BCSE315L	Wearable Computing	L	T	P	C
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Pre-requisite	**NIL**	**Syllabus version**			
		1.0			

Course Objectives

4. To explore Wearable components and building blocks of Wearable Computing.
5. To enumerate the details of Body Sensor Networks (BSN).
6. To Integrate Wearable and Cloud Computing for BSN applications.

Course Outcomes

At the end of this course, student will be able to:

6. Learn about software, hardware tools, protocols and components required for Wearable Computing.
7. Understand basics of Body Sensor Networks (BSN) and its Programming Framework.
8. Gain Knowledge about Cloud assisted BSN.
9. Learn About the necessary tools required for BSN applications.

Module:1	**Introduction to Wearable Components**	**5 hours**
History - Internet of Things and Wearables - Wearables' Mass Market Enablers - Human Computer Interface and Human Computer Relationship - A Multi Device World.		
Module:2	**Building Blocks for Wearable Computing**	**7 hours**
Bluetooth Low Energy (BLE) - Embedded Software Programming - Sensors for Wearables - Android Wear: Notification Settings and Control, Wear Network - Android Wear API: DataItem – DataMapItem – DataMap - Google Fit API: main package - data sub package		
Module:3	**Body Sensor Networks**	**6 hours**
Typical m-Health System Architecture - Hardware Architecture of a Sensor Node - Communication Medium - Power Consumption Considerations - Communication Standards - Network Topologies - Commercial Sensor Node Platforms - Bio-physiological Signals and Sensors - BSN Application Domains - Developing BSN Applications - Programming Abstractions - Requirements for BSN Frameworks - BSN Programming Frameworks		
Module:4	**Autonomic and Agent-Oriented Body Sensor Networks**	**7 hours**
Task-Oriented Programming in BSNs - SPINE framework - Task-Based Autonomic Architecture - Autonomic Physical Activity Recognition - Agent-Oriented Computing and Wireless Sensor Networks - Mobile Agent Platform for Sun SPOT (MAPS) - Agent-Based Modeling and Implementation of BSNs - Reference Architecture for Collaborative BSNs - C-SPINE: A CBSN Architecture		
Module:5	**Integration of Wearable and Cloud Computing**	**7 hours**
Background - Motivations and Challenges- Reference Architecture for Cloud-Assisted BSNs - BodyCloud: A Cloud-based Platform for Community BSN Applications - Engineering Body Cloud Applications - SPINE Based Design Methodology		
Module:6	**SPINE-Based Body Sensor Network Applications**	**6 hours**
Introduction – Background - Physical Activity Recognition - Step Counter - Emotion Recognition - Handshake Detection - Physical Rehabilitation		
Module:7	**Installing SPINE**	**5 hours**
Introduction - SPINE1.x - Install SPINE 1.x - Use SPINE - Run a Simple Desktop Application Using SPINE1.3 - SPINE Logging Capabilities - SPINE2 - Install SPINE2 - Use the SPINE2 API - Run a Simple Application Using SPINE2		
Module:8	**Contemporary Issues**	**2 hours**
	Total Lecture hours:	**45 hours**

Text Book(s)				
1.	Fortino, Giancarlo, Raffaele Gravina, and Stefano Galzarano, Wearable computing: from modelling to implementation of wearable systems based on body sensor networks, 2018, 1st edition, John Wiley & Sons, USA			
Reference Books				
1.	Sanjay M. Mishra, Wearable Android™: Android wear & Google Fit app development, 2015, 1st edition, John Wiley & Sons, USA			
2.	Barfield, Woodrow, ed. Fundamentals of wearable computers and augmented reality, 2015, 1st edition, CRC press, USA			
Mode of Evaluation: CAT / Written Assignment / Quiz / FAT				
Recommended by Board of Studies		04-03-2022		
Approved by Academic Council		No. 65	Date	17-03-2022