



Şcoala Doctorală Interdisciplinară  
(SDI)

Domeniul de doctorat:  
INGINERIA MATERIALELOR  
Conducător doctorat:  
Conf Dr Fiz NICOLAE CRETU

### TEME (TEMATICĂ) PENTRU CONCURS

#### TEMA 1: Materiale cu magnetostricţiune mare cu utilizari in ultrasonica

##### Conţinut / Principalele aspecte abordate -

1. Despre magnetismul substantelor
2. Materiale ferimagnetice, preparare, caracterizare
3. Traductori de ultrasunete cu ferite

##### Bibliografie recomandată:

1. Microwave ferrites and ferrimagnetics. B. LAX and K.J. BUTTON: McGraw-Hill, New York, 1962
2. Emil Burzo - FIZICA FENOMENELOR MAGNETICE VOL. 1 SI 2, Editura Academiei Romane , Bucuresti,1981
3. G. Bradfield-Ultrasonic transducers, *Ultrasonics*, Volume 8, Issue 2, April 1970, Pages 112-123

##### Note /Precondiții /

#### TEMA 2: Constante elastice de material

##### Conţinut / Principalele aspecte abordate

1. Proprietăți elastice ale materialelor solide
2. Metode de determinare a constantelor de material
3. Interferometria Doppler si aplicatii in determinarea constantelor elastice

##### Bibliografie recomandată:

1. [Pulse propagation in finite elastic inhomogeneous media](#), N Cretu, G Nita - Computational materials science, 2004
2. [A simplified modal analysis based on the properties of the transfer matrix](#), Cretu Nicolae, Nita Gelu - Mechanics of Materials, 2013
3. L. M. Brekhovskikh, *Waves in Layered Media* (Academic, New York, 1980)

Conducător doctorat: Nicolae CRETU



Transilvania  
University  
of Brasov

## ADMISSION TO DOCTORAL STUDIES

2020-2021

Session September 2020

Interdisciplinary Doctoral School  
(SDI)

Field of doctoral studies:

Engineering of Materials

PhD supervisor:

Assoc. Professor NICOLAE CRETU

### TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

#### TOPIC 1: Materials with significant magnetostriction and ultrasonic applications

##### Content / Main aspects to be considered

1. Magnetic properties of materials
2. Ferrimagnetic materials, ferrites chemistry, preparing, characterization techniques
3. Ultrasonic transducers using ferrites

##### Recommended bibliography:

1. Microwave ferrites and ferrimagnetics. B. LAX and K.J. BUTTON: McGraw-Hill, New York, 1962
2. Emil Burzo - FIZICA FENOMENELOR MAGNETICE VOL. 1 SI 2, Editura Academiei Romane , Bucuresti,1981
3. G. Bradfield-Ultrasonic transducers, *Ultrasonics*, Volume 8, Issue 2, April 1970, Pages 112-123

##### Prerequisites / Remarks:

#### TOPIC 2: Elastic constants of materials

##### Content / Main aspects to be considered

1. About the elastic properties of materials
2. Methods for determining of the elastic constants of materials
3. Doppler interferometry and applications in determining of the elastic constants

##### Recommended bibliography:

1. [Pulse propagation in finite elastic inhomogeneous media](#), N Cretu, G Nita - Computational materials science, Elsevier, 2004
2. [A simplified modal analysis based on the properties of the transfer matrix](#), Cretu Nicolae, Nita Gelu - Mechanics of Materials, Elsevier 2013
3. L. M. Brekhovskikh, *Waves in Layered Media* (Academic, New York, 1980)

##### Prerequisites / Remarks:

PhD supervisor: Assoc Prof NICOLAE CRETU