

KARTA OPISU MODUŁU KSZTAŁCENIA		
Nazwa modułu/przedmiotu Systemy komunikacyjne w lotnictwie		Kod 1010532131010600045
Kierunek studiów Automatyka i robotyka	Profil kształcenia (ogólnoakademicki, praktyczny) ogólnoakademicki	Rok / Semestr 2 / 3
Ścieżka obieralności/specjalność Smart aerospace and autonomous systems	Przedmiot oferowany w języku: polski	Kurs (obligatoryjny/obieralny) obligatoryjny
Stopień studiów: II stopień	Forma studiów (stacjonarna/niestacjonarna) stacjonarna	
Godziny Wykłady: 15 Ćwiczenia: - Laboratoria: - Projekty/seminaria: -		Liczba punktów 3
Status przedmiotu w programie studiów (podstawowy, kierunkowy, inny) (ogólnouczelniany, z innego kierunku) kierunkowy z danego kierunku		
Obszar(y) kształcenia i dziedzina(y) nauki i sztuki		Podział ECTS (liczba i %)
Odpowiedzialny za przedmiot / wykładowca:		
<p>płk dr inż. pil. Krzysztof Szymaniec email: krzysztof.szymaniec@put.poznan.pl tel. 61 665 2604 Faculty of Transport Engineering ul.Piotrowo 3, 60-965 Poznań</p>		
Wymagania wstępne w zakresie wiedzy, umiejętności, kompetencji społecznych:		
1	Wiedza:	Student starting this module should have basic knowledge regarding signal processing.
2	Umiejętności:	He/she should have skills allowing solving basic problems related to communication systems and should understand the need to extend his/her competences.
3	Kompetencje społeczne	Student should show attitudes as honesty, responsibility, perseverance, curiosity, creativity, manners, and respect for other people.
Cel przedmiotu:		
<p>This course is organized in two parts. The objective of the first one is dedicated to the introduction of the basic concepts of communication theory and systems. Students learn and master techniques and principles of analog and digital modulation and demodulation for information transmission. The second part is exclusively devoted to communication means on board of an aircraft. The aim of this part is to provide students with theoretical and practical skills in different antennas used in direct radio frequency communications flight paths or via satellite.</p>		
Efekty kształcenia i odniesienie do kierunkowych efektów kształcenia		
Wiedza:		
<ol style="list-style-type: none"> has extensive and in-depth knowledge in selected areas of mathematics useful for formulating and solving complex tasks as well as modelling of communication systems - [K_W1] has well-established detailed theoretical knowledge of design of communication systems - [K_W7] has theoretical detailed knowledge related to flight communication systems - [K_W11] has knowledge of the development trends and most crucial new achievements in the field of telecommunication systems and its related disciplines - [K_W12] 		
Umiejętności:		
<ol style="list-style-type: none"> is able to acquire, integrate, interpret and evaluate information from literature, databases and www sources on flight communication systems - [K_U1] is able to apply control and planning methods to solve engineering as well as scientific problems - [K_U9] is able to integrate knowledge coming both from different sub-domains of computer sciences and communication systems to formulate and solve engineering tasks - [K_U10] is able to formulate and test hypotheses (carry out simulations and experiments) regarding engineering problems and difficult research problems in the area of communication systems - [K_U15] is able to carry out critical analysis of the operation of flight communication systems - [K_U19] is able to evaluate usefulness of methods and tools for solving a communication problem; is able to use innovative and mathematical tools in the field of communication systems - [K_U22] 		
Kompetencje społeczne:		

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| 1. is aware of responsibility for their own work, is able to collaborate and cooperate in a team, and take responsibility for the jointly performed tasks; is able to lead a team, set goals and assign priorities to realize a specific task - [K_K3] |
| 2. is aware of the necessity to approach technical aspects professionally - [K_K4] |

Sposoby sprawdzenia efektów kształcenia

Formative assessment:

a) lectures:

based on answers to question in the written exam,

b) laboratory classes:

evaluation of doing correctly assigned tasks (following provided lab. instructions).

Total assessment:

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,

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.

Additional elements cover:

i. discussing more general and related aspects of the class topic,

ii. showing how to improve the instructions and teaching materials.

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).

Note finale de Module = 50% CC + 50% examen; en l'absence de DS: Note finale de Module = 30% TP + 70% examen.

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.

Treści programowe

1. Fundamental communication systems equipment

2. Introduction to communications theory

3. Modulation and demodulation

4. Radio-frequency communications

5. Aircraft antennas

6. Aircraft satellite communications system

Learning methods:

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

Literatura podstawowa:

1. Hewlett Packard, Digital modulation in communications systems, Application note 1298

2. L. Ippolito Jr., Satellite communications systems engineering: Atmospheric effects, satellite link design and system performance, 2008

3. G. Maral, M. Bousquet, Satellite communications systems: Systems, techniques and technology, J.Wiley Ltd 2009

4. J. Seybold, Introduction to RF propagation, Wiley-Interscience 2005

5. F. Schwering, A. Oliner, Antennas on aircraft, ships, or any large, complex environment, 1993

6. C. Balanis, Antenna theory: Analysis and design, Wiley-Interscience

Literatura uzupełniająca:

Bilans nakładu pracy przeciętnego studenta

Czynność		Czas (godz.)
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
Obciążenie pracą studenta		
forma aktywności	godzin	ECTS
Łączny nakład pracy	75	3
Zajęcia wymagające bezpośredniego kontaktu z nauczycielem	20	1
Zajęcia o charakterze praktycznym	0	0