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Regulation

**DIET23**

**OPTIMIZATIONTECHNIQUES**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course Category: | **Management Course- I** | Credits: 2 | | | |
| Course Type: | **Theory** | Lecture-Tutorial-Practice: | 2 | 0 | 0 |
| Prerequisites | Knowledge ofoptimization problems | Continuous Evaluation | 30M | | |
| Semester End Evaluation | 70M | | |
| Total Marks | 100M | | |

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| After Successful Completion of the course, the student will be able to: | | |
| CO No: | Course Outcome Description | K - Level |
| CO1 | State and formulate the optimization problem, without and with constraints, by usingdesignvariablesfromanengineeringdesignproblem. | 3 |
| CO2 | Applyclassicaloptimizationtechniquestominimizeormaximizeamulti-variableobjectivefunction,withoutorwithconstraints,andarriveatanoptimalsolution. | 3 |
| CO3 | ApplyandSolvetransportationandassignmentproblembyusingLinearprogrammingSimplex method. | 3 |
| CO4 | Apply gradient and non-gradient methods to nonlinear optimization problems and useinteriororexteriorpenaltyfunctionsfortheconstraintstoderivetheoptimalsolutions | 3 |
| CO5 | FormulateandapplyDynamicprogrammingtechniquetoinventorycontrol,productionplanning,engineeringdesignproblemsetc.toreachafinaloptimalsolutionfromthe current optimal solution. | 3 |

Note: K-Level is defined From Blooms Taxonomy

Contribution of Course Outcomes mapping with POs & PSOs (**1**- Low, **2** – Moderate,**3** – High)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO No.** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | 3 |  |  |  |  |  |  |  |  |  |  |  |  | 3 |
| CO2 | 3 |  |  |  |  |  |  |  |  |  |  |  |  | 3 |
| CO3 | 3 |  |  |  |  |  |  |  |  |  |  |  |  | 3 |
| CO4 | 3 |  |  |  |  |  |  |  |  |  |  |  |  | 3 |
| CO5 | 3 |  |  |  |  |  |  |  |  |  |  |  |  | 3 |

**COURSE CONTENT:**

# UNIT–I

# IntroductionandClassicalOptimizationTechniques:

Statement of an Optimization problem, design vector, design constraints, constraint surface,objectivefunction,objectivefunctionsurfaces,classificationofOptimizationproblems.

**ClassicalOptimizationTechniques:**SinglevariableOptimization,multivariableOptimizationwithoutconstraints,necessaryandsufficientconditionsforminimum/maximum,multivariableOptimizationwithequalityconstraints.SolutionbymethodofLagrangemultipliers,multivariableOptimizationwithinequalityconstraints,Kuhn–Tuckerconditions

# UNIT–II

# LinearProgramming:

Standard form of a linear programming problem, geometry of linear programming problems,definitionsandtheorems,solutionofasystemoflinearsimultaneousequations,pivotalreductionofageneralsystemofequations,motivationtothesimplexmethod,simplexalgorithm.

# UNIT–III

# TransportationProblem:

Findinginitialbasicfeasiblesolution bynorth –westcornerrule, leastcostmethodandVogel’sapproximation method,testing foroptimality of balanced transportationproblems,Specialcasesintransportationproblem.

# UNIT–IV

# NonlinearProgramming:

Unconstrainedcases,One–dimensionalminimizationmethods:Classification,Fibonaccimethod, Univariate method, steepest descent method. Constrained cases– Characteristics of aconstrainedproblem,Classification,BasicapproachofPenaltyFunctionmethod,BasicapproachesofInterior andExteriorpenaltyfunctionmethods,

# UNIT–V

# DynamicProgramming:

Dynamicprogrammingmultistagedecisionprocesses,types,conceptofsuboptimizationandtheprincipleofoptimality, computational procedure in dynamic programming, examples illustrating the calculus method ofsolution,examplesillustrating thetabularmethodof solution.

# Textbooks:

1. “Engineeringoptimization:Theoryandpractice”,S.S.Rao,NewAgeInternational

(P)Limited,3rdedition,1998.

1. “IntroductoryOperationsResearch”,H.S.Kasene&K.D.Kumar,Springer(India),Pvt.LTd.

# ReferenceBooks:

1. “Optimization Methods in Operations Research and systems Analysis”,by K.V.Mital and C. Mohan, New Age International (P) Limited, Publishers, 3rd edition,1996.
2. OperationsResearch,Dr.S.D.Sharma,Kedarnath,Ramnath&Co

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Regulation

**D23**

**Machine Learning**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course Category: | **Professional Core** | Credits: 3 | | | |
| Course Type: | **Theory** | Lecture-Tutorial-Practice: | 3 | 0 | 0 |
| Prerequisites | Basics Linear Algebra and Statistics,  Logical thinking and  basics of Python | Continuous Evaluation | 30M | | |
| Semester End Evaluation | 70M | | |
| Total Marks | 100M | | |

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| After Successful Completion of course, the student will be able to: | | |
| CO No: | Course Outcome Description | K – Level |
| CO1 | Identify the various fundamental concepts of Machine Learning in real time scenarios | Applying |
| CO2 | Apply various Nearest Neighbor-Based models for classification and regression | Applying |
| CO3 | Develop the models based on decision trees and Bayes classifier concepts | Applying |
| CO4 | Make use of various Linear and Non-Linear discriminant Techniques for classification and regression. | Applying |
| CO5 | Build the Clustering Techniques and Dimensionality Reduction Models. | Applying |

Note: K-Level is defined From Blooms Taxonomy

Contribution of Course Outcomes mapping with POs & PSOs (**1**- Low, **2** – Moderate,**3** – High)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO No.** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO4 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO5 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |

**COURSE CONTENT:**

### UNIT-1:Introduction to Machine Learning

### Evolution of Machine Learning, Paradigms for ML, Learning by Rote, Learning by Induction,Reinforcement Learning, Types of Data, Matching, Stages in Machine Learning, Data Acquisition, Feature Engineering, Data Representation, Model Selection, Model Learning, Model Evaluation, Model Prediction, Search and Learning, Data Sets.

### UNIT-2:Nearest Neighbor-Based Models

### Introduction to Proximity Measures, Distance Measures, Non-Metric Similarity Functions, Proximity Between Binary Patterns, Different Classification Algorithms Based on the Distance Measures, K-Nearest Neighbor Classifier, Radius Distance Nearest Neighbor Algorithm, KNN Regression, Performance of Classifiers, Performance of Regression Algorithms.

### UNIT-3:Models Based on Decision Trees

### Decision Trees for Classification, Impurity Measures, Properties, Regression Based on Decision Trees, Bias–Variance Trade-off, Random Forests for Classification and Regression.

### The Bayes Classifier: Introduction to the Bayes Classifier, Bayes’ Rule and Inference, The Bayes Classifier and its Optimality, Multi-Class Classification | Class Conditional Independence and Naive Bayes Classifier (NBC)

### UNIT-4:Linear Discriminants for Machine Learning

Introduction to Linear Discriminants, Linear Discriminants for Classification, Perceptron Classifier, Perceptron

Learning Algorithm, Support Vector Machines, Linearly Non-Separable Case, Non-linear SVM, Kernel Trick, Logistic Regression, Linear Regression, Multi-Layer Perceptrons (MLPs), Backpropagation for Training an MLP.

### UNIT-5:Clustering

### Introduction to Clustering, Partitioning of Data, Matrix Factorization | Clustering of Patterns, Divisive Clustering, Agglomerative Clustering, Partitional Clustering, K-Means Clustering, Soft Partitioning, Soft Clustering, Fuzzy C-Means Clustering, Rough Clustering, Rough K-Means Clustering Algorithm, Expectation Maximization-Based Clustering, Spectral Clustering.

### Textbooks:

1. “Machine Learning Theory and Practice”, M N Murthy, V S Ananthanarayana, Universities Press (India), 2024

### Reference Books:

1. “Machine Learning”, Tom M. Mitchell, McGraw-Hill Publication, 2017
2. “Machine Learning in Action”,Peter Harrington, DreamTech 2012
3. “Introduction to Data Mining”, Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7th Edition, 2019.

### E-Resources:

1. [Introduction to Machine Learning - Course (nptel.ac.in)](https://onlinecourses.nptel.ac.in/noc23_cs18/preview)
2. [Machine Learning And Deep Learning - Fundamentals And Applications - Course (nptel.ac.in)](https://onlinecourses.nptel.ac.in/noc23_ee87/preview)
3. [Introduction to Machine Learning - IITKGP - Course (nptel.ac.in)](https://onlinecourses.nptel.ac.in/noc21_cs85/preview)
4. [Machine Learning Tutorial (tutorialspoint.com)](https://www.tutorialspoint.com/machine_learning/index.htm)
5. [Machine Learning Tutorial - GeeksforGeeks](https://www.geeksforgeeks.org/machine-learning/)

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Regulation

**D23**

**Database Management Systems**

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| --- | --- | --- | --- | --- | --- |
| Course Category: | **Professional Core** | Credits: 3 | | | |
| Course Type: | **Theory** | Lecture-Tutorial-Practice: | 3 | 0 | 0 |
| Prerequisites | Understanding of data concepts like data types, structures and relationships | Continuous Evaluation | 30M | | |
| Semester End Evaluation | 70M | | |
| Total Marks | 100M | | |

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| After Successful Completion of course, the student will be able to: | | |
| CO No: | Course Outcome Description | K - Level |
| CO1 | Apply knowledge of database system structures and environments to analyze real world scenarios | Applying |
| CO2 | Apply ER model for database design | Applying |
| CO3 | Make use of SQL queries on relational database to create, maintain and manipulate a relational database. | Applying |
| CO4 | Analyze different normalization techniques for effective database design. | Analyzing |
| CO5 | Analyze transaction management and indexing techniques for a database. | Analyzing |

Note: K-Level is defined From Blooms Taxonomy

Contribution of Course Outcomes mapping with POs & PSOs (**1**- Low, **2** – Moderate,**3** – High)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO No.** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO4 | - | 3 | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO5 | - | 3 | - | - | - | - | - | - | - | - | - | - | 3 | 3 |

**COURSE CONTENT:**

### UNIT-1:

### Introduction: Database system, Characteristics (Database Vs File System), Database Users, Advantages of Database systems, Database applications. Brief introduction of different Data Models; Concepts of Schema, Instance and data independence; Three tier schemaarchitecture for data independence; Database system structure, environment, Centralized andClient Server architecture for the database.

### UNIT-2:

### Entity Relationship Model & Relational Model: Introduction, Representation of entities, attributes, entity set, relationship, relationship set, constraints, sub classes, super class, inheritance,specialization, generalization, aggregation using ER Diagrams.Relational Model: Introduction to relational model, concepts of domain, attribute, tuple, relation, importance of null values, constraints (Domain, Key constraints, integrityconstraints) and their importance, Relational Algebra, Relational Calculus.

### UNIT-3:

### BASIC SQL: Simple Database schema, data types, table definitions (create, alter), different DML operations (insert, delete, update).

SQL:Basic SQL querying (select and project) using where clause, arithmetic & logicaloperations, SQL functions (Date and Time, Numeric, String conversion). Creating tables withrelationship, implementation of key and integrity constraints, nested queries, sub queries, grouping,aggregation, ordering, implementation of different types of joins, view (updatableand non-updatable), relational set operations, Triggers.

### UNIT-4:

Schema Refinement (Normalization): Purpose of Normalization or schema refinement, concept of functional dependency, normal forms based on functional dependencyLosslessjoin and dependency preserving decomposition, (1NF, 2NF and 3 NF), concept of surrogatekey, Boyce-Codd normal form (BCNF), MVD, Fourth normal form(4NF), Fifth Normal Form(5NF).

### UNIT-5:

### Transaction Concept: Transaction State, ACID properties, Concurrent Executions, Serializability, Recoverability, Implementation of Isolation, Testing for Serializability, lock based, time stamp based, optimistic, concurrency protocols, Deadlocks, FailureClassification, Storage, Recovery and Atomicity, Recovery algorithm.

### Introduction to Indexing Techniques: B+ Trees, operations on B+Trees, Hash Based Indexing

### Textbooks:

1. Database Management Systems, 3rd edition, Raghurama Krishnan, Johannes Gehrke, TMH, 2003
2. Database System Concepts,7th edition, Silberschatz, Korth, Sudarsan, TMH,2019

### Reference Books:

1. Introduction to Database Systems, 8thedition, C J Date, Pearson,2006.
2. Database Management System, 7th edition, Ramez Elmasri, Shamkant B. Navathe, Pearson, 2017.
3. Database Principles Fundamentals of Design Implementation and Management, Corlos Coronel, Steven Morris, Peter Robb, Cengage Learning, 10th edition, 2013.

### E-Resources:

1. https://nptel.ac.in/courses/106/105/106105175/
2. <https://infyspringboard.onwingspan.com/web/en/app/toc/lex_auth_01275806667282022456_shared/overview>
3. <http://www.c4learn.com/>
4. <https://www.geeksforgeeks.org/dbms/>
5. <https://onlinecourses.nptel.ac.in/noc22_cs91/preview>
6. <https://www.tutorialspoint.com/dbms/index.htm>

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**DIGITAL LOGIC & COMPUTER ORGANISATION**

Regulation

**D23**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course Category: | **Engineering Science** | Credits: 3 | | | |
| Course Type: | **Theory** | Lecture-Tutorial-Practice: | 3 | 0 | 0 |
| Prerequisites | Basic knowledge of number systems and logic gates | Continuous Evaluation | 30M | | |
| Semester End Evaluation | 70M | | |
| Total Marks | 100M | | |

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| After Successful Completion of course, the student will be able to: | | |
| CO No: | Course Outcome Description | K - Level |
| CO1 | Apply various number systems and minimization of logic functions and design of combinational circuits | Applying |
| CO2 | Build design of sequential logic circuits | Applying |
| CO3 | Apply the computer arithmetic operations and Processor organization | Applying |
| CO4 | Apply the knowledge of various types of memory to enhance system performance | Applying |
| CO5 | Apply the knowledge of various I/O interface techniques to design and implement efficient I/O operations | Applying |

Note: K-Level is defined From Blooms Taxonomy

Contribution of Course Outcomes mapping with POs & PSOs (**1**- Low, **2** – Moderate,**3** – High)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO No.** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO4 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO5 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |

**COURSE CONTENT:**

**UNIT – I:**

Data Representation: Binary Numbers, Fixed Point Representation. Floating Point Representation. Number base conversions, Octal and Hexadecimal Numbers, compliments, Signed binary numbers, Binary codes

Digital Logic Circuits-I: Basic Logic Functions, Logic gates, universal logic gates, **Boolean Algebra,** Minimization of Logic expressions, K-Map Simplification, Combinational Circuits- Decoders, Multiplexers

**UNIT – II:**

Digital Logic Circuits-II: Sequential Circuits, Flipflops, Binary counters, Registers, Shift Registers, Ripple counters. Basic Structure of Computers: Computer Types, Functional units, Basic operational concepts, Bus structures, Software, Performance, multiprocessors and multi computers, Computer Generations, Von- Neumann Architecture

**UNIT – III:**

Computer Arithmetic : Addition and Subtraction of Signed Numbers, Design of Fast Adders, Multiplication of Positive Numbers, Signed-operand Multiplication, Fast Multiplication, Integer Division, Floating-Point Numbers and Operations, Processor Organization: Fundamental Concepts, Execution of a Complete Instruction, Multiple-Bus Organization, Hardwired Control and Multi programmed Control

**UNIT – IV:**

The Memory Organization: Basic Concepts, Semiconductor RAM Memories, Read-Only Memories, Speed, Size and Cost, Cache Memories, Performance Considerations, Virtual Memories, Memory Management Requirements, Secondary Storage

**UNIT – V:**

Input/Output Organization: Accessing I/O Devices, Interrupts, Processor Examples, Direct Memory Access, Buses, Interface Circuits, Standard I/O Interfaces

Textbooks:

1. Computer Organization, Carl Hamacher, ZvonkoVranesic, SafwatZaky, 6th edition, McGraw Hill

2. Digital Design, 6th Edition, M. Morris Mano, Pearson Education (2018).

3. Computer Organization and Architecture, William Stallings, 11thEdition, Pearson (2019).

Reference Books:

1. Computer Systems Architecture, M.Moris Mano, 3rdEdition, Pearson (1993)
2. Computer Organization and Design, David A. Paterson, John L.Hennessy, Elsevier (2005)
3. Fundamentals of Logic Design, Roth, 5thEdition, Thomson (2006)

E-Sources:

1. Online Learning Resources: https://nptel.ac.in/courses/106/103/106103068/

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Regulation

**D23**

# MACHINE LEARNING LAB

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CourseCategory: | Professional Core | Credits :1.5 | | | |
| Course Type: | Practical | Lecture-Tutorial-Practice: | 0 | 0 | 3 |
| Prerequisites | Basics Linear Algebra and Statistics,Logical thinking andbasics of Python | Continuous Evaluation | 30M | | |
| Semester End Evaluation | 70M | | |
| Total Marks | 100M | | |

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| After Successful Completion of course,the student will be able to: | | |
| CO No: | Course Outcome Description | K - Level |
| CO1 | Analyze the mathematical and statistical prospective of machine learning algorithms | Analyzing |
| CO2 | Inspect and evaluate the supervised models through python in built functions | Analyzing |
| CO3 | Analyse the unsupervised models through python in built functions | Analyzing |

Note: K-Level is defined From Blooms Taxonomy

Contribution of Course Outcomes mapping with POs & PSOs (**1**- Low, **2** – Moderate,**3** – High)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO No.** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | 3 | 3 | - | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |
| CO2 | 3 | 3 | - | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |
| CO3 | 3 | 3 | - | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |

**COURSE CONTENT:**

**Exercise 1:** Compute Central Tendency Measures: Mean, Median, Mode Measure of Dispersion:

Variance, Standard Deviation.

**Exercise 2:** Apply the following Pre-processing techniques for a given dataset.

a. Attribute selection

b. Handling Missing Values

c. Discretization

d. Elimination of Outliers

**Exercise 3:** Apply KNN algorithm for classification and regression

**Exercise 4:** Demonstrate decision tree algorithm for a classification problem and perform

parameter tuning for better results

**Exercise 5:** Demonstrate decision tree algorithm for a regression problem

**Exercise 6:** Apply Random Forest algorithm for classification and regression

**Exercise 7:** Demonstrate Naïve Bayes Classification algorithm.

**Exercise 8:** Apply Support Vector algorithm for classification

**Exercise 9:** Demonstrate simple linear regression algorithm for a regression problem

**Exercise 10:** Apply Logistic regression algorithm for a classification problem

**Exercise 11:**Demonstrate Multi-layer Perceptron algorithm for a classification problem

**Exercise 12:** Implement the K-means algorithm and apply it to the data you selected. Evaluate

performance by measuring the sum of the Euclidean distance of each example from its class center. Test the performance of the algorithm as a function of the parameters K.

**Exercise 13:** Demonstrate the use of Fuzzy C-Means Clustering

**Exercise 14:**Demonstrate the use of Expectation Maximization based clustering algorithm

### Textbooks:

1. “Machine Learning Theory and Practice”, M N Murthy, V S Ananthanarayana, Universities Press (India), 2024

### Reference Books:

1. “Machine Learning”, Tom M. Mitchell, McGraw-Hill Publication, 2017
2. “Machine Learning in Action”,Peter Harrington, DreamTech 2012
3. “Introduction to Data Mining”, Pang-Ning Tan, Michel Stenbach, Vipin Kumar, 7th Edition, 2019.

### E-Resources:

1. [Introduction to Machine Learning - Course (nptel.ac.in)](https://onlinecourses.nptel.ac.in/noc23_cs18/preview)
2. [Machine Learning And Deep Learning - Fundamentals And Applications - Course (nptel.ac.in)](https://onlinecourses.nptel.ac.in/noc23_ee87/preview)
3. [Introduction to Machine Learning - IITKGP - Course (nptel.ac.in)](https://onlinecourses.nptel.ac.in/noc21_cs85/preview)
4. [Machine Learning Tutorial (tutorialspoint.com)](https://www.tutorialspoint.com/machine_learning/index.htm)
5. [Machine Learning Tutorial - GeeksforGeeks](https://www.geeksforgeeks.org/machine-learning/)

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Regulation

**D23**

# DATABASE MANAGEMENT SYSTEMS LAB

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| CourseCategory: | Professional Core | Credits :1.5 | | | |
| Course Type: | Practical | Lecture-Tutorial-Practice: | 0 | 0 | 3 |
| Prerequisites | Understanding of data concepts like data types, structures and relationships | Continuous Evaluation | 30M | | |
| Semester End Evaluation | 70M | | |
| Total Marks | 100M | | |

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| After Successful Completion of course,the student will be able to: | | |
| CO No: | Course Outcome Description | K - Level |
| CO1 | Analyze various SQL queries to perform operations on database | Analyzing |
| CO2 | Examine PL/SQL programs for procedures, functions, cursors and triggers. | Analyzing |
| CO3 | Inspect different indexing techniques on a table and JDBC concept. | Analyzing |

Note: K-Level is defined From Blooms Taxonomy

Contribution of Course Outcomes mapping with POs & PSOs (**1**- Low, **2** – Moderate,**3** – High)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO No.** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | - | 3 | - | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |
| CO2 | - | 3 | - | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |
| CO3 | - | 3 | - | - | 3 | - | - | - | - | - | - | 3 | 3 | 3 |

**COURSE CONTENT:**

**Exercise 1:** Creation, altering and dropping of tables and inserting rows into a table (use constraints while creating tables) examples using SELECT command.

**Exercise 2:** Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSET, Constraints. Example:- Select the roll number and name of the student who secured fourth rank in the class.

**Exercise 3:** Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING and Creation and dropping of Views.

**Exercise 4:** Queries using Conversion functions (to\_char, to\_number and to\_date), string functions (Concatenation, lpad, rpad, ltrim,rtrim, lower, upper, initcap, length, substr and instr), date functions (Sysdate, next\_day, add\_months, last\_day, months\_between, least, greatest, trunc, round, to\_char, to\_date)

**Exercise 5:** i. Create a simple PL/SQL program which includes declaration section, executable section and exception –Handling section (Ex. Student marks can be selected from the table and printed for those who secured first class and an exception can be raised if no records were found)

ii. Insert data into student table and use COMMIT, ROLLBACK and SAVEPOINT in PL/SQL block.

**Exercise 6:** Develop a program that includes the features NESTED IF, CASE and CASE expression. The program can be extended using the NULLIF and COALESCE functions.

**Exercise 7:** Program development using WHILE LOOPS, numeric FOR LOOPS, nested loops using ERROR Handling, BUILT –IN Exceptions, USE defined Exceptions, RAISE- APPLICATION ERROR.

**Exercise 8:** Programs development using creation of procedures, passing parameters IN and OUT of PROCEDURES.

**Exercise 9:** Program development using creation of stored functions, invoke functions in SQL Statements and write complex functions.

**Exercise 10:** Develop programs using features parameters in a CURSOR, FOR UPDATE CURSOR, WHERE CURRENT of clause and CURSOR variables.

**Exercise 11:**

Develop Programs using BEFORE and AFTER Triggers, Row and Statement Triggers and INSTEAD OF Triggers

**Exercise 12:**

Create a table and perform the search operation on table using indexing and non-indexing techniques.

**Exercise 13:** Write a Java program that connects to a database, insert and delete valuesusing JDBC

**Exercise 14:**Write a Java program to connect to a database using JDBC and insert values into it

**Exercise 15:**Write a Java program to connect to a database using JDBC and delete values from it

**TEXT BOOKS:**

1. Oracle: The Complete Reference by Oracle Press,12c,2013.
2. Nilesh Shah, "Database Systems Using Oracle”,2nd edition PHI, 2007
3. Rick F Vander Lans, “Introduction to SQL”, Fourth Edition, Pearson Education, 2007

**REFERENCE BOOKS:**

1. The Complete Reference MYSQL, Vikram Vaswani, McGraw-HillEducation,1st Edition,2017.
2. Fundamentals of Database Systems, RamezElmasri, ShamkantB. Navathe, Seventh edition, Pearson,2015.

**E-RESOURCES/DIGITAL MATERIAL:**

1. Prof Arnab Bhattacharya IIT Kanpur, SQL Introduction <https://nptel.ac.in/courses/106104135/10>
2. Prof Arnab Bhattacharya IIT Kanpur SQL: Updates, Joins, Views and Triggers <https://nptel.ac.in/courses/106104135/11>
3. Geoff Allix and Graeme Malcolm: Microsoft , Querying with Transact-SQL (edX) <https://www.mooc-list.com/course/querying-transact-sql-edx>

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Regulation

**D23**

**Full Stack Development –I**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Course Category: | Skill Enhancement Course | Credits: 2 | | | |
| Course Type: | **Theory** | **Lecture-Tutorial-Practice**: | 0 | 1 | 2 |
| Prerequisites | knowledge of basic web programming | Continuous Evaluation | 30M | | |
| Semester End Evaluation | 70M | | |
| Total Marks | 100M | | |

**Course Outcomes:**

|  |  |  |
| --- | --- | --- |
| After Successful Completion of course, the student will be able to: | | |
| CO No: | Course Outcome Description | K - Level |
| CO1 | Applying the basics of full stack web development | Applying |
| CO2 | Develop responsive web pages using HTML and CSS | Applying |
| CO3 | Implement client-side scripting using JavaScript and Build interactive web pages using Node.JS | Applying |

Note: K-Level is defined From Blooms Taxonomy

Contribution of Course Outcomes mapping with POs & PSOs (**1**- Low, **2** – Moderate,**3** – High)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **CO No.** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** | **PSO1** | **PSO2** |
| CO1 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO2 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |
| CO3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 |

**COURSE CONTENT:**

**Experiments covering the Topics:**

 Lists, Links and Images

 HTML Tables, Forms and Frames

 HTML 5 and Cascading Style Sheets, Types of CSS

 Selector forms

 CSS with Color, Background, Font, Text and CSS Box Model

 Applying JavaScript - internal and external, I/O, Type Conversion

 JavaScript Conditional Statements and Loops, Pre-defined and User-defined Objects

 JavaScript Functions and Events

 Node.js

**Sample Experiments:**

**1. Lists, Links and Images**

a. Write a HTML program, to explain the working of lists.

Note: It should have an ordered list, unordered list, nested lists and ordered list in an unordered list and definition lists.

b. Write a HTML program, to explain the working of hyperlinks using <a> tag and href, target Attributes.

c. Create a HTML document that has your image and your friend’s image with a specific height and width. Also when clicked on the images it should navigate to their respective profiles.

d. Write a HTML program, in such a way that, rather than placing large images on a page, the preferred technique is to use thumbnails by setting the height and width parameters to something like to 100\*100 pixels. Each thumbnail image is also a link to a full sized version of the image. Create an image gallery using this technique

**2. HTML Tables, Forms and Frames**

a. Write a HTML program, to explain the working of tables. (use tags: <table>, <tr>, <th>, <td> and attributes: border, rowspan, colspan).

b. Write a HTML program, to explain the working of tables by preparing a timetable. (Note: Use <caption> tag to set the caption to the table & also use cell spacing, cell padding, border, rowspan, colspan etc.).

c. Write a HTML program, to explain the working of forms by designing Registration form. (Note: Include text field, password field, number field, date of birth field, checkboxes, radio buttons, list boxes using <select>&<option> tags, <text area> and two buttons ie: submit and reset. Use tables to provide a better view).

d. Write a HTML program, to explain the working of frames, such that page is to be divided into 3 parts on either direction. (Note: first frame  image, second frame  paragraph, third frame  hyperlink. And also make sure of using “no frame” attribute such that frames to be fixed).

**3. HTML 5 and Cascading Style Sheets, Types of CSS**

a. Write a HTML program, that makes use of <article>, <aside>, <figure>, <figcaption>,

<footer>, <header>, <main>, <nav>, <section>, <div>, <span> tags.

b. Write a HTML program, to embed audio and video into HTML web page.

c. Write a program to apply different types (or levels of styles or style specification formats) - inline, internal, external styles to HTML elements. (identify selector, property and value).

**4. Selector forms**

a. Write a program to apply different types of selector forms

i. Simple selector (element, id, class, group, universal)

ii. Combinator selector (descendant, child, adjacent sibling, general sibling)

iii.Pseudo-class selector

iv. Pseudo-element selector

v. Attribute selector

**5. CSS with Color, Background, Font, Text and CSS Box Model**

a. Write a program to demonstrate the various ways you can reference a color in CSS.

b. Write a CSS rule that places a background image halfway down the page, tilting it

horizontally. The image should remain in place when the user scrolls up or down.

c. Write a program using the following terms related to CSS font and text:

i. font-size ii. font-weight iii. font-style

iv. text-decoration v. text-transformation vi. text-alignment

d. Write a program, to explain the importance of CSS Box model using

i. Content ii. Border iii. Margin iv. padding

**6. Applying JavaScript - internal and external, I/O, Type Conversion**

a. Write a program to embed internal and external JavaScript in a web page.

b. Write a program to explain the different ways for displaying output.

c. Write a program to explain the different ways for taking input.

d. Create a webpage which uses prompt dialogue box to ask a voter for his name and age. Display the information in table format along with either the voter can vote or not

**7. Java Script Pre-defined and User-defined Objects**

a. Write a program using document object properties and methods.

b. Write a program using window object properties and methods.

c. Write a program using array object properties and methods.

d. Write a program using math object properties and methods.

e. Write a program using string object properties and methods.

f. Write a program using regex object properties and methods.

g. Write a program using date object properties and methods.

h. Write a program to explain user-defined object by using properties, methods, accessors,

constructors and display.

**8. Java Script Conditional Statements and Loops**

a. Write a program which asks the user to enter three integers, obtains the numbers from the

user and outputs HTML text that displays the larger number followed by the words

“LARGER NUMBER” in an information message dialog. If the numbers are equal, output

HTML text as “EQUAL NUMBERS”.

b. Write a program to display week days using switch case.

c. Write a program to print 1 to 10 numbers using for, while and do-while loops.

d. Write aprogram to print data in object using for-in, for-each and for-of loops

e. Develop a program to determine whether a given number is an ‘ARMSTRONG

NUMBER’ or not. [Eg: 153 is an Armstrong number, since sum of the cube of the digits is

equal to the number i.e.,13 + 53+ 33 = 153]

f. Write a program to display the denomination of the amount deposited in the bank in terms

of 100’s, 50’s, 20’s, 10’s, 5’s, 2’s & 1’s. (Eg: If deposited amount is Rs.163, the output

should be 1-100’s, 1-50’s, 1- 10’s, 1-2’s & 1-1’s)

**9. Java Script Functions and Events**

a. Design a appropriate function should be called to display

i. Factorial of that number

ii. Fibonacci series up to that number

iii. Prime numbers up to that number

iv. Is it palindrome or not

b. Design a HTML having a text box and four buttons named Factorial, Fibonacci, Prime,

and Palindrome. When a button is pressed an appropriate function should be called to

display

i. Factorial of that number

ii. Fibonacci series up to that number

iii. Prime numbers up to that number

iv. Is it palindrome or not

c. Write a program to validate the following fields in a registration page

i.Name (start with alphabet and followed by alphanumeric and the length should

not be less than 6 characters)

ii. Mobile (only numbers and length 10 digits)

iii. E-mail (should contain format like xxxxxxx@xxxxxx.xxx)

**Text Books:**

1. Programming the World Wide Web, 7th Edition, Robet W Sebesta, Pearson, 2013.

2. Web Programming with HTML5, CSS and JavaScript, John Dean, Jones & Bartlett

Learning, 2019 (Chapters 1-11).

3. Pro MERN Stack: Full Stack Web App Development with Mongo, Express, React, and

Node, Vasan Subramanian, 2nd edition, APress, O’Reilly, 2017.

**Web Links:**

1. https://www.w3schools.com/html

2. https://www.w3schools.com/css

3. https://www.w3schools.com/js/

4. https://www.w3schools.com/nodejs