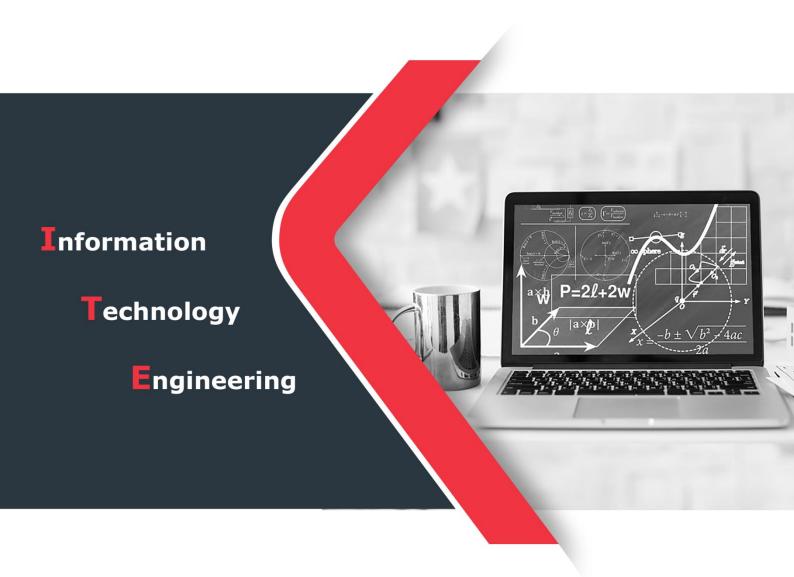


# Mathematical Analysis II Course

Course description





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#### 1. Basic Information:

Course Name	Mathematical Analysis II
Course ID	BMA402
No. of Recorded Sessions*	10-12
No. of Synchronized Sessions*	10-12
No. of Quizzes (hrs.)	0
Exam (hrs.)	2
Registered Sessions Work Load (hrs.)	36
Synchronized Sessions Work Load (hrs.)	36
Credit Hours	5

<sup>\*</sup> The duration of each session 1.5 hr

#### 2. Pre-Requisites:

Course	ID
Mathematical Analysis I	BMA401

## 3. Course Objectives:

This course exposes main concepts of mathematical analysis II. Topics include: sequence of functions, series of functions, improper integrals, Fourier series and transform, original functions and Laplace transform and its applications.

This course prepares students to apply the main concepts of mathematical analysis II in their domains of specialties: simple and uniform convergence of sequences and series of functions, continuity and derivation of the limit function, calculation of improper integrals, Fourier and Laplace transform.

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### 4. Learning Outcomes (LO):

By the end of this course the learner is expected to:

- Understand simple and uniform convergence of sequences and series of functions.
- Understand the continuity and the derivation of functions defined by sum of series.
- Understand trigonometric series and its properties.
- Understand and calculate improper integrals and use comparison tests.
- Calculate Fourier transform and Laplace transform.
- Study different mathematical problems

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# 5. Assessment Results:

			Assessment Type				
Chapter No.	Chapter Title	Intended Objectives	Developed content/ Recorded Sessions	Practical Activities (Synchronized Sessions)	Quizzes and Exams	and And Re	
CH1	Sequence of functions	Understand simple and uniform convergence of sequence and series of functions.	X	X	X		X
CH2	Series of functions	Understand the continuity and the derivation of functions defined by sum of series.	X	X	X		X
CH3	Fourier series	Understand trigonometric series and its properties.	X	X	X		X
CH4	Improper integrals	Understand and calculate	Х	X	X		X

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		improper				
	integrals and					
		comparison				
		tests.				
CH5	Fourier	Calculate Fourier	Х	X	X	X
	transform	transform		^		^
CH6	Laplace	Calculate Fourier	X	V	X	Х
	transform	transform	^	X	^	^

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# 6. Course Syllabus

Chapter No.	Chapter Title	Chapter Content (Syllabus)	No. of Theoretic al Learning Units	No. of Practical Learning Units)
CH1	Sequence of functions	<ol> <li>Simple convergence</li> <li>Uniform convergence</li> <li>Continuity</li> <li>Derivation</li> </ol>	2	2
CH2	Series of functions	<ol> <li>Simple and uniform convergence</li> <li>Convergence by norm</li> <li>Continuity and derivation</li> </ol>	2	2
CH3	Fourier series	<ol> <li>Trigonometric series</li> <li>Relation between coefficients and sum</li> <li>Fourier series</li> <li>Bessel and Parseval equation</li> </ol>	2	2
CH4	Improper integrals	<ol> <li>Definition</li> <li>Comparison tests</li> <li>Improper integrals and absolute convergence</li> </ol>	2	2
CH5	Fourier transform	<ol> <li>Definitions</li> <li>Hypothesis of existence</li> <li>Dirac function</li> <li>Fourier transform</li> </ol>	2	2

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			5. Wold decomposition		
CH6		Laplace transform	1. Definitions		
	CH6		2. Laplace transform properties	2	2
			3. Convolution		

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# 7. Practical Activity:

Tools and Labs:

Tool Name	Description

• Practical Activities per Chapters:

Chapter	Practical Activity	Remarks
CH1	<b>▼</b> Exercises	
	<b>⋈</b> Homework	
	□ Webinars	
	□ Project	
	□ Experiment	
	□ Other	
CH2	<b>▼</b> Exercises	
	▼ Homework	
	□ Webinars	
	□ Project	
	□ Experiment	
	□ Other	

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CH3	<b>Exercises</b>
	<b>▼</b> Homework
	□ Webinars
	□ Project
	□ Experiment
	□ Other
CH4	<b>▼</b> Exercises
	<b>▼</b> Homework
	□ Webinars
	□ Project
	Experiment
	□ Other
CH5	<b>▼</b> Exercises
	□ Webinars
	□ Project
	□ Experiment
	□ Other
CH6	Exercises
	<b>▼</b> Homework
	□ Webinars
	□ Project
	□ Experiment
	□ Other

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#### 8. References: