Course code B.4. **Course item** ……

1. INFORMATION ABOUT THE COURSE

A. Basic information

Course title	Enterprise Engineering
Field of study	Computer Aided Engineering
Cycle	*Second*
Study profile	*Academic*
Study mode	*Full-time*
Specialisation	*Not relevant*
Unit responsible for the field of study	*Faculty of Mechanical Engineering*
Lecturer	*Dr inż. Marek Szczutkowski*
Introductory courses	*Total Quality Management, Mathematics, Mechanics, Physics, Information Technology, Organization and Management, Machine Building Technology, Machine Design.*
Prerequisites	*Basic knowledge of mathematics, science, and engineering is required.*

B. Semester/ weekly timetable

Semester	Lectures	Classes	Laboratories	Project classes	Seminars	Field experience	ECTS credits
III	15	15	-	-	-	-	2

LEARNING OUTCOMES (acc. to National Qualifications Framework)

No.	Description of learning outcomes	Reference to learning outcomes for the field of study	Reference to learning outcomes for the area of study
KNOWLEDGE			
K1	understands problems of cooperation, including data exchange, among various computer tools; knows solutions for the problems	CAE_W07	T2A_W04, T2A_W05
K2	has knowledge sufficient enough to understand economical and legal aspects of engineering tasks	CAE_W09	T2A_W08, T2A_W10, T2A_W11
SKILLS			
S1	is able to stimulate an action of objects and technical devices and objects with usage of computer aided software and on the base of the process is able to propose improvement of existing systems and	CAE_U02	T2A_U09, T2A_U16, T2A_U17

	machines		
S2	is able to prepare technical documentation of technical devices with the usage of computer aided software with reference to economical analysis	CAE_U04	T2A_U02, T2A_U07, T2A_U14, T2A_U19
S3	Knows how to evaluate the need on computer aided tools for specific tasks to support technical processes e.g. management and technological ones	CAE_U05	T2A_U15, T2A_U18
SOCIAL COMPETENCES			
SC1	understands the need of personal constant development	CAE_K01	T2A_K01
SC2	understands non-technical aspects and outcomes of engineering activity, including environmental issues	CAE_K02	T2A_K02
SC3	role knows how to work within a team playing various stands	CAE_K03	T2A_K03
SC4	knows how to determine priorities to realize a goal defined by himself/ herself	CAE_K04	T2A_K04
SC5	correctly identifies and determines dilemmas assigned to the profession	CAE_K05	T2A_K05
SC6	can think and act in a creative and up-and-coming way	CAE_K06	T2A_K06
SC7	is aware of the social context of a graduate of a technical university, moreover understands the need to formulate and inform the society on technological achievements and other aspects of an engineering activity, especially via mass media.	CAE_K07	T2A_K07

2. TEACHING METHODS

Multimedia lecture, laboratory classes, project, design classes, presentation, discussion, case study

2. METHODS OF EXAMINATION

Oral exam, written exam (1), reports, presentations as homework assignments (4 per semester)

3. COURSE CONTENT

Specify the content separately for each type of classes in accordance with point I.B.	LECTURES: The course builds the foundation for preparing students to work professionally in the areas of manufacturing systems engineering covering design, analysis, and modeling of enterprises. Moreover topics include structured system modeling methods, enterprise integration, and enterprise transformation as well as system development methodology, discussion of enterprise architectures (i.e. Computer Integrated Manufacturing Open System Architecture), activity modeling, business modeling, activity-based performance analysis, and process improvement. Finally, Six Sigma for process and product improvement: DMAIC and DMADV as well as lean manufacturing concepts and major lean tools are introduced. CLASSES: Individual classes correspond to topics of lectures presented above. Students use various tools presented and introduced during lectures solving cases given by a teacher.

4. VALIDATION OF LEARNING OUTCOMES

(Each learning outcome from the list requires validation methods to ensure that it was achieved by a student.)

Learning outcome	Form of assessment (for example:)			
	Oral examination	Written examination	Report	Presentation
K1	X	X	X	X
K2	X	X		X
K3	X	X		X
S1	X	X	X	X
S2		X	X	X
S3	X	X		
SC1	X	X		
SC2	X	X		
SC3			X	X
SC4			X	X
SC5	X	X	X	X
SC6	X	X	X	X
SC7				

5. LITERATURE

Basic literature	Breyfogle F.W., Implementing Six Sigma: Smarter Solution Using Statistical Methods, 2nd ed., 2003, John Wiley and Sons. Oliver D.W., Kelliher T.P., Keegan, Jr J.G., Engineering Complex Systems with Models and Objects, 1997, McGraw-Hill. Kalpakjian S., Schmid S., Manufacturing engineering and technology (5th ed.), 2006, Prentice Hall Lankhorst M., Enterprise Architecture at Work: Modelling, Communication, and Analysis, 2005, Springer.
Supplementary literature	Pyzdek T., The Six Sigma Handbook, 2003, McGraw-Hill. George M., Lean Six Sigma: Combining Six Sigma Quality with Lean Production Speed, 2002, McGraw-Hill. Shermon D., Systems Cost Engineering, 2009, Gower publishing. ISO 19439:2006 Enterprise integration - Framework for enterprise modelling. Vernadat F.B., Enterprise Modeling and Integration: Principles and Applications, 1996, Chapman & Hall, London

6. TOTAL STUDENT WORKLOAD REQUIRED TO ACHIEVE EXPECTED LEARNING OUTCOMES EXPRESSED IN TIME AND ECTS CREDITS

Student's activity	Student workload– number of hours
Participation in classes indicated in point 2.2	30
Preparation for classes	10
Reading assignments	10
Other (preparation for exams, tests, carrying out a project etc)	10
Total student workload	60

Number of ECTS credits allocated by the lecturer	**2**
Final number of **ECTS credits (determined by the Programme Council for the Field of Study)**	**2**