PLANNING

Program	Mechanical Sciences (53001010053P0)
Name	INTRODUCTION TO CONTACT MECHANICS
Sigla	PCMEC
Number	2121
Credits	4
Period	01/01/2017
Professor	José Alexander Araújo
Obrigatory	No

Content

Objectives:

To introduce the basic concepts of the Theory of Elastic Contacts.

Justification:

The contact problem in mechanical assemblies is key for the design of many importante engineering components. On the other hand, at undergraduate level, there no disciplines which encompass a more profound knowledge of the stresses and strains fields produced even by basic contact geometries. Therefore, this course aims to provide MSc and DSc students not only with a robust theoretical back ground on the subject but also with some numerical skills. Basic contact configuration such as cylinder-plane; plane-plane; sphere-plane will be considered under the presence of remote time varying loading, which is a problem often found to design couplings against fretting fatigue.

Content:

Módulo 1 – Introdução a elasticidade linear; **Módulo 2 –** Formulação de problemas de contato plano; **Módulo 3 –** Solução de problemas de contato plano; **Módulo 4 –** Problemas de escorregamento parcial; **Módulo 5 –** Efeito de carga remota ao contato;

Evaluation:

Lists of exercise (**50%)**; Computational work and seminars **(50%)**

Remarks:

Bibliography:

1. **BARBER**, J.R., Contact Mechanics, Springer (Solid Mechanics and its applications series), 2018, Springer.
2. **POPOV, V.L.,** Contact Mechanics and Friction: Physical Principles and Applications 2nd ed. 2017 Edition, Springer.
3. **HILLS, D. A.,** and Nowell, D., Fretting Fatigue, Kluwer Academic Publishers, 2004.
4. **KALKER, J. J.**, Three-Dimensional Elastic Bodies in Rolling Contact (Solid Mechanics and Its Applications), Kluwer Academic Publishers, 1990.
5. **JOHNSON**, K.L., Contact Mechanics, Cambridge University Press, 1985.