**UNIVERSIDADE FEDERAL DE SANTA CATARINA**
**CENTRO DE CIÊNCIAS FÍSICAS E MATEMÁTICAS**
**PÓS-GRADUAÇÃO EM MATEMÁTICA PURA E APLICADA**

**MTM410038 Sobolev Distributions and Spacing Theory**

Pre-requisite: Theory of measurement and integral of Lebesgue, MTM410029 Functional Analysis

Weekly lesson hours: 06h

**Discipline syllabus:** The Function Space Tests. Density. Distributions in an open Ω of Rn. Derivation of distributions. Temperate Distributions. Fourier transform in L1 (Rn), S (Rn) and $L^2$ (Rn). Fourier transform of tempered distributions. Plancherel's theorem. The Sobolev Spaces W (Ω). Properties, Reflexivity, Separability, Dual. The Space W (Ω). Prolonging Operators. The Sobolev spaces Hs (Ω) and Hs (Ω), s real, Ω open subset of Rn. The Trace Theorem. Applications to Partial Differential Equations. Generalized Solutions and Existence and Uniqueness of Initial and Border Value Problems.

**BIBLIOGRAPHIC REFERENCES**


1. Medeiros, L. A., Miranda, M. M., *Espaços de Sobolev*, 2a. Edição, Instituto de Matemática, UFRJ, 2004.
2. Brezis, H., *Analyse Fonctionnelle: théorie et Applicátions*, Masson (1983).
3. Kesavan, S., *Topics in Functional Analysis and Applications*, Wiley (1989).


COMPLEMENTARY BIBLIOGRAPHY


1. Adams, R. A., *Sobolev Spaces*, Academic Press (1975).
2. Evans, L. C., *Partial differential equations*, American Mathematical Society, 2002.
3. Hörmander, L., The Analysis of Linear Differential Operators I, Distribution Theory and Fourier Analysis, Springer-Verlag, 2ed., 1990
4. Medeiros, L. A. , Rivera, P. H. *Iniciação aos Espaços de Sobolev*, IM-UFRJ, Rio de Janeiro (1977).
5. Renardy, M., Rogers, R.C., *An introduction to partial differential equations*, Springer-Verlag, 1993.