

DEPARTMENT OF COMPUTER SCIENCE

Dyal Singh College, University of Delhi

(ACADEMIC SESSION, 2023-24)

Course: Bsc. (Hons) CS (Part___/ III Semester)

Paper Code and Name: Numerical Optimization

(TH)

FACULTY

Name of Teacher: Madhu Kumari

Contact: 9899324594

Email: madhukumari.cs@dsc.du.ac.in

ASSESSMENT DETAILS

Total Marks for the course is 120, comprising following components

- CA
 - IA - 30
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TEACHING PLAN

Week	Topics Covered/ Assignments/ Test/Presentations
1-2	Introduction: Mathematical Formulation using example, Continuous versus Discrete Optimization, Constrained and Unconstrained Optimization, Global and Local Optimization, Stochastic and Deterministic Optimization, Convexity, Optimization Algorithms.
3-4	Fundamentals of Unconstrained Optimization: Concept of a Solution - Recognizing a Local Minimum, Nonsmooth Problems,
5-6	Overview of Algorithms - Two Strategies: Line Search and Trust Region, Search Directions for Line Search Methods, Models for Trust-Region Methods, Scaling. Line Search - Convergence of Line Search Methods, Rate of Convergence - Convergence Rate of Steepest Descent;
7-8	Newton's Method, Quasi-Newton Methods. Trust Region - The Cauchy Point Algorithm; Global Convergence - Reduction Obtained by the Cauchy Point; Convergence to Stationary Points.
9-10	Conjugate Gradient Methods: Basic Properties of the Conjugate Gradient Method, A Practical Form of the Conjugate Gradient Method, and Rate of Convergence
11-12	Calculating Derivatives: Finite-Difference Derivative Approximations, Approximating the Gradient, Approximating a Sparse Jacobian, Approximating the Hessian, Approximating a Sparse Hessian.
13-14	Theory of Constrained Optimization: Local and Global Solutions, Smoothness, Examples - A Single Equality Constraint, A Single Inequality Constraint, Two Inequality Constraints.
15-16	Tangent Cone and Constraint Qualifications, First-Order Optimality Condition, Second-Order Conditions - Second-Order Conditions and Projected Hessians. Linear and non-linear constrained optimization, augmented Lagrangian Method.

DEPARTMENT OF COMPUTER SCIENCE

Dyal Singh College, University of Delhi

(ACADEMIC SESSION, 2023-24)

Course: Bsc. (Hons) Physical Science CS (Part___/ III Semester)
Paper Code and Name: Python Programming With Data Handling (TH)

FACULTY

Name of Teacher: Madhu Kumari

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ASSESSMENT DETAILS

Total Marks for the course is 120, comprising following components

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TEACHING PLAN

Week	Topics Covered/ Assignments/ Test/Presentations
1-2	Introduction to Python Programming, Basic Constructs, and Python Built-in Data Structures: Introduction to Python programming language.
3-4	Basic syntax, variables, and data 16 types in Python, Functions and modular programming; Conditional statements (if, elif, else); Looping structures (for and while loops);
4-5	Mutable and Immutable Data Structures, StringsIndexing, slicing, traversal, operations; Lists-indexing, slicing, traversal, operations; tuples, dictionaries, and sets and their operations in Python.
6-7	File Handling: Opening, reading, writing, and closing files; File modes and file object methods; Reading and writing text and binary files; Working with CSV files.
8-9	Designing GUI Applications with Tkinter (15): What is Tkinter? Creating a Tkinter window, Layout managers.
10-11	Tkinter widgets -Entry, Spinbox, Combobox, Checkbutton, Text, Button, LabelFrame.
12-13	Implementing the application - LabelInput class, building of form, adding LabelFrame and other widgets.
14-15	Retrieving data from form, resetting form, building our application class.
15-16	Combining Python file handling and Tkinter: Creating a simple Tkinter application, Reading and writing to csv files in a Tkinter application.

DEPARTMENT OF COMPUTER SCIENCE

Dyal Singh College, University of Delhi

(ACADEMIC SESSION, 2023-24)

Course: Bsc. (Hons) CS (Part___/ III Semester)

Paper Code and Name: Programming Fundamental with C++ (TH)

FACULTY

Name of Teacher: Madhu Kumari

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ASSESSMENT DETAILS

Total Marks for the course is 120, comprising following components

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TEACHING PLAN

Week	Topics Covered/ Assignments/ Test/Presentations
1-2	Unit 1 Introduction to C++: Overview of Procedural and Object-Oriented Programming, Header Files.
3-4	Compiling and Executing Simple Programs in C++.
5-6	Unit 3 Object Oriented Programming: Concepts of Abstraction, Encapsulation.
7-8	Creating Classes and objects, Modifiers and Access Control, Constructors, Destructors,
9-10	Implementation of Inheritance and Polymorphism, Template functions and classes.
11-12	Unit 4 Pointers and References: Static and dynamic memory allocation.
13-14	Pointer and Reference Variables, Implementing Runtime polymorphism using pointers and references.
15-16	Unit 5 File Handling: File I/O Basics, File Operations