

# Leon Takhtajan

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## MAT 341: Applied Real Analysis Fall 2017 Schedule & Homework

Course Information      Schedule & Homework

### Schedule

The PDF version of the schedule is available for print [here](#).

Date	Topic	Section	Assignments	Due date
Aug 29	Introduction to Fourier series	1.1, 1.10	<b>1.1:</b> 1abc, 2ad, 4, 7b, 8; <b>1.10:</b> 1, 2	<b>HW1</b> Due Sept 7
Aug 31	Determining Fourier coefficients. Examples.	1.2	<b>1.2:</b> 1, 7	
Sep 5	<i>no class (Labor day)</i>			
Sep 7	Fourier sine & cosine series Convergence of Fourier series	1.3	<b>1.2:</b> 10ab, 11ab <b>1.3:</b> 1abd, 2ad, 5 6	<b>HW2</b> Due Sept 12
Sep 12	Uniform convergence of Fourier series	1.4	<b>1.4:</b> 1ae, 2,3ab, 4, 5bc	<b>HW3</b> Due Sept 19
Sep 14	Basic operations on Fourier series	1.5	<b>1.5:</b> 2, 5, 9	
Sep 19	The heat equation. Steady-state solutions	2.1, 2.2	<b>2.1:</b> 2, 9; <b>2.2:</b> 2, 6	<b>HW4</b> Due Sept 26
Sep 21	Fixed-end temperatures. Transient solutions	2.3	<b>2.3:</b> 2, 6, 8	
Sep 26	Insulated bar. Examples	2.4	<b>2.4:</b> 4, 5, 8	<b>HW5</b> Due Oct 3
Sep 28	Different boundary conditions Midterm 1 review	2.5	<b>2.5:</b> 4, 5, 6	
Oct 3	Eigenvalues and eigenfunctions Convection	2.6, 2.7	<b>2.6:</b> 7, 9, 10	<b>HW6</b> Due Oct 10
Oct 5	<b>Midterm 1</b> in class, 10:00-11:20am. Covers 1.1-1.5, 1.10, 2.1-2.4			
Oct 10	Sturm-Liouville problems. Relation to Fourier series	2.7, 2.8	<b>2.7:</b> 1, 3bc, 7	<b>HW7</b> Due Oct 17
Oct 12	Series of eigenfunctions & examples. Fourier integral	2.8, 1.9	<b>2.8:</b> 1; <b>1.9:</b> 1ab, 3a	

Oct 17	Fourier integral & applications to PDEs. Semi-infinite rod	2.10	<b>2.10:</b> 3, 4	<b>HW8</b> Due Oct 24
Oct 19	The wave equation	3.1, 3.2	<b>3.2:</b> 3, 4, 5, 7	
Oct 24	The wave equation; Examples Solution to the vibrating-string problem	3.2	<b>page 255:</b> 18 <b>page 257:</b> 31	<b>HW9</b> Due Oct 31
Oct 26	D'Alembert's solution; Examples	3.3, 3.4	<b>3.3:</b> 1, 2, 5	
Oct 31	Laplace's equation Midterm 2 review	4.1, 4.2	<b>4.1:</b> 1-6	<b>HW10</b> Due Nov 7
Nov 2	<b>Midterm 2</b> in class, 10:00-11:20am. Covers 2.5-2.8, 1.9, 2.10, 3.1-3.3			
Nov 7	Dirichlet's problem in a rectangle; Examples	4.2, 4.3	<b>4.2:</b> 5, 6	<b>HW11</b> Due Nov 14
Nov 9	Potential in a rectangle; Examples. Potential in unbounded regions	4.3, 4.4	<b>4.3:</b> 2b <b>4.4:</b> 4a, 5ab	
Nov 14	Polar coordinates. Potential in a disk	4.1, 4.5	<b>4.1:</b> 6 <b>4.5:</b> 1	<b>HW12</b> Due Nov 21
Nov 16	Dirichlet problem in a disk; Examples	4.5	<b>4.5:</b> 4	
Nov 21	Two-dimensional heat equation. Problems in polar coordinates	5.3, 5.4	<b>5.3:</b> 1, 7; <b>5.4:</b> 5	<b>HW13</b> Due Dec 5
Nov 23	<i>no class (Thanksgiving)</i>			
Nov 28	Bessel's equation. Temperature in a cylinder	5.5, 5.6	<b>5.5:</b> 4, 6; <b>5.6:</b> 3, 7	
Nov 30	Vibrations of a circular membrane	5.7	<b>5.7:</b> 2	
Dec 5	Spherical coordinates; Legendre polynomials	5.9	<b>5.9:</b> 6, 8	<b>Practice problems</b>
Dec 7	Review		<b>page 371:</b> 1, 2, 6	
Dec 15	<b>Final Exam</b> in class, 11:15am-1:45pm. The final is cumulative and covers 1.1-1.5, 1.9-1.10, 2.1-2.8, 2.10, 3.1-3.4, 4.1-4.5, 5.3-5.7, 5.9			