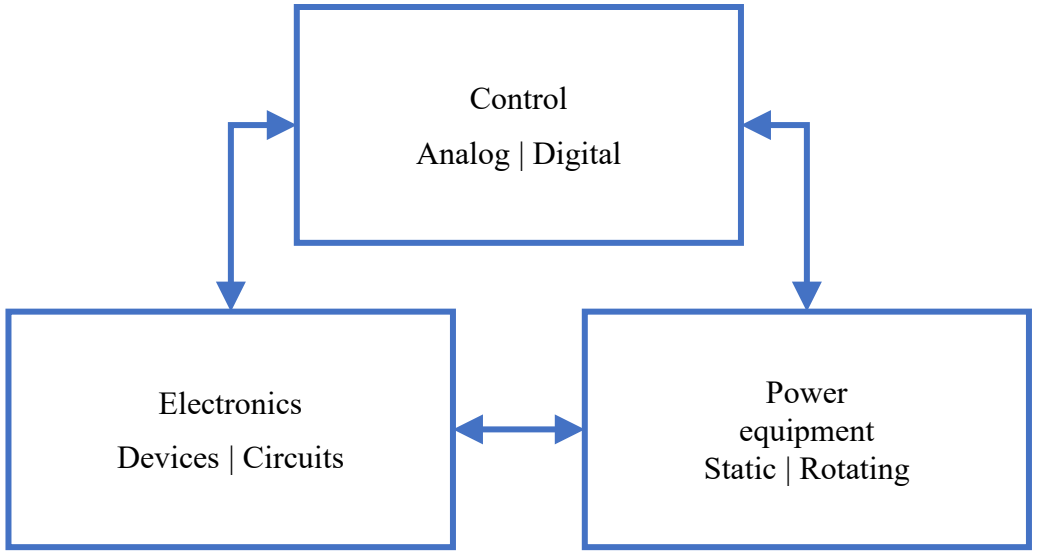
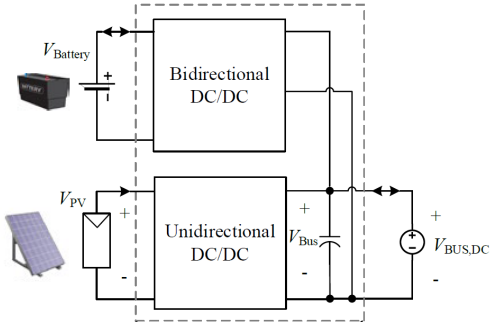
Power Electronics Final Project

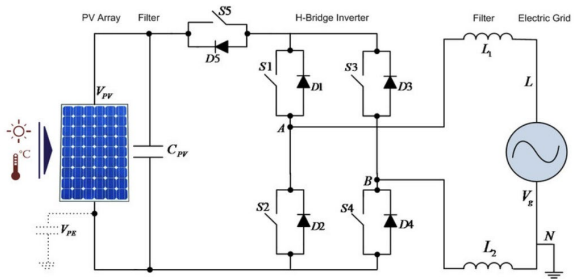
- Design and development of power electronics applications

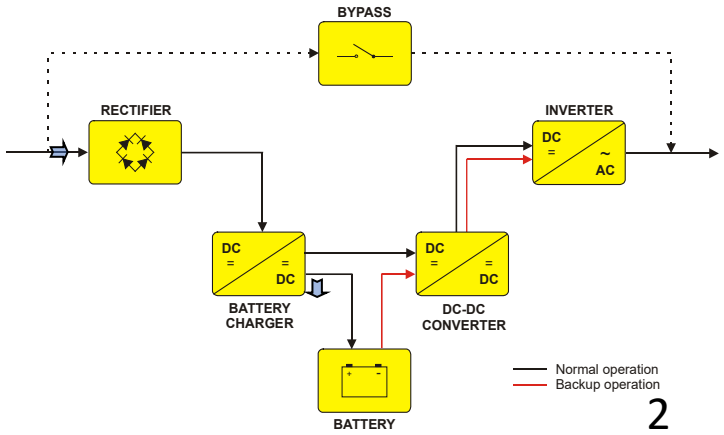


Project Options

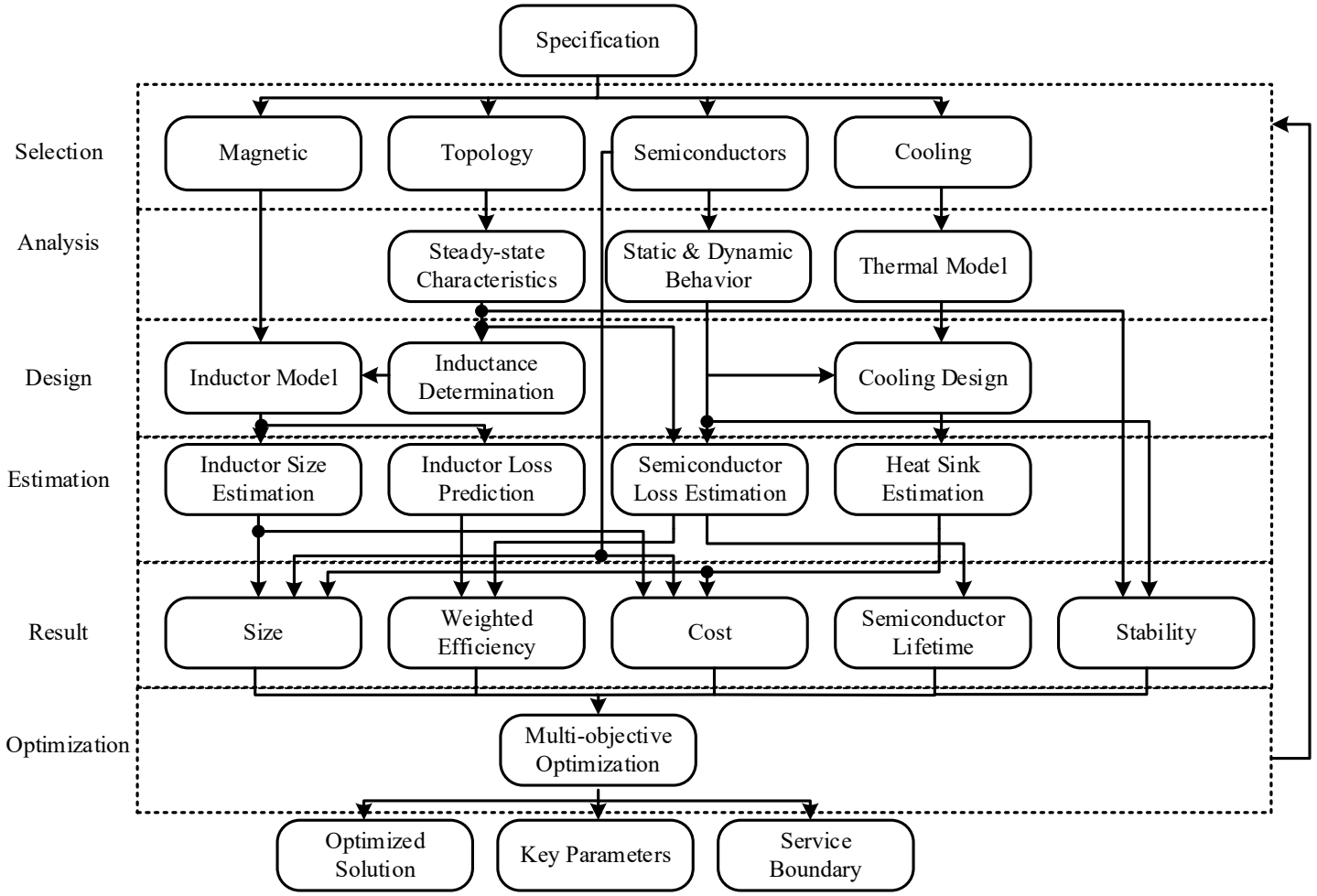
- Project for Undergraduate Students
  - Multi-terminal DC-DCs (24Vdc PV input, 24Vdc Bi-directional battery, and 36Vdc output)
  - AC-DC LED Driver (120Vdc input, 16 LEDs, 48Vdc output, with dimming)
  - PV inverter (0-200Vdc panels, 120Vac output)
- Project for Graduate Students
  - AC-DC On-Board Battery Charger (120Vac input, 400Vdc and 48Vdc batteries)
  - Uninterruptible Power Supply (120/240V input, 120/240V output)
  - 3-phase grid-following inverter (800Vdc input, 480Vac, min. 100kW, PQ control)







Guideline


Specification
Selection
Magnetic
Topology
Semiconductors
Cooling
Analysis
Steady-state Characteristics
Static & Dynamic Behavior
Thermal Model
Design
Inductor Model
Inductance Determination
Cooling Design
Estimation
Inductor Size Estimation
Inductor Loss Prediction
Semiconductor Loss Estimation
Heat Sink Estimation
Result
Size
Weighted Efficiency
Cost
Semiconductor Lifetime
Stability
Optimization
Multi-objective Optimization
Optimized Solution
Key Parameters
Service Boundary

Requirement

- Formulate a group of up to 3 students as a team
- Input the project selection and the team member information into Canvas on or before Dec 3rd, 2024
- Submit a PLECS/ MATLAB simulation file, an Excel/MATLAB efficiency estimation file, and an 8-page max. report on or before Dec 3rd, 2024.