

EE 486: Power Electronics Simulation Project

Spring 2025

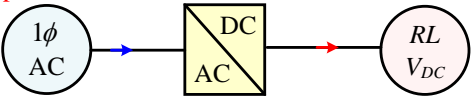
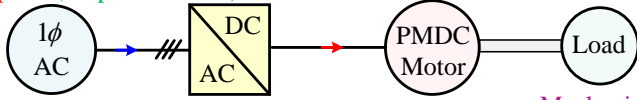
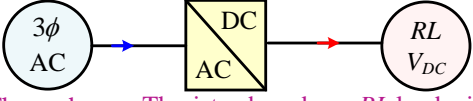

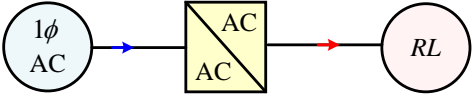
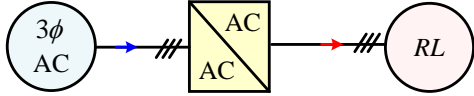
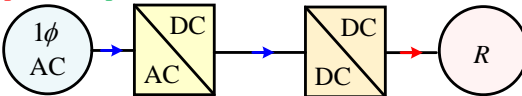
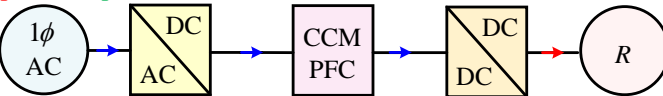
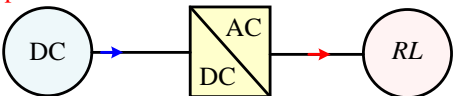
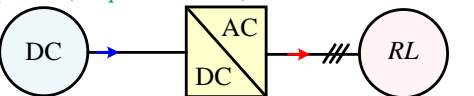
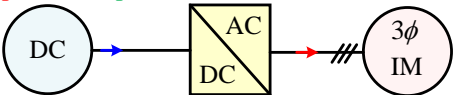
Project Due Date: 30 April 2025

Recall Grading Scheme: Final Exam (35%) – Midterm Exam#1 (15%) – Midterm Exam#2 (15%) – Midterm Exam#3 (10%) – Assignments (15%) – Project (10%)

Topics: There are 11 topics for your project to choose from as listed below. Some topics have between 2–7 points extra bonus points (i.e., you can almost double your project points, which is normally based on 10 points!).

Objective: For each topic, you must choose the parameters of the system (it can vary from student to student, but they have to be reasonable), supported by calculations. The objective is to control the power delivered to the load over a range of interest through a feedback loop by controlling (the duty cycle or firing angle) of the converter.

Deliverables: A comprehensive report (typed, not handwritten!) including your derivations, calculations, and simulation results; together with the simulation file. After submitting your report, you will need to sit with the TA (~ 30 mins) to go over your simulations and he may ask questions about the report and simulations.

Topic 1  Single-phase AC source Thyristor-based rectifier RL load with V_{DC} DC source	Topic 2 (+5 points bonus)  Single-phase AC source Thyristor-based rectifier PMDC Motor Mechanical Load
Topic 3  Three-phase AC source Thyristor-based rectifier RL load with V_{DC} DC source	Topic 4 (+5 points bonus)  Three-phase AC source Thyristor-based rectifier PMDC Motor Mechanical Load
Topic 5  Single-phase AC source Thyristor-based voltage regulator Single-phase RL load	Topic 6 (+5 points bonus)  Three-phase AC source Thyristor-based voltage regulator Three-phase RL load
Topic 7 (+2 points bonus)  Single-phase AC source Diode-based rectifier PWM-controlled converter Load R	Topic 8 (+7 points bonus)  Single-phase AC source Diode-based rectifier CCM PFC corrector PWM-controlled converter Load R
Topic 9  DC source Sinusoidal-PWM-based inverter Single-phase RL load	Topic 10 (+3 points bonus)  DC source Sinusoidal-PWM-based inverter Three-phase RL load
Topic 11 (+7 points bonus)  DC source Sinusoidal-PWM-based inverter Three-phase induction motor	Topic 12 <p>Open to Your Suggestions!</p>