THE OHIO STATE UNIVERSITY
COLLEGE OF ENGINEERING

Feedback Control Engineering for Social Justice

ECE 5550

Credit Hours:
3.00

Course Levels:
Undergraduate (1000-5000 level)
Graduate (5000-8000 level)

Course Components:
Lecture

Course Description:
Models of individual and group poverty and underdevelopment; computational social justice; assessing social impact of technology; sensitivity analysis for technology prioritization and design; feedback control for computer automation of helping to meet social justice objectives. Feedback control for organizational diversity, optimal diverse team formation and functioning.

Prerequisites and Co-requisites:
Prereq: Jr, Sr or Grad standing in College of Engineering; or permission of instructor.

Course Goals / Objectives:
- Mathematical and computational models and analysis of aspects of human development
- Matlab for computational evaluations

Course Topics:

- 1Introduction to the challenge of an analytical approach to social justice: a. Overview b. Elements of Matlab/Simulink c. Elements of Monte Carlo simulation, and statistics
- Models of poverty and financial management. Modeling capital, loans, savings. Feedback control for finance management a. PID b. Model predictive control c. Adaptive control d. Stochastic dynamic programming. Implementation approaches.
- Tragedy of the commons, environmental justice feedback control policy
- Wealth distribution as distributed feedback control
- Democracy in a community (interpolation to get a group choice, feedback loop)
- Stability of economic growth, stability of poverty traps
- Combined development/technology diffusion models, and analysis
- Sensitivity and optimization analysis of development
- Systems theory of systemic racism, analysis
- Models of diversity, equity, inclusion. Feedback control hiring policy.
- Optimal diverse team formation and functioning, Part 1
- Optimal diverse team formation and functioning, Part 2
- Cooperative management of community technology
- Cooperative sustainable community development. Overview of research directions in this subject.

Designation:

Elective