



**ADMISSION TO DOCTORAL STUDIES**

**Session September 2023**

**Field of doctoral studies: Materials Engineering**

**Doctoral supervisor: Prof. dr. eng. Dan CRISTEA**

**TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES**

**TOPIC 1:** *Magnesium or zinc-doped ternary coatings, with improved corrosion protection capacity*

**Content / Main aspects to be considered** - *Development and characterization of nitride coatings of a transition metal (MeN), doped with magnesium or zinc, with improved mechanical and anticorrosive properties.*

**Recommended bibliography:**

1. Manish Roy - Surface Engineering for Enhanced Performance against Wear - Springer, 2013
2. J.R. Davis - Surface Engineering For Corrosion And Wear Resistance– ASM International, 2001
3. Burakowski, T – Surface engineering of metals: principles, equipment, technologies – CRC Press, 1999
4. Ohring, M. The materials science of thin films. Academic Press, 1992

**Prerequisites / Remarks:** *Knowledge of physics and materials science.*

**TOPIC 2:** *Ternary nitride thin films of transition metals*

**Content / Main aspects to be considered** - *Development and characterization of ternary nitride coatings of transition metals (Me<sub>1</sub>Me<sub>2</sub>N), with improved mechanical properties.*

**Recommended bibliography:**

1. Manish Roy - Surface Engineering for Enhanced Performance against Wear - Springer, 2013
2. J.R. Davis - Surface Engineering For Corrosion And Wear Resistance– ASM International, 2001
3. Burakowski, T – Surface engineering of metals: principles, equipment, technologies – CRC Press, 1999
- Ohring, M. The materials science of thin films. Academic Press, 1992

**Prerequisites / Remarks:** *Knowledge of physics and materials science*

**TOPIC 3:** *Advanced thin solid films for photovoltaics*

**Content / Main aspects to be considered** - *Development and characterization of thin solid films with perovskite-type structures ( $ABO_3$  or  $ABN_3$ ) for photovoltaic applications.*

**Recommended bibliography:**

1. Daniel Abou-Ras, Thomas Kirchartz, and Uwe Rau- Advanced Characterization Techniques for Thin Film Solar Cells- 2016 Wiley-VCH
2. Ohring, M. The materials science of thin films. Academic Press, 1992

**Prerequisites / Remarks:** *Knowledge of physics and materials science*

**Doctoral supervisor,**

Prof. Dr. eng. Dan CRISTEA

Signature



**Coordinator of the field of doctoral studies,**

Prof. Dr. Eng. Mircea Horia TIEREAN

Signature

