

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Logistics of technical systems exploitation</b>		Code <b>1011101371011133001</b>
Field of study <b>Logistics - Full-time studies - First-cycle studies</b>	Profile of study (general academic, practical) <b>general academic</b>	Year /Semester <b>4 / 7</b>
Elective path/specialty <b>-</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>First-cycle studies</b>	Form of study (full-time,part-time) <b>full-time</b>	
No. of hours Lecture: <b>15</b> Classes: <b>-</b> Laboratory: <b>-</b> Project/seminars: <b>15</b>		No. of credits <b>4</b>
Status of the course in the study program (Basic, major, other) <b>other</b>		(university-wide, from another field) <b>university-wide</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>4 100%</b> <b>4 100%</b>
<b>Responsible for subject / lecturer:</b>  prof. dr hab. inż. Józef Fraś email: jozef.fras@put.poznan.pl tel. 61 6653417 Faculty of Engineering Management ul. Strzelecka 11 60-965 Poznań		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
<b>1</b>	<b>Knowledge</b>	The student knows the basics of production management and logistics management
<b>2</b>	<b>Skills</b>	The student has the skills of planning and scheduling tasks
<b>3</b>	<b>Social competencies</b>	The student is aware of the impact of maintenance and repair system on the competitiveness of enterprises
<b>Assumptions and objectives of the course:</b> -Presentation the idea of logistics of exploitation, understanding the principles of selection of machines in the aspect of durability, reliability and requirements for technical support. Understanding the principles of the functioning of the maintenance care systems, the choice of systems of care for the groups of machinery. Mastering the skill of organize a system of materials management in maintenance and repair. The ability to plan maintenance and repair work and the need for spare parts and materials for service		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. explains the concept of sustainability and reliability of the machines( T1A_W02) - [K1A_W05] 2. characterized the impact of design features on the machine(T1A_W02) - [K1A_W07] 3. explains how to exploitation impact on the sustainability and reliability of the machines(T1A_W03) - [K1A_W14] 4. characterized basic concepts: the lead time, repair cycle, the period between inspections (T1A_W03) - [K1A_W15] 5. explains the course of the wear process( T1A_W03) - [K1A_W16] 6. characterized specific concepts such as: TBO (time between overhauls), dispersion of durability, susceptibility on repair(T1A_W04) - [K1A_W17] 7. explains the selected factors of choice machines (in the terms of maintenance requirements)(T1A_W04) - [K1A_W18] 8. describes the evolution of systems of care for machinery equipment (T1A_W05) - [K1A_W19] 9. characterized chosen methods of care of the machinery equipment (T1A_W05,InzA_W05 ) - [K1A_W20, InzA_W05] 10. explains the types and structure of maintenance cycles (T1A_W06) - [K1A_W21] 11. explains the types of maintenance and repair work (T1A_W07) - [K1A_W23]		
<b>Skills:</b>		

<ol style="list-style-type: none"> <li>1. can prepare a presentation of the developed project of logistics system(T1A_U01) - [K1A_U1]</li> <li>2. can self developed facultative task for designed maintenance system(T1A_U02) - [K1A_U2, ]</li> <li>3. is able to schedule repair and maintenance works (T1A_U05) - [K1A_U5]</li> <li>4. is able to apply quantitative methods in material requirements planning ((T1A_U9) - [K1A_U9]</li> <li>5. can evaluate the chosen system of spare part replenishment (T1A_U12) - [K1A_U12]</li> <li>6. can perform critical analysis on methods of planning maintenance and repair activities based on repair norms (T1A_U13) - [K1A_U13]</li> <li>7. he can design using the appropriate methods and techniques of machine maintenance (T1A_U16). - [K1A_U16]</li> </ol>
<p><b>Social competencies:</b></p> <ol style="list-style-type: none"> <li>1. is willing to cooperate and work in a project group ( T1A_K03) - [K1A_K03]</li> <li>2. is aware of their responsibility for their own work and the willingness to subordinate with the rules of teamwork and take responsibility in the group of project ( T1A_K04) - [K2A_K04]</li> <li>3. is aware of the need to choose effective methods of maintenance and their impact on competitiveness and entrepreneurship( T1A_K06) - [K2A_K06]</li> <li>4. familiarize with typical engineering technologies in the field of logistics operation of technical systems and its specific issues in inventory management, warehouse management, supply and distribution logistics (InzA_W05) - [KInzA_W05]</li> </ol>

<p><b>Assessment methods of study outcomes</b></p>
<p>Formative assessment:</p> <ol style="list-style-type: none"> <li>a) in the scope of the project: on the basis of evaluation of the implementation of the next stages of the project and knowledge of the issues necessary for its implementation, work within the project group</li> <li>b) in lectures: on the basis of answers to questions about the material assimilated at the current and previous lectures,</li> </ol> <p>Collective assessment:</p> <ol style="list-style-type: none"> <li>a) in the scope of the project: public (within the Dean Group) presentation of the project completed by discussion, project completion after obtaining at least 3.0,</li> <li>b) in the scope of lectures: examination in the form of written work. The examination is awarded after obtaining at least an assessment of 3.0.</li> </ol>
<p><b>Course description</b></p>
<p>--Lecture: Introduction to the area, basic terms and ideas. Factors for selection of machinery and equipment (repair susceptibility). Documentation of equipment used in the maintenance and repair. Types and characteristics of maintenance and repair work. Classical systems of care for machinery. TPM - Total Productive Maintenance. RCM - Reliability Centered Maintenance. The allocation of work to maintain and repair. Inventory management to maintain and repair of machines.</p> <p>Project: Construction of logistics subsystem for the maintenance and repair of machines. Time horizons maintenance planning functions. Repair cycles in relation to maintenance planning. Maintenance planning and the need for capacity. Logistics supply of spare parts for repairs. Classification of the causes of failure. The choice of systems of care, the use of analysis of ABC / XYZ to manage the maintenance system.</p> <p>Didactic methods:</p> <ol style="list-style-type: none"> <li>1) lectures - teaching method: a monographic lecture with problem elements.</li> <li>2) exercises - auditorium exercises with elements of the project.</li> <li>3) project - team performance of the project task.</li> </ol>
<p><b>Basic bibliography:</b></p> <ol style="list-style-type: none"> <li>1. Legutko S., Eksploatacja maszyn, Wydawnictwo Politechniki Poznańskiej, Poznań 2007</li> <li>2. Fraś J. Normalizacja i zarządzanie jakością w logistyce, Wydawnictwo Naukowe Politechniki Poznańskiej, Poznań 2015</li> <li>3. Fraś J., Logistyka eksploatacji systemów technicznych, Materiały wykładowe niepublikowane, Politechnika Poznańska, 2013</li> <li>4. Słowiński B., Inżynieria eksploatacji maszyn, Wydawnictwo Naukowe Politechniki Koszalińskiej, Koszalin 2014</li> </ol>
<p><b>Additional bibliography:</b></p> <ol style="list-style-type: none"> <li>1. Hirano Hiroyuki, JIT Factory Revolution, Productivity Press, Portland, Oregon, 1988.</li> <li>2. Moubrey J., Maintenance Management, A New Paradigm, Maintenance 11, 1996</li> <li>3. Fraś J., Kompleksowe zarządzanie jakością w logistyce, Wydawnictwo Naukowe Instytutu Technologii Eksploatacji w Radomiu, Radom 2013</li> </ol>
<p><b>Result of average student's workload</b></p>

<b>Activity</b>		<b>Time (working hours)</b>
1. Lecture		15
2. Project		15
3. Consultations		15
4. Own study/work		38
5. Prepare to pass the course		15
6. credit		2
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	100	4
Contact hours	47	2
Practical activities	15	1