

Course title: Lifetime Oriented Design	Neptun code: GEGET418-a
Course coordinator: Szabolcs Szávai, associate professor, PhD	
type and number of lesson: Weekly lecture + seminar hours: 28 (14 x 2/week)	
method of accountability: colloquium	
curriculum location of the subject: autumn/spring	
pre-study conditions:	
The task and purpose of the subject:	
Safety and reliability are important for the whole expected service duration of an engineering structure. Therefore, prognostical solutions for different building types are needed and uncertainties have to be handled. Life-cycle strategies to control future structural degradations by concepts of appropriate design have to be developed, in case including means of inspection, maintenance, and repair.	
Course description:	
The characterization and modelling of lifetime-related external actions of multiple origin are presented in this course as well as the physical description, the modelling and the validation of material degradation. Adaptive numerical methods and simulation techniques are provided for the lifetime-oriented design concepts to forecast material and structural degradation. Stochastic aspects, mathematical optimization methods and interactions between various influences are included. Thus, a solid basis is provided for future practical use and also for standardization of structural design with respect to lifetime-prediction. · Lifetime-Related Structural Damage Evolution · Time-Dependent Reliability of Ageing Structures · Idea of Working-Life Related Building Classes · Economic and Further Aspects of Service-Life Control · Fundamentals of Lifetime-Oriented Design · Damage-Oriented Actions and Environmental Impact · Thermal Impacts on Structures · Load-Independent Environmental Impact · Degradation of Materials and Structures · Modelling and Methodological Implementation	
Required literature:	
1. Friedhelm Stangenberg et. all, Lifetime-Oriented Structural Design Concepts 2009	
Recommended literature:	
1. Stephens, R. I. – Fatemi, A. – Stephens, R. R. – Fuchs, H. O.: Metal Fatigue in Engineering. 2nd Ed. John Wiley & Sons. 2000. 2. Shigley J.E.: Standard Handbook of Mechanical Engineering, McGraw Hill BookCompany, 1996 3. Mott R.L.: Machine Elements in Mechanical Design, Prentice Hall, 2003 , Prentice Hall, 2003 .	