DEPARTMENT OF MATHEMATICS				*CLASS: II B.Sc. Mathematics*				
Sem	**Course Type**	**Course Code**	**Course Title**	**Credits**	**Contact Hours/week**	**CIA**	**Ext**	**Total**
IV	MAJOR	20U4MMC7	Sequence and Series	3	4	25	75	100

Nature of Course				
Knowledge and skill	✓		Employability oriented	
Skill oriented			Entrepreneurship oriented	

OBJECTIVES

1. To determine whether or not a sequence converges we can look at what happens to the general term as n gets infinitely large.
2. To Recognize when a sequence is increasing, decreasing, bounded, or monotone and Recognize example of geometric sequences and determine whether they converge or diverge.
3. To Recognize when a geometric series converges and be able to compute its sum in that case(conceptual +Procedural)

Unit	Description	Hours	K-level	CLO
I	Bounded sets-Least Upper Bound-Greatest Lower Bound-Inequalities-Triangle Inequalities- Cauchy Schwarz Inequalities.	10	Up toK3	CLO1
II	Sequences: Sequences-Bounded sequence-Monotonic sequence-Convergent sequence-Divergent sequence-The Algebra of limits.	12	Up toK3	CLO2
III	Behaviour of Monotonic sequence- some theorems on limits-Subsequence-Limit points –Cauchy sequence.	12	Up toK3	CLO3
IV	Infinite series – Comparison test- Kummer's test-Raabee's test-D'Alemberts Ratio test- Demorgan's test-Problems.	12	Up toK3	CLO4
V	Gauss test-Root test –Cauchy's condensation test-Integral test and problems-Alternating series-Leibnitz's test-Absolute convergence series.	14	Up toK4	CLO5

Text Book:

Sequence and Series by S. Arumugam and A. ThangapandiIssac, Latest Edition 2012, Gamma Publishing House.

Chapters: 1(1.3,1.4), 2(2.1,2.2,2.5), 3(3.1-3.11), 4, 5(5.1,5.2).

Books for Reference:

1. Real Analysis volume-I by K. Chandra SekharaRao and K.S. Narayanan, S.Viswanadhan (Printers and Publishing Private Limited), 2008.
2. Sequence and Series by M.K. Venkatraman and Manorama Sridhar, The National Publishing Company, 2002.
3. Malik S.C and SavithaArora (1991) – Mathematical Analysis, Wiley Eastern Limited New Delhi.
4. ViswanathNaik, K.- Real Analysis, Emerald Publishers, Chennai.

Web Resources:

1. http://youtu.be/DRO1kPT4iS8
2. https://youtu.be/lfZGtjSWcQs
3. https://youtu.be/jD5s2jvnH1k

Rationale and activities having direct bearing on Nature of course:

Sequence and series play an important role in various aspects of our lives. They help us predict, evaluate and monitor the outcome of a situation or event and help us a lot in decision making. The topic of sequences and series is important to study for a variety of reasons. During the study, students can synthesize many ideas about linear functions, including the effects of having only natural numbers in the domain. The patterns are first studied through manipulative to gain a true sense of what sequences are and are not. Then they use the manipulative to develop the formulas for determining partial sums of series. The information is eventually transferred to the symbolic stage and put to use in the context of real world situations.

Activities having direct bearing on Skill development/Employability/Entrepreneurship:

This course helps in strengthen the students their essentials such as functions, bounded, convergent , divergent, limit point, Infinite series, Ratio test, Root test. The course highlighting smart tips like Best practice, Problem solving, Quiz to help increase their curiosity and also help them to become expert with knowledge of exterior concepts.

Pedagogy :

Chalk and Talk, PPT Group Discussion, Seminar, Quiz, Problem Solving, Tutorial.

COURSE LEARNING OUTCOMES

On the successful completion of the course, students will be able to

CLO1	Recall the basic concepts in Sets and Functions and get the knowledge ofBounded sets and least upper bound and greatest lower bound.	Up to K3
CLO2	Understanding the concept of sequences,bounded, monotonic sequence, convergent, divergent and Oscillating sequence.	Up to K3
CLO3	Understanding the knowledge of subsequence, limit points and Behaviour of Monotonic sequences.	Up to K3
CLO4	Understanding the concept of Inequalities and Recognize when the series converges and diverges.	Up to K3
CLO5	Acquire the information about Alternating series and Absolute convergence series.	Upt o K4

Mapping of Course Outcomes (CLOs) with Program Outcomes(POs) & Program Specified Outcomes(PSOs)

	PO					**PSO**						
	PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PSO1**	**PSO2**	**PSO3**	**PSO4**	**PSO5**	**PSO6**	**PSO7**
CLO1	2	2	-	2	1	3	2	3	2	1	-	1
CLO2	3	1	-	1	2	3	2	3	3	3	3	3
CLO3	2	1	1	1	2	3	3	2	3	1	3	3
CLO4	2	1	-	1	1	3	2	3	2	1	3	2
CLO5	3	2	1	1	2	3	2	2	2	3	2	2

3- Advance Application 2- Intermediate Level 1- Basic Level

Blue Print(External Exam)

Mapping with Course Learning Outcomes(CLOs)

Units	CLOs	K. Level	Section A		Section B		Section C (Either/or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of questions	K. Level	No. of questions	K. level		
1	CLO 1	Up to K2	2	K1 &K2	1	K1	2(K1& K1)	1(K2)
2	CLO 2	Up to K3	2	K1 &K2	1	K1	2(K2&K2)	1(K3)
3	CLO 3	Up to K3	2	K1 &K2	1	K2	2(K3&K3)	1(K3)
4	CLO 4	Up to K3	2	K1 &K2	1	K2	2(K3&K3)	1(K3)
5	CLO 5	Up to K4	2	K1 &K2	1	K2	2(K4&K4)	1(K4)
No. of Questions to be asked			10		5		10	5
No. of Questions to be answered			10		5		5	3
Marks for each question			1		2		5	10
Total Marks for each Section			10		10		25	30

K1 - Remembering and recalling facts with specific answers.
K2 - Basic understanding of facts and stating main ideas with general answers.
K3 - Application oriented - Solving Problems.
K4 - Examining, analyzing, presentation and make inferences with evidences.

Distribution of section wise marks with K levels

K Levels	Section A (No choice)	Section B (No choice)	Section C (Either/ or)	Section D (Open choice)	Total marks	% of marks without choice	Consolidated
K1	5	4	10	-	19	15.83	
K2	5	6	10	10	31	25.83	41%
K3	-	-	20	30	50	41.67	42%
K4	-		10	10	20	16.67	17%
Total marks	10	10	50	50	120	100	100%

Blue Print (CIA-I)

S.No	CLOs	K. Level	Section A		Section B		Section C (Either/ or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of questions	K. Level	No. of questions	K. level		
1	CLO 1	Up to K2	2	K1 &K2	1	K1	2(K2 & K2)	2(K2&K3)
2	CLO 2	Up to K3	2	K1 &K2	2	K2	2(K3&K3)	1(K4)
No. of Questions to be asked			4		3		4	3
No. of Questions to be answered			4		3		2	2
Marks for each question			1		2		5	10
Total Marks for each Section			4		6		10	20

K1 - Remembering and recalling facts with specific answers.

K2 - Basic understanding of facts and stating main ideas with general answers.

K3 - Application oriented - Solving Problems.

K4 - Examining, analyzing, presentation and make inferences with evidences.

Distribution of section wise marks with K levels

K Levels	Section A (No choice)	Section B (No choice)	Section C (Either/ or)	Section D (Open choice)	Total marks	% of marks without choice	Consolidated
K1	2	2	-	-	4	6.67	
K2	2	4	10	10	26	43.33	50
K3	-	-	10	10	20	33.33	33
K4	-	-	-	10	10	16.67	17
Total marks	4	6	20	30	60	100	100%

Blue Print (CIA-II)

S.No	CLOs	K. Level	Section A		Section B		Section C (Either/ or Choice)	Section D (Open Choice)
			MCQs		Short Answers			
			No. of questions	K. Level	No. of questions	K. level		
1	CLO 3	Up to K3	2	K1 &K2	1	K1	2(K2& K2)	2(K2& K3)
2	CLO 4	Up to K3	2	K1 &K2	2	K2	2(K3&K3)	1(K4)
No. of Questions to be asked			4		3		4	3
No. of Questions to be answered			4		3		2	2
Marks for each question			1		2		5	10
Total Marks for each Section			4		6		10	20

K1 - Remembering and recalling facts with specific answers.
K2 - Basic understanding of facts and stating main ideas with general answers.
K3 - Application oriented - Solving Problems.
K4 - Examining, analyzing, presentation and make inferences with evidences.

Distribution of section wise marks with K levels

K Levels	Section A (No choice)	Section B (No choice)	Section C (Either/ or)	Section D (Open choice)	Total marks	% of marks without choice	Consolidated
K1	2	2	-	-	4	6.67	50
K2	2	4	10	10	26	43.33	
K3	-	-	10	10	20	33.33	33
K4	-	-	-	10	10	16.67	17
Total marks	4	6	20	30	60	100	100%

Lesson Plan

UNIT	DESCRIPTION	HOURS	Pedagogy
I	Bounded sets –Least upper bound	**2**	Chalk and Talk,
	Greatest Lower bound-Inequalities –Triangle inequalities.	**2**	Chalk and Talk, Problem Solving
	Problems based on Triangle inequalities	**3**	Chalk and Talk,
	Cauchy Schwarz Inequalities-Problems.	**3**	PPT, Group
II	Sequence-Bounded sequence-Examples	**3**	Chalk and Talk,
	Monotone sequence –convergent sequence-Theorems	**3**	Chalk and Talk, PPT Problem Solving
	Divergent sequence-Problems and Theorems	**3**	Chalk and Talk,
	The Algebra of Limit-Theorems	**3**	Chalk and Talk,
III	Behaviour of Monotonic sequence- Geometric sequence	**3**	Chalk and Talk, Seminar,PPT
	some theorems on limits- problems based on Monotonic sequences.	**3**	Chalk and Talk, quiz
	Subsequence-Example-Limit points –Theorems and problems.	**3**	Chalk and Talk,PPT
	Cauchy sequence-Theorems and Problems based on Cauchy sequence.	**3**	Chalk and Talk, Tutorial
IV	Infinite series – Comparison test-problems.	**2**	Chalk and Talk,
	Kummer's test-Raabee's test- problems.	**4**	Chalk and
	D'Alemberts Ratio test- Problems.	**3**	Chalk and Talk,
	Demorgan's test-Problems.	**3**	Chalk and
V	Gauss test- Theorems	**2**	Chalk and Talk,
	Root test -Cauchy's condensation test	**3**	Chalk and Talk,
	Integral test and problems -Alternating series– Example and problems.	**5**	Chalk and Talk, Seminar,PPT
	Leibnitz's test-Absolute convergence series-problems.	**4**	Chalk and Talk ,PPT,Tutorial.
Total Hours		**60**	

Course Designer:

Dr. M. Revathi.