Óbuda University Bánki Donát Faculty of Mechanical and Safety Engineering	Institute of Mechatronics and Vehicle Engineering

Subject title and code:	**Basic operation of mobile robots; BMXMRE6BNE**		Credits:	*5*
Full-time study	3	*ac.* 6 *semester year*		

The course is available at: mechatronical engineering

Supervised by:	dr. István Nagy	**Instructors:**	dr. István Nagy; Kovács Zsombor

Prerequisite (neptun code):   Robotics I, BMXRTE5BNF

Weekly number of lessons

Lecture: 2	Group seminar: 0	Lab: 1	Consultation: based on needs

Way of assessment: Exam   (Written and oral)

Online consultation *(in case it's required):   ... (BBB link)*

Edu. goal: *Get to know the basic navigation and localization methods, related to mobile robots. Practice basic kinematic calculations and path planning methods.*

Schedule

Education week	Topics	
1.	basic definitions, mobile robots (MR) generations, basic components of mobile agents: electrical components: communication, power supply, control; mechanical components: body, locomotion systems; sensors:internal, external; actuators-basically the locomotion system,	
2.	MR , HW architecture, basics of kinematics of legged robots	
3.	fundamental kinematic calculations of wheeled robots, related to different wheel configurations, kinematic modells of MRs.	
4.	**elektronical** components: Control circuits, motor drivers, forward, backward motion control and speed control of wheels	
5.	internal sensors of MR and its applications, odometry errors	
6.	external sensors -basic localisation methods- , Visual (camera systems) external sensors, Laser Eye, stareo-camera.	
7.	**Thursday – Rect. Holyday**	
8.	**PLC competition** -	
9.	work space (WS) reasoning/partitioning and interpretations, - point represented MR in model, WS configuring; mapping processes.	
10.	basic path planning strategies -1 (graph/line/splines based path planning methods); basic navigations strategies – 1 (other path planning methods)	
11.	basic path planning strategies -2 (global path planning methods: wave, potential field, stochastic); basic navigations strategies – 2 (other path planning methods	
12.	lecture replacements, possible delays	

13.	**Theory test paper** -	
14.	**Retake** –Test paper – in case of needs	

Mid-semester requirements					
Test		Assignment to be submitted		*Szöveg beírásához kattintson vagy koppintson ide.*	
amount	dates	amount	deadlines	amount	dates
1	13, weeks				

According to the HKR attendance of group seminars and lab exercises are mandatory.

Other requirements for participation in sessions not covered by the regulations and restrictions on substitutions:
On lectures 30% absence is allowed. Recommended mark can be reached if final sum aver > 60%. Final sum aver calc: Sum aver[%]=(TP[%] + Pr. aver [%]) / 2

Test		Assignment to be submitted		*Szöveg beírásához kattintson vagy koppintson ide.*	
maximum points available	minimum score required to pass /test	maximum points available	minimum score required to pass / assignment	maximum points available	minimum score required to pass /lab
100/TP…points	50/TPpoints	…points	…points	…points	…points

Total number of points achievable in semester:		100%points		
Grading thresholds	**satisfactory** 50 % and above	**average** 65 % and above	**good** 80 % and above	**excellent** 90 % and above

Other evaluation criteria: Recommendation mark limits: 50-64: signature; 65-75:3;76-89:4; 90-:5
Receive a signature denied entry: based on absence>30%
Required references: see: moodle
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Quality assurance methods of the subject:

Things, that are not included, can be found within the regulations of Óbuda University.