PragZo

COMPUTER SCIENCE/ INFORMATION PRACTICES

Syllabus For CUET (UG)

YEAR 2025

CUET UG POWER SERIES

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Section A

1: Database Concepts

- Introduction to database concepts, difference between database and file system, relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key.
- *Relational algebra:* selection, projection, union, set difference and cartesian product.

2: Structured Query Language - I

- Advantages of using Structured Query Language, Data Definition Language, Data Query Language and Data Manipulation Language, Introduction to MySQL, Creating a database using MySQL, DataTypes
- Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE,Data Query: SELECT, FROM, WHERE
- Data Manipulation: INSERT, UPDATE, DELETEMath functions: POWER (), ROUND (), MOD ().Text functions: UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (),LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().

3: Structured Query Language - II

- Date Functions: NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().
- Aggregate Functions: MAX (), MIN (), AVG (), SUM (), COUNT (); using COUNT(*). Querying and manipulating data using Group by, Having, Order by.
- Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

4: Computer Networks

- Introduction to computer networks, Evolution of networking,
- *Network types:* LAN, WAN, MAN
- Network devices: Modem, Ethernet Card, Repeater, Hub, Switch, Router, Gateway.Network Topologies: Mesh, Ring, Bus, Star, and Tree topologies.
- Basic concept of MAC and IP Address Difference between Internet and web.

Section B1: Computer Science

1: Exception and File Handling in Python

- Exception Handling: syntax errors, exceptions, need of exception handling, user-defined exceptions, raising exceptions, handling exceptions, catching exceptions, Try - except - else clause, Try - finally clause, recovering and continuing with finally, built-in exception classes.
- File Handling: text file and binary file, file types, open and close files, reading and writing text files, reading and writing binary files using pickle module, file access modes.

2: Stack

- Stack (List Implementation): Introduction to stack (LIFO Operations), operations on stack (PUSH and POP) and its implementation in python. Expressions in Prefix, Infix and postfix notations, evaluating arithmetic expressions using stack, conversion of Infix expression to postfix expression

3: Queue

- Queue (List Implementation): Introduction to Queue (FIFO), Operations on Queue (INSERT and DELETE) and its implementation in Python.
- Introduction to DQueue and its implementation in Python.

4: Searching

- Searching: Sequential search, Binary search, Analysis of Sequential and Binary Search. Dry run to identify best, worst and average cases. Implementation of searching techniques in Python.

5: Sorting

- Overview of sorting techniques, Bubble Sort, Selection Sort and Insertion Sort. Dry run to identify best, worst and average cases. Implementation of sorting techniques in Python.
- Hashing: Hash Functions, Collision Resolution.

6: Understanding Data

- Data and its purpose, collection and organization; understanding data using statistical methods:

mean, median, standard deviation, variance; data interpretation.

7: Database Concepts

- Introduction to database concepts, difference between database and file system, relational data model: concept of domain, tuple, relation, keys - candidate key, primary key, alternate key, foreign key;
- Relational algebra: selection, projection, union, set difference and cartesian product.

8: Structured Query Language

- Advantages of using Structured Query Language, Data Definition Language, Data Query Language and Data Manipulation Language, Introduction to MySQL, Creating a database using MySQL, Data Types
- Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE,
- Data Query: SELECT, FROM, WHERE
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- Math functions: POWER (), ROUND (), MOD ().
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9: Computer Networks

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- Basic concept of MAC and IP Address.
- Difference between Internet and web

10: Data Communication

- Concept of communication, Types of Data Communication, switching techniques
- *Communication Media*: Wired Technologies – Twisted pair cable, Co-axial cable, Ethernet Cable,Optical Fibre;
- Introduction to mobile telecommunication technologies
- Wireless Technologies – Bluetooth, WLAN, Infrared, Microwave
- *Network Protocol:* Need for Protocol, Categorization and Examples of protocol, HTTP, FTP, IP, PPP;electronic mail protocol
- Concept of Channel, Bandwidth (Hz, KHz, MHz) and Data Transfer rate (bps, Kbps, Mbps, Gbps,Tbps)

11: Security Aspects

- Threats and prevention: Viruses, Worms, Trojan horse, Spam, Cookies, Adware, Firewall, http vs https.
- Network Security Concepts: Firewall, Cookies, Hackers and Crackers
- Antivirus and their workings
- Network security threats: Denial of service, Intrusion problems, Snooping, Eavesdropping.

Section B2: Informatics Practices

1: Database Query using SQL

- *Math functions:* POWER (), ROUND (), MOD ().
- *Text functions:* UCASE ()/UPPER (), LCASE ()/LOWER (), MID ()/SUBSTRING ()/SUBSTR (),LENGTH (), LEFT (), RIGHT (), INSTR (), LTRIM (), RTRIM (), TRIM ().
- *Date Functions:* NOW (), DATE (), MONTH (), MONTHNAME (), YEAR (), DAY (), DAYNAME ().
- *Aggregate Functions:* MAX (), MIN (), AVG (), SUM (), COUNT ();

  using COUNT (*).
- Querying and manipulating data using Group by, Having, Orderby.
- *Operations on Relations* - Union, Intersection, Minus, Cartesian Product, JOIN

2: Data Handling using Pandas – I

- Introduction to Python libraries-Pandas, NumPy, Matplotlib.
- Data structures in Pandas - Series and DataFrames.
- Series: Creation of Series from – and array, dictionary, scalar value; mathematical operations; Head and Tail functions; Selection, Indexing, and Slicing.
- DataFrames: creation - from dictionary of Series, list of dictionaries, Text/CSV files; display; iteration; Operations on Rows and columns: add, select, delete, rename; Head and Tail functions;Indexing using Labels, Boolean Indexing; Styling & Formatting data, Head and Tail functions; Joining, Merging and Concatenations.
- Importing/Exporting Data between CSV files and DataFrames.

3: Data Handling using Pandas – II

- Descriptive Statistics: max, min, count, sum, mean, median, mode, quartile, Standard deviation,variance.
- DataFrame operations: Aggregation, group by, Sorting, Deleting and Renaming Index, Pivoting.
- Handling missing values – dropping and filling.
- Importing/Exporting Data between MySQL database and Pandas.

4: Plotting Data using Matplotlib

- Purpose of plotting; drawing and saving the following types of plots using Matplotlib – line plot, bargraph, histogram, pie chart, frequency polygon, box plot, and scatter plot.
- Customizing plots: color, style (dashed, dotted), width; adding label, title, and legend in plots.

5: Introduction to Computer Networks

- Introduction to Networks, Types of networks: LAN, MAN,WAN.
- Network Devices: modem, hub, switch, repeater, router, gateway
- Network Topologies: Star, Bus, Tree, Mesh.
- Introduction to Internet, URL, WWW, and its applications- Web, email, Chat, VoIP.
- Website: Introduction, the difference between a website and webpage, static vs dynamic webpage, webserver, and hosting of a website.

- Web Browsers: Introduction, commonly used browsers, browser settings, add-ons and plug-ins, cookies.

6: Societal Impacts

- Digital footprint, Etiquettes for Net surfing and for communicating through social media, data protection, Intellectual Property Rights (IPR) and their violation, plagiarism licensing and copyrights, Free and Open Source Software (FOSS), creative commons, Cybercrime and cyber laws, hacking, phishing, cyberbullying, Overview of Indian IT Act, preventing cybercrime
- .E-waste : hazards and management.
- Awareness about health concerns related to the usage of technology-like effect on eyesight,physiological issues, and ergonomic aspects.