

# AE 703: Digital Control Systems

- Course Outline

- Linear difference equations
  - \* Initial condition response,
  - \* Impulse response
  - \* Convolution and input response
  - \* Input-output stability
- Z-transforms
  - \* z-transform theorems
  - \* Inverse z-transform
- Transfer functions
  - \* Poles and stability
  - \* Poles and transient response
  - \* Response to step and harmonic inputs
- Discrete equivalents of s-transfer functions
  - \* Forward, backward and trapezoidal rules
  - \* Pole-zero mapping
  - \* Hold equivalents
- Sampling and reconstruction
- Analysis of sampled-data systems
- Design using classical techniques
- State-space concepts
  - \* Continuous-time state-space systems
  - \* ZOH equivalents of continuous time systems
  - \* Controllability and observability
  - \* Pole placement
  - \* Observers
  - \* LQR (?)

- Texts

- *Digital Control of Dynamic Systems*, Franklin, Powell and Workman
- *Digital Control Systems*, B. C. Kuo
- *Digital Control System Analysis and Design*, Phillips and Nagle

- References

- *Digital Control: A State Space Approach*, R. J. Vacaro
- *Digital Control and State Variable Methods*, M. Gopal

- Evaluation

Quizzes	30 %
Midsem	30 %
Endsem	40 %