	UNEVERSITY OF EAST SARAJEVO Faculty of Mechanical Engineering	
	Study program: Mechanical Engineering	
	1ST LEVEL OF STUDIES | 3rd YEAR	

Course title	**Basis of automatic control**
Department	Department of production engineering

Code	**Course status**	**Semester**	**ECTS**
МАФ-1-1- MC-06-1-023-5-6-3-1.7-0.3	Mandatory	V	6

Professor	PhD Saša Prodanović, assistant professor
Teaching assistant	PhD Saša Prodanović, assistant professor

Number of hours (per week)			**Individual student workload (in hours in semester)**			**Coefficient of student workload S_o**
L	**E**	**LE**	**L**	**E**	**LE**	**S_o**
3	1.7	0.3	$2*15*S_o$	$1.7*15*S_o$	$0.3*15*S_o$	1.4

Total total teaching hours in semester 3*15 + 1.7*15 + 0.3*15 = 75 hours	Total student's workload (in hours in semester) 3*15*So + 1.7*15*So + 0.3*15*So = 105 hours
Total course workload: 75 + 105 = 180 hours in semester	

Student learning objectives	1. Basic knowledge of automatic control. 2. Learning and application the methods required for the analysis and synthesis of control systems within the automatic control system as well as the automatic control system as a whole. 3. Analytical and experimental testing of the basic dynamic and static characteristics of the system. 4. Basic knowledge of Matlab software and its application in automatic control.
Conditionality	No conditioning
Teaching methods	Lectures, auditory and laboratory exercises (homework), consultations
Content of the course by weeks	1. Introduction, concept of automation, importance and application of automatic control. 2. Concept and types of systems, system representation, definition of control, control systems. 3. Automatic control systems (ACS), function and structure of control systems. 4. Controlled objects, components of control systems, concept of analysis and synthesis of ACS. 5. Modeling of ACS, system inputs and responses, performance indicators of controlled object. 6. Mathematical models and technical solutions of transfer components, examples of models in the time domain. 7. Transfer function and transfer matrix, block diagram of the system. 8. Frequency characteristic of the system, Nyquist and Bode diagrams. 9. Frequency characteristics of typical elements and systems and their parameters. 10. Types of system's dominant behaviors and components types, ACS behavior analysis. 11. Amplification and errors. 12. Concepts control and monitoring of ACS. 13. Concepts of controllability and observability. 14. Concept of stability. 15. Stability conditions of linear ACS, criteria of stability, controllability and observability.

Required literature

Authors	**Name of the publication, publisher**	**Year**	**Pages**
Lj. T. Grujić, B. R. Milojković	Automatsko upravljanje, Mašinski fakultet Beograd,	1987.	-
Lj.T. Grujić	Zadaci sa rješenjima iz automatskog upravljanja, Mašinski fakultet Beograd,	1980.	-

Additional literature

Authors	**Name of the publication, publisher**	**Year**	**Pages**
R.C.Dorf and R.H.Bishop	Modern Control Systems, Addison-Wesley publishing.	1995.	-

	Type of student evaluation	**Points**	**Percentage**
Obligations, forms of knowledge check and assessment	Pre-exam obligations		
	Attendance at lectures / exercises	10	10%
	Laboratory exercises (homework)	5	5%
	Colloquium I	15	15%
	Colloquium II	25	25%
	Final exam	45	45%
	Total	100	100 %

Web page	http://www.maf.ues.rs.ba/PDF_za_sajt/PM2017/Osnovi%20automatskog%20upravljanja.pdf
Date of certification	