

Course title: Fracture Mechanical Investigations	Neptun code: GEMTT544-a
Course coordinator: Lenkeyné Dr. Bíró Gyöngyvér Ph.D., director of division BAY Institute	
type and number of lesson: lecture, 2 hours/ week	
method of accountability: colloquium	
curriculum location of the subject: autumn/spring	
pre-study conditions: -	
The task and purpose of the subject:	
Presentation of the theory practice and application possibilities of fracture mechanics tests.	
Course description:	
<p>Damage mechanisms of structures with cracks: brittle fracture, tough fracture, fatigue, stress corrosion cracking, creep. Fracture modes, typical fracture mechanics parameters. Fracture mechanics tests of metals:</p> <p>static (KIc, JIc, J-R curve determination, KIIc, KIIIc)</p> <p>dynamic (KId, dynamic J-R curve definition)</p> <p>Fatigue crack propagation (with uniaxial and multiaxial loading); creep crack propagation test, crack stop test ((KIa, Pellini, Robertson test).</p> <p>Test methods. Comparison of fracture mechanics characteristics of structural materials under different load conditions. The relationship between fracture mechanics material properties. Static and dynamic fracture mechanics tests of plastics and ceramics, fracture mechanics characteristics. The practical importance of fracture mechanics material characteristics and their application to structural elements in its design and structural integrity analysis. Basic concepts of fracture mechanics. Fracture modes, fracture criteria. Interpretation of stress collection factors. Modes of crack propagation. Fracture toughness and test methods. Fracture mechanics metrics for ferrous and non-ferrous metals. The role of fracture mechanics in engineering design.</p>	
Required literature:	
<ol style="list-style-type: none"> 1. A. T. Zehnder: Fracture Mechanics, Springer, ISBN 978-94-007-2594-2, 2012, pp. 1-221. 2. T.L. Anderson: Fracture Mechanics, Fundamentals and Applications, Taylor & Francais, ISBN 978-0-8493-1656-2, 2005, pp. 1-611. 	
Recommended literature:	
<ol style="list-style-type: none"> 1. ASM Handbook, Vol. 19: Fatigue and Fracture, ASM International, 1996 2. J.M. Barsom, S. T. Rolfe: Fracture and Fatigue Control in Structures: Applications of Fracture Mechanics, ASTM, ISBN 0-8031-2082-6, 1999, pp. 1-507. 	