Course Title	Embedded Systems Practice	Course No	To be filled by the office		
Specialization	Electronics Engineering	Structure (IPC)	0	3	2
Offered for	B.Tech. and DD	Status (Core / Elective)	Core		
Prerequisite	----	To take effect from			
Course Objectives	In this course fundamental practices in the context of embedded systems will be covered. Hands-on experiments will be performed involving TI ARM Cortex-M microcontroller LaunchPad IDE (and booster packs), rapid prototyping of embedded systems using open source microcontrollers (Arduino, Raspberry Pi, BeagleBone Black), wireless networked embedded systems using Arduino shields, and Internet of Things concepts such as smart automation.				
Course Outcomes	At the end of the course, a student will be able to, 1. Understand how embedded systems interfaces operate (GPIO, interrupts, ADC/DAC, etc.) using the ARM Cortex LaunchPad IDE and booster packs 2. Perform experiments in sound, video (gaming) and mobile robots, with LCD displays, stepper and DC motors and RC servos 3. Rapid prototype embedded systems using open source microcontrollers (such as Arduino, Raspberry Pi, BeagleBone Black, and Intel Edison/Galileo). 4. Build wireless networked embedded systems using Arduino shields and modules (e.g., GPS, GSM/GPRS, Bluetooth, RFID, and ZigBee). 5. Conduct experiments in Internet of Things (e.g., using Arduino Yun, Intel and Microsoft Developer Kits)				
Contents of the course	Experiments in GPIO, serial interfacing, interrupts, data acquisition with ADC, sound and video, DAC Experiments in control of RC servos, stepper motors, DC motors, and design of video games and mobile robots Data acquisition and real-time control with Arduino, Raspberry Pi, and BeagleBone Black microcontrollers, shields, and add-on boards Experiments in wireless networked systems, using shields and modules, for GPS, GSM/GPRS, ZibBee, Bluetooth, and RFID Experiments in IOT for smart automation, with Intel and Microsoft development kits				
Textbook	1. IIITDM Kancheepuram –Embedded Systems Practice Manual.				
References	1. Jonathan Valvano and Ramesh Yerraballi, 2014, “Embedded Systems – Shape the World” (ebook). 2. T. Igoe, 2007, “Making things talk”, O’Reilly Press.				