

GANPAT UNIVERSITY									
FACULTY OF ENGINEERING & TECHNOLOGY									
Programme	Bachelor of Technology				Branch/Spec.	Mechatronics Engineering			
Semester	VI				Version	2.0.1.0			
Effective from Academic Year	2017-18				Effective for the batch Admitted in	June 2015			
Subject code	2MC602		Subject Name		EMBEDDED SYSTEMS				
Teaching scheme					Examination scheme (Marks)				
(Per week)	Lecture(DT)		Practical(Lab.)		Total	CE	SEE	Total	
	L	TU	P	TW					
Credit	3	0	1	0	4	Theory	40	60	100
Hours	3	0	2	0	5	Practical	25	25	50
Pre-requisites:									
Learning Outcome:									
At the end of this subject, students should be able to:									
<ul style="list-style-type: none"> Identify the basic element and functions of embedded systems. Describe the architecture of embedded systems. Demonstrate fundamental understanding on the interfacing devices. Developing the program for Cortex-M processor. Programming cortex M3 microcontroller in NI Labview Develop application/project based on microprocessor/microcontroller. Complete the experiments in laboratory. 									
Theory syllabus									
Unit	Content							Hrs	
1	Introduction to Embedded Systems: Background and History of Embedded Systems, Definition and Classification, Programming languages for embedded systems: desirable characteristics of programming languages for embedded systems, Low-level versus high-level languages, Main language implementation issues: control typing. Major programming languages for embedded systems. Embedded Systems on a Chip (SoC), IP Cores and the use of VLSI designed circuits.							8	
2	Embedded software development: Software development flow, polling, interrupt driven, multitasking systems, data types in C programming, Inputs, outputs and peripheral accesses, microcontroller interfaces. Architecture of an RTOS, Important features of RTOS, Embedded Systems Programming, Locks and Semaphores, Operating System Timers and Interrupts, Exceptions, Tasks. Task states and scheduling, Task structures, Synchronization, Communication and concurrency, Semaphores, Real time clock and system clock.							10	
3	32-Bit Cortex-M Architecture: Technical overview, Important features, Instruction set, Memory system, exceptions and interrupts, exception handling, low power and system control features. Programming, Development with Keil and mbed. Programming cortex M3 microcontroller in NI labview.							27	
Practical content									
The Practical/term work shall be based on the topics mentioned above and will be defended by the candidate.									
Text Books									
1	Joseph Yiu, The Definitive Guide to ARM Cortex-M3 processors, third edition, Newnes publication.								

Reference Books	
1	Jonathan W. Valvano, Volume 1, Introduction to ARM Cortex-M Microcontrollers (fifth edition, CreateSpace)
2	Jonathan W. Valvano, Volume 2, Real-Time Interfacing to ARM Cortex-M Microcontrollers (fourth edition, CreateSpace).
3	Jonathan W. Valvano, Volume 3, Real-Time Operating Systems for ARM Cortex-M Microcontrollers (second edition, CreateSpace).