

<b>KARTA OPISU MODUŁU KSZTAŁCENIA</b>		
Nazwa modułu/przedmiotu <b>Algorytmy planowania lotu</b>		Kod <b>1010532121010600040</b>
Kierunek studiów <b>Automatyka i robotyka</b>	Profil kształcenia (ogólnoakademicki, praktyczny) <b>ogólnoakademicki</b>	Rok / Semestr <b>1 / 2</b>
Ścieżka obieralności/specjalność <b>Smart aerospace and autonomous systems</b>	Przedmiot oferowany w języku: <b>polski</b>	Kurs (obligatoryjny/obieralny) <b>obligatoryjny</b>
Stopień studiów: <b>II stopień</b>	Forma studiów (stacjonarna/niestacjonarna) <b>stacjonarna</b>	
Godziny Wykłady: <b>15</b> Ćwiczenia: - Laboratoria: - Projekty/seminaria: -		Liczba punktów <b>3</b>
Status przedmiotu w programie studiów (podstawowy, kierunkowy, inny) <b>kierunkowy</b>		(ogólnouczelniany, z innego kierunku) <b>z danego kierunku</b>
Obszar(y) kształcenia i dziedzina(y) nauki i sztuki		Podział ECTS (liczba i %)
<b>Odpowiedzialny za przedmiot / wykładowca:</b>		
<p>płk dr inż. pil. Krzysztof Szymaniec            email: krzysztof.szymaniec@put.poznan.pl            tel. 61 665 2604            Wydział Inżynierii Transportu            ul. Piotrowo 3, 60-965 Poznań</p>		
<b>Wymagania wstępne w zakresie wiedzy, umiejętności, kompetencji społecznych:</b>		
1	<b>Wiedza:</b>	Student starting this module should have basic knowledge regarding flying robots.
2	<b>Umiejętności:</b>	He/she should have skills allowing solving basic problems related to aerial robotics and should understand the need to extend his/her competences.
3	<b>Kompetencje społeczne</b>	Student should show attitudes as honesty, responsibility, perseverance, curiosity, creativity, manners, and respect for other people.
<b>Cel przedmiotu:</b>		
<p>The objective of the course is to focus on four principal tasks:</p> <ol style="list-style-type: none"> <li>1. Path planning (determining an optimal path for vehicle to go while meeting certain objectives and constraints)</li> <li>2. Avoiding obstacles and collision, trajectory generation (determining an optimal control maneuver to take to follow a given path or to go from one location to another)</li> <li>3. Task allocation and scheduling (determining the optimal distribution of tasks amongst a group of agents, with time and equipment constraints)</li> <li>4. Deterministic and probabilistic planning approaches</li> </ol>		
<b>Efekty kształcenia i odniesienie do kierunkowych efektów kształcenia</b>		
<b>Wiedza:</b>		
<ol style="list-style-type: none"> <li>1. acquire knowledge on aerial robots - [K_W4]</li> <li>2. have wide and in-depth knowledge on flight planning - [K_W5]</li> <li>3. be informed about trends and advances in avionics - [K_W6]</li> <li>4. know methodology of carrying out experiments with flight planning - [K_W8]</li> </ol>		
<b>Umiejętności:</b>		
<ol style="list-style-type: none"> <li>1. is able to acquire, integrate, interpret and evaluate information from literature, databases and www sources on modelling, control and planning of aerial robots - [K_U1]</li> <li>2. is able to plan and arrange self-education process in particular covering issues of aerial robot planning - [K_U5]</li> <li>3. is able to apply control and planning methods to solve engineering as well as scientific problems - [K_U9]</li> <li>4. is able to integrate knowledge coming both from different sub-domains of computer sciences and robotics to formulate and solve engineering tasks - [K_U10]</li> <li>5. can conduct experimental studies and analyse their results with statistical tools - [K_U12]</li> <li>6. is able to evaluate strong and weak points of algorithms and their implementation and assess their usefulness to flight planning tasks - [K_U13]</li> </ol>		

<b>Kompetencje społeczne:</b>
1. understands that knowledge and skills related to avionics quickly becomes non relevant - [K_K1]
2. knows examples / case studies of flight planning, simulation and analysis and understands their limitations - [K_K4]
3. is able to correctly assign priorities to own tasks - [K_K6]

<b>Sposoby sprawdzenia efektów kształcenia</b>
<p>Formative assessment:</p> <p>a) lectures: based on answers to question in the written exam,</p> <p>b) laboratory classes: evaluation of doing correctly assigned tasks (following provided lab. instructions).</p> <p>Total assessment:</p> <p>a) verification of assumed learning objectives related to lectures: i.evaluation of acquired knowledge on the basis of the written exam, ii.discussion of correct answers in the exam,</p> <p>b) verification of assumed learning objectives related to laboratory classes: i.evaluation of student?s knowledge necessary to prepare, and carry out the lab tasks, ii.monitoring students? activities during classes, iii.evaluation of lab reports (partly started during classes, finished after them), iv.two written tests during the classes.</p> <p>Additional elements cover:</p> <p>i.discussing more general and related aspects of the class topic, ii.showing how to improve the instructions and teaching materials.</p> <p>Session 1: Note de contrôle continu (CC): Note CC = 50% TP + 50% DS (TP = moyenne des Travaux Pratiques et/ou Devoirs Maison; DS = un Devoir Surveillé ? mi-semestre).</p> <p>Note finale de Module = 50% CC + 50 % examen; en l'absence de DS: Note finale de Module = 30% TP + 70% examen.</p> <p>Session 2: Note finale de Module = maximum entre 100% examen session 2 et 50% CC session 1 + 50% examen session 2 ou 30% TP session 1 + 70% examen session 2.</p>

<b>Treści programowe</b>
<p>1. Path planning  2. Obstacle and collision avoidance  3. Trajectory generation  4. Task allocation and scheduling  5. Case studies</p> <p>Learning methods:</p> <p>1. Lectures: multimedia presentation, presentation illustrated with examples presented on black board, solving tasks, multimedia showcase  2. Labs: solving tasks, practical exercises, discussion, teamwork, multimedia showcase, competitions or case studies</p>

<b>Literatura podstawowa:</b>
1. Planning and decision making of aerial robots, Y. Bestaoui, Springer 2014
2. Lighter than air robots, Y. Bestaoui, Springer 2012

<b>Literatura uzupełniająca:</b>

<b>Bilans nakładu pracy przeciętnego studenta</b>	
<b>Czynność</b>	<b>Czas (godz.)</b>

1. participating in lectures	15	
2. consulting issues related to the subject of the course	3	
3. studying literature / learning aids, 250 pages	25	
4. preparing to and participating in exams	32	
<b>Obciążenie pracą studenta</b>		
<b>forma aktywności</b>	<b>godzin</b>	<b>ECTS</b>
Łączny nakład pracy	75	3
Zajęcia wymagające bezpośredniego kontaktu z nauczycielem	20	1
Zajęcia o charakterze praktycznym	0	0