COEP Technological University
(COEP Tech)
A Unitary Public University of Government of Maharashtra
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(Formerly College of Engineering Pune)

DTL Assignment 1

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Contents

1 Courses Syllabus

1.1 Ordinary Differential Equations and Multivariate Calculus

Unit I : Review of first order differential equations, Reduction of order, linear differential equations, homogeneous higher order linear differential equations, non-homogeneous higher order linear differential equations with constant coefficients and reducible to differential equations with constant coefficients (method of undetermined coefficients and method of variation of parameters), systems of differential equations, applications to orthogonal trajectories, mass spring systems and electrical circuits.

Unit II : Laplace Transforms, its properties, Unit step function, Dirac delta functions, Convolution Theorem, periodic functions, solving differential equations using Laplace transform.

Unit III : Functions of several variables, level curves and level surfaces, partial and directional derivatives, differentiability, chain rule, local extreme values and saddle points, constrained optimization.

1.2 Innovation and Creativity

Contents

Introduction to concepts of creativity / invention / innovation and their importance in present knowledge world. Components of the creative process, Analogy/model to represent the creative process.

Understanding persons Creative potential. Blockages in practicing creative process – Mindset and belief systems. Myths and misconceptions about creativity.

Practical Tips to discover and apply one's creative potential, remove blockages, deal with external factors. Importance of synergistically working in a team. Harnessing creativity from nature.

Idea conception,Idea Brainstorming sessions, Idea Evaluation, Protection/Patent review,Principles of innovation, Review of systematic strategies and methods for innovation,Innovation case study,Review of Idea/Prototype /Product and Market Plan.

Applications Exercise / Assignment: at the end of the course, the student will create teams, presents their innovative ideas, and applies their learning in practice.

1.3 Development Tools Laboratory

Course Contents

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

Shell Programming: Introduction to Linux commands, concept of shell, shell variables, getcwd() and pwd; Introduction to shell programming features: Variables declaration & 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

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