Tender for

Supply, Installation & Commissioning of lab equipment/items/software/tools for setup of (i) Embedded System & IoT Lab (ii) AI & Machine Learning, AR/VR Lab (iii) Network Security & Cyber Forensic Lab and (iv) Nanotechnology Lab at NIELIT Imphal

Ref. NIELIT(i)/Admn/CCAS/2832019 Date: 31.12.2019

On behalf of the Executive Director, NIELIT Imphal, BIDs are invited in two bid system (Technical and Financial) from the reputed and well experienced firms for supply, installation and commissioning of lab equipment/items/software/tools to setup of the following labs at NIELIT Imphal.

(i) Embedded System & IoT Lab
(ii) AI & Machine Learning, AR/VR Lab Lab
(iii) Network Security & Cyber Forensic Lab
(iv) Nanotechnology Lab

The concerns fulfilling the requirements as specified under eligibility conditions of this document shall be eligible to apply. Information about the BID, Schedule of Events of the Tender along with Eligibility Conditions, Terms & Conditions and Specification of the works/items are outlined in the Annexures to this tender as under.

a) Annexure-I : About the BID
b) Annexure-II : Schedule of Events
c) Annexure-III : Eligibility and Terms & Conditions
d) Annexure-IV : Specification of the items
e) Annexure-V : Details about Technical bid
f) Annexure-VI : Details about Financial Bid
g) Annexure-VII : Evaluation of Bids

2. The scope of the work includes Supply, installation and commissioning of lab equipment/items/software/tools. List of equipment, tools, items & software along with detailed specification/aspect are indicated at **Annexure-IV** for ready reference.

3. Firms shall have to quote complete items for at least one lab in the financial bid. The quoted rate shall include supply, installation and commissioning of equipment, tools, items & software at NIELIT Imphal, Akampat. If any firm does not quote the complete equipment, tools, items & software for a particular Lab, the bid shall not be entertained & rejected.

4. A pre-bid meeting shall be conducted on 10th January, 2020 at 1:30 pm at NIELIT Imphal

5. Tender Fee of the RFP is **Rs. 4,000/-** (Rupees four thousand) only. Tender document can be collected from NIELIT Imphal or may be downloaded from NIELIT Imphal website *https://nielit.gov.in/imphal*. The tender document shall be submitted along with proof of payment of tender fee of **Rs. 4,000/-** to NIELIT Imphal.

(**L. Shyam Sundar Singh**)
Scientist-D/In-charge (Admin & Finance)

Copy to:-

(i) PS to Executive Director for kind information of Executive Director
(ii) P. L. Rongmei, Senior Technical Officer for necessary actions.
(iii) AD (Admin) for publication in local Newspaper.

ANNEXURE-I

About the BID

NIELIT Imphal is one of the Centre of National Institute of Electronics & Information Technology (NIELIT), a scientific society of Ministry of Electronics & Information Technology (MeitY), Govt. of India. The Institute urgently requires to setup the following labs at its newly constructed Academic Building for training purpose:

Sl.	Name of the Lab
1.	Embedded System & IoT Lab
2.	AI & Machine Learning, AR/VR Lab
3.	Network Security & Cyber Forensic Lab
4.	Nanotechnology Lab

NIELIT Imphal invites to the reputed firms/vendors who have past experience in the relevant field to submit bids for supply of equipment, tools, items & software of the above mentioned four labs at the Institute.

Authorised representative(s) of the interested firms/vendors shall visit NIELIT Imphal to attend the pre-bid meeting to be held on 10.01.2020. The firm/vendor shall submit detailed specification/aspect of the equipment, tools, items & software which has to be submitted as a part of Technical bid. There is weightage of the Technical Bid and Financial Bid which is mentioned at the Annexure-VII. Following are the important information about the BID:

Particulars	Details
Nature of the Work	Supply, Installation & commissioning of lab equipment, tools, items & software in NIELIT Imphal
Details of Contact Person for clarifications/queries etc.	Shri. P. L. Rongmei, Senior Technical Officer, NIELIT Imphal. Mobile No. 9856160789
Mode of Tendering	Open Tender in Two bid System
No. of Covers	02 – Technical Bid & Financial Bid
Conservative Estimated Tender Value	Mentioned at Annexure-IV
Earnest Money Deposit (EMD) (refundable)	(i) ₹ 40,000/- for Embedded System & IoT Lab (ii) ₹ 60,000/- for AI & Machine Learning. AR/VR Lab (iii) ₹ 10,000/- for Network Security & Cyber Forensic Lab (iv) ₹ 30,000/- for Nanotechnology Lab EMD shall be paid through National Electronic Fund Transfer (NEFT) or e-transfer in favour of **NIELIT Imphal** payable at State Bank of India, Manipur University branch A/C no: 10678276043, IFSC Code SBIN0005320
Tender Fee (non-refundable)	₹ 4000/- to be paid through National Electronic Fund Transfer (NEFT) or e-transfer in favour of **NIELIT Imphal** payable at State Bank of India, Manipur University branch; A/C no: 10678276043, IFSC Code SBIN0005320
Website for downloading Tender Document, Corrigendum, Addendums	http://nielit.gov.in/Imphal
Address where the Tender Documents are to be submitted	NIELIT Imphal, Akampat Imphal-795001, Manipur
Venue for opening of Technical bid	NIELIT Imphal, Akampat-795001, Manipur

ANNEXURE-II

Schedule of Events

Event	Date & Time
Date and time of Publishing of this tender	31st December, 2019 at 5:00 pm.
Date, Time and Venue of Pre-Bid Meeting	10th January, 2020 at 1.30pm at Conference Hall, NIELIT Imphal
Bid Submission Start Date & Time	13th January, 2020 at 9:00 am
Bid Submission Closing Date & Time	27th January, 2020 at 5:30 pm
Date & Time of Technical Bid Opening	28th January, 2020 at 10:30 am
Date, Time and Venue of opening of Financial bids	29th January, 2020 at 10:30 am
Bid Validity	60 Days from the closing date of bid submission

ANNEXURE-III

Eligibility and Terms & Conditions

1. ELIGIBILITY:

1.1 The firm/vendor should have the experience in the relevant field in the past three years in any of the Departments /Autonomous Institutions /Universities /Public Sector Undertakings of the Government of India or Government of Manipur or any other State Government or Public Sector Banks or Local Bodies/Municipalities. **Proof to this effect to be attached with Technical Bid.** The bidder should furnish the details of past experience in the format given at **Appendix-5.**

1.2 The Registered Office or one of the Branch Office along with servicing Centre of the Firm should be located in any major city of the Country. If the firm/vendor who does not have the Office located in India, their bids shall not be entertained.

1.3 The firm/vendor shall not been black listed by any of the Departments /Organizations of the Government of India/Government of Manipur and no criminal case is pending against. The firm/vendor should submit an undertaking with the Technical Bid to the effect that (Prescribe Performa as per **Appendix-2**).

The firm/vendor should submit an undertaking with the Technical Bid to the effect that Terms and Conditions of the Tender are duly accepted/signed with the stamp of the prospective bidder.

1.4 The firm/vendor shall have valid Certificate of Registration No., PAN and GST Registration No. The firm/vendor must furnish details of Certificate of Registration No., PAN No., GST Registration No. etc.

1.5 The firm/vendor should have an average turnover of Rs. 100.00 lakh or more during the last three financial years 2016-17, 2017-18 & 2018-19. The firm/vendor must submit self-attested photocopies of Balance Sheet/CA's certificate as proof of the turnover along with copy of Audited/ self-attested Accounts as a proof of its Turnover.

1.6 Proof of payment of Tender Fee of Rs. 4,000/- (Rupees four thousand only) and Earnest Money Deposit (EMD) as per Annexure-I shall be submitted with the Technical Bid. Without Tender Fee & EMDs, the bid shall not be entertained & rejected.

1.7 The Firms/vendors are required to submit self-attested copies of the following documents along with the Technical Bid, failing which their Bids shall be summarily/outrightly rejected and will not be further considered:

a) Proof of payment of Tender Fee
b) Proof of payment of Earnest Money Deposit (EMD)
c) PAN, GST Registration, Firm/vendor Registration certificate.
d) Profit & Loss Account for the last 3 financial years i.e. 2016-17, 2017-18 and 2018-19.
e) Proof of Work experience of similar work during the last 3 years.
f) Undertaking that his/her firm/vendor is not blacklisted by any Govt. Departments/organization.

2. TERMS & CONDITIONS:

2.1 The rates quoted should be in Indian Rupees only. In case of any difference/ discrepancy between the rates quoted in figures and words, the later shall prevail.

2.2 The bid should be valid for a minimum period of 60 days after the closing date for submission.

2.3 Conditional bids shall not be considered and will be rejected out-rightly at the first instance.

2.4 The bidder shall quote the technical and financial bids only as per the guidelines/format mentioned at **Annexure-V & Annexure-VI.**

2.5 The **EMD** of unsuccessful firm(s)/vendor(s) shall be refunded.

2.6 The EMD of successful firm(s) shall be converted into Performance Security Deposit, and shall be returned after successful completion of contract.

2.7 The contracting Firm shall not be allowed to transfer, assign, pledge or sub-contract its rights and liabilities under this contract to any other Company/Firm/Agency without the prior written consent of this NIELIT.

2.8 The contracting Firm will be bound by the details furnished by him/her to the NIELIT, while submitting the tender or at subsequent stage. In case, any of such documents furnished by him/her is found to be false at any stage, it would be deemed to be a breach of terms of contract making him/her liable for legal action besides termination of contract.

2.9 Financial bids of only those Firms who are technically qualified shall be evaluated.

2.10 NIELIT, Imphal reserves the right to terminate the contract during initial period after giving a week's notice to the Firm.

2.11 The firm/vendor should be available on his own direct telephone (office as well as residence) and also on the mobile phone(s) so that he may be contacted immediately in emergency cases. The Mobile Number may also be provided.

2.12 Before award of contract, all original documents will be checked by the NIELIT and at that time attested photo-copies are required to be furnished.

2.13 The NIELIT Imphal shall not be responsible for any financial loss or other injury to any person deployed by the contracting firm in the course of their performing the duties to the NIELIT Imphal in connection with the contract.

2.14 In the event of failure to accept the offer of contract or failure of submission of acceptance letter the Earnest Money deposit submitted by the bidding firm shall be forfeited.

2.15 In case of breach of Contract by the vendor, NIELIT Imphal shall have the authority to cancel/terminate the Contract besides forfeiting the EMD/Security Deposits.

2.16 It may specifically be mentioned whether quotation is strictly as per tender specification/conditions. If not, deviation must be spelt out specifically in Technical Bid.

2.17 NIELIT reserves the right to accept or reject any bid or cancel the tender proceeding without assigning any reason whatsoever. Further, NIELIT reserves the right to purchase or not to purchase any item from the list submitted by the firm/party.

2.18 All disputes arising out of this contract shall be settled amicably by NIELIT Imphal and the contractor. In the event of failure to reach amicable settlement, the same shall be settled by an Arbitrator appointed as per the provisions of Arbitration and Conciliations Act, 1956. The decision of the Arbitrator shall be final and binding.

2.19 The firm/vendor selected will be required to execute the work on very short notice and shall be completed within one month time.

2.20 The items should be genuine and of standard make. In case it is found that the items are duplicate/fictitious, it would be open to the NIELIT Imphal to terminate the Agreement, forfeit the EMD/Performance Security and black list the firm.

2.21 NIELIT, IMPHAL reserves the right to issue any addendum/corrigendum to this bid document at any time prior to 2 days before the last date for submission of bids. The NIELIT, Imphal may amend any of the bid terms, and as addendum/ corrigendum to bid document in the NIELIT Imphal website. The amendment so carried out will be binding on all the bidders. It will be assumed that addendum/corrigendum have been taken into consideration by the bidders in their offers after intimation, amendments shall be deemed to form an integral part of this tender document.

ANNEXURE-IV

Specification of the work

Following is the outline specification of the work to be executed:

Sl.	*Particulars*	*Qty.*	*Remarks*
A)	**Embedded System and IoT Lab:**		**Below Rs. 23 lakhs**
1	FPGA Board	5	**Detailed Specification/ aspect attached at Appendix-6**
2	Proteus EDA (Platinum)	5	
3	Universal Programmer	2	
4	ARM Cortex Microcontroller Development Board	5	
5	Arm mbed Development Board	5	
6	ProtoMat S63 PCB Millling Machine	1	
7	Microsoft IoT Grove Kit	5	
8	Dragino LoRa IoT Development Kit	5	
9	Azure IoT starter Kit	5	
10	ESP8266 Board(NodeMCU)	10	
11	Sensors(Various) and Accessories	10 Sets	
12	Raspberry Pi Hats and Accessories	5 sets	
B)	**Network Security & Cyber Forensic Lab:**		Below Rs. 30 lakhs
1	Duplicating Hardware Machine - HDD Cloner (Tableau Touches/Falcon)	2	1(Tableau Touches)+1(Falcon)
2	Mobile Phone Forensic Tool Kit (UFED Touch for PC)	1	Upgrade from UFED Physical Pro
3	Write Protected Kits for SATA, PATA & USB (Logicube /Tableau)	3	1(SATA) +1(PATA) + 1(USB)
4	Acquiring, Analysis and reporting software (FTK)		
5	AMPED Five(Forensic Video analysis Software Tool)	1	
6	MAGNET IEF(Digital Evidence Software Tool)	1	
C)	**Artificial Intelligence ,Machine Learning Lab & VR/AR:**		**Below Rs. 6.00 lakhs**
1	MATLAB	5	
2	Simulink	5	
3	Statistics and Machine Learning Toolbox	5	
4	Deep Learning Tool Box(Formerly Neural Network Toolbox)	5	
5	Image Processing Toolbox	5	
6	Computer Vision System Toolbox	5	
7	Image Acquisition Toolbox	5	
8	AR/VR Development Tools	5	
D)	**Nanotechnology Lab:**		**Below Rs. 15 lakhs**
1	Virtual Nano Lab (VNL) with Quantum ATK(Atomistix ToolKit)	5	Perpetual Floating license
2	VisualTCAD	10	Perpetual Floating license

ANNEXURE-V

Details about Technical bid

1. Technical bid should be submitted in the prescribed format given at **Appendix-1** (duly filled in) along with the following:
    - i) Name of the lab(s) for which the Bidder is participating.
    - ii) Complete list of the equipment/items/software/tools along with specification, model and brand etc. of the lab (s).
    - iii) Warranty of the equipment/items/software/tools.
    - iv) Other Necessary enclosures and other supporting documents
    - v) Declaration (as per format enclosed as **Appendix-2**)
    - vi) Undertaking (as per format enclosed as **Appendix-3**)
    - vii) Acceptance Letter (as per format enclosed as **Appendix-4**)
    - viii) Past experience details (as per format enclosed as **Appendix-5**)

2. All the necessary supporting documents mentioned in "Eligibility" and also mentioned in "Terms and Conditions".
3. All the Technical Bid documents and enclosures should be signed by the authorized person of the bidder.

Sd/-
(**L. Shyam Sundar Singh**)
Scientist-D/In-charge (Admin & Finance)

ANNEXURE-VI

Details about Financial bid

1. Financial Bid shall be submitted for the following items
    i) Item-wise cost for supply.
    ii) Installation & Commissioning cost of items/equipment.
    iii) Annual Maintenance Contract (AMC) cost if applicable.
    iv) Taxes, Transportations and any other cost.
    v) Overall Cost.
2. All prices quoted in Financial Bid should be inclusive of all taxes, Transit Insurance loading/unloading, installation charges etc.
3. The cost incurred towards bidding and submission of tender documents is the responsibility of bidders, regardless of the conduct or outcome of the tendering process.
4. Commercial bid will be evaluated only for those bidders who qualify technically on the date & time specified in the bid schedule.

Sd/-
(L. Shyam Sundar Singh)
Scientist-D/In-charge (Admin & Finance)

ANNEXURE-VII

Evaluation of bid

Bidders are informed to note the following regarding evaluation of bids. Since the nature of the proposed work is technical, there shall be weightage of Technical bid as well as financial bid. The evaluation of bids shall be as given below:

Total Score of the bidder = [w(T) x s(T)] + [w(F) x s(F)]

where,

w(T) = Weightage of Technical Score (i.e. 60%)
w(F) = Weightage of Financial Score (i.e. 40%)
s(T) = Sore of Technical Bid
s(F) = Score of Financial Bid

Calculation of Technical Score, s(T) shall be based on the following:

Sl.	Heading	Description	Criteria of score allotment	Maximum Allotted Score
1	Technical Specification & Aspects	Technical Specification/Aspect, future aspects etc.	Matching Specification/Aspect as per requirement = 1 to 10	10
			Future Aspects, Compatibility etc. = 1 to 10	10
2	Experience in the field	Years of experience	a) 3 to 5 years = 3 b) More than 5 years = 5	5
		Having past work experience in the Govt. Organizations/Autonomous Bodies/Undertakings/Public Sectors	a) Yes = 5 b) No = 0	5
		No. of similar works/services executed	a) Upto 03 = 5 b) 4 to 10 = 8 c) More than 10 = 10	10
3	Maintenance, Support & future upgradation schemes	-	0 to 20	20

Calculation of Financial Score, s(F) shall be based on the following:

Financial Score = (Lowest financial quote / firm's/vender's financial quote) x 100

Sd/-
(L. Shyam Sundar Singh)
Scientist-D/In-charge (Admin & Finance)

APPENDIX-1

Tender for

Supply, Installation & Commissioning of lab equipment/items/software/tools for setup of (i) Embedded System & IoT Lab (ii) AI & Machine Learning, AR/VR Lab (iii) Network Security & Cyber Forensic Lab and (iv) Nanotechnology Lab at NIELIT Imphal

TECHNICAL BID (Part-I)

1	Name of the Bidder	
2	Full Address of the Bidder	
3	Telephone No.	
4	Mobile no. Whatsapp No.	
5	E-Mail	
6	Firm/Vendor's registration details:	
7	PAN No.	
8	GST No.	
9	Average Annual Turn Over for the last 03 financial years i.e. 2016-17, 2017-18, 2018-19	
10	Details of past Experience in the field	
11	Details the Registered Office or one of the Branch Office of the Firm located at Imphal including name, address, contact number, etc.	
12	Details of pending legal disputes(if any)	
13	Details of Tender Fee (Rs. 4000) paid for this tender.	
14	Details of Earnest Money Deposit (EMD)	
15	Name and telephone number of the contact person (*on behalf of the bidder*)	
16	Date of site visit/inspection for preparation of the detailed design and by whom	
17	Whether detailed design along with list of the items/equipment/works enclosed?	YES or No

TECHNICAL BID (Part-II)

1. Name of the Lab: _____

Detail Specification of the Items/Equipment/Work for which the bidder is quoted in the financial bid of this Tender				
Sl.	Name of the Equipment/items /software/tools	Detailed Specification/Aspects	Brand & Model	Remark (if any)
1				
2				
3				
4				
5				

2. Name of the Lab: _____

Detail Specification of the Items/Equipment/Work for which the bidder is quoted in the financial bid of this Tender				
Sl.	Name of the Equipment/items /software/tools	Detailed Specification/Aspects	Brand & Model	Remark (if any)
1				
2				
3				
4				
5				

TECHNICAL BID (Part-III)

List and Page no. of the documents enclosed

Sl	Item/Document	Page No.

APPENDIX-2

(To be printed on the bidder's letter head)

DECLARATION

I/We undertake that I/We have carefully studied all terms and conditions of the contract as indicated in Annexure-III and shall abide by them. I/We also understood the parameters of the proposed scope of work and shall abide by them also.

I/We hereby certify that information furnished above is true and correct to the best of my/our knowledge. I/We understand that if any deviation is found in above statement at any stage; I/We shall be blacklisted and will not have any dealing with the organization in future.

I hereby confirm that I am authorized to sign the Tender Document.

Date _____

Place _____

Signature _____

Name _____

Designation: _____

Office Stamp/Seal

APPENDIX-3

(To be printed on the bidder's letter head)

UNDERTAKING BY THE BIDDER

1. I/We undertake that my/our firm M/s. …… …….. has **not been blacklisted** by any Govt. Department/Public Sector /Undertaking/ Autonomous Body.

2. I……Son/Daughter/Wife of Shri …… Proprietor/Partner/Director/authorized signatory of M/S…….…... am competent to sign this declaration and execute this tender document.

3. I have carefully read and understood all the terms and conditions of the tender and undertake to abide by them:

4. The information/documents furnished along with the above application are true and correct to the best of my knowledge and belief. I/We, am/are well aware of the fact that furnishing of any false information /fabricated document would lead to rejection of my tender at any stage besides liabilities towards prosecution under appropriate law;

5. I understand that in case any deviation is found in the above statement at any stage, my concern/firm/co. shall be blacklisted and shall not have any dealing with the Department in future.

Date: _____
Place:_____

Signature of the authorized Signatory of the firm/Company/Organization (Bidder)

Office Stamp/Seal

APPENDIX-4

(To be printed on the bidder's letter head)

TENDER ACCEPTANCE LETTER

Date: _____

To,

The Executive Director
NIELIT Imphal
Akampat, Imphal

Sub: **Acceptance of Terms & Conditions of Tender.**

Tender Reference No:_____

Name of Tender/Work:- _____

Dear Sir.

1. I/We have downloaded/obtained the tender document(s) for the above mentioned, Tender Work from the web site, namely: _____ as per your advertisement, given in the above mentioned website.
2. I/We hereby certify that I/We have read the entire terms and conditions of the tender documents (including all documents like annexures, Appendix etc.,) which form part of contract agreement and I/We shall abide hereby by the terms/conditions/clauses contained therein.
3. The corrigendum(s) issued from time to time by your department/organization too have also be taken into consideration, while submitting this acceptance letter.
4. I/We hereby unconditionally accept the tender conditions of above mentioned tender document(s)/corrigendum(s) in its totality/entirety.
5. I/We do hereby declare that our Firm has not been blacklisted /debarred by any Govt. Department/Public sector undertaking.
6. I/We certify that all information furnished by our firm is true & correct and in the event that the information is found to be incorrect/untrue or found violated, then your department/organization shall summarily reject the bid or terminate the contract, without prejudice to any other rights or remedy including the forfeiture of the full said earnest money deposit absolutely.

Yours faithfully,

Signature of the authorized Signatory of the

firm/Company/Organization(Bidder)

(Office Stamp/Seal)

APPENDIX-5

(To be printed on the bidder's letter head)

Details of past experience in the similar field

Name of the Bidder:

Year	Name & type of work/service	Name & address of the customer	Value of Work/Service provided	Remarks

Specification/Aspect for items listed for Embedded System and IoT Lab

1. FPGA Board and Extension Boards

(i). FPGA Board Nexys A7

- Xilinx Artix-7 FPGA XC7A100T-1CSG324C or XC7A50T-1CSG324C
- 15,850 logic slices, each with four 6-input LUTs and 8 flip-flops (8,150 logic slices
- for the A7-50T)
- USB-JTAG port for FPGA programming and communication
- PWM audio output,user LEDs, switches

(ii). FPGA Basys 3 Artix-7

- Xilinx Artix-7 FPGA: XC7A35T-1CPG236C
- On-chip analog-to-digital converter (XADC)
- Digilent USB-JTAG port for FPGA programming and communication
- 90 DSP slices
- 12-bit VGA output
- USB HID Host for mice, keyboards and memory sticks
- 16 user switches,16 user LEDs,5 user pushbuttons ,4-digit 7-segment display

(iii). FPGA PYNQ-Z1

- ZYNQ XC7Z020-1CLG400C:
- 650MHz dual-core Cortex-A9 processor
- DDR3 memory controller with 8 DMA channels and 4 high performance AXI3 slave ports
- High-bandwidth peripheral controllers: 1G Ethernet, USB 2.0, SDIO
- SPI, UART, CAN, I2C
- Programmable from JTAG, Quad-SPI flash, and microSD card
- 220 DSP slices
- On-chip analog-to-digital converter (XADC)
- 512MB DDR3 with 16-bit bus @ 1050Mbps
- Gigabit Ethernet PHY
- Electret microphone with pulse density modulated (PDM) output
- 3.5mm mono audio output jack, pulse-width modulated (PWM) format
- HDMI sink port (input)
- HDMI source port (output)
- Switches, push-buttons, and LEDs

(iv). Arty A7

- Arty A7-35T/Arty A7-100T
- XC7A35TICSG324-1L/XC7A100TCSG324-1
- Xilinx Artix-7 FPGA
- On-chip ADC
- Programmable over JTAG and Quad-SPI Flash
- 256MB DDR3L with a 16-bit bus @ 667MHz
- 10/100 Mbps Ethernet
- Arduino/chipKIT Shield connector

(v). Cmod S7

- Xilinx Spartan-7 FPGA (XC7S25-1CSGA225C)
- 80 DSP slices
- On-chip analog-to-digital converter (XADC)
- Programmable over JTAG and Quad-SPI Flash
- 4 MB Quad-SPI Flash
- USB-JTAG programming circuitry
- Push-buttons and LEDs,2 Buttons,4 LEDs,1 RGB LED

(vi). Embedded Vision Bundle

- Zybo Z7-20 Zynq-7000 ARM/FPGA SoC Development Board
- 5 MP Fixed Focus Color Camera Module
- Zybo Z7: Zynq-7000 ARM/FPGA SoC Development Board
- Zybo Z7-10 Zybo Z7-20
- XC7Z010-1CLG400C XC7Z020-1CLG400C
- On-chip ADC
- RGB LEDs
- ZYNQ Processor
- 667 MHz dual-core Cortex-A9 processor
- 1G Ethernet, USB 2.0, SDIO
- SPI, UART, CAN, I2C
- Programmable from JTAG, Quad-SPI flash, and microSD card
- Programmable logic equivalent to Artix-7 FPGA
- microSD slot
- Pcam camera connector with MIPI CSI-2 support
- HDMI
- Audio codec with stereo headphone, stereo line-in, and microphone jacks
- Switches, Push-buttons, and LEDs, slide switches, RGB LED
- 4 Analog capable 0-1.0V differential pairs to XADC

(vii). Zybo Z7 Academic Pmod Pack

Video Graphics Array, 4 user slide switches, Eight high-brightness LEDs, Seven-segment display, Audio amplifier

(viii). Arty S7 Pmod Pack

Video Graphics Array, MEMS Microphone with Adjustable Gain, Audio Amplifier, Digital Humidity and Temperature Sensor, Slide Switches

(ix). Nexys Video Pmod Pack

Two-axis Joystick,16-button Keypad,Ultrasonic Range Finder,12-pin Test Point Header, WiFi: WiFi Interface 802.11g

(x). Cora Z7: Zynq-7000 Single Core and Dual Core Options for ARM/FPGA SoC Development

- Cortex-A9 processor with tightly integrated Xilinx FPGA (option between Dual Core and Single Core options)
- 512 MB DDR3 memory
- Arduino shield and Pmod connectors for add-on hardware devices

- USB and Ethernet connectivity
- Large array of general purpose input/output ports for any number of different custom solutions
- Programmable from JTAG and microSD card

(xi). JTAG-SMT3-NC: Surface-mount Programming Module

- JTAG programming/debugging solution for Xilinx FPGAs with UART side channel
- Compatible with Xilinx Tools
- High-Speed USB 2.0 port
- Open drain buffer on PS_SRST_B
- Dual channel USB controller provides simultaneous access to both JTAG and UART interfaces

(xii). Pmod ESP32: Wireless Communication Module

Wi-Fi, Bluetooth LE, and Bluetooth
12-pin Pmod connector with SPI and UART interfaces

(xiii). Pmod BLE: Bluetooth Low Energy Interface

Bluetooth® Smart 4.2 BLE compatible

(xiv). LCD

Character LCD with Parallel Interface, Character LCD with Serial Interface

2. Proteus Design Suite 8.9

- Proteus Virtual System Modelling (VSM**)**
- VSM for Microchip, ARM, Atmel, Arduino,
- IoT Builder for Arduino™ AVR and Raspberry Pi
- Proteus VSM USB simulation
- Proteus PCB design
- Proteus Visual Designer

3. Universal Programmer

- Memory: serial and parallel, NOR and NAND Flash memory devices, PROM, EPROM, EEPROM
- Microcontrollers with Flash and OTP memory, including the ARM7, ARM9, Cortex, 8051, PIC, AVR, MSP430, Z8, 9S08 and 9S12 architectures
- In-system programmable microcontrollers and Flash memory devicespackages with up to 40 pins
- adapters for operations with devices in PLCC, SOIC,TSOP, MSOP, TSSOP, SSOP, QFP, BGA, QFN, MLF and other packages as well as cables for in-system programming are available Compatible with a variety of third party adapters.

4. ARM Cortex Microcontroller Development Board

(i). STM32 discovery pack for LTE IoT cellular to cloud

- STM32L496AGI6 microcontroller featuring
- SAI Audio CODEC
- ST-MEMS digital microphones

- user LEDs, reset push-buttons
- 4-direction joystick with selection button
- Board connectors:Camera 8 bit,USB with Micro-AB, Stereo headset jack including analog
- microphone input,– microSD™ card
- Board expansion connectors:– Arduino™ Uno V3,– STMod+ ST Incard™ eSIM based on ST33
- Switchable SIM interface, eSIM and MicroSIM

(ii). LPC54018 IoT module

- FreeRTOS enabled, ready for use in designs powered by AWS
- LPC54018 power-efficient Microcontroller Units (MCUs) with advanced peripherals based on Arm® Cortex®-M4 Core
- High speed USB device port
- Longsys IEEE802.11b/g/n module based on Qualcomm GT1216
- Macronix 128 Mb flash (MX25L12835FM2)
- User LED
- External debug probe connector can be used to connect NXP (LPC-Link2), SEGGER,
- P&E Micro, and other popular ARM Cortex compatible probes
- Reset button
- LCD interface with DMA controller, supporting up to 24-bit color
- External memory interface, supporting SDRAM, SRAM and/or parallel flash
- Up to 10 Flexcom serial ports, configurable as UART, SPI, I2C, I2S (2 ports), or GPIO
- Dual CAN/CAN-FD
- 10/100Mbps Ethernet
- DAC, ADC

(iii). B-G431B-ESC1 Discovery kit

- Electronic speed controller Discovery kit for drones with STM32G431CB 3-phase driver board for BLDC/PMSM motors with discrete N-channel 60 V, 120 A, STripFET F7 power MOSFETs
- Arm®(a) Cortex®-M4 32-bit STM32G431CB MCU, 213 DMIPS, 128 Kbytes of Flash
- memory, 32 Kbytes of SRAM, analog rich, math accelerator
- On-board ST-LINK/V2-1 debugger /programmer detachable from the main board
- Support for motor sensors (Hall or encoder)
- Supported by ST motor control software development kit (SDK) with ST motor profiler
- L6387 High voltage high and low-side driver
- ESC ready for communication with any standard flight control unit (FCU):
- PWM/CAN/UART
- 2 user LEDs: 1 green LED for 3.3 V level, and 1 red LED configurable by the user

(iv). STM32 Nucleo-32 boards

STM32 microcontroller in 32-pin package
User LED, reset push-button
Arduino™ Nano V3 expansion connector, Micro-AB USB connector for the ST-LINK
ST-LINK, USB VBUS or external sources
On-board ST-LINK debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port and debug port
Arm® Mbed Enabled™ compliant

(v). STM32 Nucleo-64 boards

- STM32 microcontroller in LQFP64 package
- user LED shared with Arduino, user and eset push-buttons
- Arduino Uno V3 expansion connector, ST morpho extension pin headers for full access to all STM32 I/Os
- ST-LINK, USB VBUS or external sources
- On-board ST-LINK debugger/programmer with USB re-enumeration capability: mass storage, Virtual COM port and debug port
- Micro-AB or Mini-AB USB connector for the ST-LINK
- Arm® Mbed Enabled™ compliant

(vi). STM32L476G-DISCO Development Board

- STM32L476VGT6 microcontroller featuring
- 1 Mbyte of Flash memory, 128 Kbytes of RAM in LQFP100 package
- On-board ST-LINK/V2-1 supporting USB reenumeration capability
- Virtual com port, Mass storage, Debug port
- Mbed-enabled (mbed.org)
- LCD 24 segments, 4 commons in DIP 28
- SAI Audio DAC, Stereo with output jack
- Digital Microphone MEMS Accelerometer and magnetometer MEMS, Gyroscope MEMS
- 128-Mbit Quad-SPI Flash memory
- MCU current ammeter with 4 ranges and auto calibration
- Connector for external board or RF-EEPROM
- ST-LINK/V2-1,USB FS connector, External 5 V

5. Arm mbed Development Board

(i). Arm Mbed LPC1768 Board

- NXP LPC1768 MCU
- High performance ARM® Cortex™-M3 Core
- Ethernet, USB Host/Device, 2xSPI, 2xI2C, 3xUART, CAN, 6xPWM, 6xADC, GPIO

- Built-in USB drag 'n' drop FLASH programmer
- High level C/C++ SDK

(ii). SparkFun Mbed Application Board (Extension Boad Only)

128 x 32 graphics backlit LCD, SPI interface
- 3-axis accelerometer, +/- 1.5g, I2C interface
- Temperature sensor, I2C interface
- 5-way navigation switch (Thumb joystick)
- 2 x Potentiometers (Analogue In)
- RGB LED, (PWM out)
- Miniature loudspeaker, (PWM out)
- Socket headers for Xbee Zigbee module or RN-XV WiFi module
- 2 x 3.5mm audio jack (Analogue In/Out)
- 2 x standard R/C servo motor headers, (PWM out)
- Mini-USB connector (keyboard, mouse, MIDI)
- USB-A connector (Flash drive, Bluetooth)
- USB Host/Device select switch
- RJ-45 Ethernet connector
- 1.3mm 6-9VDC jack socket (Powering USB-A and Servo headers)

6. ProtoMat S63 PCB Millling Machine

- Max. material size and layout area (X/Y/Z) 229 mm x 305 mm x 35/22 mm (9” x 12” x 1.4/0.9”)*
- Resolution (X/Y) 0.5 µm (0.02 mil)
- Repeatability ± 0.001 mm (± 0.04 mil)
- Precision of front-to-back alignment ± 0.02 mm (± 0.8 mil)
- Milling spindles Max. 60,000 rpm, software controlled
- Tool change Automatic, 15 positions
- Milling width adjustment Automatic
- Tool holder 3.175 mm (1/8”)
- Drilling speed 120 strokes/min
- Travel speed (X/Y) Max. 150 mm/s (6”/s)
- X/Y-drive 3-phase stepper motor
- Z-drive 2-phase stepper motor
- Power supply 90–240 V, 50–60 Hz, 450 W

7. Microsoft IoT Grove Kit

- Intel Atom CPU at 500MHz, and a 32-bit Intel Quark microcontroller at 100 MHz
- 4GB RAM,
- SD Card interface
- UART,I2C,SPI,GPIO, USB2.0 1 OTG Controller
- Flash Storage 4 GB eMMC
- WiFi Broadcom 43340 802.11 a/b/g/n, Dual-band (2.4 and 5 GHz), Bluetooth BT 4.0

- Yocto Linux v1.6
- Arduino IDE, Eclipse supporting C, C++ & Python, Intel XDK supporting: Node.JS & HTML5

8. Dragino LoRa IoT Development Kit

- 400 MHz ar9331 processor
- 64MB RAM
- 16MB Flash
- ATMega328P
- 2 x RJ45 ports
- USB 2.0 Host port x 1
- Internal USB 2.0 Host Interface x 1
- WiFi Spec:
- LG01 in an IoT Network
- LoRa Gateway :
- IEEE 802.11 b/g/n
- Frenquency Band: 2.4 ~ 2.462GHz
- LoRa Spec:
- Frequency Range:
- Band 1 (HF): 862 ~ 1020 Mhz
- Band 2 (LF): 410 ~ 528 Mhz
- Programmable bit rate up to 300 kbps.
- Fully integrated synthesizer with a resolution of 61 Hz.
- FSK, GFSK, MSK, GMSK, LoRaTM and OOK modulation.
- Built-in bit synchronizer for clock recovery.

9. Azure IoT starter Kit

- Microsoft Azure IoT Developer Kit
- STM32F412, ARM Cortex M4F processor
- EMW3166 Wifi module with 256K SRAM，1M+2M Byte SPI Flash
- USB programming Arduino compatible
- DAP Link emulator
- Codec, with microphone and earphone socket
- OLED, 128x64
- Programmable buttons, RGB LED, LED working status indicators for WIFI, Azure service and testing
- Security encryption chip
- Infrared emitter for IR remote control or interaction
- Motion sensor
- Magnetometer sensor
- Atmospheric pressure sensor
- Temperature and humidity sensor
- All module pins broken out
- On-board FTDI USB-to-Serial

- 802.11 b/g/n
- Wi-Fi Direct (P2P), soft-AP
- Integrated TCP/IP protocol stack
- Integrated TR switch, balun, LNA, power amplifier and matching network
- Integrated PLLs, regulators, DCXO and power management units
- Integrated low power 32-bit CPU could be used as application processor
- +19.5dBm output power in 802.11b mode

10.

(i) **Sparkfun Blynk Board - ESP8266**

- ESP8266-Based
- On-Board Si7021 Temp/Humidity sensor
- Solderless pin connectors - compatible with alligator clips
- On-Board FTDI for re-programming
- On-board WS2812 RGB LED
- General purpose LED and button
- ADC scaled to 0-3.3V
- Expansion connectors for I2C and WS2812 output
- LiPo battery charger
- Arduino programmable

(ii). **Node MCU**

11. Sensors and Accessories (10 Sets)

- 1 x Arduino PS2 Joystick game controller module
- 1 x Infrared sensor receiver module
- 1 x Laser head sensor module
- 1 x Temperature and humidity sensor module
- 1 x Infrared emission sensor module
- 1 x 5V relay module
- 1 x Smart car avoid obstacle sensor infrared sensor photoelectric switch
- 1 x ARDUINO finger detect heartbeat module
- 1 x Microphone sensitivity sensor module
- 1 x Metal touch sensor module
- 1 x Flame sensor module
- 1 x 3-color LED module
- 1 x Hunt sensor module
- 1 x Linear magnetic Hall sensors
- 1 x Rotary encoder modules
- 1 x Active buzzer module
- 1 x Magic Light Cup modules
- 1 x Small passive buzzer module
- 1 x Digital temperature sensor module/DHT

- 1 x Optical breaking module
- 1 x Temperature sensor module
- 1 x Bicolor LED common cathode module 3MM
- 1 x Mercury opening module
- 1 x Hall magnetic sensor module
- 1 x RGB LED SMD module
- 1 x Arduino Mini Reed module
- 1 x Tilt switch module
- 1 x Automatically flashing LED module
- 1 x Key switch module
- 1 x Photoresistor module
- 1 x Vibration switch module
- 1 x ARDUINO hit/vibration sensor module
- 1 x Temperature sensor module
- 1 x Analogy Holzer magnetic sensor
- 1 x Microphone sound sensor module
- 1 x Large reed module
- 1 x Two-color LED module
- 1 x Breadboard power module
- 1 x Ultrasonic module
- 1 x MP1584EN buck module
- 1 x SD card reader module
- 1 x Gyro Module
- 1 x Soil module
- 1 x DS1302 clock module
- 1x DC Motor Driver
- 1xStepper Motor Driver (Microstepping) for Nema 17
- 1x 7" Touchscreen
- 1xStepper Motor Nema 17
- 1xSrrvo Motor (15kg,180 degree)
- 1x GSM Module
- 1 x Water level module
- 1xAdapter
- 1xMicro USB cable(120cm)

12. Raspberry Pi Hats and Accessories (5 Sets)

- 1xRaspberry Pi Sense HAT
- 1x7” Official Raspberry Pi Display with Capacitive Touchscreen
- 1x Official Micro-HDMI (Male) to Standard HDMI (Male) Cable for Raspberry Pi
- 1x Micro USB-B (Female) to USB Type C (Male) Converter Adapter for Raspberry Pi 4
- 1x T Type GPIO Breakout board with 40 pin Cable and 400pt Breadboard for Raspberry Pi 4

- 1x Raspberry Pi 8 channel Level Switching (3.5V to 5V) IO Module
- 1x SmartElex GPS HAT for Raspberry Pi 4
- 1x Mini HDMI To HDMI Cable 1 Meter Round High-Quality Copper-Clad Steel Black
- 1x HDMI to HDMI Cable 1.8 Meter Round High-Quality Copper-Clad Steel Black
- 1x Micro USB OTG Adapter Host Cable for Raspberry Pi 4
- 1x Micro USB Cable for Raspberry Pi(120cm)
- 1x Raspberry Pi GPIO Expansion Shield For PI 3/4 B B+ Module
- OV5647 5MP 1080P IR-Cut Camera for Raspberry Pi 3/4 with Automatic Day Night Mode
- 1x Raspberry PI Infrared IR Night Vision Surveillance Camera Module 500W Webcam
- 1x 5MP Raspberry Pi 3 Model B Camera Module Rev 1.3 with Cable
- 1x 10.1 inch IPS LCD Screen 1280×800 with Driver Board Kit for Raspberry Pi
- 3.2 Inch TFT LCD Touch Screen Display V4.0 for Raspberry Pi
- Official Raspberry Pi 4 Case-Red-White
- Official USB type-C 15.3W Power Supply For Raspberry Pi 4
  Raspberry Pi Sense HAT for the Pi 3/2/B+/A+ Model