



## COURSE DESCRIPTION CARD - SYLLABUS

Course name

Computer Aided Process Planning

### Course

Field of study

Management and Production Engineering

Area of study (specialization)

Production systems

Level of study

Second-cycle studies

Form of study

full-time

Year/Semester

2 / 3

Profile of study

general academic

Course offered in

Polish

Requirements

elective

### Number of hours

Lecture

15

Laboratory classes

15

Other (e.g. online)

Tutorials

15

Projects/seminars

### Number of credit points

3

### Lecturers

Responsible for the course/lecturer:

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Responsible for the course/lecturer:

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Faculty of Mechanical Engineering

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### Prerequisites

Basic knowledge of manufacturing techniques, machine tool construction, automation, logical thinking skills, using information obtained from the library and the Internet, understanding the need for learning and acquiring new knowledge

### Course objective

Student should obtain knowledge of computer aided process planning and of the tools and methods applied in CAPP programs

### Course-related learning outcomes

Knowledge



1. Student knows the role of the classification and the standardization in the technology - [K\_W07, K\_W10]
2. Student knows the principles and the structure of classifiers, their importance and principles of using in technology planning - [K\_W10]
3. Student knows the computer aided process planning methods, their variants and scope of utilisation - [K\_W07, K\_W10]
4. Student knows in the basic scope tools and methods used in CAx programs: decision trees, decision tables, expert programs, artificial intelligence, neural networks - [K\_W10]
5. Student knows in the basic scope OSN programming principles with use of simulators - [K\_W10]

#### Skills

1. Student is able to work with the simulator for the OSN programming at the basic scope - [K\_U09, K\_U14, K\_U15]
2. Student is able in the basic scope to prepare the proces plan in program Monaco - [K\_U09, K\_U14, K\_U15]
3. Student is able to to determine the principles of the build of the classifier of objects (parts) for the purposes of technology planning - [K\_U14, K\_U15]

#### Social competences

1. Student is aware to undertake the cooperation in the team - [K\_K03]
2. Student is conscious of the role of the computer aided process planning in the contemporary economy and for the society - [K\_K02, K\_K07]

#### Methods for verifying learning outcomes and assessment criteria

Learning outcomes presented above are verified as follows:

- a) in the scope of exercises based on: a written study on a topic indicated by the teacher,
- b) in the scope of laboratories: based on developed exercise tasks
- c) in the scope of lectures: credit, each question is scored on a scale of 2 to 5; pass after obtaining at least 55% of points.

#### Programme content

Development of uses of computer science in factory, introducing to computer aided systems - from partial solutions and simply programs, training of workers, to integrated systems, computer aid in department of technology in factory, methods of computer aid process planning, group technology, the standardization, typification, methods of the typification of the technology, classification, classifiers, computer aided works of the technologist, conditions and criteria of the automation of the system of the design, methods of process planning with computer aid, technological processes for conventional



machine tools, variant designing, planning on the base of the individual technological processes, process planning based on typical technological processes, process planning based on group processes, generational design - based on the synthesis of the technological process, data bases in CAPP programs, tools and methods in computer aided process planning, decision trees, decision tables, the artificial intelligence and methods of the knowledge representation, decision-making criteria, structure of the computer aided process planning system, description of the part, designing of the semi-finished product, designing of the structure of the process, designing of the structure of the operation, computer aid of standard piece time calculation, calculation or estimation of costs, the structure of tools for technological processes planning, useful features of selected systems, computer aid of selected elements of process planning with Monaco, POLCAP and SYSKLASS, integrated solutions - CIM, elements of system of class CIM

Exercises: computer aided process planning for conventional machine tools with variant method in the Monaco program: analysis and the evaluation of the functions and possibilities of the program in process planning, databases in Monaco, technology planning, entering algorithms calculating elements of the technical norm of time in the program - assessment of the possibilities and of application, comparing the Monaco program with the other programs - Sysklass, POLCAP, alternative options of the Sysklass program

Laboratory: OSN programming with using simulators Heidenhain. Contour programming in cartesian and polar layout. Cycle for drilling, pivots and grooves. Programming technics (repeats part of program, subroutines). Cycles for converting coordinates. Definition of patterns. Cycles SL. DXF converter.

### Teaching methods

1. lecture: multimedia presentation, discussion and problem analysis.
2. exercises: practical exercises, computer-assisted task solving, discussion, teamwork
3. laboratories: practical exercises, problem solving, discussion, teamwork

### Bibliography

#### Basic

1. Chlebus E., Techniki komputerowe CAx w inżynierii produkcji, WNT, Warszawa, 2000
2. Knosala R., Zastosowania metod sztucznej inteligencji w inżynierii produkcji, WNT, Warszawa, 2002

#### Additional

1. Matuszek J., Plinta D, System komputerowego wspomaganie projektowania procesów wytwarzania SYKLASS, wyd. PŁ Filia w Bielsku-Białej, Bielsko-Biała , 2000
2. Uniejewski J., Wieczorowski K., Projektowanie procesów technologicznych wspomagane komputerowo pakietem programów POLCAP, Zakład Projektowania Technologii, ITM PP, monografia, Poznań, 1997



### Breakdown of average student's workload

|   | Hours | ECTS |
|---|-------|------|
| Total workload  | 75    | 3,0  |
| Classes requiring direct contact with the teacher   | 60    | 2,0  |
| Student's own work (literature studies, preparation for laboratory classes/tutorials, preparation for tests/exam, project preparation) <sup>1</sup> | 15    | 1,0  |

<sup>1</sup> delete or add other activities as appropriate