

University of Debrecen
Faculty of Engineering

Engineering Management MSc Program

2019

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DEAN'S WELCOME

Welcome to the Faculty of Engineering!

This is an exciting time for you, and I encourage you to take advantage of all that the Faculty of Engineering UD offers you during your bachelor's or master's studies. I hope that your time here will be both academically productive and personally rewarding. Think creatively and be confident.

The Faculty of Engineering of the University of Debrecen is at the forefront of the education and training of engineers in the North-Great-Plain Region of Hungary. It is a dynamically developing Faculty with over 3000 students and a highly-qualified and enthusiastic teaching staff of about 80 members. We offer a great variety of BSc, MSc courses and post-graduate training courses tailored to the needs of the rapidly changing world of engineering and focusing on European and international trends.

In order to optimize the quality of training the Faculty continuously strives to expand the number of industry and educational partners at home and abroad.

The Faculty was awarded the Quality Prize in 2011 by the Ministry of Education in recognition of its efforts in this field.

I wish you every success in your studies and hope to meet you personally in the near future.

With best wishes

Edit Szűcs

Dean

HISTORY OF THE UNIVERSITY

The history of Debrecen's higher education dates back to the 16th century. The Calvinist Reformed College, established in 1538, played a central role in education, teaching in the native language and spreading Hungarian culture in the region as well as in the whole country. The College was a sound base for the Hungarian Royal University, founded in 1912. Apart from the three academic faculties (arts, law, theology) a new faculty, the Faculty of Medicine was established, and the University soon became one of the regional citadels of Hungarian higher education. Today, University of Debrecen is classified as "University of National Excellence" and offers the highest number of academic programs in the country, therefore it is considered to be one of the best universities in Hungary. Its reputation is the result of its quality training, research activities and the numerous training programs in different fields of science and engineering in English. With 14 faculties and a student body of almost 30.000, out of which about 3700 are international students, the University of Debrecen is one of the largest higher education institutions in Hungary.

The history of the Faculty of Engineering dates back to 1965, when the Technical College was established. In 1972 it was renamed Ybl Miklós Polytechnic and in 1995 it became part of Kossuth Lajos University. In 2000 the Faculty of Engineering became part of the integrated University of Debrecen.

In 2005 the Bologna System was introduced which supports the competitiveness of qualifications received at the University of Debrecen against universities all over Europe.

The Faculty of Engineering is practice-oriented and develops skills required for the current needs of the national and international labour market. The teaching staff is involved in numerous domestic and international research and design projects. The recently-opened new building wing with its ultra-modern design hosts several lecture halls, seminar rooms and laboratories equipped with the latest technology. Our students are provided with practical knowledge, training and field practice from numerous prestigious domestic and multi-national industry partners. The internship periods are excellent opportunities for students to experience how theory is put into practice at the most renowned industry representatives and become more successful in the labour market of this highly competitive sector. Students learn how to work in the working environment of multi-national companies and adapt to challenges easily. After graduation they will be able to work at a strategic decision-making level, giving priority to efficiency and engineering ethics.

The Faculty of Engineering offers a great variety of BSc, MSc courses and post-graduate training courses tailored to the needs of the rapidly changing world of engineering and focusing on European and international trends. In 2011 the Faculty of Engineering launched engineering trainings in English. In order to optimize the quality of training, the Faculty continuously strives to expand the number of industrial and educational partners at home and abroad.

The Faculty of Engineering has been a pioneer in the introduction of Quality Management System at faculty level to measure and evaluate the efficiency of its education and

teaching staff in order to improve the quality of education and training from the feedback received.

The Faculty of Engineering has a vivid student life. There is a film club waiting for movie buffs and the door of the Faculty library is always open. The library is not only the host to the latest technical books, exhibitions and tea afternoons with invited speakers, but students can also purchase theatre and concert tickets from the librarians. The Borsos József Dormitory is also a hub of activities for students.

The increasing number of international students brings cultural and ethnic diversity to the faculty.

Our aim is to aid students to become efficient members of the labour market and enrich the world of engineering in Hungary and abroad with their knowledge and expertise.

ADMINISTRATION UNITS FOR INTERNATIONAL PROGRAMMES

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The Coordinating Centre for International Education supports the international degree programmes of the University of Debrecen in giving new students information on admission and entrance exam. It has tasks in promoting and is in charge of tasks like enrolment, study contracts, modifying student status or degree programme, activating student status, modifying students' personal data, requesting and updating student cards, providing certificates for the Immigration Office (for residence permit), issuing student status letters and certificates on credit recognition, concluding health insurance contract and providing Health Insurance Card, helping students with visa process application.

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The International Office has been functioning since 2014 in order to ensure the smooth running of the international degree courses. The office is responsible for student administration (full-time students, full-time transfer students, visiting/Erasmus students), providing certificates for students, considering and accepting requests, solving problems related to course registration, giving information about internship, final exam, thesis, etc.

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Department of Basic Technical Studies
Department of Building Services and Building Engineering
Department of Civil Engineering
Department of Engineering Management and Enterprise
Department of Environmental Engineering
Department of Mechanical Engineering
Department of Mechatronics
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ACADEMIC CALENDAR

General structure of the academic year:

Study period	1 st week	Registration*	1 week
	2 nd – 7 th week	Teaching Block 1	6 weeks
	8 th week	1 st Drawing Week	1 week
	9 th – 14 th week	Teaching Block 2	6 weeks
	15 th week	2 nd Drawing Week	1 week
Exam period	directly after the study period	Exams	7 weeks

*Usually, registration is scheduled for the first week of September in the fall semester, and for the first week of February in the spring semester.

ACADEMIC CALENDAR OF THE FACULTY OF ENGINEERING 2019/2020

Opening ceremony of the academic year	8 September 2019 (Sunday)
Registration week	2-6 September 2019
Revision week (exams in Exam courses may be scheduled during this week)	2-6 September 2019
1st semester study period in MSc and BSc programs	9 September 2019 - 13 December 2019 (14 weeks) In case of finalist courses: 9 September 2019 - 8 November 2019 (9 weeks)
Career Days – “Industry Days in Debrecen 2019” (working days without teaching for Mechanical Eng. BSc, Mechanical Eng. MSc, Environmental Eng. MSc, Mechatronic Eng. BSc, Mechatronic Eng. MSc, Civil Eng. BSc students)	10-11 October 2019

<p><i>7th ISCAME (International Scientific Conference on Advances in Mechanical Engineering)</i></p> <p><i>VII. Exhibition on Mechanical Engineering</i></p> <p>(organised by the Department of Mechanical Engineering)</p>	10-11 October 2019
<p><i>Career Days in Environmental Engineering</i></p> <p>(organised by the Department of Environmental Engineering)</p>	10-11 October 2019
<p><i>Career Days in Mechatronics (exhibition, company presentations)</i></p> <p>(organised by the Department of Mechatronics)</p>	10-11 October 2019
<p><i>“Árkádia” Conference</i> (organised by the Department of Architectural Engineering)</p>	10-11 October 2019
<p><i>“Problem-Based Learning in Engineering Education” Conference</i> (organised by the Department of Basic Technical Studies)</p>	10-11 October 2019
<p>Faculty Conference of Scientific Students’ Association</p>	22 October 2019
<p><i>Career Days in Civil Engineering</i> (organised by the Department of Civil Engineering)</p>	6-8 November 2019
<p>Reporting period I (Drawing week I)</p>	<p>21 - 25 October 2019</p> <p>(5 working days without scheduled lessons, consultation schedule announced previously)</p>
<p>Reporting period II (Drawing week II)</p>	9-13 December 2019

	(5 working days without scheduled lessons, consultation schedule announced previously)
1st semester examination period	16 December 2019 - 31 January 2020 (7 weeks) In case of finalist courses: 11 November - 13 December 2019 (5 weeks)
Thesis (BSc, MSc) submission deadline	As defined by the departments; max. 14 days of the beginning of the final examination period.
Final examination period	As defined by the departments; at least one occasion between 16 December 2019 and 31 January 2020. The departments shall announce the date of the final examination until 15 September 2019.
Registration week	3 - 7 February 2020
2nd semester study period in MSc and BSc programs	10 February - 15 May 2020 (14 weeks) In case of finalist courses: 10 February - 10 April 2020 (9 weeks)
Conferences	
<i>Career Days in Civil Engineering</i> (organised by the Department of Civil Engineering)	7-8 May 2020
International conference entitle " <i>Electrical Engineering and Mechatronics Conference EEMC'20</i> " (organised by the Department of Mechatronics)	7-8 May 2020
<i>Career Days in and Exhibition on Building Services Engineering</i>	7-8 May 2020
Reporting period I (Drawing week I)	23 - 27 March 2020

	(5 working days without scheduled lessons, consultation schedule announced previously)
Reporting period II (Drawing week II)	11 – 15 May 2020 (5 working days without scheduled lessons, consultation schedule announced previously).
2nd semester examination period	18 May - 3 July 2020 (7 weeks) In case of finalist courses: 13 April - 15 May 2020 (5 weeks)
Thesis (BSc, MSc) submission deadline	As defined by the departments; max. 14 days of the beginning of the final examination period.
Final examination period	As defined by the departments; at least one occasion between 11 May 2020 and 26 June 2020. The departments shall announce the date of the final examination until 15 February 2020.

THE ENGINEERING MANAGEMENT MASTER'S PROGRAM

INFORMATION ABOUT THE PROGRAM

Name of master's program:	Engineering Management Master's Program
Specializations available:	<ul style="list-style-type: none">• Industrial Process Engineering Specialization• Material Handling and Logistics• Construction Industry Specialization
Field, branch:	Engineering; Engineering management
Level:	MSc (master)
Qualification:	Engineering Manager
Mode of attendance:	Full-time
Faculty:	Faculty of Engineering
Program coordinator:	Dr Edit Szűcs, Professor
Program length:	4 semesters
Credits total:	120 (Thesis: 30, Optional subjects: 6)

Professional competencies to be acquired

An engineering manager

Knowledge:

- understands the general and specific principles, rules, relations and procedures pertaining to natural sciences, engineering sciences, agricultural science, organisational science necessary to work in the field of engineering.
- knows the functional operation, requirements of engineering devices, production systems.
- knows the conditions, methods of creating and improving economical maintenance.
- knows the operational principles of organisations as purposeful systems.
- knows the engineering-, agriculture- and management-related activities and their relations.
- knows the theory and methodology necessary to found production and service organisations and to control and improve their operation.

- knows the engineering, economic and legal regulations relating to quality management, environmental protection, consumer protection, product responsibility, health and safety at work.
- possesses the widely-used problem-solving techniques necessary for research and scientific work.
- knows the main quantitative analytical methods and the basics of operation research, programming in mathematics, probability theory and statistics in mathematics.

Abilities:

- is capable of the practical application of the acquired knowledge and using problem-solving techniques.
- is able to review production and service processes from engineering, economic, human and other social perspectives and communicate with representatives from different professional fields.
- is able to prepare and realise business plans, complete pre-decision-making tasks and make decisions, work out and implement innovation strategies.
- is capable of the application of integrated knowledge from the following areas: engineering devices, technological processes, materials and technologies, electronics, informatics.
- is able to complete the tasks of engineering value analysis, quality assurance of production systems and technologies, improve the quality and efficiency indicators of economy.
- is able to harmonize the design and implementation of innovation processes.
- is able to harmonize tasks which need multidisciplinary engineering skills and control their realisation.
- is creative, flexible, has good communication, argumentative, cooperative and problem-solving skills.
- is able to apply statistical and econometric devices to deepen research activity.

Attitude:

- is open and sensitive to professional and technological development and innovation and their proactive application.
- identifies with the professional and ethical value system relating to his/her professional field.
- endeavours to design and complete the tasks at a professionally high level individually or in teamwork.
- is characterised by continuous readiness to learn, profound and in-depth education, highly developed analytic and synthetic skills, environmental sensitivity.

- is ethically strong, critical and self-critical.
- is capable of cooperation, teamwork and completing leadership tasks individually followed by the necessary amount of practice.
- shows respect for other people's professional opinion, results.
- is characterised by system-based thinking and approach.

Autonomy and responsibility:

- is capable of solving engineering-economic-like tasks individually.
- is careful before individually making decisions in consultation with representatives from diverse fields (primarily that of engineering, economics, law). He/she takes responsibility for his/her decisions.
- is characterised by initiative, responsibility and decision-making ability.
- when making decisions he/she takes into account health and safety at work; engineering, economic and legal regulations; professional-ethical aspects.
- evaluates his/her inferiors' work, facilitates professional development through his/her critical remarks, educates them to take responsibility and shows ethical behaviour in their professional field.
- is able to individually keep track of technical, technological, economic, financial, legal, social changes, problem-solving techniques, global social and economic processes in relation to his/her professional field.

Specializations

Students select a specialization prior to enrolling on the program. The minimum number of applicants per specialization shall be 10.

Certain subject groups are common for all Engineering Management MSc students (scientific knowledge, economics and humanities, field-specific subjects). The subject group "Differentiated Field-specific Subjects" contains specialized topics and fields.

COMPLETION OF THE ACADEMIC PROGRAM

The Credit System

Majors in the Hungarian Education System have generally been instituted and ruled by the Act of Parliament under the Higher Education Act. The higher education system meets the qualifications of the Bologna Process that defines the qualifications in terms of learning outcomes: statements of what students know and can do on completing their degrees. In describing the cycles, the framework uses the European Credit Transfer and Accumulation System (ECTS).

ECTS was developed as an instrument of improving academic recognition throughout the European Universities by means of effective and general mechanisms. ECTS serves as a model of academic recognition, as it provides greater transparency of study programmes and student achievement. ECTS in no way regulates the content, structure and/or equivalence of study programmes.

Regarding each major the Higher Education Act prescribes which professional fields define a certain training program. It contains the proportion of the subject groups: natural sciences, economics and humanities, subject-related subjects and differentiated field-specific subjects.

For the Engineering Management MSc programme, the following professional fields define the training:

- Natural Sciences (Mathematics, Physics, Chemistry and other subjects, e.g. Quantitative Methods, Mechanics, Ecology, Nanotechnology, Econometry) 20-35 credit points;
- Economics and Humanities (International Management and Economics, Analysis of Competitiveness, Labour Economics, Sustainable Development, Organisational Improvement, Human Resources Management, Communication Skills), other professional skills defined in the curriculum: 10-20 credit points;
- Engineering Management [System Analysis, Design and Control of Systems, Process Control, Technologies in different branches (engineering industry, chemical industry, nanotechnology, biotechnology, waste management), other professional skills defined in the curriculum]: 15-35 credit points.

Credit points assigned to field-specific subjects along with thesis: 40-60.

Minimum of credit points assigned to optional subjects: 6

Credit points assigned to thesis: 30

Credits total: 120

During the program students have to complete a total amount of 120 credit points. It means approximately 30 credits pro semester. The curriculum contains the list of subjects (with credit points) and the recommended order of completing subjects which takes into account the prerequisite(s) of each subject.

There is a certain degree of freedom in the order students can complete the subjects. However, it is recommended that the suggested order be followed because some subjects can only be taken after the completion of the prerequisite subject(s), and/or can be the prerequisites for other subjects. You can find the recommended list of subjects in chapter "Guideline".

Guideline (Lisf of Subjects/Semesters)

The total number of credit points (120) of the training program can be obtained by completing the subjects of the curriculum. There is a certain degree of freedom in the order students can complete the subjects. However, it is recommended that the suggested order be followed because some subjects can only be taken after the completion of the prerequisite subject(s), and/or can be the prerequisites for other subjects.

About the prerequisites of each subject please read the chapter “Course Descriptions”!

The list of subjects one must complete during the semesters according to the model curriculum of Engineering Management MSc programme **Construction Industry specialization**.

1 st semester	2 nd semester
Quantitative Methods	Econometrics
Applied Mathematics in Manufacturing Design	Introduction to Nanotechnology
Development of Organization and Human Resource	Applied Engineering
Advanced Corporate Finance	Advanced Quality Management
Risk and Reliability	Control of Integrated Information System
Energy Conscious Architecture	Building Energetics II
Optional subject I	Complex Project
	Optional subject II
3 rd semester	4 th semester
Negotiation and Conflict Management	Process Simulation
International and Management Accounting	Leadership Competencies Development
Operation Management	Construction Management III
Project Leadership	MSc Thesis II
Reconstruction	
MSc Thesis I	

The list of subjects one must complete during the semesters according to the model curriculum of Engineering Management MSc programme **Industrial Process Engineering specialization**:

1 st semester	2 nd semester
Quantitative Methods	Econometrics
Applied Mathematics in Manufacturing Design	Introduction to Nanotechnology
Development of Organization and Human Resource	
Advanced Corporate Finance	Applied Engineering
Risk and Reliability	Advanced Quality Management
Production Technologies	Control of Integrated Information System
Optional subject I	Cellular Manufacturing
	Complex Project
	Optional subject II
3 rd semester	4 th semester
Negotiation and Conflict Management	Process Simulation
International and Management Accounting	Leadership Competencies Development
Operation Management	
Project Leadership	System Engineering
Advanced Applied Engineering	MSc Thesis II
MSc Thesis I	

The list of subjects one must complete during the semesters according to the model curriculum of Engineering Management MSc programme **Material Handling and Logistics specialization**:

1 st semester	2 nd semester
Quantitative Methods	Econometrics
Applied Mathematics in Manufacturing Design	Introduction to Nanotechnology
Development of Organization and Human Resource	Applied Engineering
Advanced Corporate Finance	Advanced Quality Management
Risk and Reliability	Control of Integrated Information System
Digital Logistics	Advanced Production Logistics
Optional subject I	Complex Project
	Optional subject II
3 rd semester	4 th semester
Negotiation and Conflict Management	Process Simulation
International and Management Accounting	Leadership Competencies Development
Operation Management	System Engineering
Project Leadership	MSc Thesis II
Supply Chain Informatics System	
MSc Thesis I	

Work and Fire Safety Course

According to the Rules and Regulations of the University of Debrecen a student has to complete the online course for work and fire safety. Registration for the course and completion are necessary for graduation. For MSc students the course is only necessary only if BSc diploma has been awarded outside of the University of Debrecen.

Registration in the Neptun system by the subject: MUNKAVEDELEM

Students have to read an online material until the end to get the signature on Neptun for the completion of the course. The link of the online course is available on webpage of the Faculty.

Physical Education

According to the Rules and Regulations of University of Debrecen a student has to complete Physical Education courses at least in one semesters during his/her Master's training. Our University offers a wide range of facilities to complete them. Further information is available from the Sport Centre of the University, its website: <http://sportsci.unideb.hu> or on the webpage of the Faculty: <https://eng.unideb.hu/en/node/214>.

Optional Courses

According to the Rules and Regulations of the University of Debrecen a student has to complete elective courses during his/her Master's training. These elective courses are opened by the Departments at the Faculty of Engineering at the beginning of the actual semester. You can find the list of the actual semester under "Current Students">"Useful Information about your Study">"Optional subjects".

A student can also select optional courses from other faculties of University of Debrecen to complete.

In the Engineering Management MSc programme, you have to gain at least 6 credits by completing elective subjects.

Pre-degree Certification

A pre-degree certificate is issued by the Faculty after completion of the master's (MSc) program. The pre-degree certificate can be issued if the student has successfully completed the study and exam requirements as set out in the curriculum, the requirements relating to Physical Education as set out in Section 10 in Rules and Regulations – with the exception of preparing thesis – and gained the necessary credit points (120). The pre-degree certificate verifies (without any mention of assessment or grades) that the student has fulfilled all the necessary study and exam requirements defined in the curriculum and the requirements for Physical Education. Students who obtained the pre-degree certificate can submit the thesis and take the final exam.

Thesis

Thesis is the creative elaboration of a professional task (fields: engineering processes, finance, economics, marketing, corporate finance, management, quality and environment controlling, production and banking) in written form as defined in the requirements of the training program. By solving the task, the student relies on his/her studies using national and international literature under the guidance of an internal and external supervisor. By preparing and defending thesis students who complete the Engineering Management master's program prove that they are capable of the practical applications of the acquired skills, summarizing the work done and its results in a professional way, creatively solving the tasks related to the topic and doing individual professional work.

Students in the master program must write a thesis as a prerequisite of the final exam. Requirements regarding the content of the thesis, the general aspects of evaluation and the number of credits assigned to it are defined based on the requirements of the program. In case of the Engineering Management Master Program, the number of credits assigned to the thesis is 30.

Thesis topics are announced by the departments until the end of Week 4 of the study period of the last but one semester. The department hands out thesis guides to assist students with preparing their thesis. Students may also offer a topic for the thesis, which the competent head of department may accept or reject. The conditions on the acceptance of a SSS (Student Scientific Society) paper as a degree thesis are defined by the Faculty. SSS papers are supposed to meet the requirements of a thesis both in form and content. Furthermore, it is necessary that the committee of the Pre-SSS make suggestions on the SSS papers to be accepted as theses.

Thesis is prepared under the guidance of an internal supervisor previously approved by the department and with the assistance of an external supervisor also previously approved by the department.

The thesis submission deadline is defined in the academic calendar of the Faculty (issued by the Vice-Rector for Education) or, failing that, the Head of the Department sets the date.

Thesis is evaluated by a reviewer. Based on the review, the internal supervisor makes suggestions for the evaluation of thesis. Finally, the committee assesses it on a five-grade scale. If the reviewer evaluates the thesis firmly as fail, the student may not take the final exam and must create a new thesis. Students must be informed about it. Conditions on resubmitting the thesis are designated by the head of the relevant educational unit responsible for the major or specialization.

Final exam

After obtaining the pre-degree certificate, students conclude their studies in the Engineering Management master's (MSc) program by taking the final exam. The final exam shall test and assess the knowledge, skills and abilities requisite to the award of the degree, whereby students shall also prove their ability to apply the acquired knowledge in practice. The conditions for taking the final exam and the parts of the final exam itself shall be defined in the requirements for the training program (see entry 'Completion of studies'). The final exam shall be taken in front of a board in the examination period following the award of the pre-degree certificate. If a candidate does not pass the final exam until the termination of his/her student status, that student can sit for the final exam any time after the termination of his/her student status according to the provisions regarding the final exam, effective at the time of taking the final exam.

Final exam consists of different parts (as defined in the curriculum):

- thesis defence, answers to possible questions, remarks;
- oral exam: 1: Integrated Management Module: Advanced Corporate Finance, Operation Management, Advanced Quality Management, Project Leadership.

Engineering modules depending on the specialization:

- Oral exam 2: Engineering Module – Industrial Process Engineering Specialization: Production Technologies, Cellular Manufacturing, Advanced Applied Engineering, System Engineering.

- Oral exam 2: Engineering Module – Construction Industry Specialization: Energy-Conscious Architecture, Building Energetics, Reconstruction, Construction Management.
- Oral exam 2: Engineering Module – Material Handling and Logistics Specialization: Advanced Production Logistics, Digital Logistics, Supply Chain Informatics System, System Engineering.

The requirements for the oral part of the final exam and the agenda of the topics with the indication of their literature are announced by the department no later than the last week of the study period. The oral examination shall be assessed on a five-grade scale by the members of the final examination board. The board shall then consult behind closed doors and vote about the final grade for the final exam. In case of equal division of the votes, the chairperson shall be given the casting vote. The result of the final exam shall be announced by the chairperson of the board. Minutes shall be taken during the final examination. The marking scheme contains the diploma grade and the grades awarded for the different parts of the final exam.

Improving failed final exam

If any parts of the final exam are evaluated as fail, according to the existing rules of the university, it can be retaken. The retake of the final exam may be attempted in the following examination period at the earliest.

Final examination board

The chair of the final exam board shall be delegated and by the dean of the faculty. He/she is selected from among the acknowledged internal and external experts of the professional field. The final exam board consists of – besides the chairperson – at least two members and the required number of examiners. The length of the appointment of membership in the final exam board shall be one year. Students are assigned to different examination boards by the department.

COURSE DESCRIPTIONS FOR ENGINEERING MANAGEMENT MSC

The order of subject follows the subject list in the model curriculum above.

Subject group "Science Knowledge" (for all 3 specializations)

Quantitative Methods

Code: MK5KVANA04MX17-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

Graph theory, using graphs; The basic tasks of linear programming, applications; Queue models and inventory models, Basics of probability calculus (probability space, conditional probability, independence of events, random variables, distributions sights, the law of large numbers); Sampling methods, descriptive statistics; Estimates (the estimated properties, point estimates, interval estimates); Non-parametric tests (fit testing, homogeneity, independence test); Parametric tests (Tests for the expected value and the standard deviation); Correlation and regression analysis; Time series analysis; Statistics in quality management (Statistical Process Control, Six Sigma); Simulation, Monte Carlo methods; Decision theory, decision model, decision matrix, decision-making process; Goodness and reliability of business processes

Literature:

Compulsory:

- Rice, J. A. (2007): Mathematical statistics and Data Analysis. Belmont. Thomson's.
- Wolfram, S. (2003): The mathematica book. Champaing. Wolfram Media.

Recommended:

- STATISTICS Methods and Applications:
- <http://www.statsoft.com/textbook>
- Murphy, P.: Introduction to Quantitative Methods:
- <http://www.ucd.ie/statdept/classpages/introductiontoquantitativemet.htm>
- Investopedia (www.investopedia.com) CFA Level 1 - Chapter 2: Quantitative Methods:

- <http://www.investopedia.com/study-guide/cfa-exam/level-1/quantitative-methods/>
- Cornuejols, G. - Trick, M.: Quantitative Methods for the Management Sciences (Course Notes)
- <http://mat.gsia.cmu.edu/classes/QUANT/>

Schedule

1 st week Registration week	
<p>2nd week:</p> <p>Lecture: Types of optimization problems: unconstrained and constrained optimization.</p> <p>Practice: Problems related to optimization.</p> <p>4th week:</p> <p>Lecture: Derivative-free optimization I (genetic algorithms, neural networks).</p> <p>Practice: Problems related to derivative-free optimization.</p> <p>6th week:</p> <p>Lecture: Survey of probability calculus (probability space, random variables, probability distributions, limit theorems)</p> <p>Practice: Problems related to probability calculus.</p>	<p>3rd week:</p> <p>Lecture: Methods of optimization: derivative-based optimization.</p> <p>Practice: Problems related to derivative-based optimization.</p> <p>5th week:</p> <p>Lecture: Derivative-free optimization II (decision trees, clustering). Network optimization.</p> <p>Practice: Problems related to derivative-free optimization.</p> <p>7th week:</p> <p>Lecture: Basics of statistics: point estimation, interval estimation, hypothesis testing</p> <p>Practice: Hypothesis testing.</p>
8 th week: 1 st drawing week	
<p>9th week:</p> <p>Lecture: Normality test, one- and two-factor ANOVA</p> <p>Practice: ANOVA</p> <p>11th week:</p> <p>Lecture: Monte Carlo methods</p> <p>Practice: Process simulation.</p> <p>13th week:</p> <p>Lecture: Time series characteristics. Time series regression.</p>	<p>10th week:</p> <p>Lecture: Basics of decision theory – decision model, decision matrix, decision-making process.</p> <p>Practice: Process simulation</p> <p>12th week:</p> <p>Lecture: Basics of game theory</p> <p>Practice: Problems related to game theory.</p> <p>14th week:</p> <p>Lecture: ARIMA models, Markov chains.</p>

Practice: Problems related to time series.

Practice: Problems related to Markov chains.

15th week: 2nd drawing week

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three occasions during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there are two tests: the mid-term test on the 8th week and the end-term test on the 15th week. Students must sit for the tests.

B, for a grade:

The grade is based on the average grade of the two tests.

The minimum requirement of the mid-term and the end-term test is 60% separately. The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 60, the student once can take a retake test of the whole semester material.

Applied Mathematics in Manufacturing Design

Code: MK5AMTTM04MX18-EN

ECTS Credit Points: 4

Evaluation: exam grade

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 1+2

Topics:

The applied mathematics in manufacturing design course is covered the following topics: Business Forecasting and product lifecycle, time series forecasting, capacity analysis of machine, Models and indicators in production system, inventory design, aggregate planning. At the end of the semester the student should be have a basic understanding of design, and schedule manufacturing system.

Literature:

Compulsory:

- Wayne L. Winston: Operations research: Applications and Algorithm, 4th Edition, Brook/Cole, Canada, 2004, ISBN: 978-0534380588
- William J. Stevenson: Operations management, 13th ed., McGraw-Hill Education - New York, 2018, ISBN 978-125-9921-81-0
- Stephen N. Chapman, J. R. Tony Arnold, Ann K. Gatewood, Lloyd M. Clive: Introduction to Materials Management, 8th. global ed., Pearson New - Jersey, 2016, ISBN: 978-1-292-16235-5

Recommended:

- Steven Nahmias, Tava Lennon Olsen: Production and Operations Analysis, 7th ed., Waveland press, Inc., - Long Grove Illinois, 2015, ISBN 978-1-4786-2306-9

Schedule

1st week Registration week

2nd week:

Lecture: Applied mathematics in manufacturing processes: introduction to production and service operations. Components of demand.

Practice: Knowledge survey – solved problem.

4th week:

Lecture: Introduction to Forecasting. Elements, steps in the forecasting process. Qualitative Forecasts.

Practice: Forecast based on time series data.

6th week:

Lecture: Capacity planning for products and services, waste in the manufacturing.

Practice: Determination of real and theoretical capacity. Bottleneck in process – developing capacity strategies.

8th week: 1st drawing week

9th week:

3rd week:

Lecture: Competitiveness, productivity, model of manufacturing systems.

Practice: Determination of manufacturing system's components. Productivity – problem solving.

5th week:

Lecture: Monitoring forecast error. Choosing a forecasting technique, using forecast information.

Practice: Associative forecasting technique.

7th week:

Lecture: Service level improving. Capacity planning for services.

Practice: Developing capacity strategies for services.

10th week:

Lecture: Basic Economic Order Quantity.

Lecture: Define the term of Inventory, functions of inventories.

Practice: Inventory (stock) control.

11th week:

Lecture: Introduction to Aggregate planning.

Practice: Techniques for Aggregate planning.

13th week:

Lecture: Waiting Lines Management – Implications, goals characteristics.

Practice: Queuing models.

Practice: Deterministic Inventory Models.

12th week:

Lecture: MRP - Inputs of MRP, steps of MRP.

Practice: MRP processing.

14th week:

Lecture: Lean operation – characteristics of lean systems. Building blocks.

Practice: Lean tools.

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practice is compulsory. Students must attend lectures and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

End of the semester the students must write a test for signature. The minimum requirement of the test is 60%. If the score of test is below 60% the student once can take a retake test of the whole semester material until 1st week of the exam period. If the result is 60 % or better the retake test is success.

B, for grade:

B, for a grade:

The course ends in an examination in the exam period.

The grade is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Econometrics

Code: MK5OKONM04MV17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 1+3

Topics:

The objective of this course is to prepare students for basic empirical work in economics. This course aims to make students familiar with the basic concepts of econometric analysis. In particular, the course will be focused on the data analysis, regression analysis, testing, and forecasting. By the end of the course, the student should be able to understand the scope and limitations of classical econometric techniques, read, write and properly interpret articles and reports of an applied econometric nature using these techniques.

Literature:

Compulsory:

- Wooldridge, J. (2013): *Introductory Econometrics: A Modern Approach* Upper Level Economics Titles Series. South-Western Cengage Learning. ISBN: 1111531048, 9781111531041. Fifth Edition.
- Ramanathan, R. (2002): *Introductory econometrics with applications*. Harcourt College Publishers. Fifth Edition. ISBN: 0-03-034342-9.

Recommended:

- Brooks, C. (2008): *Introductory Econometrics for Finance*. Second Edition. Cambridge University Press. ISBN: 1139472305, 9781139472302.
- Dougherty, C. (2011): *Introduction to Econometrics*. Fourth Edition. Oxford University Press. ISBN: 978-0-19-956708-9.

Schedule

1st week Registration week

2nd week:

Lecture: The nature of econometrics and the structure of economic data

Introduction (Types of data, Data sources, The structure of economic data, steps of empirical analysis, econometric model, Mean, Mode, Median, Measures of dispersion)

Practice: Calculating Problems – Computer related problems

4th week:

3rd week:

Lecture: Relationship among variables - Correlation Analysis (Types of correlation, Scatter diagrams, Correlation graph, Pearson's coefficient of correlation, rank correlation)

Practice: Correlation (negative and positive correlation – examples, linear and non-linear correlation, Properties of Pearsonian Correlation Coefficient, Calculations for Coefficient of Correlation.

5th week:

Lecture: Linear Regression – The simple regression model I.

Deriving the Ordinary Least Squares Estimates

Practice: Calculating Problems – Computer related problems. (Dependent – independent variable, error term, fitted values and residuals, Algebraic Properties of OLS Statistics)

6th week:

Lecture: The Expected of the OLS estimators

The Variances of the OLS Estimators - Unbiasedness of OLS

Practice: Calculating Problems – Computer exercises

8th week: 1st drawing week

9th week:

Lecture: Hypotheses Testing: The t Test, Confidence intervals, The F test

Practice: Calculating Problems – Computer related problems. (Confidence intervals, F and t statistics)

11th week:

Lecture: Non-linear regression model II

Practice: Functional forms - exponential, hyperbolic, polynomial model

13th week:

Lecture: Multiple regression analysis II - estimation

Practice: The Model with k Independent Variables – computer related problem

15th week: 2nd drawing week

Lecture: Linear Regression – The simple regression model II. - Goodness of Fit

Practice: Calculating Problems - total sum of squares (SST), the explained sum of squares (SSE), and the residual sum of squares (SSR), R-squared of the regression.

7th week:

Lecture: Estimating the Error variance; (Variances of the OLS Estimators, Heteroskedasticity, homoskedasticity)

Practice: Sampling Variances of the OLS Estimators, Case study analysis

10th week:

Lecture: Nonlinear regression model I - Linearization

Practice: The linearized regression - Logarithmic Functional Forms; Quadratic function, The double logarithmic functions

12th week:

Lecture: Multiple regression analysis I - estimation

Practice: The Model with Two Independent Variables (Obtaining the OLS Estimates, Interpreting the OLS Regression Equation - interpreting of the coefficients)

14th week:

Lecture: Time series data analysis (The nature of time series data, Time series regression models, index numbers)

Practice: Computer related problems – Complex model problem (estimation of time series regression model)

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three occasions during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there are two tests: the mid-term test on the 8th week and the end-term test on the 15th week. Students must sit for the tests.

B, for a grade:

The course ends in an examination.

The minimum requirement of the mid-term, the end-term test and the teamwork is 50% separately. Based on the score of the tests separately, the grade for the tests and the examination is given according to the following table:

The grade is given according to the following: 0-49 = fail; 50-62 = pass (2); 63-75 = satisfactory (3); 76-89 = good (4); 90-100 = excellent (5).

If the score of any test is below 50, the student once can take a retake test of the whole semester material.

An offered grade: It may be offered for the students if the average of the mid-term test, end-term tests and the teamwork is at least good (4). The offered grade is the average of them.

Introduction to Nanotechnology

Code: MK5NANOM04MX17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 1+2

Topics:

The chemistry and physics nanotechnology importance of two aspects may take: structure for the operation of chemical nanotechnology devices, respectively, development of physical methods and onset of nanotechnology tools and processes chemical, physical, physical-chemical interactions. The aim of this course is describing the importance of nanotechnology in practice and the role of chemistry and physics in development of nanotechnology.

Literature:

Compulsory:

- Bharat Bhushan (ed.): Springer handbook of nanotechnology, (2004) Berlin, New York, Springer-Verlag
- Alain Nouailhat: An Introduction to Nanoscience and Nanotechnology, (2008) WILEY, London
- Duncan Shaw: Introduction to Colloid and Surface Chemistry, (1992) Butterworth-Heinemann, Oxford

Recommended:

- Peter Fratzl, John W.C. Dunlop, Richard Weinkam (ed.): Materials Design Inspired by Nature: Function Through Inner Architecture, (2013), RCS Publishing
- Gabor L. Hornyak, J. J. Moore, H.F. Tibbals, J. Dutta: Fundamentals of Nanotechnology, (2008), CRC Press

Schedule

1 st week Registration week	
2nd week: Lecture: Introduction to the course, Historical perspective of micro and nano-manufacturing technology, advantages and applications of nanotechnology Practice: Ethics and environmental effects of nanotechnology. Safety Education.	3rd week: Lecture: Materials overview, atomic structure, bonding, polymers, electrical characteristics, crystal structures and defects, physical chemistry of solid surfaces Practice: Real crystal structures models building
4th week: Lecture: Physical and chemical properties of materials Introduction to composites materials and their application. Practice: Materials properties modification at different temperatures	5th week: Lecture: Overview of Nano Fabrication Methods: Top-down and bottom-up approaches Practice: Effects of grain size variation
6th week: Lecture: Nanomaterial characterization Observing with electrons Practice: Application of scanning electron microscope, Investigation of nano structures	7th week: Lecture: Characterization techniques, Optical microscopy, Spectrophotometer, AFM, FFM, TEM, X-ray Practice: EDS - Energy Dispersive X-ray Spectroscopy
8th week: 1st drawing week	

9th week:

Lecture: Introduction to Colloid Chemistry Sol-gel processing, applications

Practice: Making of colloid structure

11th week:

Lecture: Introduction to the Rheology of Complex Fluids

Practice: Rheological characterization of Fluids –suspensions, emulsions

13th week:

Lecture: Organic compounds and bio-applications of nano-materials

Practice: Application of bio- and chemi-sensors, Sensor technologies

10th week:

Lecture: Dispersion in physical and chemical systems

Practice: Investigation of colloid structures

12th week:

Lecture: Fundamentals of Electrochemistry

Practice: Industrial Applications, Determination of concentration by conductivity

14th week:

Lecture: Nanomaterial inspired by nature

Practice: Nature tech application

15th week: 2nd drawing week**Requirements****A, for a signature:**

Participation at practice is compulsory. Students must attend lectures and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

End of the semester the students must write a test for signature. The minimum requirement of the test is 60%. If the score of test is below 60% the student once can take a retake test of the whole semester material until 1st week of the exam period. If the result is 60 % or better the retake test is success.

B, for a grade:

The course ends in an examination in the exam period in written.

The grade is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Process Simulation

Code: MK5FOSZM04MX19-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 2nd year, 2nd semester

Prerequisite: Operation Management

Number of teaching hours/week (lecture + practice): 1+2

Topics:

The course provides methods and techniques which are required to analyse, design, implement, automate, and evaluate business processes. The business process simulation is the one of the most important parts of business process management and its related fields. Students are going to learn how to analyse organizational performance from a process's point of view, redesign processes using value-focused techniques, design workflows and implement them in BPM systems, simulate new process designs, and carry out process analysis. Furthermore, students are being introduced to process mining and its use with simulation techniques.

Literature:

Compulsory:

- Lecture and practice slides.
- Jakob Freund, Bernd Rücker: *Real-life BPMN: Using BPMN 2.0 to analyse improve and automat processes in your company* (ISBN: 978-1480034983)
- Stephen A. White: *BPMN Modeling and Reference guide: understanding and using BPMN* (ISBN: 978-0-9777527-2-0)
- Wil M.P. van der Aalst: *Process mining – data science in action* (ISBN: 978-3-662-49851-4)
- Wil M.P. van der Aalst: *Process mining and simulation: a match made in heaven!* (<http://www.padsweb.rwth-aachen.de/wvdaalst/publications/p1002.pdf>)
- A. Rozinat et al: *Discovering Simulation Models.* (http://www.processmining.org/media/publications/discsim_is.pdf)

Schedule

1st week Registration week

2nd week:

Lecture: Introduction of Business Process Simulation. (what is process. Software applications, what is simulation)

3rd week:

Lecture: Structure of Business Processes, workflow analysis

Practice: Computer-related practice - Descriptive statistics, revision of different distributions

4th week:

Lecture: BPMS + Workflow analysis

Practice: Computer-related practice - Process modelling with the use of Aura portal, add data to the process model

6th week:

Lecture: Implementation of simulation technique in process improvement

Practice: Computer-related practice - Design as-is and to-be process models

8th week: 1st drawing week

9th week:

Lecture: Process mining – petri nets

Practice: Creating a case event log. Preparing the event log for analysis. Checking event logs against business process models.

11th week:

Lecture: -

Practice: -

13th week:

Lecture: -

Practice: -

15th week: 2nd drawing week

Practice: Computer-related practice - Process Architecture, Basic elements of BPMN 2.0 (tasks, events, operators)

5th week:

Lecture: Simulation with the use of AuraPortal

Practice: Computer-related practice - Identification of bottlenecks, alerts and warnings.

7th week:

Lecture: Introduction to process mining

Practice: Computer-related practice - Setting up a process mining project, getting to know Disco

10th week:

Lecture: Combination of process mining and simulation technique.

Practice: Computer-related practice create a small simulation project related to process mining.

12th week:

Lecture: -

Practice:

14th week:

Lecture: -

Practice: -

Requirements

Participation at practices is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures and practices will be recorded by the lecturer. Being late is equivalent with an absence. In case

of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

B, for a grade:

The course ends in end-term test. The grade for the test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Subject group “Economics and Humanities” (for all 3 specializations)

Development of Organization and Human Resource

Code: MK5SZEMM04MX17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

The aim of this course is describing the organizational changes and the management of organizational development processes, tools and models through processing case studies.

Literature:

Compulsory:

- Mee-Yan Cheung-Judge, Linda Holbeche (2015): Organization Development: A Practitioner's Guide for OD and HR. Kogan Page; 2 edition. ISBN-10: 0749470178
- W. Warner Burke, Debra A. Noumair (2015): Organization Development: A Process of Learning and Changing. Pearson FT Press; 3 edition. ISBN-10: 0133892484
- W. Warner Burke (2013): Organization Change: Theory and Practice (Foundations for Organizational Science series). SAGE Publications, Inc; 4 edition. ISBN-10: 145225723X
- Raymond Noe, John Hollenbeck, Barry Gerhart, Patrick Wright (2013): Fundamentals of Human Resource Management with Connect Plus. McGraw-Hill/Irwin; 5 edition. ISBN-10: 0077801989

- Robert N. Lussier, John R. Hendon (2012): Human Resource Management: Functions, Applications, Skill Development. SAGE Publications, Inc; 1 edition. ISBN-10: 1412992427 Recommended:

Schedule

1st week Registration week	
<p>2nd week: Lecture: Situation analysis, Organizational Structure Determination, job Descriptions, information flow Practice: SWOT, PEST, BCG, Drawing an organization chart and information flow map</p> <p>4th week: Lecture: The designation of specific (quantitative and qualitative) development goals, Appointment of persons involved in organizational development Practice: Ordering tools and methods of intervention points, Assigning tasks</p> <p>6th week: Lecture: Ordering quantitative and qualitative indicators of the planned interventions Practice: SMART method</p>	<p>3rd week: Lecture: Identification of problems, exploring the causes of problems, Appointment of intervention points Practice: Ishikawa and pareto analyses, What you need to improve?</p> <p>5th week: Lecture: Establish a timetable Practice: Gantt chart</p> <p>7th week: Lecture: Planning corrective actions Practice: PDCA cycle</p>
8th week: 1st drawing week	
<p>9th week: Lecture: Human resource management planning system, Strategies, planning, evaluation Practice: Creating a concrete strategy</p> <p>11th week: Lecture: Resource insurance systems, Recruitment, selection, insertion and retraction Practice: Case study, situational tasks</p> <p>13th week:</p>	<p>10th week: Lecture: Job and competence analysis, Elements and analyzes of the job system, Process analysis Practice: Job and competence analysis based on case studies</p> <p>12th week: Lecture: Career management, Lifetime phases, career components Practice: Creating a career plan</p> <p>14th week:</p>

Lecture: Performance Management and Performance Evaluation Systems, Design and strategy of Performance Management

Practice: Case study

Lecture: Staff Development System and employee relations system

Practice: Case study

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there is one test: the end-term test is on the 15th week. Students must sit for the test. The minimum requirement of the test is 60%. If the score of test is below 60% the student once can take a retake test of the whole semester material until 1st week of the exam period. If the result is 60 % or better the retake test is success.

B, for a grade:

The course ends in an examination.

The grade is given according to the following: 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Advanced Corporate Finance

Code: MK5HVLPM04MX17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 1+3

Topics:

Cash flow analysis. Future value of money and present value of money. The relationship between future value and present value. Economic evaluation of investments with identical (different life-times). Investment decision making processes. The value of bonds Project Analysis. Capital investment process; Sensitivity analysis, Option algebra.

Investments and economic rents. The relationship between risk and return. Examination of portfolio risk. Valuation of stocks, Performance measurement and financial decisions, Economic and market value added.

Literature:

Compulsory:

- Brealey, R. A. - Myers, S. C. – Allen, F (2011): Principles of Corporate Finances. McGraw-Hill/Irwin. ISBN: 0077356381, 9780077356385
- Ogden, J. – Jen, F. C. – O’Connor, P. F. (2002): Advanced corporate finance. Prentice Hall. ISBN-10 0130915688

Recommended:

- Scott Besley - Eugene F. Brigham (2011): Principles of Finance. Cengage Learning. ISBN: 1111527369, 9781111527365

Schedule

1st week Registration week

2nd week:

Lecture: Corporate finance investment and financing decisions. The financial goal of the corporation. Future value calculation I.

Practice: Preparatory overview of financial calculation I. Calculation Problems – Cash flow analysis. Future value and present value. Continuous compounding.

4th week:

Lecture: The present value of an investment opportunity. Net Present Value. The opportunity cost of capital. Profitability index.

Practice: Calculation Problems – Net present value.

6th week:

Lecture: Making investment decisions II.

Practice: Calculation Problems – equivalent annual cost- choosing the discount rate, choosing among projects.

3rd week:

Lecture: Review of the future value and present value calculation.

Practice: Preparatory overview of financial calculation II. Calculation exercises: Ordinary annuity and annuity due. Review of the future value and present value calculation. Valuing Cash Flows in Several Periods.

5th week:

Lecture: Net present value and other investment criteria. Making investment decisions I. Investment in Physical Capital and Human Capital.

Practice: Calculation Problems/computer related problems – Internal rate of return, modified IRR, problem of limited resources.

7th week:

Lecture: Investment decisions – economic rent – purchasing decisions, annuities. Complex investment problem - Sensitivity analysis. Interest rates, risk, inflation and present value.

8th week: 1st drawing week

9th week:

Lecture: Valuation of bonds, Duration, volatility. Market value added - Economic value added.

Practice: Price and interest rate, time to maturity, yield to maturity, and yield to call. Calculation Problems (Stocks, financial indicators).

11th week:

Lecture: Portfolio analysis. Portfolio returns and risk. Diversifiable risk and market risk.

Practice: Portfolio analysis – Calculation problems.

13th week:

Lecture: Options II. – Option algebra

Practice: Option strategies – computer related problems (bull, bear call/put spread, call/put butterfly, Call/put straddle options).

15th week: 2nd drawing week

Practice: Calculation Problems, Complex investment problem – computer related problems.

10th week:

Lecture: The Value of Common Stocks, Project analysis I.

Practice: Risk and rates of return, cost of capital. Computer related problems.

12th week:

Lecture: Options I. (Call options, put options). Exercise price. Position and profit diagram.

Practice: Calculation Problems – computer related problems.

14th week:

Lecture: Integrated financial/ investment problems. International investment decisions.

Practice: Computer related problems.

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three occasions during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there are two tests: the mid-term test on the 8th week and the end-term test on the 15th week. Students must sit for the tests.

B, for a grade:

The course ends in an examination.

The minimum requirement of the mid-term, the end-term test and the teamwork is 50% separately. Based on the score of the tests separately, the grade for the tests and the examination is given according to the following table:

The grade is given according to the following (score/grade): 0-49 % = fail (1); 50-62 % = pass (2); 63-75 % = satisfactory (3); 76-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 50, the student once can take a retake test of the whole semester material.

An offered grade: It may be offered for the students if the average of the mid-term test, end-term tests and the teamwork is at least good (4). The offered grade is the average of them.

Negotiation and Conflict Management

Code: MK5TKOMM04MX17-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1st semester

Number of teaching hours/week (lecture + practice): 1+2

Topics:

Negotiation and Conflict Management

Literature:

Miscellaneous articles, clippings and videos of the most recent literature published in the Harvard Business Review

Schedule

1st week Registration week

2nd week:

Lecture: Introduction to the role of communication

Practice: the role of communication in a professional environment, enhancing efficiency of conflict management and negotiations

4th week:

Lecture: Communication in a multi-lingual, multi-cultural professional environment II.

3rd week:

Lecture: Communication in a multi-lingual, multi-cultural professional environment I.

Practice: cross-cultural understanding, rules of etiquette, verbal and non-verbal communication

5th week:

Lecture: The importance of the development of communication skills I.

Practice: dos and don'ts in negotiations and conflict management

6th week:

Lecture: Complaining in person and on the phone, sources of conflicts

Practice: complaining, handling complaints

8th week: 1st drawing week

9th week:

Lecture: Handling problems/complaints in person and on the phone

Practice: describing problems, getting solutions, handling misunderstandings

11th week:

Lecture: Speaking to business associates and superiors in a formal, informal or semi-formal situation

Practice: setting the degree of formality, adjusting to the given degree of formality

13th week:

Lecture: Entering negotiations; the rules of bargaining

Practice: getting what you want, give a little-get a little, types of negotiations

15th week: 2nd drawing week

Practice: sources of conflict and misunderstanding in internal communication, external communication

7th week:

Lecture: Complaining in person and on the phone

Practice: complaining, handling complaints

10th week:

Lecture: Complaints and handling complaints in writing

Practice: checking letters of complaints and replies given to letter of complaints

12th week:

Lecture: Types of negotiations and negotiators, Preparing for negotiations

Practice: types of negotiations and what type(s) of negotiators are the most effective, listing and deciding on aims, imperatives, desirables and areas where you can make concessions

14th week:

Lecture: Communicating results, decisions and other follow-up activities after negotiations

Practice: how to close negotiations, verbal and written confirmation of what has been achieved/agreed

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students cannot take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

Attendance is compulsory.

B, for a grade:

Completion of home assignments by deadline.

International and Management Accounting

Code: MK5NVSZM04MX17-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1st semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

This course introduces the students into the fundamentals of managerial accounting – the internal use of accounting information to manage firms, including planning, analysis, and decision-making. The course’s main objective is to equip students with the knowledge and ability to prepare, understand, evaluate, and execute financial and non-financial reports used in business organizations. Managers face several business decisions every day that require the use of financial and non-financial information about products, processes, employees, suppliers, customers, competitors, and resources. These decisions range from evaluating profitability of investment projects to managing product-line portfolios and pricing, from supply chain and customer management to evaluating and motivating employees. For this reason, utilizing relevant information (both financial and non-financial) to make efficient decisions is essential to business organizations and is an important skill for a career in corporate management, business consulting, financial services.

Literature:

Compulsory:

- Kaplan Publishing (2015): ACCA Paper F2 and FIA Diploma in Accounting and Business, Management Accounting (MA/FMA) Complete Text, Kaplan Publishing UK, ISBN: 978-1-78415-441-7
- Study materials provided by the lecturer

Recommended:

- Warren, C. - Reeve, J. – Duchac, J (2015): Financial & Managerial Accounting. Cengage Learning. 13th Edition. ISBN: 130548049X, 9781305480490
- Maher, M. – Stickney, C. – Weil, R. (2011): Managerial Accounting: An Introduction to Concepts. Methods and Uses. Cengage Learning. 11th Edition. ISBN: 1111571260, 9781111571269

Schedule

1st week Registration week

2nd week:

Lecture: The overview of financial accounting. Legal frameworks. The aim of accounting law (IFRS accounting, according to standards. The smallholder's concept. Scope of the Accounting Act. Structure of the Accounting Act. Accounting principles, Accounting obligations. Structure of account classes and their relationships with other account classes. Accounting for specific economic events. Types of accounting documents.

Practice: Accounting of different business events. The content elements of the basic accounting documents of accounting and bookkeeping documents are familiar to them in the context of actual tasks.

4th week:

Lecture: The role and limits of traditional management accounting. Management accounting as the most important constructor element of controlling. Controlling definition, aims and functions within the organization. The place of management accounting in corporate management. Structure of the management accounting information system. The final product of management accounting is the management report. Responsibility principle in management accounting.

Practice: A complex task is solved by using the lessons learned so far and the topics to be studied during the semester, as well as the students to gain insight into the topics to be dealt with during the semester. Planning, control, management, information supply.

3rd week:

Lecture: The annual report (financial statement IFRS). Balance structure, relationship with account classes. Structure of the profit and loss account and its relationship with the account classes.

Practice: For an existing company's financial statements. Understand the balance sheet, the financial statement, the supplementary attachment, the content of the business report.

5th week:

Lecture: Cost Accounting. The purpose of cost calculation. Definition and clarification of cost, expenditure, and expense concepts. Nature and behavior of costs. Accounting Cost, Economic Cost, Normal Cost, Economic and Accounting Profit Relationship. Costs related to continuous operation, functions costs (OPEX). The concept of explicit cost, implicit cost (accountable, non-eligible). Remittance of Costs. Analytic and ledger register of costs.

Practice: The relationship between costs, expenses and expenditures through a concrete example. The identification of costs, expenses and expenditures in the process from procurement to sales. The identification of accounting processes for major processes. Voucher order.

6th week:**5th week:**

Lecture: Cost Consciousness. Definition of cost management. The areas of Cost Planning. Planning of costs, cost allocation, cost calculation, coverage analysis. Interpretation of capacity and cost. The operating of capacity, capacity are his maintenances. Non-controllable resources, flexible controllable resources. Substance (CAPEX) and human (HUMEX) expenditures of investment and development.

Practice: Practical questions of cost management. Practical application of coverage analysis in a numerical example. The contact of the resource and capacity through exercises.

8th week: 1st drawing week**9th week:**

Lecture: Principles of cost calculation: justiceship, emphasis direct costs; consistency; completeness; accruals, correct choice of the project funds. Time horizon of cost calculation. Structure of a possible calculation data sheet. The identification of the direct costs. Cost calculation methods, costing.

Practice: Exercising structure of a possible calculation data sheet. Identifying the elements through practical examples. Determining the value of the self-produced stocks.

11th week:

Lecture: New calculation methods. Information request of the activity-based cost calculation, and its structure. Identifying costing places. Repair option of the effectiveness of the cost allocation.

7th week:

Lecture: Certified and not certified expenses. Relationship between costs and expenditures. Total Cost Procedure, expense result statement according to procedure. Expenses incurred during the period and incurring a period. Possibilities for additional grouping of costs. Accountability, volume relationship, the form of appearance, complexity, classification according to level of responsibility, controllability, and influence ability.

Practice:

Identification of certified and non-certified costs. Analysis of Total Cost and cost procedures. The structure of their information system and their peculiarities.

10th week:

Lecture: Divisor costing (simple, equivalent); complementing costing (global; sorter; activity-based), mixed costing; normative costing. Other traditional cost calculation methods. Connection between the content of the production costs and the outcome. Positive negative stock changes.

Practice: Knowing prime cost calculation through practical examples. Equivalent, simple one stage, multistage, divisor costing examples. Complementing costing examples (global; sorter). Normative costing examples.

12th week:

Lecture: Classification of economic analysis. Grouping criteria's. Time, analytical procedure, scope, status and frequency of the production process, method and content of analysis. Balance sheet, profit and loss statement, cash flow analysis. Creating indicators. Liquidity, asset

Comparison the traditional and activity-based complementing method.

Practice: Practical questions of identifying costing places. Solving several examples with the activity-based cost calculation methods. Comparison the traditional and activity-based complementing method through practical examples.

13th week:

Lecture: Analysis the Balance sheet. Quick Diagnosis Indicators. Liquidity quick ratio, Stability and indebtedness indicator. Analysis status of the assets. The process of converting assets into cash. Liquidity analysis. Vertical analysis options. Vertical indicators of assets and sources. Horizontal indicators. Analysis of profit and loss statement. Categories of the profit and loss and selecting the right projection funds. Analysis of income status. Profitability indicators.

Practice: Analysis of the report of an existing economically active company based on the principles known in the lecture. Analysis the Balance sheet, and the Profit and loss statement.

management, tax treatment, profitability. Comprehensive analysis of economic activity.

Practice: Analysis of the report of an existing economically active company based on the principles known in the lecture

14th week:

Lecture: Efficiency indicators. Yields (Net sales, gross output, value-free production, net production value, value added, and enterprise income funds). Returns indicators. ROCE (rate of return on capital employed), EPS (earnings per share), ROA (return on asset), ROE (return on equity), ROI (return on investment), ROIC (return on invested capital), EBIT (operational / business / profit), EBITDA (EBIT+ amortization). NOPLAT (Net Operating Profit Less Adjusted Taxes).

Practice: Analysis of the report of an existing economically active company based on the principles known in the lecture

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three occasions during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. During the semester there are two tests: the mid-term test on the 7th week and the end-term test on the 14th week. Students must sit for the tests. Solving team tasks on the exercises, pre-published themes for presentation.

B, for a grade:

The course ends in a mid-semester grade based on the average grade of the two tests.

The minimum requirement of the mid-term and the end-term test is 60% separately. The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 60, the student once can take a retake test of the whole semester material.

Leadership Competencies Development

Code: MK5KOMPM04MX17-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 2nd semester

Prerequisite: Negotiation and Conflict Management

Number of teaching hours/week (lecture + practice): 2+2

Topics: Leadership Competencies Development

Literature: Miscellaneous articles, clippings and videos of the most recent literature published in the Harvard Business Review and etc.; sources available at the University Library

Schedule

1st week Registration week

2nd week:

Lecture: Orientation, Leadership theories, a historical overview

Practice: introduction to the course, outline of the material, goals and requirements; Introduction to Leadership styles

4th week:

Lecture: Public speaking and roles of a leader as figurehead

Practice: the basics of public speaking, presentation technique for leaders, functions of a leader as a figurehead, representing and communicating the company and its core values

3rd week:

Lecture: Leadership styles and communication styles Assertive communication and assertive leadership behavior

Practice: the examination of the most typical leadership styles and the accompanying communication styles, assertive vs. aggressive communication, stylistic differences

5th week:

Lecture: Time Management

Practice: the importance of time management at work and outside work; the most popular techniques

6th week:

Lecture: Team building

Practice: collaboration vs. competition, team building; complimentary vs competitive skillset

8th week: 1st drawing week

9th week:

Lecture: Handling conflicts

Practice: describing problems, getting solutions, handling misunderstandings, typical conflicts leaders face, when to intervene and when to stay out

7th week:

Lecture: Motivating colleagues and employees

Practice: extrinsic and intrinsic motivation; motivation techniques and their efficiency

10th week:

Lecture: Strategic thinking and planning; change management and risk assessment

Practice: Strategic thinking and planning; setting long-term and short-term goals, defining mission and articulating vision, how to manage change at work; how to deal with feelings related to change, managing risk

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students cannot take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

Attendance is compulsory.

B, for a grade:

Students are required to participate in in-class discussions, tasks and role play exercises. They are also required to give a training to the others with a partner at an assigned date. The training should be closely related to the theory delivered at the lecture classes.

Subject group "Field-Specific Subjects" (for all 3 specializations)

Applied Engineering

Code: MK5TERMM04M217_EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 1+2

Topics:

The aim of the course is to introduce the students to the basics of Operations Research. During the semester, students are going to learn the basic models and methods which are related to the field of engineering management. Furthermore, students can analyse the results of the optimal solution which is indispensable part of this field. The following topics are covered in the Applied Engineering subject:

- Modelling real-life business situations (identification of objective, constraints, etc...)
- Acquiring the use of MS Excel's Solver Plugin
- Determination of optimal production structure
- Transportation and transshipment problem solving
- Assignment
- Networks
 - o Networks in production and transportation
 - o Project management (Critical Path Method, Project Evaluation and Review Technique, Project Crashing)

Literature:

Compulsory:

- Cliff T. Ragsdale: *Spreadsheet Modeling & Decision Analysis*, 8th edition, 2017, ISBN: 9781305947412
- Wayne L. Winston: *Operations research: Applications and Algorithm*, 4th Edition, Brook/Cole, Canada, 2004, ISBN: 978-0534380588
- George B. Dantzig: *Linear Programming and Extensions*, Princeton University Press, 1998, ISBN: 978-0691059136

Schedule

1st week Registration week

2nd week:

Lecture: Basics of decision making

Practice: Process of decision making

4th week:

Lecture: Simplex method

3rd week:

Lecture: Graphical solution

Practice: Computer related practice – graphical solution of two-variable problems

5th week:

Practice: Simplex method

6th week:

Lecture: Sensitivity analysis

Practice: Computer related practice –
Optimal production structure problems

8th week: 1st drawing week

9th week:

Lecture: Financial problems

Practice: Computer related practice –
Capital Budgeting and Portfolio models

11th week:

Lecture: Transportation and
transshipment problems

Practice: Computer related practice –
Transportation and transshipment
methods

13th week:

Lecture: Project management

Practice: Computer related practice –
CPM, PERT and Project Crashing

15th week: 2nd drawing week

Lecture: Design of an operations research
model by using MS Excel

Practice: Computer related practice –
Model design of two-variable problems.

7th week:

Lecture: Duality

Practice: Computer related practice –
Optimal production structure problems

10th week:

Lecture: Assignment method

Practice: Computer related practice –
Work assignment, Optimal changeover
sequence

12th week:

Lecture: Networks in the production

Practice: Computer related practice –
Generalized network flow problem

14th week:

Lecture: Revision

Practice: Computer related practice –
Solving complex tasks

Requirements

A, for a signature:

Participation at practices is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures and practices will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

B, for a grade:

The course ends in end-term test. The grade for the test is given according to the following table:

Score	Grade
0-59	fail (1)
60-69	pass (2)
70-79	satisfactory (3)
80-89	good (4)
90-100	excellent (5)

C, Etiquette:

A large portion of class time is spent sharing opinions and sharing information. Therefore, it is of utmost importance to communicate with courtesy and professionalism. Professional courtesy includes respecting others' opinions, being courteous and respectful, and working together in the spirit of cooperation. Discussions and assignments will be graded on quality and professionalism. Please refrain from using cell phones or other disruptive electronic devices while attending class, and please silence all sounds made by such devices while class is in session.

D, Use of English:

In accordance with Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for the improper use of English.

Advanced Quality Management

Code: MK5HMINM04MX17-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

The subject contains the advanced concepts of quality management. The aim of the course is students become familiar with the elements, installation, operation and tools of integrated management system. During the subject students can be familiar with seven new methods and quality improvement methods.

Literature:

Compulsory:

- Kim-Soon Ng (2012): Quality Management and Practices. InTech, Chapters published. ISBN 978-953-51-0550-3
- David L. Goetsch, Stanley Davis: Quality management: introduction to total quality management for production, Pearson Prentice Hall, 2013, ISBN 0-13-287097-5, 978-0-13-287097-9
- B. G. Dale: Managing Quality, Wiley-Blackwell, 2007, ISBN 978-1-4051-4279-3

Schedule

1st week Registration week	
<p>2nd week: Lecture: ISO 9000 standards, PDCA, Documentation system, General Requirements, Quality Management Manual Practice: Analyze examples for the ISO 9001:2008</p> <p>4th week: Lecture: MSZ EN ISO 14001:2005, elements and structure Practice: Analyze examples for the MSZ EN ISO 14001:2005</p> <p>6th week: Lecture: ISO 13485:2003, MSZ EN ISO 22000, Elements and Structure Practice: Analyze examples for the ISO 13485:2003 and MSZ EN ISO 22000</p>	<p>3rd week: Lecture: Responsibilities of management, Customer Focus, Quality Policy Practice: Analyze examples for the ISO 9001:2008</p> <p>5th week: Lecture: MSZ 28001:2008, occupational health and safety, elements and structure Practice: Analyze examples for the MSZ 28001:2008</p> <p>7th week: Lecture: MSZ ISO/ICE 15408, ISO/ICE 27001:2005, information safety, elements and structure Practice: Analyze examples for the MSZ ISO/ICE 15408 and ISO/ICE 27001:2005</p>
8th week: 1st drawing week	
<p>9th week: Lecture: Affinity diagrams, charts the relationship between each other, Wood chart, graph matrix Practice: Analyze examples for the methods</p> <p>11th week: Lecture: Arrow diagrams, Gantt diagram Practice: Analyze examples for the methods</p>	<p>10th week: Lecture: Matrix data analysis, decision-making process card program analyst Practice: Analyze examples for the methods</p> <p>12th week: Lecture: Brainstorming, action plan, block diagram, SWOT, FMEA, QFD, why-why,</p>

13th week:

Lecture: Definition of TQM, model of TQM, Principles of TQM

Practice: Case studies

Poka-Yoke, NGT, Multivoting, Logframe matrix

Practice: Analyze examples for the methods, Analyze examples for the methods

14th week:

Lecture: Quality and lean in the manufacturing, Methodologies, effects, tools

Practice: Case studies

15th week: 2nd drawing week**Requirements****A, for a signature:**

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there are two tests: the mid-term test is on the 8th week and the end-term test is on the 15th week. Students must sit for the tests.

B, for a grade:

The course ends in a mid-semester grade based on the average grade of the two tests.

The minimum requirement of the mid-term and the end-term test is 60% separately. The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 60, the student once can take a retake test of the whole semester material.

Operation Management

Code: MK5HTEV204MX17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 2ndyear, 1stsemester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

The course focuses on the advanced aspects of the production and service management. The goal of the course to summary the advanced engineering technique. Emphasis is placed on the practical implementation of recommendations generated from the advanced modelling and system’s understanding gained in the full range of Industrial engineering. The primary goal of the course is to allow students to see the applications of theories in a more realistic and intricate setting to gain a broader view of production and service management.

Literature:

Compulsory:

- Arnold, J. R. Tony; Chapman, Stephen N.; Clive, Lloyd M.: Introduction to Materials Management, Pearson New International Edition Pearson Education 2013
- Ashok D. Belegundu, Tirupathi R. Chandrupatla: Optimization Concepts and Applications in Engineering, (2nd ed.) Cambridge University Press 2011
- William Stevenson: Operations Management (11th ed.) McGraw-Hill 2011

Recommended:

- Hirano, Hiroyuki: JIT Implementation Manual - The Complete Guide to Just-In-Time Manufacturing: Volume 3 - Flow Manufacturing - Multi-Process Operations and Kanban Taylor & Francis, 2009
- Baudin, Michel: Working with Machines: The Nuts and Bolts of Lean Operations with Jidoka Taylor & Francis 2007

Schedule

1st week Registration week	
2nd week: Lecture: Introduction to operation management Practice: Examples, case studies	3rd week: Lecture: Building of Process Management System Practice: Examples, case studies
4th week: Lecture: Production Planning, create Value flow Practice: Examples, case studies	5th week: Lecture: Production control, SPC Practice: Examples, case studies
6th week: Lecture: Inventory Planning Deterministic Models EOQ models	7th week: Lecture: Inventory control: MRP I-II, ERP

Practice: Examples, case studies

Practice: Examples, case studies

8th week: 1st drawing week

9th week:

Lecture: JIT comparison of push and pull systems, MTO-MTS dilemma

Practice: Examples, case studies

11th week:

Lecture: Production process modeling: eEPC –VSM

Practice: Examples, case studies

13th week:

Lecture: Service quality level improving

Practice: Examples, case studies

10th week:

Lecture: OEE – overall equipment efficiency, Capacity analyzing

Practice: Examples, case studies

12th week:

Lecture: Service pool line model

Practice: Examples, case studies

14th week:

Lecture: Service and production development (Six sigma)

Practice: Examples, case studies

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there are two tests: the mid-term test is on the 8th week and the end-term test is on the 14th week. Students must sit for the tests. The minimum requirement of the mid-term and the end-term test is 60% separately. If the score of any test is below 60%, the student once can take a retake test of the whole semester material. If somebody fails then he/she has to write both tests in the 1st week of the exam period again. If the result is 60 % or better the retake test is success.

B, for a grade:

The course ends in an examination.

The grade is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Project Leadership

Code: MK5PROVM04MX17-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1st semester

Number of teaching hours/week (lecture + Seminar): 2+2

Topics:

Project management involves both leading people and managing resources to achieve the intended project outcome. Leadership is often the difference between project success and failure. The objective of this course is to equip students with the concepts, tools and techniques for effective leadership within a project context. Within this context, the course primarily focuses on understanding project management, aligning project management with the organization, project management oversight, projects as capital investments, globalization and resources optimization.

Literature:

Compulsory:

- Pinto K. Jeffrey: Project Management: Achieving Competitive Advantage (Rental Edition), 5/E, 2019
- Madsen, S.: Project Leadership, Routledge, 2016
- Coleman, S.; Macnicol D.: Project Leadership, Gower Publishing, 2015

Recommended:

- Lewis, P.J.: Project Leadership. McGraw-Hill, 2003
- Lord G.R., Maher J. K.: Leadership Information Processing. Linking Perceptions and Performance. Routledge, 1993

Schedule

1st week Registration week

2nd week:

Lecture: Introduction, The Organizational Context

Seminar: Case study

4th week:

3rd week:

Lecture: Project Selection and Portfolio Management

Seminar: Case study

5th week:

Lecture: Leadership vs. Management

Seminar: Case study

6th week:

Lecture: Scope Management

Seminar: Case study

8th week: 1st drawing week

9th week:

Lecture: Risk Management

Seminar: Case study

11th week:

Lecture: Lagging, Crashing and Activity Networks

Seminar: Case study

13th week:

Lecture: Resource Management

Seminar: Case study

15th week: 2nd drawing week

Lecture: Project Leadership

Seminar: Case study

7th week:

Lecture: Project Team, Negotiation

Seminar: Case study

10th week:

Lecture: Cost Estimation and Budgeting

Seminar: Case study

12th week:

Lecture: Agile and Critical Chain

Seminar: Case study

14th week:

Lecture: Project Evaluation

Seminar: Case study

Requirements

A, for signature:

- active, proactive participation on course
- participation in seminars is mandatory. We also expect all students to be present during the lectures.

B, for a grade:

The calculation of the final grade is as follows:

- Exam 50%
- Own project (Excel, Microsoft Project) 50%
- +Individual assignment on lectures 5 %

Risk and Reliability

Code: MK5KOCKM04MX17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

Fundamentals of risk, uncertainty, and reliability. Methods to analyse and quantify the risk of failures, and the reliability of complex systems, including fault tree analysis, reliability block diagrams, probabilistic risk assessment. Introduction to research methods for risk and reliability analysis during the early design stages.

Literature:

Compulsory:

- Mohammad Modarres: Risk Analysis in Engineering: Techniques, Tools and Trends, Taylor & Francis (2006).
- Terje Aven: Quantitative risk assessment: the scientific platform Cambridge, UK; New York: Cambridge University Press, 2011.

Schedule

1st week Registration week	
2nd week: Lecture: Basic concepts and definitions: Risk vs. Reliability, Hazards, Failures, Uncertainty sources Practice: Selection of research project topic	3rd week: Lecture: Traditional design; Safety Factors; Probabilistic Design Practice: Safety factor Measures and reliability block diagram
4th week: Lecture: Reliability engineering; Reliability measures; Reliability block diagrams Practice: Reliability block diagrams	5th week: Lecture: Failure: definitions and modelling (HW vs SW failures; component vs system-level failures) Practice: Select system, list failures & provide example of a failure or reliability
6th week: Lecture: Failure modes and effects analysis (FMEA), Criticality analysis (CA) Practice: Generate FMECA for selected system	7th week: Lecture: Fault Tree Analysis (FTA), Event Tree Analysis (ETA) Practice: Generate FTA for selected system and compare to FMECA results
8th week: 1st drawing week	
9th week: Lecture: Probabilistic Risk Assessment (PRA)	10th week:

Practice: Generate ETA for selected system and compare to FMECA result

11th week:

Lecture: Failure analysis during functional design (FFDM) Design repository

Practice: Use of design repository for selected system

13th week:

Lecture: Cost-benefit analysis (CBA)

Practice: Cost-benefit analysis (CBA)

Lecture: Risk considerations in early design stages

Practice: Analyses of design states

12th week:

Lecture: Functional failure identification and propagation (FFIP)

Practice: Generate FFIP for selected system

14th week:

Lecture: Hazard identification methods , Process hazards checklists , Hazards surveys and analysis Hazard and operability in industry

Practice: Course summary

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at lectures is compulsory. Students must attend lectures and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

The minimum requirement of the mid-term and the end-term test is 60% separately. The first (50 points max) in the 8th, the second (50 points max) in the 14th week. At the end of the semester everybody will get a seminar grade on the basis of the table below: The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 60 point, the student once can take a retake test of the whole semester material. If somebody fails then he/she has to write both tests in the 1st week of the exam period again. If the result is 50 points (50%) or better, then he can take an exam. If somebody has to repeat his midterm tests then his seminar grade can't be better than (2).

B, for a grade:

For their exam everybody will get an exam grade. The final grade will be the average of the seminar and the exam grade. If it is for example (3.5) then the lecturer decides if it is (3) or (4).

Control of Integrated Information System

Code: MK5INFRM04MX17-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 1+3

Topics:

This course aims to make students familiar with the integration of aviation operational information. In particular, the course will be focused on the special information systems applied in Aviation. By the end of the course, the student should be able to comprehensively overview the information systems that are used by the stakeholders in Aviation, their interactions and integrations. The course focuses on the theory and application of the following: System integration principles, system and task analysis, Implementing Safety Management System in Aviation, Airport systems, Airline systems, Air Traffic Control systems, Airline/Airport/Air Traffic control centers, system integration, tasks, layout, resource management, Integrated management systems.

Literature:

Compulsory:

- Massoud Bazargan (2016): Airline Operations and Scheduling, 2nd Edition, ISBN-13: 978-0754679004, ISBN-10: 0754679004.
- Andreas Wittmer, Thomas Bieger, Roland Müller (2011): Aviation Systems: Management of the Integrated Aviation Value Chain, ISBN: 978-3-642-20080-9.

Recommended:

- Thomas L. Seamster, Barbara G. Kanki (2016): Aviation Information Management: from documents to data, ISBN-13: 978-0754619666, ISBN-10: 0754619664.
- Alan J. Stolzer, John J. Goglia (2016): Implementing Safety Management Systems in Aviation, 2nd Edition, ISBN: 978-1-4724-3175-2.

Schedule

1st week Registration week

2nd week:

Lecture: Aviation Operational information: context, structure.

Practice: Case study

3rd week:

Lecture: System integration principles, system and task analysis, system engineering

4th week:

Lecture: Implementing Safety Management System in Aviation, regulatory background, safety culture, risk assessment

Practice: Case study

6th week:

Lecture: Airport systems: Common Used Terminal Equipment (CUTE) Systems; Building Management Systems (BMS), Access Control Systems (ACS), Airport Operation Databases (AODB), Resource Management Systems (RMS)

Practice: Team problems for airport systems

8th week: 1st drawing week

9th week:

Lecture: Airline systems: Navigational Database, Crew Planning, Flight Scheduling, Maintenance Planning, Electronic Flight Plan (EFB)

Practice: Team problems for airline systems

11th week:

Lecture: Air Traffic control systems: Data Recording System, Automatic Terminal Information Service (ATIS), Controller Working Position System, Remote Tower concept

Practice: Team problems for Air Traffic Control systems.

13th week:

Lecture: Airport Control center, system integration, tasks, layout, resource management

Practice: Team and/or individual work presentation

Practice: Case study

5th week:

Lecture: Airport system: Baggage Handling Systems (BHS), Flight Information Display Systems (FIDS), Departure Control Systems (DCS), Weight & Balance Systems.

Practice: Team problems for airport systems

7th week:

Lecture: Airline systems: Global Distribution System (GDS), Airline Reservation System (ARS), Billing Settlement Plan (BSP), Pricing and Revenue Management

Practice: Team problems for airline systems

10th week:

Lecture: Air Traffic control systems: Multi Radar Tracking System (MRS), Flight Data Processing (FDP), Data Communication System (DCMS), Voice Communications System.

Practice: Team problems for Air Traffic Control systems.

12th week:

Lecture: Airline Control center, system integration, tasks, layout, resource management

Practice: Team and/or individual work presentation

14th week:

Lecture: Air Traffic Control center, system integration, tasks, layout, resource management

Practice: Team or individual work presentation

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three occasions during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there are two tests: the mid-term test on the 8th week and the end-term test on the 15th week. Students must sit for the tests.

B, for a grade:

The course ends in an examination.

The minimum requirement of the mid-term, the end-term test and the teamwork is 50% separately. Based on the score of the tests separately, the grade for the tests and the examination is given according to the following table:

The grade is given according to the following (score/grade): 0-49 % = fail (1); 50-62 % = pass (2); 63-75 % = satisfactory (3); 76-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 50, the student once can take a retake test of the whole semester material.

An offered grade:

It may be offered for the students if the average of the mid-term test, end-term tests and the teamwork is at least good (4). The offered grade is the average of them.

MSc Thesis I.

Code: MK5DIP1M09MX17-EN

ECTS Credit Points: 9

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1st semester

Number of teaching hours/week (lecture + practice): 0+3

Topics:

This course is an overview of writing and organizational skills necessary for completion of thesis and submission of articles for publication. Thesis I. course is designed to help MSc

students undertaking a literature research related to the field of Engineering Management. At the completion of this course students should be able to:

Formulate key questions for a review

Organize a literature search; identify, analyse, evaluate relevant sources.

Create evidence tables and summary tables

Rate the scientific quality of each study and the level of evidence for each question.

Literature:

Compulsory:

- Student Success: A Guide to APA 6th ed. Referencing Style
- Cochrane Handbook for Systematic Reviews of Interventions, Chapter 6: Searching for studies.

Schedule

1st week Registration week	
2nd week: Practice: Introduction of literature research	3rd week: Practice: Structure of Literature review, steps and requirements of literature review and thesis.
4th week: Practice: Find a subject and supervisor, read the key articles, make a literature research plan.	5th week: Practice: APA format references, TEST on e-learning system.
6th week: Practice: Using refworks, and Cite and Side	7th week: Practice: Data clearing in excel
8th week: 1st drawing week	
9th week: Practice: Data analysis and visualization.	10th week: Practice: Survey evaluation in excel and Analysis toolpak
11th week: Practice: Structure of presentation	12th week: Practice: Presentation of literature review
13th week: Practice: Presentation of literature review	14th week: Practice: Presentation of literature review
15th week: 2nd drawing week	

Requirements

Participation at practices is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures and practices will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor. At least 80% has to be reached on reference test for signature.

B, for a grade:

The course ends with a literature review submission. Every student has to submit a literature review in field of engineering management. The content of literature review has to meet with the requirements. The literature review will be graded on the following way: Critical thinking, Coherence/Organization, References, Mechanics.

MSc Thesis II

Code: MK5DIP2M21MX17-EN

ECTS Credit Points: 21

Evaluation: mid-semester grade

Year, Semester: 2nd year, 2nd semester

Number of teaching hours/week (lecture + practice): 0+7

Prerequisite: MSc Thesis I

Based on the literature review performed during the Thesis 1. course, the practical part of the MSc thesis has to be carried out under the supervision of the chosen Professor/Teacher. Furthermore, preparation for the final defence (Binding the thesis and creating the PPT presentation) should be made 1 week before the deadline of the thesis submission. In this semester, students have to consult at least once per week with his/her supervisor to present the progress of his/her practical part.

Formal thesis requirements can be found at the Faculty's website:
<https://eng.unideb.hu/en/node/288>

Subject group “Differentiated Field-Specific Subjects” for Construction Industry
specialization

Energy Conscious Architecture

Code: MK5ENTEM04M317-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 1+3

Topics:

Climate and buildings. Principle of energy conscious design. Site planning and analysis.
Basics of heat transfer. Passive houses. Renewable energy.

Literature:

Compulsory:

- Goswami, D. Y. Principles of solar engineering, 3rd edition, CRC Press Taylor & Francis Group, 2015.
- Moss, J. K. Heat and Mass Transfer in Buildings, 2nd edition, Taylor & Francis, 2007.
- Hodge, B. Alternative Energy Systems and Applications, Wiley, 2009.
- Richarz, C. and Schulz, C. Energy efficiency refurbishments, FSC, 2013.
- J.K. Nayak , J.A. Prajapati, Handbook on energy conscious buildings, 2006

Recommended:

- Moss, J. K. Energy Management in Buildings, Taylor & Francis, 2006.
- Littler, J. and Thomas, R. Design with energy The conservation and use of energy in buildings, Cambridge University Press, 2003.
- Al-Shemmeri, T. Energy Audits, Willey-Blackwell, 2011.
- Kalmár, F. Energy conscious heating, Akadémia Kiadó, 2011.

- EPBD recast (<http://eur-lex.europa.eu>)

Schedule

1st week Registration week	
2nd week: Lecture: Climate and buildings. Energy and built environment. Practice: Basic examples of calculation.	3rd week: Lecture: Comfort requirements and physical manifestation for different climates. Practice: Basic examples of calculation.
4th week: Lecture: Principles of energy conscious design. Practice: Basic examples of calculation.	5th week: Lecture: Heat transfer processes. Practice: Basic examples of calculation.
6th week: Lecture: Thermal balance of a building. Practice: Basic examples of calculation.	7th week: Lecture: Energy use for heating and cooling. Practice: Basic examples of calculation.
8th week: 1st drawing week	
9th week: Lecture: Bioclimatic architectural principles. Practice: Basic examples of calculation.	10th week: Lecture: Green buildings, materials used. Practice: Basic examples of calculation.
11th week: Lecture: Nearly zero energy buildings. Practice: Basic examples of calculation.	12th week: Lecture: Passive houses. Practice: Basic examples of calculation.
13th week: Lecture: Energy efficiency refurbishments. Practice: Basic examples of calculation.	14th week: Lecture: Renewable energy technologies for energy efficient buildings. Practice: Basic examples of calculation.
15th week: 2nd drawing week	

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor. During the semester there are

two tests: the mid-term test is on the 7th week and the end-term test is on the 14th week. Students must sit for the tests.

B, for a grade:

The course ends in a midyear grade based on the average grade of the two tests. The minimum requirement of the mid-term and the end-term test is 60% separately. The grade for each test is given according to the following: score/grade: 0-59 fail (1), 60-69 pass (2), 70-79 satisfactory (3), 80-89 good (4), 90-100 excellent (5). If the score of any test is below 60, the student once can take a retake test of the whole semester material.

Building Energetics II

Code: MK5EPE2M04M317-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

Basic knowledge of the following themes: The relations between the energy, the economy, the society and the environment. The basic definitions of the energy management, the systems of the energy supply and the different kinds of converters. The importance of the building energetics, the EPBD directive and the Hungarian regulations. The energy model of the building. The energy performance of the building (method of calculation). The relevant regulations, requirements, rules. Energy performance certification. Improving the energy efficiency of the building and possibilities of reducing the energy need and energy use of the building. District heating and cooling. The nearly zero energy buildings.

Literature:

Compulsory:

- Al-Shemmeri, T. Energy Audits, Willey-Blackwell, 2011.
- EPBD recast (<http://eur-lex.europa.eu>)
- Richarz, C. and Schulz, C. Energy efficiency refurbishments, FSC, 2013.

Recommended:

- Hodge, B. Alternative Energy Systems and Applications, Wiley, 2009.
- Kalmár, F. Energy concious heating, Akadémia Kiadó, 2011.
- Moss, J. K. Energy Management in Buildings, Taylor & Francis, 2006.

- Moss, J. K. Heat and Mass Transfer in Buildings, 2nd edition, Taylor & Francis, 2007.
- Littler, J. and Thomas, R. Design with energy The conservation and use of energy in buildings, Cambridge University Press, 2003.

Schedule

1st week Registration week	
<p>2nd week: Lecture: The relations between the energy, the economy, the society and the environment. The basic definitions of the energy management, the systems of the energy supply and the different kinds of converters Practice: Basic heat transfer calculations</p> <p>4th week: Lecture: The energy model of the building. The energy balance of the building. Components of the energy balance. Practice: Basic heat transfer calculations</p> <p>6th week: Lecture: Net energy need for heating. Summer overheating of a building Practice: Basic examples of calculation</p>	<p>3rd week: Lecture: The importance of the building energetics, the EPBD directive and the Hungarian regulations. The relevant regulations, requirements, rules Practice: Basic heat transfer calculations</p> <p>5th week: Lecture: Degree-day method Practice: Basic examples of calculation</p> <p>7th week: Lecture: Heating primer energy use calculation methods. Practice: Examples of calculation</p>
8th week: 1st drawing week	
<p>9th week: Lecture: Ventilation primer energy use calculation methods. Practice: Basic examples of calculation</p> <p>11th week: Lecture: Refrigeration. Heat pumps. Practice: Basic examples of calculation</p> <p>13th week: Lecture: The nearly zero energy buildings. Energy performance certification. Practice: Basic examples of calculation</p>	<p>10th week: Lecture: Cooling primer energy use calculation methods. Practice: Basic examples of calculation</p> <p>12th week: Lecture: District heating and cooling. Practice: Basic examples of calculation</p> <p>14th week: Lecture: Improving the energy efficiency of the building and possibilities of reducing</p>

the energy need and energy use of the building

Practice: Basic examples of calculation

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

B, for a grade:

During the semester there are two tests: the mid-term test is on the 7th week and the end-term test is on the 14th week. The minimum requirement of the mid-term and the end-term test is 60% separately. If the score for any of the tests is below 60 points, the student can take a retake test of the whole semesters material. Students must sit for the tests. The grade for each test is given according to the following: score/grade: 0-59 fail (1), 60-69 pass (2), 70-79 satisfactory (3), 80-89 good (4), 90-100 excellent (5). The course ends in an exam. The average grade of the two tests represents 50% of the final grade and the other 50% of the grade is from the oral exam.

Complex Project

Codes: MK5KOMPM04M217-EN, MK5KOMPM04M117-EN, MK5KOMPM04M317-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 2ndsemester

Number of teaching hours/week (lecture + practice): 0+4

Topics:

In particular, the course will be focused on the student's ability development to manage complex exercises and implement technical, economic, financial and management tasks so that students are able to make comprehensive, comparative and scientific analysis. The

course is highly interactive with challenging complex problem solving, team work, individual presentation and case studies.

Literature:

Compulsory:

- Hevner et al., Design Science in IS Research, MIS Quarterly Vol. 28 No. 1, pp. 75-105/ March 2004
- Ken Peffers et al., A design Science Research Methodology for Information Systems Research, Journal of Management Information Systems, August 2007, Vol. 24, No. 3, pp. 45-77
- Research Methods for Operations Management: Edition 2, by Christer Karlsson

Schedule

1st week Registration week	
<p>2nd week: Practice: Introduction to Complex Project. Domestic points and goals of Complex Project. Research as a problem solving process. Examples for it.</p> <p>4th week: Practice:Databases for literature study. Search engines and library databases</p> <p>6th week: Practice: Define a research question</p>	<p>3rd week: Practice: Project Log-frame. Design the requirements of project with log-frame.</p> <p>5th week: Practice: Perform literature study. Finding books. Finding journal articles. Selecting keywords</p> <p>7th week: Practice: Research Design – meta process, Conceptualization, Operationalization, and Measurement</p>
8th week: 1st drawing week: Mid-term test	
<p>9th week: Practice: Structures of artefact. Artefact is built.</p> <p>11th week: Practice: Data collecting methods, Data processing methods, Data analysis</p> <p>13th week: Practice: Report creation out of the project. Wrap up of Complex Project.</p>	<p>10th week: Practice: Data collecting methods, Data processing methods, Data analysis.</p> <p>12th week: Practice: Data collecting methods, Data processing methods, Data analysis</p> <p>14th week: Practice: Evaluation of submitted research paper</p>

15th week: 2nd drawing week: Research paper presentations (Presentation of Complex project and discussion)

Requirements

A, for a signature:

Participation at practice is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at practice will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practices must be made up for at a later date, being discussed with the tutor.

B, for a grade:

During the semester research paper is written. The research paper consists of literature study and case study. By the end of the semester the research paper is presented by the students. The course ends in end-semester grade. The grade is calculated as

- 50% from mid-term test
- 25% from submitted paper.
- 25% from presentation of the project

The minimum requirement for passing is 60%, the grade for the final mark is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Reconstruction

Code: MK5REKOM04M317-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1st semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

During the semester students are familiar with the whole process (steps, phases) of the building reconstruction.

Literature:

Compulsory:

- Edward Allen, Joseph Iano (2013): Fundamentals of Building Construction: Materials and Methods. Wiley; 6 edition. ISBN-10: 1118138910

- Madan L Mehta, Walter Scarborough, Diane Armpriest (2012): Building Construction: Principles, Materials, & Systems. Pearson; 2 edition. ISBN-10: 0132148692
- Francis D. K. Ching (2014): Building Construction Illustrated. Wiley; 5 edition. ISBN-10: 1118458346 *Recommended:*

Schedule

1st week Registration week	
2nd week: Lecture: Status survey I. Practice: On-site visual inspection, material sampling 4th week: Lecture: Analysis, structural analysis Practice: Collection of structural errors 6th week: Lecture: Examination of external structural elements II. Practice: Main wall, pillars	3rd week: Lecture: Status survey II. Practice: Making of documents, photographs, site plan, floor plan 5th week: Lecture: Examination of external structural elements I. Practice: Plinth, pattern, cellar 7th week: Lecture: Structure analysis Practice: Slab, roofing
8th week: 1st drawing week	
9th week: Lecture: Examination of internal structural elements I. Practice: Main wall, pillars, column, beam 11th week: Lecture: Examination of internal structural elements III. Practice: Examination of partition walls and masonry walls, substrate, crack, water test 13th week: Lecture: Roof structure examination II. Practice: High roof, beams	10th week: Lecture: Examination of internal structural elements II. Practice: Slab, balcony, internal slab 12th week: Lecture: Roof structure examination I. Practice: Flat roof, water, heat and sound insulation, sloping concrete 14th week: Lecture: Roof structure examination III. Practice: Rafters and roof rails
15th week: 2nd drawing week	

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three practice classes during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

During the semester there is one test: the end-term test is on the 15th week. Students must sit for the test.

B, for a grade:

The course ends in a mid-semester grade based on the one test.

The minimum requirement of the mid-term and the end-term test is 60% separately. The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 60, the student once can take a retake test of the whole semester material.

Construction Management III

Code: MK5EPS3M04M317-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 2nd semester

Prerequisite: Reconstruction

Number of teaching hours/week (lecture + practice): 2+2

Topics:

This course is focusing on various scopes of BIM. Main topics are data standardization and the benefits of model based estimating.

Literature:

Compulsory:

- BIM Forum: Level Of Development Specification. BIM Forum, Digitally printed: 2019 April. 256 pp.

Schedule

1st week Registration week	
2nd week: Lecture: Introduction, BIM overview Practice: Vico Office software demo and intro training	3rd week: Lecture: Level of Development Specification Practice: Database building - LOD
4th week: Lecture: Construction Classification Standards Practice: Database building - Work breakdown structure	5th week: Lecture: 3D planning and quantity takeoff Practice: Database building - Quantification
6th week: Lecture: Model-based cost planning Practice: Cost planning in Vico Office	7th week: Lecture: Model-based schedule planning Practice: Schedule planning in Vico Office
8th week: 1st drawing week	
9th week: Lecture: Virtual construction workflows Practice: Project communication	

Requirements

A, for a signature:

Participation at practice classes is compulsory. Students must attend practice classes and may not miss more than three occasions during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Students can't take part in any practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practice classes must be made up for at a later date, being discussed with the tutor.

B, for a grade:

The course ends in mid-semester grade based on a homework assignment.

The grade is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

In case of fail, students will have a chance to resend the fixed assignment.

Subject group “Differentiated Field-Specific Subjects” for Industrial Process
Engineering specialization

Production Technologies

Code: MK5TERMM04M217-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 1+3

Topics:

The aim of this course is to develop the systematic approach and process-oriented thinking of the students which allows them to select the related technical fields with complex technical equipment design, operation and development. The course is aimed at the integration of systems thinking mainly to the introduction of the use of modern tools and typical process, manufacturing control engineering design tasks.

Literature:

Compulsory:

Mikell P. Groover (2014): Fundamentals of Modern Manufacturing, Danvers, MA, John Wiley & sons, Inc.

Schedule

1st week Registration week

2nd week:

Lecture: Introduction and Basic concepts of Manufacturing

Practice: Laboratory safety, Engineering Materials

4th week:

3rd week:

Lecture: Processing of ceramics and cements

Practice: Handmade technologies of ceramics, Bulk deformation of clay

5th week:

Lecture: Shaping processes in glassworking
Practice: Product design Consideration

6th week:

Lecture: Processing of Polymer Matrix Composites
Practice: Making of carbon fiber reinforced PMC

8th week: 1st drawing week

9th week:

Lecture: Fundamentals of metal casting. Metal casting processes
Practice: Metal casting

11th week:

Lecture: Bulk deformation processes in metalworking
Practice: Sheet metalworking

13th week:

Lecture: Surface processing operations
Practice: Ceramic Coating Process with fired enamel technics

15th week: 2nd drawing week

Lecture: Shaping processes for plastics
Practice: Vacuum forming, Additive technology

7th week:

Lecture: Manufacturing technology of composite materials
Practice: Making of Bio composite structure

10th week:

Lecture: Property-Enhancing operations
Practice: Heat treatment of steel

12th week:

Lecture: Particulate processing
Practice: Materials and products for Powder Metallurgy

14th week:

Lecture: Joining and Assembly Processes
Practice: Soldering, adhesive bonding, mechanical assembly

Requirements

A, for a signature:

Participation at lectures is compulsory. Students must attend lectures and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

The minimum requirement of the mid-term and the end-term test is 60 % separately. At the end of the semester everybody will get a mid-semester grade on the basis of the table below: The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 60 point, the student once can take a retake test of the whole semester material. If somebody fails, then he/she must write both tests in the 1st

week of the exam period again. If the result is 60 % or better the retake test is success. If somebody must repeat his midterm tests, then his grade can't be better than (2).

B, for a grade:

The grade will be the average of the two test's grade. If it is for example (3.5) then the lecturer decides if it is (3) or (4).

Cellular Manufacturing

Code: MK5GYCELM04M217-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 2ndsemester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

In this course, we will cover the following topics: design of different manufacturing systems, design and control of cellular manufacturing systems, and planning and control problems encountered in manufacturing systems. At the end of the semester the students should be have a basic understanding of the design, operation and control of cellular manufacturing systems and be able to use quantitative methods to model, analyze, and optimize such systems.

Literature:

Compulsory:

- N. Singh, D. Rajamani: Cellular Manufacturing Systems: Design, planning and control 1996th Edition ISBN-10: 041255710X
- Nahmias, S. 2004. Production and Operations Analysis. 5th Edition. McGraw Hill/Irwin. ISBN 0-07-241741-2

Schedule

1st week Registration week	
2nd week: Lecture: Introduction to Cellular manufacturing Practice: Case studies	3rd week: Lecture: Types of cellular Practice: Case studies
4th week: Lecture: Intelligent automation	5th week: Lecture: Intelligent automation

<p>Practice: Jidoka Problem Solving</p> <p>6th week:</p> <p>Lecture: Material flow scheduling</p> <p>Practice: Heijunka</p>	<p>Practice: Jidoka tools</p> <p>7th week:</p> <p>Lecture: Production flow analysis</p> <p>Practice: Methods of flow analysis</p>
8th week: 1st drawing week	
<p>9th week:</p> <p>Lecture: Flexible manpower line</p> <p>Practice: Technics of optimizing the number of workers</p>	<p>10th week:</p> <p>Lecture: Standard work</p> <p>Practice: methods of planning standard work</p>
<p>11th week:</p> <p>Lecture: Flexible manufacturing</p> <p>Practice: Control of cellular flexible manufacturing systems</p>	<p>12th week:</p> <p>Lecture: One piece flow</p> <p>Practice: Lot streaming</p>
<p>13th week:</p> <p>Lecture: Multi process handling</p> <p>Practice: Case studies</p>	<p>14th week:</p> <p>Lecture: Combined cellular Manufacturing</p> <p>Practice: Case studies</p>
15th week: 2nd drawing week	

Requirements

A, for a signature:

Participation in practice classes is compulsory. Students must attend practice classes and they do not have more than three absence during the semester. In case a student does so, they will not get a signature for the subject, and they must repeat the course. Students cannot take part in any other practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. Delayed practice classes will be held on a later date, which will be discussed with the professor.

During the semester there are two tests: the mid-term test on the 8th week and the end-term test on the 15th week. Students must take the tests.

B, for a grade:

The course ends up with an exam based on the average result of the two tests.

The minimum requirement of the mid-term and the end-term test is 60% in each test. The grade for each test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

If the score of any test is below 60, the student once can take a retake test of the whole semester material.

Complex Project

Codes: MK5KOMPM04M217-EN, MK5KOMPM04M117-EN, MK5KOMPM04M317-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 0+4

Topics:

In particular, the course will be focused on the student's ability development to manage complex exercises and implement technical, economic, financial and management tasks so that students are able to make comprehensive, comparative and scientific analysis. The course is highly interactive with challenging complex problem solving, team work, individual presentation and case studies.

Literature:

Compulsory:

- Hevner et al., Design Science in IS Research, MIS Quarterly Vol. 28 No. 1, pp. 75-105/ March 2004
- Ken Peffers et al., A design Science Research Methodology for Information Systems Research, Journal of Management Information Systems, August 2007, Vol. 24, No. 3, pp. 45-77
- Research Methods for Operations Management: Edition 2, by Christer Karlsson

Schedule

1st week Registration week

2nd week:

Practice: Introduction to Complex Project. Domestic points and goals of Complex Project. Research as a problem solving process. Examples for it.

4th week:

Practice: Databases for literature study. Search engines and library databases

6th week:

Practice: Define a research question

3rd week:

Practice: Project Log-frame. Design the requirements of project with log-frame.

5th week:

Practice: Perform literature study. Finding books. Finding journal articles. Selecting keywords

7th week:

	Practice: Research Design – meta process, Conceptualization, Operationalization, and Measurement
8th week: 1st drawing week: Mid-term test	
9th week: Practice: Structures of artefact. Artefact is built.	10th week: Practice: Data collecting methods, Data processing methods, Data analysis.
11th week: Practice: Data collecting methods, Data processing methods, Data analysis	12th week: Practice: Data collecting methods, Data processing methods, Data analysis
13th week: Practice: Report creation out of the project. Wrap up of Complex Project.	14th week: Practice: Evaluation of submitted research paper
15th week: 2nd drawing week: Research paper presentations (Presentation of Complex project and discussion)	

Requirements

A, for a signature:

Participation at practice is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at practice will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed practices must be made up for at a later date, being discussed with the tutor.

B, for a grade:

During the semester research paper is written. The research paper consists of literature study and case study. By the end of the semester the research paper is presented by the students. The course ends in end-semester grade. The grade is calculated as

- 50% from mid-term test
- 25% from submitted paper.
- 25% from presentation of the project

The minimum requirement for passing is 60%, the grade for the final mark is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Advanced Applied Engineering

Code: MK5OPERM04M217-EN

ECTS Credit Points: 4

Year, Semester: 2st year, 1nd semester

Evaluation: mid-semester grade

Number of teaching hours/week (lecture + practice): 2+2

Topics:

In the frame of advanced applied engineering students are going to continue their study in the field of operations research. Uncertain feature of real business problems is included, by which students can carry out a complete analysis of a given problem. Important advanced models are discussed, such as multi-objective linear programming, multi-period production planning, facility location problems, etc. At the end of the course a complex project will be given to the students, which relies on the previously acquired material.

Literature:

Compulsory:

- Cliff T. Ragsdale: Spreadsheet Modeling & Decision Analysis, 8th edition, 2017, ISBN: 9781305947412
- Wayne L. Winston: Operations research: Applications and Algorithm, 4th Edition, Brook/Cole, Canada, 2004, ISBN: 978-0534380588
- George B. Dantzig: Linear Programming and Extensions, Princeton University Press, 1998, ISBN: 978-0691059136

Schedule

1 st week Registration week	
2nd week: Lecture: Revision of Applied Engineering course Practice: Computer related practice – Modell creation, sensitivity analysis	3rd week: Lecture: Decision making under uncertainty Practice: Computer related practice – Decision making under uncertainty
4th week: Lecture: Decision making under uncertainty Practice: Computer related practice – Decision making under uncertainty	5th week: Lecture: Multi-objective linear programming Practice: Computer related practice – Multi-objective linear programming
6th week:	7th week:

<p>Lecture: Multi-objective linear programming</p> <p>Practice: Computer related practice – Multi-objective linear programming</p>	<p>Lecture: Deterministic Multi-period programming</p> <p>Practice: Computer related practice – Multi period models for production</p>
8th week: 1st drawing week	
<p>9th week:</p> <p>Lecture: Deterministic Multi-period programming</p> <p>Practice: Computer related practice – Multi period models for production</p>	<p>10th week:</p> <p>Lecture: Queuing theory</p> <p>Practice: Computer related practice – Queuing theory</p>
<p>11th week:</p> <p>Lecture: Facility location design</p> <p>Practice: Computer related practice – Facility location design</p>	<p>12th week:</p> <p>Lecture: Facility location design</p> <p>Practice: Computer related practice – Facility location design</p>
<p>13th week:</p> <p>Lecture: Complex project solving</p> <p>Practice: Complex project solving</p>	<p>14th week:</p> <p>Lecture: Complex project solving</p> <p>Practice: Complex project solving</p>
15th week: 2nd drawing week	

Requirements

A, for a signature:

Participation at practices is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures and practices will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

B, for a grade:

The course ends in end-term test. The grade for the test is given according to the following table:

Score	Grade
0-59	fail (1)
60-69	pass (2)
70-79	satisfactory (3)
80-89	good (4)

90-100

excellent (5)

C, Etiquette:

A large portion of class time is spent sharing opinions and sharing information. Therefore, it is of utmost importance to communicate with courtesy and professionalism. Professional courtesy includes respecting others' opinions, being courteous and respectful, and working together in the spirit of cooperation. Discussions and assignments will be graded on quality and professionalism. Please refrain from using cell phones or other disruptive electronic devices while attending class, and please silence all sounds made by such devices while class is in session.

D, Use of English:

In accordance with Faculty Policy, students may be penalized up to 10% of the marks on all assignments, tests, and examinations for the improper use of English.

System Engineering

Code: MK5RENDM04M217-EN and MK5RENDM04M117-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Prerequisites:

on Industrial Process Engineering specialization: Advanced Applied Engineering

on Material Handling and Logistics specialization: Supply Chain Informatics System

Year, Semester: 2nd year, 2nd semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

This course in systems engineering examines the principles and process of creating effective systems to meet application demands. Concepts, problems, and methods of systems engineering are introduced in lectures and discussions and applied in assignments and through semester-long group projects.

Literature:

Compulsory:

- Kossiakoff, A., Sweet, W. (2003). Systems Engineering Principles and Practice. John Wiley and Sons, Inc: Hoboken, New Jersey. ISBN 0-471- 23443-5

Schedule

1st week Registration week	
2nd week: Lecture: Definition of a system Practice: Case studies	3rd week: Lecture: Structure of a complex system Practice: Fault-tree analysis
4th week: Lecture: The system life cycle Practice: Case studies of Life-cycle cost analysis	5th week: Lecture: Quality function deployment Practice: Different dimensions of QFD
6th week: Lecture: Maintainability Engineering Practice: MTA and RCM tools	7th week: Lecture: Advanced System Quality Planning Practice: The steps and methods of ASQP
8th week: 1st drawing week	
9th week: Lecture: Needs analysis, Risk analysis Practice: VOC investigation, Risk factor calculation and risk reporting	10th week: Lecture: Quality function deployment Practice: Requirements of system
11th week: Lecture: - Practice: -	12th week: Lecture: - Practice: -
13th week: Lecture: - Practice: -	14th week: Lecture: - Practice: -
15th week: 2nd drawing week	

Requirements

Participation at practices is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures and practices will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

B, for a grade:

The course ends in end-term test. The grade for the test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

Subject group “Differentiated Field-Specific Subjects” for Material Handling and Logistics specialization

Digital Logistics

Code: MK5DILOM04M117-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 1st year, 1st semester

Number of teaching hours/week (lecture + practice): 1+3

Topics:

There is widespread recognition among leaders in most industries that the role of digital technology is rapidly shifting, from being a driver of marginal efficiency to an enabler of fundamental innovation and disruption. While it is clear that digital technology will transform most industries, there are a number of challenges that need to be understood and addressed. This course is about the latest developments and trends from the digitalization of business and society affecting logistics during that what is called the Fourth Industrial Revolution.

Focus of the course: effects of digitization on management and technical facilitation of material flows in supply chains.

Literature:

Compulsory:

- Wang, Y.; Pettit, S: E-Logistics, Pearson Education, 2012
- Graham, D.; Manikas, I.; Folinas, D. K.: E-Logistics and E-Supply Chain Management, Eurospan Group, 2013
- Ross, D. F.: Introduction to e-Supply Chain Management, CRC Press, 2002

Recommended:

- Arnold, J. R. Tony; Chapman, Stephen N.; Clive, Lloyd M.: Introduction to Materials Management, Pearson Education, 2014
- Grant, David B.: Logistics Management, Pearson Education, 2012

Schedule

1st week Registration week

2nd week:

Lecture: Key concepts of material handling, logistics and supply chain management – the effects of global business and industry digitization.

Practice: Case study

4th week:

Lecture: Digitalization in purchasing, procurement and inbound logistics.

Practice: Case study

6th week:

Lecture: Distribution - impact of e-commerce on logistics

Practice: Case study

8th week: 1st drawing week**9th week:**

Lecture: Transportation - self driving and autonomous vehicles, e-Fleet management.

Practice: Case study

11th week:

Lecture: Telematics & Telematics Technology, Reverse logistics and circular economy, Workforce and consumers in the Digital Era. Sharing economy or Uberization

Practice: Case study

13th week:

Lecture: Progression of capabilities: supply chain integration and collaboration

Practice: Case study

15th week: 2nd drawing week**3rd week:**

Lecture: The digital transformation of logistics: Threats and opportunities.

Practice: Case study

5th week:

Lecture: Industry 4.0 - Intelligent operations and material management in production logistics and packaging.

Practice: Case study

7th week:

Lecture: Warehousing and inventory management - systems and software.

Practice: Case study

10th week:

Lecture: Case study

Practice: Case study

12th week:

Lecture: Progression of capabilities: functional excellence, Progression of capabilities: enterprise logistics management

Practice: Case study

14th week:

Lecture: IoT, cloud, digital supply chain and machine learning vs boxes-and-materials supply chain - new business models

Practice: Case study

Requirements**A, for a signature:**

- attendance on study trips

- attendance on the prescribed lectures of scientific and trade conferences
- attendance on at least 60% of course lectures

B, for a grade:

- individual or group analysis of a digital logistics case study
- presentation of the case study

Advanced Production Logistics

Code: MK5HTLOM04M117-EN

ECTS Credit Points: 4

Evaluation: exam

Year, Semester: 1st year, 2nd semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

In this course, students are taught different material flow techniques, which can be applied in push and pull logistics system. This course covers these fields: planning line capacity, planning work in process, planning material flow, planning material supply.

Literature:

Compulsory:

- Nahmias, S. 2004. Production and Operations Analysis. 5th Edition. McGraw Hill/Irwin. ISBN 0-07-241741-2
- Askin, R.G. and J.B. Goldberg. 2002. Design and Analysis of Lean Production Systems. John Wiley & Sons Inc. ISBN 0-471-11593-2

Schedule

1st week Registration week	
2nd week:	3rd week:
Lecture: Total Flow Management Model	Lecture: Capacity planning
Practice: Production flow	Practice: Line capacity planning
4th week:	5th week:
Lecture: Push flow	Lecture: Material flow scheduling
Practice: I. MRP II	Practice: Heijunka

<p>6th week: Lecture: Standard work Practice: methods of standard work planning</p>	<p>7th week: Lecture: Inventory in the material flow Practice: Supermarket design</p>
8th week: 1st drawing week	
<p>9th week: Lecture: Inventory in the material flow, Pull flow Practice: Puffer design, MTS planning</p>	<p>10th week: Lecture: Pull flow Practice: MTO planning</p>
<p>11th week: Lecture: Mizusumashi and milk run Practice: Material flow in manufacturing</p>	<p>12th week: Lecture: Techniques of components' supply Practice: Methods of continuous supply</p>
<p>13th week: Lecture: Techniques of components' supply Practice: Methods of continuous supply</p>	<p>14th week: Lecture: Techniques of components' supply Practice: <u>Sequential</u> supply</p>
15th week: 2nd drawing week	

Requirements

A, for a signature:

Participation in practice classes is compulsory. Students must attend practice classes and they do not have more than three absence during the semester. In case a student does so, they will not get a signature for the subject, and they must repeat the course. Students cannot take part in any other practice class with another group. Attendance at practice classes will be recorded by the practice leader. Being late is equivalent with an absence. Delayed practice classes will be held on a later date, which will be discussed with the professor.

During the semester there are two tests: the mid-term test on the 8th week and the end-term test on the 15th week. Students must take the tests.

B, for a grade:

The course ends up with an exam based on the average result of the two tests.

The minimum requirement of the mid-term and the end-term test is 60% in each test. The grade for each test is given according to the following table:

Score	Grade
0-59	fail (1)
60-69	pass (2)
70-79	satisfactory (3)
80-89	good (4)
90-100	excellent (5)

If the score of any test is below 60, the student once can take a retake test of the whole semester material.

Complex Project

Code: MK5KOMPM04M217-EN and MK5KOMPM04M117-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1st semester

Number of teaching hours/week (lecture + practice): 0+4

Topics:

In particular, the course will be focused on the student's ability development to manage complex exercises and implement technical, economic, financial and management tasks so that students are able to make comprehensive, comparative and scientific analysis. The course is highly interactive with challenging complex problem solving, team work, individual presentation and case studies.

The course focuses on the theory and application of the following:

Collection of data; The method of data processing and analysis; evaluation of data, data visualizing, interpretation of results. Strategy planning, performance measurement, handle cost constraints, examination of the change in a complex project environment, strategies for identifying and handling scope creep, risk management planning.

Literature:

Compulsory:

- Brealey, R. A. - Myers, S. C. – Allen, F (2014): Principles of Corporate Finances. 11th Edition. McGraw-Hill/Irwin, 2014. ISBN-13: 9780077151560.
- Ploccak, J. – Remington, K. (2012): Tools for Complex Projects. Gower Publishing, Ltd., 2012. ISBN 1409458725, 9781409458722.

Recommended:

- Wysocki, R. K. (2011): Executive's Guide to Project Management: Organizational Processes and Practices for Supporting Complex Projects. John Wiley & Sons, 2011. ISBN 1118089243, 9781118089248
- Stefano Gatti (2013): Project Finance in Theory and Practice Designing, structuring and financing private and public projects ELSEVIER INC.
- Correia, C. – Flynn, D. K. - Besley – Ulian, E. – Wormald, M. (2012): Financial Management. 6th edition. Juta and Company Ltd. ISBN: 0702171573, 9780702171574.

- Yogesh Kumar Singh (2006): Fundamental Of Research Methodology And Statistics. New Age International, 2006. ISBN 8122418864, 9788122418866.

Schedule

1st week Registration week	
2nd week: Practice: Structure of Construction Investment	3rd week: Practice: documents, plans, permissions Historical
4th week: Practice: Authorization documents	5th week: Practice: Prime contractor selection criteria
6th week: Practice: Building contract and peculiarities	7th week: Practice: Participants in building processes, tasks, responsibilities
8th week: 1st drawing week	
9th week: Practice: Storage, depositing and logistics of building materials	10th week: Practice: Substructure works
11th week: Practice: Structural works	12th week: Practice: Finishing works
13th week: Practice: Area retrieval and protocol	14th week: Practice: Warranty, Own project presentation
15th week: 2nd drawing week	

Requirements

A, for signature:

Participation at practice is compulsory. Student must attend the practices and my not miss more than three practice during the semester. In case a student misses more than three, the subject will not be signed and the student must repeat the course. Student can't make up a practice with another group. The attendance on practice will be recorded by the practice leader. Being late is counted as an absence. In case of further absences, a medical certificate needs to be presented. Missed practices should be made up for at a later date, to be discussed with the tutor. Students are required to bring the necessary utensil (e.g. calculator) for the course with them to each practice. Active participation is evaluated by the teacher in every class. If student's behavior or conduct doesn't meet the requirements of active participation, the teacher may evaluate their participation as an absence due to the lack of active participation in class.

During the semester there are two tests: the mid-term test is in the 7th week and the end-term test in the 14th week. Students have to sit for the tests.

B, for grade:

The minimum requirement of the mid-term test and the end-term test is 50% separately.

The course ends in mid-semester grade, the grade is calculated as:

- 30%-30% from the two tests,
- 40% from the result of the teamwork.

The minimum requirement for passing is 50%, the grade for the final mark is given according to the following (score/grade): 0-49 % = fail (1); 50-62 % = pass (2); 63-75 % = satisfactory (3); 76-88 % = good (4); 89-100 % = excellent (5).

If the score of any test is below 50%, the student once can take a retake test of the whole semester material

Supply Chain Informatics System

Code: MK5ELIRM04M117-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 1stsemester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

The students can acquire knowledge of supply chain system (operations, warehousing, transportation, procurement and so on). The students will learn about: design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally, The students can also gain insights into the practice methods: procurement, logistic, information technology, center location problem, inventory management, unit load management, risk analysis, value stream analysis. Main target of the course is to teach the students a global thinking, and to understand the connections of the whole supply chain process. By the end of the semester the students will acquire and be able to use these kinds of methods and thinking.

Literature:

Compulsory:

- Oxford Express Series - English for Logistics; ISBN: 978-0-19-457945-2

- Donald Waters - Global Logistics New Directions in Supply Chain Management; 2010; ISBN: 9780749457037
- Alan Rushton, Phil Croucher, Peter Baker - The Handbook of Logistics and Distribution Management; 2010; ISBN: 9780749457143
- Martin Christopher - Logistics and Supply Chain Management; 2011; ISBN: 9780273731122
- Sunil Chopra · Peter Meindl - Supply Chain Management, Strategy, Planning, and Operation; 2012; ISBN: 9780132743952
- Virginia Anderson · Lauren Johnson - Systems Thinking Basics: From Concepts to Causal Loops; 2015; ISBN: 9781883823122 · ASIN: 1883823129

Schedule

1st week Registration week	
2nd week: Lecture: Supply chain history, models and paradigm changes today Practice: Supply chain models	3rd week: Lecture: Tactical logistic management Practice: Logistic systems and tools
4th week: Lecture: Procurement methods and supplier management Practice: Make or Buy analysis	5th week: Lecture: Supply chain in logistic strategy Practice: Material flow matrix with CRAFT method
6th week: Lecture: Incoming logistic, Warehousing Practice: center location planning	7th week: Lecture: Stock management, packaging Practice: Stock level forecast methods
8th week: 1st drawing week	
9th week: Lecture: Packaging optimisation Practice: Unit forming unit load planning	10th week: Lecture: Stock management, packaging Practice: Stock level forecast methods
11th week: Lecture: Packaging optimisation Practice: Unit forming unit load planning	12th week: Lecture: Incoterms and parity Handling and information flow in a production process Production efficiency improvement, wastes Practice: Stochastic & deterministic material flow, Material flow matrix, Value stream analysis, production modelling

13th week:

Lecture: Waste supply chain management (WSC) Recycling & Return management (RM),

Practice: Single channel and multichannel service, queuing models

14th week:

Lecture: Logistic information network, Risk management, financial aspects of Supply Chain Informatic Systems

Practice: Waiting time analysis. Global decision

15th week: 2nd drawing week**Requirements**

There are two tests during the semester: the 1st test in the 8th week and the 2nd test in the 15th week – and there are three design tasks. Attendance at lectures is strongly recommended, but not obligatory. Participation at practice classes is compulsory. Students must attend practice classes and do not miss more than three times during the semester. If a student misses the classes more than three times, the subject will not be signed and the student must repeat the course. A student can't make up a practice with another group. The attendance at lectures and at practice classes will be recorded by the staff of the department. Being late is equivalent with an absence. In case of further absences, medical certificates need to be presented. Missed practice classes should be made up for at a later date, being discussed with the tutor. Students are required to bring the calculator and the printed materials of the lectures to each occasion (both lectures and practice classes). Active participation is evaluated by the teacher. Students are required to actively participate at every class. Students have to submit all the two tests and the design tasks until the deadline and they have to reach the minimum points. The minimum points are required to have mid-semester grade.

The students can achieve maximum 100 points from the 2 test and the design task. The maximum point of the first and second test is 30 points, and he have to achieve min. 18 from each. The maximum points of the design task is 40 points and he have to achieve minimum 2 point. In total the students shall achieve 61 points to pass the exam.

The course ends in an exam grade. The grade for the test is given according to the following table: Score Grade 0-59 fail (1) 60-69 pass (2) 70-79 satisfactory (3) 80-89 good (4) 90-100 excellent (5).

If the score of any test is below 60, the student once can take a retake test of the whole semester material.

System Engineering

Code: MK5RENDM04M217-EN and MK5RENDM04M117-EN

ECTS Credit Points: 4

Evaluation: mid-semester grade

Year, Semester: 2nd year, 2nd semester

Number of teaching hours/week (lecture + practice): 2+2

Topics:

This course in systems engineering examines the principles and process of creating effective systems to meet application demands. Concepts, problems, and methods of systems engineering are introduced in lectures and discussions and applied in assignments and through semester-long group projects.

Literature:

Compulsory:

- Kossiakoff, A., Sweet, W. (2003). Systems Engineering Principles and Practice. John Wiley and Sons, Inc: Hoboken, New Jersey. ISBN 0-471- 23443-5

Schedule

1st week Registration week	
2nd week: Lecture: Definition of a system Practice: Case studies	3rd week: Lecture: Structure of a complex system Practice: Fault-tree analysis
4th week: Lecture: The system life cycle Practice: Case studies of Life-cycle cost analysis	5th week: Lecture: Reliability Engineering Practice: Reliability component relationship
6th week: Lecture: Maintainability Engineering Practice: MTA and RCM tools	7th week: Lecture: Advanced System Quality Planning Practice: The steps and methods of ASQP
8th week: 1st drawing week	
9th week: Lecture: Needs analysis, Risk analysis Practice: VOC investigation, Risk factor calculation and risk reporting	10th week: Lecture: Quality function deployment Practice: Requirements of system
11th week: Lecture: Quality function deployment Practice: Different dimensions of QFD	12th week: Lecture: : Functional analysis Practice: The methods of functional analysis
13th week: Lecture: Value/Cost Engineering Practice: Sample cost breakdown structure	14th week: Final test

15th week: 2nd drawing week

Requirements

A, for a signature:

Participation at practices is compulsory. Students must attend practices and may not miss more than three of them during the semester. In case a student does so, the subject will not be signed and the student must repeat the course. Attendance at lectures and practices will be recorded by the lecturer. Being late is equivalent with an absence. In case of further absences, a medical certification needs to be presented. Missed lectures must be made up for at a later date, being discussed with the tutor.

B, for a grade:

The course ends in end-term test. The grade for the test is given according to the following (score/grade): 0-59 % = fail (1); 60-69 % = pass (2); 70-79 % = satisfactory (3); 80-89 % = good (4); 90-100 % = excellent (5).

DIPLOMA

Within 30 days of the successful final exam the diploma is issued and given out by the Faculty at the graduate's special request. Otherwise, the diploma will be awarded to him/her at the graduation ceremony of the Faculty.

The diploma is an official document decorated with the coat of arms of Hungary which verifies the successful completion of studies in the Engineering Management master's program. The diploma contains the following data: name of HEI (higher education institution); institutional identification number; serial number of diploma; name of diploma holder; date and place of his/her birth; level of qualification; training program; specialization; mode of attendance; place, day, month and year issued. Furthermore, it has to contain the Rector's (or Vice-Rector's) original signature and the seal of HEI. The University keeps a record of the diplomas issued.

At the graduate's special request, a certificate on the completion of studies is issued. The document does not contain any reference to qualification, it merely proves that the candidate has taken a successful final exam. The Faculty keeps a record of the certificates issued.

Calculating diploma grade

Grade=(A+B)/2, where

A: Average of the grades of the subjects of the final exam

B: Grade awarded for defending thesis

Classification of the award:

With honours	4,81 – 5,00
Excellent	4,51 – 4,80
Good	3,51 – 4,50
Satisfactory	2,51 – 3,50
Pass	2,00 – 2,50

Award with Distinction

An award with Distinction is permitted where a student obtained grade 5 in all subjects of the final exam. The average of thesis grade, his/her exam grades and mid-semester grades during his/her studies is at least 4,00. Moreover, he/she is not permitted to have a grade worse than grade 3 during his/her studies.

MODEL CURRICULUM OF ENGINEERING MANAGEMENT MSC, Construction Industry Specialization

	Subject group	Subject	Code	8 th semester				9 th semester				10 th semester				11 th semester				Prerequisite
				L	P	E	C	L	P	E	C	L	P	E	C	L	P	E	C	
1	Science knowledge	Quantitative Methods	MK5KVANA04MX17-EN	2	2	m	4													
2		Applied Mathematics in Manufacturing Design	MK5AMTTM04MX18-EN	1	2	e	4													
3		Econometrics	MK5OKONM04MX17-EN					1	3	e	4									
4		Introduction to Nanotechnology	MK5NANOM04MX17-EN					1	2	e	4									
5		Process Simulation	MK5FOSZM04MX19-EN													1	2	e	4	Operation Management
6	Economics and Humanities	Development of Organization and and Human Resource	MK5SZEEM04MX17-EN	2	2	e	4													
7		Advanced Corporate Finance	MK5HVLPM04MX17-EN	1	3	e	4													
8		Negotiation and Conflict Management	MK5TKOMM04MX17-EN								1	2	m	4						
9		International and Management Accounting	MK5NVSZM04MX17-EN								2	2	m	4						
10		Leadership Competencies Development	MK5KOMPMP04MX17-EN												2	2	m	4	Negotiation and Conflict Management	
11	Professional core material	Applied Engineering	MK5ALKMM04MX17-EN					1	2	m	4									
12		Advanced Quality Management	MK5HMINM04MX17-EN					2	2	m	4									
13		Operation Management	MK5HTEV2M04MX17-EN									2	2	e	4					
14		Project Leadership	MK5PROVM04MX17-EN									2	2	m	4					
15		Risk and Reliability	MK5KOCKM04MX17-EN	2	2	e	4													
16		Control of Integrated Information System	MK5INFRM04MX17-EN					1	3	e	4									
17	Differentiated professional skills	Energy Conscious Architecture	MK5ENTEM04M317-EN	1	3	m	4													
18		Building Energetics II	MK5MPE2M04M317-EN					2	2	e	4									
19		Complex Project	MK5KOMPMP04M317-EN					0	4	m	4									
20		Reconstruction	MK5REKOM04M317-EN									2	2	m	4					
21		Construction Management III	MK5EPS3M04M317-EN												2	2	m	4	Reconstruction	
22		Msc Thesis I	MK5DIP1M09MX17-EN								0	3	m	9						
23		Msc Thesis II	MK5DIP2M21MX17-EN												0	7	m	21	Msc Thesis I	
24	Optional subjects	Optional Subject					3													
25		Optional Subject								3										
26	Criteria subjects	Physical Education**	SI-004																	
27		Work and Fire Safety	MUNKAVEDELEM																	
		Hours per week		9	14			8	18			9	13			5	13			
		Total Credits	120				27				31			29				33		
		Exam				2				4			1					1		
		Mid-Semester Grade				2				3			5					3		
		* Optional subjects according to Rules and Regulations of the Faculty: at least 6 credits in any semester																		
		** According to Rules and Regulations of the Faculty at least 1 semester during the studies.																		
		Abbreviations: L= Lecture, P= Practice, E= Evaluation, C= Credits, e = exam, m = mid-semester																		

MODEL CURRICULUM OF ENGINEERING MANAGEMENT MSC, Industrial Process Engineering Specialization

	Subject group	Subject	Code	8 th semester				9 th semester				10 th semester				11 th semester				Prerequisite
				L	P	E	C	L	P	E	C	L	P	E	C	L	P	E	C	
1	Science knowledge	Quantitative Methods	MK5KVANA04MX17-EN	2	2	m	4													
2		Applied Mathematics in Manufacturing Design	MK5AMTTM04MX18-EN	1	2	e	4													
3		Econometrics	MK5OKONM04MX17-EN					1	3	e	4									
4		Introduction to Nanotechnology	MK5NANOM04MX17-EN					1	2	e	4									
5		Process Simulation	MK5FOSZM04MX19-EN													1	2	e	4	Operation Management
6	Economics and Humanities	Development of Organization and and Human Resource	MK5SZEMM04MX17-EN	2	2	e	4													
7		Advanced Corporate Finance	MK5HVLPM04MX17-EN	1	3	e	4													
8		Negotiation and Conflict Management	MK5TKOMM04MX17-EN								1	2	m	4						
9		International and Management Accounting	MK5NVSZM04MX17-EN								2	2	m	4						
10		Leadership Competencies Development	MK5KOMPM04MX17-EN												2	2	m	4	Negotiation and Conflict Management	
11	Professional core material	Applied Engineering	MK5ALKMM04MX17-EN					1	2	m	4									
12		Advanced Quality Management	MK5HMINM04MX17-EN					2	2	m	4									
13		Operation Management	MK5HTEV2M04MX17-EN								2	2	e	4						
14		Project Leadership	MK5PROVM04MX17-EN								2	2	m	4						
15		Risk and Reliability	MK5KOCKM04MX17-EN	2	2	e	4													
16		Control of Integrated Information System	MK5INFRM04MX17-EN					1	3	e	4									
17	Differentiated professional skills	Production Technologies	MK5TERMM04M217-EN	1	3	m	4													
18		Cellular Manufacturing	MK5GYCELM04M217-EN					2	2	e	4									
19		Complex Project	MK5KOMPM04M217-EN					0	4	m	4									
20		Advanced Applied Engineering	MK5HALMM04M219-EN								2	2	m	4						
21		System Engineering	MK5RENDM04M217-EN												2	2	m	4	Advanced Applied Engineering	
22		Msc Thesis I	MK5DIP1M09MX17-EN							0	3	m	9							
23		Msc Thesis II	MK5DIP2M21MX17-EN											0	7	m	21	Msc Thesis I		
24	Optional subjects*	Optional Subject					3													
25		Optional Subject								3										
26	Criterion subjects	Physical Education**	SI-004																	
27		Work and Fire Safety	MUNKAVEDELEM																	
Hours per week				9	14			8	18			9	13			5	13			
Total Credits				120				27			31			29					33	
Exam						4				4			1					1		
Mid-Semester Grade						2				3			5					3		
* Optional subjects according to Rules and Regulations of the Faculty: at least 6 credits in any semester																				
** According to Rules and Regulations of the Faculty at least 1 semester during the studies.																				
Abbreviations: L= Lecture, P= Practice, E= Evaluation, C= Credits, e = exam, m = mid-semester																				

MODEL CURRICULUM OF ENGINEERING MANAGEMENT MSC, MATERIAL HANDLING AND LOGISTICS SPECIALIZATION

	Subject group	Subject	Code	8 th semester				9 th semester				10 th semester				11 th semester				Prerequisite
				L	P	E	C	L	P	E	C	L	P	E	C	L	P	E	C	
1	Science knowledge	Quantitative Methods	MK5KVANA04MX17-EN	2	2	m	4													
2		Applied Mathematics in Manufacturing Design	MK5AMTTM04MX18-EN	1	2	e	4													
3		Econometrics	MK5OKONM04MX17-EN					1	3	e	4									
4		Introduction to Nanotechnology	MK5NANOM04MX17-EN					1	2	e	4									
5		Process Simulation	MK5FOSZM04MX19-EN												1	2	e	4	Operation Management	
6	Economics and Humanities	Development of Organization and and Human Resource	MK5SZEEMM04MX17-EN	2	2	e	4													
7		Advanced Corporate Finance	MK5HVLPM04MX17-EN	1	3	e	4													
8		Negotiation and Conflict Management	MK5TKOMM04MX17-EN								1	2	m	4						
9		International and Management Accounting	MK5NVSZM04MX17-EN								2	2	m	4						
10		Leadership Competencies Development	MK5KOMPM04MX17-EN												2	2	m	4	Negotiation and Conflict Management	
11	Professional core material	Applied Engineering	MK5ALKMM04MX17-EN					1	2	m	4									
12		Advanced Quality Management	MK5HMINM04MX17-EN					2	2	m	4									
13		Operation Management	MK5HTEV2M04MX17-EN								2	2	e	4						
14		Project Leadership	MK5PROVM04MX17-EN								2	2	m	4						
15		Risk and Reliability	MK5KOCKM04MX17-EN	2	2	e	4													
16		Control of Integrated Information System	MK5INFRM04MX17-EN					1	3	e	4									
17	Differentiated professional skills	Digital Logistics	MK5DILOM04M117-EN	1	3	m	4													
18		Advanced Production Logistics	MK5HTLOM04M117-EN					2	2	e	4									
19		Complex Projekt	MK5KOMPM04M117-EN					0	4	m	4									
20		Supply Chain Informatics System	MK5ELIRM04M117-EN								2	2	m	4						
21		System Engineering	MK5REMIM04M117-EN												2	2	m	4	Supply Chain Informatics System	
22		Msc Thesis I	MK5DIP1M09MX17-EN									0	3	m	9					
23		Msc Thesis II	MK5DIP2M21MX17-EN											0	7	m	21	Msc Thesis I		
24	Optional subjects*	Optional Subject					3													
25		Optional Subject								3										
26	Criterion subjects	Physical Education**	SI-004																	
27		Work and Fire Safety	MUNKAVEDELEM																	
Hours per week				9	14			8	18			9	13			5	13			
Total Credits				120							27				31			29		33
Exam						4				4			1				1			
Mid-Semester Grade						2				3			5				3			
* Optional subjects according to Rules and Regulations of the Faculty: at least 6 credits in any semester																				
** According to Rules and Regulations of the Faculty at least 1 semester during the studies.																				
Abbreviations: L= Lecture, P= Practice, E= Evaluation, C= Credits, e = exam, m = mid-seme																				