GUJARAT TECHNOLOGICAL UNIVERSITY

Subject Name: Device Drivers – I (Elective)
Subject Code: 3725208
Semester II

Type of Course: ME - Electronics & Communication Engineering (VLSI & Embedded Systems Design)

Prerequisite: Basic knowledge in operating system

Rationale: NA

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks				Total Marks
L	T	P	C	Theory Marks		Practical Marks		
				ESE (E)	PA (M)	ESE (V)	PA (I)	
4	2#	0	5	70	30	30	20	150

L- Lectures; T- Tutorial/Teacher Guided Student Activity; P- Practical; C- Credit; ESE- End Semester Examination; PA- Progressive Assessment;

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction** Embedded System Architecture fundamentals. Hardware and Software abstraction models. Operating Systems fundamentals. Real time OS overview	7	15
2	**RTOS Fundamentals** Study of Real time OS principles and requirements. Application specific requirements. Throughput and latency requirements. Schedulers, tasks and processes. Memory management. Code and footprint optimization. Study of current and emerging RTOS	7	15
3	**OS internals and Kernels** Internal components of Operating systems. Study, compare and contrast of various OS platforms. Unix/Linux kernel fundamentals. I/O devices, file systems and peripheral devices	8	20
4	**Device drivers** Fundamentals of device drivers, device enumeration and configuration. Data transfer and management mechanisms	8	20

Reference Books:

Product documentation from ARM (KEIL), Cypress, Windows Mobile, VxWorks, Symbian

- BUS Specifications – Bluetooth, USB, 802.11x
- Standards Specifications – JPEG, MPEG etc. as required

Course Outcome:

1. After learning the course the students should be able to:

2. Explain the architecture of embedded systems and operating system fundamentals.
3. Describe the fundamentals of real time operating systems.
4. Develop the device drivers and real time operating systems.

List of Experiments: (with Open Ended Problems)

1. Create n child processes in a chain sequence and also create unlimited number of child processes and check the limit.
2. Write a kernel program for loading two dynamic modules where one module depends on the other
3. Write a kernel program that passes the number of devices for a particular module as command line argument
4. Write a kernel program that prints the name of the process and its PID
5. Write a program to run date, calendar and ls command using fork () and excel () system calls.

List of Open Source Software/learning website:

1. **Linux-Opensuse 11.3**

Review Presentation (RP): The concerned faculty member shall provide the list of peer reviewed Journals and Tier-I and Tier-II Conferences relating to the subject (or relating to the area of thesis for seminar) to the students in the beginning of the semester. The same list will be uploaded on GTU website during the first two weeks of the start of the semester. Every student or a group of students shall critically study 2 papers, integrate the details and make presentation in the last two weeks of the semester. The GTU marks entry portal will allow entry of marks only after uploading of the best 3 presentations. A unique id number will be generated only after uploading the presentations. Thereafter the entry of marks will be allowed. The best 3 presentations of each college will be uploaded on GTU website