

MAT2971	TÓPICOS DE MATEMÁTICA CARGA HORÁRIA TOTAL: 45 HORAS Nº CRÉDITOS: 3 PROFESSOR: Jeanine Van Order
TÍTULO DA DISCIPLINA:	AUTOMORPHIC REPRESENTATIONS ON $GL(n)$
OBJETIVOS DA DISCIPLINA/TURMA	Introdução às representações automórficas do grupo $GL(n)$ sobre corpos numéricos e seus anéis de adeles. Tópicos incluem formas modulares clássicas, representações cuspidais, séries de Eisenstein, modelos de Whittaker, funções L automórficas e aplicações aritméticas
EMENTA DA DISCIPLINA	Most central topics in modern number theory and the Langlands programme are described in the language of automorphic forms and L-functions. We give a systematic introduction to this theory, starting with the theory of Hecke L-functions for $GL(1)$ following Tate and Iwasawa, then developing the theory of automorphic representations on $GL(2)$ via Whittaker models following [1, Chapters II and III] and [3]. We then explain how this theory extends to $GL(n)$ following [3] and [2]. A large motivation will be to describe the standard L-function of an automorphic representation of $GL(n)$, as well as the theory of Rankin-Selberg convolution, and standard conjectures in the Langlands programme.
PRÉ-REQUISITOS DA DISCIPLINA	Álgebra linear, estruturas algébricas básicas (grupos, anéis, corpos), análise real e complexa. É desejável alguma familiaridade com teoria dos números e formas modulares.
PROGRAMA DA DISCIPLINA/TURMA	Tentative outline: 1. Adèles and $GL(1)$ *Adèles and idèles; global fields and topological groups *Tate's thesis 2. Classical Modular Forms and Hecke Theory *Modular forms, Hecke operators, and L-functions *Modular forms as functions on the $\backslash H$ and on adèle groups *Cusp forms, Eisenstein series, and Petersson inner product 3. Automorphic Representations of $GL(2)$ *Realization of modular forms as automorphic forms on $GL(2,A)$ *Cuspidal automorphic representations and Whittaker models *Newforms, Atkin-Lehner theory, and Kirillov models *Local components and unramified representations

4. General Theory for $GL(n)$

- *Principal series and induced representations
- *Global automorphic representations, Langlands classification
- *Whittaker models and multiplicity one
- *L-functions and the global functional equation

5. Further Topics and Arithmetic Applications

- *Rankin–Selberg convolutions and integral representations
- *Eisenstein series and constant terms
- *Base change and automorphic induction
- *CM theory and connections to abelian varieties

AVALIAÇÃO DA DISCIPLINA

Critério 12

Média = G1

DETALHAMENTO AVALIAÇÃO DA DISCIPLINA

Tarefa de casa escrita e exame oral

BIBLIOGRAFIA BÁSICA DA DISCIPLINA

[1] D. Bump, Automorphic Forms and Representations, Cambridge Stud. Adv. Math. 55, Cambridge University Press (1998).

[2] D. Goldfeld, Automorphic Forms and L-functions for the Group $GL(n, \mathbb{R})$, Cambridge Stud. Adv. Math. 99, Cambridge University Press (2006).

[3] D. Goldfeld and J. Hundley, Automorphic Representations and L-Functions for the General Linear Group, Volumes I & II, Cambridge Stud. Adv. Math. 129 & 130, Cambridge University Press (2011).

[4] T. Miyake, Modular Forms, Springer Monogr. Math., Springer-Verlag, Berlin, Heidelberg (1989).

BIBLIOGRAFIA COMPLEMENTAR DA DISCIPLINA

[1] Shimura, Goro. Introduction to the Arithmetic Theory of Automorphic Functions. Princeton University Press, 1971.

[2] Shimura, Goro. Abelian Varieties with Complex Multiplication and Modular Functions. Princeton University Press, 1998.

BIBLIOGRAFIA DE PESQUISA DA DISCIPLINA