

Academic Course Description

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

BMA101 MATHEMATICS - I
First Semester, 2017-18 (Odd Semester)

Course (catalog) description

To make the students learn Mathematics in order to formulate and solve problems effectively in their respective fields of engineering.

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 : +2 Mathematics

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 Differentiation, integration and probability theories are assumed.

Following courses : BMA201 Mathematics –II

SYLLABUS CONTENT

UNIT 1 MATRICES

12

Characteristic equations- Eigen values and eigen vectors of the real matrix- Properties- Cayley-Hamilton theorem(Excluding proof)- Orthogonal transformation of a symmetric matrix to diagonal form- Quadratic form- Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY

12

Equation of a Sphere- Plane section of a sphere- Tangent plane- Equation of cone- Right circular cone- Equation of a cylinder- Right circular cylinder.

UNIT III DIFFERENTIAL CALCULUS

12

Curvature in Cartesian coordinates- Centre and radius of curvature- Circle of curvature- Evolutes-Envelopes- Applications of Evolutes and Envelopes.

UNIT 1V FUNCTIONS OF SEVERAL VARIABLES

12

Partial derivatives- Euler's theorem for homogeneous functions- Total derivatives- Differentiation of implicit functions- Jacobians- Taylor's expansion- Maxima and Minima- Method of Lagrangian multipliers.

UNIT V MULTIPLE INTEGRALS

12

Double integration- Cartesian and Polar coordinates- Change of order of integration- Change of variables between Cartesian and Polar coordinates- Triple integration in Cartesian coordinates-Area as double integral- Volume as triple integral.

TEXT BOOK:

1. Ravish R.Singh and Mukkul Bhatt, "Engineering Mathematics-I" First Reprint, Tata McGraw Hill Pub Co.,New Delhi. 2011.
2. Grewal.B.S, "Higher Engineering Mathematics" , 40 th Edition, Khanna Publications, Delhi. 2007.

REFERENCES:

- 1 . Ramana.B.V. "Higher Engineering Mathematics", Tata McGraw Hill Publishing Company, New Delhi, 2007.
2. Glyn James, "Advanced Engineering Mathematics", 7 th Edition, Pearson Education, 2007.

Computer usage: Nil

Professional component

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

Broad area : Matrices | Calculus | Multiple Integrations

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1 st week	Session 1 to 20	2 Periods
2	Cycle Test-2	September 2 nd week	Session 21 to 40	2 Periods
3	Model Test	October 2 nd week	Session 1 to 60	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 fundamentals in Matrices	b,c,d,j	a,f,k	e,g
2. To develop the ability to solve problems in Analytical Geometry in three dimension	b,c,f	a,d,g,h	j
3. To understand the concepts of Differential calculus.	a,d,e	b,g	j,k
4. To develop students problem solving techniques in several variables	a,d,e	b,g,h,k	f,j
5. To learn the Multiple integration in polar and cylindrical coordinates	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 MATRICES			
1.	Characteristic Equations	Yes	[T1]
2.	Cayley-Hamilton theorem	Yes	
3.	Eigen values of Eigen vectors 2*2 real matrix	Yes	
4.	Eigen values of Eigen vectors 3*3 real matrix		
5.	Definition and Properties orthogonal transformation		
6.	Orthogonal transformation of a symmetric matrix to diagonal form	Yes	
7.	Quadratic form	Yes	
8.	Reduction of quadratic form to canonical form by orthogonal transformation.	Yes	
UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY			
9.	Equation of a Sphere	Yes	[T2]
10.	Plane section of a sphere	Yes	
11.	Tangent plane	Yes	
12.	Equation of cone	Yes	
13.	Right circular cone	Yes	
14.	Equation of a cylinder	Yes	
15.	Right circular cylinder.	Yes	

UNIT III DIFFERENTIAL CALCULUS			
16.	Curvature in Cartesian coordinates	Yes	[T3]
17.	Centre of curvature	Yes	
18.	radius of curvature		
19.	Circle of curvature	Yes	
20.	Evolutes of parabola	Yes	
21.	Evolutes of Ellipse		
22.	Envelopes	Yes	
23.	Evolute as envelope of normal's	Yes	
UNIT IV FUNCTIONS OF SEVERAL VARIABLES			
24.	Partial derivatives of second and higher order	Yes	[T4]
25.	Euler's theorem for homogeneous functions	Yes	
26.	Total derivatives	Yes	
27.	Differentiation of implicit functions	Yes	
28.	Jacobian	Yes	
29.	Taylor's expansion	Yes	
30.	Maxima and Minima	Yes	
31.	Method of Lagrangian multipliers	Yes	
UNIT V MULTIPLE INTEGRALS			
32.	Double integration	Yes	[T5]
33.	Cartesian and Polar coordinates	Yes	
34.	Change of order of integration	Yes	
35.	Change of variables between Cartesian and Polar coordinates	Yes	
36.	Triple integration in Cartesian coordinates	Yes	
37.	Area as double integral	Yes	
38.	Volume as triple integral		

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
(Mr.P.Bhathmanaban)

HOD/ECE