

EENT 404
ADVANCED ELECTRONICS CIRCUIT ANALYSIS AND DESIGN

2000 – 2002 Catalog Data: EENT 404 - (Credit, 3 Hours) (Lecture, 3 hours) Semiconductor diode theory, dc and ac equivalent circuits, analysis and design of biasing circuits of BJT and FET, dc and ac load lines, maximum symmetrical output analysis, h-parameters for BJT, analysis of CE, CC, CB, and multistage amps, Coupling techniques, low and high frequency response of R-C coupled CE and CS amps, Bode plots, design of CE and CC amps, and Pspice Applications.

Prerequisite(s): Electronic Circuit II (EENT 216), Calculus I (MATH 264).

Textbook: "Electronic Design, From Concept to Reality," by Martin S. Roden, Gordon L. Carpenter, and William R. Wieserman, 4th Edition, Discovery Press Inc., 2002.

References: 1. "Electronics," by Allan R. Hambley, 2nd edition, Prentice-Hall, Inc., 2000.
2. "Electronic Circuits," by Norbert R. Malik, 1st edition, Prentice-Hall, Inc., 1995.

Lecture: TR 11:00-12:20, Room 150 Pinchback Hall

Instructor: Dr. Manjit S. Randhawa, Professor
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Prerequisites by topics:

1. Understanding of electrical circuit analysis techniques.
2. Understanding of the basic knowledge of electronic circuits involving diodes and transistors.
3. Knowledge of differential and integral calculus.

Course Objectives:

1. To develop a thorough understanding of the semiconductor diode theory.
2. To develop the ability to analyze linear electronic circuits involving Bipolar Junction (BJT) and Field Effect (FET) transistors at both low and high frequencies
3. To develop the ability to design Common Emitter (CE) and Common Source (CS) amplifiers
4. To develop the ability to use PSPICE and/or MICRO-CAP software in the analysis and design of CE and CS amplifiers

Course Educational Strategies

1. Students will demonstrate their comprehension of course materials through tests, homework assignments, and quizzes.
2. Related computer software package will be used as supplement to the textbook.

Course Content:

1. Semiconductor diode theory.
2. Graphical analysis of amplifiers.
3. Small signal low frequency analysis of CE, CC, CS, and CD amplifiers.
4. High frequency models of BJT and FET and high and very low frequency analysis of CE and CS amplifiers and Bode plots.
5. Frequency response of CE and CS amplifiers using PSPICE or Micro CAP.
6. Biasing circuit design for CE amplifier.
7. Design of CE and CS amplifiers.

COURSE ASSESSMENT:

Course Objective	Intended Educational Outcomes	Means of Assessment	Criteria of Success	Program Objectives/ ABET (a-o)
Objective 1: To develop a thorough understanding of the semiconductor diode theory.	1.1 Students will demonstrate an understanding of semiconductor diode theor. 1.2 Students will demonstrate the ability to use the Schottky equation to calculate diode resistance and other diode parameters .	1. Locally developed exams and quizzes 2. Course opinion survey 3. DCE course score 4. BKS Competencies Evaluation	1- 85% passing rate 2- 85% positive response 3- 70% passing rate 4-80% will achieve critical level of performance (CLP)	Edu.Objective: 1, 2, and 3 Prog. Outcomes: 1, 2, 4, and 6
Objective 2: To develop the ability to analyze linear electronic circuits involving Bipolar Junction (BJT) and Field Effect (FET) transistors.	2.1 Students will demonstrate an ability to analyze amplifier circuits involving BJT. 2.2 Students will demonstrate an ability to analyze amplifier circuits involving FET.	1. Locally developed exams and quizzes 2. Course opinion survey 3. DCE course score 4. BKS Competencies Evaluation	1- 85% passing rate 2- 85% positive response 3- 70% passing rate 4-80% will achieve critical level of performance (CLP)	Edu.Objective: 1, 2, and 3 Prog. Outcomes: 1, 2, 4, and 6
Objective 3: To develop the ability to design Common Emitter (CE) and Common Source (CS) amplifiers	3.1 Students will demonstrate an ability to design a CE & CS amplifiers under the given specifications.	1. Locally developed exams and quizzes 2. Course opinion survey 3. DCE course score 4. BKS Competencies Evaluation	1- 85% passing rate 2- 85% positive response 3- 70% passing rate 4-80% will achieve CLP	Edu.Objective: 1, 2, and 3 Prog. Outcomes: 1, 2, 4, and 6
Objective 4: To develop the ability to use PSPICE or MICRO-CAP software in the analysis and design of amplifiers	4.1 Students will demonstrate an understanding to use PSICE or v- CAP in the analysis and design of amplifiers using both BJTs and FETs.	1. Locally developed exams and quizzes 2. Course opinion survey 3. DCE course score 4. BKS Competencies Evaluation	1- 85% passing rate 2- 85% positive response 3- 70% passing rate 4-80% will achieve critical level of performance (CLP)	Edu.Objective: 1, 2, and 3 Prog. Outcomes: 1, 2, 4, and 6