

# **POSTGRADUATE COURSES**

**Spring 2017**

## **RCMS**

**Course Title:** Model Order Reduction

**Course Code** CSE-879

**Credit Hours:** 3-0

**Pre Requisites:** -

### **Detailed Contents:**

- Basics of linear systems
- Solving matrix equations.
- Model reduction methods for linear and nonlinear systems:
  - Modal truncation (eigenvalue-based methods),
  - Balanced truncation (SVD-based methods),
  - Pade approximation / rational interpolation (Krylov subspace based methods),
  - Proper orthogonal decomposition (POD),
  - Reduced basis method.
- Applications of model reduction.
- Model reduction for parametric systems.

### **Text/Ref Books:**

- A.C. Antoulas: Approximation of Large-Scale Dynamical Systems, SIAM, Philadelphia, 2005.
- P. Benner, V. Mehrmann, D.C. Sorensen: Dimension Reduction of Large-Scale Systems, Springer-Verlag, Berlin/Heidelberg, June 2005.
- P. Benner: Numerical Linear Algebra for Model Reduction in Control and Simulation, GAMM Mitteilungen, 2006.
- G. Obinata, B.D.O. Anderson: Model Reduction for Control System Design, Springer-Verlag, 2000.
- W.H. Schilders, H.A. van der Vorst, J. Rommes Model Order Reduction: Theory, Research Aspects and Applications, Springer-Verlag, 2008.

**Time Schedule:** Spring Semester 2017

### **Name and Qualification of faculty conducting course:**

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Discipline: Electrical & Electronics Engg  
Specialization: Control Systems