**414467 Computer Laboratory X**

**SYLLABUS**

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| **414467: COMPUTER LABORATORY-X** | | |
| **Teaching Scheme: Practical:02 Hours/Week** | **Credits:01** | **Examination Scheme:** |
| **TW:25 Marks**  **OR: 25 Marks** |
| **Prerequisites:**   1. Computer Network Technology. 2. Human Computer Interface | | |
| **Course Objectives:**  1. To design and implement user interfaces for performing database operations.  2. To design applications for accessing smart devices and data generated through sensors and services.  3. To implement authentication protocols for providing security. | | |
| **Course Outcomes:**  1. To set up the Android environment and explain the Evolution of cellular networks.  2. To develop the User Interfaces using pre-built Android UI components.  3. To create applications for performing CURD SQLite database operations using Android.  4. To create the smart android applications using the data captured through sensors.  5. To implement the authentication protocols between two mobile devices for providing. Security.  6. To analyze the data collected through android sensors using any machine learning algorithm. | | |
| **Suggested List of Laboratory Assignments** | | |
| Android development environment. Installing and setting up the environment. Hello world application. Running the emulator. Inserting debug messages. | | |
| Android UI Design: Design a User Interface using pre-built UI components such as structured layout objects, UI controls and special interfaces such as dialogs, notifications, and menus. Also make this UI attractive using Android graphics platform OpenGL | | |
| Android-database Connectivity: Create a SQLite Database for an Android Application and perform CRUD (Create, Read, Update and Delete) database operations. | | |
| Sensors for building Smart Applications: Use any sensors on the device to add rich location and motion capabilities to your app, from GPS or network location to accelerometer, gyroscope, temperature, barometer, and more. | | |
| Develop a Smart Light System (Light that automatically switched on in evening and gets off in morning) using open-source Hardware platform like Arduino and some sensors (Light dependent resistor) and actuator (An LED). | | |
| Design and Develop a GUI for FAN regulator that uses Android platform | | |
| Develop an Android based FAN regulator using open-source Hardware platform like NodeMcu and actuator (a SERVO Motor). | | |
| Android and Machine Learning: Mobile multimodal sensing- Draw inferences over the data coming from phone’s sensing hardware (e.g., accelerometer, GPS, microphone), and processing these samples with the help of machine learning. (Any Application: Healthcare, Smart City, Agriculture, etc.). | | |
| Android Security: Authentication of two mobile devices. | | |
| Case Study: Evolution of cellular networks all the way up to 7G | | |

**ORAL QUESTION BANK**

**Assignment No 1**

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| **Q.No.** | **Question** |
|  | What is Android Asset Packaging Tool? |
|  | What is Android Debug Bridge? |
|  | What are the basics tools used to develop an Android App? |
|  | What are the advantages of Android? |
|  | What devices are supported for Google play instant? |
|  | Do developers need to build two different android apps? |
|  | Can users choose to install the app permanently? |
|  | How do permission work in Google play instant? |
|  | Which permission are available to an instant app? |
|  | What is the use of manifest file in Android Studio? |
|  | What is the use of Emulator in Android? |
|  | How to debug Android applications? |

**Assignment No 2**

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| **Q. No.** | **Question** |
|  | List different UI screen components? |
|  | What is the difference between an implicit & an explicit intent? |
|  | When should you use a fragment, rather than an activity? |
|  | You are replacing one fragment with one another –how do you ensure that user can return to the previous segment, by pressing the back button? |
|  | How would you create a multi-threaded android app without using thread class? |
|  | What is a thread pool? and is it more effective than using several separate thread s? |
|  | What is a relationship between the lifecycle of an Asyncktask & life cycle of an activity? |
|  | What programming language is used for Android Apps? |
|  | Why is UI important? |
|  | List and Explain UI elements. |
|  | What are the different UI controls provided by Android? |
|  | How to create UI controls? |

**Assignment No 3**

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| **Q. No.** | **Question** | |
|  |  | Explain what SQLite is? |
|  |  | List out the standard SQLite commands? |
|  |  | Explain what SQLite transactions is? |
|  | List out the areas where SQLite works well? | |
|  | What is the difference between SQL and SQLite? | |
|  | List out the advantages of SQLite? | |
|  | Mention what are the SQLite storage classes? | |
|  | Mention what is the command used to create a database in SQLite? | |
|  | Mention what is the maximum size of a VARCHAR in SQLite? | |
|  | Explain how you can delete or add columns from an existing table in SQLite? | |
|  | Mention what is. dump command is used for? | |
|  | Explain how Boolean values in SQLITE are stored? | |

**Assignment No 4**

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| **Q. No** | **Question** |
|  | What is the Google map platform? |
|  | Which API do I need? |
|  | What countries does the Google map platform cover? |
|  | Can I put Google maps on my site without using Google map platform products? |
|  | How do I deliver maps applications on mobile devices? |
|  | What is the purpose of motion sensor? |
|  | What is a driveway motion detector? |
|  | Why is my motion sensor giving false detection? |
|  | Are there such things as a motion detector guard log? |
|  | Can pets trigger motion sensors? |
|  | What is the motion flood light? |
| 12. | Can I use motion sensor besides for security purpose? |

**Assignment No 5**

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| **Q. No.** | **Question** |
|  | What is LDR? |
|  | How LDR works? |
|  | What is NTC & PTC? |
|  | What is the significant of NTC & PTC in real world? |
|  | How much money can you save when converting to LED? |
|  | Which LDR is suitable for automatic intensity control circuit? |
|  | Is it possible to install a LDR in a complicated circuit as the controller of the whole circuit? |
|  | What are the different applications of LDR? |
|  | What is the use of Arduino UNO board? |
|  | List the disadvantages of LED & LDR? |
|  | Explain the working of Arduino UNO board? |
|  | What are the technical specification of Arduino UNO board? |

**Assignment No 6**

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| **Q.No.** | **Question** | |
|  | | Differentiate NodeMCU vs Arduino Uno? |
|  | | What is the purpose of Rx & Tx pin in NodeMCU?  2 pins out of 11 are generally reserved for RX and TX in order **to communicate with a host PC from which compiled object code is downloaded**. |
|  | | Is it possible to control 230V, 50Hz operated FAN? How? |
|  | | How relay operate?  A relay is an electrically operated switch. They commonly **use an electromagnet (coil) to operate their internal mechanical switching mechanism (contacts)**. When a relay contact is open, this will switch power ON for a circuit when the coil is activated. |
|  | | What is NodeMCU?  NodeMCU is an open source platform based on ESP8266 which can **connect objects and let data transfer using the Wi-Fi protocol**. In addition, by providing some of the most important features of microcontrollers such as GPIO, PWM, ADC, and etc, it can solve many of the project's needs alone |
|  | | List different pins of NodeMCU.  **Pin Code Arduino alias**  A0 A0 A0  D0 GPIO 16 16  D1 GPIO 5 5  D2 GPIO 4 4  D3 GPIO 0 0  D4 GPIO 2 2  D5 GPIO 14 14  D6 GPIO 12 12  D7 GPIO 13 13  D8 GPIO 15 15  SD2 GPIO 9 9  SD3 GPIO 10 10  RX GPIO 3 3  TX GPIO 1 1 |
|  | | Is NodeMCU a microcontroller?  The NodeMCU (**Node MicroController Unit**) is an open source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266 |
|  | | Explain the working of dc motor?  The DC motor is the motor which **converts the direct current into the mechanical work**. It works on the principle of Lorentz Law, which states that “the current carrying conductor placed in a magnetic and electric field experience a force”. And that force is the Lorentz force. |
|  | | Which factor determines the difference between the types of armature windings?  **The armature windings are all connected to the commutator** in the case of DC machines. Commutator is nothing but device which converts dc voltage to ac voltage. |
|  | | Where is the armature located?  The armature can be on **either the rotor (rotating part) or the stator (stationary part)**, depending on the type of electric machine. |
|  | | What are the types of armature winding?  In DC machines, two types of armature windings are used −   1. Wave Winding 2. Lap Winding |
|  | | What is mean by armature winding?  Armature winding can be defined as, **an electrical machine in which emf can be generated because of the air gap field flux**. It must be noted that the air gap is produced because of the DC current flow in the winding. In general, this winding is housed on slots of the stator & the field winding on rotor slots. |

**Assignment No 7**

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| **Q. No.** | **Question** |
|  | What is Open-Source Hardware?  "Open hardware," or "open source hardware," refers to the design specifications of a physical object which are licensed in such a way that said object can be studied, modified, created, and distributed by anyone. |
|  | How is open hardware different from other hardware? |
|  | How is open-source hardware different from open-source software?  Open source hardware is hardware that is built based on principles analogous to open source software. That is, open source hardware typically come with original design files that enable people to study them freely, make changes and share those changes with others. |
|  | What is NodeMCU? |
|  | List different pins of NOdeMCU. |
|  | Is NodeMCU a microcontroller? |
|  | What is NodeMCU ESP8266?  What is the difference between ESP8266 and NodeMCU?  ESP8266 is a microcontroller with WiFi capability. it requires external flash memory and some antenna to work. There are different modules and development boards with this system |
|  | What is the use of ESP8266?  The ESP8266 WiFi Module is a self contained SOC with integrated TCP/IP protocol stack that can give any microcontroller access to your WiFi network. The ESP8266 is capable of either hosting an application or offloading all Wi-Fi networking functions from another application processor. |
|  | What is ESP in ESP8266?  “Espressif modules”  ESP32 is created and developed by **Espressif Systems**, a Shanghai-based Chinese company, and is manufactured by TSMC using their 40 nm process. It is a successor to the ESP8266 microcontroller. |
|  | What is Actuator?  mechanical device for moving or controlling something. |
|  | What is the work of Actuator?  An actuator is a device that **produces a motion by converting energy and signals going into the system**. The motion it produces can be either rotary or linear. An actuator is a device that produces a motion by converting energy and signals going into the system. |
|  | What are the three types of Actuators?  There are three types of Linear Actuators used in manufacturing: **Hydraulic, Pneumatic, and Electro-Mechanical** |
|  | What is SERVO Motor and how does it work?  The servo motor is **a closed-loop mechanism that incorporates positional feedback in order to control the rotational or linear speed and position**. The motor is controlled with an electric signal, either analog or digital, which determines the amount of movement which represents the final command position for the shaft. |
|  | How many types of SERVO Motors are there? Explain.  Servo motors come in many sizes and in three basic types. The three types include positional rotation, continuous rotation, and linear.  **Positional Rotation** servos rotate 180 degrees. They also have stops in the gear mechanism to protect the output shaft from over-rotating.  A **Continuous Rotation** servo motor is a servo that does not have a limit on its range of motion. Instead of having the input signal determine which position the servo should rotate to, the continuous rotation servo relates the input to the speed of the output and direction. The limitless motion of these motors enables them to move in both CW, and CCW directions.  **Linear** Servos use a rack and pinion mechanism to change their output. The rack and pinion converts rotary motion to linear motion. |
|  | What are the advantages of SERVO Motor?   * **Precision**– Servo motors entail highly precise operation, hence why they are commonly used in CNC machinery for movement of slide axis. * **Speed**– Servo motors offer high speed rotation, and more torque in a small package. * **Encoder**– Translates rotary or linear motion to a digital signal. * **Versatility**– Wide range of use for servo motors in a variety of applications. * **Closed Loop-** Servo motors use feedback signal to control the system. |

**Assignment No 8**

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| **Q. No.** | **Question** | | |
|  |  | What is Machine Learning? |  |
|  |  | What is the difference between supervised and unsupervised machine learning? |  |  |
|  | How to make a Machine Learning App? | | |
|  | List few Machine Learning applications. | | |
|  | How to apply Machine Learning to Android? | | |
|  |  | What are the different types of Machine Learning? |  |  |
|  | What are the basics of Machine Learning? | | |
|  | List few examples of Machine Learning. | | |
|  | How does Deep Learning differ from Machine Learning? | | |
|  | Explain Classification and Regression. | | |
|  | What is a Confusion Matrix? | | |
|  | What is the difference between Inductive and Deductive Learning? | | |

**Assignment No 9**

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| **Q. No.** | **Question** |
|  | What is the difference between Authentication and Authorization?  **authentication is the process of verifying who someone is, whereas authorization is the process of verifying what specific applications, files, and data a user has access to**. |
|  | How to enhance security in Android?   1. Use phone locks. 2. Use a VPN. 3. Use two-factor authentication. ... 4. Download apps only from the Google Play Store. ... 5. Use anti-virus software. ... 6. Do not use WiFi and Bluetooth connections at an unknown place. |
|  | What is Data Integrity?  “data integrity” refers to **the accuracy and consistency of data stored in a database, data warehouse, data mart or other construct**. |
|  | What is Confidentiality?  It allows authorized users to access sensitive and protected data. |
|  | What is non-Repudiation?  Nonrepudiation ensures that no party can deny that it sent or received a message via [encryption](https://www.techtarget.com/searchsecurity/definition/encryption) and/or [digital signatures](https://www.techtarget.com/searchsecurity/definition/digital-signature) or approved some information. It also cannot deny the authenticity of its signature on a document. It is the practice of managing information-related risks and protecting information systems, like computers, servers and enterprise networks. |
|  | How to secure Android phone?   1. Use phone locks. 2. Use a VPN. 3. Use two-factor authentication. ... 4. Download apps only from the Google Play Store. ... 5. Use anti-virus software. ...   Do not use WiFi and Bluetooth connections at an unknown place |
|  | How to provide security in Android App?   1. Use Internal Storage for Sensitive Data. 2. Encrypt Data on External Storage. 3. Use Intents for IPC. 4. Use HTTPS. 5. Use GCM Instead of SMS. 6. Avoid Asking for Personal Data. 7. Validate User Input. 8. Use ProGuard Before Publishing. |
|  | What is the difference between IOS and Android operating systems with respect to security?  Android is more often targeted by hackers, too, because the operating system powers so many mobile devices today. The global popularity of the Android operating system makes it a more attractive target for cybercriminals.  While iOS may be considered more secure, it’s not impossible for cybercriminals to hit iPhones or iPads with malicious software. |
|  | What is the best Security App for Android?   * Bitdefender Mobile Security. * Avira. * Norton Mobile Security. * Avast Mobile Security. * Kaspersky Mobile Antivirus. * AVG Antivirus Free. * Trend Micro Mobile Security. * McAfee Mobile Security. |
|  | Does Android have any built-in security? |
|  | What are the important key security features in Android?   * Security at the operating system level through the Linux kernel. * Mandatory application sandbox. * Secure interprocess communication. * Application signing. * Application-defined and user-granted permissions. |
|  | List few security threats in Android.   * 1) Data Leakage. Mobile apps are often the cause of unintentional data leakage. ... * 2) Unsecured Wi-Fi. ... * 3) Network Spoofing. ... * 4) Phishing Attacks. ... * 5) Spyware. ... * 6) Broken Cryptography. ... * 7) Improper Session Handling. |

**Assignment No 10**

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| **Q. No.** | **Question** |
|  | How Frequency Hopping Is Used for Security In Bluetooth? |
|  | Why Is Bluetooth 2.0 Better Than Previous Versions? |
|  | What Do You Mean by The Term Frequency-hopping Spread Spectrum? |
|  | What Is the Difference between 3g and 4g? |
|  | What Are the Different Types of Transmission Impairment? |
|  | What Do You Mean by Network And Switching Subsystem? |
|  | What Do You Mean By Base Station Subsystem? |
|  | What Do You Mean By Mobile Station Subsystem? |
|  | Explain The Concepts Of Digital Certificates |
|  | What Is Point-to-point Tunneling Protocol? |
|  | What Method Is Used For Voice Transfer? Brief About The Method Used? |
|  | What Is Compulsory Tunnel and Voluntary Tunnel? |
|  | What is the speed of 1g, 2g, 3g, 4g and 5g? |
|  | Which country uses 7g network? |
|  | What are 1g, 2g, 3g, 4g, 5g, 6g and 7g? |
|  | What is Network Generation? |
|  | What is Cellular Network and how it works |