

COURSE PROSPECTUS

Name of the Group: *Product Engineering GROUP*

Name of the Course: Certificate Course on Processor based System Design

Course Code: PD 504

Starting Date: 18/05/2020

Duration: 5 Weeks

Course Coordinator: Mr. Manoj Kumar MK, Senior Technical Officer

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Preamble: *Emergence of India as a global economy has opened up a huge demand for electronic products. National Policy on Electronics and Make in India initiative of Government of India has resulted in setting up of many industries in the Electronics sector and has led to a huge demand for trained man power in Electronics Board Design.*

Objective of the Course: *Certificate Course on Processor based System Design is offered to developed competency in Embedded System Design & Development. Qualifier shall able to develop a 32 bit processor based embedded product for desired application.*

Outcome of the Course: *On successful completion of the Course, the Participants have*

- *Hands on exposure to the tool Chain utilized in Embedded System Design & Development.*
- *Able to Identify appropriate hardware and software for a given Embedded system application.*
- *Able to Develop Competency in Interfacing and Communication with Processor*

Expected Job Roles:

Embedded C Programmer in Embedded Systems Industry

Course Structure:

Sl. No	Module Title	Duration (Hours)			Credit	
		Theory	Lab	Total	Theory	Lab
1	<i>Revision of C Programming</i>	10	25	35		
2	<i>Introduction to Cortex ARM Architecture & Programming</i>	20	50	70		
3	<i>Interfacing with ARM Cortex</i>	10	25	35		
4	<i>Project</i>	10	25	35		
	Total Duration/Credit	50	125	175	7	

Other Contents

I. Course Fees:

General Candidates: Course fee is Rs. 16,660/- (*Rs 14,000/- + 18% GST + 1%KFC*)

SC/ST Candidates : Tuition Fees are waived for SC/ST students admitted under SCSP/TSP. However they are required to remit an amount of **Rs. 1000/- as Advance caution/security deposit**. This amount will be considered as caution/security deposit and will be refunded after successful completion of the course. If the student fails to complete the course successfully, this amount along with any other caution/security deposits by the student will be forfeited.

Module wise Course Fee: Not applicable for this course

II. Registration Fee: An amount of Rs.1000/- (including all taxes as applicable) (nonrefundable) should be paid at the time of registering for the course.

This fee shall be considered as part of course fee, if the student joins the course. If a student register and pay for more than one course and join for any one course, all such amount will be adjusted against the course fee payable.

If the student does not join for the registered course / any of the registered courses, fee paid shall be forfeited.

For SC/ST candidates, the registration fee is Rs.500/- and will be considered as part of caution/security deposit and will be refunded after successful completion of the course. If the candidate does not join or fails to complete the course the amount will be forfeited.

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

- Course postponed and new date is not convenient for the student
- Course cancelled in advance, well before the admission date

III. Course Fee Installment Structure: Not applicable for this course

IV. Eligibility: B.E./ B.Tech in Electronics/ Electronics & Communication/ Electrical/ Electrical and Electronics/Instrumentation/ Biomedical /Computer Science/Information Technology or MSc in Electronics/ Instrumentation/ Computer Science/Information Technology or Diploma in Electronics/CS/IT/EEE/EI

V. Number of Seats : 20

VI. Selection of candidates : Selection is based on the marks in the qualifying Degree.

VII. Test/Interview: *Not Applicable*

VIII. Counseling/Admission : on 18/05/2020

IX. Important Dates:

Last date for Registration	4/05/2020
Publication/Intimation of selection via website/email:	8/05/2020*
Counseling Date:	18/05/2020
Class Commencement Date:	18/05/2020

*Those who have not received the selection information by email as on the dates mentioned may contact the course coordinator.

- X. Course Timings :** This program is a practical oriented one and hence there shall be more lab than theory classes. The classes and labs are from 9.30 am to 12.45 pm and 1.30 pm to 5.00 pm Monday to Friday. The theory to lab proportion is 30:70.

- XI. Placement :** Students can register with Model Carrier Centre

XII. Lab Facilities DSOs, DPOs, Protocol Analysers, Logic Analysers, SMD Rework station, High Precision Digital Multimeters, ARM Embedded Development tools like KEIL/ True Studio, STM32 CubeMX, ST Link SWD/JTAG Debugger, IoT modules.

PCB design tools such as OrCAD Capture, OrCAD / Allegro PCB Editor, OrCAD Digital Simulator, Hyper Lynx PCB Design Tool(Signal Integrity, Power Integrity, Thermal and EMC Analysis for High-Speed PCB Design) etc

XIII. Course Contents

PD 504 A: Revision of C Programming (1 Week)

- Introduction, Data Types and storage classes, Operators, Control Statements, Arrays, Strings

PD 504 B: Introduction to Cortex ARM Architecture & Programming (2 Weeks)

- Introduction to ARM cortex Processor architecture and programmer's model, Introduction to Processor Instruction Set Architecture, Interrupt mechanisms and Exception handling, Cross compilation, Tool chains and Development environments, Programming using Assembly, C and Mixing the Assembly and C programming.
- Introduction to STM32 Cortex M3 hardware, Introduction to CMSIS, JTAG/SWIM based debugging using ST-LINK/V2, Introduction to STM32 Cube MX graphical configuration and generating the code in KEIL / TrueStudio.

PD 504 C: Interfacing with ARM Cortex (1 Week)

- Switches, LCD, Keyboard, IO programming, etc. through processor ports, Generating delays and PWM using timers, and Watchdog mechanism, Working with PC and RS-232, Peripheral interfacing through I2C,SPI etc, Interfacing with Memory, Providing Reset and Clock on a board, Interacting with real world using ADC and DAC.

PD 504 D: Project (1 Week)

- Done as a group project where the trainees will be working on a real life problem sourced from industry/ start-ups and developing a complete embedded based electronic product.

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