

COURSE PROSPECTUS

**Name of the Group:** *Embedded System Group*

**Name of the Course:** Certificate course Cyber Physical Systems

**Course Code:** CPS100

**Starting Date:** 25<sup>th</sup> February 2019

**Duration:** 4 Weeks

**Course Coordinator:** Rajesh M., +919447217649

**Preamble:**

*In India, the design aspect is still new but thanks to Government initiatives like the 'Make in India', the demand for hardware designers is growing dramatically.*

*Cyber-physical systems, which consist of physical systems tightly integrated and/or controlled by software, are ubiquitous in many safety critical domains, including automotive, avionics, railways, healthcare, atomic energy, power, and industrial automation. The principles of design and implementation of cyber-physical systems are remarkably different from that of other embedded systems because of the tight integration of real valued and dense time real time systems with software based discrete automated control.*

*To better compete in the global market, successful companies are finding that investments in hardware and software are no longer enough. Human elements with specialized engineering and design skills have become the essential part of equation.*

**Objective of the Course:**

*To mould fresh electronics engineers and to retrain working engineers into High Caliber professionals by enhancing their knowledge and skills in various hardware and software design aspects of Cyber Physical Systems . The objective of this course is to develop an exposition of the challenges in implementing a cyber-physical system from a computational perspective, but based equally on the principles of automated control. The course aims to expose the student to real world problems in this domain and provide a walk through the design and validation problems for such systems. This course is also an excellent preparation for those wishes to engage in application research in this rapidly developing area. Also the course offers the idea of how to develop products specific to Indian needs in the domains.*

## Outcome of the Course:

The objective of this course is to introduce students to cyber-physical systems modeling, analysis, and design. Students should be able to:

- Define embedded systems and cyber-physical systems (CPS) and give examples
- Understand various modeling formalisms for CPS, such as hybrid automata, state-space methods, etc.
- Understand CPS security and safety aspects
- Understand the basics of CPS implementation

**Course Structure:** *This course contains total three modules.*

<i>Code</i>	<i>Module Name</i>	<i>Weeks</i>
<i>CPS-101</i>	<i>CPS - Platform &amp; Automated Control Design</i>	<i>2</i>
<i>CPS-102</i>	<i>CPS - Implementation &amp; Safety Assurance Methods</i>	<i>1</i>
<i>CPS-103</i>	<i>CPS - Secure Deployment &amp; case studies</i>	<i>1</i>
	<i>Total</i>	<i>4</i>

## Other Contents

### a. Course Fees :

#### General Candidates:

Course fee is **Rs 15000** + GST at actual

**SC/ST Candidates:** Tuition Fees/Examination 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.

**Modular wise Course Fee:** Not Applicable for this course.

### b. Registration Fee: NA

### c. Course Fee Installment Structure: Not Applicable for this course.

Students should pay the full fees of **Rs 15000/- + \*GST 18%**

<b>Fees</b>	<b>*Amount for General Candidates</b>	<b>Amount for SC/ST Candidates</b>	<b>Due Date (on or before)</b>
Fee For Four weeks	<b>Rs 15000/- + *GST 18%</b>	<b>Rs 1000/-</b> (refundable after successful completion of course)	25/02/2019

\* Above fees is inclusive GST 18% and revision if any will be applicable at the time of payment.

d. **Eligibility:** *Knowledge in C Programming & Basic Electronics is a pre-requisite of this course*

i. *M.E./M.Tech (Passed out or final Year students) or B.E./B.Tech (Passed out or final Year students) in Electronics/ Electronics & Communication/ Electrical/ Electrical and Electronics/ Instrumentation/ Biomedical / Computer Science/Information Technology or MSc. (Passed out or final Year students) in Electronics/ Instrumentation/ Computer Science/Information Technology or Diploma in Electronics/CS/IT/EEE/EI or BSc in CS/Electronics or MCA*

ii. *Candidates who have appeared or studying in final Year in the qualifying examination and awaiting results may also apply.*

iii. *On the date of counseling/admission, the candidate must produce the original mark lists up to the last semester/year of examination.*

e. **Number of Seats : 20**

f. **How to Apply :**

Students are advised to apply online @<http://nielit.gov.in/content/online-registration>. Payment towards nonrefundable registration fee of Rs.1,000/- (not applicable for SC/ST students) may be paid through online payment gateway available in the Registration page or through any of the mode of payments specified in <http://nielit.gov.in/calicut/content/mode-payments-0>

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.

g. **Selection of candidates :** *The selection to the course shall be based on the following criteria:*

- i. *Selection of candidates will be based on their marks in the qualifying examination and subject to eligibility and availability of seats. Knowledge in C Programming & Basic Electronics is a pre-requisite of this course.*
- ii. *The First list of Provisionally Selected Students will be published in our website <http://nielit.gov.in/calicut/> on 20<sup>th</sup> February 2019.*
- iii. *All general candidates who appear in selection list may pay Rs. 15000+ \*GST 18% and SC/ST candidates may pay Rs. 1000 on counseling day ie, on 25<sup>th</sup> February 2019 by direct payment into our account from any bank where core banking facility is available.*

h. **Test/Interview :** NA

i. **Counseling/Admission :** *All candidates provisionally selected and paid the fees will have to be present personally for **counseling and admission on 25<sup>th</sup> February 2019** with all the necessary documents (originals and attested copies). Working days are from Monday to Friday. Admission timings are from 9.30 am to 4.00 pm. Those who don't bring the necessary documents (originals and attested copies) by 25<sup>th</sup> February 2019 are not eligible for admission and counseling.*

j. **Spot Admission:** *If spot admission is open, spot admission will close within 5 days of Counseling/Admission of a particular course. On spot admission students should provide an undertaking saying that he/she is fully aware that he/she missed so much days of class and will not ask for extra classes or further extension of course.*

k. **Admission Procedure :**

Students who have been selected for test/interview/counseling/admission are required to report to the Institute on the prescribed day by 9:30 hrs along with the following

- a. **Original and attested Copies of Proof of Age, Qualifications, etc**
- b. **One passport size photograph and one stamp size photograph for identity card.**
- c. **SC/ST Certificate (Original and two attested copies, if applicable)**
- d. **Govt. issued photo id card (Aadhaar mandatory for SC/ST candidates. Original and one copy)**

l. **Discontinuing the course:** *No fees (including the caution deposit) under any circumstances, shall be refunded in the event of a student discontinuing the course. No certificate shall be issued for the classes attended.*

A student can however, be eligible for module certificates (applicable only for courses which provide for modular admission) which he has successfully

completed provided, he/she has paid the entire course fees. This is not applicable to SC/ST candidates availing fee concession. SC/ST candidates availing fee concession are eligible for module certificates only after completing the full course with required attendance.

**m. 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 5.15 pm Monday to Friday. During project work, the timings are from 9.15 am to 5.15 pm. The theory to lab proportion is 30:70.*

**n. Location and how to reach :**

NIELIT Calicut is located very close to NIT campus and is about 22Kms from the Calicut (Kozhikode) city. A number of buses (Buses to NIT via Kunnamangalam) are available from "Palayam Bus Stand and KSRTC Bus Stand". The bus stop at our Institute is called "Panthrand" and is one stop before NIT. The bus fare is around Rs17/- from Calicut City to NIELIT.

Calicut (Kozhikode) is well connected by Rail, Road and Air from different parts of the country. The maximum and minimum temperatures range between 35°C and 20°C.

**o. 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.

**p. Important Dates (if applicable) :**

**25th February 2019 - Counseling , Commencement of classes**

**q. Placement :** *We have a placement cell, which provides placement assistance to students who qualify our courses. The course improves the knowledge and skill of the students as it deals with the latest technologies and tools used in industries. This helps the student in getting a placement by*

*a. Campus placement*

*b. Placement by companies for whom we send the students bio data and they conduct interviews at their site.*

*c. Students themselves attend interview at different companies and the course helps in the interview.*

**r. Hostel facilities :**

Hostel accommodation is available for boys and girls on monthly or daily chargeable basis. The hostel fee varies from Rs.1,400 /- to Rs.1,500/-- per month depending on the type of accommodation. However, students are

required to pay the hostel fees for the duration of the course for which they are seeking admission at the time of joining the course.

**s. Canteen facilities :**

Canteen & Mess facility is available for both boys & girls, students, those who avail mess facility should pay monthly mess fee 4000/- per month . An amount of Rs.1,000/- should be paid as mess advance to the Canteen Contractor at the time of joining the mess which will be adjusted in the last month mess fee.

An amount of Rs.3,000/- should be paid as caution deposit (hostel & mess) at the time of joining the hostel which will be refunded/adjusted at the end of the course.

**t. Lab Facilities**

*We have state-of-the-art lab facility in embedded systems which include,*

- *32-bit ARM Microcontroller Development Systems – ARM Cortex-M3/M4 STM32, ATMEL ARM9 EK & CIRRUS LOGIC EDB9315*
- *Friendly ARM, Raspberry PI, Intel Galileo and Arduino Boards*
- *8-bit & 16-bit Microcontroller Dev. Systems - Intel 8051, 80C196, MPLAB for PIC 16 & 18 series, Cygnal etc*
- *IoT application development tools - Contiki OS, mbedOS, GNS3, Cooja, Wireshark*
- *GSM/GPRS/GPS/Zigbee/Bluetooth/WiFi/sub1GHz Modems and Modules.*
- *VxWorks, RTLinux & ChibiOS/RT RTOS, FreeRTOS*
- *Wireless Network Simulators expertise in Glomosim, NS2, NS3, etc.*
- *SPI/I2C/CAN Protocol Analyzers*
- *Xilinx ISE FPGA Design Tools, Model Sim Simulator*
- *'C' compiler for 8051 (KEIL 'C' Development IDE), PIC (CCS), 80C196 (Tasking), ARM Developer Suite (ADS v1.)*
- *Matlab, Simulink, TI 'C6000 target for Matlab, LabView, Wireless LAN*
- *Universal DATA I/O programmer, PC Based EDA tools (ORCAD)*
- *Digital Storage & Mixed Signal Oscilloscopes (500, 350, 300, 100 MHz )*
- *EMI Test Setup, Logic Analyzer, SMD Rework station*

**u. Course Contents :**

Please click [here](#) to see the Course Syllabus