The syllabus of Fourier and Real Analysis

<table>
<tr><td colspan="6">课程基本信息（Course Information）</td></tr>
<tr><td>课程代码
（Course Code）</td><td>MA 216</td><td>学时
（Credit Hours）</td><td>64</td><td>学分
（Credits）</td><td>4</td></tr>
<tr><td rowspan="2">课程名称
（Course Name）</td><td colspan="5">（中文）傅里叶分析与实分析</td></tr>
<tr><td colspan="5">Fourier and Real Analysis</td></tr>
<tr><td>课程属性
(Course Type)</td><td colspan="5">专业必修课</td></tr>
<tr><td>开课院系
（School）</td><td colspan="2">Department of Mathematics</td><td>开课学期
（Term）</td><td colspan="2">Spring</td></tr>
<tr><td>先修课程
（Prerequisite course）</td><td colspan="5">Mathematical Analysis</td></tr>
<tr><td>授课教师
（Instructors）</td><td colspan="5">Mikhail Tyaglov</td></tr>
<tr><td>课程简介（Description）
300-500 字</td><td colspan="5">The course is introduction to the theory of Fourier series and transform as well as to the theory of Lebesque integration. Fundamental ideas and rigorous proof will be presented. Topics of the course to be covered include Fourier series, their convergence and applications, Poisson kernel, Cesaro and Abel summability, Plancherel formula, Poisson summation formula, measures, measurable sets and functions, Lebesgue integral and Fubini theorem.</td></tr>
<tr><td colspan="6">课程教学大纲（course syllabus）</td></tr>
<tr><td>*学习目标(Learning Outcomes)</td><td colspan="5">After completing the course, students should:
1. Know the definition and basic (analytic) properties of Fourier series and Fourier transform, and be able to apply them in different areas of mathematics such as ODE, PDE, functional and integral equations, ergodic theory, geometry etc.
2． Know definition and the basic properties of the Lebesgue integration</td></tr>
<tr><td>*教学内容、进度安排及要求
(Class Schedule
& Requirements)</td><td colspan="5"><table>
<tr><th>教学内容
topics</th><th>学时
Credit hours</th><th>教学方式
Teaching methodology</th><th>作业及要求
tasks</th><th>基本要求
Intended learning outcomes</th><th>考查方式
Assessment methods</th></tr>
<tr><td>Introduction, Genesis of Fourier Series</td><td>4</td><td></td><td></td><td></td><td>homework</td></tr>
<tr><td>Definition of Fourier Series, Examples,</td><td>4</td><td></td><td></td><td></td><td>homework</td></tr>
</table></td></tr>
</table>

	applications to PDE					
	Poisson kernel, convolution	4				homework
	Good kernels, Cesaro and Abel summability	4				homework
	Introduction to Hilbert and Banach spaces	4				homework
	Convergence of Fourier series	4				homework
	Application of Fourier series to PDE, ergodic theory and geometry	4				homework
	Applications of Fourier series to boundary problems of ODE	4				homework
	Fouerier transform and Plancherel formula	4				homework
	Applications of Foureir transform to PDE and Poisson summation formula	4				homework
	Properties of Fourier transform and applications to integral-functional equations	4				homework
	Basic facts of the sets theory	4				homework
	Measurable sets and Lebesque measure	4				homework
	Measurable functions	4				homework

	Lebesgue integral	4				homework
	Fubini's theorem, final review	4				Homework/final
考核方式 (Assessment methods and Grading)	The *final grade* is decided as follows: 50% - Homework, 50% - Final					
教材或参考资料 (Textbooks & Other Reading Materials)	Text books: Stein & Shikarchi "Fourier Analysis" and Stein & Shikarchi "Real Analysis", my translation from Russian of lecture notes by Budylin.					
备注 （Notes）						