RTU Course "Fracture Theory"

15325 Teorēt.mehānikas un materiālu pretestības katedra

General data

Code	MMP535
Course title	Fracture Theory
Course status in the programme	Compulsory/Courses of Limited Choice
Course level	Post-graduate Studies
Course type	Academic
Field of study	Mechanics, Mechanical Engineering, Machine Building
Responsible instructor	Krasņikovs Andrejs
Academic staff	Kononova Olga
Volume of the course: parts and credits points	1 part, 3.0 Credit Points, 4.5 ECTS credits
Language of instruction	LV, EN, RU
Possibility of distance learning	Not planned
Maximum auditorium capacity	30
Maximum number of students per semester	30
Abstract	Griffith ideas on cracks stability conditions. Irvin method. Stress concentration. Stress intensity factor. Fracture toughtness. Energy methods: J-integral, strain energy release rate parameter, R-curve. Damagemechanics. Cracks and debonding in composites. Cyclic loading and de-bonding in composites. Cyclic loading and cracks propagation conditi-ons.
Goals and objectives of the course in terms of competences and skills	The aim of the study course is to teach students to analyze the structure of the cracks and the stress concentrators of elastic, plastic and viscoelastic materials, determine the design strength, structural design, analysis and crack stress concentrator hazards in structures.
Structure and tasks of independent studies	During the course students should perform independent work on the themes: 1). Stress concentrators in structures, 2). Cracks, mathematical gaps, 3). Cracks and nonlinear deformation.
Recommended literature	1).Л.М.Качанов "Основы механики разрушения" М.1972. 2).К.Хеллан "Введение в механику разрущения" М.1988; 3).J.F.Knott "Fundamentals of Fracture Mechanics" London.1973.
Course prerequisites	Resistance of materials, theoretical mechanics, mathematics, physics

Course outline

Theme	Hours
Stress, strain. Strength theory. Stress Area.	12
Griffiths theory.	10
Cracks. Math cracks. Stress intensity factor. Maud collapse.	12
The energy release rate. Cherepanova-Rice integral.	14

Learning outcomes and assessment

Learning outcomes	Assessment methods
Knowledge of theories of strength	Tests
Knowledge of plastic deformed state structure determination	Consultations
Knowledge of stress concentration factor, stress intensity factors, fracture Toughness factor	Tests
Knowledge of COD, the energy release rate and Čerepanova-Rice integral	Tests

Study subject structure

Part	CP	ECTS	Hours per Week			Tests		
			Lectures	Practical	Lab.	Test	Exam	Work
1.	3.0	4.5	1.0	2.0	0.0		*	