Academic Course Description

BHARATH UNIVERSITY
Faculty of Engineering and Technology
Department of Electrical and Electronics Engineering

BEE042ELECTRONIC INTEGRATED CIRCUITS
Sixth Semester, (Even Semester)

Course (catalog) description

To master the various biasing techniques, small and large signal analysis and design, wave shaping, regulating and rectification using electronics devices. This will help you to gain knowledge in the electronic integrated circuits

Compulsory/Elective course: Elective for EEE students

Credit hours : 3 credits & 45 hours

Course Coordinator : S. Sherine

Instructors : Ms Dhivya

Name of the instructor	Class handling	Office location	Office phone	Email (domain:@ bharathuniv.ac.in	Consultation
Ms Dhivya	Third year EEE	KS 302		contactdhivya@gmail.com	9.00-9.50 AM

Relationship to other courses:

Pre –requisites **:** BEE403 - Linear Integrated circuits
Assumed knowledge : Knowledge based on integrated circuits

Syllabus Contents

UNIT I BASIC STABILITY AND DEVICES STABILIZATION 9

Biasing Circuits for BJT, DC and AC load lines-Stability factor analysis-Temperature compensation methods-Biasing circuits for FET's and MOSFETs

UNIT II SMALL SIGNAL LOW FREQUENCY ANALYSIS AND DESIGN 9

Transistor, FET and MOSFET Amplifier, Equivalent circuit, input and output characteristics, calculation of Mid band gain input and output impedance of various amplifier, cascade amplifier, Darlington bootstrapping, differential amplifier, CMRR measurement, use of current source in emitter.

UNIT III LARGE SIGNAL AMPLIFIER 9

Class A, AB, B, C and D type of Operation, Efficiency of class A amplifier with resistive and transformer coupled load, Efficiency of class B amplifier, Complementary symmetry amplifiers, MOSFET power amplifier, Thermal stability of power amplifiers heat sink design.

UNIT IV PULSE CIRCUITS 9

RC wave shaping circuits – Diode clampers and clippers – multi vibrators – Schmitt trigger – UJT triggering circuits – Saw tooth oscillators.

UNIT V RECTIFIERS AND POWER SUPPLIES 9

Half and full wave rectifiers ripples factor calculation for C, L, L-C and "Pi" symbol filters- Switch mode power supplies- Linear electronic voltage regulators – Power control using SCR.

Text book(s) and/or required materials

T1. Albert Paul Malvino, "Electronic Principles", Sixth Edition, Tata McGraw Hill Edition, 1998

T2. R.S Sedha, "Applied Electronics", Third edition, S Chand Publishing, 2008

Reference Books:

R1. David A. Bell, "Electronic Devices and Circuits", Prentice Hall of India, 1998 McGraw Hill, 2007, New Delhi.

R2. Donald L. Schilling Chartes Beloue, "Electronic Circuits", Third Edition,1989

Computer usage:

Professional component

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

Broad area : Electrical Machines/**Electronics/**Power system/Control &Instrumentation**.**

Test Schedule

S. No.	Test	Tentative Date	Portions	Duration
1	Cycle Test-1	February 2nd week	Session 1 to 14	2 Periods
2	Cycle Test-2	March 2nd week	Session 15 to 28	2 Periods
3	Model Test	April 3rd week	Session 1 to 45	3 Hrs

4	University Examination	TBA	All sessions / Units	3 Hrs.

Mapping of Instructional Objectives with Program Outcome

To master the various biasing techniques, small and large signal analysis and design, wave shaping, regulating and rectification using electronics devices. This will help you to gain knowledge in the electronic integrated circuits	Correlates to program outcome		
	H	**M**	**L**
1. : To understand the biasing techniques of various electronics devices.	D,h,j	A,b,c,e,f,g,l	K
2. To learn the small signal low frequency analysis and design of various electronic devices.	A,d,e,h,I,j	B,c,g,l	K
3. To analyze various large signal amplifier and to study their design.	B,d,e,h,I,j,l	f	A,g,k
4. To understand the principle of various wave shaping, triggering and oscillating circuits.	B,d,e,I,k,l	C,f,h	A,g,i
5. To learn the fundamentals of rectification, filter design and regulating power supplies	A,d,e	B,c,g	I,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	**OVERVIEW OF EMBEDDED SYSTEMS**		
1.	Biasing Circuits for BJT	NO	[T1],[R1]
2.	Biasing Circuits for DC	NO	
3.	Biasing Circuits AC load lines	NO	
4.	Stability factor analysis	NO	
5.	Temperature compensation methods	NO	
6.	Biasing circuits for FET's	NO	
7.	Biasing circuits for MOSFETs	NO	
8.	Revision on MOSFET	NO	
9.	Revision on circuits	NO	
UNIT II	**CPU ARCHITECTURE OF PIC MICROCONTROLLER**		
10.	Transistor, FET and MOSFET Amplifier	NO	[T2],[R1]
11.	Equivalent circuit, input and output characteristics	NO	
12.	calculation of Mid band gain input characteristics	NO	
13.	calculation of Mid band output characteristics	NO	
14.	cascade amplifier	NO	
15.	Darlington bootstrapping	NO	
16.	differential amplifier	NO	
17.	CMRR measurement,	NO	
18.	use of current source in emitter	NO	
UNIT III	**PIC PROGRAMMING**		
19.	Class A, AB type of operation	NO	[T1],[R2]
20.	B, C and D type of Operation	NO	
21.	Efficiency of class A amplifier with resistive	NO	
22.	Efficiency of class B amplifier	NO	
23.	Complementary symmetry amplifiers	NO	
24.	Thermal stability of power amplifiers heat sink design.	NO	
25.	Efficiency of class A amplifier with transformer load	NO	
26.	Revision on types of operations	NO	
27.	Revision on amplifiers	NO	
28.	Revision on transformer loads	NO	
UNIT IV	**CASE STUDIES OF PIC MICROCONTROLLER**		
29.	RC wave shaping circuits	**NO**	

30.	Diode clampers	NO	[T2],[R2]
31.	Diode Clippers	NO	
32.	multi vibrators	NO	
33.	Schmitt trigger	NO	
34.	UJT triggering circuits	NO	
35.	Saw tooth oscillators.	NO	
36.	Revision on diodes	NO	
37.	Revision ON UJT	NO	
38.	Revision on vibrators	NO	
UNIT V	**REAL-TIME OPERATING SYSTEM CONCEPTS**		
39.	Half and full wave rectifiers ripples factor calculation for C, L, L-C	NO	[T1],[T2]
40.	"Pi" symbol filters	NO	
41.	Switch mode power supplies	NO	
42.	Linear electronic voltage regulators	NO	
43.	Power control using SCR.	NO	
44.	**Revision** on rectifiers	NO	
45.	Revision on SCR	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%
Assignment	-	5%
Attendance	-	5%
Final exam	-	70%

Prepared by: S. Sherine **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 Dhivya	

Course Coordinator
(S. Sherine)

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