



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title	Experimental Superconductivity								
Course Code	EEE564		Course Level		Second Cycle (Master's Degree)				
ECTS Credit	8	Workload	200 (Hours)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course	This course aims to teach experimental superconductivity.								
Course Content	Maxwell's equations, Magnetism in matter, magnetic materials, Superconductivity, High T _c superconductivity, BSCCO, YBCO, preparation and characterization of bulk High T _c materials experimentally, Meissner effect, Superconducting magnets, superconducting cables, superconducting maglev trains (experimental work will be performed in the Electrical Measurement Lab).								
Work Placement	N/A								
Planned Learning Activities and Teaching Methods	Explanation (Presentation), Demonstration, Discussion, Case Study, Project Based Study, Individual Study, Problem Solving								
Name of Lecturer(s)									

Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	30
Final Examination	1	35
Laboratory	4	35

Recommended or Required Reading

1	Serway R. A., Physics for Scientists and Engineers, 3rd ed. (updated version), Saunders College Publishing, International ed., 1992
2	Rose-Innes A.C., Rhoderick E. H., Introduction to Superconductivity, 2nd ed., Pergamon, GBR, 1980
3	Narlikar A. V., High Temperature Superconductivity 1: Materials, Springer-Verlag, Berlin, 2004
4	Narlikar A. V., High Temperature Superconductivity 2: Engineering Applications, Springer-Verlag, Berlin, 2004
5	Lecture notes, lab instructions, and Internet sources

Week	Weekly Detailed Course Contents	
1	Theoretical	Maxwell's equations and Magnetism in matter, magnetic materials (Revision)
2	Theoretical	Introduction to superconductivity, Perfect Diamagnetism and Meissner effect, High T _c superconductivity
3	Theoretical	Type-I Superconductivity
4	Theoretical	Type-II Superconductivity
5	Theoretical	Superconducting material and cable production methods, doping mechanism and structural characterization in high T _c superconductivity (XRD, SEM, RBS, etc.)
6	Theoretical	Electrical characterization of high T _c superconductors
7	Practice	Experiment 1: Production of high T _c superconductors (YBCO)
8	Intermediate Exam	Midterm Exam
9	Practice	Experiment 2: Production of high T _c superconductors (BSCCO)
10	Practice	Experiment 1&2 continuing
11	Practice	Experiment 3: Electrical characterization of High T _c superconductors (YBCO)
12	Practice	Experiment 4: Electrical characterization of High T _c superconductors (BSCCO)
13	Practice	Experiment 3&4 continuing + structural characterization
14	Practice	Project work (experimental)
15	Practice	Project work (experimental)
16	Final Exam	Final Exam (project)

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	6	5	3	48
Project	2	12	3	30
Laboratory	6	12	3	90



Midterm Examination	1	12	2	14
Final Examination	1	15	3	18
Total Workload (Hours)				200
[Total Workload (Hours) / 25*] = ECTS				8

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	Can understand the magnetism in matter
2	Can comprehend the nature of superconductivity
3	Can understand the structural and electrical properties of high Tc superconductivity
4	Can produce and perform the structural and electrical characterizations of superconducting high Tc bulk materials experimentally
5	Can understand the superiority of high Tc superconductivity in engineering applications

Programme Outcomes (Electrical and Electronics Engineering Master)

1	Developing and intensifying knowledge that requires expertise in the area of Electrical-Electronics Engineering, and gaining the skills necessary to analyze and solve problems using this knowledge
2	Grasping the inter-disciplinary interaction related to Electrical-Electronics Engineering, interpreting and forming new types of knowledge by combining the knowledge from Electrical-Electronics Engineering and the knowledge from various other disciplines
3	Developing new approaches to solve the complex problems arising in Electrical-Electronics Engineering, coming up with solutions while taking responsibility and carrying out a specific study independently
4	Assessing the knowledge and skill gained in the area of Electrical-Electronics Engineering with a critical view
5	Transferring the current developments and one's own work in Electrical-Electronics Engineering, to other groups in written, oral and visual forms
6	The ability to control the collecting, interpreting, practicing and announcing processes of the Electrical-Electronics Engineering related to data taking into consideration scientific, cultural and ethical values and the ability to teach these values to others
7	Developing application plans concerning the subjects related to Electrical-Electronics Engineering and the ability to evaluate the end results of these plans within the frame of quality processes

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	4	4	4	4	4
P2	4	4	4	4	4
P3	4	4	4	4	4
P4	4	4	4	4	4
P5	4	4	4	4	4
P6	4	4	4	4	4
P7	4	4	4	4	4

