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| **TSC Category** | Design and Architecture | | | | | |
| **TSC Title** | Embedded Systems Interface Design | | | | | |
| **TSC Description** | Design and set up interface and interconnections from or among sensors, through a network, to a main location, to enable transmission of information | | | | | |
| **TSC Proficiency Description** | **Level 1** | **Level 2** | **Level 3** | **Level 4** | **Level 5** | **Level 6** |
|  |  |  | **ICT-DES-4002-1.1** | **ICT-DES-5002-1.1** |  |
|  |  |  | Design physical layouts reflecting connections among sensors, networks and data collection or transmitting systems, and test and fine tune them | Guide the design of sensor networks and the associated embedded systems interfaces, and verify the viability of the designed interfaces |  |
| **Knowledge** |  |  |  | * Sensor networks concepts and principles of operation * Key components of sensor networks and their characteristics * Different types of data collection or transmitting devices, programs, systems and methods * Different types of connections among electrical and electronic devices, embedded systems, software and sensors * Application of sensors, actuators and transducers, and associated wiring systems * Usage of simulation or modelling software for sensor networks * Types and usage of tests on sensor networks * IoT system interface concepts and principles * Functions and operations of virtual and/or digital databases * Security considerations for sensor networks | * Methodologies and key principles in designing integrated sensor networks * Data structures in sensor networks * Various connectivity options and considerations among sensors, smart devices and other technologies * New and emerging technologies for data collection and transmission * Range of analytical or scientific simulation software * Conditions and parameters for testing viability of embedded system or sensor network * Internet of Things (IoT) guidelines and communication standards * Verification process for connection of sensors * Large scale monitoring and analytics applications and technologies * Types and functions of electronics in sensor networks |  |
| **Abilities** |  |  |  | * Develop physical layouts or maps reflecting connections among sensors, networks and data collection or transmitting systems * Design interfaces among embedded systems, software and sensors * Identify the appropriate hardware devices and software programmes needed to capture and transmit desired information * Operate a set of network management tools * Calibrate embedded system devices or data collection equipment to ensure connections are stable * Utilise simulation or modelling software to model and test interconnections among devices and programs * Implement user acceptance testing to test the embedded systems interfaces and/or products * Implement embedded systems to the real world context * Tune the deployed system to ensure it delivers the expected outcome * Conduct troubleshooting of sensor network failures | * Direct the design of embedded systems interconnections and interfaces * Examine the architecture and operating principles of data structures in embedded system interfacing * Create schematics and physical layouts of integrated sensor networks and systems * Evaluate the appropriate data capturing and transmitting technologies and tools * Evaluate operating system functions in embedded systems and/or sensor networks against user needs * Oversee the modelling and testing of interconnections among devices and programs * Establish environmental, capacity and user acceptance conditions for the testing of the embedded system network design * Verify the technical, operational and business viability of the designed sensor networks |  |
| **Range of Application** |  | | | | | |