SRI GURU TEGH BAHADUR KHALSA COLLEGE

North Campus, New Delhi

Academic Calendar July-Dec 2016

Week	Dates	Days	Lecture Schedule	List of Holidays
1st	20/07/2016-23/07/2016	4	Total Days: 100	
2nd	25/07/2016-30/07/2016	6	Holidays : 08	Sem. Break: 11oct-16oct
3rd	01/08/2016-06/08/2016	6	Total Teaching Days: 92	Aug. 15: Independence Day
4th	08/08/2016-13/08/2016	6		Aug. 25: Janmashtami
5th	16/08/2016-20/08/2016	5		Sep. 12: Id-ul-Zuha
6th	22/08/2016-27/08/2016	5		Oct. 02: M.Gandhi B'Day
7th	29/08/2016-03/09/2016	6		Oct. 11: Dussehra
8th	05/09/2016-10/09/2016	6		Oct. 12: Muharram
9th	13/09/2016-17/09/2016	5		Oct. 30: Diwali
10th	19/09/2016-24/09/2016	6		Nov. 14: Guru Nanak B'Day
11th	26/09/2016-01/10/2016	6		
12th	03/10/2016-08/10/2016	6		
13th	10/10/2016-15/10/2016	1		
14th	17/10/2016-22/10/2016	6		
15th	24/10/2016-29/10/2016	6		
16th	31/10/2016-05/11/2016	6		
17th	07/10/2016-12/11/2016	6		

SRI GURU TEG BAHADUR KHALSA COLLEGE

North Campus, University of Delhi

Department: Mathematics

Course : B.Sc. Physical Science

Semester : V (Sec: A+B+C)

Subject : Real Analysis (MAPT-505)

Teacher : Ms Prabhleen Kaur

The aim of the module is to introduce the students to the fundamental ideas of Real Analysis: properties of real numbers, limits of sequences, infinite series, limits of real functions, power series etc. The module should encourage students to think clearly and critically and to begin to be able to prove simple statements on their own.

Learning objectives:

At the end of the module students should

- *Understand the Axiom of Completeness*
- *Be able to determine whether some simple sequences and series converge or diverge*
- *Understand the difference between convergence and absolute convergence*
- *Be able to prove statements on their own using "epsilon" arguments*
- *Understand Power series and the Radius of convergence*

Teaching Schedule

(July- Dec 2016)

Number of classes/week: 4 theory + 1 interactive session

Week	Topics	Remarks
1st	• Sets and functions • Finite and infinite sets	
2nd	• Countable and uncountable sets • Cantor's theorem • Examples: page 18 [1] • Exercises: page 21 [1]	[1] R.G. Bartle and D.R. Sherbert : Introduction to real analysis
3rd	• Algebraic and order properties of R • Absolute value, Real line • Examples: page 28,32,33 [1] • Exercises: page 29,34[1]	
4th	• Bounded sets, suprema and infima of a set • Order completeness property of R • Applications of suprema property • Examples: page 39[1] • Exercises: page 43[1]	Assignment 1
5th	• Intervals, characterization theorem • Cluster point, Bolzano Weierstrass theorem for sets • Exercises: page 50[1]	Test: 1
6th	• Introduction to Sequences • Limits of sequences • Examples: page 55,57,58[1] Page 31,33,35[2] • Exercises: page 59[1] Page 36[2]	[2] K.A. Ross : Elementary analysis- The Theory of Calculus Series
7th	• Limit theorems, order preservation and squeeze theorem • Examples: page 64[1] Page 46-48[2] • Exercises: page 67[1] Page 52[2]	
8th	• Monotone sequences and their convergence • Divergence criteria • Bolzano Weierstrass theorem for sequences • Examples: page 70,71,76,77[1] • Exercises: page 74,80[1]	
9th	• Cauchy convergence criterion • Examples: page81,82,85[1] • Exercises: page86[1]	Assignment 2
10th	• Introduction to Infinite series • Cauchy convergence criterion for series • Examples: page 90,91[1] • Exercises: page95[1]	Test 2

11th	• Convergence tests • Absolute and conditional convergence • Tests for non absolute convergence • Examples: page 94,259, 261,265[1] Page 96[2] • Exercises: page 256,262,265[1] Page 98[2]	
12th	• Sequence and series of functions • Pointwise and uniform convergence • Examples: page 228, 230[1] Page 177, 179[2] Page 422[3] • Exercises: page 232[1] Page 182[2]	[3] T.M. Apostol: Calculus, Volume-1
13th	• Introduction to power series	Assignment 3
14th	• Power series continued • Radius of convergence • Examples: page 173, 187[2] Page 428[3] • Exercises: page 176[2]	
15th	• Cauchy-Hadamard Theorem • Term by term differentiation and integration of power series	
16th	• Uniqueness theorem for power series • Definition and properties of $\sin x$, $\cos x$, e^x in terms of power series • Examples: page271[1] Page 195[2] • Exercises: page 199[2]	Test 3
17th	• Revision week	