B/L/TY

Reg. No: 22BCT0134

VIT
Vellore Institute of Technology

Final Assessment Test - November 2025

Course: BCSE315L - Wearable Computing

Class NBR(s): 2402/2403 Slot: F2+TF2

Time: Three Hours Max. Marks: 100

- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

COs	CO Statements
CO1	Learn about software, hardware tools, protocols and components required for Wearable Computing.
CO2	Understand basics of Body Sensor Networks (BSN) and its Programming Framework.
CO3	Gain Knowledge about Cloud assisted BSN.
CO4	Learn About the necessary tools required for BSN applications.

BL – Blooms Taxonomy Level (1 – Remember, 2 – Understand, 3 – Apply, 4 – Analyse, 5 – Evaluate, 6 – Create)

Answer ALL Questions
(10 X 10 = 100 Marks)

1.	Discuss how technological advancements of ARM processor can revolutionize the development of System-on-Chip (SoC) architecture to enable large-scale commercialization of wearable devices.	CO1	BL2
2.	Explain the hardware architecture of a sensor node with a neat block diagram. Discuss the various wearable sensors supporting the hardware architecture for SoC.	CO2	BL1
3.	Imagine you are designing a BSN based health monitoring system application for elderly patients, which continuously collects ECG and temperature data from wearable sensors and sends it to doctors for remote monitoring. Describe how middleware-based programming helps in managing communication, data processing, and coordination among sensors and healthcare servers with a sample code and diagram.	CO2	BL3
4.	Apply the SPINE Task-Based Autonomic framework to design a multi-plane architecture for a wearable body sensor network that monitors athletes' performance in real time. Illustrate the architecture showing how different planes manage sensing, communication and autonomic task control for activities such as resting, jogging and sprinting.	CO4	BL3

5.	Illustrate the Agent-Oriented Computing (AOC) principles that correspond to the characteristics of Wireless Sensor Networks (WSNs) and discuss the common properties shared between them.	CO4	BL2
6.	Draw the BodyCloud architecture and Explain the roles of the four main subsystems in the Cloud-based Platform for Community BSN Applications.	CO3	BL3
7.	Describe the SPINE-based Design for Body Sensor Network systems and outline the SPINE-based Platform Design process schema with neat diagram.	CO3	BL2
8.	List the SPINE Listener interface methods that must be implemented on the server side. Demonstrate the steps with a flow diagram to run a Simple Desktop Application Using SPINE1.3.	CO4	BL2
9.a)	You are developing a smartwatch app that tracks the user's daily steps and sends the data to a paired smartphone. The smartwatch should update the phone whenever the step count changes, and the phone should display a notification when new data arrives. Using the Android Wear API, explain which APIs and classes you would use to: i. Detect when the smartwatch and phone connect or disconnect. ii. Send and synchronize the step count data. iii. Receive updates and display them on the phone.	CO3	BL3
	OR		
9.b)	You are developing a fitness tracking app called FitBuddy that connects to a user's smartwatch and stores data such as heart rate, steps, and workout sessions in Google Fit. Explain how you would use different Google Fit APIs to: i. Connect your app to Google Fit and manage permissions. ii. Collect and record live heart rate data. iii. Save and retrieve a "Morning Run" session including its duration and activity type.	CO3	BL3
10.a)	In SPINE-based emotion recognition, describe the core signal analyzed for stress detection (SPINE-HRV), listing its decision criteria (indices and rule). Explain the physiological change pattern and the specific Nonstationary Index (NSI) threshold used to detect fear.	CO4	BL3
	OR		
10.b)	Outline the two key phases of the SPINE Motor Rehabilitation Assistant system and specify the primary data storage destination and the user benefits.	CO4	BL3

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