



ADMISSION TO DOCTORAL STUDIES

Session September 2024

Field of doctoral studies: Mechanical Engineering

Doctoral supervisor: Prof. dr. eng. Călin Itu

TOPICS FOR THE ADMISSION TO DOCTORAL STUDIES

TOPIC 1: *Modeling and frontal impact testing of a kart used in car racing.*

Content / Main aspects to be considered:

- *analytical calculation models for stress and strain states caused by temperature variations in composite structures;*
- *finite element analysis of stress and strain states in composite structures mechanically loaded under the action of the temperature variation;*
- *mechanical testing of structures and parts made of laminated composite materials.*

Recommended bibliography:

1. Barbero E. J., *Finite element analysis of composite materials*, CRC Press Taylor & Francis Group, ISBN -13: 978-1-4200-5434-0, Boca Raton, 2008;
2. Călin Itu – *Materiale Compozite Stratificate*, Ed. Universităţii Transilvania Braşov, 2015
3. Springer G. S., *Environmental Effects, Environmental Effects on Composite Materials*, vol. 3, Editor Springer, G., S., Lancaster, PA: Technomic Publishing Company, 1988;
4. Timoshenko S. P., Woinowsky-Krieger S., *Teoria plăcilor plane și curbe*, Editura Tehnică, Bucureşti, 1968;
5. Vlase, S., Teodorescu, H., Purcărea, R., Modrea, A. - *Mecanica materialelor compozite armate cu fibre*, Ed. Infomarket, 2008. ISBN 978-973-8204-98-0.

Prerequisites / Remarks:

Basic competences and abilities for the candidate:

- *knowledge of the fundamental concepts and calculation methods from Strength of Materials and Mechanics;*
- *knowledge of the basic concepts from Theory of elasticity;*
- *knowledge of the basic concepts about composite materials.*

Scientific Doctorate (full-time only)

Professional Doctorate – in the fields of Music and Science of sport and physical education (full-time or part-time)

without tuition fee (state budget funded)

with tuition fee or with funding from other sources than the state budget

TOPIC 2: *The study of the requirements of a mannequin used to simulate car accidents.*

Content / Main aspects to be considered:

- *analytical calculation models for stress and strain states caused by temperature variations in composite structures;*
- *finite element analysis of stress and strain states in composite structures mechanically loaded under the action of the temperature variation;*
- *mechanical testing of structures and parts made of laminated composite materials.*

Recommended bibliography:

6. Barbero E. J., *Finite element analysis of composite materials*, CRC Press Taylor & Francis Group, ISBN -13: 978-1-4200-5434-0, Boca Raton, 2008;
7. Călin Itu – *Materiale Compozite Stratificate*, Ed. Universității Transilvania Brașov, 2015
8. Springer G. S., *Environmental Effects, Environmental Effects on Composite Materials*, vol. 3, Editor Springer, G., S., Lancaster, PA: Technomic Publishing Company, 1988;
9. Timoshenko S. P., Woinowsky-Krieger S., *Teoria plăcilor plane și curbe*, Editura Tehnică, București, 1968;
10. Vlase, S., Teodorescu, H., Purcărea, R., Modrea, A. - *Mecanica materialelor compozite armate cu fibre*, Ed. Infomarket, 2008. ISBN 978-973-8204-98-0.

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TOPIC 3: *Solutions for reducing the weight of electric cars by optimizing the shape of the chassis and body.*

Content / Main aspects to be considered:

- *analytical calculation models for stress and strain states caused by temperature variations in composite structures;*
- *finite element analysis of stress and strain states in composite structures*

mechanically loaded under the action of the temperature variation;

- *mechanical testing of structures and parts made of laminated composite materials.*

Recommended bibliography:

11. Barbero E. J., *Finite element analysis of composite materials*, CRC Press Taylor & Francis Group, ISBN -13: 978-1-4200-5434-0, Boca Raton, 2008;
12. Călin Itu – *Materiale Compozite Stratificate*, Ed. Universității Transilvania Brașov, 2015
13. Springer G. S., *Environmental Effects, Environmental Effects on Composite Materials*, vol. 3, Editor Springer, G., S., Lancaster, PA: Technomic Publishing Company, 1988;
14. Timoshenko S. P., Woinowsky-Krieger S., *Teoria plăcilor plane și curbe*, Editura Tehnică, București, 1968;
15. Vlase, S., Teodorescu, H., Purcărea, R., Modrea, A. - *Mecanica materialelor compozite armate cu fibre*, Ed. Infomarket, 2008. ISBN 978-973-8204-98-0.

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Doctoral supervisor,
Prof. Dr. Eng. Călin Itu
Signature

Coordinator of the field of doctoral studies,
Prof. Dr. Eng. Mat. Sorin Vlase