DEPARTMENT OF TELECOMMUNICATION ENGINEERING

Conducted Top up Lecture on

"DESIGNING AN EMBEDDED SOLUTION"

Date: 14.10.2017
Time: 10:30 – 12:30 AM

Venue: Seminar Hall 6

The Department of Telecommunication Engineering was established in the year 1992 with the aim of giving quality education in the field of Telecommunication. To our credit we have VTU ranks. Our department students and faculties have actively participating in national, international conferences and presenting technical papers.

Every semester our department is inviting experts from various industries and organization for delivering the lectures on the current topics in the field of Telecommunication.

This semester we organized a **Top up lecture** on **"Designing an Embedded Solution"**

on 14th October 2017 at seminar hall 6. The guest speakers were **Mr. Sharath Maidargi, Application Engineer 1** and **Mr. Jagan Jothivel, University Program Manager.**

The event started with invocation song by Monisha from 5th semester followed by welcome address by Tarun from 7th semester. It proceeded with a short talk about **Mr. Sharath Maidargi,** and **Mr Jagan Jothivel.** The lecture started at 10:30 AM and ended at 12:30 PM.

Mr. Sharath Maidargi interacted with students regarding designing and embedded system the constraints and datasheets with real world examples a problem statement and videos.

This top up lecture helped students to visualize the connection between their college project work and the real world. The lecture focuses on imparting industrial knowledge to students to design and develop complete embedded solutions that can be quickly converted into a product in the market.

Students also learnt that to achieve this, one must clearly understand the various elements comprising an embedded system and the constraints that industries are currently thriving to overcome.

The lecture helped them know more about the design cycle and constraints that 7th semester students studied in the 4th unit under subject "embedded system design 10TE765.The product development cycle implemented by all embedded industries was discussed to guide students plan their college projects in a way that matched the industrial standards.

The speaker also enlightened the students with data sheets about a controller and HDL programming through which 5th semester students could relate their theory topics in microprocessor and HDL 15EC53.

A problem statement was given to the students, and every one interacted with much interest in giving solutions.

Additionally, **Mr Jagan Jothivel** explained the careers in several embedded industries based on the product development cycle

He creating awareness of the real-world jobs available in the embedded industry and helped students understand their role of work. The various skills of an embedded engineer were discussed to provide a superficial insight into what the embedded industries are currently expecting from the engineers.

Products and Courses were shown and explained to students to help them in their project work.

Highlights of the lecture include

1) Terminologies related on embedded systems and solutions

2) Product development and roles

3) Evolution of embedded system

4) Future of Embedded systems

He also explained the structure of an embedded system on basis of the components like

- Sensors are given as inputs

- Microcontroller and processors with memory form the intermediate

- Outputs are the actuators, displays and communication.

Key points included in the lecture were:

1) Embedded system is obtained as the result of an embedded solution.

- A computer system is different from a computer system.

- A computer system is designed for a general purpose whereas an embedded system is designed to perform a specific task. The complexity of construction of an embedded system is hidden from the users.

- Both hardware and software is considered during the design of an embedded system and efficiency is the key factor of the design.

Mr. Sharath also explained how as students can we develop an embedded solution. He said an embedded system can be developed by

- Identifying the problem statement and all possible issues that may erupt in the future.

- Framing a solution and start working on the solution.

- *If all the problems are identified at the first instance the embedded system created will give best results*.

- Hardware and software requirement for an embedded system:

- Hardware: Choosing the appropriate microcontroller is based on the Physical Size, Input and output pins, Electrical parameters, Operating voltage range, Number of bits in each register, Clock speed, Timers, ADC ,low power mode and communication.

- Software: Choosing an OS and application code.

He explained the major Constrains in a design as:

Manufacturing cost, Design cost, Performance, Power, Time to market

The market looks for cost-critical application and life-critical applications.

He also explained on few Product development cycle and roles in the industry:

Concept/problem/requirement –Customer application engineer(CAE), Field Application Engineer(FAE)

System architecture-Architect

Hardware design- RTL design(Verilog), Physical design(layout), Verification engineer-power analysis

Software development-Embedded software (engineering tools)

Testing, validation and documentation-Validation Engineer, Technical writer(datasheet/manuals)

Training and support-Software Engineer

Customer support

2) Evolution of Embedded Systems

Autonetics D17(1961)

Apollo Guidance Computer NASA(1960's)

12-PDP mini computers

3) Future of Embedded Systems

- **Product service Automation**

Smart Homes, Autonomous Driving Cars, Use of Drones by Amazon, Communication of Electronics

- **Production Automation**

-Smart phone industries, All consumer products (E.g.: lens kart), Most Automotive Industries

Skills Required by an Embedded systems engineer

- **TECHNICAL SKILLS**

  -Systems architecture: Von Neuman and Havad

  -FPGA architecture, HDL, Verilog, HDL simulation tools

  -Programming Skills like: Python, C, C++, Assembly.

  -Basic analog modules like: OP-AMP, ADC, PWM.

  -Basic Digital modules like: Timers, Watch-Dog Timer etc.

  -Memory Technologies

  -Protocols

- **NON-TECHNICAL SKILLS**

  -Inter-disciplinary approach

  -Make use of both hardware and software

  -Ability to deal with complexities

  -Interest in the project

  -Patience

He explained the theory topic of unit 1 and 2 of embedded system design 10TE765. With the product life cycle process to development and efficiency all constraints and problem statement were given.

He even shared the datasheet information during selection of a controller, design of a OS, sensors and other devices. Topics on HDL and Microprocessor were also covered during the seminar.

A problem statement was given to the students and were asked to give solution. It was an interactive session.

The lecture was concluded with videos, some include cycling BOT, DARPA videos and HAVAL's intelligence video on future view which included an encouraging thought "to keep learning".

University Program: Jagan Jothivel

University Program Manager Jagan Jothivel explained the various products available for students to carry out their project work.

He even elaborated the courses and skill development for faculty and students. Explained the process of development with the products and evolution of an embedded system from wheel to IoT; s

He shared few mail ids through which students can check for modules. He even said students can share their project idea with Microchip and ask them to test their module.

The students left the seminar hall with information on lot of skills, Job levels and satisfaction.

Photos of the event Top up Lecture