1. INFORMATION ABOUT THE COURSE

A. Basic information

<table>
<thead>
<tr>
<th>Name of course</th>
<th>Mechanical Recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study level</td>
<td>first degree</td>
</tr>
<tr>
<td>Unit running the study programme</td>
<td>Faculty of Mechanical Engineering</td>
</tr>
<tr>
<td>Study programme</td>
<td>Mechanical engineering</td>
</tr>
<tr>
<td>Speciality</td>
<td></td>
</tr>
<tr>
<td>Name of teacher (s) and his academic degree</td>
<td>Józef Flizikowski, Professor, Adam Mroziński, PhD; Marek Szczutkowski, PhD</td>
</tr>
<tr>
<td>Introductory courses</td>
<td>Machine Design, Environmental Science for Engineers, Basics of plastics processing</td>
</tr>
<tr>
<td>Prerequisites</td>
<td>Basic knowledge of the scope of mathematic, the physic and energetic problems, the principle of conservation of energy, momentum, mass; rules and monitoring machinery and technology; processing technology base; thermal processes, chemical base, mechanical, energy, control and logistics; skill leveling potentials of energy, mass and technical means</td>
</tr>
</tbody>
</table>

B. Semester/week schedule of classes

<table>
<thead>
<tr>
<th>Semester</th>
<th>Lectures</th>
<th>Classes</th>
<th>Laboratories</th>
<th>Project</th>
<th>Seminars</th>
<th>Field exercises</th>
<th>ECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>winter</td>
<td>30</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

2. EFFECTS OF EDUCATION (acc. to National Qualifications Framework)

Knowledge

Student upon completion of item has the ability to: define the problem, solutions (hypothesis); describe, evaluate and propose solutions to the situation of recycling material, energy, other innovative capabilities; the tasks, it is the implementation of new technological, organizational and market application in recycling.

Skills

On successful completion of the course student is supposed to, for example: analyse the design or technology processes with the reference to material recycling requirements, define the pros and cons on application of new tools in production processes both technological and management ones, make decisions on reasonable application on most modern computer software in the mentioned are, plan production process having in mind waste issues etc.

Competences

On successful completion of the course student is supposed to choose ecological technology (machines) of material recycling and follow its rules in an environment of a modern production enterprise.

3. TEACHING METHODS

Lectures – traditional lecture, multimedia presentation, using of simulating applications
Laboratories – multimedia laboratory exercises, Lecture and project based computer support procedures; under design formulation problems, practical solutions, innovative, productive and technological; economic analysis and study of the project

4. METHODS OF EXAMINATION

Lectures – test; Laboratories – final report prepared by every student

5. SCOPE
### Lectures

The essential features of systems engineering in manufacturing processes are flows of energy and material streams. The main objective of the course is to provide students with background information about modelling and computing of the basic parameters of typical drive and materials flow between manufacturing machines. Introduction to recycling. Technology and equipment recycling complex products (cars, household-and elements, computer hardware, electronic). Technologies and equipment for recycling industrial and reuses, simple products made from plastics, rubber, polymers, ceramics (health, construction, technical, special abrasives) and glass. Designing technological line and recycling of selected technologies. Balance sheets imported materials: automotive products and consumables, domestic appliances, electronic and computer equipment, packaging and construction materials. Technologies, equipment and recycling of selected waste industrial reuses products. Automotive and their materials (steel, iron, metals, colourful, tires, batteries and consumables). Electronic and computer products. Post uses and industrial waste products from plastics. Post uses industrial waste, rubber and polymer, ceramic, glass construction and packaging.

### Laboratories

Design technologies and products for their recycling. LCA, LCC, LCM Method. Design line technology recycling of selected technologies.

### 6. LITERATURE

#### Basic literature


#### Supplementary literature