



Study program: Doctoral Academic Studies in Biomedical Sciences		
Name of the subject: MATHEMATICAL MODELS IN CLINICAL RESEARCH		
Teacher(s): Ljubomir M. Petrović, Jasna M. Mihailović, Mihalj M. Poša, Veljko S. Krstonošić, Teodor M. Atanacković		
Status of the subject: elective		
Number of ECTS points: 15		
Condition:-		
Goal of the subject Application of mathematical modeling in clinical research.		
Outcome of the subject Upon completion of the course, the student is expected to be able to apply the appropriate mathematical model in clinical practice / research.		
Content of the subject		
<i>Theoretical lectures</i>		
<ol style="list-style-type: none"> 1. Compartmental method. New results and applications 2. Mathematical models of blood vessels. Models of Aneurysm. 3. Mathematical models in orthopedics: Hip Prosthesis durability. 4. Systems with memory. Models of biological and technical systems with memory. 5. Viscoelastic properties of dental composites. Mathematical models of dentin. 6. Stress in dental composite during polymerization. Mathematical models. 7. Cyclic Fatigue of nickel-titanium endodontic instruments. Mathematical models 8. Mathematical models in clinical practice. 9. Software's in medicine. 10. Stochastic processes. Markov processes and chains 11. Principal component analysis (PCA) and Quantitative structure–activity relationship models (QSAR models) 12. Viscosity, flow and deformation of materials. 13. Mathematical models function for flow curves and viscosities approximation. 14. Viscoelastic systems and models for illustration of viscoelastic behavior. 15. Application of rheology in medicine, pharmacy and dentistry. 		
<i>Practical lectures</i>		
<ol style="list-style-type: none"> 1. Application of mathematical models in clinical practice / case analysis from clinical research in various fields of medicine 		
Recommended literature		
<ol style="list-style-type: none"> 1. Claudio Cobelli and Ewart Carson, Introduction to Modeling in Physiology and Medicine. Academic Press and Elsevier, London 2008. 2. Gilbert G. Walter Martha Contreras, Compartmental Modeling with Networks. Springer 1999. 3. J. J. Callaghan et al., The Adult Hip: Hip Arthroplasty Surgery, vol. 1-2, Wolters Kluwer Health Adis (ESP), 3rd edition, 2015 4. Aldocigno, Foundations of Pharmacokinetics, Kluwer, 2004. 5. J. Popović, Matematički principi u Farmakokinetici, kompartmentskoj analizi i biofarmaciji. Medicinski fakultet Novi Sad, 1999. 6. Articles from Journals. Will be given at lectures 		
Number of active classes	Theory: 60	Practice: 45
Methods of delivering lectures Theoretical lectures, e-learning, hands-on teaching, workshops, mathematics-based learning, clinical case analysis, participation in research and development projects		
Evaluation of knowledge (maximum number of points 100)		
lectures: 25		
SRW: 25		
oral exam: 50		