

Course description

Course abbreviation:	KKY/RVB	Page:	1 / 3
Course name:	Control and use of UAV		
Academic Year:	2023/2024	Printed:	01.06.2024 10:17

Department/Unit /	KKY / RVB			Academic Year	2023/2024
Title	Control and use of UAV			Type of completion	Exam
Long Title	Control and use of unmanned aerial vehicles				
Accredited/Credits	Yes, 3 Cred.			Type of completion	Written
Number of hours	Lecture 3 [Hours/Week]				
Occ/max	Status A	Status B	Status C	Course credit prior to	NO
Summer semester	0 / -	0 / -	1 / -	Counted into average	YES
Winter semester	0 / -	0 / -	0 / -	Min. (B+C) students	not determined
Timetable	Yes			Repeated registration	NO
Language of instruction	Czech			Semester taught	Summer semester
Optional course	Yes			Internship duration	0
Evaluation scale	1 2 3 4				
No. of hours of on-premise					
Auto acc. of credit	Yes in the case of a previous evaluation 4 nebo nic.				
Periodicity	K				
Substituted course	None				
Preclusive courses	N/A				
Prerequisite courses	N/A				
Informally recommended courses	N/A				
Courses depending on this Course	N/A				

Course objectives:

Introduce to cybernetic and geomatic aspects of the use of unmanned aerial vehicles, such as design of the control algorithm, processing of sensor data, orientation in space or processing of geodata.

Requirements on student

Mastering of the discussed matter

Content

- Design of kinematic and dynamic models
- Methods of automatic control
- Methods for estimation of position and orientation
- Sensors for perception of the environment
- Localization and navigation in the environment
- Reference surfaces and coordinate systems
- Representation of the real world in a digital form
- Geographic information systems
- Digital imagery
- Aerotriangulation
- Multiframe photogrammetry
- Results of photogrammetric processing

Fields of study

Guarantors and lecturers

- **Guarantors:** Doc. Ing. Miloš Železný, Ph.D. (100%)
- **Lecturer:** Ing. Radek Fiala, Ph.D. (100%), Ing. Miroslav Flidr, Ph.D. (100%), Ing. Petr Neduchal, Ph.D. (100%), Doc. Ing. Miloš Železný, Ph.D. (100%)

Literature

- **Basic:** Astrom Karl Johan, Murray Richard M. *Feedback Systems: An Introduction for Scientists and Engineers*.
- **Basic:** Pavelka, Karel. *Fotogrammetrie*. Plzeň : Západočeská univerzita, 2003. ISBN 80-7082-972-9.
- **Basic:** Šimandl, Miroslav. *Identifikace systémů a filtrace*. Plzeň : ZČU, 1995. ISBN 80-7082-170-1.
- **Basic:** Úvod do GIS (Jedlička Karel) - <http://gis.zcu.cz/studium/ugi/elearning/index1.htm> >
- **Recommended:** Buchar P. *Matematická kartografie 10*. ČVUT Praha, 2002.
- **Recommended:** Corke, Peter I. *Robotics, vision and control : fundamental algorithms in MATLAB*. Berlin : Springer, 2011. ISBN 978-3-642-20143-1.

assessment methods

Knowledge - knowledge achieved by taking this course are verified by the following means:

Oral exam

Skills - skills achieved by taking this course are verified by the following means:

Oral exam

Competences - competence achieved by taking this course are verified by the following means:

Oral exam

prerequisite

Knowledge - students are expected to possess the following knowledge before the course commences to finish it successfully:

porozumět základům lineární algebry a matematické analýzy
rozumět základům geometrie

Skills - students are expected to possess the following skills before the course commences to finish it successfully:

využít podobnost trojúhelníků
vyřešit trojčlenku

Competences - students are expected to possess the following competences before the course commences to finish it successfully:

N/A

teaching methods

Knowledge - the following training methods are used to achieve the required knowledge:

Lecture
Self-study of literature

Skills - the following training methods are used to achieve the required skills:

Lecture supplemented with a discussion

Competences - the following training methods are used to achieve the required competences:

Lecture

learning outcomes

Knowledge - knowledge resulting from the course:

popsat základní způsoby reprezentace prostorových dat
popsat principy a proces pořízení snímků
vyjmenovat výsledky fotogrammetrického zpracování snímků

popsat způsoby lokalizace a navigace v prostředí
 charakterizovat metody odhadu polohy a orientace
 popsat model dynamického chování

Skills - skills resulting from the course:

reprezentovat polohu a orientaci a pohyb v prostoru
 navrhnout jednoduchý řídicí algoritmus

Competences - competences resulting from the course:

N/A

Course is included in study programmes:

Study Programme	Type of	Form of	Branch	Stage	St. plan v.	Year	Block	Status	R.year	R.
Certificate Programmes	Postgraduate Master	Full-time	Technologie pro bezpilotní létání	1	2022	2023	Povinné předměty	A	2	LS
Certificate Programmes	Postgraduate Master	Full-time	Technologie pro bezpilotní létání	1	2022	2023	Povinné předměty	A	2	LS
Certificate Programmes	Postgraduate Master	Full-time	Technologie pro bezpilotní létání	1	2017	2023	Povinné předměty	A	2	LS
Certificate Programmes	Postgraduate Master	Full-time	Technologie pro bezpilotní létání	1	2017	2023	Povinné předměty	A	2	LS
Distribučované výpočetní systémy	Postgraduate Master	Full-time	Distribučované systémy	1	2022 akr	2023	Doporučené výběrové předměty	C	2	LS
Distribučované výpočetní systémy	Postgraduate Master	Full-time	Výpočetní technika	1	2022 akr	2023	Doporučené výběrové předměty	C	2	LS