Academic Course Description

BHARATH University
Faculty of Engineering and Technology
Department of Electronics and Communication Engineering

BEE101 Basic Electrical and Electronics Engineering
First Semester, 2017-18 (Odd Semester)

Course (catalog) description

This course introduces to the concepts and definitions of Ohms law, KCL, KVL, power and energy. By applying Kirchhoff's current and voltage laws to circuits in order to determine voltage, current and power in branches of any circuits excited by DC voltages and current sources. Apply simplifying techniques to solve DC circuit problems using basic circuit theorems and structured methods like node voltage and mesh current analysis. This course also introduces the basic electronics components like Logic gates, Flip lops etc. This course also introduces the construction and operating principle of AC machines, DC machines, Generators and Transformers.

Compulsory/Elective course:		Compulsory for all circuit branch students
Credit and Contact hours	:	2 & 30
Course Coordinator	:	Ms Sheryl, Asst. Professor

Instructors   **:**

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Mr.K.SAKTHIVEL	All First Year Students	FIRST YEAR MAIN BULIDING		**ksakthivelme@gmail.com**	12.45-1.15 PM
Ms Sheryl	All First Year Students	FIRST YEAR MAIN BULIDING		**Sherine07@gmail.com**	12.45-1.15 PM

Relationship to other courses:

Pre –requisites	**:**	+2 physics, +2 Maths
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	:	-

SYLLABUS CONTENT

UNIT I   ELECTRIC 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 -Problems.

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 Applications – HWR, FWR –Zener Diode – BJT (CB, CE, CC) configuration & Characteristics.

UNIT V   DIGITAL ELECTRONICS   6
Number system – Logic Gates – Boolean Algebra– De-Morgan's Theorem – Half Adder & Full Adder –
Flip Flops.

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

REFERENCES:
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	-	0%
Engineering sciences & Technical arts	-	100%
Professional subject	-	0%

Broad area : Circuit Theory | Electronics | Transmission Lines and Networks | Linear Integrated Circuits

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	August 1st week	Session 1 to 14	2 Periods
2	Cycle Test-2	September 2nd week	Session 15 to 28	2 Periods
3	Model Test	October 2nd 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 circuit theory through the application of techniques and principles of electrical circuit analysis to common circuit problems. This course emphasizes:	Correlates to program outcome		
	H	M	L
1. To develop an understanding of the fundamental laws and elements of electric circuits.	b,c,d,j	a,f,k	e,g
2. To develop the ability to apply circuit analysis to DC and AC circuits	b,c,f	a,d,g,h	j
3. To understand the measuring instruments of electrical quantities and its constructions.	a,d,e	b,g	j,k
4. Introduce students to construction of machines.	a,d,e	b,g,h,k	f,j
5. To learn the working operation of logic gates, flip flops and registers	e	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 ELECTRIC CIRCUITS		
1.	Circuit elements, Ohms Law	Yes	[T1]
2.	Kirchhoff's Law – V-I Relationship of R,L and C	Yes	
3.	Series parallel combination of R, L&C	No	
4.	mesh current & node voltage method	Yes	
5.	superposition theorem	Yes	
6.	Thevenin's theorem	Yes	
7.	Norton's Theorem -Problems.	Yes	
	UNIT II ELECTRICAL MACHINES		
8.	Construction of DC motor	No	[T1]
9.	Principle of operation DC motor	No	
10.	Basic Equations and applications of DC machines	Yes	
11.	Construction and operation of DC generator	No	
12.	Single phase Induction Motor	No	
13.	Single Phase Transformer	No	
	UNIT III BASIC MEASUREMENT SYSTEMS		
14.	Introduction to Measurement Systems	No	[T1]
15.	Construction and Operating principles of PMMC	No	
16.	Construction and Operating principles of PMMI-Moving Iron	No	
17.	Dynamometer Wattmeter	No	

18.	power measurement by three-watt meter	No	
19.	two watt method – and Energy meter.	No	
	UNIT IV SEMICONDUCTOR DEVICES		
20.	Basic Concepts of semiconductor devices	No	
21.	PN Junction Diode Characteristics and its Applications	No	
22.	HWR, FWR	No	[T1]
23.	Zener Diode	No	
24.	BJT- CB, CE, CC configuration	No	
	UNIT V DIGITAL ELECTRONICS		
25.	Number system	No	
26.	Logic Gates	No	
27.	Boolean Algebra	No	[T1]
28.	De-Morgan's Theorem	No	
29.	Half Adder & Full Adder	No	
30.	Flip Flops	No	

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: Ms Sheryl, Assistant professor , Department of EEE   **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.K.Sakthivel	

Course Coordinator   **HOD/ECE**