Academic Course Description

BHARATH University
Faculty of Science and Humanities
Department of Electronics and Communication Engineering

BMA201 MATHEMATICS - II

Second Semester, 2016-17 (Even Semester)

Course (catalog) description

In this course, in the first Chapter we introduce the concepts Higher order linear differential equations with constant coefficients , Method of variation of parameters , Cauchy's and Legendre's linear equations and simultaneous first order linear equations with constant coefficients.

In the second chapter we introduces to the concepts and definitions of Gradient, divergence and curl ,Directional derivatives – Irrational and Solenoidal vector fields, vector integration, Green's theorem in a plane , Gauss divergence theorem and Stoke's theorem (without proofs) and simple applications involving cubes and rectangular parallelepipeds

In The third Chapter we introduce the concepts Functions of a complex variable ,Analytic functions , Necessary conditions, Cauchy-Riemann equation and sufficient conditions (without proofs) ,Harmonic and orthogonal properties of analytic functions – Harmonic conjugate – construction of analytic functions and conformal mapping : W= Z+C,CZ , 1/Z and bilinear transformation.

In the fourth Chapter we introduce the concept Complex integration – Statement and application of Cauchy's integral theorem and Cauchy's integral formula – Taylor and Laurent expansions – Singular points – Residues – Residue theorem – Application of Residue theorem to evaluate real integrals – Unit circle and semi-circular contour (excluding ploes on boundaries).

In the fifth Chapter we introduce the concepts of Mean , Median ,Mode – Moments – Skewness and Kurtosis – correlation – Rank Correlation – Regression –Chi square test – 2 x 2, m x n .

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Compulsory/Elective course: Compulsory for all branch students
Credit & contact hours : 3 & 60
Course Coordinator : Dr. Deepa, Assoc. Professor

Instructors :

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Mr.P.Bhathmanaban	All first Year Students	FIRST YEAR MAIN BULIDING		**bhathrns@gmail.com**	9.00-9.50 AM
Mrs. K.Janaki	All First Year Students	FIRST YEAR MAIN BULIDING		**Janu89lava@gmail.com**	12.45-1.15 PM

Relationship to other courses:

Pre –requisites **:** Mathematics-I

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, Ordinary differentiation, series concepts .

Following courses : BMA301 MATHEMATICS-III

Syllabus Content

UNIT I ORDINARY DIFFERENTIAL EQUATION 12

Higher order linear differential equations with constant coefficients - Method of variation of parameters – Cauchy's and Legendre's linear equations - simultaneous first order linear equations with constant coefficients.

UNIT II VECTOR CALCULUS 12

Gradient, divergence and curl –Directional derivatives –Irrotational and solenoidal vector fields – vector integration– Green's theorem in a plane , Gauss divergence theorem and Stoke's theorem (without proofs) – simple applications involving cubes and rectangular parallelepipeds.

UNIT III ANALYTIC FUNCTIONS 12

Functions of a complex variable – Analytic functions – Necessary conditions, Cauchy-Riemann equation and sufficient conditions (without proofs) – Harmonic and orthogonal properties of analytic functions – Harmonic conjugate – construction of analytic functions – conformal mapping: W= Z+C, CZ, 1/Z and bilinear transformation.

UNIT IV COMPLEX INTEGRATION 12

Complex integration – Statement and application of Cauchy's integral theorem and Cauchy's integral formula – Taylor and Laurent expansions – Singular points – Residues – Residue theorem –Application of Residue theorem to evaluate real integrals – Unit circle and semi-circular contour (excluding poles on boundaries).

UNIT V STATISTICS 12

Mean, Median, Mode – Moments –Skewness and Kurtosis – Correlation – Rank Correlation – Regression –Chi square test for contingency tables.

TEXT BOOK:

1. R.M.Kannan and B.Vijayakumar " Engineering Mathematics – II " 2nd Edition , SRB Publication , Chennai 2007.
2. Bali.N.P and Manish Goyal , " Engineering Mathematics " , 3rd Edition , Laxmi Publications (p) Lltd, 2008 .
3. Grewal .B/S "Higher Engineering Mathematics" , 40th Edition , Khanna Publications , Delhi , 2007 .

REFERENCES:

1. Ramana.B.V , " Higher Engineering Mathematics " , Tata McGraw Hill Publishing Company , New Delhi,2007.
2. Gupta SC, and VK.Kapoor, "Fundamentals Mathematical Statistics", 11th edition, Sultan Chand Sons, , New Delhi, 2014

Computer usage: Nil

Professional component

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

Broad area : Complex Analysis, Vector Calculus, Statistics, Differential Equations.

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	January 4th week	Session 1 to 14	2 Periods
2	Cycle Test-2	February 4th week	Session 15 to 28	2 Periods
3	Model Test	March 4th week	Session 1 to 45	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 ODE	b,c,d,j	a,f,k	e,g
2. To develop the ability to solve problems in Vector Calculus	b,c,f	a,d,g,h	j
3. To understand the concepts of Analytic Functions	a,d,e	b,g	j,k
4. To develop students problem solving techniques in Complex Integration	a,d,e	b,g,h,k	f,j
5. to learn basic concepts of **S**tatistics	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 ORDINARY DIFFERENTIAL EQUATIONS		
1.	Higher order linear differential equations with constant coefficients	Yes	[T1]
2.	Types to find Complementary Function	Yes	
3.	Types to find particular Integral	Yes	
4.	Method of variation of parameters	Yes	
5.	Cauchy's Linear equation	Yes	
6.	Legendre's linear equations	Yes	
7.	Simultaneous first order linear equations with constant coefficients.	Yes	
	UNIT II VECTOR CALCULUS		
8.	Gradient, divergence and curl	Yes	
9.	Directional derivatives	Yes	
10.	Irrotational and Solenoidal vector fields	Yes	
11.	vector integration	Yes	
12.	Green's theorem in a plane	Yes	
13.	Gauss divergence theorem		
14.	Stoke's theorem		
15.	simple applications involving cubes and rectangular parallelepipeds		
	UNIT III ANALYTIC FUNCTIONS		
16.	Functions of a complex variable	Yes	
17.	Analytic functions	Yes	

18.	Necessary conditions, Cauchy-Riemann equation and sufficient conditions	Yes	[T3]
19.	Harmonic and orthogonal properties of analytic functions	Yes	
20.	Harmonic conjugate.	Yes	
21.	construction of analytic functions	Yes	
22.	Conformal mapping: W= Z+C,CZ , 1/Z and bilinear transformation.	Yes	
	UNIT IV COMPLEX INTEGRATION		
23.	Complex integration	Yes	[T4]
24.	Statement and application of Cauchy's integral theorem and Cauchy's integral formula	Yes	
25.	Taylor and Laurent expansions	Yes	
26.	Singular points	Yes	
27.	Residues	Yes	
28.	Residue theorem	Yes	
29.	Application of Residue theorem to evaluate real integrals	Yes	
30.	Unit circle and semi-circular contour (excluding ploes on boundaries).	Yes	
	UNIT V STATISTICS		
31.	Mean	Yes	[T5]
32.	Median	Yes	
33.	Mode	Yes	
34.	Moments	Yes	
35.	Skewness and Kurtosis	Yes	
36.	correlation	Yes	
37.	Rank Correlation	Yes	
38.	Regression	Yes	
39.	Chi square test – 2 x 2, m x n .	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: P.Bhathmanaban, Assistant professor , Department 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
Mr.P.Bhathmanaban	

Course Coordinator **HOD/ECE**