राष्ट्रीय इलेक्ट्रॉनिकी एवं सूचना प्रौद्योगिकी संस्थान, चेन्नई
National Institute of Electronics & Information Technology, Chennai

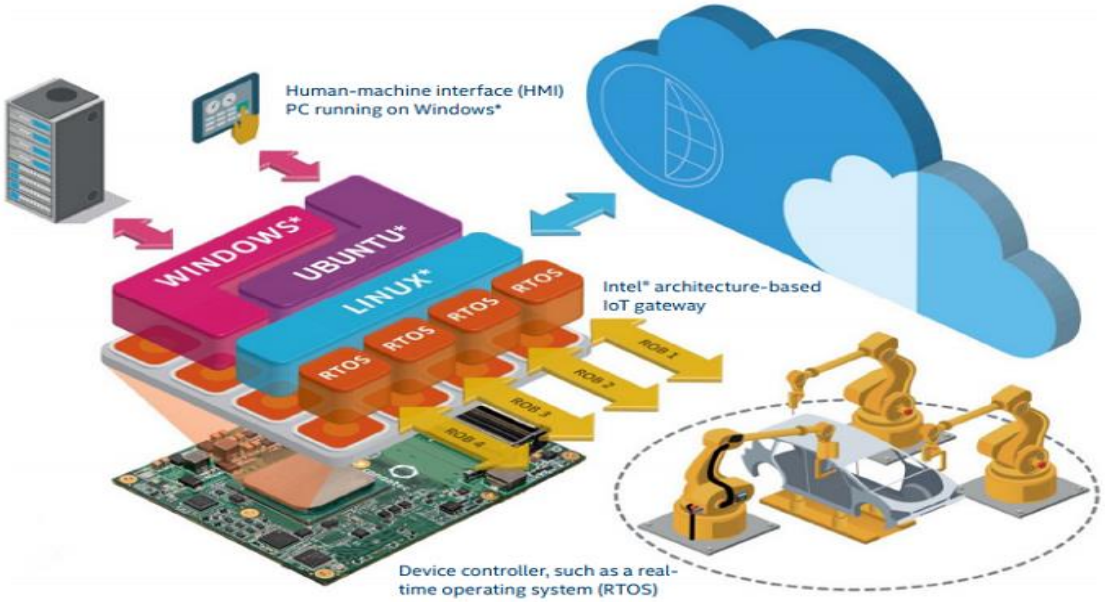
Ministry of Electronics & Information Technology
Government of India

नेशनल इंस्टीट्यूट ऑफ इलेक्ट्रॉनिक्स एंड इंफॉर्मेशन टेक्नोलॉजी, चेन्नई
National Institute of Electronics and Information Technology, Chennai
Autonomous Scientific Society of Ministry of Electronics & Information Technology (MeitY), Govt. of India
ISTE Complex, 25, Gandhi Mandapam Road, Chennai - 600025

Course Prospectus

PG Diploma in Embedded Real Time Systems

Mode: ONLINE (Blended)



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Course Prospectus

Name of the Group: Embedded System

Course Name: PG Diploma in Embedded Real Time Systems (Online-Blended Mode)

Course Code: ED 600

NSDA CODE: NIELIT/ES/L8/026

NSQF LEVEL: 08

Duration: 840 Hours, 6 Months

Last Date of Registration: 17-01-2021

Display of Provisional Selection List: 20-01-2021

Payment of first instalment fee: 21-01-2021 to 26-01-2021

Course Start Date: 01-02-2021

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. We live in the age, where information is just one click away and talking just one touch away. The near future of the age is the Internet of Things (IoT), the IoT is nothing but a computing concept in which everyday objects with embedded hardware/devices are connected to a network or are simply online.

The Embedded and IoT Industry is growing rapidly with the introduction of wide variety of Product for various applications catering to different sector demands. This increases the complexity of embedded system design; currently there is a shortage of qualified engineer with good Embedded and IoT Design and Development skills. Sector will continue to grow with introduction of new innovative products & application; therefore, the need for Skilled Engineers will continue to grow. Hence, there need an advanced training program in Embedded Field, this 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:

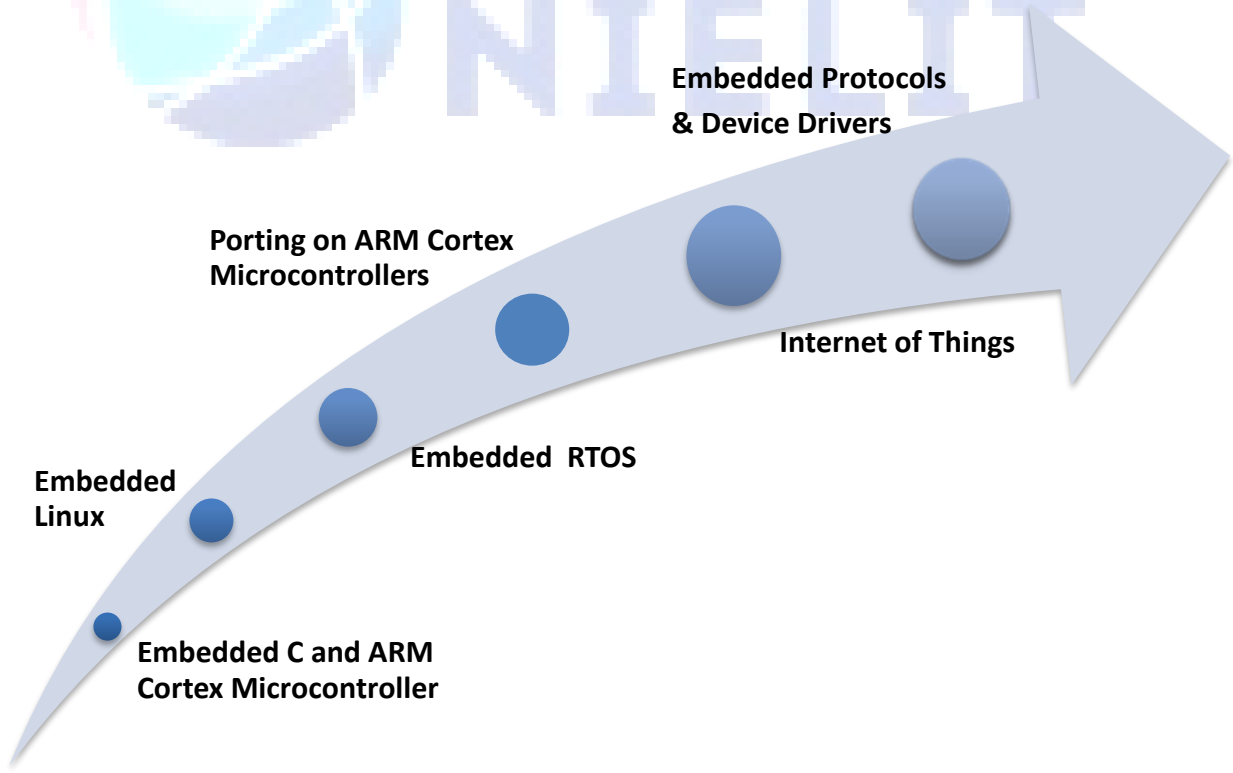
To develop the skillset required for Design and Development of the Embedded System Applications using suitable Hardware and Software tools. This course offers a range of topics of immediate relevance to industry and makes the participants exactly suitable for Embedded Industry

Outcome of the Course:

After successful completion of this Course, students can able to:

- Develop Embedded Application using ARM Cortex Microcontroller with Embedded- C Programming.
- Build Real-time application using Embedded OS/RTOS and porting it on ARM Platform.
- Expertise in Developing Device Drivers for Embedded Linux Application.
- Develop IoT applications using proper hardware and software Tools/platforms.

Full Flow of Course



Course Structure

This course contains totally eight modules. After completing the first seven modules, the students have to do a six weeks project using any of the topics studied to earn the PG Diploma; you can find the detailed syllabus by viewing the following URL (PG diploma in embedded syllabus.doc).

Module Code	Module Name	Duration(in Hours)
ED 601	Embedded C and ARM Cortex Microcontroller	140
ED 602	Embedded Linux	70
ED 603	Embedded RTOS	140
ED 604	Porting on ARM Cortex Microcontrollers	70
ED 605	Internet of Things	70
ED 606	Embedded Protocols and Device Drivers	105
ED 607	Seminar and case study	35
ED 608	Project Work	210
Total Duration		840

Course Fees

Course fee is Rs. 21,000/- +GST as applicable. (Can be paid as a single instalment of Rs. 24,780/- or in 2 instalments as given below)

Registration Fee	Rs. 1000/- for SC-ST Adjustable against advance security deposit.	Rs. 1000/- for others	
Instalment No.	# SC-ST Candidates (Fee including GST in Rs.)	General Candidates (Fee including GST in Rs.)	Last Date
1	2,500.00*	11,890.00	26-01-2021
2		11,890.00	26-03-2021
Total		23,780.00	
* Tuition Fees are waived for eligible SC/ST students. However, they are required to remit an amount of Rs. 2,500/- as advance security deposit. This amount will be considered as 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 security deposits will be forfeited.			

**GST is Applicable as per Govt. Norms GST (currently it is 18%).*

Apart from above fee, following fee to be paid by all selected candidates (excluding SC-ST) directly while applying for registration/NSQF examination:

1. *NSQF registration fee of Rs. 200+GST=Rs. 236/- after admission during registration at the time of NSQF registration*
2. *NSQF Examination fee of Rs. 2600/- while registering for examination.*

 # Important Note: This course is submitted for NSQF validity extension. Fee relaxation will subject to the approval of NSQF validity extension.

Registration Fee

(**Non-Refundable if candidate is selected for admission but did not join and if a candidate has applied but not eligible.)**

SC/ST: Rs. 1,000/- for SC-ST, adjustable against advance security deposit.

Others: Rs. 1,000/- (Adjustable with Total fee for candidates)

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

- ✓ Candidates are eligible but not selected for admission.
- ✓ Course postponed and new date is not convenient for the student.
- ✓ Course cancelled.

Eligibility

- ✓ B.E. /B. Tech in Electronics/ Electronics & Communication/Electrical/ Electrical and Electronics/Instrumentation/ Biomedical /Computer Science/Information Technology.

Number of Seats: 100 (One Hundred) - Total

Category	No. of Seats
SC (15%)	15
ST (7.5%)	8
GENERAL	77
Total	**100**

Note: Seats are allocated based on the merit of the Qualification.

How to Apply?

Candidates can apply online in our website http://reg.nielitchennai.edu.in. Payment towards non-refundable registration fee can be paid through any of the following modes:

- ✓ Online transaction: Account Name: NIELIT CHENNAI, Account No: 31185720641, Bank name: State Bank of India (SBI), Branch: Kottur (Chennai), IFSC Code: SBIN0001669.
- ✓ Pay through UPI Mobile Apps
- ✓ DD drawn from a nationalized bank (preferably SBI) in favour of ―NIELIT Chennai payable at Chennai.

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: 17th January, 2021

Registration Procedure

All interested candidates are required to fill the Registration form online with registration fees before **17th January, 2021** with all the necessary information.

Selection Criteria of candidates

The selection to the course shall be based on the following criteria:

Selection of candidates will be based on their marks in the qualifying examination subject to eligibility and availability of seats.

- ✓ The first list of Provisionally Selected Candidates will be published on NIELIT Chennai website (www.nielit.gov.in/chennai) on **20-01-2021** by **5:00 PM**. In case of vacancy, an additional selection list will be prepared and the selection will be intimated by email only.
- ✓ Provisionally selected candidate has to upload their document on registration portal for online verification.
- ✓ After document verification, selected candidates have to pay first instalment of Rs. ***11,890/-*** or as applicable on or before **26-01-2021** by payment mode mentioned above. Selected candidates are requested to upload the proof of remittance of fee on registration portal and also send the proof of remittance of fee as email to ripunjay@nielit.gov.in / trng.chennai@nielit.gov.in.

Admission: All provisionally selected candidates whose documents are verified and paid the fees (full or first instalment) and verified by accounts section of NIELIT Chennai will get a welcome message in his/her login ID provided during registration. The Credential and URL for online portal will be shared through WhatsApp or email.

Admission Procedure:

Students who have been selected for admission are required to SUBMIT to the Institute with the 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.
- ✓ Self-attested copy of community certificate (if availing SC/ST concession).
- ✓ AADHAR Identity proof must for SC/ST Candidates (For availing concession).

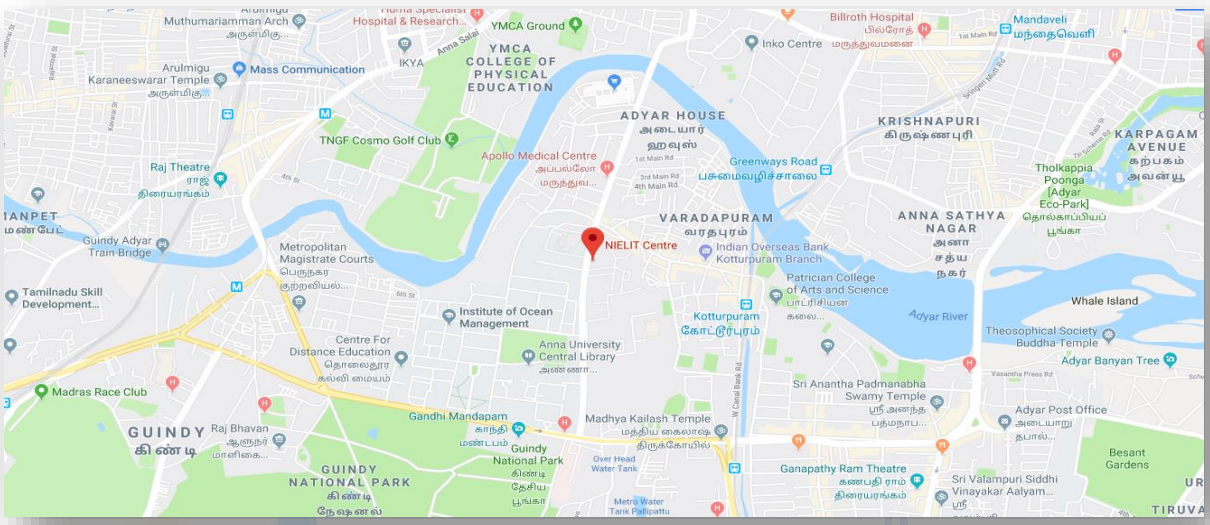
Note: *Working days are from Monday to Friday (9.00 am to 5.30 pm.)*

Discontinuing the course

No fees (including the security deposit) under any circumstances, shall be refunded in the event of a student who have completed the process of admission for discontinuing the course in between. No certificate shall be issued for the classes attended. Only Grade Sheet will be issued if applicable.

Course Timings: This program is a practical oriented one and hence there shall be more lab than theory classes. The cloud based online theory classes will be on forenoon and lab session will be conducted on afternoon time.

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



Address:

National of Electronics and Information Technology

ISTE Complex, No. 25, Gandhi Mandapam Road, Chennai – 600025

E-mail: trng.chennai@nielit.gov.in/Phone: 044-24421445

Contact Person: Mr. Ripunjay Singh, Mobile: 9445220125 (Call @ 9 AM to 6 PM)

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.

Placement:

Students who have completed the course successfully and qualified, Placement guidance and career counselling will be given to crack their interviews.

Important Dates

Last Date of Registration: 17-01-2021

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Course Start Date: 01-02-2021

Examination & Certification

- ✓ Certification Body: Examination Section, NIELIT Head Quarter.
- ✓ PG Diploma Certificates will be issued after successful completion of all the modules including assignment, seminar and project.
- ✓ For getting PG Diploma certificate a candidate has to pass each module individually with minimum required marks of 50%.

Examination Scheme

Examination scheme for each module is as follows:

Module Name	Total Marks	Written	Practical / Assignment
Embedded C and ARM Cortex Microcontroller	**100**	25	75
Embedded Linux	**100**	25	75
Embedded RTOS	**100**	20	80
Porting on ARM Cortex Microcontrollers	**100**	20	80
Internet of Things	**100**	20	80
Embedded Protocols and Device Drivers	**100**	20	80
Seminar and case study	**100**	NA	100
Project Work	**100**	NA	100
Total	**800**	**130**	**670**

Grading Scheme

- ✓ Following Grading Scheme (on the basis of total marks) will be followed:

Grade	S	A	B	C	D	E	Fail
Marks Range (in %)	>90%	80%-89%	70%-79%	60%-69%	50%-59%	40-49%	**<40%**

- ✓ Final Grading as per above grading scheme will be given on the basis of total marks obtained in all modules. For last module (ED608) grade will be given on the basis of project demonstration.

NSQF Examination Pattern:

Theory **(Each Question will carry 1 mark)** **Duration (in Min): 90**		**Practical**			**Internal Assessment (Marks)**	**Project/ Presentation/ Assignment** **(Marks)**	**Major Project/ Dissertation**		**Total**
Papers	**No. of Questions/Paper**	**Papers**	**Duration (in Min)**	**Marks/Paper**			**No. Of Projects**	**Marks**	
3	100	2	180	90	60	60	1	100	700

Lab Infrastructure Details:

Hardware Facilities:

- ✓ Development Boards - STM32, ARM Cortex-M4, Arduino Uno, NodeMCU, MSP430, Beagle Bone Black, Raspberry Pi
- ✓ Shields – Ethernet, CAN, Wi-Fi, GSM/GPRS, GPS & Bluetooth Shield
- ✓ Sensors–PIR, Ultrasonic, LDR, Soil Moisture, Flame, Accelerometer & Gyro meter
- ✓ Camera Module, Sense Hat, Capacitive Touch Screen
- ✓ Wireless Sensor Network Radio and Related Modules with Integrated Antenna
- ✓ Aardvark I2C/SPI Host adapter, I2C/SPI development board, CAN Development board, Komodu CAN Duo Interface

Software Facilities:

- ✓ FreeRTOS
- ✓ OpenSTM, CubeMX
- ✓ Segger Timing Analysis Tool
- ✓ Code Composer Studio(CCS)
- ✓ Proteus VSM
- ✓ Arduino IDE
- ✓ Keil Software

Note:

To get the detailed syllabus of the course, use the following URL

PG diploma in embedded real time system.pdf