

Academic Course Description

BHARATH University Faculty of Science and Humanities Department of Civil Engineering BMA101 ENGINEERING MATHEMATICS - I First Semester, 2017-18 (Odd Semester)
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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 credits & 60
 Course Coordinator : Mr.P.Bhathmanaban, Asst. 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 : BPH101 Engineering Physics –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 Differentiation, integration and probability theories are assumed.

Following courses : BMA301 Mathematics –III

	UNIT – I D.C. AND A.C CIRCUITS	6
	Ohm’s law – Kirchoff’s Laws, V – I Relationship of Resistor (R) Inductor (L) and capacitor (C).Series parallel combination of R, L&C – Current and voltage source transformation – mesh current & node voltage method –superposition theorem – Thevenin’s and Norton’s Theorem -	
UNIT 1	MATRICES Problems.	12
	UNIT – II ELECTRICAL MACHINES	6
	Construction, principle of operation, Basic Equations and applications - D.C.Generators and D.C.Motors. -Single phase Induction Motor - Single Phase Transformer.	
	UNIT – III BASIC MEASUREMENT SYSTEMS	6
	Introduction to Measurement Systems, Construction and Operating principles of PMMC, Moving Iron, Dynamometer Wattmeter, power measurement by three-watt meter and two watt method – and Energy meter.	
	UNIT IV – SEMICONDUCTOR DEVICES	6
	Basic Concepts of semiconductor devices – PN Junction Diode Characteristics and its Application – HWR, FWR – Zener Diode – BJT (CB, CE, CC) configuration & its characteristics.	
	UNIT V – DIGITAL ELECTRONICS	6
	Number system – Logic Gates – Boolean Algebra – De-Morgan’s Theorem – Half Adder & FullAdder – Flip Flops.	
	Total No. of Periods: 30	

TEXT BOOKS:

1. N.Mittle “Basic Electrical Engineering”. Tata McGraw Hill Edition, New Delhi, 1990.
2. A.K. Sawhney, ‘A Course in Electrical & Electronic Measurements & Instrumentation’,Dhanpat Rai and Co, 2004.
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 Compay, 2nd Edition, 1983.
2. Hyatt W.H and Kemmerlay J.E. “Engineering Circuit Analysis”, McGraw Hill Internatinal 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.

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 14	2 Periods
2	Cycle Test-2	September 2 nd week	Session 15 to 28	2 Periods
3	Model Test	October 2 nd week	Session 1 to 45	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		
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	-	5%
Assignment	-	5%
Attendance	-	10%
Final exam	-	70%

Prepared by: P.Bhathmanaban, Assistant professor , Department of Mathematics

Dated :

Addendum

ABET Outcomes expected of graduates of B.Tech / Civil/ 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 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

Civil Engineering graduates will have knowledge to apply the fundamental principles for a successful profession and/or for higher education in Civil Engineering based on mathematical, scientific and engineering principles, to solve realistic and field problems that arise in engineering and non engineering sectors

PEO2: CORE COMPETENCE

Civil Engineering graduates will adapt to the modern engineering tools and construction methods for planning, design, execution and maintenance of works with sustainable development in their profession.

PEO3: PROFESSIONALISM

Civil Engineering Graduates will exhibit professionalism, ethical attitude, communication and managerial skills, successful team work in various private and government organizations both at the national and international level in their profession and adapt to current trends with lifelong learning.

PEO4: SKILL

Civil Engineering graduates will be trained for developing soft skills such as proficiency in many languages, technical communication, verbal, logical, analytical, comprehension, team building, inter personal relationship, group discussion and leadership skill to become a better professional.

PEO5: ETHICS

Civil Engineering graduates will be installed with ethical feeling, encouraged to make decisions that are safe and environmentally-responsible and also innovative for societal improvement.

Course Teacher	Signature
Mr.P.Bhathmanaban	

Course Coordinator

HOD/Civil