

Minnesota State College Southeast

ELEC 1251: Solid State Devices

A. COURSE DESCRIPTION

Credits: 4

Lecture Hours/Week: 2

Lab Hours/Week: 4

OJT Hours/Week: *.*

Prerequisites: None

Corequisites: None

MnTC Goals: None

An in-depth understanding of solid state circuit configurations and operations will be enhanced through both theoretical and experimental exercises. Topics of interest will be Transistor amplifiers, Mosfets, Operational Amplifiers, Solid State switching circuits and Voltage regulators. (Prerequisite or Concurrent: ELEC1250) (4 credits: 2 lecture/2 lab)

B. COURSE EFFECTIVE DATES: 07/01/2010 - Present

C. OUTLINE OF MAJOR CONTENT AREAS

1. Identify amplifier configurations
2. Analyze amplifier classes of operation
3. Build common-emitter amplifier
4. Build a three state audio amplifier

D. LEARNING OUTCOMES (General)

1. Analyze common emitter amplifier
2. Identify amplifier configurations
3. Build common emitter amplifier
4. Measure amplifier characteristics
5. Analyze amplifier configurations
6. Analyze power amplifier
7. Verify Triac phase control circuit
8. Verify direct couples amplifier
9. Build Darlington amplifier
10. Identify types of power amplifiers
11. Verify complementary power amplifier
12. Analyze frequency compensation techniques
13. Measure input impedance
14. Verify differential amplifier
15. Describe transistor switching characteristics
16. Analyze differential amplifier characteristics
17. Analyze constant current source
18. Analyze voltage follower circuit
19. Identify transistors
20. Interpret transistor data sheet
21. Describe half-wave rectifier circuit
22. Build noninverting op-amp circuit
23. Describe full-wave rectifier circuit
24. Describe bridge rectifier circuit
25. Measure common mode rejection ratio
26. Analyze filter capacitor effects
27. Measure Gain Bandwidth Product
28. Analyze zener diode voltage regulator
29. Analyze series-feedback voltage regulator
30. Verify constant current source
31. Build unregulated power supplies
32. List oscillator classifications
33. Verify half-wave rectifier circuit
34. Calculate oscillator operating frequency
35. Verify full-wave rectifier circuit
36. Analyze LC oscillators
37. Measure voltage gain
38. Analyze RC oscillators
39. Verify bridge rectifier circuit
40. Analyze crystal oscillators
41. Calculate DC parameters
42. Verify voltage doubler circuit
43. Measure ripple voltage
44. Verify series voltage regulator

45. Verify protection circuits
46. Calculate dynamic resistance
47. Calculate voltage gain
48. Categorize biasing parameters
49. Analyze common base amplifier
50. Build IC voltage regulator circuit
51. Analyze base-biased common emitter amplifier
52. Analyze split power supply common emitter amplifier
53. Analyze amplifier troubleshooting techniques
54. Analyze common collector amplifier
55. Classify heat sinks
56. Calculate amplifier efficiency
57. Analyze Darlington amplifier
58. Build complementary symmetry amplifier
59. Analyze amplifier classes of operation
60. Analyze complementary-pair amplifier
61. Analyze cascaded amplifier
62. Measure operating frequency
63. Analyze inverter circuit
64. Verify clipper circuit
65. Analyze MOSFET biasing
66. Describe power FET operation
67. Calculate amplifier gain
68. Verify SCR static switch
69. Describe amplifier coupling techniques
70. Describe SCR construction
71. Analyze phase control circuit
72. Analyze photo-transistor operation

E. Minnesota Transfer Curriculum Goal Area(s) and Competencies

None

F. LEARNER OUTCOMES ASSESSMENT

As noted on course syllabus

G. SPECIAL INFORMATION

None noted