

Intel® Unnati

Data-Centric Labs in Emerging Technologies

Give Your Students the Intel Edge.

Today, there is a wide, and growing, skill gap between technical graduates and IT industry expectations. To propel India's digital economy transformation, it is imperative that the higher education system in the country bridges this gap by developing new curricula and offering courses in emerging technologies. The National Education Policy 2020[1] recognises this, and stresses the need for greater industry-academic linkages, and for higher education institutions to focus on research and innovation.

With the **Intel® Unnati Program**, you can keep pace with fast changing industry needs and expectations. It will help you:

Equip your students with industry relevant data-centric skills

In this age of data explosion, there is immense opportunity. Give your students the edge by equipping them with data-centric skills that will help them glean better insights and develop high-value solutions.

Unleash your students' creative potential

We, in India, have an incredible opportunity to unleash the creative potential of the largest student population in the world by training them in the right skills to drive India's digital transformation.

Build a strong reputation

With an Intel co-branded lab, you can be recognised as an institute that is committed to train your students in the latest technology to prepare them for industry, and focus on faculty development.

Build capability for the long term

Establish your leadership and maintain it with the help of our System Integrator partners, who will get you Intel's recommendations for end-to-end Technology Labs set up, course content, and the training to go with it.

Leverage our System Integrator Partner Network

Be it training, customisations of your lab set up, or maintenance and support requests, you can rely on our strong System Integrator Partner Network for all your needs.

[1]Ministry of Human Resource Development, Government of India, National Education Policy 2020, https://static.pib.gov.in/WriteReadData/userfiles/NEP_Final_English_0.pdf

Intel® Unnati
FPGA Solutions

Student or researcher – we've got them covered!

A student or researcher can gain knowledge on creating complex FPGA designs as a hardware engineer, writing software for an embedded processor, modeling and implementing deep learning algorithms, and managing large amounts of data for high-speed communication.

Coursework that builds FPGA expertise

Quickly build practical expertise with hands on labs using our FPGA courses focused on Digital Design, Computer Organisation, Embedded Systems, AI and FPGA Acceleration, High Speed Communication and Data Acquisition.

Remote access

Remote access infrastructure available for FPGA boards with documentation for easy setup.

FPGA acceleration from edge to cloud

Students learn how to combine Intel FPGA hardware and software to efficiently accelerate workloads for processor intensive tasks.

Showcase new skills

Students are awarded an Intel co-branded certificate at the completion of their course.

Industry leading design software

With industry leading Intel® Quartus® Prime Design Software and Intel® oneAPI Toolkits, get optimised performance from your Intel hardware.

Custom lab deployments

Our System Integrator partners will assist you for customisations to your lab setup and training content to suit your needs.



FPGAs: Innovation for the Data Era

Field Programmable Gate Arrays (FPGAs) provide benefits to designers of many types of electronic equipment, ranging from smart energy grids, aircraft navigation, automotive driver's assist-ance, medical ultra-sounds, data centre search engines —just to name a few.

Benefits of FPGAs

Flexibility: FPGA functionality can change upon every power-up of the device. When a design engineer wants to make a change, he or she can simply download a new configuration file into the device and try out the change.

Acceleration: Get products to market quicker and/or increase your system performance. FPGAs provide off-load and acceleration functions to CPUs, effectively speeding up the entire system performance.

Integration: Today's FPGAs include on-die processors, transceiver I/Os at 116 Gbps (or faster), RAM blocks, DSP engines, and more. More functions within the FPGA mean fewer devices on the circuit board, increasing reliability by reducing the number of device failures.

Total Cost of Ownership (TCO): While ASICs may cost less per unit than an equivalent FPGA, building them requires a non-recurring expense (NRE), expensive software tools, specialised design teams, and long manufacturing cycles. Intel FPGAs support long lifecycles (15 years or more), avoiding the cost of redesigning and requalifying OEM production equipment if one of the electronic devices on-board goes end of life (EOL).

https://www.intel.com/content/www/us/en/products/programmable/fpga/new-to-fpgas/resource-center/overview.html

Digital Logic and Embedded Systems Lab

For institutions training students on digital logic concepts, RTL coding in Verilog or VHDL and ARM based application processor running embedded Linux in conjunction with an FPGA



FPGA Courses

1) Digital Logic
2) Computer Organisation
3) Embedded Systems

Minimum Suggested Specifications for 30 Users

Server/Workstations

- 15 (minimum 10) x Intel® Core™ i3 processor based PCs with at least 4 GB RAM

Boards

- 10 x DE10-Lite*
- 2 x DE10-Nano*
- 2 x DE1-SoC*
- 1 x DE10-Standard*

Software

- Intel® Quartus® Lite with FPGA libraries supported along with ModelSim* FPGA Starter edition and Intel® SoC Embedded Development Suite (SoC EDS) standard edition and Intel® HLS Compiler

Project Development Kits

for semester long capstones and senior designs

- **Self Balancing Robot:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=238&No=1096*
- **Servo Motor Kit:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=238&No=1028*
- **A-Cute Car Robotic Kit:** *https://www.terasic.com.tw/cgibin/page/archive.pl?Language=English&CategoryNo=238&No=1018&PartNo=1*
- **Terasic Spider:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=238&No=994&PartNo=6*
- **Multi Touch LCD Module:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&No=653*

FPGA Acceleration and Artificial Intelligence Lab

For institutions training students on Visual Inferencing using CPUs, GPUs, FPGAs and other specialised video processing hardware, High Level Synthesis and Parallel Programming



FPGA Courses

1) Artificial Intelligence
2) OpenVINO™
3) DPC++ and Targeting FPGAs with Intel® oneAPI
4) Acceleration Stack for Intel® Xeon® processor based CPU with FPGAs

Minimum Suggested Specifications for 30 Users

Server/Workstations

- **Tools/License Server:** Intel® Core™ i7/i9 or Intel® Xeon processor, 64 GB RAM, 500 GB SATA HDD running Linux OS, 24" Monitor, Keyboard and Mouse
  Optional: Graphics Card
- **1 x Qualified Server for housing the Intel® Programmable Acceleration Card (PAC):** Refer to *Qualified Servers* list below
- 15 (minimum 10) x Intel® Core™ i3 processor based PCs with at least 4 GB RAM for server-based license access

Acceleration Cards

- 2 x Intel® Arria® 10 FPGA PAC
  or
- 1 x Intel® Arria® 10 FPGA PAC and 1 x Intel® Stratix® 10 FPGA PAC (D5005)

Software

- Intel® Quartus® Standard Design Software and Intel® SDK for OpenCL™ is included
- Intel® Distribution of OpenVINO™ Toolkit
- Intel® oneAPI Base Toolkit
- Intel® FPGA Add-on for oneAPI Base Toolkit
- Intel® Acceleration Stack (supports OpenCL™, DPC++, RTL based descriptions)

Project Development Kits

for semester long capstones and senior designs

- **Intel® Arria® HAN Pilot:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=228&No=1133*
- **Intel® Arria® Flik:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=228&No=1237*

Users can also try out the oneAPI or FPGA DevCloud for a limited period of time:

- **Intel® DevCloud for the Edge:** *https://devcloud.intel.com/edge/home*
- **Intel® DevCloud for oneAPI:** *https://devcloud.intel.com/oneapi*
- **FPGA DevCloud:** *https://software.intel.com/content/www/us/en/develop/tools/devcloud/fpga.html*

Qualified Servers for Intel® FPGA PAC:

- **With Intel® Arria® 10 GX:** *https://www.intel.com/content/www/us/en/programmable/products/boards_and_kits/dev-kits/altera/acceleration-card-arria-10-gx/buy.html*
- **D5005:** *https://www.intel.com/content/www/us/en/programmable/products/boards_and_kits/dev-kits/altera/intel-fpga-pac-d5005/buy.html*

Communications and High Speed Data Acquisition Lab

For institutions training students on high-speed communication and applications requiring the capture and transportation of large amounts of data



FPGA Courses

1) High Speed Data Acquisition
2) Electronic Warfare (EW), Radar and Secure Communication

Minimum Suggested Specifications for 30 Users

Server/Workstations

- **Tools/License Server:** Intel® Core™ i7/i9 or Intel® Xeon processor, 64 GB RAM, 500 GB SATA HDD running Linux OS, 24" Monitor, Keyboard and Mouse
  Optional: Graphics Card

Boards and Cards

- 1 x Intel® Arria® 10 GX with ADI* AD9371*
- 1 x Intel® Stratix® 10 GX with ADI* AD9174*

Select board based on required peripherals and connectors.

Software

- Intel® Quartus® Standard Design Software is included along with the development board

Project Development Kits

for semester long capstones and senior designs

- **RFS:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=225&No=1025*
- **ADC-FMC:** *https://www.terasic.com.tw/cgi-bin/page/archive.pl?Language=English&CategoryNo=73&No=1193&PartNo=2#section*

Design Examples

- JESD204B Intel® Arria® 10 FPGA IP Design
- JESD204B Intel® Stratix® 10 FPGA IP Design



To know more about how your institution can benefit from the Intel® Unnati Program, please contact:

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