Course description

1 General information

Course name	**Fundamentals of electro physical and chemical machining**
Course code	
Level of study (B.Sc, M.Sc., Ph.D.)	B.Sc
ECTS	4
Course manager	Prof. Sebastian Skoczypiec
Course length	One (1) semester
Coordinator for international programs	erasmus@mech.pk.edu.pl

(*) – the course for polish students covers 8P instead of 15P.

2 Prerequisites

- Basic knowledge of physics, chemistry, machine building, computer aided design and manufacturing

2 Program

Type	Lectures	Classes	Labs	Computer labs	Project	Seminar
Hours	15		7		15	

3 Contents

Lectures		
No.		Hours
1	Specificity of electro physical and chemical machining. Physical principles and definitions. Classification.	3
2	Fundamentals of electrodischarge machining (EDM) and its application.	3
3	Fundamentals of electrochemical machining (ECM) and its application.	2
4	Fundamentals of laser beam machining (LBM) and its application.	2
5	Fundamentals of water-jet/abrasive water jet machining (WJM/AWJM) and its application.	2
6	Fundamentals of ultrasonic machining (USM) and its application.	1
7	The role of electro physical and chemical machining in manufacturing chain.	2
Σ		15

Labs		
No.		**Hours**
1	Electrodischarge sinking and drilling (EDM).	2
2	Electrochemical machining (ECM)	3
3	Laser machining (LBM)	2
Σ		7

Projects		
No.		**Hours**
1	Selection of technological parameters of laser beam machining for selected materials.	3
2	Selection of technological parameters of abrasive-water jet machining for selected materials.	4
3	Comparative analysis of electro physical and chemical machining application for high aspect ratio holes drilling (*).	8
Σ		4

(*) – Polish students implement only project no. 3

3 Learning Outcomes (skills and knowledge):

- Student understand physical principles of selected electro physical and chemical machining processes.
- Student knows application area of main electro physical and chemical machining processes.
- Student can explain the role of electro physical and chemical machining in manufacturing chain.

4 Assessment policy (examination):

- Understanding the merits of main electro physical and chemical machining processes.
- Ability to select the adequate electro physical or chemical machining method for given simple technological task.

5 Literature

1. Hassan El-Hofy. Advanced Machining Processes. Nontraditional and Hybrid Machining Processes, McGraw-Hill, 2005.
2. Helmi A. Youssef, Hassan El-Hofy, Machining Technology: Machine Tools and Operations, CRC Press, 2008.