2013 Scanning Sheet. Assignment Description:_____ Instructor:_____ Date:_____ Scanned File Name:_____

| ABET Outcomes | | | | | | | | | | | Rubric or | Example | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | student % | problem | Outcome # | **EE 479 Superconductive Devices (3) – Outcomes Reviewed 2013** |
| 1 | | 2 | | 2 | | 1 | 2 | 1 | 1 | 1 | | | 1 | Introduction to material properties of solids and superconducting materials. Review of trends in superconducting material research and high temperature superconductor usage in devices for integrated circuit chip. |
| 1 | | 2 | | 2 | | | | 1 | | 1 | | | 2 | Analysis and application of free electron theory, energy gap, phonon spectrum electrical conductivity and resistivity conductor, Meissner, different classes of superconductors. Electron paring, Cooper pair model, gap parameters and condensation energy, statistics for pair excitation, temperature dependence of gap parameter. Tunneling barriers, tunneling between normal metals, tunneling between normal metal and superconductor, and tunneling between superconductors. |
| | | 2 | | 2 | | | | 1 | | 1 | | | 3 | Apply current field relation, London equation, quantization of magnetic flux, Pippard coherence length, Meissner effect and penetration depth,. Inductance of thin field lines, superconducting transmission lines and passive microwave circuits. Theory of Josephson junctions, Josephson junction devices. |
| | | 2 | | 2 | | | | 1 | | 1 | | | 4 | Understand and design of electronics applications of Josephson junction in: RF signal generation, SQUIDS, digital circuits, memories in Josephson and hybrid technologies |
| 1 | | 2 | | 2 | | | | 1 | | 2 | | | 5 | Apply magnetization, demagnetization factors, Gibbs energy, phase transitions, superconducting and normal phase transition. Ginzburg-Landau theory, surface energy, proximity effects. |
| 1 | | 2 | | 2 | | | 2 | 1 | | 2 | | | 6 | Understanding and application of Type II superconductors, high temperature superconductors, superconducting device fabrication and integration issues. |

1=supporting contribution
2=significant contribution

| Rubric |
|---|
| 5: Excellent Mastery of Outcome By Vast Majority of Students |
| 4: Good Mastery of Outcome By Vast Majority of Students |
| 3: Adequate Mastery of Outcome By Majority of Students |
| 2: Marginal Mastery of Outcome By Most Students |
| 1: Lack of Mastery of Concept By Most Students |

Improvement Suggestions or Comments:

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| 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 system, component, or process to meet desired needs within realistic constraints such as economic, |
| d. an ability to function on multi-disciplinary 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 solution in a global, economic, environmental, and |
| 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 |