BME Faculty of Mechanical Engineering **MSc in Mechanical Engineering Modelling**
Compulsory subject

COURSE DESCRIPTION AND DATASHEET
2015.09.01.

Machine Design and Production Technology

1.	Subject code	Semester	Lec/Sem/Lab/reqs	Credit	Language
	BMEGEGEMW01	1	2+1+0/e	4	English

2. Responsible person for the subject:

Name	Position	Department
Dr. Körtélyesi Gábor	assistant professor	Department of Machine and Product Design

3. Lecturer(s):

Name	Position	Department
Dr. Váradi Károly	Professor	Department of Machine and Product Design
Dr. Váncza József	associate professor	Department of Manufacturing Science and Engineering
Dr. Németh István	associate professor	Department of Manufacturing Science and Engineering
Dr. Szalay Tibor	associate professor	Department of Manufacturing Science and Engineering
Dr. Körtélyesi Gábor	assistant professor	Department of Machine and Product Design
Dr. Markos Sándor	honorary professor	Department of Manufacturing Science and Engineering
Dr. Boór Ferenc	research fellow	Department of Manufacturing Science and Engineering
Vidovics Balázs	lecturer, assistant	Department of Machine and Product Design

The phone numbers, e-mail addresses and office hours of the lecturers from the Department of Machine and Product Design during the semester can be found on the following webpage: http://gt3.bme.hu/ , under the Staff menu.

The phone numbers, e-mail addresses of the lecturers from the Department of Manufacturing Science and Engineering can be found on the following webpage: www.manuf.bme.hu, under the Staff menu (appointment by e-mail)

4. The subject builds on knowledge of the following topics:

General knowledge on engineering design and production on Bachelor level.

5. Course prerequisites and advisories:

The course is a Masters course, Bachelor degree is required. There are no course prerequisites.

6. Aims and objectives:

The goal of the course is to give a theoretical overview on the fields of machine design and production technology, according to the detailed topics below. Some elements of the methodology are covered on the seminars more in depth.

Machine design: Design principles and methods. Modern design techniques. Design process models. Requirements. Conceptual design methods. Evaluation and selection in the design process. Structural behavior and modeling. Design of frame structures. Load transfer between engineering components. Structural optimization (object function, design variables, constrains, shape and size optimization).

Production: Machine tools, robots and other manufacturing equipment, devices and fixtures, machining principles, production procedures and processes, production volume, batches and series. Manufacturability and tooling criteria, preliminary conditions and production analysis, methods of sequencing operations, production planning and scheduling. Production management (TQC and JIT), automated production; cellular manufacturing and manufacturing systems. Product data and technical document management (PDM, TDM), engineering changes and production workflow management (CE, ECM).

7. Course calendar

Week	**Lectures (R. bd. 109.)**	**Seminars**
1. odd	Manufacturing systems. (Production) (11/09/15)	No seminar (09/09/15)
2. even	Design methodology – Problems and processes. (Design) (18/09/15)	No seminar - university sports day (16/09/15)
3. odd	Analysis of manufacturing demands. (Production) (25/09/15)	Simulation of manufacturing systems (Production) (23/09/15) (G 123)
4. even	Design methodology – Problems and solutions. (Design) (02/10/15)	Simulation of manufacturing systems (Production) (30/09/15) (G 123)
5. odd	Design for manufacture (Production) (09/10/15)	Problem definition and specification. List of requirements (Design) (07/10/15) (R111)
6. even	Design methodology – Creativity and Innovation in Design. (Design) (16/10/15)	Problem definition and specification. List of requirements (Design) (14/10/15) (R111)
7. odd	National Holiday – No lecture (23/10/15)	Tolerance and SPC (Production) (21/10/15) (G123)
8. even	Material requirements planning (MRP) (Production) (30/10/15)	Tolerance and SPC (Production) (28/10/15) (G123)
9. odd	CAE design tools – Structural models. Process of analysis. (Design) (06/11/15)	Functional analysis, functional structure. (Design) (04/11/15) (R111)
10.	Production planning (Production) (13/11/15)	Functional analysis, functional structure. (Design) (11/11/15) (R111)
11. odd	Costs in design (Design) (20/11/15)	Production planning (Production) (18/11/15) (G 123)
12. even	University Open Day – No lecture (27/11/15)	Production planning (Production) (25/11/15) (G 123)
13. odd	Test (04/12/15)	Principle solutions, concept generation. Evaluation and selection. (Design) (02/12/15) (R111)
14. even	Make-up Test (if necessary) (11/12/15)	Principle solutions, concept generation. Evaluation and selection. (Design) (09/12/15) (R111)
Make-Up Week	Extra make-up Test (if necessary, for those who have attempted at least one test either on 13th or 14th week) (date and time to be announced on 14th week)	

8. Requirements

8.1 Submitting seminar documents prepared throughout the seminar. Each seminar students will be challenged with short tasks to be solved during the given seminar. Teachers provide guidance. Students will work in small groups, prepare required deliverables and submit them signed at the end of the seminar. No mid-term points are collected upon the seminar tasks, however students must contribute to at least 4 out of the 6 tasks in the semester.

8.2 Written mid-term test. A mid-term test should be written covering the lecture topics, maximum points of 100. (No minus points for wrong answer.)

8.3. During the semester (conditions for signature):

- Number of the absence from the seminars has to be maximum 2.
- Test should be fulfilled at least 50% (min. 50 points equals pass).

8.4 In the exam period (conditions for examination mark)

- Written examination (minimum 50% equals pass).

9. Supplementary opportunity

The test can be repeated in the 14th week. Seminar tasks should be done in the assigned class primarily, supplementary option is the other class in the same topic. For further information see 7. Course calendar.

10. The determination method of the exam mark

1. Pre-Mark. For those who have successfully received a signature, a pre-mark is calculated upon the mid-term test points, accordingly the limits below. The pre-mark is an option for the student to accept it as a final exam mark.

76 – 88	good
89 – 100	excellent

2. Exam. A max. 50 points test exam is obligatory in writing. The result points are added to half of the mid-term test points, or simply multiplied by two (whichever results in higher points) and the sum is evaluated following the limits below.

0 – 49	fail (1)
50 – 62	pass (2)
63 – 75	satisfactory (3)
76 – 88	good (4)
89 – 100	excellent (5)

11. Consultation opportunity

Each and every lecturer/tutor involved in the course has open office hours, please check the websites of their departments. Occasionally appointments at other times are possible upon previous arrangement.

12. Recommended literature

1. Ullman, D.G.: The mechanical design process, McGraw Hill, 1997.

2. Grabowski, H.: Universal design theory, Shaker Verlag, Aachen, 1998.

3. Dym, C.L.: Engineering design, Cambridge University Press, 1994.

4. Kalpakjian, Schmid: Manufacturing Engineering and Technology, Prentice-Hall Inc. Publ. 2001, ISBN 0-201-36131-0

5. D. J. Williams: Manufacturing Systems – An introduction to the technologies, Second Edition, Kluwer Academic Publishers, 1994, ISBN 0 412 60580 5

6. Nanua Singh, Divakar Rajamani: Cellular Manufacturing Systems – Design, planning and control, Chapmen & Hall, London, 1995, ISBN 0 412 55710 X

7. Hopp, W.J.; Spearman, M.L, Factory physics, Foundations of manufacturing management, Irwin/McGraw-Hill, second edition, 2001.

13. Working hours required for the subject

42 Contact hours. Preparations for test and exam: 42 hours.

14. Responsible person for the topics of the subject

Name	Position	Department
Dr. Körtélyesi Gábor	assistant professor	Department of Machine and Product Design
Dr. Szalay Tibor	associate professor	Department of Manufacturing Science and Engineering
Balázs Vidovics (course administration)	lecturer, assistant	Department of Machine and Product Design

15. Grading

Hungarian (BME) and ECTS grading scale

Hungarian grade	*ECTS equivalent*	*Explanation for the Hungarian grade*
5	**A**	**Excellent**
4	**B**	**Good**
3	**C**	**Satisfactory**
2	**D**	**Pass**
1	**F**	**Fail**
Nem jelent meg	**DNA**	**Did not attend (no credit)**
Nem vizsgázott	**I**	**Incomplete (no credit)**
Aláírva	**S**	**Signed (no credit)**
Megtagadva	**R**	**Refused (no credit)**

16. Others

Unless otherwise stated the regulations of the Code of Studies and Exams are governing.

The official webpage of the course is http://gt3.bme.hu/mw01. Webpage to be accessed after successful registration on the site.