Module Medical Robotics

Module Name: Medical Robotics

Module Number	X4M 2340	Level Master	Short Name MEDROB
Responsible Lecturers	Prof. Dr. Achim Schweikard		
Department, Facility	UZL, Institute for Robotics		
Course of Studies	Biomedical Engineering, Master		
Compulsory/elective	Elective	ECTS Credit Points	4
Semester of Studies	2	Semester Hours per Week	3
Length (semesters)	1	Workload (hours)	120
Frequency	SuSe	Presence Hours	45
Teaching Language	English	Self-Study Hours	55 + 20 exam prep.
Consideration of Gender and Diversity Issues	☒ Use of gender-neutral language (THL standard) ☐ Target group specific adjustment of didactic methods ☐ Making subject diversity visible (female researchers, cultures etc.)		
Applicability	Biomedical Engineering		
Remarks	None		

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Course 1: Medical Robotics Lecture and Exercise

Course Number		Short Name	MEDROB
Course Type	Lecture and exercise	Form of Learning	Presence
Mandatory Attendance	x	ECTS Credit Points	4
Participation Limit	None	Semester Hours per Week	3
Group Size (practical training, exercises, …)	None	Workload (hours)	120
Teaching Language	English	Presence Hours	45
Study Achievements („Studienleistung“, SL)	None	Self-Study Hours	55 + 20 exam prep.
SL Length (minutes)	n. a.	SL Grading System	n. a.
Exam Type	Written Exam	Exam Language	English
Exam Length (minutes)	90	Exam Grading System	One-third Grades
Learning Outcomes	The participants are able to derive the inverse kinematic equation for a given robot construction with 6 degrees of freedom, and implant it in an application. Design goals for a robotic application can be formulated and reduced to a practical system. Mathematical methods for machine learning can be applied to motion learning, considering the dynamics of motion. The dynamics of motion in space can be mapped to learning techniques.		
Participation Prerequisites	Basic knowledge in robotics		
Contents	Kinematics, path planning of robot systems Robot Programming Medical Navigation Sensors in medical applications Surgery planningl Velocity kinematics after motion prediction Motion planning		
Literature	J. -C. Latombe: Robot Motion Planning –Dordrecht: Kluwer 1990 J.J. Craig: Introduction to Robotics - Pearson Prentice Hall 2002 Lecture notes (400 pages full text)		
Remarks	None		