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" A" Re-accredited By NAAC (2014) with CGPA-3.16

SU/BOS/Engg/ 3072 Date:-6-07-2015

The Principal
All affiliated Engineering Colleges
Shivaji University, Kolhapur.

Sub-: Minor Modification in the structure and syllabi of M.E.Electronics Engineering Part-I Sem II under the Faculty of Engineering & Technology.

Ref-: SU/BOS/Engg./ 3859 dtd.26/6/2014.

Sir/Madam

With reference to the subject mentioned above, I am directed to inform you that the University authorities have made some minor modification in the structure and syllabi of M.E.Electronics Engineering Part-I Sem II **"Real Time Embedded Systems design"**

The term,'**design**' has been deleted from title of the paper **"Real Time Embedded Systems"** mentioned in the structure and the copy of modified syllabi mentioned below

M.E. (Electronics Engineering) Revised (Sem. II) with effect from July 2014 onwards
REAL TIME EMBEDDED SYSTEMS

Lect :- 3 Hrs./week **Theory :- 100marks.**
Practical :-2 Hr. / week **POE :- 25 marks.**

UNIT I ARM9 architecture and programming **(6)**
ARM9 architecture, Memory organization, Programmers model, instructions and assembly programming.

UNIT II Arm Caches, MPU and MMU **(6)**
Cache architecture, Cache policy, co-processor15 and caches, protected region, initialising MPU, caches and write buffer, virtual memory, ARM MMU, page tables, TLB, Caches and write buffer, coprocessor 15 and MMU operation

UNIT III ARM Peripherals and Programming **(6)**
On chip peripherals, GPIO, Interrupts, RTC, Watchdog, UART, I^2C, ADC and SPI interfacing and programming using Embedded 'C', (LPC 29xx series Example 2921/23/25),

UNIT IV Introduction to RTOS **(6)**
RTOS basics, RTOS architecture, share data problem, critical section, shared resources, Task states multitasking, context switching, Kernals, pre-emptiness & non-pre-emptive schedulers, mutual exclusion, semaphores, Interrupt's Latency, pipes & mails boxes. Message queues, timer functions events, member management.

Contd…

UNIT V µCOS **(6)**

Kernel Structure: Tasks, Task State, Task Level Context Switching, Locking and unlocking of scheduler, Idle Task, Statistics Task, Interrupts, Clock Tick, Initialization, Starting the OS, Task Management: Creating/deleting and Suspending/ Resuming Task, Task Stacks and checking, Changing Task's Priority.

UNIT VI Time Management and Event Control Blocks **(6)**

Time Management: Delaying/Resuming Task, System Time. Event Control Blocks: Initialization of ECB, Placing/Removing Task from ECB waitlist, Finding Highest Priority Task, List of Free ECB, Task State Management. Communication in µCOS-II

Practicals: (Any 8)

1. Any 2 experiments on Assembly language programming on LPC 29xx series.
2. Any 4 experiments on ARM peripherals using embedded 'C' on keil.
3. Any 4 experiments on RTOS/µCOS experiments.

Text Books:

1. ARM System Developers Guide 1st edition, Designing & Optimizing System Software by Andraw sloss .
2. Embedded softer primer by David Simon, Person Education.
3. MicroC/OSII the Real Time Kernel, 2nd Edition, Jim Labarosse, CMP Books, PIC C Manual, CCS Inc.
4. LPC 29xx series data sheet on www.ARM.com.

The above modifications shall come in the effect from the academic year 2014-15 onwards. This syllabi is also available on university website www.unishivaji.ac.in You are therefore requested to bring this to the notice of all teachers & students concerned.

Thanking you.

Yours faithfully,
Sd/-
Dy. Registrar

Copy f.w.cs.to
1) Dean, Faculty of Engineering & Technology
2) Chairman, B.O.S. in Electronics Engineering
} For information

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