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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  **Matlab simulations and verification** of real dynamic systems students are associated with. The data taken by students by themselves   * **During the course students may collect a real data related to student’s working place,**   **which is a system data or not.**   * **Using the data students may identify and verify the mathematical model to the real system** | | | | | | |
| NB ! Latest/recent developments regarding the specified course applications can be incorporated. | | | | | | |
| Pre-requisites | Matlab installed in students PC | | | | | |
| Semester |  | | | | | |
| Status of Course | Major Mandatory | | | | | |
| Teaching & Learning  Methods | Lecture supported by Computer exercises using MATLAB | | | | | |
| Assessment/Evaluation |  | **Measurement** | | **Value/Mark (%)** | |  |
| **Attendance** | | **10%** | |
| **Mid Assignment**  **Final Assignment**  **Total** | | | **40%**  **50%**  **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/Ext_PG_Identification> | | | | | | |