eCAL Recommended Courses for Research

The Energy, Controls, and Applications Lab (eCAL) conducts research than spans across control systems, optimization, batteries, energy storage, building energy, vehicle-grid integration, and smart grids. To conduct high-quality research, a fundamental training is absolutely required through coursework. The following is a list of "eCAL recommended courses" for current & prospective eCAL graduate researchers.

The following is an aggregate list of recommended courses, and *does not* represent a comprehensive curriculum nor course requirements for a M.S. or Ph.D. degree. Your course schedule must comply with departmental requirements and the Berkeley Graduate Division Guide to Graduate Policy.

THEORY		APPLICATION	
Controls Group		**Power and Energy Group**	
CE 295	Energy Systems and Control	EE 137A	Introduction to Electric Power Systems
EE 221A -or- ME C232	Linear Systems Theory -or- Advanced Control Systems I	CE 107 -or- ER 200	Climate Change Mitigation -or- Energy & Society
EE 222 -or- ME 237	Nonlinear Systems- Anal, Stab., Ctrl -or- Control of Nonlinear Dynamics Systems	ER 254	Electric Power Systems
ME 231A	Experiential Advanced Control Design, aka Model Predictive Control	ME 246	Advanced Energy Conversion Principles
ME 233	Advanced Control Systems II (optimal, stochastic, & adaptive control)	ARCH 249-002	Assessing Building Energy Use and Indoor Environmental Quality
EE 223	Stochastic Estimation and Control		
ME 234	Multivariable Control Systems	**Climate, Sustainability, Policy, & Energy Economics**	
CE 290I	Control and Information Management	CE 268E	Civil Systems & Environment
CE C291F	Control and Optimization of Distributed Parameter Systems	CE 218A	Air Quality Engineering
MATH 126 -or- MATH 222A/B	Intro to Partial Differential Equations -or- Partial Differential Equations	ER 290	Seminar in Energy & Resources
		CE 256	Transportation Sustainability
Optimization Group		EEP 147 -or- MBA 212	Regulation of Energy & Environment -or- Energy & Environmental Markets
CE 191 -or- EE 127/ 227AT	CEE Systems Analysis, aka Optimization -or- Optimization Models in Engineering	Law 270.6	Energy Regulation & the Environment
EE 227BT	Convex Optimization	Law 270.2	Environmental Law and Policy
EE C227C	Optimization for Modern Data Analysis		
IEOR 265	Learning and Optimization	**Hardware, Cyber Physical Systems, & Projects**	
		CE 186	Design of Cyber Physical Systems
Statistics and Data Analysis Group		CE 271	Sensors & Signals
CE 193	Engineering Risk Analysis	CE 209	Design for Sustainable Communities
EE 126 -or- EE 226A	Probability & Random Processes -or- Random Processes	CS194-5 /CS294-100	Internet of Everyday Things
CE 263N	Scalable Spatial Analytics	CE C289	Embedded System Design
CE 264	Behavioral Modeling for Engineering, Planning, and Policy Analysis		
STAT 215A	Statistical Models: Theory & Application		
CS 289A	Introduction to Machine Learning		
CS 281A/ STAT241A	Statistical Learning Theory		