

Study program / course: Mechanical Engineering			
Type and level of study: Master academic studies			
Course: Designing of motor vehicles			
Lecturers: Miroslav D. Demic, Ph.D., full professor			
Status of course: Elective, joint for module M₃ and module M₈, III semester			
Number of ECTS: 6			
Precondition: none			
The objective of course			
Education of student in the area of methods and procedures of designing the passenger cars, trucks and busses.			
The outcome of course			
Students ability to: analyze market technical demands for newly designed (new) vehicle (passenger car, truck, bus), define project demands fro new vehicle, define new vehicle's conception and basic design parameters, define parameters and select new vehicle's units, develop the general design of a new vehicle (seminar paper) and defend the seminar paper.			
Syllabus			
Theoretical study			
1. Basics of ergonomics and ergonomic demands in motor vehicle design, 2. Elements of truck design: Classification of trucks, Exploitation conditions for trucks, Design phases of trucks, Selection of truck conception, Selection of type, overall dimensions and working space of trucks, Organization drivers working space, Selection of trucks conception, Selection of drive formula, Definition of trucks overall dimensions, Selections of parameters of trucks longitudinal ground clearance, stability and comfort, Selection of parameters of trucks units and systems: engine, transmission, suspension system, carrying system, braking system, self unloading device, etc, Procedure for making the general project of trucks, 3. Elements of passenger car design: Classification of passenger cars, Exploitation conditions for passenger cars, Trends in passenger cars development, Selection of passenger car conception, Definition of passenger space and organization of drivers working space, Definition of vehicles overall dimensions, Selection of drive scheme, Selection of parameters of longitudinal ground clearance, stability and comfort of a passenger car, Selection of parameters of units and systems of passenger car: engine, transmission, suspension system, carrying system, braking system, etc, Procedure for making the general project of passenger car, 4. Elements of bus design: Classification of buses, Exploitation conditions for buses, Phases of bus design, Selection of bus conception, Selection of drive scheme, Definition of car body, passenger space and drivers working space, Selection of parameters of longitudinal ground clearance, stability and comfort of bus, Selection of parameters of units and systems of bus: engine, transmission, suspension system, carrying system, braking system, etc, Procedure for making the general project of bus, 5. Elements of optimal motor vehicles design: Elements of virtual design and prototype manufacture, Dynamic simulation – basis for virtual design, Role of specific software (mechanics, hydraulics, pneumatics, automatics, etc) in vehicle design, Elements of stochastic parametric optimization, Examples of optimal design of vehicles and motor vehicles systems.			
Practical Studies:			
Verbal exercises: individual work on seminar paper and its defending; getting to know Mechanical desktop software. Student will be trained for basic research in the area of the subject in the framework of study research.			
Recommended reading			
Obligatory			
1. Demic, M., at all: "Elements of motor vehicle design", (in Serbian), Faculty of mechanical engineering from Kragujevac, 1994, 2. Demic, M., Diligenski, Dj.: "Theory basics of bus design", (in Serbian), Faculty of mechanical engineering from Kragujevac, 2003, 3. Demic, M.: "Design of passenger cars", (in Serbian), Faculty of mechanical engineering from Kragujevac, 2004			
Additional			
1. Demic, M.: "Optimization of motor vehicle's vibratory systems", (in Serbian), Faculty of mechanical engineering from Kragujevac, 1997			
The number of hours of active teaching:			Other classes:
Theory: 3	Practical classes: 1.4	Other forms of teaching: 0.6	Research study: 0
Other classes: 1			
Methods of teaching			
Teaching will be conducted with the use of multimedia tools, which will create conditions for more active participation of students. Problems from the area of the subject will be solved; introduction to Mechanical desktop software conducted and working on seminar paper and its defending will be done during verbal exercises. Testing of knowledge is done through one individually done seminar paper and two colloquiums (one corrective colloquium is anticipated). Verbal final exam is anticipated.			
Evaluation of knowledge			
Pre-final exam obligations	points	Final exam	points
Activities during the classes:	10	verbal exam	30
Practical classes:	/		
Colloquiums(s) :	40 (2x20)		
Seminar(s) :	30		