

Course title: Structural Integrity	Neptun code: GEMTT541-a
Course coordinator: Dr. János Lukács, Full Professor, CSc (PhD)	
type and number of lesson: lectures, 28 hours/ semester	
method of accountability: colloquium	
curriculum location of the subject: autumn / spring	
pre-study conditions: N/A	
The task and purpose of the subject:	
systematic presentation of the elements of failure analysis and structural integrity; introduction to dimensions of life-time management; overview of basic concepts of fracture mechanics and their characteristics; application of fracture mechanics in structural safety	
Course description:	
Failure modes and statistics, loading modes and types, connection among loading and failure modes. General scheme of failure analysis. Conceptual model of structural integrity: global, experimental and information-technical aspects. Dimensions of life-time management. Classical and fracture mechanical design philosophies. Low cycle fatigue, high cycle fatigue, fatigue design curves. Basic concepts of fracture mechanics: linear elastic, elastic-plastic and dynamic fracture mechanics; environmental and velocity influences. Fracture toughness values, fatigue crack growth, crack opening displacement, R-curves. Application of fracture mechanical concepts in safety of different structures, case studies.	
Required literature:	
<ol style="list-style-type: none"> 1. A. F. Jr. Grandt: Fundamentals of Structural Integrity. John Wiley and Sons, Inc., Hoboken, New Jersey, 2004. (ISBN-10: 0-471-21459-0) 2. A. F. Liu: Structural Life Assessment Methods. ASM International, Materials Park, Ohio, 1998. (ISBN-10: 0-87170-653-9) 3. Lukács J.; Nagy Gy.; Harmati I.; Koritárné F. R.; Kuzsella Lné. K. Zs.: Szemelvények a mérnöki szerkezetek integritása témaköréből. Lukács J. (Szerk.) Miskolci Egyetem, Miskolc, 2012. (ISBN-13: 978-963-358-000-4) 	
Recommended literature:	
<ol style="list-style-type: none"> 1. J. Schijve: Fatigue of Structures and Materials. Springer, Dordrecht, 2009. (ISBN-13: 978-1-4020-6807-2) 2. J. M. Barsom; S. T. Rolfe: Fracture and Fatigue Control in Structures: Applications of Fracture Mechanics. ASTM manual series: MNL 41. ASTM, West Conshohocken, PA, 1999. (ISBN-10: 0-8031-2086-2) 3. R. I. Stephens; A. Fatemi; R. R. Stephens; H. O. Fuchs: Metal Fatigue in Engineering. John Wiley and Sons, Inc., 2000. (ISBN-10: 0-471-51059-9) 	