

EE 551 Energy Storage Technologies

COURSE INFORMATION

Prerequisites	Academic Year &Level		Teaching Methods			Credit Hrs.
	Year	Semester	Lecture	Tutorial	Lab.	
EE 423	5	9 \10	2	2		3

COURSE AIM

- Enrich the student’s basic background concept of electrical storage elements.
- Develop the student ability to recognize and analyze different energy storage technologies.
- Train student to model batteries. Ultracapacitors, SMES during charge and discharge.
- Select proper EES for a given application.

COURSE WEEKLY CONTENTS

- 1 Introduction to the energy storage systems (ESS)
- 2 Different types of batteries
- 3 Charging and discharging cycles of batteries
- 4 Supper capacitors
- 5 Superconducting Magnetic Energy Storage (SMES)
- 6 Fuel cells
- 7 Midterm Exam
- 8 Flywheels Energy Storage
- 9 Hydroelectricity and pumped-storage
- 10 Thermal storage systems
- 11 Integration of the ESS.
- 12 Applications of ESS (1).
- 13 Applications of ESS (2).
- 14 Long term power smoothing of intermittent energy resources using ESS
- 15 Short term power smoothing of intermittent energy resources using ESS

STUDENT GRADING & ASSESSMENT

Weeks	Exams	Assign.	Quizzes	Reports	Present.	Lab.	Total
1 to 7	20 Midterm	←	10	MARKS		→	30
To be freely distributed among possible assessments							
8 to 12	←		20	MARKS		→	20
13 to 15	←		10	MARKS		→	10
16 or 17	40 Final						40
Total	Exams	Assign.	Quizzes	Reports	Present.	Lab.	100

REFERENCES

Textbook Alfred Rufer, “Energy Storage: Systems and Components,”CRC Press, 2017.
 Other Robert Huggins, “Energy Storage: Fundamentals, Materials and Applications,” 2nd ed. 2016.

