Bialystok University of Technology, Faculty of Mechanical Engineering									
Field of study	*Mechatronics*							**Degree level and programme type**	*second-cycle (MSc, Eng) full-time studies*
Specialization/ diploma path	*Common course*							**Study profile**	*academic*
Course name	*Manufacturing techniques*							**Course code**	*IS-FME-00264S*
								Course type	
Forms and number of hours of tuition	**L**	**C**	**LC**	**P**	**SW**	**FW**	**S**	**Semester**	*summer*
	30			*30*				**No. of ECTS credits**	*4*
Entry requirements	-								
Course objectives	*Getting students acquainted with modern ways of organising manufacturing systems and with issues concerning flexible manufacturing systems (FMSs) and computer-integrated manufacturing (CIM)*								
Course content	*Lecture: Production system. Mechanization, automation and robotization. Scope of automation, forms of automation. Flexible production systems - definition, systems structure. Forms of production organisation. Functional subsystems: machining, assembly, quality control, transport and storage, information flow in manufacturing systems. Tool systems. Computer integrated manufacturing (CIM) - definitions, CAx systems, structure. Integration of design and manufacturing processes: concurrent engineering, rapid prototyping, reverse engineering.* *Project: machine part machining project with milling and turning operations in CAM software.*								
Teaching methods	*Information and problem lecture; Project classes*								
Assessment method	*Lecture: two tests* *Project: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes*								

Symbol of learning outcome	**Learning outcomes** **Students who successfully complete the course:**	**Reference to the learning outcomes for the field of study**
LO1	*have knowledge of production processes and the organisation of manufacturing systems*	*MK2_W04*
LO2	*are able to select appropriate tools and equipment for manufacturing processes*	*MK2_W04, MK2_U09*
LO3	*have knowledge of tools supporting manufacturing processes*	*MK2_W04, MK2_U07, MK2_U09*
LO4	*develop their skills of operating CAM systems*	*MK2_W04, MK2_U07, MK2_U09*
LO5	*have knowledge of the structure of flexible manufacturing systems*	*MK2_W04*
LO6	*can work individually and cooperate in groups*	*MK2_U01*

Symbol of learning outcome	**Methods of assessing the learning outcomes**	**Type of tuition during which the outcome is assessed**
LO1	*Lecture: two tests;*	*L*
LO2	*Lecture: two tests; Project: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes;*	*L, P*
LO3	*Lecture: two tests; Project: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes;*	*L, P*

LO4	*Lecture: two tests; Project: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes;*	*L, P*
LO5	*Lecture: two tests;*	*L*
LO6	*Project: evaluation of: students' projects, their ongoing work progress, participation in discussions and students' activity during classes;*	*P*

Student workload (in hours)		**No. of hours**
Calculation	*Participation in lectures*	*30*
	Participation in project classes	*30*
	Preparation for passing the lecture	*17*
	Preparation for project assignments	*22*
	Completion of project assignments (including preparation of presentations)	*5*
	Preparation for passing project assignments	*6*
	Participation in consultations	*5*
	TOTAL:	*115*

Quantitative indicators	**HOURS**	**No. of ECTS credits**
Student workload – activities that require direct teacher participation	*50*	*2*
Student workload – practical activities	*65*	*2.6*

Basic references	*1. Krzyżanowski J.: Wprowadzenie do elastycznych systemów wytwórczych, Oficyna Wydawnicza Politechniki Wrocławskiej, Wrocław 2005* *2. Honczarenko J.: Elastyczna automatyzacja wytwarzania. Obrabiarki i systemy obróbkowe, Wydawnictwo Naukowe PWN, 2018* *3. Pająk E.: Zarządzanie produkcją. Produkt, technologia, organizacja, PWN, 2009* *4. Chlebus E.: Techniki komputerowe CAx w inżynierii produkcji. WNT. Warszawa 2000.*
Supplementary references	-
Organisational unit conducting the course	*Department of Materials Engineering and Production*
Author of the programme	*Karol Golak, PhD, MSc, Eng*

	Date of issuing the programme
	24.04.2019

L – lecture, C – classes, LC – laboratory classes, P – project, SW – specialization workshop, FW - field work, S – seminar