Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Electrical and Electronics Engineering
BMA 401 &Applied Probability And Statistics
Fourth Semester (Even Semester)

Course (catalog) description

To understand the concepts of Energy in general and Heat and Work in particular, to understand the fundamentals of quantification and grade of energy, to understand fluid statics and fluid dynamics and to study the applications of mass, momentum and energy equation in fluid flow

Compulsory/Elective course: Compulsory for EEE students

Credit hours& contact hours : 4& 75 hours

Course Coordinator : Ms.Subhashini

Instructors **:** Ms.Subhashini

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Ms.Subhashini	Second year EEE	KS 101	**04422290125**	hod.maths **@bharathuniv.ac.in**	12.30-1.30 PM

Relationship to other courses:

Pre –requisites **:**BMA 201(MATHS II)

Syllabus Contents

UNIT I PROBABILITY AND RANDOM VARIABLES 9+6
Probability concepts, Random variables, MGF, Binomial, Poisson, Geometric, Normal, Uniform, and Exponential Distributions.

UNITII TWO DIMENSIONAL RANDOM VARIABLES 9+6
Marginal and Conditional distributions, covariance, correlation, regression and transformation of random variables, application of central limit theorem.

UNIT III RELIABILITY ENGINEERING 9+6
Concepts of Reliability, Hazard function, series and parallel systems, reliability and availability of Markov systems, maintainability, preventive maintenance.

UNIT IV CONTROL CHARTS 9+6
Control charts for measurements and attributes- $\overline{X}$ Chart , R-Chart ,np-chart, p-chart, Control Charts for fixed sample size and variable sample size. Stability and Capability, Seven Quality Control tools and its applications.

UNIT V DESIGN OF EXPERIMENTS 9+6

Completely Randomised Design, Randomised Block Design and Latin Square Design. Factorial Experiment- 2^2 Experiment.

Text book(s) and/or required materials

1. S.C.GuptaandV.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand and Sons, New Delhi ,2003. [Units I & II]
2. S.C. Gupta and V.K. Kapoor, "Applied Statistics". Sultan Chand and Sons, New Delhi 2004 [Units IV & V]
3. TirupathiR.Chandrupatta. "Quality and Reliability in Engineering". Book Vistas, New Delhi. [Unit III]

Reference Books:

1. Miller U and Frieund JE. "Probability and Statistics for Engineers", PHI 1999
2. Douglas C.Montgomory and George C.Runger. "Applied Statistics and Probability for Engineers" 5thEdn. 2010. Wiley India Pvt Ltd. New Delhi.
3. Douglas C.Montgomory. "Design and Analysis of Experiments" 7thEdn. 2012. Wiley India Pvt Ltd. New Delhi
4. Albert Leon Garcia, "Probability and Random Processes for Electrical Engineering". 2ndEdn. Pearson Education, Chennai-600 113

Computer usage: NIL

Professional component

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

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 2 nd week	Session 1 to 30	2 Periods
2	Cycle Test-2	March 2nd week	Session 31 to 60	2 Periods
3	Model Test	April 3rd week	Session 1 to 75	3 Hrs
4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

To understand the concepts of Energy in general and Heat and Work in particular, to understand the fundamentals of quantification and grade of energy, to understand fluid statics and fluid dynamics and to study the applications of mass, momentum and energy equation in fluid flow	Correlates to program outcome		
	H	**M**	**L**
CO1:Solve Engineering problems in Electrical & Electronic Engineering by making use of Probability, Reliability and Hazard functions.	A,b,e,	F,g,	C,d,h,I,j,k,l
CO2: Use control charts to find tolerance limits in electric circuits.	A,b,	E,f,g,	C,d,h,I,j,k,l
CO3: How Design of Experiments are to be analysed.	A,b,e,f	g	C,d,h,I,j,k,l

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

Draft Lecture Schedule

S.NO	Topics	Problem solving (Yes/No)	Text / Chapter
UNIT I	**PROBABILITY AND RANDOM VARIABLES**		
1.	Probability concepts	**Yes**	T1,R2,T2
2.	Probability concepts	**Yes**	
3.	Random variables	**Yes**	
4.	Random variables	**Yes**	
5.	MGF	**Yes**	
6.	Binomial	**Yes**	
7.	Binomial	**Yes**	
8.	Poisson	**Yes**	
9.	Poisson	**Yes**	
10.	Geometric	**Yes**	
11.	Geometric	**Yes**	
12.	Normal	**Yes**	
13.	Normal	**Yes**	
14.	Uniform and Exponential Distributions.	**Yes**	
15.	Uniformand Exponential Distributions	**Yes**	
UNITII	**TWO DIMENSIONAL RANDOM VARIABLES**		
16.	Marginal and Conditional distributions	**Yes**	T2,T1,R1
17.	Marginal and Conditional distributions	**Yes**	
18.	Marginal and Conditional distributions	**Yes**	
19.	covariance	**Yes**	
20.	covariance	**Yes**	
21.	covariance	**Yes**	
22.	correlation	**Yes**	
23.	correlation	**Yes**	
24.	correlation	**Yes**	
25.	regression and transformation of random variables	**Yes**	
26.	regression and transformation of random variables	**Yes**	
27.	regression and transformation of random variables	**Yes**	
28.	application of central limit theorem	**Yes**	
29.	application of central limit theorem	**Yes**	
30.	application of central limit theorem	**Yes**	
UNITIIIRELIABILITY ENGINEERING			
31.	Concepts of Reliability	**Yes**	T3,T1,R2
32.	Hazard function	**Yes**	
33.	Hazard function	**Yes**	
34.	series and parallel systems	**Yes**	

35.	series and parallel systems	**Yes**	
36.	series and parallel systems	**Yes**	
37.	reliability and availability of Markov systems	**Yes**	
38.	reliability and availability of Markov systems	**Yes**	
39.	reliability and availability of Markov systems	**Yes**	
40.	maintainability	**Yes**	
41.	maintainability	**Yes**	
42.	maintainability	**Yes**	
43.	preventive maintenance	**Yes**	
44.	preventive maintenance	**Yes**	
45.	preventive maintenance	**Yes**	
UNIT IV	**CONTROL CHARTS**		
46.	Control charts for measurements and attributes- $\overline{X}$ Chart	**Yes**	T1,R1,T2
47.	R-Chart ,np-chart	**Yes**	
48.	R-Chart ,np-chart	**Yes**	
49.	R-Chart ,np-chart	**Yes**	
50.	p-chart	**Yes**	
51.	p-chart	**Yes**	
52.	Control Charts for fixed sample size and variable sample size	**Yes**	
53.	Control Charts for fixed sample size and variable sample size	**Yes**	
54.	Control Charts for fixed sample size and variable sample size	**Yes**	
55.	Stability and Capability	**Yes**	
56.	Stability and Capability	**Yes**	
57.	Stability and Capability	**Yes**	
58.	Seven Quality Control tools and its applications.	**Yes**	
59.	Seven Quality Control tools and its applications.	**Yes**	
60.	Seven Quality Control tools and its applications.	**Yes**	
UNIT V	**DESIGN OF EXPERIMENTS**		
61.	Completely Randomised Design	**Yes**	
62.	Completely Randomised Design	**Yes**	
63.	Completely Randomised Design	**Yes**	
64.	Completely Randomised Design	**Yes**	
65.	Completely Randomised Design	**Yes**	
66.	Randomised Block Design and Latin Square Design	**Yes**	
67.	Randomised Block Design and Latin Square Design	**Yes**	

68.	Randomised Block Design and Latin Square Design	**Yes**	T1,R1,T2
69.	Randomised Block Design and Latin Square Design	**Yes**	
70.	Randomised Block Design and Latin Square Design	**Yes**	
71.	Factorial Experiment- 2^2 Experiment.	**Yes**	
72.	Factorial Experiment- 2^2 Experiment.	**Yes**	
73.	Factorial Experiment- 2^2 Experiment.	**Yes**	
74.	Factorial Experiment- 2^2 Experiment.	**Yes**	
75.	Factorial Experiment- 2^2 Experiment.	**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	-	05%
Cycle Test – II	-	05%
Model Test	-	10%
Attendance	-	05%
SEMINAR&ASSIGNMENT	-	05%
Final exam	-	70%

Prepared by: Ms.Subhashini **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.

Course Teacher	Signature
Ms.Subhashini	

Course Coordinator **HOD/EEE**

(Ms.Subhashini) ( )