Course Title	**Sensors and Embedded Systems**	Course Code	ECxxxx			
Department/ Specialization	Electronics & Communications	Credits	L	T	P	C
			2	0	4	4
Faculty proposing the course		Status	Core □		Elective □	
Offered for		Type	New ■		Revision □	
Recommendation from the DAC		Date of DAC				
External Expert(s)						
Pre-requisites		Submitted for Approval				
Learning Objectives	The key objective of this course is to explore the design of embedded systems, embedded hardware components and platforms, interfacing with external environments using sensors and actuators, wireless communication, and emerging application domains such as the Internet-of-Things (IoT).					
Learning Outcomes	At the end of the course, students should be able to • perform data acquisition from different types of sensors • process the data by embedded processors and transferring to a remote system/server/cloud • configure an IoT gateway for sensing and actuating					
Course Contents (with approximate breakup of hours for lecture/ tutorial/practice)	• Introduction to Sensors and Transducers, Classifications, Passive and Active Sensors– Resistance, Inductance and Capacitance, Strain Gauges (4T + 2P) • Measurement of Physical Quantities such as Displacement, Acceleration, Pressure, Force, Temperature, and Humidity (4T + 2P) • Embedded Processor- Embedded Systems Design using ARM Cortex/Raspberry Pi, Data Acquisition, Sensor Interfacing, Configure and Control Actuators (8T + 4P) • IoT- Utilize Raspberry Pi as an IoT gateway, Sensor Interfacing, Sensing and Actuating *things* via IoT gateway, Accessing Sensor Data via an Android Application (8T + 4P)					
Essential Reading	• Alan S. Morris, Measurement and Instrumentation Principles, 3rd Edition, Elsevier, ISBN-9780080496481, 2001. • S. Berger, Embedded Systems Design: An Introduction to Processes, Tools, and Techniques, CMP, ISBN: 1578200733, 2002. • T. Erl, Z. Mahmood, and R. Puttini, Cloud Computing: Concepts, Technology & 4. Architecture, Prentice Hall, 1st edition, 2013, ISBN: 978-0133387520.					
Supplementary Reading	• "Medical Instrumentation Application and Design, 5th Edition", John G. Webster and Amit J. Nimunkar, ISBN: 978-1-119-45733-6, John Wiley & Sons, 2020. • J. W. Valvano, Embedded Systems: Introduction to Arm® Cortex (TM)-M Microcontrollers, 5th Edition, Create Space, ISBN: 978-1477508992, 2012. • Howard Austerlitz, Data acquisition techniques using PCs, 2nd edition, Academic Press, ISBN:9780080530253, 2002.					