Academic Course Description

BHARATH UNIVERSITY

Faculty of Science and Humanities

Department of Mathematics

BMA301 MATHEMATICS - III

Third Semester, 2017-18 (Odd Semester)

Course (catalog) description

In this course, in the first Chapter we introduce the concepts Partial Differential Equations, Formation of PDE, Solution of PDE in ordinary cases, Different solutions of PDE, Types of Solution, Types of first order non linear PDE(Type I to VI), Lagranges linear equations, method of grouping, method of multipliers, Homogeneous linear PDE.

In the second chapter we introduces to the concepts and definitions of periodic functions, limit of a function, continuous and dis -continuous functions, fourier series, Dirichlet condition, even and odd functions, change of interval, half – range expansion, complex form of Fourier series, Parsevals identity, RMS value, Harmonic analysis.

In The third Chapter we introduce the concepts method of separation of variables, the vibrating string, solution of wave equation, solution of vibrating string with non zero initial velocity, one dimensional heat flow, steady state condition and zero boundary condition, two dimensional heat flow equation, solution of two dimensional heat flow equation.

In the fourth Chapter we introduce the concept transform of simple functions, basic operational properties, transforms of derivatives and integrals, initial and final value theorems, inverse transforms, convolution theorem, periodic functions, applications of laplace transforms for solving linear ODE upto second order with constant coefficients and simultaneous equations of first order with constant coefficients.

In the fifth Chapter we introduce the concepts of integral transform, Fourier integral theorem, Fourier sine and cosine integral, complex form of Fourier integral, Complex Fourier transform and its inversion formula, properties of fourier transform, Fourier sine and cosine transform and its properties, convolution of two functions, Parsevals identity.

Compulsory/Elective course: Compulsory for all branch students

Credit & Contact hours : 3 & 75

Course Coordinator : Ms P.Jagadeeswari, Asst. Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Ms P.Jagadeeswari	II ECE	SA BLOCK			12.45-1.15 PM
Ms. P. J. Kavitha	II ECE	SA BLOCK		kavithajanarthanam@gmail.com	12.45-1.15 PM

Relationship to other courses:

Pre –requisites **:** BMA 101 Mathematics – I, BMA 201 Mathematics - II

Assumed knowledge : The students will have a physics and mathematics background obtained at a high school (or Equivalent) level. In particular, working knowledge of basic mathematics including integration, differential equations, Partial differentiation and series concepts.

Following courses : BMA401 Numerical Methods

Syllabus Content

UNIT I PARTIAL DIFFERENTIAL EQUATIONS 9+6 Formation - Solutions of standard types of first order equations Lagrange's Linear equation - Linear partial differential equations of second and higher order with constant coefficients.

UNIT II FOURIER SERIES 9+6
Dirichlet's conditions - General Fourier series - Half-range Sine and Cosine series - Parseval's identity - Harmonic Analysis.

UNIT III BOUNDARY VALUE PROBLEMS 9+6
Classification of second order linear partial differential equations - Solutions of one - dimensional wave equation, one-dimensional heat equation - Steady state solution of two-dimensional heat equation - Fourier series solutions in Cartesian coordinates.

UNIT IV LAPLACE TRANSFORMS 9+6
Transforms of simple functions - Basic operational properties - Tran sforms of derivatives and integrals - Initial and final value theorems - Inverse transforms - Convolution theorem - Periodic functions-Applications of Laplace transforms for solving linear ordinary differential equations upto second order with constant coefficients and simultaneous equations of first order with constant coefficients.

UNIT V FOURIER TRANSFORMS 9+6
Statement of Fourier integral theorem - Fourier transform pairs - Fourier Sine and Cosine transforms - Properties - Transforms of simple functions - Convolution theorem - Parseval's identity.

Computer usage: Ni

Professional component

General	-	0%
Basic Sciences	-	100%
Engineering sciences & Technical arts	-	0%
Professional subject	-	0%

Broad area : Signals & Systems, Digital signal processing.

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1st week	Session 1 to 25	2 Periods
2	Cycle Test-2	September 2nd week	Session 26 to 50	2 Periods
3	Model Test	October 2nd week	Session 1 to 75	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

To develop problem solving skills and understanding of Mathematics. This course emphasizes:	Correlates to program outcome		
	H	M	L
1. To develop an understanding of the fundamental s in PDE	b,c,d,j	a,f,k	e,g
2. To develop the ability to solve problems in Fourier series	b,c,f	a,d,g,h	j
3. To understand the concepts of Boundary Value Problems.	a,d,e	b,g	j,k
4. To develop students problem solving techniques in Laplace Transforms	a,d,e	b,g,h,k	f,j
5. To learn the Fourier transform	a	a,b,c,d,g	j,k

H: high correlation, M: medium correlation, L: low correlation

Draft Lecture Schedule

Session	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I	**PARTIAL DIFFERENTIAL EQUATIONS**		
1.	Formation	Yes	[T1]
2.	Solutions of standard types of first order equations	Yes	
3.	Lagrange's Linear equation	Yes	
4.	Linear partial differential equations of second with constant coefficients	Yes	
5.	Linear partial differential equations of higher order with constant coefficients	Yes	
UNIT II	**FOURIER SERIES**		
6.	Dirichlet's conditions	Yes	[T2]
7.	General Fourier series	Yes	
8.	Half-range Sine and Cosine series	Yes	
9.	Parseval's identity	Yes	
10.	Harmonic Analysis.	Yes	
UNIT III	**BOUNDARY VALUE PROBLEMS**		
11.	Classification of second order linear partial differential equations	Yes	[T3]
12.	Solutions of one - dimensional wave equation	Yes	
13.	one-dimensional heat equation		
14.	Steady state solution of two-dimensional heat equation	Yes	
15.	Fourier series solutions in Cartesian coordinates.	Yes	
UNIT IV	**LAPLACE TRANSFORM**		
16.	Transforms of simple functions	Yes	[T4]
17.	Basic operational properties	Yes	
18.	Transforms of derivatives and integrals	Yes	
19.	Initial and final value theorems	Yes	
20.	Inverse transforms	Yes	
21.	Convolution theorem	Yes	
22.	Periodic functions	Yes	
23.	Applications ofLaplace transforms for solving linear ordinary differential equations upto second order with constant coefficients simultaneous equations of first order with constant coefficients	Yes	

UNIT V	FOURIER TRANSFORMS		
24.	**S**tatement of Fourier integral theorem	Yes	[T5]
25.	Fourier transform pairs	Yes	
26.	Fourier Sine and Cosine transforms	Yes	
27.	Properties	Yes	
28.	Transforms of simple functions	Yes	
29.	Convolution theorem	Yes	
30.	Parseval's identity	Yes	

Teaching Strategies

The teaching in this course aims at establishing a good fundamental understanding of the areas covered using:

- Formal face-to-face lectures
- Tutorials, which allow for exercises in problem solving and allow time for students to resolve problems in understanding of lecture material.
- Laboratory sessions, which support the formal lecture material and also provide the student with practical construction, measurement and debugging skills.
- Small periodic quizzes, to enable you to assess your understanding of the concepts.

Evaluation Strategies

Cycle Test – I	-	5%
Cycle Test – II	-	5%
Model Test	-	10%
Assignments/Seminar/online test/quiz	-	5%
Attendance	-	5%
Final exam	-	70%

Prepared by: Ms P.Jagadeeswari,Assistant professor , Dept. of Mathematics **Dated :**

Addendum

ABET Outcomes expected of graduates of B.Tech / ECE / program by the time that they graduate:

a) An ability to apply knowledge of mathematics, science, and engineering
b) An ability to design and conduct experiments, as well as to analyze and interpret data
c) An ability to design a hardware and software system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability
d) An ability to function on multidisciplinary teams
e) An ability to identify, formulate, and solve engineering problems
f) An understanding of professional and ethical responsibility
g) An ability to communicate effectively
h) The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context
i) A recognition of the need for, and an ability to engage in life-long learning
j) A knowledge of contemporary issues
k) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.

Program Educational Objectives

PEO1: PREPARATION
Electronics Engineering graduates are provided with a strong foundation to passionately apply the fundamental principles of mathematics, science, and engineering knowledge to solve technical problems and also to combine fundamental knowledge of engineering principles with modern techniques to solve realistic, unstructured problems that arise in the field of Engineering and non-engineering efficiently and cost effectively.

PEO2: CORE COMPETENCE
Electronics engineering graduates have proficiency to enhance the skills and experience to apply their engineering knowledge, critical thinking and problem solving abilities in professional engineering practice for a wide variety of technical applications, including the design and usage of modern tools for improvement in the field of Electronics and Communication Engineering.

PEO3: PROFESSIONALISM Electronics Engineering Graduates will be expected to pursue life-long learning by successfully participating in post graduate or any other professional program for continuous improvement which is a requisite for a successful engineer to become a leader in the work force or educational sector.

PEO4: SKILL
Electronics Engineering Graduates will become skilled in soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, interpersonal relationship, group discussion and leadership ability to become a better professional.

PEO5: ETHICS
Electronics Engineering Graduates are morally boosted to make decisions that are ethical, safe and environmentally-responsible and also to innovate continuously for societal improvement.

Course Teacher	Signature
Ms P.Jagadeeswari	

Course Coordinator **HOD**