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| **Adama Science and Technology University**  **School of Electrical Engineering and Computing**  **Department of Electrical Power and Control Engineering** | | | | | | |
| Course Code | PCE 6301 | | | | | |
| Course Title | System Identification & Parameter Estimation | | | | | |
| Degree Program | MSc in Electrical Power and Control Engineering (Control) | | | | | |
| Credits | 3 | | | | | |
| Contact Hours/week | Lecture | | Tutorial | | Practice/Laboratory | |
|  | 2 | | * none - | | * none - | |
| Course Instructor (s) |  | | | | | |
| Address | Building: Rm 606 <Tel:+251> 99 480 7269 E-mail: snkim0701@daum.net | | | | | |
| Course Objectives: Upon successful completion of the course, students will be able  To familiarize System Identification Concepts and Procedure  To distinguish the differences between parametric, and nonparametric identification methods  To learn System Identification Terminology, Wiener-Hopf relation, correlation, SV Decomposition, etc.  To learn how to parametric method using linear regression, recursive estimation techniques.  To model validation estimation techniques | | | | | | |
| **Course Description/Course Contents**  **Non-Parametric System Identification:** Impulse/pulse Response Identification, Frequency Response Identification, Transfer Function identification  **Correlation Method:** Wiener-Hopf Relation, Cross-correlation between input/output.  **Static System identification:** linear /non-linear static system, least square estimation, identifiability, Singular Value Decomposition Method, Bounded-noise problem, iterative Method, model parametrization, maximum likelihood estimation  **Dynamic System Identification:** linear /nonlinear system identification, Subspace identification, Orthogonal projection method  **Time Varying Dynamic System Identification:** linear/nonlinear system identification, recursive least square estimation, recursive prediction error estimation.  **Model Validation**: Model reduction, Simulation, Prediction. | | | | | | |
| NB ! Latest/recent developments regarding the specified course applications can be incorporated. | | | | | | |
| Pre-requisites | **Probability and Random variables / real analysis** | | | | | |
| Semester |  | | | | | |
| Status of Course | Major Mandatory | | | | | |
| Teaching & Learning  Methods | Lecture supported by Computer exercises using MATLAB | | | | | |
| Assessment/Evaluation |  | **Measurement** | | **Value/Mark (%)** | |  |
| **Attendance** | | **10%** | |
| **2 Assignments/**  **1 Test**  **Mid-Exam**  **Examination (final)**  **Total** | | | **20%(B&A Mid Exam)**  **10%(Dec.18)**  **20%(Nov.18)**  **40%(Jan.06)**  **100%** | | |
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| Attendance  Requirements | Minimum 80% during lecture except for some unprecedented mishaps | | | | | |
| Textbooks and References   1. Karel J. Keesman,“System Identification”, Springer, 2011. 2. Lennart Ljung,,”System Identification ”,Prentice Hall,1999. 3. G.Strang, “Linear Algebra and Its Application”, Harcourt Brace Jovanovich,3rd ed.,1988. 4. “System Identification Toolbox”,Mathlab & Simulation, 2016a 5. <https://github.com/snkim0701/Identification> | | | | | | |