National Institute of Electronics and Information Technology, Chennai

COURSE PROSPECTUS

Name of the Group:	EPDPT
Name of the Course:	Embedded Protocols: Wired and Wireless
Course Code:	AE405
Starting Date:	1st April, 2019
Duration:	80hrs
Course Coordinator:	Raghuraman.V
Last date of Registration:	29th March, 2019

Preamble:

In today's world, embedded systems are all over, homes, offices, cars, factories, hospitals and consumer electronics. The inherent value of embedded systems lies in its pervasiveness. They are literally embedded in all electronic products, from consumer electronics to office automation, automotive, medical devices and communications. They make the products smart, connected and are responsible for differentiating the products in the market.
Embedded systems are normally built around Microcontrollers and ARM Processor based SOCs. This Embedded System Design course focuses on the architecture and programming of embedded processors, development of applications using Embedded/Real-Time Operating Systems and porting the applications on ARM.

Objective of the Course:

a. To Provide hands on training in Embedded System Design using ARM.
b. To make students familiar with the basic concepts and terminology of the target area, the embedded systems.
c. Making students to write their own programs for their product or project.
d. To make students familiar with the Wired and Wireless Protocols.

Outcome of the Course:

1. Understand what a microcontroller is & embedded system.
2. Understand different components of a micro-controller and their interactions.
3. Become familiar with programming environment used to develop embedded systems
4. Understand key concepts of embedded systems like IO, interaction with peripheral devices.
5. Learn debugging techniques for an embedded system
6. Become familiar with Wired and wireless protocols

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Course Structure:

S.no	Module Name	Duration
1	Introduction to ARM Cortex M4	4Hrs
2	GPIO	4hrs
3	Introduction to Serial Wired Protocols	4hrs
4	Universal Asynchronous Receiver Transmitter	10hrs
5	Synchronous Serial Interface/Serial Peripheral Interface	10hrs
6	Inter Integrated Circuits	10hrs
7	Controller Area Network	10hrs
8	Introduction to Wireless Protocols	4hrs
9	Bluetooth	8hrs
10	Xigbee	8hrs
11	GSM	8hrs
Total		80hrs

Other details:

Course Fees

For General Candidates: Course fee is **Rs.4,500/-(Including GST)**

For SC/ST Candidates: No Fee

However they are required to remit an amount of Rs.1,000/-as advance security deposit. This amount will be considered as security deposit and will be refunded after completion of the course. If the student fails to complete the course successfully this amount along with any other security deposits will be forfeited.

Registration Fee: (non-refundable)

SC/ST: No registration fee

Others: **Rs.500/-. (Including GST)**

However the above registration fee shall be refunded on few special cases as given below

1. If course postponed and new date is not convenient for the student.
2. If Course cancelled.

Payment schedule: The Fee is to be paid in one installment as given below.

Instalment No.	**Last Date for Payment**	**Amount (in Rs.)**
1.	29th March, 2019	5000/-

Eligibility

Students and Graduates of BE/B.Tech/M.Sc (Electronics/CS/IT)

National Institute of Electronics and Information Technology, Chennai

Number of Seats: 30

How to apply:

Candidates are advised to download the Registration form from our website www.nielit.gov.in/chennai. After filing the form with all documents and fees, it can be submitted to NIELIT Chennai office in person or through post before staring of the course. Payment towards non-refundable Registration and Course fee can be paid through any one of the following modes:

- DD drawn from a nationalized bank (preferably SBI) in favor of "NIELIT Chennai" payable at Chennai.
- Online transaction: Account No: 32558810978 Branch: Kottur (Chennai), IFSE Code: SBIN0001669.
- Pay through nationalized bank Debit card (Service charges applicable)

Note: The Institute will not be responsible for any mistakes done by either the bank concerned or by the depositor while remitting the amount into our account.

Last date of Registration is 29th March, 2019

Selection of candidates: First cum First Serve basis

Admission Procedure:

All interested candidates are required to fill the Registration form with the fees (Registration and Course fees) before 29th March, 2019 with all the necessary following documents.

- Original and self-attested Copies of Proof of Age, Qualifications, etc.
- One passport size photograph and one stamp size photograph for identity card.
- Self-attested copy of Govt. issued photo ID card (AADHAR is mandatory for SC/ST candidates).
- Self-attested copy of community certificate (if availing SC/ST fee concession)

Note: Working days are from Monday to Friday. Admission timings are from 9.00 am to 5.30 pm.

Discontinuing the course: No fees under any circumstances shall be refunded in case of a student discontinuing the course. No certificate shall be issued if discontinued.

Course Timings: 9:00 AM to 5:30 PM (Monday to Friday)

Location and how to reach: NIELIT Chennai is located at Gandhi Mandapam Road, Kotturpuram, Chennai (Landmark: Opp. To Anna Centenary Library)

Address:

National Institute of Electronics and Information Technology Chennai Centre,
ISTE Complex, NO. 25, Gandhi Mandapam Road, Chennai – 600025
E-mail: training.chennai@nielit.gov.in
Phone: 044-24421445
Contact Person: Raguram, Mobile: 8939708290

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Course enquiries: Students can enquire about the various courses either on telephone Or by personal contact between 9.15 A.M. to 5.15 P.M. (Lunch time 1.00 pm to 1.30 Pm) Monday to Friday.

Annexure

Detailed Syllabus of the Course

Module 1 – INTRODUCTION TO ARM CORTEX M4(4hrs):

1. Introduction to Microcontrollers.
2. Explanation about Architecture of TM4C123GH6PM microcontroller.
3. Introduction to Code Composer Studio(IDE)

Module 2 - GPIO(4hrs):

1. Explanation about Programmable General Purpose Input and Output Registers.
2. Exercises on controlling LED and push button switches.

Module 3 – Introduction to Serial Wired Protocols (4hrs):

1. Parallel to Serial data Conversion
2. Serial to Parallel data Conversion
3. Flipflops

Module 4 - Universal Asynchronous Receiver Transmitter(10hrs):

1. UART Block diagram explanation from Tiva User guide.
2. UART Registers overview.
3. UART Programming using CCS for sending characters as ASCII value to computer and displays it.
4. UART Programming using CCS for sending Characters from one Tiva controller and receives it in the other Tiva controller.

Module 5 -Synchronous Serial Interface/Serial Peripheral Interface(SSI/SPI)(10hrs):

1. SSI Block diagram explanation from Tiva user guide.
2. SSI Register overview.
3. Introduction to 8x8 LED DOT Matrix Module using MAX7219 IC.
4. SSI Programming using CCS for displaying custom characters and images in 8x8 LED DOT Matrix module.

Module 6 - Inter Integrated Circuits(I2C)(10hrs):

1. I2C Block diagram explanation from Tiva user guide.
2. I2C Register overview.
3. I2C Programming using CCS for sending characters from one Tiva board to another.
4. I2C Programming using CCS to operate RTC module and displays time in LCD.

Module 7 – Controller Area Network(10hrs):

1. CAN Block diagram explanation from Tiva user guide.
2. CAN Register overview.
3. CAN Programming using CCS for sending characters from one Tiva board to another.
4. CAN Programming using CCS to interface Tiva controller and Total Phase CAN Activity Board Pro.

Module 8 Introduction to Wireless Protocols(4hrs):

1. Wireless Communication Overview
2. Various Modulation Techniques
3. Frequency Shift Keying
4. Phase Shift Keying

Module 9 Bluetooth(8hrs):

1. Fundamentals of Bluetooth.
2. Bluetooth Programming using CCS to establish communication between Two Bluetooth devices.

Module 10 Xigbee(8hrs):

1. Fundamentals of Xigbee.
2. Working with Xigbee editing software XCTU to edit Zigbee devices.
3. Xigbee programming using CCS to establish communication Two Zigbee devices.

Module 11 GSM(8hrs):

1. Fundamentals of GSM.
2. GSM programming using CCS to control a device from mobile