Course code C.8. **Course item** ……

1. INFORMATION ABOUT THE COURSE

A. Basic information

Course title	CNC Machining And Rapid Prototiping
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. Robert Polasik*
Introductory courses	*Mechanical Drawing, Machine Building Technology, Jigs&Fixtures*
Prerequisites	*Basic knowledge of mechanic, machine design and mechanical drawing*

B. Semester/ weekly timetable

Semester	Lectures	Classes	Laboratories	Project classes	Seminars	Field experience	ECTS credits
III	15	-	30	-	-	-	3

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	Student knows the CAx software, used for production processes support	CAE_W05	T2A_W04, T2A_W06
SKILLS			
S1	Ability of usefulness computer aided-tools (CAx) methods for technical processes evaluation	CAE_U05	T2A_U15, T2A_U18
SOCIAL COMPETENCES			
SC1	Ability to think and work in a creative and enterprising way	CAE_K06	T2A_K06

2. TEACHING METHODS

multimedia lecture, project, discussion, visiting manufactures / trades.

2. METHODS OF EXAMINATION

colloquium, report

3. COURSE CONTENT

Specify the content separately for each type of classes in accordance with point I.B.	LECTURES: – basic concepts, including: CNC's types, mostly used the symbolism and the signs, – examples of solutions, basic rules of CNC programming, – application and proper use of CNC machines and handles areas, – CNC machines selection rules for specific machining tasks, – ISO-code programming fundamentals, – CNC machines axes orientations, – Build-in cycles, etc. LABORATORY: – CNC axes, movements and operating rules, – Tool loading, base points, calibrating methods, – 2,5D programming, – 3D, 5 axes programming, – Workpiece dimensions verification, – Correcting programs.

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	Colloquium	Project	Report	……
K1			x		x	
…						
S1			x		x	
…						
SC1			x		x	
…						

5. LITERATURE

Basic literature	Smid, Peter (2008), *CNC Programming Handbook* (3rd ed.), New York: Industrial Press, ISBN 9780831133474, LCCN 2007045901. Makely, William (August 2005), "Numbers Take Control: NC Machines", *Cutting Tool Engineering* **57** Arnold, Heinrich Martin (November 2001), "The recent history of the machine tool industry and the effects of technological change", *LMU*
Supplementary literature	Praca zbiorowa: Poradnik inżyniera. Obróbka skrawaniem. Tom I, Tom II, Tom III. WNT, Warszawa 1993, 1994 Krull, F.N. (September 1994), "The origin of computer graphics within General

	Motors", *IEEE Annals of the History of Computing* **16** (3): 40–56

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

Student's activity	Student workload– number of hours (for example:)
Participation in classes indicated in point 2.2	45
Preparation for classes	15
Reading assignments	15
Other (preparation for exams, tests, carrying out a project etc)	15
Total student workload	90
Number of ECTS credits allocated by the lecturer	**3**
Final number of **ECTS credits (determined by the Programme Council for the Field of Study)**	3