Entrepreneurship nal unit Institute of Social Sciences, Dep prior learning Presentation Presentation Practice Laboratory per week 1 per week 2 per week per term 5 per term 10 per term or the subject Name Odorige Ca Goals, development objectives The learning material gives b butput, location in establishing, operating and transisues. By the end of the course entrepreneurial and business legates presentation In a classroom with Practice Flipchart, blackbos seminar rooms suit Laboratory other Vother Students will know the basic mechanisms of operating firms, k and external environments, know Ability students will be able to use term to identify and determine the rest to understand the steps of comparelevant literature. Attitude They are open and willing to disc opinion, but without disclosing a their own company. They have s to comperate with each other. They opportunities for problems. he subject The value chain and creation of a technical and economic connect in the work) of business relationshi internet. Evaluation of suppliers, Strategic procurement. The meth production logistics. Resource pl Management of customer relatio wares). The importance of servic | in Hungarian Vállalkozástan in English Entrepreneurship nal unit Institute of Social Sciences, Department prior learning Practice Laboratory per week 1 per week 2 per term 5 per term 10 per week 0 or the subject Name Odorige Cathérine Goals, development objectives d justification of utput, location in establishing, operating and transformin issues. By the end of the course the st entrepreneurial and business legal know Presentation In a classroom with the use seminar rooms suitable for Laboratory Other Knowledge Students will know the basic terms mechanisms of operating firms, know the and external environments, know the cot Ability Students will be able to use terms of this to identify and determine the resources of to identify and determine the resources of to identify and determine the resources of pointon, but without disclosing any impo their own company. They have sensibility Autonomy and responsibility Students feel responsibility Students will be able to use terms of the internet. Evaluation of suppliers, the crit Strategic procurement. The whave sen opportunities for problems. he subject The value chain and creation of double v technical and economic connections of v <br< td=""><td>in Hungarian Vállalkozástan in English Entrepreneurship nal unit Institute of Social Sciences, Department of Manageme prior learning Institute of Social Sciences, Department of Manageme Presentation Practice Laboratory Requirement per term 5 per term 0 M or the subject Name Odorige Cathérine Enorédia Goals, development objectives Institute of the course the students will be entrepreneurial and business legal knowledge in practite issues. By the end of the course the students will be entrepreneurial and business legal knowledge in practite Presentation In a classroom with the use of projector of the course the students will be entrepreneurial and business legal knowledge in practite Students will know the basic terms of entreprene mechanisms of operating firms, know the legal background external environments, know the leg</td><td>in Hungarian Vállalkozástan Level in English Entrepreneurship Code nal unit Institute of Social Sciences, Department of Management and En prior learning Presentation Practice Laboratory Requirement Credit per verek 1 per week 2 per week M 5 per term 5 per term 10 per term 0 M 5 or the subject Name Odorige Cathérine Enorédia Schedule Gals, development objectives The learning material gives board knowledge in entrepren utput, location in establishing, operating and transforming firms, handling their issues. By the end of the course the students will be able to entrepreneurial and business legal knowledge in practice. Practice Friepchart, blackboard and other multimedia equipt seminar rooms suitable for group work Laboratory Other Students will know the basic terms of entrepreneurship, to mechanisms of operating firms, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the leconomic systems, aims at Ability</td></br<> | in Hungarian Vállalkozástan in English Entrepreneurship nal unit Institute of Social Sciences, Department of Manageme prior learning Institute of Social Sciences, Department of Manageme Presentation Practice Laboratory Requirement per term 5 per term 0 M or the subject Name Odorige Cathérine Enorédia Goals, development objectives Institute of the course the students will be entrepreneurial and business legal knowledge in practite issues. By the end of the course the students will be entrepreneurial and business legal knowledge in practite Presentation In a classroom with the use of projector of the course the students will be entrepreneurial and business legal knowledge in practite Students will know the basic terms of entreprene mechanisms of operating firms, know the legal background external environments, know the leg | in Hungarian Vállalkozástan Level in English Entrepreneurship Code nal unit Institute of Social Sciences, Department of Management and En prior learning Presentation Practice Laboratory Requirement Credit per verek 1 per week 2 per week M 5 per term 5 per term 10 per term 0 M 5 or the subject Name Odorige Cathérine Enorédia Schedule Gals, development objectives The learning material gives board knowledge in entrepren utput, location in establishing, operating and transforming firms, handling their issues. By the end of the course the students will be able to entrepreneurial and business legal knowledge in practice. Practice Friepchart, blackboard and other multimedia equipt seminar rooms suitable for group work Laboratory Other Students will know the basic terms of entrepreneurship, to mechanisms of operating firms, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the legal background of co and external environments, know the leconomic systems, aims at Ability | | |

| | atics 3. | in Hungar | ian | Matematika | 3. | | | | Level | BSc | |
|---|--------------|---------------|--|---|---|--|--|---|--|--|--|
| Name of th | ne sumiect | in English | | Mathematic | s 3. | | | | Code | DUEN(L)-IMA-110 | |
| Responsib | le educatio | | | Institute of Science | Institute of Information Technology, Department of Mathematics and Computer Science | | | | | | |
| Name of co DUEN(L)- | | prior learn | ing | IMA-152 | | | | | | | |
| Type Presentation | | | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time | | per week | 0 | per week | 3 15 | per week | | | 5 | english | |
| Part time | 150/15 | per term | 0 | per term Name | 15 | per term Nagy Bálin | | schedule | Associate professor | | |
| Teacher responsible for the subject Training objective and justification of the course (content, output, location ir the curriculum) | | | | elsajátításáh szakirodalo legfontosab Rendelkezil számítógép | natematik toz nélku m tanulm b matema k az alk algebrai | objectives cai, függvén ülözhetetlen ányozásáho atikai össze almazott m | ytani al ek, va z. Ismer függése atemati | lamint maten ri és érti a szal ket és az eze | natikai is kterület m eket felép elsajátíta | melyek a szaktárgyal smeretek bővítése a űveléséhez szükséges ítő fogalomrendszert ását segítő valamely | |
| Typical delivery methods | | | | Presentation Practice Laboratory Other | | ak, módszer | ek ismo | ertetése nagy e | lőadóban, | , táblás előadás. | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | Knowledge Knows the methods and procedures required to solve mathematical tasks appropriate to the IT field. He has the knowledge and knowledge of the mathematical and functional education required for his field of expertise. Ability Able to apply the learned mathematical knowledge and activity system. Uses learned problem-solving methods and procedures. Able to prepare own solution plan and to defend it in debates (argumentative debate skills) in relation to learned mathematical concepts. Able to effectively organize your own learning process, find and use a wide variety of learning resources (printed, electronic) Attitude They are open to learning about and accepting mathematical development and innovation related to their qualification and field of expertise. Interested in new methods and tools related to the field. Autonomy and responsibility They take responsibility for their own results, as well as those of their colleagues (working in the same project). | | | | | | | |
| Short descr content | ription of t | he subject | | surfaces of Numerical i Variable tra differential second orde | revolution integration ansformate equations or different | n. Length n. Solving r ion: ax+by a. Second or tial equation | of a cu onlinea +c. Var der line 1s. | rve. Centre of r equations. S iable transfor ar differential | f gravity. eparable o mation: y equations | es. Area. Volumes and Multiple integration differential equations /x. First order linea s. Missing variable in | |
| Types of st | tudent activ | vities | | material. Ta | sk solution. Proces | on with cont | rol. Ind | ependent proce | essing of t | essing of theoretical casks. Text ups. Conflicting | |
| Required li | iterature an | nd contact of | letails | | | A Guide to M Study Guide | | atical Analysis | s, Dunaújv | város, 2007, pp. 1- 79 | |
| Recommer details | nded literat | ure and co | ntact | | | | | | | | |
| Description submitted/ | | | | | | | | | | | |
| | n and timet | table of the | During the semester, there are two compulsory tests: one (maximum 50 points) | | | | | | | s) on the 12th week ir | |

Mathematics 3.

| Enginee | ering con | structio | n | | | | | | | | | | |
|--------------------|--|--------------|---------|--|---|---------------|-----------------------|---------------------------------|-------------|--|--|--|--|
| Name of the | he aubient | in Hungar | ian | Gépszerkes | ztés | | Level | BSc | | | | | |
| Iname of u | ne subject | in English | l | Engineering | g construc | tion | Code | DUEN(L)-MGT-112 | | | | | |
| Responsib | le educatio | nal unit | | Institute of | Technolo | gy, Departn | nent of l | Mechanical Er | gineering | and Energy | | | |
| Name of c | ompulsory | prior learn | ing | MGT-111 | | | | | | | | | |
| DUEN(L) | - | - | | MG1-III | 101-111 | | | | | | | | |
| Туре | | Presentati | on | Practice Laboratory Requirement | | Credit | Language of education | | | | | | |
| Full time | 150/39 | per week | 1 | per week | 2 | per week | 0 | м | 5 | analish | | | |
| Part time | 150/15 | per term | 5 | per term | 10 | per term | 0 | М | 5 | english | | | |
| Teacher re | sponsible f | or the subj | iect | Name | | Róbert Sán | ta, PhD | | schedule | Associate professor | | | |
| | bjective an | | | | Goals, development objectives | | | | | | | | |
| the course | (content, o | utput, loca | tion in | and their int | eractions | . In heating, | cooling | g, ventilation a | nd air cond | ditioning, the systems, | | | |
| the curricu | ılum) | | | system com | ponents, | and | | | | | | | |
| | | | | Presentation | | | | lecture, preser MS Teams, us | | a whiteboard, puter network. | | | |
| Typical de | livery meth | nods | | Practice | | work presen | | | | | | | |
| | • | | | Laboratory | | | | | | | | | |
| | | | | Other | | | | | | | | | |
| | | | | Knowledge | | | | | | | | | |
| | | | | | | ology, key o | concept | s and theories | related to | your field. | | | |
| | | | | Comprehen | sive know | wledge of the | he meth | nods of knowl | ledge acqu | uisition and problem- | | | |
| | | | | solving in th | | | | | | | | | |
| | | | | | | | | | | nd methods, machine | | | |
| | | | | | technology, control procedures and operational processes. | | | | | | | | |
| | | | | | Comprehensive knowledge of the operating principles and structural units of the machinery and power tools, mechanical equipment and tools used. | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | Understand, characterise and model the structure and operation of the components and elements of mechanical engineering systems, and the design and interrelationship of | | | | | | | | | |
| | | | | elements of mechanical engineering systems, and the design and interrelationship of the system components used. | | | | | | | | | |
| | | | | Apply the related computational and modelling principles and methods of mechanical | | | | | | | | | |
| D: | | | | product, process and technological design. | | | | | | | | | |
| learning of | ents (expres | ssed in terr | ns oi | Ability | | | | | | | | | |
| | utcomes) | | | Perform the job according to your qualifications. | | | | | | | | | |
| | | | | Ability to plan, organise and carry out independent learning. | | | | | | | | | |
| | | | | Ability to identify, formulate and solve (through the practical application of standard | | | | | | | | | |
| | | | | operations) routine professional problems, and to identify, formulate and solve (through | | | | | | | | | |
| | | | | the practical application of standard operations) the theoretical and practical | | | | | | | | | |
| | | | | background necessary for their solution. | | | | | | | | | |
| | | | | Attitude | | | | | | | | | |
| | | | | Open to learning and absorbing knowledge related to mechanical engineering related | | | | | | | | | |
| | | | | to his/her qualifications and area of expertise. Interested in new methods and tools | | | | | | | | | |
| | | | | related to the field. | | | | | | | | | |
| | | | | Autonomy | _ | - | | | | | | | |
| | | | | | | | | and the work | | | | | |
| | | | | | | | | | | ection of plane bodies. | | | |
| Short desc | ription of t | he subject | | | | | | | | sing of curved bodies. | | | |
| content | - | 5 | | | | | | | | Fits. Surface quality and machined parts. | | | |
| | | | | | | | | e engineering) | | a and machined parts. | | | |
| | | | | | | | | | | processing of | | | |
| | | | | | | | | ng with guidan | | | | | |
| Types of s | tudent activ | vities | | | | | | | | | | | |
| | | | | processing of tasks 40 % Laboratory measurements with guidance - Preparation of laboratory reports - | | | | | | | | | |
| Required 1 | iterature ar | nd contact | details | Moodle notes | | | | | | | | | |
| | | | | Moodle notes Robert L. Norton: Machne Design - An Integrated Approach, 2006, Pearson | | | | | | | | | |
| Recomme details | Prentice Hall Upper Saddle River NL - Franz Koenigsberger Ma | | | | | | | | | | | | |
| Descriptio | n of tasks t | o be | | | | | | | | | | | |
| submitted/ | measureme | ent reports | | | | | | | | | | | |
| Descriptio | n and time | | e | A final nand | er in weel | rs 6 and 12 | from the | e lectures and | laboratory | classes | | | |
| workshops | 8 | | | ² x mai pape | | | | c icetures and | aboratory | 0100000. | | | |
| | | | | | | | | | | | | | |

Engineering construction

| Technol | logy of S | | | | | | | | | | |
|--|--------------|--------------|------------|---|--------------|---------------|---------------------|-----------------|-----------|-----------------------|--|
| | | in Hungarian | | Szerkezeti a | nyagok te | echnológiája | Level | BSc | | | |
| Name of the subject in English | | | Technology | of Struct | ural Materia | Code | DUEN(L)-MUA- 116 | | | | |
| Responsible educational unit | | | | Institute of Technology, Department of Structural Integrity | | | | | | | |
| Name of compulsory prior learning DUEN(L)- | | | | MST-210 | | | | | | | |
| Туре | Presentation | | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time | | per week | 1 | per week | 0 | per week | 2 | М | 5 | english | |
| Part time | | per term | 5 | per term | 0 | per term | 10 | | | | |
| Teacher re | sponsible f | or the subj | ect | Name | | Zsolt Csepe | eli, PhD | | schedule | College professor | |
| | | | | structural materials, as well as the processes of modification (alloying, casting, plastic forming, heat treatment and surface treatment) and forming (casting, plastic forming) of these materials. technologies. Students will learn about the operation and application of the main bulk | | | | | | | |
| | | | | and pressure welding processes. Presentation Projector, ppt lectures, learning materials available in moodle. | | | | | | | |
| | | | | Practice | riojecu | or, ppt lectu | ies, ieai | ining materials | available | e ili iliooule. | |
| Requirements (expressed in terms of learning outcomes) Short description of the subject content | | | | Laboratory Tabletop exercise and/or laboratory measurement. Use of overhead projector. | | | | | | | |
| | | | | Other | project | 51. | | | | | |
| | | | | Knowledge Have a comprehensive knowledge of the basic facts, trends and limits. In-depth knowledge of the structural materials used in engineering, their methods of manufacture and conditions of use. Ability Ability Ability to plan, organise and carry out independent learning. Attitude Open to learning and absorbing knowledge related to his/her qualifications and field of engineering. Interested in new methods and tools related to the field. Autonomy and responsibility It takes its decisions independently, in consultation with other disciplines, and takes responsibility for them. Metal production: pig iron production, steel production, continuous casting, aluminium | | | | | | | |
| | | | | production by electrolysis. Fe-Fe3C equilibrium phase diagram. Classification of steel and aluminium alloys, their characteristic properties. Germ formation and growth. Transformation diagrams for isothermal and continuous cooling. Formation of non- equilibrium tissue elements. Primary and secondary tissue structure. Tissue structure and mechanical properties of hot worked alloys. Forging, stamping, hot rolling, tube making processes. Metallurgical phenomena in cold forming. Fabric structure and mechanical properties of cold formed alloys. Plate forming technologies: straightening of base materials, material separation by thermal or shear stress, forming by bending, deep drawing, stretch forming. Full section heat treatments. Surface heat treatments. Operation and application of the main bulk and press welding processes. Preparation and processing of polymers and ceramics, their typical properties. | | | | | | | |
| Types of s | tudent activ | vities | | Processing of heard text with annotation 50%. Conducting material tests 30%. Evaluation of measurements, preparation of report 20%. | | | | | | | |
| Required literature and contact details | | | | Dr. József Verő - Dr. Mihály Káldor: Metallurgy. Textbook Publishing House, Budapest, 1977 Dr. Éva Dénes, Dr. Péter Farkas, Mrs Zsolt Fülöp and Dr. Zoltán Szabó. Főiskolai Kiadó, Dunaújváros, 2008 Dr. Tamás Tóth: Ferroalloys. National Textbook Publishing House, Budapest. 2002. TÁMOP e-learning course material: moodle.duf.hu; moodle.mk.uni- pannon.hu www.tankonyvtar.hu | | | | | | | |

Technology of Structural Materials

| Recommended literature and contact details | Tamás Tóth: Mechanical properties of materials and methods of their investigation, Főiskolai Kiadó, Dunaújváros, 2004 | | | | | |
|---|---|--|--|--|--|--|
| Description of tasks to be submitted/measurement reports | The student shall draw up a measurement report on the measurements carried out. | | | | | |
| Description and timetable of the workshops | A final paper in weeks 6 and 12 from the lectures and laboratory classes. | | | | | |

Mechanics 3.

| Mechanics 3. | | in Hungari | n | Machanika | 3 | | | | Level | BSc | |
|--|--------------|----------------------------|---|--|----|------------|------|-------------|--------|-----------------------|--|
| Name of the subject | | in Hungarian in English | | Mechanika 3. | | | | | | DUEN(L)-MUG- | |
| | | | | Mechanics : | | | Code | 153 | | | |
| Responsible educational unit | | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of compulsory prior learning DUEN(L)- | | | | MUG-152 | | | | | | | |
| Туре | Presentation | | n | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time 150/39 | | per week | 1 | per week | 2 | per week | 0 | Е | 5 | english | |
| Part time 150/15 | | per term | 5 | per term | 10 | per term | 0 | | | engilon | |
| Teacher responsible | or the subje | ect | Name Miklós Horváth, PhD schedule | | | | | | | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | Presentation All students in a large lecture, using lecture, Power Point and overhead projector | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | Laboratory | Practice exercises | | | | | | | |
| | | | Other | | | | | | | | |
| | | | Knowledge of the general and specific mathematical, scientific and social principles, rules, contexts and procedures necessary for the operation of the technical field. You know the terminology, key concepts and theories related to your field. You have a comprehensive knowledge of the main theories and problem-solving methods in your field. Ability Ability to plan, organise and carry out independent learning. Ability to identify routine professional problems, to identify, formulate and solve them (using standard operations in practice) against a theoretical and practical background. Ability to build basic models of technical systems and processes. Attitude Open to learning and absorbing knowledge related to mechanical engineering related to his/her qualifications and area of expertise. Interested in new methods and tools related to the field. Autonomy and responsibility Taking responsibility for your own work and the work of others. | | | | | | | | |
| Short description of the subject content | | | | Amount of motion, permittivity, kinetic energy, work of force and torque, power of a point of matter. Kinetic theorems. Rigid body concept, types of motion, elementary motions. State of velocity of rigid body, velocity diagram. State of acceleration of rigid body, acceleration diagram. Amount of motion of rigid body, perpendicularity, kinetic energy. Kinetic theorems for a rigid body. Rolling of rigid body and catcher motion about stationary axis. Static and dynamic balancing. Kinetics of structures by classical and reduction method. Summary of material point rocking theory. One degree of freedom bending and torsional vibration. Multi-degree of freedom vibration systems. Collision of solid bodies. Concepts, characterisation and classification of mechanisms, structure, kinematic analysis. Kinematics of drives (gears, belt, friction and chain drives). Mechanisms commonly found in mechanical engineering. | | | | | | | |
| Types of student activities | | | Task completion with guidance/independent: 20/29 % Laboratory measurements under supervision: 1 % Csizmadia ed. Mechanika III/B főiskolai jegyzet, Budapest, Tankönyvkiadó | | | | | | | | |
| Required literature and contact details | | | Departmental Working Group: Mechanics III/1. Dynamics (basics) Workbook, Dunaújváros, DF Kiadó Dunaújváros | | | | | | | | |
| Recommended literature and contact details | | | Dr. Vigh S. ed: Technical mechanics III. tutorial, college note, Budapest, Tankönyvkiadó, 2000 Dr. Béla M. Csizmadia - Dr. Ernő Nádori: Mechanics for engineers. Engineers for Mechanical Engineers. National Textbook Publisher, 1999. | | | | | | | | |

| | Dr. István Sályi: Mechanisms: the basics of the kinematics and dynamics of machines, Budapest, Textbook Publishing House, 1973. |
|---|---|
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

| Tuman | | e Mana | | t Emberi erőforrás menedzsment | | | | | | 20 | | |
|--|-----------------------------------|----------------------|--|---|---|--|--|---|--|--|--|--|
| Name of t | ame of the subject | | | | | | Level Code | BSc DUEN(L)-TVV-111 | | | | |
| <u>v</u> | | | Human Resource Managment Code DUEN(L)-TVV-111 Institute of Social Sciences, Department of Management and Entrepreneurship Entrepreneurship | | | | | | | | | |
| | Name of compulsory prior learning | | | | | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/39 150/15 | per week per term | 1 5 | per week per term | 2 10 | per week per term | 0 | М | 5 | english | | |
| Teacher re | esponsible f | or the sub | ject | Name | | | jcsányi- | Molnár, PhD | schedule | College professor | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | The goal of workplace a The course market insti of labor rel activities, c | Goals, development objectives The goal of the course is to develop the essential skills required of employees at the workplace and to expand students' HR management skills. The course broadens the students' knowledge and gives abilities to manage the labor market institutions and policies, workplace and labor market characteristics, the system of labor relations, competence and motivation management, personnel management activities, organizational behavior, organizational communication, human resource management case studies, occupational safety and health project management. | | | | | | | |
| Typical de | elivery meth | nods | | Practice Laboratory | | | | | | er in each lecture. er in each lecture. | | |
| | | | | Other | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ms of | resource ma They know activities. They famili social relati- knows that : Ability The student thinking in : They are ab They can pl They can pl They can gl They | and unde and unde ar with the onships, ti a key elem s can apple alternative le to achie an, schedri ake the su y solving a pable of u activity c apply the s. le to form iators are resentative e-oriented account to to accom important lifelong le and resp - nal questi e problem f it is a ne elect its over ponsibiliti | t (HRM) sys rstand the p he business heir impact <u>nent in the p</u> ly the analy: es, inspectio eve the tasks ule and com ggestions a a task withir inderstandin hain of plan roles conne ulate an opi patient, wel res of the oti l bargainers he employn modate new it for indivice earning and onsibility ons negotia s alone. The ed in a cert wn staff, tak ttly supply t y for subord | stem of rocesses of man on hum <u>rosperi</u> zing me n) on th s assign plete th ad decise a their o g the ca ning-or cted to d <u>nion of</u> l-educa mer side respect hent pra inform lual care help the tors can ey can ta ain nego | knowledge an s and procedu ufacturing and an resources. ty of the peopl thods and task ecoretical and ed to them wite e tasks within sions and take wn scope of co uuse-result rela ganizing-decise employment at their own, del ted and have e and accept the their counterp ctices of legal ation, new tas eer planning. e staff as well. play the role of ackle problem otiation phase o account the s is it controls hu working fellow | d activity. res for the l service p le working (le working (le working) (le working) (s (plannir practical g (hout cont their scop measures ompetence ationship a sion prepa nd use and (liver and c empathy, i eir opinion part, are tr , ethical a ks that rec of a decisis s as respo or situation pecified c uman proc v. | e modalities of human processes, human and g successfully. ng, organizing, and grounds. rol and inspection. be of responsibility. required for e. and using analyzing uring-decision-making d utilize managerial lefend it. .e. they can identify n. ustworthy and not nd professional rules. quire collaboration. ion-maker and are nsible persons, i.e. on to cooperate with riteria. esses. | | |
| Short description of the subject content | | | | Evolution of the human resource management. Environmentally determination of HRM. The HRM place in the organizational structure. The HRM's activities and tasks. Job planning, analysis, competency models. Career management, career planning alignment of individual and organizational career opportunities. The workforce training and development opportunities. | | | | | | | | |

Human Resource Managment

| | Performance evaluation and feedback management. Compensation and incentive systems. Industrial relations system. Management of organizational changes. New trends in HRM practice. | | | | |
|--|--|--|--|--|--|
| Types of student activities | Pair work presentation Group work (case study analysis) | | | | |
| Required literature and contact details Recommended literature and contact details | David Campbell & Tom Craig (2011): Organisation and the Business Environment, Second edition, Routledge Publishing, USA Materials on Moodle Handouts from the lecturer TORRINGTON, Derek – HALL, Laura – TAYLOR, Stephen (2005): Human Resource Management. Pearson Education Limited, Essex, England.810 p. ISBN 978-0-273-68713-9 ARMSTRONG, Michael (2009): A handbook of Human Resource Management Practice, 11th ed. London: Kogan Page 1062 p. ISBN 0-7494- 4631-5 http://www.academia.edu/1418840/ARMSTRONGS_HANDBOOK_OF_H UMAN RESOURCE MANAGEMENT_PRACTICE) | | | | |
| Description of tasks to be submitted/measurement reports | Students have to take a final test | | | | |
| Description and timetable of the workshops | Multi-choice questions | | | | |

| Nama of t | ha aubiaat | in Hungar | ian | Menedzsment Level BSc | | | | | BSc | | | |
|---|-------------------------------|-------------|---|---|---------------------|-----------------------|---|-------------|----------|-----------------------|--|--|
| Iname of u | ame of the subject in English | | | | Management Code DUE | | | | | | | |
| | | | Institute of | Institute of Social Sciences, Department of Management and Entrepreneurship | | | | | | | | |
| Name of c DUEN(L) | ompulsory - | prior learr | ning | | | 1 | | 1 | 1 | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time | 150/39 | per week | 1 | per week | 2 | per week | 0 | М | 5 | english | | |
| Part time | 150/15 | per term | 5 | per term | 10 | per term Mánika Ba | 0 | Molnár | sahadula | | | |
| Teacher responsible for the subject Training objective and justification of the course (content, output, location in the curriculum) | | | Goals, deve The aim of managemer of managen competence of the conce imparted, th develop ski Practical ex contexts. | NameMónika Rajcsányi-MolnárscheduleCollege teacherGoals, development objectivesThe aim of the course is to familiarise students with the most important aspects of the management of work organisations, to provide an overview of the "special" dimension of management and the factors that determine them. In order to develop the professional competences and theoretical knowledge of students, the course provides an overview of the concepts and major models of management organisation. Through the knowledge imparted, the course enables students to analyse and develop work organisations; to develop skills in the application of the management techniques and methods taugh Practical examples help to interpret theoretical knowledge and to identify relevan contexts.PresentationTeacher presentation, with explanations and practical examples. Students' comments on some topics, sharing their experiences, followed by a teacher's summary. All students present together in a large lecture with projector and presentation technique. | | | | | | | | |
| Typical delivery methods | | | Practice Laboratory Other | projector and presentation techniques. | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | Other Knowledge Knowledge of the basic factors, key concepts, requirements, contexts and procedures of management and organisation science. You will acquire the theoretical and methodological basis for the performance of management tasks and the exercise of functions. You know the procedures and methods often used in planning, organising and managing. You know the leadership style models and understand their role in effective leadership behaviour. He/she knows the methods of understanding and analysing the management and decision-making systems of work organisations, their ethical limits and their possibilities for improvement. Understand and identify with the importance of corporate social responsibility. Understands the ethical responsibilities of management and its role in the effective functioning of the company. Ability Ability Ability to demonstrate and exercise managerial functions. Distinguish between management styles on the basis of advantage and disadvantage and apply the appropriate style as necessary. It distinguishes between long-term and short-term tasks and consequences. Ability to creatively analyse the purpose, process and organisational system of a work organisation. Ability to arganise his/her own and others' work effectively and humanely, and to lead working groups. The ability to manage, organise, control and coordinate the development of the company's financial and information processes. A sense of re | | | | | | | | | |

| | Autonomy and responsibility It builds and initiates new areas of knowledge and new practices with creative autonomy. He/she can take a leading role and participate in a high level of cooperation in the formulation of practical issues affecting his/her work and the future of his/her organisation. Take responsibility for the consequences of your actions and decisions. The ability to independently perform management tasks related to the technical- economic processes of the enterprise, the management of operations. A sense of responsibility for sustainable development. |
|--|---|
| Short description of the subject content | The world of business, organisations, businesses and companies. Business and its environment. Business and management, organisational and management functions. Management, leadership, governance and how they relate to each other. Managerial roles and levels. A historical overview of leadership. Management trends, schools and concepts. Similarities and differences. Planning: hierarchy of organisational goals and levels of planning, long, short term and operational planning, methods of planning. Organisation: change of structure, processes, understanding of organisations, division of labour and arrangement of divisions, creation of process and organisational structures, structural characteristics of organisations, types of organisations and their characteristics. Management: enforcement of authority, setting standards, measurement, evaluation and correction, dealing with day-to-day problems, monitoring and controlling, strategic management tools. Personal leadership: leadership behaviour and leadership style, identities and differences in theories of leadership style and the conclusions to be drawn. Politics and ethics in organisational life. Understanding, areas and sources of business ethics. Characteristics of ethical behaviour and ethical business. The concept of a responsible company, an introduction to corporate social responsibility. Ethical responsibilities of management within the company. |
| Types of student activities | Guided and independent study of theoretical material, Problem solving with guidance and independently. Analysis of case studies, group work. Solving complex tasks, cooperation in team work. Collecting, processing and presenting information on a professional topic. |
| Required literature and contact details | Teaching aids and ppt's to help you work through the different chapters of management. Compiled by Enikő Nagy, 2016, available in moodle Angyal Á: Corporate Social Responsibility, Corporate Governance, Kossuth, Bp. 2009. |
| Recommended literature and contact details | Csaba Deák - Balázs Heidrich - Éva Heidrich: Management skills. Booklands 2000 Publisher, 2006, ISBN: 9789632025209 Miklós Dobák:Organizational forms and leadership. Akadémia Kiadó, Bp. 2008, ISBN: 9769630583406 Angyal Á: Corporate Social Responsibility, Corporate Governance, Kossuth, Bp. 2009. ISBN: 9789630959957 Csaba Deák: Management skills. Booklands, Békéscsaba. 2002. Miklós Dobák et.al.:Organizational forms and leadership. Budapest, KJK-Kerszöv, 2004. Antal Zs Kis N.: Organization administration and management. Management and Management of Management and Management and Management and Management. downloaded 05.08.2016. http://vtki.uni-nke.hu/uploads/media_items/antal-zsuzsannakiss-norbert-tamas-szervezetigazgatas-es-menedzsment.original.pdf Vígvári: The revaluation of the control function and the challenges of modern management. http://193.6.12.228/uigtk/uipz/hallgatoi/ellcikk.pdf Noémi Piricz: Fair behaviour in business networks.In: Budapest University of Technology and Economics, Department of Management and Business Economics (ed.) Paper of the XXI National Conference of the Association for Marketing Education and Research, Budapest, 27-28 August 2015.Conference place and time: Budapest, Hungary, 2015.08.27 - 2015.08.28. 517-525. (ISBN:978-963-313-189-3) |
| Description of tasks to be submitted/measurement reports | |

| scription and timetable of the | |
|--------------------------------|--|
| workshops | |

Basics of energetics

| Basics of energetics | | | | | | | | | D.C. | | | |
|---|-------------------------------------|----------------------|--|---|--|----------------------|------------------------|------------------|-------------|--|--|--|
| Name of the subject | | | Energetika a | 10 | | Level Code | BSc DUFN(L)-MGT-211 | | | | | |
| · · · · · · · · · · · · · · · · · · · | | | Basics of energetics Code DUEN(L)-MGT-211 Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | | |
| Name of compulsory prior learning DUEN(L)- | | | | ansulate or reenhology, Department of Meenanical Engineering and Energy | | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 0 | per week per term | 1 5 | М | 5 | english | | |
| | sponsible | | | Name | | Róbert Sán | ta, PhD | | schedule | e Associate professor | | |
| | bjective an (content, c ilum) | | | Goals, deve interpret and | • | 0 | on and ir | nstallation spec | cification | s of appliances. | | |
| | | | | Presentatior | ¹ Teams. | | | | | r on-line using MS | | |
| Typical de | elivery met | hods | | Practice | Small g exercise | | to 25 pe | ople, sketchin | g, draftin | g, calculation | | |
| | | | | Laboratory | | | | | | | | |
| | | | | Other Knowledge | | | | | | | | |
| | | | | Have a com area of engi | prehensiv neering. | - | | | | nd limits of the subject | | |
| | | | | rules, conte | xts and pi | rocedures ne | ecessary | for the operat | ion of the | c and social principles, e field of engineering. and theories related to | | |
| | | | | Comprehen solving in th | Comprehensive knowledge of the methods of knowledge acquisition and problem solving in the main theories of the field. | | | | | | | |
| | | | | Comprehensive knowledge of basic economic, business and legal rules and tools. Knowledge of the main structural materials used in the field of energy and their | | | | | | | | |
| | | | | conditions of use. Comprehensive knowledge of the basic principles and methods of operation of energy systems and processes and of energy conversion machines and technologies. | | | | | | | | |
| | | | | Ability 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. Knowledge of the terminology, the most important relationships and theories related to the field. | | | | | | | | |
| | ents (expre | ssed in terr | ms of | Comprehensive knowledge of the methods of knowledge acquisition and problem solving in the main theories of the field. | | | | | | | | |
| learning o | utcomes) | | | Comprehensive knowledge of basic economic, business and legal rules and tools. Knowledge of the main structural materials used in the field of energy and their | | | | | | | | |
| | | | | conditions of use. Comprehensive knowledge of the basic principles and methods of operation of energy systems and processes and of energy conversion machines and technologies. | | | | | | | | |
| | | | | Attitude | | | | | | | | |
| | | | | Open and receptive to energy, health and environmentally conscious design and operation principles and methods. He/she shall strive for continuous self-learning in the | | | | | | | | |
| | | | | field of energy, in line with his/her professional goals. Carries out and makes | | | | | | | | |
| | | | management decisions by listening to the opinions of management and other staff. In his/her work, he/she shall apply the requirements of efficiency, sustainability and | | | | | | | | | |
| | | | | environmental and health awareness. Assume and authentically represent the role of | | | | | | | | |
| | | | the profession in society and its fundamental relationship with the world. He/she takes | | | | | | | | | |
| | | | decisions in complex and unexpected decision-making situations, taking full account of legal and ethical standards. He/she is open to the use of information technology tools, | | | | | | | | | |
| | | | of legal and ethical standards. He/she is open to the use of information technology tools, and seeks to learn and use expert systems for planning and decision support in the field | | | | | | | | | |
| | | | of energy. | | | | | | | | | |
| | | | | Autonomy | | | a ha/-1 | a indona-1- (| ly, this 1- | through and develo | | |
| | | | | | | | | | | through and develops asis of given sources. | | |
| | | | | Responsibly | comprehensive, well-founded professional questions on the basis of given sources. Responsibly upholds and represents the values of the engineering profession and is open to professionally informed critical comment. | | | | | | | |
| | | | | open to professionally informed critical comment. | | | | | | | | |

| Short description of the subject content | The role and fields of energetics. The three subsystems of energy, - production, generation, - transport, distribution, storage, - end-use of energy. Energy indicators, energy efficiency. Energy aspects of sustainable development. Primary and secondary energy needs. Fossil, nuclear fuels and renewable energy sources, their use and environmental impact. Introduction to pressurised water nuclear power, combined heat and power and renewable energy sources. Energy conversion processes in pressurised water nuclear power plants, combined heat and power generation. |
|---|--|
| Types of student activities | Presentation: Processing of the text with notes 70%, independent processing of theoretical material 30%, |
| Required literature and contact details | <u>https://energy.ec.europa.eu/system/files/2020-</u>01/hu_final_necp_main_hu_0.pdf Materials on MOODLE |
| Recommended literature and contact details | Ősz J.: Energetika jegyzet .ppt formátumban a www.energia.bme.hu honlapon. Büki G.: Energetika, Műegyetemi kiadó, 2000. Büki G.: Erőművek. Műegyetemi Kiadó, 2004. Oktatási segédanyagok: www.energia.bme.hu |
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

| Fluid m | achinery | r | | | | | | | | | | |
|--|--|----------------------|--|---|--|--|--|--|---|--|--|--|
| Name of t | he subject | in Hungar | | Áramlástec | | oek | Level | BSc | | | | |
| | ne subject | in English | | Fluid machi | | | Code | DUEN(L)-MGT-212 | | | | |
| Responsible educational unit | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | | |
| Name of c DUEN(L) | ompulsory - | prior learn | iing | MUT-250 | | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 0 | per week per term | 1 5 | М | 5 | english | | |
| Teacher re | esponsible f | or the subj | ect | Name | | Miklós Hor | váth, Pl | hD | schedule | College professor | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | Have a com area of engi You know t Comprehen machines, p Understand | Goals, development objectives Have a comprehensive knowledge of the basic facts, directions and limits of the subject area of engineering. You know the terminology, key concepts and theories related to your field. Comprehensive knowledge of the operating principles and structural units of the machines, power tools, mechanical equipment and tools used. Understand, characterise and model the structure and operation of the structural units and elements of mechanical systems, the design and interrelationship of the system | | | | | | | |
| Typical de | elivery meth | nods | | Practice | | | | | | poard presentation | | |
| J1 | , v | | | Laboratory Other | Manual | editing exe | rcise in | groups of up | to 30 | | | |
| Requirements (expressed in terms of learning outcomes) | | | | area of engi You know t You have a methods in Comprehen machinery, Understand and elemen components Ability Students sha to this cours of machines After comp diagrams. Students wi Attitude He is open t his qualifica mechanical Autonomy Taking resp | prehensiv neering. he termin compreh your field sive know power too , characte ts of mec s used. ould have se. They s and be a oleting the ll gain ski to learning ations and pneumati and resp onsibility | ology, key o nensive kno l. wledge of th ols, mechani rise and mo chanical sys a basic und hould be far ble to apply e course, st ills in pneum g about and area of exp cs and hydr onsibility for your ov | concept: wledge ne oper- ical equ del the tems, th erstandi niliar w them ir tudents natic ac acceptin ertise. I aulics. vn work | s and theories of the main ating principle ipment and too structure and ne design and ing of mechani ith the basic o n practice. should be ab tuation, PLC a ng technical en nterested in no | related to theories a es and str ols used. operation interrelat ical engine peration a ole to dra application ngineering ew method | nd problem-solving uctural units of the of the structural units ionship of the system eering after listening nd energy processes w hydraulic circuit ns and programming g problems related to ds and tools in | | |
| content | cription of the second se | | | engineering Conversion Characterist machine eff Pumps and pressure rec technology. Pneumatic o elements. O Processing independen Guided task 2 papers fro | , their def between tics of cor ficiency, w motors, h lucers, flo Pneumat componen peration of theoretica tly 25 % solving 1 on the pre | inition, app different me stant speed variable speed ydraulic pow www.regulator ics Characte ats. Basic co of pneumati- al material 10 % Indepen- sentation m | lication. easurem operati- ed opera- wer cyli s. Pipes eristics a nnectio <u>c eleme</u> with gu | ent systems. on of machine ttion, starting, nders. Proport , pipe fittings, and application ns. Introduction nts, examples idance 30 % ask processing | Systems of stopping. tional press batteries, ns of pneu on and ide of applica Processin g 12 % | of measurement. energy transfer, Hydraulics. sure limiters, filters. Switching matic actuators. ntification of | | |

Fluid machinery

| Required literature and contact details | Attila Kovács: General Mechanical Engineering (university note) Műegyetemi Kiadó, Bp. 1999 Zobory I Szabó A.: General Mechanical Engineering (university note) Műegyetemi Kiadó, Bp. 1998. Kjell Evensen-Jul Ruud : Basics of pneumatics, MECMAN EGER Ltd. Budapest 1994, FESTO: Introduction to pneumatics P111. Festo Ltd. 2001. FluidSIM simulation software on the institutional network Hydraulics Mannesmann-Rexroth Gmbh: What you need to know about hydraulics Volume 1 Number: RU 00301/4.82 |
|---|---|
| Recommended literature and contact details | Imre Dolgos:Operation of machinery I. National Textbook Publishing House, 1998. Budapest Pattantyús Á. Géza:Operation of machinery, Műszaki Könyvkiadó, 1983. Budapest |
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

Industrial drive technology

| muusui | | etechnology | | | | | | | | 1 | |
|--|------------------|----------------------|--|--|---|--|--|--|--|---|--|
| in English | | | Gépészeti h | | Level | BSc | | | | | |
| | | Industrial d | | Code | DUEN(L)-MGT-251 | | | | | | |
| Name of compulsory prior learning | | | Institute of Technology, Department of Mechanical Engineering and Energy MUG-152 MUG-222 | | | | | | | | |
| Type | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 0 0 | E | 5 | english | |
| Teacher re | sponsible f | 1 | ject | Name | | Tamás Zah | ola | | schedule | Master instructor | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | components design such using comp | t should , assembl units. Be uter tools Enginee | know the c lies and sub able to pre s. The stude ring and N | -assemb pare the nt will Iechani | blies used in e e drawing doc be able to ap cs to the cre | engineerin umentatio pply the k eation and | nowledge acquired in design of complex | |
| | | | | Presentation | ¹ projecto | or | | | | r Point and overhead | |
| Typical de | livery meth | nods | | Practice Laboratory Other | Compu | ter-aided de | sign exo | ercise for up to | o 20 stude | nts. | |
| Requirements (expressed in terms of learning outcomes) | | | ms of | of the techn Familiarity Comprehen acquisition methods of Basic know operational Has an app measuring e Understand and elemen components Ability Performs th Ability to p The ability with a view Attitude He/she is op technology methods an Autonomy Taking resp | of the gen ical field. with the t sive know and problem s ledge of processes lied know equipment , characte ts of mec a used. e job acco lan, organ to quality pen to lear related to d tools rel and resp onsibility | erminology, vledge of th em solving solving. machine de s. vledge of m t used in me rise and mo chanical sys ording to his lise and carr e and contro 7 assurance a his/her qua lated to the f onsibility for your ov | the main sign pri easuren chanica del the tems, th /her qua y out in l the pro and qua sorbing lificatio ïeld. | in contexts an theories of the nciples and me nent procedur lengineering. structure and de design and alifications. dependent lea oduction proceed lity control. | d theories he field in hethods, co es, their t operation interrelat rning. esses of sp elated to e expertise. of others. | Interested in new | |
| Short description of the subject content | | | | Design of complex machinery structures: strength design, correct structural design, operation and maintenance. The subject matter of the course concentrates on drive technology in addition to other topics not previously covered but relevant to engineering practice. Flexible (belt) drives, clutches, gear drives, springs, brakes, pipes and fittings, seals. | | | | | | | |
| Types of s | tudent activ | vities | | Processing theoretical material with guidance 20 % Independent processing of theoretical material 20 % Problem solving with guidance 20 % Independent processing of tasks 40 % Laboratory measurements with guidance Preparation of laboratory reports | | | | | | | |
| Required literature and contact details | | | | B.N Sarkar, Fundamentals of Industrial Drives Paperback, Publisher : Phi Learning pvt Ltd; 1st edition (February 17, 2011), ISBN-13 : 978- 8120344334 Materials on MOODLE | | | | | | | |

| Recommended literature and contact details | Imre Dolgos: Operation of machinery I. National Textbook Publishing House, 1998. Budapest Pattantyús Á. Géza: Operation of machinery, Műszaki Könyvkiadó, 1983. Budapest |
|---|--|
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

Industrial automatics

| - | | 1 | | | | | - | | | |
|---|--|---|--|--|---|--|---|---|--|--|
| in Hungar | | Ipari automatizálás | | | | | | BSc | | |
| | | | | | | | | | | |
| | ing | | reciliolog | gy, Departin | | | giity | | | |
| F | 8 | IMA-152 | | | | | | | | |
| Presentatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| per week per term | 1 5 | per week per term | 2 10 | per week per term | 0 0 | Е | 5 | english | | |
| for the subj | ect | Name | | András Nag | gy, PhD | | schedule | Associate professor | | |
| | | Introduce st most import | udents to tant parts ng autom | the essentia of process ation. Deve | control, loping F | with particular PLC programm | ar emphas ning skills | sis on process control, s in students | | |
| | | Presentatior | each leo | cture | | 1 0 | | • | | |
| hods | | Practice | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | I theories sive know he main the ledge of in neering p sive know chanical e et, charact s of auto s a work t an, organ htify rout a backgr n practice arning ab h and field and resp ity for on | wledge of the neories of hindustrial con- procedures. wledge of the equipment an arerize and m mated syste hat matches ize and perfi- ine profession round needed by. out and acco- d of expertise onsibility e's own wor | he met s/her fie atrol sys e operati nd devic odel the ms, the his qua orm ind onal pro- ed to so epting a se. Inter- | hods of acqueld. tems and mething principles ses. e structure and design and conditional design and conditional dependent lear poblems, explosional polve them, ar | nods, man and struct operation onnection ning. re and for ad solve sign devel methods a ers | owledge and problem ufacturing technology, tural units of industrial of the structural units of the applied system mulate the theoretical them (using practical opments related to his and tools related to the | | |
| Short description of the subject content | | | | Fundamentals of control engineering, control and regulation technology basics. Characteristics, goodness, and types of control and regulation. Signals and systems, descriptive characteristics, block diagrams. Methodology of system description. Mappings, modeling, simulation. Structural and block diagrams. Deterministic test signals. Static and dynamic optimization. Fourier and Laplace transformation. Frequency response. Characteristics of fuzzy control. Basic steps of PLC programming, step and ladder programming, SCADA systems. Basics of sensors and actuators, connections. Industrial field bus systems, protocols. | | | | | | |
| | | theoretical material 20% Problem solution with control 20% Independent processin of tasks 40% | | | | | | | | |
| | | | | | | • | | | | |
| ture and co | ntact | Conner Gareth: Scenic Automation Handbook, ISBN9781138850279, 2018 Fabrizio Frigeni: Industrial Robotics Control, EAN9781484289884, 2022 | | | | | | | | |
| | | • 10 | | igem. maus | unai Ko | boues control | 1, EAN970 | 01404209004, 2022 | | |
| to be ent reports etable of the | | Project worl | | igeni. maus | unai Ko | bolles Control | I, LAN976 | 81484289884, 2022 | | |
| | in English mal unit prior learn per week per term for the subj nd justificat botput, loca hods ssed in terr the subject vities nd contact of | in English prior learning Presentation per week 1 per term 5 for the subject ad justification of butput, location in hods essed in terms of the subject | in English Industrial au onal unit Institute of T prior learning IMA-152 Presentation Practice per week 1 per week per term 5 per term for the subject Name ad justification of output, location in hods Practice Laboratory Other Name Ability He performs Ability to pl Able to ider and practice comprehens solving of th Basic knowl control engi Comprehens solving of the solving | in English Industrial automatics mal unit Institute of Technolo prior learning IMA-152 Presentation Practice per week 1 per week 1 per term 5 per term 5 d justification of output, location in Goals, development Introduce students to most important parts manufacturing autom In a cla each lea hods Practice Flipcha seminat Laboratory Other In a cla each lea hods Practice Flipcha seminat Laboratory Other In a cla each lea bods Practice Flipcha seminat Laboratory Other In a cla each lea bods Practice Flipcha seminat Laboratory Other In a cla each lea contexts and theories Comprehensive know control engineering p Comprehensive know control, mechanical e Can interpret, charact and elements of auto elements Ability He performs a work to Ability to plan, organ Able to identify rout and practical backgy opera | in English Industrial automatics onal unit Institute of Technology, Departm prior learning IMA-152 Presentation Practice Laboratory per week 1 per week 2 per week 1 per week 2 per term 5 per term 10 per term for the subject Name András Nag ad justification of putput, location in Goals, development objectives Introduce students to the essentia most important parts of process of manufacturing automation. Deve Presentation hods Presentation In a classroom with each lecture Practice Flipchart, blackboa seminar rooms suit Laboratory Other Other Stows the conceptual system relecontexts and theories. Comprehensive knowledge of industrial cor control engineering procedures. Comprehensive knowledge of the control, mechanical equipment at Can interpret, characterize and mand elements of automated systee ssed in terms of elements Ability He performs a work that matches Ability to plan, organize and perf Able to identify routine professia and practical background neede operations in practice). Attitude Strives to learning about and | in English Industrial automatics onal unit Institute of Technology, Department of S prior learning IMA-152 Presentation Practice Laboratory per week 1 per week 2 per week 1 per week 2 per term 5 per term 10 of the subject Name András Nagy, PhD djustification of putput, location in Introduce students to the essential elememost important parts of process control, manufacturing automation. Developing I hods Presentation In a classroom with the use each lecture Practice Flipchart, blackboard and o seminar rooms suitable for Laboratory Other Other Other Knowledge Knowledge of the met solving of the main theories of his/her fit Basic knowledge of industrial control sys control engineering procedures. Comprehensive knowledge of the operatic control, mechanical equipment and devic Can interpret, characterize and model the and elements of automated systems, the elements ssed in terms of Ability He performs a work that matches his qua Ability to plan, organize and perform ind Able to identify routine professional pre and practical background needed to se operations in | In English Industrial automatics onal unit Institute of Technology, Department of Structural Integration prior learning IMA-152 Presentation Practice Laboratory Requirement per week 1 per week 2 per week 0 E per term 5 per term 10 per term 0 E of or the subject Name András Nagy, PhD Coals, development objectives Introduce students to the essential elements of control most important parts of process control, with particul manufacturing automation. Developing PLC programm hods Presentation In a classroom with the use of projector, each lecture Practice Flipchart, blackboard and other multime seminar rooms suitable for group work n Laboratory Other Comprehensive knowledge of the methods of acque solving of the main theories. Comprehensive knowledge of the operating principles control, mechanical equipment and devices. Comprehensive knowledge of the operating principles control, mechanical equipment and devices. Can interpret, characterize and model the structure and and elements of automated systems, the design and core elements Ability He performs a work that matches his qualifications. | In English Industrial automatics Code nnal unit Institute of Technology, Department of Structural Integrity | | |

Production Technology

| FIOUUCU | on Tech | | | | | | | | r | | | |
|--|-------------|--------------|---------|--|---|--|--|--|---|--|--|--|
| | | in Hungari | an | Gyártástech | nológia | | Level | BSc | | | | |
| Name of th | e subject | in English | | Production ' | Production Technology Code DUEN(L)-MUG- 252 | | | | | | | |
| Responsibl | | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | |
| Name of co DUEN(L)- | | prior learn | ing | MUG-152 | | | | | | | | |
| Туре | | Presentatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time | | per week | 2 | per week | 1 | per week | 0 | Е | 5 | english | | |
| Part time | 150/15 | per term | 10 | per term 5 per term 0 | | | | | | | | |
| Teacher res | sponsible f | or the subj | ect | Name | - | Gábor Vizi | , PhD | | schedule | Associate professor | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | Understand technologie principles processes - | ing the ba ing the th s, produc and impli Calculation ne and cos | sics of man eoretical ba ction equip ications of on and selec st - Understa | sis of p ment a machin tion of p unding of | lastic forming nd tools. CU ning - Under process data - (other machinin | . Knowled JTTING standing Calculatio ag process | the basic machining n of machine time and es | | |
| | | | | Presentatior | ¹ overhea | d projector | _ | | | ard, projector or | | |
| Typical de | livery meth | nods | | Practice | Small ta | able top exe | rcises fo | or up to 20 peo | ople | | | |
| | | | | Laboratory | | | | | | | | |
| | | | | Other Knowledge | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | Basic knowledge of machine design principles and methods, machine manufacturing technology, control procedures and operating processes. Apply the related computational and modelling principles and methods of engineering product, process and technology design. Ability Performs the job according to his/her qualifications. Ability to plan, organise and carry out independent learning. The ability to manage and control the production processes of specialised technology, with a view to quality assurance and quality control. Attitude He/she is open to learning and absorbing knowledge related to engineering technology related to his/her qualification and area of expertise. Interested in new methods and tools related to the field. Autonomy and responsibility Taking responsibility for your own work and the work of others. | | | | | | | | |
| Short description of the subject content | | | | THE FORMAL FORMATION PROCEDURES The theoretical basis of metal formation. Classification of non-ferrous forming processes. Forging, stamping, rolling technologies, production equipment and tools. Seamless tube manufacturing technologies, equipment and tools. Bending theory, technology, machines and tools. Theory, technology and tools for deep drawing. Techniques, tools and machinery for cold heading and cold flow. Casting technology, processes and tools. CHIPPING PROCEDURES Chipping methods and characteristics of chipping. Turning, planing, drilling, milling, grinding. Optimum determination of the number of passes, feeds and cycles for each type of machining. Calculation of the standard time. Cost analysis. Non-conventional procedures. Other machining processes (hobbing, sawing, serrations, etc.). Determination of the prefabrication. | | | | | | | | |
| Types of st | udent activ | vities | | Processing theoretical material with guidance 5 % Independent processing of theoretical material 40 % Task solving with guidance 15 % | | | | | | | | |
| Required li | terature an | id contact o | letails | Independent processing of tasks 40 % Dr. Stevan Firstner: Manufacturing technology (machining) note (J1) Dunaújváros College Publishing Office, 2007. Dr. Firstner Stevan: Manufacturing Technology (machining) study guide (TU1) - note. First Engineering Technology (TU TU). Zsoltné Fülöp, Metal technology (chipless forming processes) (J2 Dunaújváros College Publishing Office, 2008. | | | | | | | | |

| | • Zsoltné Fülöp, Study Guide for the subject "Metal Technology" (chipless forming processes) (TU2) Dunaújváros College Publishing Office, 2008. |
|---|---|
| Recommended literature and contact details | Illés Dudás: Machine Manufacturing Technology I.(GM), Miskolc University Publishing House, 2000. Gál Gaszton-Kiss Antal-Sárvári József-Tisza Miklós: Plastic Cold Formation, Tankönyvkiadó, Budapest, 1981. p. 360. Ziaja György: Plastic Formation, Tankönyvkiadó, Budapest, 1978. p. 396 |
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

| Heat Er | ngines | | | | | | | | | | |
|--|---|----------------------|--|---|---|--|--|--|--|--|--|
| Name of t | he subject | in Hungar | | Hőenergetikai gépek | | | | | | BSc | |
| | - | in English | l | Heat engines Coo | | | | | | DUEN(L)-MGT-151 | |
| | ole educatio | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of c DUEN(L) | compulsory - | prior learn | ing | MGT-212 | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | Laboratory | | Credit | Language of education | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 0 | Е | 5 | english | |
| Teacher re | esponsible t | for the subj | ect | Name | | Róbert Sán | ta, PhD | | schedule | Associate professor | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | thermodyna knowledge so that som grilling, ope | the cours mic cycl of combu- he of the eration of | e is to intro les and the astion techno problems in a domestic | e real p ology re everyd boiler, a | processes taki equired to und lay life can be air conditionin | ng place erstand th e easily u | nent implementing the in them. The basic lese is also passed on, nderstood (eg fire for mp heating, operation | |
| | | | | | n Inacla | ssroom with | n the use | e of projector o | or comput | er in each lecture | |
| Typical de | elivery met | hods | | Practice | Group | work and pr | esentati | ons | | | |
| - J Picul u | inter set | | | Laboratory | | | | | | | |
| | | | | Other Knowledge | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | student kno student inte conversion. energy com purposes, th main feature about the of structure of them. The s combustion Ability The student able to des distinguisher represent th more comp between the his knowled The student control met | we sthe p erprets th The stud version. The role of es of the c operation the comp tudent is a engines, is able to scribe real es between hermodyn lex therm operating dge of that t selects those of st | rocesses that a structure ent knows t The student his turbine, onstruction of the con- oression and aware of the their advant o identify co- al systems n solutions f amic process odynamic p g, control am- ermodynam- he type of eam turbine | at take p of the he struc undersi compre- of a gas mpresso spark ig possibi tages an ombustic with at for diffe sses in roblems d design ics, reco- chiller to s and the | place in dome special stear ture of the rea tands the desi essor and fireb turbine used in r refrigerator, gnition engine, lities of increa d disadvantage on processes in ostract thermo- rent abatement state diagrams in real equiption n solutions of ognize deviation o suit your ne | estic and i m turbine action stea gn of a g box. The s n aviation . The stu , the proce sing the p es. m real equi- dynamic t methods s. The stu ment. The different r ons from eeds. The ments. The | mental protection. The ndustrial boilers. The , the way of energy im turbine, the way of gas turbine for energy tudent is aware of the . The student informed dent understands the esses that take place in erformance of internal ipment. The student is models. The student is models. The student is able to ident applies to solve e student distinguishes nixing systems. Apply theoretical processes, student describes the e student describes the hkel). | |
| | | | Student strives to meet and enforce quality standards. Student strives to organise and carry out their tasks in accordance with environmental, health and sustainability standards. Using student's technical knowledge, Student will seek to gain a better understanding of observable phenomena and to describe and explain their laws. Autonomy and responsibility Student shares her acquired knowledge and experience through formal, non-formal and informal information transfer with those in her field. Student demonstrates responsibility for sustainability, health and safety culture and environmental awareness. In student's decisions, it takes account of the principles and application of environmental protection, quality, consumer protection, product liability, equal access, health and safety at work, technical, economic and legal regulation and engineering | | | | | | | | |
| Short description of the subject content | | | | ethics. The course aims to acquaint students with the special operating and design knowledge of energy equipment. Accordingly, multistage chillers, heat pumps, and absorption chillers are presented. Using a systems approach, they acquire methods for designing fuel cells, solar cells, and ORC cycles. Students will become familiar with the losses, | | | | | | | |

Heat Engines

| | characteristic curves, and modeling of the combustion process and heat losses in internal combustion engines. Using a systems approach, they are familiar with the solutions used in gas engines, steam, and gas turbines. Students can master the methods used to reduce sustainability and environmental impact. |
|--|---|
| Types of student activities | Processing heard text with notes 60% Task-based organisation of information 10% Independent processing of tasks 30%. |
| Required literature and contact details | Fundamentals of Heat Engines, Author(s):Jamil Ghojel PhD, First published:28 February 2020 Print ISBN:9781119548768 Online ISBN:9781119548829 DOI:10.1002/9781119548829 Materials on MOODLE |
| Recommended literature and contact details | P.K.Nag-Basic and Applied Thermodynamics-Tata Mc Graw Hill Publishing Company, 2002 R.K.Rajput-Engineering Thermodynamics-Laxmi Publications S.C.Somasundaram-Thermal Engineering-New Age International (P) Ltd,1996 Ferziger, J.H., Peric, M.: Computational Methods for Fluid Dynamics, Springer, 1999 |
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

| Metrolog | y | • | | • | | | | | • | | |
|--|------------------|----------------------|--|--|--|---|---|---|--|--|--|
| | | in Hungai | rian | Gépészeti | méréstech | nika | Level | BSc | | | |
| Name of the | e subject | in Englisł | 1 | Metrology | / | | Code | DUEN(L)-MUG- 213 | | | |
| Responsible | | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of con DUEN(L)- | mpulsory | prior learn | ning | MUG-257 MUG-222 | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| | 150/39 150/15 | per week per term | 2 10 | per week per term | 0 | per week per term | 1 5 | М | 5 | english | |
| Teacher resp | | | | Name | Ť | Gábor Pór, | - | 1 | schedule | Professor emeritus | |
| Training objective and justification of the course (content, output, location in the curriculum) Typical delivery methods | | | | The attend and load d tribologica have to pla They have | lants must lata, have al propertie an and run e to learn th , thermal | to be able to es. The life ti tribological ne different f | identify me and t systems ields of | y the mayor w third body mos s on the basis o the applied tri | earing pro at be detern of properti bology (p | etermine the structural presses in the wave of mined generally. They es of lubrication state. rocessing, mechanical blier systems run and | |
| | | | | | on In a cla Flipcha semina | art, blackboa | rd and o | | | er in each lecture. nent in smaller | |
| Requirements (expressed in terms of learning outcomes) | | | understand student kr student in conversion energy co purposes, main featu about the structure of them. The combustion Ability Performs the Ability to The ability with a view Attitude Student stu Student stu health and Using stuco of observal Autonom | d and uses nows the p neterprets the n. The student student in the role of the role of the composition of the composition student is on engines, the job acce plan, orga y to manage w to qualite rives to me rives to me student's technologies to ble pheno y and resp | knowledge of processes that the structure lent knows to The student is turbine, construction a of the con- pression and aware of the their advant ording to his nise and control y assurance eet and enfor ganise and ci- cility standard nical knowle mena and to- ponsibility | of combut take p of the he struc underst compre- of a gas npresso spark ig possibi ages an- /her qua y out in l the pro- and qua ce quali arry out ls. dge, Stu describu | ustion theory in place in dome special stear (ture of the rea tands the desi, essor and fireb turbine used in r refrigerator. gnition engine, lities of increa d disadvantage alifications. dependent lean oduction proce lity control. | n environ stic and i n turbine ction stea gn of a g ox. The s n aviation. The stu the proce sing the proce sing the proce ses. | | | |
| Short description of the subject content | | | | The mechanical tools of the direct linear dimensioning. The mechanical tools of the relative linear dimensioning. Optical linear dimensioning instruments. Gauge blocks. Coordinate measuring instrument. Angular measurement. Extension and strength measuring. The operation principle, the main sources of errors and the application techniques of the dynamometer, extensometer and the dislocation-meter. Mechanical examinations, the application possibilities of the stressing examinations. Processing of measuring results with statistical methods. The estimation of measuring results. | | | | | | | |
| Types of stu | | | | Independe | ent process | ing of tasks | 30%. | isk-based olga | | n mormation 1070 | |
| Required lit | erature ar | nd contact | details | Materials on MOODLEGUM (Guide ot Uncertainty of Measurement | | | | | | | |
| Recommend details | led literat | ure and co | ontact | Jay L. Bucher, The Metrology Handbook Hardcover – April 1, 2004, springer, ISBN-13: 978-0873896207 | | | | | | | |

| | • Heather A. Wade, The ASQ Metrology Handbook, Third Edition (eBook), Published 2023, ISBN: 9781636940205, Item Number: E1596 |
|---|--|
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

Thesis project

| in Hungarian | | | Szakdolgoza | t - GEPE | SC | Level | BSc | | | | | |
|---|-----------|-------------|-------------|--|---|---|---|---|---|---|--|--|
| Name of the s | ubject | in English | | Thesis proje | ct | | Code | DUEN(L)-MUG- 091 | | | | |
| Responsible e | | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | |
| Name of comp DUEN(L)- | pulsory | prior learn | ing | 1-6 félév minden tárgyának teljesítése | | | | | | | | |
| Туре | | Presentatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| | | per week | 0 | per week | 9 | per week | 0 | S | 15 | english | | |
| | | per term | 0 | per term | 45 | per term | 0 | 5 | | - | | |
| Teacher respo | nsible f | or the subj | ect | Name | 1 | Tamás Zah | ola | | schedule | Mater instructor | | |
| Training object the course (co the curriculun | ntent, o | 5 | | consultation internship. | on indep , using th | endent litera | | | | , as well as individual d collected during the | | |
| Typical delive | erv meth | ods | | Presentation Practice | The stu | dent prepare ations in 100 | | er thesis indep | endently i | n individual | | |
| i j picur den ve | ny men | 1045 | | Laboratory | - onsure | | ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | ie praeueer | | | | |
| | | | | Other Knowledge | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | the work pla science and thesis is an in thesis shall l long and no Ability The student based on wl solve variou You can ch solutions. Be The student s sketching an student shou fitment syste to specify ac prescribe the Be able to un problems) an Be able to pu Attitude Open to lear and area of e able to incor Autonomy a Taking respo | acement, electroni independe be superv longer th should be nat has b s comple: oose the e able to t should be ad editing ild be fan em for the ccuracy s e surface i design in Be able to design in Be able to aderstand ind | prepares a cs integrate nt work requ- ised and as an 80 pages able to solv- een learned x problems optimal so rain and rep proficient i g componen niliar with e correct spe pecification finish metri- nachine par and analyse recomstruct e part can be and analyse recommenda d document absorbing e Interested i em into the onsibility for your ow | thesis of d engin hiring th sisted b ve proble . Recog and be a lution for resent of the con- cifications of man ts with t the con- cifications for m cifications for m cifications for m problem ngineer n new r thesis. vn work | on the chosen heering as a sy- he creative use by a superviso dems in mechan gnise the elem able to determ for the situati- complex shaped dependent use ngs, and draft icceptual struct on of tolerance hachine parts. a typical de chnical drawin ced from the d ms in industria or their improv- ns and solution ing knowledge nethods and to and applying | topic in t ynthesis o of the kno r and shal nical engin entary str ine their c on from a es in engin of standar ing machi ure of the es, toleran Know, be sign for a g of real n rawing. al processe yement. ns appropri- e related to ools related technical | o your qualifications d to the field. And standards | | |
| Short descript content | ion of tl | ne subject | | The student, summarising the knowledge acquired during the course and the results the professional practice, prepares a thesis on the chosen topic in the field of mechani engineering integrated with computer science and electronics. The thesis is independent work requiring the creative use of the knowledge acquired. The thesis prepared under the regular guidance and guidance of a supervisor | | | | | | | | |
| Types of stude | ent activ | vities | | suggestions at the approp | into the the the the the theorem is the second s | nesis. Conti el. | nuous d | | nd docume | entation of the thesis | | |
| at the appropriate level. • A guide to the thesis. 2nd expanded and revised edition. University publisher • Materials on MOODLE | | | | | | n. University | | | | | | |

| Recommended literature and contact details | |
|---|--|
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

Professional Practice

| Professio | onal Pra | ictice | | | | | | | | | | |
|-------------------------------------|--|----------------------|----------------|---|---|----------------------|-----------|------------------|-----------|-------------------------|--|--|
| | | in Hungar | rian | Szakmai gy: | akorlat - (| GEPBSC | | | Level | BSc | | |
| Name of th | e subject | in English | l | Professional | Professional Practice Code DUEN(L)-MUC 093 | | | | | | | |
| Responsibl | Responsible educational unit | | Institute of 7 | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | |
| Name of co DUEN(L)- | | | ning | | | | | | | | | |
| Туре | Type Presentation | | | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/0 150/0 | per week per term | 0 | per week per term | 0 | per week per term | 0 | S | 5 | english | | |
| Teacher responsible for the subject | | | - | Name | 0 | Tamás Zah | Ŷ | | schedule | Mater instructor | | |
| | | | | | lonment | | olu | | penedule | Whater mistractor | | |
| | Fraining objective and justification of he course (content, output, location in | | | | | | perfor | m engineering | activitie | es under professional | | |
| the curricul | lum) | Julput, 10et | uion m | supervision | siloulu | | perior | in engineering | | es under professional | | |
| uie cuiricui | (uiii) | | | Presentation | | | | | | | | |
| | | | | Practice | | | | | | | | |
| Typical del | ivery met | hods | | Laboratory | | | | | | | | |
| | | | | Other | - | | | | | | | |
| | | | | | | | | | | | | |
| | | | | Knowledge | | 1 1 1 | 6.4 1 | | 1 11 | 1 . 64 1. 4 | | |
| | | | | | | | of the b | asic facts, tren | ds and bo | undaries of the subject | | |
| | | | | area of the t | | | | | | 1.4 . 1. 1. | | |
| | | | | | Knows the conceptual system, the most important relationships and theories related to | | | | | | | |
| | | | | | his field of expertise. | | | | | | | |
| | | | | He has a comprehensive knowledge of the main theories of his field of knowledge | | | | | | | | |
| | | | | acquisition and problem solving methods. He has a thorough knowledge of the learning, knowledge acquisition and data | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | collection methods of the field of mechanical engineering, their ethical limitations and | | | | | | | | |
| | | | | problem-solving techniques. | | | | | | | | |
| | | | | Ability | | | | | | | | |
| Requireme | | ssed in terr | ns of | Performs a job corresponding to his qualifications. | | | | | | | | |
| learning ou | tcomes) | | | Able to apply the most important terminologies, theories and procedures of the given | | | | | | | | |
| | | | | technical field when performing related tasks. | | | | | | | | |
| | | | | Ability to plan, organize and carry out independent study. | | | | | | | | |
| | | | | In the course of his work, he is able to apply and comply with safety, fire protection | | | | | | | | |
| | | | | and hygiene | | | | | | | | |
| | | | | Able to communicate in a professionally adequate manner, orally and in writing, in his | | | | | | | | |
| | | | | native language and at least one foreign language, according to his field of expertise. | | | | | | | | |
| | | | | | | | | | | ration of mechanical | | |
| | | | | | | | | | relations | of the adjustment and | | |
| | | | | operation of | machine | s and mecha | inical ed | quipment. | | | | |
| | | | | Attitude | | | | | | | | |
| | | | | Autonomy | and resp | onsibility | | | | | | |
| | | | | | | | | | | | | |
| Short descr | iption of t | he subject | | | | | | | | | | |
| content | | 5 | | | | | | | | | | |
| | | | | | | | | | | | | |
| Types of st | udent activ | vities | | | | | | | | | | |
| Required li | | | details | • | | | | | | | | |
| Recommen | | | | | | | | | | | | |
| details | | | muet | • | | | | | | | | |
| Descriptior submitted/1 | | | | | | | | | | | | |
| Description | | | | | | | | | | | | |
| | | table of the | 2 | | | | | | | | | |
| workshops | | | | 1 | | | | | | | | |

| Quality Manage | ement | | | | | | | | | | | |
|--|------------------------------|-------|--|---|---|--|---|--|--|--|--|--|
| | in Hungari | ian | Minőségirá | nyítás | Level | BSc | | | | | | |
| Name of the subject | in English | | Quality Ma | nagement | Code | DUEN(L)-MUG- 117 | | | | | | |
| Responsible educati | Responsible educational unit | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | | |
| Name of compulsor DUEN(L)- | | ing | | | | | | | | | | |
| Туре | Presentatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | | |
| Full time 150/39 | per week | 2 | per week | 1 | per week | 0 | М | 5 | english | | | |
| Part time 150/15 | per term | 10 | per term | 5 | per term | 0 | | 5 | cirgiisii | | | |
| Teacher responsible | for the subj | ect | Name | | Mrs. Ildikó PhD | Angere | r Petrovickij, | schedule | Associate professor | | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | main areas of quality, between th formulate th structure of national qu employees requiremen role in EU c of the struc managemer of quality | should b of quality, its differe e actors of the role and the "qual tality sys and the en- ts, the rol- quality pol- ture of a s at standard and envin | e able to un to analyse ence from t of production d structure of ity house". tem, the T vironment, e of standar icy, the met ystem to m ds (MIR, KI ronmental n | the diffe he concorn and of quality The stury QM ph the purp rds, thei hod of i eet the p R /EMA manager | erent approach sept of confor service process ty managemen dent will be fa hilosophy and bose of quality r national and nterpretation of requirements of AS, ISO 1400 nent systems | tes and even mity, to it sees in the asses in the miliar with tis imp awards and internation of standard of a system I/, MEBIF | quality, to review the olution of the concept interpret the relations e light of quality, to prises, to describe the th the structure of the act on management ad the essence of their onal system and their ds and textual analysis n standard, the use of R) and the application and techniques, the | | | |
| Typical delivery methods | | | European system of conformity certification. Presentation For all students, in a large lecture, presentation on a whiteboard, projector or on-line using MS Teams, using a computer network. Practice Group work, presentations Laboratory Other | | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | Basic know quality and Understand and elemen interrelation Ability Ability to p control tec elements of Attitude Open to le managemer in new mett Autonomy Taking resp | t knows the delege of of d environ , character ts of qual hiship of the blan, organ hinologica quality as arrning an at systems hods and t and responsibility | quality and mental ma rise and mo ity and envi e system ele- nise and can lly speciali- ssurance and d absorbin, related to h <u>ools related</u> onsibility for your ow | environ anagemend del the s ironmen ements i rry out i sed pro d quality g know his/her q to the f | mental managent procedure structure and o tal manageme used. independent le duction proce γ control. ledge related qualifications a ield. and the work | ement pris s and opperation of nt system earning. A esses, taking to quality and area of of others. | | | | |
| Short description of content | the subject | | The course provides a general overview of the technical aspects of build operating a quality management system and the process approach to be management systems. It takes into account the legal background, the requirement the documentation system and the techniques that facilitate quality improves presents the main elements of the ISO 9000 system and the different quality and, in addition, briefly covers the Environmental Management Systems (ISO EMAS) and MEBIR. | | | | | | approach to building d, the requirements of ality improvement. I ferent quality award Systems (ISO 14001 | | | |
| Types of student act | | | Independen | t processi | ng of tasks 3 | 30%. | | | f information 10% | | | |
| Required literature a | | | G | éza Grem | sperger. No | te DF, d | lownloadable | help files | | | | |
| Recommended litera details | ature and con | ntact | A.R.Tenner - I.J.DeToro: Total Quality Management Technical Publishers. Budapest. 1997. | | | | | | | | | |

Quality Management

| Description of tasks to be submitted/measurement reports | 2 essays to be submitted on a topic of your choice |
|---|---|
| Description and timetable of the workshops | In the semester period, in weeks 7 and 13, a total of 2 independent project papers/case studies of your choice on topics related to quality management, environmental management systems (ISO 14001, EMAS) and MEBIR systems, 8-15 pages in length, illustrated |

| Environ | mental p | | | d energy management Környezetvédelem és energiagazdálkodás Level BSc | | | | | | | |
|---|--------------------------|----------------------|----------|--|----------|----------------------|----------|--|-----------|-----------------------|--|
| Name of th | he subject | in Hungar | | | | | Level | BSc | | | |
| | 5 | in English | 1 | Environmental protection and energy management Code DUEN(L)-MUT-110 Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| | le educatio ompulsory | | ning | mounted or recumology, Department of Meenanical Engineering and Energy | | | | | | | |
| DUEN(L) | | | iiiig | | | | | | | | |
| Туре | | Presentati | ion | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 0 | per week per term | 1 5 | М | 5 | english | |
| | sponsible f | 1 | | Name | | Endre Kiss | , PhD | 1 | schedule | College professor | |
| | | | | Goals, deve | | | | | | | |
| | | utput, loca | ation in | | | | | | | ems of environmental | |
| the curricu | (IUIII) | | | Presentation | Present | ation in a le | | t and elimination of the termination of ter | | computer driven | |
| | 1 | 1 | | | projecto | or | | | | | |
| I ypical de | livery metl | nods | | Practice Laboratory | Measur | ement in lab | oratory | in pairs (max | 11 nairs) | | |
| | | | | Other | ivicasai | | Jonatory | in puits (inux | 11 puiis) | | |
| | | | | Knowledge | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | | 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, relationships and procedures necessary for the operation of the field of engineering. Knowledge of the terminology, the most important contexts and theories related to the field. Comprehensive knowledge of the methods of knowledge acquisition and problemsolving in the main theories of the field. Comprehensive knowledge of basic economic, business and legal rules and tools. Knowledge of measurement procedures at an applied level. Has an applied knowledge of the requirements and standards of health and safety at work, fire protection, safety and health at work, and environmental protection in the field of his/her specialisation. Comprehensive knowledge of the management, environmental protection and quality assurance principles, their limits and requirements, which are intrinsically linked to the field. | | | | | | | |
| | | | ms of | of the technical field, to synthesise relationships and to make appropriate evaluations. Ability to plan, organise and conduct independent learning. Ability to identify routine professional problems, to identify, formulate and solve (using standard operations in practice) the theoretical and practical background necessary to solve them. Ability to understand and use literature, computer and library resources specific to the field. Ability to apply the acquired IT knowledge to the solution of problems in the field. Ability to apply and enforce safety, fire safety and hygiene rules and regulations. Ability to communicate orally and in writing in his/her mother tongue and in at least one foreign language in a professionally appropriate manner, in accordance with his/her field of specialisation. Attitude It is open to learning about, embracing and authentically communicating professional, technological development and innovation in engineering. It strives to make self-learning a means to achieve its professional goals. He/she takes decisions in complex and unexpected decision-making situations in full respect of legal and ethical standards. Seek to solve problems, preferably in cooperation with others. | | | | | | | |
| | | | | Strive to maintain self-development in the field on an ongoing basis and in line with professional goals. He/she strives to solve problems and make management decisions by listening to the opinions of his/her supervisors, preferably in cooperation. Have the stamina and tolerance of monotony required to carry out practical activities. Open to the use of IT tools. Open and receptive to the application of new, modern and innovative practices and methods related to organic farming and health awareness. | | | | | | | |

Environmental protection and energy management

| | In the course of his/her work, he/she observes and complies with the relevant safety, health, environmental protection, quality assurance and control requirements. Autonomy and responsibility Responsibly upholds and represents the values of the engineering profession, and is open to professionally informed critical comment. In the performance of his/her professional duties, he/she will cooperate with qualified professionals from other disciplines (primarily technical, economic and legal). Identify shortcomings in the technologies used, process risks and take the initiative to mitigate them. Monitor legislative, technical, technological and administrative changes in the field. Under the direction of the line manager, manages the work of the staff assigned to him/her and supervises the operation of machinery and equipment. Assesses the efficiency, effectiveness and safety of the work of subordinates. Supervises the professional development of his/her subordinates. |
|---|--|
| | Sharing his/her experience with his/her colleagues in order to support their development. Takes responsibility for the consequences of his/her technical analyses, the proposals he/she makes and the decisions he/she takes. Translated with www.DeepL.com/Translator (free version) |
| Short description of the subject content | Basics of ecology. The subject, the questions, and purpose of environmental protection. The biological and geological environment. Cycles. The gas cover of Earth. The most important pollutants of air. The properties of dust pollution in the air. The general properties dust collection. Settling chambers and collectors with flow direction transformation. Cyclones. Basics of bag filters. Operating and cleaning of bag filters. Introduction of electrostatic precipitators. Powders with low and high electric resistance. The parts of electrostatic precipitators. Bag filter with electrostatic charging and their applications. Electrostatic precipitation with pulse energisation, abatement and decomposition of gases. Adsorption and absorption processes. Scrabbers. Oxidation methods. Burning technologies. Odor abatement. The measurement of air pollution. The properties of the natural waters, and their pollution, self cleaning. Water treatment technologies and their equipments. The pollution of soil. Waste and their treatment. Noise and vibration as environmental protection. Radioactive pollution. |
| Types of student activities | Lecture: the making notes: studiing the text independently, labor: studying the information, making reports |
| Required literature and contact details | Kiss E,: Environmental Protection and Economical usage of Energy (on Moodle drive) 2. Environmental Science Toward a Sustainable Future Richard T. Write, Bernard J. Nebel, Prentice Hall |
| Recommended literature and contact details | . The Biosphere, Ian Bradbury, Belhaven Press 4. Air Pollution, Its Origin and Control, Kenneth Wark and Cecil F. Warner, Harper and Row 5. Hazardous Waste Management Michael D. LaGrega, McGraw Hill 6. Drinking Water Quality, N.F. Gray, Wiley |
| Description of tasks to be submitted/measurement reports | Laboratory report according to schedule |
| Description and timetable of the workshops | Assay type test at the 6th week and at the last week |

MACHINE MAINTENANCE AND TECHNICAL DIAGNOSTICS

| Maintena | | U | | | | 1 1/ 1/ | | | Level | n .a | |
|--|------------|-------------|---------|--|--|--|--|--|---|---|--|
| Name of the | Sumerr | in Hungari | an | Gépüzemfenntartási technológiák 1. | | | | | | BSc | |
| | - | in English | | Maintenance technologies 1. Code DUEN(L)-MGT-113 | | | | | | | |
| Responsible | | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of con DUEN(L)- | npulsory | prior learn | ing | MUG-222 | | | | | | | |
| Туре | | Presentatio | on | Practice Laboratory Requirement | | | | Credit | Language of education | | |
| Full time | 150/39 | per week | 2 | per week | 1 | per week | 0 | М | 5 | anglish | |
| Part time | 150/15 | per term | 10 | per term | 5 | per term | 0 | IVI | 3 | english | |
| Teacher resp | onsible f | or the subj | ect | Name | | Szabó Attil | a, PhD | | schedule | College associate professor | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | restoration t disassembly operations, a | analyze o echnolog and ass analyze a | damage pro ies based o embly tech nd solve ass | n the ki nologie embly c | nowledge of the s, as well as dimension chai | ne damage the prece | t. Be able to choose e. Be able to plan the ding and subsequent | |
| I | | | | Presentation | | or, ppt prese | | | | | |
| Typical deliv | verv metł | nods | | Practice | projecto | or, ppt prese | entations | 8 | | | |
| i j picui dell' | very mea | 1045 | | Laboratory | | | | | | | |
| | | | | Other | | | | | | | |
| Requirements (expressed in terms of learning outcomes) Short description of the subject content | | | | uncover cau Ability Performs a j Able to plan Able to diag tasks Attitude He is open to related to the related to the Autonomy a Taking respondent The damagin consequences the surface of recovery the technologies Planning the | ob corress , organiz nose med o learning s qualific e field. and resp onsibility ng effects es. Classi quality. A chnologie s. Cleaning dismour | ors and prof ponding to e and carry chanical fail g about and ation and fi onsibility for your ov s occuring c fication of t nalysis of d es affecting ng the mac ating and ass | fessiona his qual out inde ures, se receivir eld of e wn work on the so he breal amages. g the s hines. I sembly | Ily eliminate t ifications. pendent study lect remedial a ng knowledge xpertise. Inter and the work urface of mach kdowns. The s The connection urface quality Dismounting a technologies. | hem. actions, so related to ested in n of your p nine parts urface qui on betwee y. The s nd assem | aines and equipment, olve repair technology machine maintenance ew methods and tools eers. and volume and their ality; factors affecting n the damages and the election of recovery bly of the machines. | |
| Types of stu | dent activ | vities | | Independent Task solutio Processing t | processi n with gu asks inde | ng of theore iidance 15 % pendently 8 | etical co % \$5% | ith guidance: 6 urse material: | 40 % | | |
| Required lite | erature an | d contact o | letails | Lech Pawlowski, The Science and Engineering of Thermal Spray Coating John Wiley & Sons, 2008 | | | | | | | |
| Recommend details | ed literat | ure and con | ntact | | | | | E. Bowditch; N odheart-Willco | | owditch, Welding | |
| Description of submitted/m | | | | Completion | of 2 hom | ework assig | gnments | during the ser | nester | | |
| Description a workshops | and timet | able of the | | 2 tests durin | g the sem | nester | | | | | |

Maintenance technologies 1.

in Hungarian Gyártástervezés, CAM Level BSc Name of the subject DUEN(L)-MUGin English Production planning, CAM Code 111 Institute of Technology, Department of Mechanical Engineering and Energy Responsible educational unit Name of compulsory prior learning MUG-252 DUEN(L)-Language of Requirement Credit Type Presentation Practice Laboratory education Full time 150/39 0 per week 2 per week per week 1 Μ 5 english Part time 150/15 per term 10 per term 0 per term College associate Gábor Vizi, PhD Teacher responsible for the subject Name schedule professor Goals, development objectives Familiarisation with micro-design documentation in manufacturing technology. Familiarity with and use of the operations plan, operations instructions and Training objective and justification of accompanying documentation. the course (content, output, location in Understand the technological role and design of appliances and participate in the design the curriculum) of a simple appliance. To learn about the construction and operation of NC-controlled machining machines, the function and application of machine components. Gain CNC programming experience. Gain CAM programming experience. For all students, in class, on whiteboard or computer. Use of projector Presentation 50% of all lessons). Practice Typical delivery methods For all students in class. Using computer and CNC machines (25% of Laboratory all lessons) Other Knowledge 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 technical field. You know the terminology, key concepts and theories related to your field. You have a comprehensive knowledge of the main theories and problem-solving methods in your field. Requirements (expressed in terms of Ability learning outcomes) Ability to plan, organise and carry out independent learning. Ability to identify routine professional problems, to identify, formulate and solve them (using standard operations in practice) against a theoretical and practical background. Ability to build basic models of technical systems and processes. Attitude Taking responsibility for your own work and the work of others. Autonomy and responsibility Choice of prefabricated products. Determining the grid tolerances of the prefabricated parts and calculating the final dimensions. Presentation of a numerical example. Concept of operation and preparation of the sequence of operations. Development of operation instructions. Forms of execution of the operation plan. Presentation of an example. Implementation of technological documentation. Organisation of documentation. Bases, base selection error, size chains. The process of designing Short description of the subject apparatus. Static, kinematic and dynamic calculations. Sizing of components of content apparatus. Drilling, milling and turning devices and their main functions and characteristics. Demonstration of the appliances manufactured. Design of CNC lathes and machining centres. Basics of programming CNC machines through a simulation system. Standards for CNC machines. NCT control instructions. Tooling of CNC machines. Solving a concrete technical problem (programming). Understanding the CNC programming process for lathes and milling machines. Understanding CAM formal processes. Demonstration of the development of a concrete example. Processing theoretical material with guidance 20 % Independent processing of theoretical material 20 % Types of student activities Task solving with guidance 20 % Independent processing of tasks 40 % Dr. Stevan Firstner, Production Planning, CAM, Practical (P) (manuscript), Required literature and contact details Dunaújváros College 2007.

Production planning, CAM

| | Hiram E. Grant, Example of workpiece grippers, Technical Book Publishing, Budapest 1970 Description of EdgeCAM software, NCT simulator software description Egon Lechner: Elements of the construction of turning devices. |
|---|---|
| Recommended literature and contact details | Manufacturing technology, BME note NCT 2000 programming manual, machine manual Illés Dudás: Mechanical Engineering I. ME note |
| Description of tasks to be submitted/measurement reports | Solving a complex production planning problem. Participation in exercises at least 70 % Submission and satisfactory completion of the mid-term assignment Positive assessment of the final knowledge assessment. 1. Written exam (Developing an engineering design for a given component) 25 ÷ 50 points. 2. ZH (Writing NC program, Solving a complex milling and turning problem with EdgeCAM) 25 ÷ 50 points These are used to determine the grade: 51 - 60 points: sufficient, 61 - 70 points: medium, 71 - 80 points: good, 81 - 100 points: excellent |
| Description and timetable of the workshops | |

Tribology

| Tribolog | <i>v</i> | in Hungar | ian | Tribológia | | | | | Level | BSc | |
|--|--------------------------|----------------------|---------|--|---|--|--|---|--|---|--|
| Name of the | a subject | in English | | | | | DUEN(L)-MUG- | | | | |
| | | e | | Code 118 | | | | | | | |
| Responsible | | | • | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of co DUEN(L)- | mpulsory | prior learn | ing | MUG-222 | | | | | | | |
| Туре | | Presentatio | on | Practice | Practice Laboratory Requiremen | | | | Credit | Language of education | |
| | 150/39 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 0 | М | 5 | english | |
| Teacher res | ponsible f | or the subj | ect | Name | | Szabó Attil | a, PhD | | schedule | College associate professor | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | and load dat tribological have to plan They have to | nts must a, have t propertie and run t b learn th hermal p n. projecto | be able to an o be able to s. The life tin rribological e different f rrime movement. | identif me and systems ields of r), as w ntations | y the mayor w third body most s on the basis of the applied tri vell as the rel | earing prost be deter of properti bology (p | etermine the structural pocesses in the wiev of mined generally. They se of lubrication state. rocessing, mechanical blier systems run and | |
| Typical deli | Typical delivery methods | | | | projecto | or, ppt prese | ntation | S | | | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | He get to know machine design principles and methods, machine manufacturing technology procedures based on tribological aspects. He has a comprehensive knowledge of the tribological processes taking place in used work and power machines and mechanical equipment. Ability Performs a job corresponding to his qualifications. Able to plan, organize and carry out independent study. Able to diagnose mechanical failures, select remedial actions, solve repair technology tasks. Attitude He is open to learning about and receiving knowledge related to tribology related to the field. Autonomy and responsibility Taking responsibility for your own work and the work of your peers. | | | | | | | |
| Short description of the subject content | | | | Definition of tribology. Description of tribological systems. Friction processes. Analysation of tribological processes. Surface quality of mechanical parts. The propertiese of surface layers. The relation between tribological duty and wearing mechanisms. Type of wearings. The practical methods of wearing measurement. The analytical method of wearing determination. Introduction of lubricants. Lubricants propertiese. Investigation of lubricants. Selection of lubricants. Selections of structural materials. Grading of lubrication states: Hydrodynamic lubrication (HD, EHD), Boundary lubrication, Extreme pressure lubrication, Process tribology: cutting, hot and cool deformation. Lubrication of mechanical parts and structures. | | | | | | | |
| Types of stu | udent activ | vities | | Independent Task solutio Processing t | processi n with gu asks inde | ng of theore iidance 15 % pendently 8 | tical co 6 5% | ith guidance: 6 ourse material: | 40 % | | |
| Required lit | terature an | id contact o | details | R Gohar (Imperial College London, UK) & H Rahnejat (Loughborough University, UK): FUNDAMENTALS OF TRIBOLOGY Machine Maintenance I. Edited by Dr. Janik József, Dunaújváros, 2001. Jenő Szántó:Tribology, Budapest 1991. | | | | | | | |

| Recommended literature and contact details | Gwidon Stachowiak and Andrew W Batchelor : Engineering Tribology, Third Edition Prasanta Sahoo |
|---|---|
| Description of tasks to be submitted/measurement reports | Completion of 2 homework assignments during the semester |
| Description and timetable of the workshops | 2 tests during the semester |

| Technical Diag | | | | | | | | | | |
|---|--------------------------|--|---|---|--------------------------------|-----------------------|------------------------------|-----------|--|--|
| | in Hunga | rian | Műszaki diagnosztika 1. | | | | | | BSc | |
| Name of the subjec | ^t in Englisl | n | Technical D | iagnostic | s 1. | Code | DUEN(L)-MUG- 157 | | | |
| Responsible educat | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of compulso DUEN(L)- | ry prior lear | ning | MUG-153 IMA-110 | | | | | | | |
| Туре | Presentat | ion | Practice | Practice Laboratory Requirement | | | | | Language of education | |
| Full time 150/39 | | 2 | per week | 1 | per week | 5 | english | | | |
| Part time 150/15 | | 10 | per term | 5 | per term | E | | <u> </u> | | |
| Teacher responsible for the subject Training objective and justification of the course (content, output, location in the curriculum) | | | | the train heoretica | ing is to ac l and praction | quire th | | | Professor emeritus iagnostics of rotating surement, which is the | |
| | | | Presentation | | | | lecture, using a ter network | a whitebo | ard, projector or | |
| Typical delivery m | Typical delivery methods | | | | | | projector or o | verhead p | rojector | |
| Requirements (expressed in terms of learning outcomes) | | | Knowledge Understand, characterise and model the structure and operation of the structural units and elements of mechanical systems, the design and interrelationship of the system components used. Ability Performs the job according to his/her qualifications. Ability to plan, organise and carry out independent learning. Ability to diagnose mechanical failures, select troubleshooting operations, solve repair tasks Attitude He/she is open to learning and absorbing knowledge related to engineering technology related to his/her qualification and area of expertise. Interested in new methods and tools related to the field. Autonomy and responsibility | | | | | | | |
| Short description o content | : | In this course, students will learn the essence of the different maintenance strategies (operation until failure, TMK, condition-based, predictive). They will learn the basic concepts of vibration theory, the description of single-freedom harmonics and forced vibration without and with damping. In the course of this subject, you will learn about the additivity of vibration, complex vibrations, the amplitude and frequency scales of vibration, the phase, the relationship between the time and frequency domains, and the Fourier transform. Students will learn the basics of measuring and processing vibration signals, the laws and problems of analog-to-digital signal conversion. They will acquire the theoretical and practical knowledge to use a correct vibration analyser, to deal with the phenomenon of aliasing, to use the windowing technique. Students will become familiar with the use of methods of vibrations, time will be devoted to the analysis of natural frequency vibrations, the study of resonance phenomena, and the study of critical axis velocities. In addition to the study of failure frequencies to detect bearing failures, we will learn the basics of one of the most effective methods, cepstrum analysis. Students will also learn the theoretical and practical foundations for the application of state-of- | | | | | | | | |
| Types of student ac | ctivities | | Processing a information. | text you Indepen | have heard dent process | by takin sing of t | asks | -guided o | rganisation of | |
| Required literature | and contact | details | 20 | Dr. István Nagy: Technical Diagnostics I. Főiskolai Kiadó, Dunaújváros, 2010. | | | | | | |
| | | | | | | | :: Delta-3N Kft., | | | |

Technical Diagnostics 1.

| Description of tasks to be | |
|----------------------------------|--|
| submitted/measurement reports | |
| Description and timetable of the | |
| workshops | |

Maintenance technologies 2.

| Mainten | ance tec | hnologi | es 2. | | | | | | | | |
|---|--------------|--------------|-------|---|--|---------------|-----------------|----------------|-------------|--------------------------------|--|
| Name of th | ne subject | in Hungari | | Gépüzemfe | nntartási t | echnológiál | k 2. | | Level | BSc | |
| | Ũ | in English | | Maintenanc | e technolo | Code | DUEN(L)-MGT-253 | | | | |
| Responsibl | | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of co DUEN(L)- | | prior learn | ing | MGT-113 | | | | | | | |
| Туре | | Presentatio | on | Practice | actice Laboratory Requirement | | | | Credit | Language of education | |
| Full time | | per week | 2 | per week | 1 | per week | 0 | Е | 5 | english | |
| Part time | 150/15 | per term | 10 | per term | 5 | per term | 0 | Ľ | 5 | | |
| Teacher re | sponsible f | for the subj | ect | Name | | Szabó Attil | la, PhD | | schedule | College associate professor | |
| Training objective and justification of the course (content, output, location ir the curriculum) | | | | The studen implementa the recover | Goals, development objectives The students should be able to design the recovery technologies and to control the implementation of the recovery technologies. The students should be able to calculate the recovery expenses. He should be able to select the recovery technology, which would be the appropriate in accordance with the situation and the goal on the basis of | | | | | | |
| | | | | Presentation | | | | 3 | | | |
| Typical de | livory moth | anda | | Practice | projecto | or, ppt prese | entations | 8 | | | |
| i ypicai ue | iivery meu | 1005 | | Laboratory | | | | | | | |
| | | | | | | | | | | | |
| | | | | Knowledge | | | | | | | |
| | | | | Able to analytically examine the damage processes of machines and equipment, | | | | | | | |
| | | | | uncover causes of errors and professionally eliminate them. | | | | | | | |
| | | | | Ability Performs a job corresponding to his qualifications. | | | | | | | |
| | | | | | | | | | | | |
| л · | | 1. | c | | | | | ependent study | | -1 | |
| | | ssed in tern | 18 01 | tasks | gnose med | manical fai | lures, se | siect remediai | actions, se | olve repair technology | |
| learning ou | itcomes) | | | Attitude | | | | | | | |
| | | | | He is open to learning about and receiving knowledge related to machine maintenance related to his qualification and field of expertise. Interested in new methods and tools related to the field. | | | | | | | |
| | | | | Autonomy and responsibility | | | | | | | |
| | | | | Taking responsibility for your own work and the work of your peers. | | | | | | | |
| Short desc content | ription of t | he subject | | The technological methods of recovery. Recovery: - with mechanical methods; - by welding; -with soft and hard soldering; - with thermal scattering; - gluing and plasticizing. High energy density technologies and surface strengthening processes modifying surface integrity. Economy and organization of machine maintenance. Indicators of the economy of machine maintenance. | | | | | | | |
| Types of st | tudent activ | vities | | Processing theoretical course material with guidance: 60 % Independent processing of theoretical course material: 40 % Task solution with guidance 15 % Processing tasks independently 85% | | | | | | | |
| Required literature and contact details Lech Pawlowski, The Science and Engineering of Thermal Spray O John Wiley & Sons, 2008 Maintenance manual - methods and tools for managing maintenance [professional editor Zoltán Gaál]. Budapest: RAABE Tanácsadó és Kft., 2004. Materials on MOODLE | | | | | | | g maintenance. | | | | |
| Recommer details | nded literat | ure and con | ntact | • W | /illiam A. | Bowditch; | Kevin I | | | owditch, Welding | |
| Description submitted/ | | | | Technology Fundamentals Goodheart-Willcox, 2009 Completion of 2 homework assignments during the semester | | | | | | | |
| | n and time | table of the | | 2 tests during the semester | | | | | | | |

Maintenance strategy

| | nance str | in Hungar | ian | Karbantartás | smenedzs | sment | | | Level | BSc | |
|------------------------|--|----------------------|---------|---|---------------------------------|----------------------|----------|-----------------------|-----------------|---------------------------------------|--|
| Name of t | he subject | in English | | Maintenance | | | | Code | DUEN(L)-MGT-254 | | |
| | le educatio | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of c DUEN(L) | compulsory - | prior learn | ing | MGT-113 | | | | | | | |
| Туре | | Presentatio | on | Practice | Practice Laboratory Requirement | | Credit | Language of education | | | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 5 | english | | | |
| Teacher re | Teacher responsible for the subject | | | | | Szabó Attil | a, PhD | | schedule | College associate professor | |
| the course | Training objective and justification of the course (content, output, location in | | | Goals, deve | - | - | 1 the ma | intenance stra | tegy based | l on reliable operation. | |
| the curricu | ilum) | | | Presentation | | or, ppt prese | | | 8, | I I I I I I I I I I I I I I I I I I I | |
| T · 11 | 1 | 1 | | Practice | 1 3 | or, ppt prese | | | | | |
| I ypical de | elivery meth | nods | | Laboratory | | | | | | | |
| | | | | Other | | | | | | | |
| | | | | Knowledge | | | | | | | |
| | | | | | | | | | | es in companies. Able | |
| | | | | | company | s maintenar | ice phil | osopny, identi | ry gaps an | d modernize it. | |
| | | | | Ability Performs a job corresponding to his qualifications | | | | | | | |
| | | | | Performs a job corresponding to his qualifications. Able to plan, organize and carry out independent study. | | | | | | | |
| | ents (expres | ssed in tern | ns of | Able to design a maintenance strategy that meets the needs of companies. | | | | | | | |
| learning o | utcomes) | | | Attitude | | | | | | | |
| | | | | He is open to learning about and receiving knowledge related to machine maintenance | | | | | | | |
| | | | | related to his qualification and field of expertise. Interested in new methods and tools related to the field. | | | | | | | |
| | | | | related to the field. Autonomy and responsibility | | | | | | | |
| | | | | Autonomy and responsibility Taking responsibility for your own work and the work of your peers. | | | | | | | |
| | | | | The moder | internr | etation of | the def | inition of m | aintenanc | e" Maintenance and | |
| | | | | The modern interpretation of the definition of "maintenance". Maintenance and terotechnology. The connection between production and maintenance. The double- | | | | | | | |
| | | | | circled model of the machine life-time. Effects that can damage the machine parts. | | | | | | | |
| | | | | Appearance forms of damages. Deterioration reserve and its wearing out. Breakdowns | | | | | | | |
| C1 1 | • •• •• | | | and operational errors. Weak-point analysis. The probabilistic examination of | | | | | | | |
| Short desc | cription of t | he subject | | operational processes. The calculation method of maintenance cycle-time. Risk analysis in maintenance. The process of root-reason-analysis. Fault-tree analysis. | | | | | | | |
| content | | | | Maintenance strategies and philosophies. The development of maintenance. Falure | | | | | | | |
| | | | | Based Corective Maintenance (FBCM). Planned Preventive Maintenance. Parameter | | | | | | | |
| | | | | Condition Based Maintenance (PCBM). Reliability Centred Maintenance (RCM). Risk | | | | | | | |
| | | | | Based Maintenance (RBM); Risk Based Inspection and Maintenance (RBIM). Total | | | | | | | |
| | | | | Productive Maintenance (TPM). Automatic Maintenance (AM). | | | | | | | |
| | | | | Processing theoretical course material with guidance: 60 % Independent processing of theoretical course material: 40 % | | | | | | | |
| Types of s | student activ | vities | | | | | | uise materiai. | 40 70 | | |
| | | | | Task solution with guidance 15 % Processing tasks independently 85% | | | | | | | |
| | | | | • Da | avid J Sn | nith: Reliabi | lity, Ma | aintainability a | nd Risk, H | Elsevier, 2013. | |
| | | | | | | | | | | unaújváros, 2001. | |
| Required | literature ar | id contact of | details | Maintenance manual - methods and tools for managing maintenance. [professional editor Zoltán Gaál]. Budapest: RAABE Tanácsadó és Kiadó Kft., 2004 | | | | | | | |
| Recomme details | nded literat | ture and co | ntact | • M | | | II. Edit | ed by Dr. Janil | k József, F | őiskolai Kiadó, | |
| submitted | on of tasks t /measureme | ent reports | | Completion of 1 homework assignments during the semester | | | | | | | |
| | on and time | | e | 2 tests during the semester | | | | | | | |
| r | | | | • | | | | | | | |

Complex Machine Designing

| Comple | x Machi | ne Desig | , <u> </u> | | | | | | | 1 | | |
|---|---|----------------------|------------|--|---|--|---|-----------------------------------|--|---|--|--|
| | | in Hungari | an | Komplex gépészeti tervezés | | | | | | BSc | | |
| Name of t | he subject | in English | | Complex M | Complex Machine Designing Code DUEN(L)-MUG- 216 | | | | | | | |
| Responsib | le educatio | nal unit | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | |
| | ompulsory | prior learni | ing | Listice of Teening, 2 opariment of Treesandar 2.15meering and 2.1455 | | | | | | | | |
| Туре | pe Presentation | | | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/26 150/10 | per week per term | 0 | per week per term | 0 | per week per term | 2 10 | М | 5 | English | | |
| | | | * | Name | 0 | Gábor Vizi | schadula | Associate professor | | | | |
| Teacher responsible for the subject Training objective and justification of the course (content, output, location in the curriculum) | | | ion of | Goals, dev The studen design (C. engineering design prot | t should be AD), fini g (CAM). plems, esta | objectives e able to per ite element Be able to ablish select | form tas streng explore on crite | th calculation and sketch so | cal engine n (VEM) lution var develop t | ering, computer aided and manufacturing iations of mechanical he optimal variant. Be | | |
| | | | | Presentatio | n | | | | | | | |
| Typical de | Typical delivery methods Requirements (expressed in terms of learning outcomes) | | | Practice Laboratory Other | | | | m, blackboard of all lessons). | l class, lab |). | | |
| | | | | Get to know and apply the most common maintenance philosophies in companies. Able to review a company's maintenance philosophy, identify gaps and modernize it. Ability Performs a job corresponding to his qualifications. Able to plan, organize and carry out independent study. Able to design a maintenance strategy that meets the needs of companies. Attitude He is open to learning about and receiving knowledge related to machine maintenance related to his qualification and field of expertise. Interested in new methods and tools related to the field. Taking responsibility for your own work and the work of your peers. | | | | | | | | |
| Short desc content | ription of t | he subject | | Practise parametric 3D modelling and drawing on simple machine parts, then assemblies, part pick-up. Development of model variants. Basics of finite element method. Structure of program systems, interpretation of INPUT / OUTPUT data. Solid state applications, shape optimisation. Preparation of technical documentation. Development of component manufacturing technology. Selection of machining cycles. Generation of CNC program. | | | | | | | | |
| Types of s | tudent activ | vities | | | | idance 15 % | | | | | | |
| Required 1 | literature ar | nd contact d | letails | Independent processing of tasks 85 % SolidWorks design system description Béla Csizmadia - Ernő Nándori:Mechanics for engineers. Nándor M. Mechanical engineers. National Textbook Publishing House, 1998. 435-480 p. Materials on MOODLE | | | | | | | | |
| Recomme details | nded literat | ture and cor | ntact | • S • E | olidWork EdgeCAM | s VEM mod technology | ule soft softwar | ware descripti e description | | | | |
| | n of tasks t measureme | | | Continuous assembly d for a specif | sly produc rawings is ic load ca | e 3D model ssued during se. | s and in the sen | nproved parts of nester. VEM to | esting of a | from parts and simple machine part | | |
| Description and timetable of the workshops | | | | Create a 3D model of a specific part per student and produce a drawing of the part in accordance with the specifications of the technical drawing within a given time. Positive evaluation of progress monitoring and homework. Create and perform finite element analysis of a 3D model of a simple workpiece. exploring and evaluating alternative solutions to the technical problem posed, based on given selection criteria, and then selecting the viable alternative(s). | | | | | | | | |

| Technica | a Diagn | lostics 2 | | | | | | | | | |
|--|------------------------|-------------|--|--|---|--|--|---|--|--|--|
| | | in Hungar | rian | Műszaki dia | gnosztika | a 2. | Level | BSc | | | |
| Name of th | e subject | in English | ı | Technical Diagnostics 2. | | | | | Code | DUEN(L)-MUG- 219 | |
| Responsible | e educatio | nal unit | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of co DUEN(L)- | | prior learr | ning | MUG-157 | | | | | | | |
| Туре | | Presentati | on | Practice Laboratory Requirement | | | Credit | Language of education | | | |
| Full time | | per week | 2 | per week | 0 | per week | 1 | М | 5 | english | |
| Part time | | per term | 10 | per term | 0 | per term | 5 | 171 | | _ | |
| Teacher res | sponsible f | or the sub | ject | Name | | Gábor Pór, | PhD | | schedule | Professor emeritus | |
| Training objective and justification of the course (content, output, location ir the curriculum) | | | | processing i derivations of frequency d from signals diagnostic p and their use and practica infrared ther a deeper und | ng the ma n modern of the fu omain tr s by sign rocedure sfulness f al basics mograph lerstandir | athematical a diagnostic nctions and ansformatic al processin s based on or diagnost of diagnos y, ferrograp ng of the mo | system proced ns, inten ng and them, n cs. The tic tech hy, ultra pre comp | as. Thorough I ures taught. C repretation of quantitative k hathematical for aim of the train uniques and n asonic fault and | cnowledge Confident signals ar nowledge oundation ning is to a nethods (d leakage so of vibra | e of signals and signal e of the mathematical handling of time and ad functions obtained of measurement and s of modern methods acquire the theoretical vibration diagnostics, detection), and to gain tion measurement and | |
| | | | | Presentation | For all | students, in | a large l | lecture, using | | ard, projector or | |
| T | — • • • • • • • | | | | overhea | d projector. | , compu | ter network | | | |
| Typical del | ivery metr | loas | | Practice Laboratory | Measur | ements with | lahora | tory instrumen | te | | |
| | | | | Laboratory Measurements with laboratory instruments. Other | | | | | | | |
| Requirements (expressed in terms of learning outcomes) Short description of the subject content | | | ms of | and elements of mechanical systems, the design and interrelationship of the system components used. Ability Performs the job according to his/her qualifications. Ability to plan, organise and carry out independent learning. Ability to diagnose mechanical failures, select troubleshooting operations, solve repair tasks Attitude He/she is open to learning and absorbing knowledge related to engineering technology related to his/her qualification and area of expertise. Interested in new methods and tools related to the field. | | | | | | | |
| | | | Taking responsibility for your own work and the work of others. In the field of balancing rotating machinery, students will learn the theoretical basics and practice balancing rotating machinery in a state-of-the-art laboratory. Students will learn the steps of modern laser shaft alignment. Students will master the steps of data and knowledge base building, measurement preparation and measurement evaluation using the expert system. Students will be able to carry out full system development and operation using the vibration diagnostics expert system, which will lay the foundation for the organisation of condition-based maintenance in production companies. The design and functions of machine vibration protection systems, shaft motion monitoring and orbit testing will be discussed in the course. The students will learn the theoretical basics of infrared image analysis, the use of infrared cameras in laboratory exercises and the computer processing of thermal images in machine condition diagnostics, fault location of electrical equipment and control cabinet joints and the identification of insulation defects in buildings. Students will learn about the application of ultrasonic | | | | | | | | |
| Types of st | udent activ | vities | | Processing a | text you | have heard | by takin | trasonic flaw d ng notes. Task tasks. | | | |
| Required literature and contact details | | | | information. Independent processing of tasks. Dr. István Nagy: Technical Diagnostics I. Note, Főiskolai Kiadó, Dunaújváros, 2010. Dr. István Nagy: Technical Diagnostics II. Note, Főiskolai Kiadó, Dunaújváros, 2010. | | | | | | | |

Technical Diagnostics 2.

| Recommended literature and contact details | Dr. István Nagy: Condition-based Maintenance, Technical Diagnostics I., Vibration Diagnostics,ISBN96306 0807 3, Publisher: Delta-3N Kft., 2006. Dr. István Nagy, Gábor Baksai and Károly Sólyomvári: Condition-based Maintenance, Technical Diagnostics II. Edited by Dr. Ferenc Dömötör College Publishing House. Dunaújváros, 2003. |
|--|--|
| Description of tasks to be | |
| submitted/measurement reports | |
| Description and timetable of the | |
| workshops | |

GREEN TRANSFORMATION

Energy management

| | nent | | L . | | | | | L . | | |
|--|-------------------------------------|---------|--|--|--|--|---|--|--|--|
| Name of the subject | in Hungar | | Energiamenedzsment | | | | | Level | BSc | |
| Responsible educatio | in English | | Energy management Code DUEN(L)-MGT-114 Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of compulsory | | ing | institute of recimology, Department of Meenanical Engineering and Energy | | | | | | | |
| DUEN(L)- | 1 | 0 | | | | | | | | |
| Туре | Presentati | on | Practice | | Laboratory | Laboratory | | Credit | Language of education | |
| Full time150/39Part time150/15 | per week per term | 2 10 | per week 1 per week 0 per term 5 per term 0 M | | | М | 5 | english | | |
| Teacher responsible f | Teacher responsible for the subject | | | | Éva Kovác | s-Bokor | , PhD | schedule | College assosiate professor | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | economic k with the ba and method will acquire context of s on basic en evaluating t | the cour nowledge sic econo s across the a combi ustainabil vironmen he externa | se is to fan of the ener mic process ne entire end ined technic ity and resp ttal manage alities of end | gy sectores, man ergy sec cal and onsibility ment pr ergy on | or. According agement and tor. By applyin economic opt ty for future ge | ly, student economic ng a system timisation enerations ble method basis | ms approach, students methodology. In the , the course will focus ds for describing and | |
| Typical delivery methods | | | Presentation Practice Laboratory | ¹ projecto | | using N | MS Teams, usi | | | |
| Requirements (expres learning outcomes) | ssed in terr | ns of | their classif project and practical im the context advantages their appli managemen Knows the possible for risks that ca Ability Explores th the role of t the theoretic knowledge strategies a different fi different fo scheduling permitting a possible for identification Attitude Constantly energy man information needed for o to provide accuracy. A | mprehens ication. H the possi plementa of design and disad cation. I t. He has permittin ms and m n be iden e differen hose invo cal backgr areas. P re develop nancial se rms of p managem and furthe rms and n of poter monitors agement a technolo energy ma accurate pplies the in solving | te has an acc ble organiza tion criteria ing and mar vantages of t distinguis compreher g and addit anagement tified and ac t forms of p lved in the p round and pr trioritizes t ped and ma ettlement se roject scope ent and the r phases of management and sustaina gy tools. It anagement a and error- principles of | curate k ational f of proc haging p different shes be sive kn ional ph options ldressed project a ractical he circ naged. projects ent pos nd treatt esults, a bility th strives and ecor free pro- | nowledge of t forms. Knows ess groups and procurement cc at financial acc etween differ iowledge of p hases of project for project final and the possible implementation umstances in Selects the add the limits of gement. Evaluation of the imple as well as ma sibilities of ment options. | the role of the theored d knowled ontract stra- counting s rent form roject sch cts. It pro ancing. Is and their of le organiza on criteria which p dvantages of their a ates the p mented so nagement project fit as. Expandous learning ous learning ous l | pject management and those involved in the etical background and lge areas. Informed in ategies. He knows the solutions, the limits of s of project scope eduling management. vides an overview of aware of the potential classification. Defines ational forms. Applies of process groups and procurement contract and disadvantages of pplication. Evaluates ossibilities of project blutions. Evaluates the options. Explores the nancing. Solves the ls your knowledge of ng. Open to the use of putinely use the tools Develops your ability tering precision, and ty, and environmental anges in the social, | |

| | Collaborates with the instructor and fellow students to expand knowledge. Accepts well-founded professional and other critical remarks. In some situations, as part of a team, he/she works with his/her fellow students to solve tasks. With his/her knowledge, he/she makes a responsible, informed decision based on his/her analysis. He/She feels responsible for energy, energy management problems, the sustainable use of the environment, and present and future generations. He/She is committed to the principles and methods of systems thinking and problem-solving. |
|--|---|
| Short description of the subject content | Energy market situation. Changes in the energy mix; Energy use and the energy intensity - sectoral comparison between Hungary and EU countries. Liberalisation in the energy sector. Pro and con of liberalisation; Political, economic, social, environmental and corporate challenges of the global energy crisis. Process and resource requirements of corporate management. Concept of corporate resources, main categories; Key challenges and problem areas of corporate energy management; Investment. The main methods of calculating investment economics; Methodological specificities of evaluating energy investments; Cost and capital efficiency of resources. Cost management. Classification of costs, cost functions; Calculation of margins - the turning point of profitability and profitability. |
| Types of student activities | Processing heard text with notes 60% Task-based organisation of information 10% Independent processing of tasks 30%. |
| Required literature and contact details | Materials on MOODLE Guide to Energy Management, Eighth Edition 8th Edition by Barney L. Capehart Ph.D. CEM, Wayne C. Turner Ph.D. PE CEM, River Publishers, 2016, ISBN-13 978-1498759335 |
| Recommended literature and contact details | Wayne C. Turner, Steve Doty, Energy management, handbook, sixth edition, Distributed by Taylor & Francis Ltd., 6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487, USA Craig B. Smith, Kelly E. Parmenter, Energy Management Principles - Applications, Benefits, Savings, Published 2016 Elsevier, ISBN 978-0-12-802506-2 |
| Description of tasks to be submitted/measurement reports Description and timetable of the workshops | 1 essay to be submitted on a topic of your choice |

| Renewable ener | 0, | | 1 | | | | | 1 | 1 | |
|--|--------------------------------|---------|---|--|---|--|--|---|---|--|
| Name of the subject | ne of the subject in Hungarian | | | nergiafori | rások | Level BSc | | | | |
| 5 | in English | 1 | Renewable energy Code DUEN(L)-MGT-115 | | | | | | | |
| Responsible educatic Name of compulsory DUEN(L)- | | ning | Institute of Technology, Department of Mechanical Engineering and Energy MUT-250 | | | | | | | |
| Туре | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time 150/39 Part time 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 0 | М | 5 | English | |
| Teacher responsible | for the subj | ject | Name | | Róbert Sán | ta, PhD | - | schedule | Associate professor | |
| Training objective and justification of the course (content, output, location ir the curriculum) | | | utilization indicators, of of the court | he course (passive operation rse is als tion of dif | is to introdu solar, solar and system so to descr fferent energ | collect integrat ibe the gy utiliz | tor, PV, heat tion to the built | pump, b ldings' ene stem desig | evel renewable energy piomass boiler), their ergy systems. The aim gns and the possible | |
| Typical delivery met | hods | | Presentation Practice Laboratory Other | ¹ projecto | | using l | | | puter network. | |
| Requirements (expre learning outcomes) | ssed in terr | ns of | renewable of of the relev. of the operation different typ the operation based heat a licensing pri- about the prossibilities building's of necessary size renewable of Ability Able to ev Selects the li- to distingui- develop a co- system usin use the know solar energy into conside of different energy system Attitude Constantly knowledge new profess criticism or accurate an- apply the priority building en- Autonomy Collaborate well-founder team, work responsible enriching th | the knows energy sol ant meteo tition of ea The studer bes of bio- on of sola generation occess for ossibilitie and limit energy sol energy bas aluate the best renew she betwee conceptual g renewal wiedge ga v utilization the renewable ems. monitors into pract sional and opinions d error-free rinciples ergy supp and resp s with the concepts | urces integr rological co ach equipme nt knows the mass based r collectors, and geothe building lev s of passive ations of int ystem. Sun ipments an- urces. Distin- sed systems e possibilitie vable energy en each sy l plan for the ble energy sined to enal on possibilitie e characteris e based system his work, mice, to use p l scientific r and able to be problem so of energy e ly concepts. onsibility e instructor ional and o llow studen d decision lig | ation in inditions ent utilities estructur heat ger , PV sy- ermal sy- remal sy- remal sy- remal sy- remal sy- remal sy- est PV sy- est PV sy- est PV sy- est est est d instal guishess oblession sources belession tressults a problem results a problem results a problem ession est solaries. Abl- tressults a problem ession est solaries. Abl- tressults a problem results a problem ession est solving, ffficience and felt ther critic ts to so based o g field v | buling energy s. The student zing renewabl re of solar col- neration and ge stems, heat pu- stems. The stu- ystems. The stu- ystems in Hun- nergy utilizati g certain renew s the applica- lation requires between the given for the given the au uses renew opriate system from their ope c systems. Able to propose the be building. A ble to perform and conclusio -solving techr Open to formu- decisions and engineering p y and environ- llow students tical remarks. olve tasks. Win n his analyzes with new know | y systems. knows the e energy s lectors, P eothermal ump, diffe udent is av gary. The on. The s vable ener tion limi ments of efficiency of renew meteorolo vable ene to design. A erational c e to disting the optimal able to det energy assess ns. Strive iques. Su- ilating app to draw c precision a umental av to expand In some s ith his kn- s. The stu- | and possibilities of The student is aware e physical background sources, the necessary V systems, heat pump, systems. Understands rent types of biomass ware of the distributor student was informed tudent is aware of the gy equipment into the ts, selection criteria, each system utilizing indicators of different vable energy sources. gical conditions. Able rgy sources. Able to Able to evaluate each haracteristics. Able to guish between passive system design, taking ermine the limitations sessment of renewable s to put the acquired sceptible to the use of propriate response for conclusions. Develops ind accuracy. Seeks to wareness in providing I knowledge. Accepts situations, as part of a owledge, he makes a ident is committed to scientific results. The thinking and problem | |

Renewable energy

| Short description of the subject content | The aim of the course is to introduce the students to the technologies utilizing renewable energy sources (solar, water, wind, biomass, geothermal) and converting them into secondary energy carriers (fuel, heat, electricity), their possibilities and application limitations. In addition to the technical solutions, the students will get acquainted with the optimal selection and design process of renewable energy supply systems, as well as their operational aspects. In addition to energy production, the issues of integration into the system and energy storage will also be emphasized. |
|--|---|
| Types of student activities | Processing heard text with notes 60% Task-based organisation of information 10% Independent processing of tasks 30%. |
| Required literature and contact details | Planning and Installing Solar Thermal Systems: A Guide for Installers, Architects and Engineers. Deutsche Gesellschaft für Sonnenenergie, Earthscan, 2008, ISBN-13: 978-1844077601 Planning and Installing Photovoltaic Systems: A Guide for Installers, Architects and Engineers, Deutsche Gesellschaft für Sonnenenergie, Earthscan, 2005, ISBN: 978-1-84407-442-6 Materials on MOODLE |
| Recommended literature and contact details | • Duffie- Beckman: Solar Engineering of Thermal Processes, 4th edition, John Whiley and Sons Inc., New Jersey, 2013, ISBN: 978-0-470-87366-3 |
| Description of tasks to be submitted/measurement reports | 2 essays to be submitted on a topic of your choice |
| Description and timetable of the workshops | |

Basics of energy saving and conservation

| Basics (| of energy | / saving | and o | conservati | | | | | | | | |
|--|---|----------------------|--|---|---|---|---|--|---|---|--|--|
| Name of t | | | | Gazdaságos | | | Level | BSc | | | | |
| | - | in Englisł | 1 | Basics of en | | | Code | DUEN(L)-MGT-153 | | | | |
| | le educatio | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | |
| | Name of compulsory prior learning DUEN(L)- | | | | | | | | | | | |
| Туре | | Presentati | ion | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 0 | Е | 5 | English | | |
| Teacher re | esponsible f | for the sub | ject | Name | | Endre Kiss, | PhD | - | schedule | College professor | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | Goals, development objectives | | | | | | | | | |
| | | | | Presentation | Use of | projector. | _ | | | board presentation. | | |
| Typical de | elivery met | hods | | Practice | | | | nt solution of r l-scale exercis | | examples and case | | |
| | | | | Laboratory | | | | | | | | |
| | | | | Other Knowledge | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ms of | Have a comparea of engineration of fixed operation of Knowledge operation of Knowledge Comprehens and problem methods of pasic know operational pasic know operational problem measuring e Understand, and elements Ability The ability to a technical dis Ability to pathematical dis Ability to pathematical dis Ability to pathematical dis Ability to pathematical dis Ability to id needed to see to identify, for the standard open to least fundamental Open to least technologic: Seeks to sol Have the standard the ability Applies his/observable pathematical dis Ability the standard the ability open to least the ability open to least technologic seeks to sol Have the standard the ability Applies his/observable pathematical dis | neering. of the ger the field of the ter sive know solving problem s ledge of processes ied know quipment character s of mec used. o analyse cal field, pply the scipline ir an, organ entify rou lve them formulate and auth relations ming abo d develop ve proble mina and ty to her acqu ohenomer work, he, tal, qualit and resp | heral and spo of engineer minology, k /ledge of the solving. machine de: /ledge of m used in me rise and mo hanical sys e at a basic l to synthesis most impo to spotted to synthesis most impo to the perform ise and con- tine technic and implen dures). - | ecific ru ing. ey conc e main sign pri easuren chanica del the tems, th evel the se relati rtant te nance o duct ind al probl ment (sta epresent e world. g and a innovat oly in co f mono cal know be and co and con | thes, contexts a cepts and theor theories in the nciples and m nent procedur l engineering, structure and e design and e disciplines th onships and to minologies, th f related tasks lependent learn ems and to app andard operation ts the social uthentically c ions in the fiel poperation wit tony to carry c wledge to gai explain their la complies win throl requirem | and proceed ries relate ries relate field of 1 acthods, c es, their t operation interrelat at make u o make ap theories a ning. oly the pri ons in pra role of i ommunic d of engin h others. out practice n a thoro tws. th the re ents. | cnowledge acquisition ontrol procedures and cools, instruments and of the structural units ionship of the system up the knowledge base propriate evaluations. and procedures of the nciples and techniques ctice) ts profession and its ating professional and neering. cal activities ugh understanding of levant safety, health, | | |
| | | | In unexpected decision situations, he/she independently thinks through and develops comprehensive, substantiating professional questions on the basis of given sources. In the performance of his/her professional duties, he/she will also cooperate with qualified professionals from other disciplines (primarily technical, economic and legal). | | | | | | | | | |

| | He/she will share his/her experience with his/her colleagues in order to support their development. |
|---|---|
| | Assumes responsibility for the consequences of his/her technical analyses, the resulting proposals and the decisions taken. |
| Short description of the subject content | Introduction to energy management. Areas of energy and energy management. Overview of the world energy economy, main trends and macro-relationships. Overview of national energy management in Hungary. National energy structure and energy balance. Main energy needs of each economic sector. Energy demand and energy use of the population. Energy carriers and sources I: Energy carriers and energy sources of our planet. Exhaustible, renewable and renewable resources. Physical and chemical properties of different energy carriers. Extraction, transport and storage of energy carriers. Fossil fuels. Coal, oil, natural gas. Energy carriers and resources II: Exhaustible energy sources: nuclear energy. Renewable energy sources: solar, wind, hydro and geothermal, biomass, biogas. Waste- to-energy options. Conversion processes of energy carriers: combustion, combustion products. Energy conversion 1. Thermal energy: stove, convector, hot water boiler, steam boiler. Electricity: thermal power plants, gas engines, gas and steam turbines, steam cycles, condensing power plants, combined cycle power plants. Treatment, storage, disposal and use of pollutants. Remediation, maintenance. Energy transport. Storage facilities. Water, gas, hot water, steam and electricity networks. Energy use in industrial processes. Electricity and heat consumption. Energy requirements of agriculture, transport and services. Ways of meeting demand. Legal environment, strategic approach. Legal environment of energy supply, laws and regulations. Corporate energy management. Tasks of the energy manager. Strategic approach. Energy management. Systematic description of energy use. Understanding of system and system boundary. Mass and energy balances. Effectiveness and efficiency. Energy use II . Nature of use, performance and duration diagram. Estimation of expected consumption. Optimal control, monitoring of consumption, equipment operating in parallel. Energy storage options, storage. Energy use in residential, government, industry and agriculture. The ener |
| Types of student activities | Energy use IV . Description of energy conversion and consumption processes. Balance equations: mass, energy and waste balance. Identification of losses. Presentation: Processing of lectures with notes 40%, independent processing of |
| Required literature and contact details | theoretical material 20%, preparation of a seminar presentation 40% Endre Kiss: The Basics of Economical Energy Use, Electronic handbook, 2023, Moodle system |
| Recommended literature and contact | Y. Mizuta: Energy Saving Technology kézikönyv, JICA-DEED kiadásában, |
| details | 2003 Full time, student seminer presentations |
| Description of tasks to be submitted/measurement reports | Full-time: student seminar presentations Part-time: student seminar presentations |
| Description and timetable of the workshops | During the semester, for correspondence students in the 2nd and 4th consultation, and for day students in the 6th and 13th week, five theoretical questions from the lectures. The papers are 100-100 marks, with a maximum of 20 marks for each question. The |

| Sustainable Fina | 1 | <u> </u> | | | | | | - | | | |
|--|---------------|----------|--|--|---|----------------------------------|--|------------------------|---|--|--|
| | in Hungaria | ın | Fenntartható pénzügyek és a FinTech cégek Level BSc | | | | | | | | |
| Name of the subject | in English | | Sustainable Finance and Bigtech Companies in Code DUEN(L)-TGT-252 | | | | | | | | |
| Responsible education | | | Institute of | Social Sci | ences, Depa | artment | of Economics | | | | |
| Name of compulsory prior learning DUEN(L)- | | ng | | | | | | | | | |
| Туре | Presentation | n | Practice | - | Laboratory | | Requirement | Credit | Language of education | | |
| Full time 150/39 | per week | 2 | per week | 1 | per week | 0 | Е | 5 | English | | |
| Part time 150/15 | per term | 10 | per term | 5 | per term | 0 | 1. 010 | 1 1 1 | - | | |
| Teacher responsible | tor the subje | ct | Name | | Andrea Ke | szi-Szer | emlei, PhD | schedule | College professor | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | financial in | e develop struments nt. To lear mpanies a | oment of f , options au n about fin nd their dev | nd solut ancial in relopme | ions that supp nvestments. To nt path. | port ESG o understa | is to understand the goals for sustainable and the importance of poard presentation. | | |
| | | | Presentation | ⁿ Use of j | projector. | | | | - | | |
| Typical delivery methods | | | Practice | | | | nt solution of r l-scale exercis | | examples and case | | |
| | | | Laboratory | | | | | | | | |
| | | | instruments | of susta | | | | an apply | sustainable financial | | |
| Requirements (expressed in terms of learning outcomes) | | | Ability Ability to distinguish between sustainable financial instruments Ability to propose and develop alternatives for private and workplace financial decisions. Ability to plan, organise and carry out independent learning. Ability to apply the knowledge acquired in solving problems in his/her field of specialisation. Attitude Open to learn about, adopt and authentically communicate developments and innovations in the financial field Interested in new methods and tools in the field. Applying his/her acquired knowledge of finance, he/she seeks to gain a better understanding of observable phenomena, to describe and explain their laws. | | | | | | | | |
| | | | Autonomy and responsibility In the performance of his/her professional duties, he/she collaborates with qualified professionals in other fields (primarily economic and legal) assumes responsibility for the consequences of his/her financial analyses, the proposals based on them and the decisions taken. | | | | | | | | |
| Short description of t content | he subject | | Types of financial instruments Financial aspects of sustainable development Characteristics of sustainable financial instruments in our country and abroad Possible future financial instruments Definition, characteristics and operation of FinTech companies | | | | | | | | |
| Types of student acti | vities | | | | | | th notes 60%, search 10%. | independ | ent processing of | | |
| Required literature a | | | | | | | Schramade: Pr versity Press, 2 | | | | |
| Recommended litera details | | tact | • P | aiki -Siror | i: FinTEch | Innovat | tion, Wiley Fin | nance Seri | ies, Libristo, 2016. | | |
| Description of tasks t submitted/measurem | | | | | | | | | | | |
| Description and time workshops | | | During the | semester, | 2 essays wi | th five t | heoretical que | stions from | m the lectures. | | |

Sustainable Finance and Bigtech Companies in Finance

| Practica | 11 | | | vable ener | <u> </u> | | | | - | 1 | |
|--|---------------------------|----------------------|--|---|--|---|--|--|--|---|--|
| Name of the | he subject | in Hungar | | Megújuló energiaforrások projektfeladat | | | | | | BSc | |
| in English | | | Practical application of renewable energy sources Code DUEN(L)-MGT-215 | | | | | | | | |
| | le educatio | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of c DUEN(L) | ompulsory - | prior learn | ing | | | 1 | | 1 | 1 | 1 | |
| Туре | | Presentatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time Part time | 150/39 150/15 | per week per term | 0 | per week per term | 0 0 | per week per term | 3 15 | Е | 5 | English | |
| Teacher re | esponsible f | for the subj | ect | Name | | Éva Kovác | s-Boko | r, PhD | schedule | College assosicate professor | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | renewable e them. | ve of the nergy so | course is t urces and the | e basic | design and me | asurement | the different types of t procedures related to on-line using MS | |
| Typical de | elivery meth | nods | | Presentation Practice Laboratory Other | ¹ Teams. | | | renewable ene | | | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | understand student will Ability The student their conseq links betwee Attitude By the end of to preservin responsible activities a environmen Autonomy | will lea what it recognis is able to uences the of the cou- ng envir- way. The nd the r t and resp | means to be e the links b o consider en rough exam , his/her own rse, the stude onmental va student will natural envi | alance = etween nvironn pples. T n life an ent will alues a take re ronmen | needs and em natural resour mental or socia he student will d that of his/he be committed nd to using sponsibility fo tt, and for co | vironment ces and th l, econom be able to er environ to using g energy in r the prese | ces; The student will al opportunities; The e economy-society. ic energy choices and o explore the systemic ment. reener energy sources, an environmentally rvation of his/her own g with his/her social | |
| Short desc content | cription of t | he subject | | Grouping or energy mixe on land and - biofuels. I fuel, fuel co design. | f energy es. Solar at sea. N Biomass ells. New | sources, Hu energy - sola farine and ri fuels. Nucle propulsion | ngary's ar panel ver hyd ar and methoo | and the EU's of s, Solar energy Iropower. Use fusion energy ds in the auto | y - solar co of geothe utilisation motive in | ategy, presentation of ollectors. Wind energy rmal energy. Biomass h. Hydrogen as a new dustry. Passive house t processing of | |
| Types of s | tudent activ | vities | | theoretical 1 | naterial 2 | | al: Prep | aration of labo | | | |
| - | literature ar | | | • TI M • D • K | he Renew loodle, r. Éva Ko ároly Ren | vable Energy ovács-Bokor nényi: Rene | / Source Kovác wable I | es in the Servio s: Renewable I Energies, Akad | Energy So lémiai Kia | n Energy note, nurces note, Moodle, ndó, Budapest, 2007 | |
| Recomme details | nded literat | ture and co | ntact | A | kadémiai | Kiadó, Bud | apest, 2 | 2010 | | oon cycle is life, | |
| | n of tasks t measureme | | | Students wi basis of the total | ll take a 1 measurei | report of eac nent results. | h meası Part tir | urement exerci me students: D | se and wi | g the semester. Il be graded on the semester, there is a | |
| Description and timetable of the workshops | | | | During the semester period, in weeks 7 and 13, a total of 2 independent project papers/ case studies on topics of your choice related to renewable energy sources, 8-15 pages in length, illustrated with diagrams, charts and photos of the material presented | | | | | | | |

Practical application of renewable energy sources

| Novel te | echnique | | | nental pro | | | | | | | | |
|------------------------|---|----------------------|--|---|-----------------|----------------------|---------------|------------------|-------------|---------------------------------------|--|--|
| Name of the | | | | Új környeze | | | Level Code | BSc | | | | |
| | - | in English | 1 | Novel techn | DUEN(L)-MGT-216 | | | | | | | |
| | le educatio | | | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | |
| | Name of compulsory prior learning DUEN(L)- | | | | | | | | | | | |
| Туре | | Presentation | | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 0 | per week per term | 1 5 | Е | 5 | English | | |
| | sponsible f | | | Name | | Endre Kiss | , PhD | | schedule | College professor | | |
| | | | | Goals, deve | | | | | | | | |
| | | output, loca | ation in | | | | | onmental tecl | nniques a | nd their application, | | |
| the currict | the curriculum) | | | recycling of Presentation | For all | students in a | | ecture hall wit | h a blackt | poard presentation. | | |
| T · 11 | 1. 4 | | | | Use of | projector. | | | | | | |
| I ypical de | livery metl | nous | | Practice Laboratory | Measur | ements in la | horator | ies | | | | |
| | | | | Other | wiedsui | ements m t | iooraior | 103 | | | | |
| | | | | Knowledge | | | | | | | | |
| | | | | | | neral and sp | ecific ru | iles, contexts a | and proced | lures for the operation | | |
| | | | | of the techn | | - | | | | · · · · · · · · · · · · · · · · · · · | | |
| | | | | | | | | | | related to the field. | | |
| | | | | | | | ne main | theories of the | ne field ir | terms of knowledge | | |
| | | | | acquisition a | | | | | | | | |
| | | | | methods of problem solving. Basic knowledge of machine design principles and methods, control procedures and | | | | | | | | |
| | | | | Basic knowledge of machine design principles and methods, control procedures and operational processes. | | | | | | | | |
| | | | | Has an applied knowledge of measurement procedures, their tools, instruments and | | | | | | | | |
| | | | | measuring equipment used in mechanical engineering. | | | | | | | | |
| | | | | Understand, characterise and model the structure and operation of the structural units | | | | | | | | |
| | | | | and elements of mechanical systems, the design and interrelationship of the system components used. | | | | | | | | |
| | | | | Ability | | | | | | | | |
| | | | | Ability to apply the most important terminology, theories and procedures of the | | | | | | | | |
| | | | | technical field in the performance of related tasks. | | | | | | | | |
| | | | | Ability to plan, organise and conduct independent learning. | | | | | | | | |
| Requireme | ents (expres | ssed in terr | ns of | Ability to identify routine technical problems and to apply the necessary principles and | | | | | | | | |
| learning of | | ssed in terr | 115 01 | techniques to solve them | | | | | | | | |
| 8 - | , | | | to identify, formulate and implement (standard operations in practice) | | | | | | | | |
| | | | | (using standard procedures). Attitude | | | | | | | | |
| | | | | | learning | about, embi | racing a | nd authentical | ly commu | inicating professional | | |
| | | | | It is open to learning about, embracing and authentically communicating professional, technological development and innovation in engineering. | | | | | | | | |
| | | | | Seeks to solve problems, preferably in cooperation with others. | | | | | | | | |
| | | | | Have the stamina and tolerance of monotony to carry out practical activities | | | | | | | | |
| | | | | has the abili | | inad taabmi | al Ima | wladaa ta aai | n a thana | uch understanding of | | |
| | | | | | | | | explain their la | | ugh understanding of | | |
| | | | | | | | | | | levant safety, health, | | |
| | | | | | | | | ntrol requirem | | ···· , | | |
| | | | | Autonomy | and resp | onsibility | | | | | | |
| | | | | | | | | | | operate with qualified | | |
| | | | | | | | | echnical, econo | | | | |
| | | | | He/she shares his/her experience with his/her colleagues, thus contributing to their | | | | | | | | |
| | | | development. He/she is responsible for the consequences of his/her technical analyses, the proposals | | | | | | | | | |
| | | | he/she is responsible for the consequences of his/her technical analyses, the proposals he/she makes and the decisions he/she takes. | | | | | | | | | |
| | | | | | | | | | t in line w | vith Chinese emission | | |
| | | | | reduction pl | ans (aime | d at develop | oing em | ission reduction | on process | es and equipment that | | |
| Short desc | ription of t | he subiect | | meet a tenth of the EU limit). Possibilities to improve the efficiency of conventional | | | | | | | | |
| content | r | | | electrostatic precipitators in coal and other fossil-fired power plants. Electrostatic precipitators with increased efficiency, Bag filters with improved electrostatic charge. | | | | | | | | |
| | | | | | | | | | | inciples for separators | | |
| | | | | | | | | | | | | |
| | | | | using a combination of the above options. Design guidelines. New trends in water | | | | | | | | |

Novel techniques of environmental protection

| | treatment. Newer principles and options for biological water purification. Theory and practice of endocrine disruptor removal from water. New noise reduction techniques (interference, new types of attenuation. New methods of odour control, modern methods of odour measurement. Dioxin and PCB abatement. New radioactivity reduction techniques. Processing of red mud, extraction of rare earths and scandium. | | | | |
|--|---|--|--|--|--|
| | Presentation: Processing of lectures with notes 40%, independent processing of theoretical material 20%, preparation of lab notes 40% | | | | |
| Required literature and contact details | Endre Kiss: New environmental techniques, Electronic note, 2023, Moodle system | | | | |
| Recommended literature and contact details | Y. Mizuta: Energy New Environmental Technologies Technology Handbook, JICA-DEED publication, 2003 Proceeding Publication of the Wroclaw International World Conference on Electrostatic Discharge Elimination | | | | |
| | Full-time: preparation of 5 measurement reports Part-time: 3 measurement reports | | | | |
| Description and timetable of the workshops | During the semester, for correspondence students in the 2nd and 4th consultation, and for day students in the 6th and 13th week, five theoretical questions from the lectures. The papers are 100-100 marks, with a maximum of 20 marks for each question. | | | | |

| Basic Pi | rinciples | | 0 | n Technol | 03 | | | | | | |
|---|--------------------------|----------------------|---------|--|--|---|---|---|--|--|--|
| Name of the | he subject | in Hungar | | Hidrogéntee | | | Level | BSc | | | |
| | - | in English | | Basic Princ | | Code | DUEN(L)-MGT-257 | | | | |
| | le educatio | prior learn | ino | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| DUEN(L) | | | ing | | | | | 1 | Longuage of | | |
| Туре | | Presentatio | | Practice Laboratory Requirement | | | | Credit | Language of education | | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 0 0 | Е | 5 | English | |
| Teacher re | sponsible | for the subj | ect | Name | | Imre Ková | cs, PhD | | schedule | Associate professor | |
| Training objective and justification of the course (content, output, location in the curriculum) Typical delivery methods | | | | compounds production adsorption | ill learn , the prod of high- processes , and elect For all s | about the uction of h purity hydr at the solid trochemical students in a projector. | ydrogen. rogen. l-gas int process a large l | in laboratory Students will terface, diffus ses in material ecture hall wit | and indu also lea ion throug s containi h a blackl | ties of hydrogen, its strial settings, and the urn about elementary gh solids (metals) and ng active hydrogen. board presentation. | |
| | | | | Practice Laboratory Other | Laboratory | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ns of | The student material; The studen chemical an Ability The studen consequenc The student the environm Attitude At the end sources, ind environmen The student | will learr will under t will rec d the econ t is able es through will be a ment. of the cou- cluding h tally resp t will as n of the t. and resp ependentl | erstand the ognise the nomy-socie to conside h examples; ble to explo urse, the stu ydrogen, to onsible way ssume resp natural en onsibility | knowled links be ty. er socia ore the s dent wi protec 7. ionsibili | etween the result, economic ystemic links Il be committ t the environit ty for his/he | and energed and energed between e ed to the ment and r own ac | o hydrogen; ith this energy storage ssociated with such a gy choices and their nergy, economics and use of greener energy to use energy in an ctivities and for the ting with the social | |
| Short desc content | ription of t | he subject | | to hydrogen | . Its prod | uction, phys | sical and | l chemical pro | perties, ai | ll chemistry in relation nd future uses. | |
| Types of s | tudent acti | vities | | theoretical 1 | naterial 2 | 0%, prepara | ation of | lab notes 40% | - | t processing of | |
| Csepeli-Kovács: Chemistry and Materials Science notebo Materials on MOODLE Viktor Hacker, Shigenori Mitsushima, Fuel Cells and Hydrogen Energy 1st Edition, publisher 978-0128114599 Handbook of Hydrogen Energy 1st Edition, Edited By S.A Goswami, E.K. (Lee) Stefanakos, Aldo Steinfeld, ISBN 9 1058 Pages 375 B/W Illustrations , Published September Press. | | | | | Hydrogen: From her Elsevier, ISBN-13 S.A. Sherif, D. Yogi N 9781420054477, | | | | | | |
| details | | ture and co | ntact | Introductory Chapter: Hydrogen Energy, Written By Ahmed Albahnasawi and Murat Eyvaz, Published: 07 December 2022, DOI: 10.5772/intechopen.108635 | | | | | | | |
| | n of tasks t measurem | | | Full-time: A total of 3 | assignme | nts to be su | bmitted | during the ser | nester. | | |

Basic Principles of Hydrogen Technology

| | By correspondence: A total of 2 papers to be written during the semester. |
|--|--|
| Description and timetable of the workshops | At the end of the semester, in the 13th week of the semester, a 100-point essay. |

| Basics of | of the cir | cular econo | my | | | | | | | | | |
|--|-----------------------------|---|---|---|---|----------------------|---|--------------------------|---|--|--|--|
| Nama of t | ha aubiaat | in Hungarian | Körforgásos | gazdasá | g alapjai | | Level | BSc | | | | |
| Name of t | he subject | in English | Basics of the | e circular | Code | DUEN(L)-MGT-258 | | | | | | |
| Responsib | le educatio | nal unit | Institute of 7 | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | | |
| Name of c DUEN(L) | | prior learning | | | | | | | | | | |
| Туре | | Presentation | Practice | | Laboratory | | Requirement | Credit | Language of education | | | |
| Full time Part time | 150/39 150/15 | per week 2 per term 10 | per week per term | 1 5 | per week per term | 0 | Е | 5 | english | | | |
| | | for the subject | Name | - | Éva Kovác | s-Bokor | . PhD | schedule | Senior lecturer | | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | in protection re and develop | he course elated to v ment opp | e is to famili waste manag ortunities; to | gement, o learn t | international a | and nation sign tasks | ems of environmental al solutions, technical of waste recovery and ar cells, batteries), by- | | | |
| Typical delivery methods | | | Presentation Practice Laboratory Other | Use of | projector or | overhea | ecture hall wit ad projector e room with pr | | board presentation. | | | |
| Requirements (expressed in terms of learning outcomes) | | | The student understand student will Ability The student their conseq relationships Attitude By the end environment will take res environment Autonomy a The student | The student is able to consider environmental or social, economic energy choices and their consequences through examples; The student is able to explore the systemic relationships between nature, his/her own life and the environment. Attitude By the end of the course, students should be committed to the preservation of environmental values and the environmentally responsible use of energy. The student will take responsibility for the preservation of his/her own activities and the natural environment, and for cooperation with the social environment. Autonomy and responsibility | | | | | | | | |
| Short desc content | he subject | waste mana; Managemen processes, m for waste pr industrial co nuclear indu | The current state of waste management in Hungary and Europe. Basic concepts of waste management. Waste management. Legislation on waste management. Waste Management Plans. Waste collection, treatment, transport, storage. Landfills: design, processes, monitoring, recultivation Energy recovery from waste. Methods and policies for waste prevention and minimisation (IPPC, LCA) Processes and technologies for industrial composting Recycling of spent solar cells and Li-batteries. Management of nuclear industrial waste. Radioactive waste disposal processes and methods. | | | | | | | | | |
| Types of s | student activ | vities | theoretical n | naterial 2 | 0%, Exercis | se: 40% | | • | ent processing of | | | |
| | | d contact detail | | | | | otes: Moodle s | | | | | |
| Recomme details | nded literat | ure and contact | | | | | | | ntroduction to the SBN 9781536192339 | | | |
| - | on of tasks t /measureme | | | | | | | | | | | |
| submitted/measurement reports Description and timetable of the workshops | | | During the semester, in weeks 7 and 14, five theoretical questions from the lectures are presented. The tests are both 100-100 marks, with a maximum of 20 marks per 5 essay questions. The mark for the essay will be calculated according to the mark limits | | | | | | | | | |

Basics of the circular economy

NUCLEAR ENERGY

Basics of nuclear safety

| Name of the subject in En Responsible educational un Name of compulsory prior DUEN(L)- | | an | Nukleáris bi Basics of nu | | | | | Level | BSc |
|---|---------|-----------|---|--|---|---|---|--|--|
| Responsible educational un Name of compulsory prior DUEN(L)- | nit | | Basics of nu | aloor cofe | | | | | |
| Name of compulsory prior DUEN(L)- | | | | | Code | DUEN(L)-MGT-117 | | | |
| DUEN(L)- | learn | | Institute of [| Fechnolog | gy, Departm | nent of I | Mechanical En | gineering | and Energy |
| Type Prese | | | | | | | | | |
| | entatio | on | Practice | | Laboratory | | Requirement | Credit | Language of education |
| Full time 150/39 per w | | 2 10 | per week | 0 | per week 1 per term 5 | | | 5 | english |
| Part time 150/15 per te | | - | per term | - | per term | - | | 1 1 1 - | _ |
| Teacher responsible for the subject | | | Name Cools dove | | Miklós Hor | vain, P | nD | schedule | College professor |
| Training objective and justification of | | | Goals, deve | | | s to giv | a the student | on over | ion, of the history of |
| the course (content, output | | | | | | | | | |
| the curriculum) | i, 10ea | .1011 111 | for the futur | re, the jo | urney of ura | anium o | ore from minir | ng to buri | al, and trends, and to |
| | | | | | | | etail in each su | | |
| | | | | | | | | | ooard presentation. |
| Typical delivery methods | | | Practice | For all | students in a | a lecture | e room with pr | ojector. | |
| | | | Laboratory | | | | | | |
| | | | Other Knowledge | | | | | | |
| Requirements (expressed in learning outcomes) | in term | ns of | Have a com area of engin Knowledge rules, conten You know th You have a methods in y Comprehens He has a t mechanical application. Basic know technology, Comprehens machinery, He/she kno instruments, He/she kno protection, specialisatio Comprehens managemen law and eco In-depth kn their ethical Knowledge based on tec Understand, and elements Apply the re product, pro Ability The ability to a technical fie Ability to pl | neering. of the ger ts and pr he termin comprel your field sive know horough engineeri ledge of m control p sive know power too ws the r instrume ws the ex safety a on, as wel sive know power too ws the r instrume t, enviror nomics, v owledge limitation of the me hnical pr character s of mecl used. elated con cess and o analyse cal field, pply the ld in the an, organ | heral and spectocedures neo- ology, key of hensive knool. Vledge of ba knowledge ng, the methan nachine desi rocedures an vledge of the ols, mechanian neasuring pro- ents and measuring pro- to and neo- neasuring pro- to and neo- neasuring pro- values of the ols, mechanian neasuring pro- values of the mental pro- vhich are into of learning ns and prob- thods and to inciples. rise and moo- hanical system nputational technology at a basic le to synthesis most impo- performance ise and carri- putine profe | ecific m ecessary concepts wledge sic ecor of the nods of the nod oper- national literation want envites the base tection, tegrally , knowl lem-solv bols of the and moo design. | athematical, se for the operat s and theories of the main t nomic, busines structural ma their manufact ciples and met ating processes ating principle ipment and too res used in m equipment. quirements of health areas /ironmental pr ics, limits an quality assura related to the ledge acquisiti ving technique business econor tructure and op e design and in delling principle disciplines tha onships and to rminology, the ted tasks. dependent lean problems, to | cientific a ion of the related to heories a s and lega aterials us ure and th hods, made s. es and str ols used. hechanical the occup related to otection re d require mce, infor field of er on, data s in mech mics and of peration o herrelatio les and m t make up make appresentes and ring. identify, f | nd problem-solving al rules and tools. sed in the field of e conditions of their chine manufacturing uctural units of the engineering, their pational safety, fire o his/her field of egulations. ments of logistics, rmation technology, |

| | Ability to understand and use literature, computer and library resources specific to their field. |
|--|--|
| | The acquired IT knowledge can be applied to the solution of tasks in the field. Ability to build basic models of technical systems and processes. |
| | The ability to use their knowledge in a creative way to manage their workplace |
| | resources effectively. |
| | In the course of his/her work, he/she is able to apply and enforce safety, fire safety and hygiene rules and regulations. |
| | Ability to communicate in a professionally appropriate manner, orally and in writing, |
| | in your mother tongue and at least one foreign language. |
| | Ability to apply the technical specifications related to the operation of mechanical systems, the principles and economic context of setting up and operating machinery |
| | and mechanical equipment. The ability to manage and control the production processes of specialised technology, |
| | with a view to quality assurance and quality control. |
| | Ability to diagnose mechanical failures, select troubleshooting operations, solve |
| | repair tasks Attitude |
| | It assumes and authentically represents the social role of its profession and its |
| | fundamental relationship with the world. |
| | It is open to learning about, embracing and authentically communicating |
| | professional, technological development and innovation in engineering. You strive to make your self-training a means to achieve your professional goals. |
| | Make decisions in complex or unexpected decision-making situations, taking full |
| | account of legal and ethical standards. |
| | It tries to solve problems in cooperation with others, where possible. Strive to keep their self-training in mechanical engineering continuous and in line |
| | with their professional goals. |
| | It strives to solve its tasks and make management decisions by listening to the |
| | opinions of the colleagues it manages, preferably in cooperation. You have the stamina and tolerance for monotony needed to carry out practical |
| | activities. |
| | You are open to the use of IT tools, you strive to learn and use software in the field |
| | of mechanical engineering, and you know and use at least one of these programs to a proficient level. |
| | Open and receptive to new, modern and innovative practices and methods related to |
| | organic farming and health awareness. |
| | Using his/her technical knowledge, he/she strives to understand the observable |
| | phenomena as thoroughly as possible, to describe and explain their laws. In the course of his/her work, he/she observes and complies with the relevant safety. |
| | health, environmental, quality assurance and control requirements. |
| | Autonomy and responsibility |
| | The evolution of security philosophy. The basics of modern security philosophy. Risk and security. Technical aspects of security philosophy, implementing defence in depth International security requirements. IAEA and EU security standards. Domestic |
| Short description of the subject | regulatory requirements, Nuclear Safety Regulations. Safety functions. Safe heat |
| content | removal from the reactor active zone. Safe heat removal from the spent fuel pool. Safety systems. Reliability and safety. Verification of design safety, safety reports and safety |
| | analyses. Safety management during the operating period, Operating Conditions and |
| | Limits. |
| Types of student activities | Processing of heard text by note-taking and recording of material using own notes and electronically available notes 80% Development of test questions 20% |
| | • Fundamentals of Nuclear Safety (electronic note, rapporteur's note) |
| Required literature and contact details | Elter J., Gadó J., Holló E., Lux I. (eds.): Safety of Nuclear Reactors, ELTE Eötvös Kiadó, ISBN 978-963-312-180-1, Budapest, 2013 |
| | Materials on MOODLE Nuclear Safety Regulations Volumes 1-10 and Guides (OAH website) |
| Recommended literature and contact | Nuclear Safety Regulations Volumes 1-10 and Guides (OAH website) IAEA Safety Standards (Safety Fundamentals, Safety Standards, Safety |
| details | Guides) (IAEA website) |
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the | Week 7: I final examination |
| workshops | Week 12: II final examination |
| * | Week 13: any paper can be substituted |

| Basics of Atome | | | n | | | | | 1 | 11 | |
|--|----------------------|---------|---|---|--|---|--|--|--|--|
| Name of the subject | in Hungar | | Atomenerge | | | Level | BSc | | | |
| | in English | l | Basics of A | | | Code | DUEN(L)-MGT-118 | | | |
| Responsible education | | • | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of compulsory DUEN(L)- | prior learn | iing | | | | | 1 | 1 | | |
| Туре | ype Presentation | | Practice | | Laboratory | | Requirement | Credit | Language of education | |
| Full time150/39Part time150/15 | per week per term | 2 10 | per week per term | M | | | 5 | english | | |
| Teacher responsible f | ject | Name | | Miklós Hoi | rváth, Pl | hD | schedule | College professor | | |
| | | | A series of nuclear ene for the futu | Goals, development objectives A series of introductory lectures to give the student an overview of the history of nuclear energy, the types of nuclear power plants currently in operation and planned for the future, the journey of uranium ore from mining to burial, and trends, and to anticipate what they will learn in more detail in each subject. | | | | | | |
| | | | Presentation | | | | ecture hall wit ad projector. | h a black | board presentation. | |
| Typical delivery meth | ods | | Practice Laboratory | Practice | e, example | | | | | |
| | | | Other Knowledge | <u> </u> | | | | | | |
| Requirements (expres learning outcomes) | ssed in terr | ns of | area of engi Knowledge rules, conte You know t You have a methods in Ability The ability of the techn Ability to a technical fie Ability to a technical fie Ability to a them (using background Ability to u their field. The acquire Ability to b The ability to b The ability resources ef In the cours and hygiene Attitude It assumes fundamenta It is open professiona You strive t Make decis account of I It tries to so Strive to kee with their p Autonomy In unexpect comprehens Responsibly open to pro- | neering. of the ger xts and pr he termin a compreh your field to analyse ical field, apply the eld in the lan, organ dentify ro g standard. d IT know uild basic to use th fectively. se of his/h e rules and and auth l relations to lear l, technolo o make yo ions in co egal and e lve proble sp fessional and resp ed decisic sive, subst y uphold a fessionally out his/he | heral and sp ocedures ne ology, key of hensive kno at a basic le to synthesis most impo performance ise and carr butine profe d operation and use lit wledge can b models of t eir knowled er work, he l regulations entically re ship with the ning about ogical devel bur self-training al goals. onsibility on situations antiating pr and represent | ecific m ecessary concepts wledge evel the e relation rtant te e of rela y out in ssional s in pr erature, be appli- technica dge in s. eventhis echnica dge in s. eventhis echnica s. e | athematical, s for the operat s and theories of the main main disciplines that onships and to rminology, the ted tasks. dependent lea problems, to actice) agains computer and ed to the solut l systems and a creative way able to apply a able to apply a s the social r racing and a and innovation neans to achie ted decision-r with others, w hanical engin- al questions of alues of the en- | cientific a ion of the related to theories a t make up make app eories and rning. identify, it a theor d library n ion of tash processes y to man and enfor- ole of its authentica on in engin ve your p making si here poss eering co- y thinks th on the bas ngineering also coop | the knowledge base ropriate evaluations. d procedures of the formulate and solve etical and practical resources specific to ks in the field. age their workplace ce safety, fire safety s profession and its lly communicating heering. rofessional goals. tuations, taking full ible. ntinuous and in line prough and develops is of given sources. g profession, and be perate with qualified | |

Basics of Atomenergetics

| | Identify the shortcomings of the technologies used, the risks of the processes and initiate measures to reduce them. Monitor legislative, technical, technological and administrative changes in the field. Directs the work of the personnel assigned to him/her, supervises the operation of machinery and equipment, based on the instructions of the workplace manager. |
|--|---|
| Short description of the subject content | The history of nuclear reactors. The Bomb 1939-1945,-47; The first atomic bomb. Accidents Nuclear power plant generations. From the uranium vein to the graveyard. The safety principles. The entire uranium life cycle Uranium ore mining. Fuel cell production. Nuclear power plant use (source: npp.hu). Temporary storage. Reprocessing. Waste management. Final disposal. Reactor physics. Fundamentals of nuclear physics. Criticality (four and six factor formulae). Point kinetics. Building blocks of reactors. Reactor calculations. From transport equation to point kinetics backwards. Reactor kinetics equations with late neutrons Solutions to the transport equation, critical reactor state. Multiplication factor, concept of reactivity. Diffusion approximation. Space dependence calculations. Treatment of reactor ores in reactor physics. Mechanical engineeringThe main components of the primary circuit. Other main equipment of the primary circuit. Elements of the primary circuit safety protection system. The secondary circuit heat cycle processes. Thermohydraulics of the reactor plant. Main factors to increase the safety of nuclear power plants. Fission nuclear power generation of the futureFusion power generation |
| Types of student activities | Taking notes on what you have heard and recording the material using your own notes and those available electronically 80% Developing test questions 20% |
| Required literature and contact details | Gábor Pór:Nuclear Energy Basics textbook Materials on MOODLE International Atomic Energy Agency textbook, <u>https://www-pub.iaea.org/MTCD/Publications/PDF/P082_scr.pdf</u> Gyula Csom:Nuclear Power Plant Operation I Fundamentals of Reactor Physics and Technology (Technical University of Budapest, 1997) Gyula Csom:Nuclear Power Plants Operation II/1 - Operation of Energetic Nuclear Reactors (Műegyetemi Kiadó, Budapest, 2005) By: Operational knowledge (University of Dunaújváros, university note, in progress) |
| Recommended literature and contact details | Zoltán Szatmáry: Introduction to Reactor Physics, (Akadémiai Kiadó, Budapest, 2000) Duderstadt, J and Hamilton, L.: Nuclear Reactor Analyses (Wiley, New York, 1976) Bell, G. I., and Glasstone, S.: Nuclear Reactor Theory (American Nuclear Society, 1970) Dénes Bódizs:Measurement Techniques for Nuclear Radiation (Typotex, Budapest, 2009) G. F. Knoll, Radiation Detection and Measurement, 3rd Edition (John Wiley & Sons, Inc., 2000.) |
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

| Ensuring the int | | * | | | | | | | | |
|--|----------------------|---------|---|--|--|---|---|---|--|--|
| Name of the subject | in Hungar | | Berendezések integritásának biztosítása | | | | | | BSc | |
| - | in English | 1 | Ensuring the integrity of equipment Code DUEN(L)-MGT-11 | | | | | | | |
| Responsible education Name of compulsory | | ina | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| DUEN(L)- | | mg | | | | | | | | |
| Туре | Presentati | on | Practice | | Laboratory | Laboratory | | Credit | Language of education | |
| Full time 150/39 Part time 150/15 | per week per term | 2 10 | per week per term | rm 5 per term 0 M | | | М | 5 | english | |
| Teacher responsible | for the sub | ject | Name | | Péter Tram | pus, Ph | D | schedule | Professor emeritus | |
| Training objective and justification of the course (content, output, location ir the curriculum) | | | the goals of quality, asse prioritizing | Goals, development objectives the goals of ensuring equipment integrity encompass safety, reliability, compliance, quality, asset management, environmental protection, and risk management. By prioritizing equipment integrity, organizations can safeguard their people, assets, and reputation while enhancing operational performance and sustainability. | | | | | | |
| | | | Presentation | | | | ecture hall wit ad projector | h a black | board presentation. | |
| Typical delivery met | hods | | Practice Laboratory | Measur | ements and | exampl | 65 | | | |
| | | | Other | wicasul | ements and | exampl | | | | |
| Typical delivery methods Requirements (expressed in terms of learning outcomes) | | | subject area Knowledge rules, conte You know t You have a methods in Comprehen He/she has mechanical application. Basic know technology, Comprehen machinery, He/she kno instruments Ability The ability to a technical fie Ability to a technical fie Ability to a technical fie Ability to a technical fie Ability to a technical fie Ability to a them (using background Ability to b The ability to b The ability to b The ability resources ef Attitude It assun fundame It is op professi You strii Make da account It tries t | nprehensi of engine of the ger sts and pr he termina comprel your field sive know a thorou engineeri ledge of r control p sive know power too ws the r , instrume to analyse ical field, pply the eld in the lan, orgar dentify ro g standar nderstand d IT know uild basic to use th fectively. mes and a ental rela- ponal, tech ve to mal ecisions in of legal a o solve pro- o keep the | eering. neral and sp rocedures ne ology, key of nensive knoul. vledge of ba gh knowled ng, the meth nachine des procedures a wledge of th ols, mechani- neasuring p ents and mea- e at a basic let to synthesis most impor- performance ise and carr putine profe d operation I and use lift wledge can b models of the neir knowled carolise and carr putine profe d operation I and use lift wledge can b models of the in knowled carolise and carr putine profe d operation I and use lift models of the neir knowled carolise and carr putine profe d operation I and use lift models of the in complex o and ethical s roblems in complex o | ecific m accessary concepts wledge sic ecor ge of th add oper- ne oper- cal equi- procedur asuring evel the e relation tant ter e of rela- y out in ssional s in pr erature, be appli- echnica- dge in a represe- h the wo out, emi- evelopm training r unexp tandard ooperat ng in m | hathematical, si for the operation of the main the nomic, business the structural re- their manufact ciples and meta ating processes ating principle ipment and too res used in ne equipment. disciplines that onships and to minologies, the ted tasks. dependent leas problems, to actice) agains computer and a creative way ents the social orld. bracing and a means to ac ected decision s. ion with other | cientific a ion of the related to theories a as and lega naterials ure and the chods, may see and stri- bls used. nechanica t make up make app neories an rning. identify, t a theor d library n ion of tash processes y to mana role of in authentica vation in e hieve you -making s | al rules and tools. used in the field of the conditions of their chine manufacturing ructural units of the l engineering, their o the knowledge base ropriate evaluations. d procedures of the formulate and solve retical and practical resources specific to ks in the field. age their workplace ts profession and its ally communicating engineering. ur professional goals. situations, taking full | |

Ensuring the integrity of equipment

| | ··· · · · · · · · · · · · · · · · · · | | | | | | |
|---|--|--|--|--|--|--|--|
| | It strives to solve its tasks and make management decisions by listening to the opinions of the colleagues it manages, preferably in cooperation. | | | | | | |
| | Autonomy and responsibility | | | | | | |
| | In unexpected decision situations, he/she independently thinks through and | | | | | | |
| | develops comprehensive, substantiating professional questions on the basis of | | | | | | |
| | given sources. | | | | | | |
| | Responsibly uphold and represent the values of the engineering profession, and | | | | | | |
| | be open to professionally informed critical comments. In carrying out his/her professional duties, he/she will also cooperate with qualified professionals in other fields (primarily technical, economic and legal). Identify the shortcomings of the technologies used, the risks of the processes and initiate measures to reduce them. | | | | | | |
| | Monitor legislative, technical, technological and administrative changes in the field. | | | | | | |
| | Directs the work of the personnel assigned to him/her, supervises the operation of machinery and equipment, based on the instructions of the workplace manager. Assesses the efficiency, effectiveness and safety of the work of subordinates. He/she is attentive to promoting the professional development of his/her subordinates, to managing and supporting their efforts in this direction, and to applying the principle of equal access. | | | | | | |
| | The concepts of functional and structural integrity and a coherent system for ensuring | | | | | | |
| | them. Their role in safety and availability. Tools: maintenance, monitoring, inspection | | | | | | |
| | and testing. Ageing processes and effects, ageing management. | | | | | | |
| Short description of the subject | Purpose and system of maintenance. Modern maintenance strategies and techniques | | | | | | |
| content | (condition-based, reliability-centred, risk-based). Optimisation of maintenance. | | | | | | |
| | Purpose and system of periodic inspection. Elements of an effective periodic inspection | | | | | | |
| | (performance, risk aspects). The role of non-destructive testing in periodic inspection. | | | | | | |
| | Qualification of inspection systems. | | | | | | |
| | Processing of heard text by note-taking and recording of material using own notes and | | | | | | |
| Types of student activities | electronically available notes 80% Development of test questions 20% | | | | | | |
| | Lecture notes in Moodle | | | | | | |
| | Safety of Nuclear Power Plants II (eds.: J. Elter, J. Gadó, E. Holló, I. Lux), ELTE Eötvös Kiadó, Budapest, 2013 | | | | | | |
| Dequired literature and contact datails | • Gyula Csom:Nuclear Power Plant Operation I Fundamentals of Reactor | | | | | | |
| Required literature and contact details | Physics and Technology (Technical University of Budapest, 1997) | | | | | | |
| | Gyula Csom:Nuclear Power Plants Operation II/1 - Operation of Energetic Nuclear Reactors (Műegyetemi Kiadó, Budapest, 2005) By: Operational knowledge (University of Dunaújváros, university note, in progress) | | | | | | |
| | Zoltán Szatmáry: Introduction to Reactor Physics, (Akadémiai Kiadó, Budapest, 2000) | | | | | | |
| | Duderstadt, J and Hamilton, L.: Nuclear Reactor Analyses (Wiley, New York, 1976) | | | | | | |
| Recommended literature and contact | Bell, G. I., and Glasstone, S.: Nuclear Reactor Theory (American Nuclear | | | | | | |
| details | Society, 1970) | | | | | | |
| | Dénes Bódizs:Measurement Techniques for Nuclear Radiation (Typotex, Budapest, 2009) | | | | | | |
| | G. F. Knoll, Radiation Detection and Measurement, 3rd Edition (John Wiley & Sons, Inc., 2000.) | | | | | | |
| Description of tasks to be | • | | | | | | |
| submitted/measurement reports | | | | | | | |
| Description and timetable of the | | | | | | | |
| workshops | | | | | | | |

| Equipm | ents of N | Nuclear | Powe | er Plants | | | | | | | | |
|--|------------------|----------------------|---------|--|---|--|---|---|--|-----------------------|--|--|
| Name of t | he subject | in Hungar | | Atomerőmű | | Level Code | BSc | | | | | |
| | - | in English | 1 | Equipments | DUEN(L)-MGT-152 | | | | | | | |
| | ole educatio | | | Institute of [| Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | | |
| Name of a DUEN(L) | compulsory | prior learn | ning | | | | | 1 | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education | | |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | 1 5 | per week per term | 0 | Е | 5 | english | | |
| Teacher re | esponsible f | | ject | Name | | Péter Tram | pus, Ph | D | schedule | Professor emeritus | | |
| Training objective and justification of the course (content, output, location in the curriculum) | | | | Goals, development objectives After completing the subject, the student should know the engineering technology systems and equipment of the pressurized water nuclear power plant, the task, structure and operation of the main equipment. In possession of this knowledge, he should be able to perform independent engineering or management and coordination work in the design, operation, maintenance and inspection of equipment. | | | | | | | | |
| Б · 1 1 | 1 | | | Presentation Practice | Lecture | s with black | kboard a | and projector. | | | | |
| Typical de | elivery met | hods | | Laboratory | Carryin | g out experi | iments a | and calculation | 1. | | | |
| | | | | Other | | | | | | | | |
| Requirements (expressed in terms of learning outcomes) | | | ms of | knowledge i user systems Ability In solving a o It can solv of-the-art kr It is able to technical pro Prepared to native langu Attitude Constantly r energy man open to the use the tools your ability and accurated environmen power plant Publishes hii Autonomy Collaborates well-founde his/her fello a responsib energy, the environmen principles an | for the pl for the pl s and proof problem, re specific nowledge use info oblems. conduct age and i monitors agement use of in: s needed f to provid tal aware technolog <u>s/her opin</u> and resp s with the d profess w student le, well-f problem t, as well ad method | anning and cesses it is able to c technical p acquisition rmation and publication n at least or his work, re and sustain formation te for energy m e accurate a lies the pr ness in solv gies. Publish nions and vi onsibility e instructor ional and ot is to solve ta ounded dec as of energ as present a ds of system | operation organis problem and dat l comm a foreig esults, a esults, a esults, a comment esults, a comm | on of complex se cooperation s in its field ir a collection m unication tech tation and dis <u>on language</u> . und conclusior through conti gy tools. Striv eent and econor r-free problem of energy ergy managem ter results follo <u>hout offending</u> low students cal remarks. A ome situations wased on his magement, and e generations. nking and prob | with expen- an innov ethods. mologies acussions acussions as. Expand nuous lea es to get to mic probl a solving, o efficiency ent tasks. owing his/ g others. to expand as part of a . With his analysis. d the sus The stude olem-solv | | | |
| Short description of the subject content | | | | The main technological systems of the pressurized water nuclear power plant (primary and secondary circuits). Primary circuit equipment: reactor equipment (reactor tank, reactor cover, internal structures), reactor cooling circuit equipment (main circulation line, main circulation pump), pressure control system equipment (volume compensation tank), steam generator, zone failure cooling system equipment, other safety system equipment, primary circuit auxiliary system equipment. Secondary circuit equipment: feed water preheating system equipment, turbine, generator. Condensate system equipment (turbine condenser). Heating element transfer, spent heating element treatment equipment | | | | | | | | |
| Types of s | student acti | vities | | | ng and as naterials 3 | similation o 30% | | pics of presen | | | | |
| Required | literature ar | nd contact | details | 1 | | n MOODLI | E | | | | | |
| | | | | | | | | | | | | |

Equipments of Nuclear Power Plants

| Recommended literature and contact details | Atomerőművek üzemtana, II. kötet, Az energetikai reaktorok üzemtana, Budapest, 2012. Zoltán Szatmáry: Introduction to Reactor Physics, (Akadémiai Kiadó, Budapest, 2000) Duderstadt, J and Hamilton, L.: Nuclear Reactor Analyses (Wiley, New York, 1976) Bell, G. I., and Glasstone, S.: Nuclear Reactor Theory (American Nuclear Society, 1970) Csom Gyula, Atomerőművek üzemtana, Műegyetemi Kiadó, Budapest 2005 |
|---|--|
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | |

Industrial knowledge

| Industrial know | <u> </u> | | Le | | | | | ь. | |
|--|----------------------|---------|--|--|---|--|--|---|--|
| Name of the subject | in Hungar | | Üzemtani is | | | Level | BSc | | |
| | in English | | Industrial k | ě. | | Code | DUEN(L)-MGT-213 | | |
| Responsible education Name of compulsory DUEN(L)- | | ing | Institute of | l ecnnolo | gy, Departn | ient of r | Mechanical Er | igineering | and Energy |
| Туре | Presentatio | on | Practice | Practice Laboratory Requirement | | | Credit | Language of education | |
| Full time 150/39 Part time 150/15 | per week per term | 2 10 | per week 0 per week 1 M per term 0 per term 5 M | | | | М | 5 | english |
| Teacher responsible | ect | Name | _ | Gábor Lada | ányi | | schedule | Master instructor | |
| Training objective and justification of the course (content, output, location ir the curriculum) | | | The student in the reactor the links be able to asso | Goals, development objectives The student will understand the basic reactor physics and thermohydraulics processes in the reactor active zone. Understand the factors that influence reactivity. Recognise the links between the technological systems and the behaviour of the active zone. Be able to assess the role of an engineering system in the safety of the active zone. Understand how design and safety analysis are linked through an iterative process. | | | | | |
| Typical delivery met | hods | | Practice Laboratory | | | | and calculation | n. | |
| Requirements (expre learning outcomes) | ssed in tern | ns of | area of engi Knowledge engineering Knowledge the field. Comprehen and probler basic econo materials us Has a basic construction Comprehen machinery, measuring mechanical Has an work to his/her at protection r Comprehen managemen and econom In-depth kr managemen methods of problem-sol Knowledge cost-benefit Understand, elements of components methods of Ability Ability to c system of th Ability to ut discipline in independent | prehensiv neering. of the ge , principle of the ter sive known solving mic, busi ed in eng knowled to technolo sive know power to procedure engineeriting know rea of spe equirement sive know t, environ ics, whice nowledge t of the m analysis. characte f engineerities arry out the technic not the perfit t learning d solve (l background inderstand | neral and sp es, rules, comminology, the veldge of the g and problemess and leg ineering, the dige of the popy, control weldge of the popy, control weldge of the popy, control weldge of the popy, control weldge of the set to cols, mech es, their too ng. The dige of occession weldge of the set weldge of the lean integration of the lean of the lean integration of the lean of th | becific n ntexts a ne most e main em-solv gal rules eir prod procedu he oper anical ols, inst cupation safety, eld of th the ba ection, o ally rela urning, ngineer search a tools o del the s ns, the elated c process lysis of related identifi ical app d to sol | nathematics re- nd procedures important rela- theories in the ring methods. a and tools. Th- uction method es and method res and opera- rating princip equipment and ruments and hal health and sa- e activity. sics, limits a quality assurar ted to the field knowledge ad- ing discipline. nd data collect f business ecc- structure and c design and i computational and process d the discipline sing and evalu- ogies, theories tasks. Ability y routine tech- lication of star- | equired to of natural ationships e field of k Compreh- horough kr ls and con ds of mac ting proce les and s measurin safety and fety at wo and requi- nce, inform d of engine equisition, their onomics a operation of interrelatic and mod esign. | tructural units of the used. Knowledge of g equipment used in fire prevention related rk and environmental rements of logistics, nation technology, law eering. data collection and ethical limitations and and engineering-based of the components and onship of the system lelling principles and |

| | Ability to apply the acquired knowledge in the field of information technology to the solution of problems in the field apply the knowledge and skills acquired in the field Ability to construct basic models of technical systems and processes. Ability to use knowledge in a creative way, using the resources of the workplace effectively. Ability to apply and comply with safety, fire safety and hygiene rules and regulations in the course of his/her work. Ability to apply, orally and in writing, in a professionally appropriate manner, in accordance with the area of competence communicate in his/her mother tongue and al least one foreign language. Ability to apply the technical specifications relating to the operation of mechanical systems, the the principles of setting up and operating machinery and mechanical equipment, and the principles of economic efficiency the economic context. Ability to manage and control technical production processes, taking into account the elements of quality assurance and quality control. Ability to diagnose mechanical breakdowns and to select remedial actions, solve repair technology problems. Attitude It assumes and authentically represents the social role of its profession and its fundamental relationship with the world. Open to professional, technological development and innovation in the field of engineering and innovation in the technical field. strives to make self-learning a means of achieving professional goals. Takes decisions in complex or unexpected decision-making situations, taking full account of legal and ethical standards. Seek to solve problems, preferably in cooperation. Prosesses sufficient stamina and tolerance of monotony to carry out practical activities have the ability to perform tasks with. Open to the use of information technology tools and has a good knowledge and application of software in the field of engineering, with at least one such program at a proficiency Vevel. Open and receptive to the application of new, modern and innovative practices and operat |
|---|---|
| | methods related to organic farming and health awareness. Applies his/her acquired technical knowledge to gain a better understanding of |
| | observable phenomena and to describe and explain their laws. In the course of his/her work, he/she shall apply the relevant safety, health, |
| | environmental and quality assurance and control requirements. |
| | Autonomy and responsibility |
| Short description of the subject content | Beam decay, NAA. Basic concepts in reactor physics: transport equation, diffusion approximation, cross section, neutron spectrum, reactivity coefficients. Moderation. Inherent safety. Reactor physics framework parameters and their derivation. Charge design. Zone thermohydraulics: heat conduction from fuel to moderator, DNBR. RIA analyses flow. Fuel behaviour. Relationship between framework parameters-safety analyses-technical design. Manoeuvring: reactor control modes, rod, boric acid, steam generator, Xe process. In-core, ex-core measurements. |
| Types of student activities | Laboratory and simulator exercises |
| Required literature and contact details | Gábor Pór:Nuclear Energy Basics textbook Materials on MOODLE International Atomic Energy Agency textbook, <u>https://www-pub.iaea.org/MTCD/Publications/PDF/P082_scr.pdf</u> Gyula Csom:Nuclear Power Plant Operation I Fundamentals of Reactor Physics and Technology (Technical University of Budapest, 1997) Gyula Csom:Nuclear Power Plants Operation II/1 - Operation of Energetic Nuclear Reactors (Műegyetemi Kiadó, Budapest, 2005) By: Operational knowledge (University of Dunaújváros, university note, in progress) |
| Recommended literature and contact details | Zoltán Szatmáry: Introduction to Reactor Physics, (Akadémiai Kiadó Budapest, 2000) Duderstadt, J and Hamilton, L.: Nuclear Reactor Analyses (Wiley, New York, 1976) Bell, G. I., and Glasstone, S.: Nuclear Reactor Theory (American Nuclear Society, 1970) |

| | Dénes Bódizs:Measurement Techniques for Nuclear Radiation (Typotex, Budapest, 2009) G. F. Knoll, Radiation Detection and Measurement, 3rd Edition (John Wiley & Sons, Inc., 2000.) |
|---|---|
| Description of tasks to be submitted/measurement reports | |
| Description and timetable of the workshops | As announced in the first session |

Operation and maintenance practice

| Name of the subject in English Operation and maintenance practice Code | BSc DUEN(L)-MGT-214 and Energy | | | | | | |
|---|---|--|--|--|--|--|--|
| In English Operation and maintenance practice Code Responsible educational unit Institute of Technology, Department of Mechanical Engineering | | | | | | | |
| | and Energy | | | | | | |
| Name of compulsory prior learning | Institute of Technology, Department of Mechanical Engineering and Energy | | | | | | |
| DUEN(L)- | | | | | | | |
| Type Presentation Practice Laboratory Requirement Credit | Language of education | | | | | | |
| Full time150/39per week0per week0per week3Part time150/15per term0per term0per term15 | english | | | | | | |
| Teacher responsible for the subject Name János Kuti schedule | Master instructor | | | | | | |
| Training objective and justification of Goals, development objectives | | | | | | | |
| the course (content, output, location in After completing the exercise, the student will have a d | | | | | | | |
| the curriculum) understanding of the structure, design and operation of a nuclear | power plant. | | | | | | |
| Presentation Lectures with blackboard and projector. Practice | | | | | | | |
| Laboratory Carrying out experiments and calculation. | Laboratory Carrying out experiments and calculation. | | | | | | |
| Other | | | | | | | |
| Knowledge Have a comprehensive knowledge of the basic facts, directions an | d limits of the subject | | | | | | |
| area of engineering. Knowledge of the general and specific mathematics required to o | operate in the field of | | | | | | |
| engineering, principles, rules, contexts and procedures of natural | | | | | | | |
| Knowledge of the terminology, the most important relationships a | | | | | | | |
| the field. Comprehensive knowledge of the main theories in the field of k | nowledge acquisition | | | | | | |
| and problem solving and problem-solving methods. Comprehe | ensive knowledge of | | | | | | |
| basic economic, business and legal rules and tools. Thorough kn | | | | | | | |
| | materials used in engineering, their production methods and conditions of use. Has a basic knowledge of the principles and methods of machine design, machine | | | | | | |
| construction technology, control procedures and operating process | construction technology, control procedures and operating processes. | | | | | | |
| | Comprehensive knowledge of the operating principles and structural units of the | | | | | | |
| | machinery, power tools, mechanical equipment and tools used. Knowledge of measuring procedures, their tools, instruments and measuring equipment used in | | | | | | |
| mechanical engineering. | g equipment used in | | | | | | |
| Has an working knowledge of occupational health and safety and | Has an working knowledge of occupational health and safety and fire prevention related | | | | | | |
| protection requirements in the field of the activity. | to his/her area of specialisation, safety, health and safety at work and environmental protection requirements in the field of the activity. | | | | | | |
| Comprehensive knowledge of the basics, limits and requir | | | | | | | |
| Requirements (expressed in terms of and economics, which are integrally related to the field of engine | management, environmental protection, quality assurance, information technology, law and economics, which are integrally related to the field of engineering. | | | | | | |
| learning outcomes) In-depth knowledge of the learning, knowledge acquisition, | In-depth knowledge of the learning, knowledge acquisition, data collection and | | | | | | |
| | management of the mechanical engineering discipline. | | | | | | |
| problem-solving techniques. | methods of learning, learning, research and data collection, their ethical limitations and problem-solving techniques | | | | | | |
| | Knowledge of the methods and tools of business economics and engineering-based | | | | | | |
| cost-benefit analysis. | cost-benefit analysis. | | | | | | |
| | Understand, characterise and model the structure and operation of the components and elements of engineering systems, the design and interrelationship of the system | | | | | | |
| | elements of engineering systems, the design and interrelationship of the system components used. Apply the related computational and modelling principles and | | | | | | |
| methods of mechanical product, process and process design. | methods of mechanical product, process and process design. | | | | | | |
| | Ability | | | | | | |
| | Ability to carry out a basic analysis of the disciplines that make up the knowledge system of the technical field, to synthesising and evaluating contexts. | | | | | | |
| | Ability to understand the main terminologies, theories and procedures of the technical | | | | | | |
| discipline in the performance of related tasks. Ability to plan, o | discipline in the performance of related tasks. Ability to plan, organise and conduct | | | | | | |
| | independent learning. Ability to identify routine technical problems and to identify, formulate and solve (by the practical application of standard operations) the theoretical | | | | | | |
| and practical background required to solve them. | formulate and solve (by the practical application of standard operations) the theoretical and practical background required to solve them. | | | | | | |
| Ability to understand and use literature specific to his/her fit | Ability to understand and use literature specific to his/her field of specialisation, | | | | | | |
| computing library resources | computing, library resources. | | | | | | |
| | ion tooh 1 · · · · | | | | | | |
| Ability to apply the acquired knowledge in the field of informat solution of problems in the field apply the knowledge and skills | | | | | | | |

| | Ability to use knowledge in a creative way, using the resources of the workplace effectively manage their workplace effectively. Ability to apply and comply with safety, fire safety and hygiene rules and regulations in the course of his/her work. |
|----------------------------------|--|
| | Ability to apply, orally and in writing, in a professionally appropriate manner, in accordance with the area of competence communicate in his/her mother tongue and at |
| | least one foreign language. |
| | Ability to apply the technical specifications relating to the operation of mechanical systems, the the principles of setting up and operating machinery and mechanical |
| | equipment, and the principles of economic efficiency |
| | the economic context. Ability to manage and control technical production processes, taking into account the elements of quality assurance and quality control. |
| | Ability to diagnose mechanical breakdowns and to select remedial actions, solve repair |
| | technology problems. |
| | Attitude It assumes and authentically represents the social role of its profession and its |
| | fundamental relationship with the world. |
| | Open to professional, technological development and innovation in the field of |
| | engineering and innovation in the technical field. strives to make self-learning a means of achieving professional goals. |
| | Takes decisions in complex or unexpected decision-making situations, taking full |
| | account of legal and ethical standards. |
| | Seek to solve problems, preferably in cooperation with others. He/she shall endeavour to pursue continuous and professional development in the field |
| | of mechanical engineering. |
| | in line with his professional goals. |
| | He/she strives to solve problems and make management decisions by listening to the opinion of his/her supervisor, preferably in cooperation. |
| | Possesses sufficient stamina and tolerance of monotony to carry out practical activities |
| | have the ability to perform tasks with. |
| | Open to the use of information technology tools and has a good knowledge and application of software in the field of engineering, with at least one such program at a |
| | proficiency level. |
| | Open and receptive to the application of new, modern and innovative practices and |
| | methods related to organic farming and health awareness. Applies his/her acquired technical knowledge to gain a better understanding of |
| | observable phenomena and to describe and explain their laws. |
| | In the course of his/her work, he/she shall apply the relevant safety, health, environmental and quality assurance and control requirements. |
| | Autonomy and responsibility |
| | In unexpected decision-making situations, independently answer comprehensive, |
| | fundamental professional questions and develop them on the basis of given sources. |
| | Responsibly upholds and represents the values of the engineering profession, is open to open to professionally informed critical comment. |
| | In the performance of his/her professional duties, he/she collaborates with other |
| | professionals (primarily technical and economic and legal). |
| | Identify the shortcomings of the technologies used, the risks of the processes and the initiate mitigating measures. |
| | Monitors the development of legislation, technical, technological and regulatory |
| | developments in the field administrative changes. |
| | Under the guidance of his/her line manager, manages the assigned staff supervises the operation of machinery and equipment. |
| | Assesses the efficiency, effectiveness and effectiveness of the work of subordinates |
| | safety. |
| | He/she takes care to promote the professional development of his/her subordinates and to manage their efforts in this direction and assisting them in their efforts, and applying |
| | the principle of equal access. |
| | Sharing his/her experience with his/her colleagues in order to support their |
| | development. Taking responsibility for the technical analysis, proposals and results of his/her work |
| | the consequences of its decisions. |
| | Familiarisation with the normal operational and design basis processes at Paks. |
| Short description of the subject | Nuclear Power Plant (Paks 1) full-scale simulator and exercise on the analytical simulator. |
| content | Familiarisation with the main equipment of the VVER-440 pressurised water nuclear |
| | power plant and and study of the equipment at the Paks Maintenance Training Centre (Paks 1) |
| Types of student activities | Laboratory and simulator exercises |
| -JE-2 of Stadent additions | |

| Required literature and contact details | Gyula Csom:Nuclear Power Plant Operation I Fundamentals of Reactor Physics and Technology (Technical University of Budapest, 1997) Gyula Csom:Nuclear Power Plants Operation II/1 - Operation of Energetic Nuclear Reactors (Műegyetemi Kiadó, Budapest, 2005) By: Operational knowledge (University of Dunaújváros, university note, in progress) |
|--|--|
| Recommended literature and contact details | Gyula Csom:Nuclear Power Plant Operation I Fundamentals of Reactor Physics and Technology (Technical University of Budapest, 1997) Gyula Csom:Nuclear Power Plants Operation II/1-3 - Operation of Energetic Nuclear Reactors (Műegyetemi Kiadó, Budapest, 2005) Gyula Csom:Operation of Nuclear Power Plants II/4 - Operation of Energetic Nuclear Reactors (Műegyetemi Kiadó, Budapest, 2012) Zoltán Szatmáry: Introduction to Reactor Physics, (Akadémiai Kiadó, Budapest, 2000) Duderstadt, J and Hamilton, L.: Nuclear Reactor Analyses (Wiley, New York, 1976) Bell, G. I., and Glasstone, S.: Nuclear Reactor Theory (American Nuclear Society, 1970) Dénes Bódizs:Measurement Techniques for Nuclear Radiation (Typotex, Budapest, 2009) G. F. Knoll, Radiation Detection and Measurement, 3rd Edition (John Wiley & Sons, Inc., 2000.) |
| Description of tasks to be submitted/measurement reports | As announced in the first session |
| Description and timetable of the workshops | As announced in the first session |

in Hungarian Sugárvédelem és környezetpolitika Level BSc Name of the subject in English Radiation protection and environmental policy Code DUEN(L)-MGT-255 Responsible educational unit Institute of Technology, Department of Mechanical Engineering and Energy Name of compulsory prior learning DUEN(L)-Language of Requirement Credit Туре Presentation Practice Laboratory education 150/39 0 Full time per week per week 2 per week 1 Е 5 english 150/15 10 Part time 5 0 per term per term per term Endre Kiss, PhD Teacher responsible for the subject schedule College professor Name Goals, development objectives Training objective and justification of The goal of radiation protection and environmental policy is to achieve a balance the course (content, output, location in between utilizing radiation for beneficial purposes, such as medical diagnosis and the curriculum) treatment, industrial applications, and energy generation, while minimizing its potential adverse impacts on human health and the environment. Presentation Lectures with blackboard and projector. Practice Typical delivery methods Laboratory Carrying out experiments and calculation. Other Knowledge Have a comprehensive knowledge of the basic facts, trends 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 technical field. You know the terminology, key concepts and theories related to your field. You have a comprehensive knowledge of the main theories and problem-solving methods in your field. Comprehensive knowledge of basic economic, business and legal rules and tools. He/she has a thorough knowledge of the structural materials used in the field of mechanical engineering, the methods of their manufacture and the conditions of their application. Basic knowledge of machine design principles and methods, machine manufacturing technology, control procedures and operating processes. Comprehensive knowledge of the operating principles and structural units of the machinery, power tools, mechanical equipment and tools used. He/she knows the measuring procedures used in mechanical engineering, their instruments, instruments and measuring equipment. He/she knows the expectations and requirements of the occupational safety, fire protection, safety and occupational health areas related to his/her field of specialisation, as well as the relevant environmental protection regulations. Comprehensive knowledge of the basics, limits and requirements of logistics, Requirements (expressed in terms of learning outcomes) management, environmental protection, quality assurance, information technology, law and economics, which are integrally related to the field of engineering. In-depth knowledge of learning, knowledge acquisition, data collection methods, their ethical limitations and problem-solving techniques in mechanical engineering. Knowledge of the methods and tools of business economics and cost-benefit analysis based on technical principles. Ability Ability to analyse at a basic level the disciplines that make up the knowledge base of the technical field, to formulate synthetically the interrelationships and to make adequate evaluations. Ability to apply the most important terminology, theories and procedures of the technical field in the performance of related tasks. Ability to plan, organise and carry out independent learning. Ability to identify routine professional problems, to identify, formulate and solve them (using standard operations in practice) against a theoretical and practical background.

Radiation protection and environmental policy

Ability to understand and use literature, computer and library resources specific to their field. The acquired IT knowledge can be applied to the solution of tasks in the field.

Ability to build basic models of technical systems and processes.

Attitude

| It assumes and authentically represents the social role of its profession and its fundamental relationship with the world. It is open to learning about, embracing and authentically communicating professional, technological development and innovation in engineering. You strive to make your self-training a means to achieve your professional goals. Make decisions in complex or unexpected decision-making situations, taking full account of legal and ethical standards. It tries to solve problems in cooperation with others, where possible. Strive to keep their self-training in mechanical engineering continuous and in line with their professional goals. It strives to solve its tasks and make management decisions by listening to the opinions of the colleagues it manages, preferably in cooperation. You have the stamina and tolerance for monotony needed to carry out practical activities. You are open to the use of IT tools, you strive to learn and use software in the field of mechanical engineering, and you know and use at least one of these programs to a proficient level. Open and receptive to new, modern and innovative practices and methods related to organic farming and health awareness. Using his/her technical knowledge, he/she strives to understand the observable phenomena as thoroughly as possible, to describe and explain their laws. In the course of his/her work, he/she observes and complies with the relevant safety, health, environmental, quality assurance and control requirements. Autonomy and responsibility |
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| In unexpected decision situations, he/she independently thinks through and develops comprehensive, substantiating professional questions on the basis of given sources. Responsibly uphold and represent the values of the engineering profession, and be open to professionally informed critical comments. In carrying out his/her professional duties, he/she will also cooperate with qualified professionals from other fields (primarily technical, economic and legal). Identify the shortcomings of the technologies used, the risks of the processes and initiate measures to reduce them. |
| Monitor legislative, technical, technological and administrative changes in the field. Directs the work of the staff assigned to him/her, supervises the operation of machinery and equipment, based on the instructions of the workplace manager. Assesses the efficiency, effectiveness and safety of the work of subordinates. He/she is attentive to promoting the professional development of his/her subordinates, to managing and supporting their efforts in this direction, and to applying the principle of equal access. He shares his experience with his colleagues, helping them to develop. It takes responsibility for the consequences of its technical analyses, its proposals and its decisions. |
| The main environmental issues of the moment are global warming, carbon dioxide emissions and sequestration, the impact of human activity on global warming, carbon dioxide emissions and ways to reduce global warming. The 3 E harmonisation. Life expectancy and polluting emissions of fossil fuels and nuclear feedstocks. Accounting for renewable energy sources and the significance of their environmental emissions. Energy production options, combined fossil, nuclear and renewable energies, basics of environmental management, environmental policy. Radioactivity and the interaction of different materials, absorption of radiation. Reduction of radiation intensity by different walls, thin film walls. Effects of radiation on the human body, decontamination procedures |
| Processing of heard text by note-taking and recording of material using own notes and electronically available notes 80% Development of test questions 20% |
| Endre Kiss: Environmental protection and energy management (electronic note) Sándor Bisztray-Balku, László Bozóki, László Koblinger: The Development of Radiation Protection in Hungary, Akadémiai Kiadó, 1982 |
| Martin James E: Physics for radioactivity, Wiley-VCM Verlag GMBH, 2013 Nikjoo Mooshang: Interaction of radiation with Matter, Taylor and Francis 2019 |
| |
| Week 7: I final examination Week 12: II final examination Week 13: any paper can be substituted |
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| NPP me | easureme | ents and | NDT | - - | | | | | | |
|--|---|---|--|---|------------|--------------|-----------|---|-------------|-----------------------|
| h Galantian Jan Hungarian | | | ian | Üzemi mérések és anyagvizsgálatok | | | | | | BSc |
| Name of the subject in English | | NPP measu | rements a | nd NDT | | | Code | DUEN(L)-MGT-256 | | |
| Responsible educational unit | | | Institute of | Institute of Technology, Department of Structural Integrity | | | | | | |
| | compulsory | | ning | | | | | | | |
| Туре | | Presentati | on | Practice | | Laboratory | | Requirement | Credit | Language of education |
| Full time Part time | 150/39 150/15 | per week per term | 2 10 | per week per term | | | Е | 5 | english | |
| | esponsible f | 1 | | Name | 5 | Gábor Pór, | | | schedule | Professor emeritus |
| Training objective and justification of the course (content, output, location in the curriculum) | | Goals, development objectives Students learn the modern model-based measurement philosophy, which enables the measurement of reactor parameters that cannot be measured directly, learn about the most important nuclear power plant-specific, primarily primary circuit measurement chains, and get an overview of material testing techniques used in destructive and non- destructive nuclear power plants. | | | | | | | | |
| Typical delivery methods | | | Presentation Practice Laboratory Other | | | | materials | | | |
| Requirements (expressed in terms of learning outcomes) | | | Knowledge Students get to know the primary circuit measurement methods and typical data collection and evaluation systems of nuclear power plants. He knows the measuring tools and methods used in the primary circuit of nuclear power plants. Ability Students are able to set up a suitable measuring device in a nuclear power plant environment, think through its consequences and proper operation, develop the measurement procedure and measurement evaluation Attitude Forms cooperation with his/her group mates and the instructor during the expansion of knowledge. Autonomy and responsibility Able to independently learn nuclear power plant measurement procedures and prepare a study based on international literature, with risk analysis | | | | | | | |
| Short deso content | Neutron flux measurements; Temperature measurements; In-zone neutron detect DPZ transmitters (KNI chains); Pressure measurements; Traffic measurement Vibration measurements. Reactivity coefficients, heating element temperat Measurement philosophy model-based measurements. Nuclear power plant collection systems Hungarian data collector VERONA Human-mac | | | | | | | raffic measurements; element temperature: ar power plant data A. Human-machine new Verona. ALPS or searching for loose | | |
| Types of s | student activ | vities | | Participation | n in lectu | es, preparat | tion of a | in independent | t study bas | sed on literature |
| Required | literature ar | nd contact | details | • IA | AEA relati | ing material | s from i | internet or on l | Moodle | |
| Recomme details | ended literat | ture and co | ontact | IAEA relating materials from internet or on Moodle Xavier E. Gros, Applications of NDT Data Fusion, Publisher Springer New York, Ny, 978-0-7923-7412-1Published: 31 July 2001, Number of PagesXIV, 277 | | | | | | |
| submitted | on of tasks t /measureme on and time | ent reports | | Presentation and study of nuclear power plant systems based on pre-agreed literature: 1 ppt presentation approx. 20 slides and an essay describing it | | | | | | |
| workshop | | | | | | | | | | |

NPP measurements and NDT