
Academic Course Description

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

BMA101 ENGINEERING MATHEMATICS - I
First Semester (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 and 60 hours
Course Coordinator : Mr.P.Bhathmanaban, Asst. Professor
Instructors : Mr.P.Bhathmanaban

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	04422290125	bhathrns@gmail.com	9.00-9.50 AM

Relationship to other courses:

Pre –requisites : + 2 Level 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 includin Differentiation, integration and probability theories are assumed.

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.

3. Jacob Millman and Christos C-Halkias, "Electronic Devices and Circuits", Tata McGraw Hill

REFERENCE BOOKS:

1. Edminister J.A. "Theory and problems of Electric Circuits" Schaum's Outline Series. McGraw Hill Book Company, 2nd Edition, 1983.
2. Hyatt W.H and Kemmerly J.E. "Engineering Circuit Analysis", McGraw Hill International Editions, 1993.
3. D. P. Kothari and I. J. Nagrath "Electric machines" Tata McGraw-Hill Education, 2004
4. Millman and Halkias, "Integrated Electronics", Tata McGraw Hill Edition, 2004.

S.

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 24	2 Periods
2	Cycle Test-2	September 2 nd week	Session 25 to 48	2 Periods
3	Model Test	October 2 nd week	Session 1 to 60	3 Hrs
5	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 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

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	Yes	
5.	Definition and Properties orthogonal transformation	Yes	
6.	Orthogonal transformation of a symmetric matrix to diagonal form	Yes	
7.	Quadratic form	Yes	
8.	Problems on Quadratic form	Yes	
9.	Test	Yes	
10.	Test	Yes	
11.	Reduction of quadratic form to canonical form by orthogonal transformation.	Yes	
12.	Test	Yes	
UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY			
13.	Equation of a Sphere	Yes	[T2]
14.	Plane section of a sphere	Yes	
15.	Tangent plane	Yes	
16.	Equation of cone	Yes	
17.	Right circular cone	Yes	
18.	Equation of a cylinder	Yes	

19.	Problems on Equation of a cylinder	Yes	
20.	Test	Yes	
21.	Test	Yes	
22.	Right circular cylinder.	Yes	
23.	Problems on Right circular cylinder	Yes	
24.	Test	Yes	
UNIT III DIFFERENTIAL CALCULUS			
25.	Curvature in Cartesian coordinates	Yes	[T3]
26.	Centre of curvature	Yes	
27.	radius of curvature		
28.	Circle of curvature	Yes	
29.	Evolutes of parabola	Yes	
30.	Evolutes of Ellipse		
31.	Test	Yes	
32.	Envelopes	Yes	
33.	Test on Envelopes	Yes	
34.	Evolute as envelope of normal's	Yes	
35.	Evolute as envelope of normal's	Yes	
36.	Test	Yes	
UNIT IV FUNCTIONS OF SEVERAL VARIABLES			
37.	Partial derivatives of second and higher order	Yes	[T4]
38.	Euler's theorem for homogeneous functions	Yes	
39.	Total derivatives	Yes	
40.	Differentiation of implicit functions	Yes	
41.	Jacobian	Yes	
42.	Taylor's expansion	Yes	
43.	Problems on Taylor's expansion	Yes	
44.	Test	Yes	
45.	Test	Yes	
46.	Maxima and Minima	Yes	
47.	Method of Lagrangian multipliers	Yes	
48.	Test	Yes	
UNIT V MULTIPLE INTEGRALS			
49.	Double integration	Yes	
50.	Cartesian and Polar coordinates	Yes	
51.	Change of order of integration	Yes	
52.	Change of variables between Cartesian and Polar coordinates	Yes	

53.	Triple integration in Cartesian coordinates	Yes	[T5]
54.	Area as double integral	Yes	
55.	Area as double integral	Yes	
56.	Test	Yes	
57.	Test	Yes	
58.	Volume as triple integral	Yes	
59.	Volume as triple integral	Yes	
60.	Test	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%
Assignment	-	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 / EEE / program by the time that they graduate:

- a) An ability to apply knowledge of mathematics, science, and engineering fundamentals.
- b) An ability to identify, formulate, and solve engineering problems.
- c) An ability to design a system, component, or process to meet the desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- d) An ability to design and conduct experiments, as well as to analyze and interpret data.
- e) An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- f) An ability to apply reasoning informed by the knowledge of contemporary issues.
- g) An ability to broaden the education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.
- h) An ability to understand professional and ethical responsibility and apply them in engineering practices.
- i) An ability to function on multidisciplinary teams.
- j) An ability to communicate effectively with the engineering community and with society at large.
- k) An ability in understanding of the engineering and management principles and apply them in project and finance management as a leader and a member in a team.
- l) An ability to recognize the need for, and an ability to engage in life-long learning.

Program Educational Objectives

PEO1: PREPARATION

Electrical Engineering Graduates are in position with the knowledge of Basic Sciences in general and Electrical Engineering in particular so as to impart the necessary skill to analyze and synthesize electrical circuits, algorithms and complex apparatus.

PEO2: CORE COMPETENCE

Electrical Engineering Graduates have competence to provide technical knowledge, skill and also to identify, comprehend and solve problems in industry, research and academics related to power, information and electronics hardware.

PEO3: PROFESSIONALISM

Electrical Engineering Graduates are successfully work in various Industrial and Government organizations, both at the National and International level, with professional competence and ethical administrative acumen so as to be able to handle critical situations and meet deadlines.

PEO4: SKILL

Electrical Engineering Graduates have better opportunity to become a future researchers/ scientists with good communication skills so that they may be both good team-members and leaders with innovative ideas for a sustainable development.

PEO5: ETHICS

Electrical Engineering Graduates are framed to improve their technical and intellectual capabilities through life-long learning process with ethical feeling so as to become good teachers, either in a class or to juniors in industry.

BMA101- Engineering Mathematics-1

Course Teacher	Signature
Mr.P.Bhathmanaban	

Course Coordinator
(Mr.P.Bhathmanaban)

HOD/EEE
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