

# Assignment 1

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# **1 Courses in DTL**

## **1.1 LaTeX**

Basic syntax, compiling and creating documents; Document structure, sections, paragraphs; packages, Math, Adding Images, Drawing images (using tools like Inkscape) Table of contents; Source code, graphs (using tools like Graphviz), Adding references, different templates, IEEE format, Bibliography

## **1.2 Shell Programming**

Introduction to Linux commands, concept of shell, shell variables; Introduction to shell programming features: Variables declaration and scope, test, return value of a program, if-else and useful examples, for and while loop, switch case; Shell functions, pipe and redirection, wildcards, escape characters; Awk script: Environment and workflow, syntax, variables, operators, regular expressions, arrays, control flows, loops, functions, output redirections

## **1.3 GIT**

Creating a project using git locally, add, commit, status, diff; branch and merge, GIT: cloning a remote repo, working with a remote repo – git push, pull, fetch; creating issues and pull requests; working on a project in a distributed fashion

## **2 Courses in FCS**

### **2.1 Control Systems**

Importance of control systems, Control situations in Industry and around, classification of control system, transfers function, System modeling in the time domain.

### **2.2 Electrical and Mechanical Systems**

Dynamics of electrical and mechanical systems. Signal flow graph, System response in the time domain, Time-domain specifications. Time response analysis, 1st, 2nd and higher order systems. Basic properties of feedback, Advantage of feedback, Steady state errors (SSE) for feedback systems, static error constants and system types.

### **2.3 Stability of Systems**

Stability of open loop and closed loop systems, Routh-Hurwitz stability criterion. Root locus techniques, Root locus construction rules, Effects of Pole and Zeros. Using root-locus ideas to design controller, reducing steady-state error.