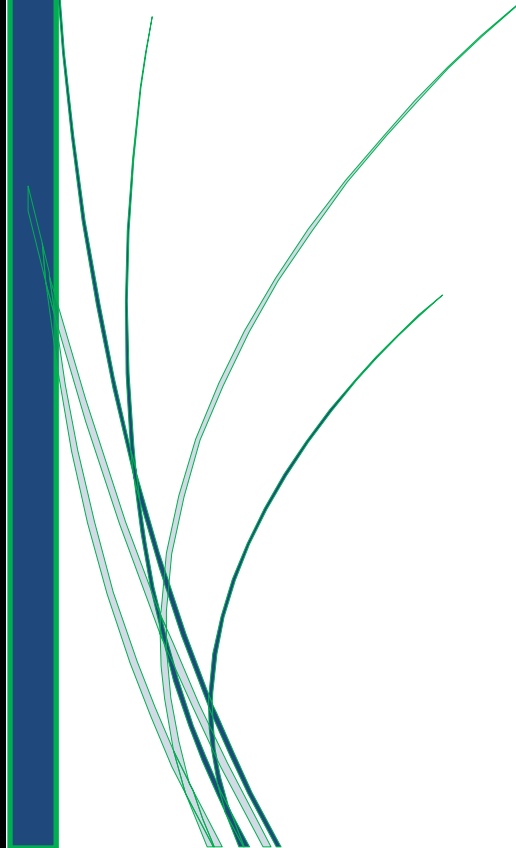


For the year 2025

**Computer  
Science/Informatics  
Practices -308 Syllabus  
for  
NCET 2025**



*Note:*

*There will be one Question Paper which will contain Two Sections i.e. Section A and Section B [B1 and B2].*

*Section A will have 10 questions covering both i.e. Computer Science/Informatics Practices which will be compulsory for all candidates.*

*Candidates are required to choose either B1 or B2 according to their choice.*

*Section B1 will have 18 questions from Computer Science out of which 15 questions are to be attempted.*

*Section B2 will have 18 questions purely from Informatics out of which 15 questions are to be attempted.*

*In total, candidate has to attempt 25 questions.*

## Section A

### 1: Database Concepts

- Introduction to database concepts, the difference between database and file system, relational data model: concept of the 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, Data Types
- Data Definition: CREATE TABLE, DROP TABLE, ALTER TABLE, Data Query: SELECT, FROM, WHERE
- Data Manipulation: INSERT, UPDATE, DELETE Math 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, and 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.
- The basic concept of MAC and IP Address Difference between the Internet and the Web.

## **Section B1: Computer Science**

#### **1: Exception and File Handling in Python**

- Exception Handling: syntax errors, exceptions, need for 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, the difference between database and file system, relational data model: the concept of a 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
- Data Manipulation: INSERT, UPDATE, DELETE
- 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, and Order by.
- Operations on Relations - Union, Intersection, Minus, Cartesian Product, JOIN

## 9: 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
- The basic concept of MAC and IP Address.
- Difference between the 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, and Order by.
- *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 – an 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, bar graph, 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.