



# Advanced Faculty Training in Emerging Trends of Hardware, Embedded Systems and Information Technology

*"A knowledge economy is one that relies intensively on human skills and creativity, the utilization of human intellectual capital supported by life-long learning and adaptation, the creative exploitation of existing knowledge, and extensive creation of new knowledge through research and development."*

*-Anonymous*

## About C-DAC

Centre for Development of Advanced Computing (C-DAC), a Scientific Society of the Department of Information Technology, Ministry of Communications and Information Technology is primarily an R&D institution involved in design, development and deployment of Advanced Electronics and Information Technology Solutions, including the celebrated PARAM series of Supercomputers.

C-DAC, Hyderabad centre is working in R&D with a focus on Ubiquitous Computing, System Level Programming, Web Technologies and Embedded Programming in the application domains of Network Security, e-Learning, Supply Chain Management and Wireless Sensor Networks. In line with these R&D strengths, the centre offers post graduate level diploma courses in Advanced Computing, Embedded Systems Design, Network Security, Analog and Digital Design and System Software Development through its Finishing School for Information Technology. C-DAC Hyderabad is working closely on the advanced areas like VLSI Design, Network Security and offering certificate programs jointly with JNT University, Hyderabad.

## Course Methodology and Highlights

- Full-time program (8 hrs per day for 10 days)
- Classroom & lab sessions
- Extensive demonstrations and laboratory assignments
- Relevant case studies / mini projects
- Course material in the form of presentations with lecture notes
- Supplementary course material physical copies and online content
- Seminars and Group Discussions
- Utilization of R&D experts for classroom as well as lab sessions
- Industry interactions / visits

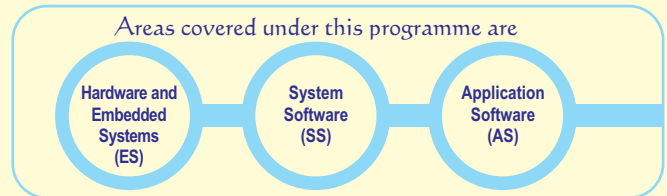
## Course Details

### Network Security and Malware Analysis

- Introduction to Security Engineering, Attacks, Mechanisms and Services, Attack Detection, Prevention and Recovery
- Network Packet Capturing and Analysis
- Authentication and access control, email security and web security
- Perimeter Security Solutions – IDS, Gateway Firewall and VPN
- Database Security
- Security Standards and Auditing
- Introduction to Windows Architecture
- Windows Programming and API, PE format
- Windows Security Concepts
- Data Structures in Windows and Kernel Programming
- Introduction to Malware, Automated Analysis, Behaviour Analysis
- Malware Analysis with samples
- Dealing with Advanced Malware
- Analysing Memory Images with Volatility Toolkit
- Analysing Web based malware, malicious documents
- Analysing vulnerability exploitation which is carried out using Metasploit Framework

#### Pre-requisites

C / C++ Programming, Data Structures, Networking & TCP/IP Concepts, OS Concepts, Working knowledge of Linux & Windows OS



## Advanced Faculty Training Project Initiative

Realizing the need for skilled manpower in advanced areas of IT, the Department of Electronics and Information Technology (DEIT) has initiated and actively supporting a programme on "Manpower Development for the IT Industry". The primary objective of this programme is to update/enhance the skills of engineering faculty in advanced domains of Information Technology keeping pace with the IT industry. The engineering faculty may be exposed to the needs of IT industry so that they can in-turn nurture, educate and mould their students while they are still in the college.

Based on the strengths, C-DAC Hyderabad was given the responsibility of conducting Advanced faculty Training for Engineering Faculty. The programme is designed for faculty to keep abreast with rapidly growing trends in **Hardware, Embedded Systems, System Software and Application Software**. Such programs can stimulate the faculty and help in shaping the engineering graduates to meet the industry expectations.

JNT University, Hyderabad is associated in this programme as academic partner.

## Course Schedule

Sl. No.	Dates	Course Title	Course Code
1	14 <sup>th</sup> May 2012 – 25 <sup>th</sup> May 2012	System Design Using FPGA	ES - MAY 12
		Network Security and Malware Analysis	SS - MAY 12
2	28 <sup>th</sup> May 2012 – 8 <sup>th</sup> June 2012	Enterprise Solutions for Web Applications	AS - MAY 12
3	11 <sup>th</sup> June 2012 – 22 <sup>nd</sup> June 2012	Network Programming and Security Engineering	SS - JUN 12
4	18 <sup>th</sup> June 2012 – 29 <sup>th</sup> June 2012	Hardware and Firmware design for ARM based Embedded Systems	ES - JUN 12

### Network Programming and Security Engineering

- Introduction to Security Engineering, Attacks, Mechanisms and Services, Attack Detection, Prevention and Recovery
- Network Packet Capturing and Analysis
- Authentication and access control, email security and web security
- Perimeter Security Solutions – IDS, Gateway Firewall and VPN
- Introduction to Malware and Analysis
- Security Standards and Auditing
- Client-Server Paradigm, TCP & UDP based network programming
- Multithreaded servers with I/O multiplexing and Synchronization
- PCAP programming, Security protocol implementation using Crypt library
- OpenSSL programming
- Secure coding in C & C++
- Secure coding in Java
- Web based threats and securing web applications
- Database Security
- Security design principles, architectures & models
- Security Testing and Evaluation Criteria

#### Pre-requisites

C / C++ Programming, Data Structures, OOPs concepts, Networking & TCP/IP Concepts, OS Concepts, Working knowledge of Linux & Windows OS, Internet & Web Concepts

### System Design using FPGA

- VLSI Design Flow
- FPGA Architecture
- Hardware Description Language
- Designing and Implementation of Finite state Machines for FPGA
- Synthesis Techniques and Timing Analysis
- Placement and Routing
- Embedded Hardware and Software Design with FPGA
- Porting Embedded Operating Systems on FPGA
- Case Study on FPGA based System Design

#### Pre-requisites

C, Microprocessors, Microcontrollers, Digital Electronics, Knowledge in computer science, Basic concepts in VLSI

### Enterprise Solutions for Web Applications

- Introduction to Web programming
- JDBC
- Servlets, JSP and JSTL
- Hibernate
- Introduction to JEE frameworks
- Mini project based on above topics

#### Pre-requisites

Core java, Fundamentals of database technologies, Basics of web programming (HTML, Java script)

### Hardware and Firmware design for ARM based Embedded Systems\*

- Overview of 32 bit Microcontrollers
- Microcontroller based Hardware Board Design
- Kit fabrication and testing
- Cortex M3 overview and Basics
- Instruction Set and Memory Subsystem
- Programming and debugging in Eclipse
- Exceptions and Interrupt Handling
- Programming Stellaris Cortex
- Kit Interfacing and Programming- Switches, LEDs, Temperature/Light Sensors, PS2 keyboard, VGA display Audio Sampling
- Embedded RTOS
- RTOS Drivers
- Porting of Embedded RTOS on ARM
- JTAG Debugging and Case Studies
- Power Saving modes
- Variants of ARM boards
- Mini project

#### Pre-requisites

C, Microprocessors, Microcontrollers, Digital Electronics

\* Participating colleges will be entitled to receive a teaching lab from Texas Instruments. The lab donation will consist of 6 lab kits based on Stellaris ARM Cortex-M3 along with teaching materials.

## Duration

Two Weeks Full Time course (8 Hours daily)

## Selection Process

The selection of the candidate will be based on their eligibility criteria. The selected candidates will be intimated through e-Mail / Post/Phone.

## Eligibility Criteria

- Faculty from engineering colleges teaching in the areas of Electronics, Computer Science and Information Technology
- Faculty should have a basic knowledge in the pre-requisite skills mentioned in the brochure.
- The participants should be nominated by their college Principals i.e the registration form should be forwarded by their colleges.
- Applicants should have at least one year of teaching experience in domains specified in the pre-requisite

## Course Venue

Hardware, Embedded Systems & Application Software	System Software
C-DAC, 3rd floor, Nalanda Building, No-1 Shivbagh, Ameerpet, Hyderabad-500016	C-DAC, JNTUH Campus, Kukatpally, Hyderabad – 500 085.

## Accommodation & Travel

Shared Non A/C accommodation and travel allowance for outstation participants will be provided by C-DAC, Hyderabad.

## Registration procedure

The applicants should fill the registration form online. Upon submission of the Online Registration Form, a copy of the application shall be printed. Duly filled form with approval from respective Institution Head to be posted to the following address Superscribing "Application for Advanced Faculty Training Programme/Course Applied/Course Code".

CO-ORDINATOR, Advanced Faculty Training  
Centre for Development of Advanced Computing (C-DAC)  
3<sup>rd</sup> Floor, Nalanda Building, No-1, Shivbagh, Ameerpet, Hyderabad-500016.  
Tel: +91-40-23737124/7125. Fax: +91-40-23743382. e-mail: future@cdac.in  
Registration Website: [www.elearn.cdac.in/future/](http://www.elearn.cdac.in/future/)  
[www.cdachyd.in/future/](http://www.cdachyd.in/future/)

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## प्रगत संगणन विकास केन्द्र

### CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

संचार एवं सूचना प्रौद्योगिकी मंत्रालय की वैज्ञानिक संस्था, इलेक्ट्रॉनिकी और सूचना प्रौद्योगिकी विभाग, भारत सरकार  
A Scientific Society of the Ministry of Communications and Information Technology, Department of Electronics and Information Technology, Government of India

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