

**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**

**INNOVATIVE ASSIGNMENTS**

**ACADEMIC YEAR: 2023-2024 SEM-II**

**PYTHON PROGRAMMING II YEAR II SEM**

1. **Task**:  
**Create** a GUI-based password strength checker using Tkinter.  
**Analyze** password complexity using entropy calculations and common pattern detection.  
**Design** a user-friendly interface with real-time feedback.  
**Implement** data persistence to track password improvement over sessions. **(CO4)**

2. **Task**:  
**Create** a rule-based chatbot in Python for basic customer support.  
**Analyze** common user queries and response effectiveness using logs.  
**Design** modular functions to handle greetings, FAQs, and fallback responses.  
**Implement** exception handling to manage unexpected inputs and improve stability. **(CO4)**

**ANALOG AND DIGITAL ELECTRONICS II YEAR II SEM**

1.**Construct** 3\*8 Decoder using logic gates and its truth table? **[CO-5]**

2. **Construct** the 32:1 Multiplexer using 16:1 Multiplexer and 8:1 multiplexer? **[CO-5]**

3. **Minimize** the following expressions using K-map and realize using NAND Gates

F(A,B,C,D) = ∑m (0,2,3,6,7,8,10,12,13). ? **[CO-4]**

4.**Design** a modulo 10 counter using JK flipflops and **explain** its timing? **[CO-6]**

5. **Explain** the 4-bit up down ripple( asynchronous) counterusing JKflipflop ? **[CO-6]**

**COMPILER DESIGN III YEAR II SEM**

1.**Apply** the parse tree structure for the expression:**(CO2)**

position=initial+rate\*60

2.Optimize and **develop** this code by eliminating common on induction variables and eliminating all the induction variable you can: **(CO4)**

t6=4\*i

a[tr]=t9

**λ**=a[t6]

t10=4\*j

t7=4+I

a[t10]=x

t8=4\*j

goto B2

t9=a[t6]

B2:i=i+1

**WEB TECHNOLOGIES III YEAR II SEM**

1. **Design** and Implementation of the Website Based on PHP &MYSQL.**(CO1)**

2. A Comparative Study and Benchmarking on XML Parsers.**(CO2)**

3. Code implementation for developing a simple JSP web application.**(CO3)**

4. Implementation of Cookies by Using Servlets and JSP.**(CO3)**

**INFORMATION RETRIEVAL SYSTEMS III YEAR II SEM**

1. Take set of documents **apply** the term clustering method create the clusters.**(CO3)**
2. Take your own document calculate the term frequencies for all unique terms.**(CO3)**

**COMPUTER VISION IV YEAR II SEM**

## **1.**Design a real-time vision-based system for a smart city application (such as parking occupancy detection, traffic flow analysis, or pedestrian counting). Define system architecture, data flow, hardware requirements, and algorithms used. Justify your design choices. (CO4)

## **2.** Create a prototype solution for visually-impaired users that detects obstacles and provides audio feedback. Design the system architecture, implement the vision models, and analyze system latency. Include a user interface that can be easily tested with non-technical users. (CO4)

## ****DESIGN PATTERNS**** IV YEAR II SEM

## 1. Create a prototype of a cross-platform GUI library using the Abstract Factory pattern. Implement a small demo application where switching between platforms (e.g., Windows, macOS) dynamically changes the widget styles without modifying application logic.(CO2)

## 2. Implement a plugin-based architecture for a media player using the Factory Method pattern. Analyze how your implementation supports future extension without requiring changes to the core system. (CO2)

## BLOCKCHAIN TECHNOLOGY IV YEAR II SEM

1. "**Design** a blockchain protocol focused on energy efficiency. **Analyze** the environmental impact of existing protocols. **Create** a proof-of-concept that minimizes computational overhead using innovative consensus or data storage techniques." **(CO1)**

2."**Analyze** the consensus mechanisms (PoW, PoS, DPoS, etc.) across at least three blockchain platforms. **Compare** their scalability, security, and energy efficiency in real-world deployments. Present findings as a detailed report or data-driven presentation." **(CO2)**