

# A 3-Day Discrete Control System Course

The Discrete Control System Course is a university level course. The course is designed to raise the standard of working control engineers and graduate students who are entering the field of control. Each attendee will receive presentation notes, the textbook *Optimal Discrete Control Theory: The Rational Function Structure Model* and license to use the RTF-SISO Discrete Control toolbox. The course will cover the following topics.

## Day 1. Discrete Linear Control Systems.

- Difference Equations and the z Transform.
- Mathematical Model of Linear Systems.
  - Transfer Function Model.
  - State Space Model.
- Responses to Special Signals.
- Disturbed Feedback Control Systems.

## Day 2. Designing Deterministic Tracking Controllers.

- The Tracking PID controller.
- The Dead Beat Controller.
- The Dahlin Controllers.
- The Pole-Zero Placement Controller.
- The Vogel-Edgar Controller.
- The IMC Controller.
- The Linear Quadratic Tracking Controller.
- The Set Point Model Tracking Controllers.
- Evaluation of a Tracking Controller.

## Day 3. Designing Stochastic Regulating Controllers.

- The ARIMA Time Series.
  - The Time Statistics.
  - Forecast of an ARMA Time Series.
  - The Frequency Statistics.
- The LQG Controllers.
  - The One Step Optimal Controller.
  - The N Steps Optimal Controller.
  - The Infinite Steps Optimal Controller.
  - The Pseudo-infinite Steps Optimal Controller.
- The H-infinity Controller.
  - The H-infinity Control Concepts.
  - The Least Sensitivity Controller.
- Evaluation of a Regulating Controller.