

# GUJARAT TECHNOLOGICAL UNIVERSITY

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## Report on Short Term Training Program (STTP)

on

### “Embedded System Design”

The short term training program on “Embedded System Design” was held at Vishwakarma Government Engineering College, Chandkheda, Ahmedabad from 25<sup>th</sup> – 29<sup>th</sup> July 2012. This program was organized by Gujarat Technological University (GTU) in collaboration with Instrumentation and Control Engineering Department, Vishwakarma Government Engineering College (VGEC), Chandkheda and Edutech Learning Systems, Baroda. Gujarat Technological University has funded this program and it has been coordinated by Dr. Chetan Bhatt, Head of Department, Instrumentation and Control Engineering, VGEC, Chandkheda.

**The main objective of the program was to introduce effective learning methods for embedded system design and devise experiments. One session on IDP/UDP based on embedded system was also held for students.**

The workshop schedule and registration process was announced on GTU web site. Organizers have received overwhelming response from engineering faculty members. Total 50 participants have been shortlisted out of about 80 applications received.

On the first day (25<sup>th</sup> July) workshop was started by registration process followed by welcome speech by Prof. M. R. Patel, Principal, VGEC, Chandkheda. Next Dr. Chetan Bhatt has presented the objectives and schedule of workshop followed by lecture session on introduction to embedded system by Mr. Nitin Paranjape, Edutech Learning Systems, Baroda. Another session on the same day was conducted by Mr. Nitin Paranjape introducing effective teaching methods for embedded system design. He has explained about the methods by which embedded system design can be taught in generalized way so that students will be able to work on various microprocessors/microcontrollers.

On second day, Dr. Chetan Bhatt has introduce various microprocessors/microcontrollers architectures, design flow for designing processor, and PIC18 series microcontroller architecture. He also discussed embedded design hardware issues such as clock system, I/O

ratings, and various peripheral devices. He has discussed about practical problems such as cross talk and reflection, and electromagnetic interferences and methods to solve it. The second session was hands – on session on programming for PIC18 microcontroller using MPLAB IDE.



On third day, morning sessions were on hardware interface with PIC18 series microcontrollers conducted by Ketan Patel, Chintan Khamholja, and Ruchit Shah of Edutech Learning Systems. An open source compiler tools and IDE for 8051, PIC, and ARM microcontrollers family has been introduced. All the participants were actively involved in interfacing various peripheral with PIC18 microcontroller development boards. First post lunch session on ARM7 architecture was conducted by Dr. Rahul Dubey, DAIICT, Gandhinagar. He has explained in brief the ARM7 architecture and demonstrated the low cost development kit available in market. Second session on IDP/UDP for faculty was conducted by Dr. Chetan Bhatt. He has first explained the GTU's intention in introducing IDP/UDP as part of final year curriculum. He discussed about the Washington Accord and NBA accreditation criterion and in that context importance of activities like IDP/UDP. He

further explained about engineering, categories of engineering knowledge, and how to identify the engineering problems. Many participants of the opinion that special program may be organized for such topics.

On forth day, hands - on - session was organized for ARM7 microprocessor. All the participant have performed experiment on ARM7 platform throughout the day. At the end session on IDP/UDP was organized for students also. Various embedded applications were demonstrated by Mr. Niting Paranjape and his team, and Dr. Chetan Bhatt to the students.



Last day, on-line learning tutorial was demonstrated to faculty members. Access to on-line tutorial for a period of one month was also given so that faculty members can continue their study and practice. Next, a hands-on-session on RTOS deployment and developing applications was organized followed by demonstration of industrial programming techniques. Techniques to write reusable code and reduce the development time were demonstrated.

Workshop was concluded by taking feedback from participants followed by presenting vote of thanks by Dr. Chetan Bhatt. At last Prof. M. R. Patel and Mr. Nitin Paranjape have distributed certificates to participant.



The workshop was a great success. The following feedback/suggestions have been received.

1. Conduction of similar workshop at regional levels so that more faculties can participate
2. Special workshops for students which can be conducted college wise
3. Listing out of IDP topics at a central level (GTU level) for reference
4. More hands-on sessions on topics other than the syllabus and essential at the industry levels
5. More use of on-line learning and assessments on day-to-day basis thereby increasing the use of ICT
6. Special workshop on topics like engineering, engineering knowledge, and Washington Accord.