Department of Mechanical and Plastics Engineering
Fracture Mechanics

Module name: Fracture Mechanics, 5 ECTS, lecture and exercise, master level

Contact: Prof. Dr.-Ing. Brita Pyttel (brita.pyttel@h-da.de)

Time: summer term 2022 at h_da (1st April 2022 until 22nd July 2022), (online) meeting weekly about (19th April until 22nd July 2022), written exam and/or exercise

Idea: mix students in online and offline meetings, hybrid teaching, moodle-course with lectures and exercises (might include a short time mobility if possible, co-teaching and other ideas for future offers welcome)

Application/Enrollment: If you are interested in participating in the course, send us an email to brita.pyttel@h-da.de by Monday, 11th April 2022. Please indicate your course of study/discipline/major and your university when applying.

Content:

Fracture mechanics (BM.Lecture)

-   Basics of linear elastic fracture mechanics
-   Basics of elastic plastic fracture mechanics
-   Input quantities – defect state, loading state, material state
-   Modelling and fracture mechanics calculation at static and cyclic loading
-   Consideration of mixed mode loading, dynamic loading, stress corrosion cracking, welded joints, probabilistic calculation
-   Worked examples from mechanical engineering

Fracture mechanics (BM.Exercise)

-   Documentation of cracks and fractures
-   Translation of important technical terms English-German
-   Calculation of crack tip loading and parameters of linear elastic and elastic plastic fracture mechanics
-   Proof of strength for simple components under static and cyclic loading using analytical methods and professional software IWM-Verb (free licence for students)
-   Numerical investigation of a cracked component with Franc2D and Ansys (free licence for students)

- (Experimental determination of fracture mechanics material properties under cyclic loading)

Recommended knowledge: No prerequisites

Youtube (not indexed): full course for possible self study, here e.g. Introduction part 1
https://youtu.be/lJhZcBT9fyU