课程大纲
COURSE SYLLABUS

1.	**课程代码/名称** **Course Code/Title**	**MAT7062 双曲动力学 Hyperbolic Dynamics**
2.	**课程性质** **Compulsory/Elective**	Elective
3.	**课程学分/学时** **Course Credit/Hours**	Course credits 3 – 48 hours
4.	**授课语言** **Teaching Language**	English
5.	**授课教师** **Instructor(s)**	Jana Rodriguez Hertz, Professor; Raul Ures, Professor
6.	**是否面向本科生开放** **Open to undergraduates or not**	Yes
7.	**先修要求** **Pre-requisites**	（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.） MA401 动力系统 Any basic course of Dynamical Systems. No differences between undergraduate and graduate students.

8. 教学目标
Course Objectives

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

This course introduces the basic concepts of hyperbolic dynamics, both uniform and non-uniform. It focusses on some classical results that are important for the following development of the theory as well on some recent developments, preparing the students for the study of more advanced topics and research.

9. 教学方法
Teaching Methods

（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

In presence class. No differences between undergraduate and graduate students.

10. 教学内容
Course Contents
（如面向本科生开放，请注明区分内容。 If the course is open to undergraduates, please indicate the difference.）

Section 1	**1. Hyperbolic dynamics** 1.1 The Smale horseshoe 1.2 The Arnold's cat map 1.3 Hyperbolic sets 1.4 The Stable Manifold Theorem 1.5 Smale's spectral decomposition Theorem
Section 2	**1. Non-uniformly hyperbolic dynamics** 2.1 Lyapunov exponents. Examples. 2.2. The Oseledets Theorem

		2.3 Pesin Stable Manifold Theorem 2.4 Elements of Pesin Theory: Pesin Blocks, Pesin Region, etc. 2.5 Absolute continuity 2.6 Ergodicity criterion
	Section 3	**Partial hyperbolicity** 3.1 Partial hyperbolicity, definition and examples 3.2 Accessibility 3.3 Ergodic theorems for partially hyperbolic diffeomorphisms 3.4 Dominated splitting 3.5 Open problems and conjectures
	Section 4	
	Section 5	
	Section 6	
	Section 7	
	Section 8	
	Section 9	
	Section 10	
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11. 课程考核
Course Assessment

（①考核形式 Form of examination；②.分数构成 grading policy；③如面向本科生开放，请注明区分内容。If the course is open to undergraduates, please indicate the difference.）

Homework 30%+ Mid-term Exam (closed-book) 30%+Final Exam (closed book) 40%

12. 教材及其它参考资料
Textbook and Supplementary Readings

- Pollicott, Mark, Lectures on ergodic theory and Pesin Theory on compact manifolds, Cambridge University Press
- Katok, A., Hasselblatt, B., Introduction to the Modern Theory of Dynamical Systems, Cambridge University Press
- Rodriguez Hertz, F.; Rodriguez Hertz, J.; Ures, R., Partially Hyperbolic Dynamics. Publicações Matemáticas do IMPA, 2011.