**CHAMP Course Map**

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| **Course Name:** Solid State Devices ELT 135 |
| **Instructor Name:** Scott Fambrough | **Date:** 01 August, 2014 |
| **Course Competencies:**1. Identify the symbols, elements, and subscripts associated with UJTs.
2. Explain the proper biasing technique of UJTs.
3. Discuss the resistive regions of the UJT.
4. List the applications of the UJT.
5. Construct and analyze operation of UJT circuits.
6. Identify the symbols, elements, and subscripts associated with SCRs.
7. Explain the proper biasing techniques of SCRs.
8. Explain the operation and examine the wave shapes of an SCR circuit.
9. List the applications of the SCR.
10. Identify the symbols for a diac and a triac.
11. Identify the symbols and explain the uses of some of the other thyristor devices.
12. Identify symbol of the thermistor.
13. Discuss the NTC and PTC of a thermistor.
14. Describe basic applications of thermistors.
15. Identify types and symbols of varactors.
16. Describe basic characteristics of varactors.
17. Define a light emitter of a photodector.
18. Identify symbols for the photoresistor, photovoltaic cells, photo diode, and LED.
19. Describe some applications for the optoelectrical devices.
20. Identify some of the symbols for varactor.
21. Describe the principles of how a varactor works.
22. List some of the uses for the varactor.
23. List the uses of oscillators.
24. Identify the requirements necessary for oscillation.
25. Describe the basic operation of oscillators.
26. Explain the operation of a tuned circuit.
27. Identify and analyze the characteristics of an Armstrong oscillator.
28. Recognize and measure the characteristics of a Hartley oscillator.
29. Construct a Colpitt,s oscillator and examine the data.
30. Assemble a RC-Coupled Phase Shift oscillator and interpret the data.
31. Measure and collect data for a Crystal Controlled oscillator.
32. Identify and measure the characteristics of a Astable multivibrator.
33. Recognize and examine the characteristics of a Monostable multivibrator.
34. Measure and collect data for a Bistable multivibrator.
35. Analyze and interpret the data collected for a Schmitt Trigger.
36. Identify the symbols and explain the operation of JFET.
37. Construct and discuss the biasing techniques of JFET.
38. Define the ohmic, pinch off, and breakdown regions of the characteristic curves.
39. Identify and explain the operation of a common course, drain, or gate.
40. List some of the advantages and disadvantages of the different biasing techniques.
41. Construct and explain the operation of the T-Notch filter.
42. Identify the symbols and explain the operation for enhancement and depletion modes.
43. Discuss the biasing techniques of the MOSFET.
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**Course Materials (Text, Edition and any other publisher items)**

**Textbooks and/or Resources: 1. Analog Fundamentals A Systems Approach, T. L. Floyd and D. M. Buchla, 1st ed.**

 **2. Laboratory Manual to Accompany Analog Fundamentals A Systems Approach, T. L. Floyd and D. M. Buchla, 1st ed.:**

**Resources:**

**Rubrics:** Rubrics and specific grading criteria for EACH assessment should be included at the end of the course map.

| **Module # and Title** | **CCNS Competencies** | **Content, Activities or Challenges****(Learner Interaction** **& Engagement)**  | **Assessments, Rubrics (Feedback)** | **Publish to OER** |
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| Start Here  | Course Map | Course Content, Activities or Challenges, (Learner Interaction & Engagement)  |  |  |
| Module 2: Field Effect Transistors | XXXVI, XXXVII, XXXVIII, XXXIX, XL, XLI, XLII, XLIII | 1. Reading
2. Field Effect Transistors
3. JFET Characteristics
4. JFET Biasing
5. MOSFET E & D Type Characteristics
6. MOSFET E & D Type Biasing
7. Lecture
8. Field Effect Transistors
9. JFET Characteristics
10. JFET Biasing
11. MOSFET E & D Type Characteristics
12. MOSFET E & D Type Biasing
13. Laboratory Exercise
14. JFET CE Amplifiers
15. MOSFET Amplifiers
 | 1. End of Chapter Review Questions
2. Written Exam; JFET & MOSFET Characteristics and Applications
3. Laboratory Exercise; JFET CE Amplifiers Rubric
4. Laboratory Exercise; MOSFET Amplifiers Rubric
 | Lecture Notes;Field Effect Transistors, JFET Characteristics, JFET Biasing, MOSFET E & D Type Characteristics, MOSFET E & D Type BiasingWritten Exam; JFET & MOSFET Characteristics and Applications |
| Module 3: Multistage Amplifiers | XXXVI, XXXVII, XXXVIII, XXXIX, XL, XLI, XLII, XLIII | 1. Reading
2. Multistage Amplifiers
3. Amplifier Coupling Techniques
4. Class A Power Amplifiers
5. Class B Power Amplifiers
6. Class C Power Amplifiers
7. Class D Power Amplifiers
8. Lecture
9. Multistage Amplifiers
10. Amplifier Coupling Techniques
11. Class A Power Amplifiers
12. Class B Power Amplifiers
13. Class C Power Amplifiers
14. Class D Power Amplifiers
15. Laboratory Exercise
16. Multistage Amplifiers
17. Class A Power Amplifiers
18. Class AB Power Amplifiers
 | 1. End of Chapter Review Questions
2. Written Exam Multistage JFET & MOSFET Amplifiers
3. Laboratory Exercise Class A Power Amplifiers Rubric
4. Laboratory Exercise Class AB Power Amplifiers Rubric
 | Lecture Notes;Multistage Amplifiers, Amplifier Coupling Techniques, Class A Power Amplifiers, Class B Power Amplifiers, Class C Power Amplifiers, Class D Power AmplifiersWritten Exam; Multistage JFET & MOSFET Amplifiers |
| Module 4: Oscillators & Timers | XXIII, XXIV, XXV, XXVI, XXVII, XXVIII, XXIX, XXX, XXXI, XXXII, XXXIII, XXXIV, XXXV | 1. Reading
2. Oscillators
3. Feedback Oscillator Principles
4. Sinusoidal Oscillators with RC Feedback
5. Oscillators with LC Feedback
6. Timers (Multivibrators)
7. Relaxation Oscillator
8. 555 Timer as an Oscillator
9. 555 Timer as a One-Shot Multivibrator
10. Lecture
11. Oscillators
12. Feedback Oscillator Principles
13. Sinusoidal Oscillators with RC Feedback
14. Oscillators with LC Feedback
15. Timers (Multivibrators)
16. Relaxation Oscillator
17. 555 Timer as an Oscillator
18. 555 Timer as a One-Shot Multivibrator
19. Laboratory Exercise
20. 555 Timer as a One-Shot Multivibrator
 | 1. End of Chapter Review Questions
2. Written Exam; Oscillators and Timers (Multivibrators)
3. Laboratory Exercise 555 Timer as a One-Shot Multivibrator Rubric
 | Lecture Notes;Oscillators1. Feedback Oscillator Principle\
2. Sinusoidal Oscillators with RC Feedback.
3. Oscillators with LC Feedback

Timers (Multivibrators)1. Relaxation Oscillator
2. 555 Timer as an Oscillator
3. 555 Timer as a One-Shot Multivibrator

Written ExamOscillators and Timers (Multivibrators) |
| Module 5: Special Purpose Diodes & ApplicationsModule 5 (cont) | XV, XVI, XVII, XVIII, XIX, XX, XXI, XXII, XV, XVI, XVII, XVIII, XIX, XX, XXI, XXII,  | 1. Reading
2. Special Purpose Diodes and Applications
3. Special Purpose Diodes
4. Photo Based Solid State Components
5. Lecture
6. Special Purpose Diodes and Applications
7. Special Purpose Diodes
8. Photo Based Solid State Components
 | 1. End of Chapter Review Questions
2. Written Exam; Special Purpose Diodes and Applications
 | Lecture NotesSpecial Purpose Diodes and Applications1. Special Purpose Diodes
2. Photo Based Solid State Components

Written Exam1. Special Purpose Diodes and Applications
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| Module 6: Thermistors |  | 1. Reading
2. Thermistor
3. NTC Thermistor
4. PTC Thermistor
5. Lecture;
6. Thermistor
7. NTC Thermistor
8. PTC Thermistor
 | 1. End of Chapter Review Questions
 | Lecture NotesWritten ExamLaboratory Exercise |