



# CONTENTS

*Preface*

*page ix*

## INTRODUCTION

§ 1	The Nature of Harmonic Analysis	1
2	The Properties of the Lebesgue Integral	4
3	The Riesz-Fischer Theorem	27
4	Developments in Orthogonal Functions	34

## CHAPTER I

### PLANCHEREL'S THEOREM

§ 5	The Formal Theory of the Fourier Transform	46
6	Hermite Polynomials and Hermite Functions	51
7	The Generating Function of the Hermite Functions	55
8	The Closure of the Hermite Functions	64
9	The Fourier Transform	67

## CHAPTER II

### THE GENERAL TAUBERIAN THEOREM

§ 10	Enunciation of the General Tauberian Theorem	72
11	Lemmas Concerning Functions whose Fourier Transforms Vanish for Large Arguments	80
12	Lemmas on Absolutely Convergent Fourier Series	86
13	The Proof of the General Tauberian Theorem	94
14	The Closure of the Translations of a Function of $L_1$	97
15	The Closure of the Translations of a Function of $L_2$	100

## CHAPTER III

## SPECIAL TAUBERIAN THEOREMS

§ 16	The Abel-Tauber Theorem	<i>page</i> 104
17	The Prime-Number Theorem as a Tauberian Theorem	112
18	The Lambert-Tauber Theorem	119
19	Ikehara's Theorem	125
20	The Mean Square Modulus of a Function	138

## CHAPTER IV

## GENERALIZED HARMONIC ANALYSIS

§ 21	The Spectrum of a Function	151
22	The Spectra of Certain Linear Transforms of a Function	164
23	The Monotoneness of the Spectrum	180
24	The Elementary Properties of Almost Periodic Functions	185
25	The Weierstrass and Parseval Theorems for Almost Periodic Functions	196
	<i>Bibliography</i>	200

