GSTIN : 20AAAAI0686D1ZA
भारतीय प्रौद्योगिकी संस्थान (भारतीय खनि विद्यापीठ), धनबाद
धनबाद, झारखण्ड, भारत, पिन-826004
(शिक्षा मंत्रालय, भारत सरकार के अधीन राष्ट्रीय महत्त्व का एक संस्थान)
INDIAN INSTITUTE OF TECHNOLOGY (INDIAN SCHOOL OF MINES), DHANBAD
DHANBAD, JHARKHAND, INDIA, PIN-826004
(An Institute of National Importance under Ministry of Education, Govt. of India)
PROJECT PURCHASE SECTION Phone: (0326)2235660 || Email: projectpurchase@iitism.ac.in || Website: www.iitism.ac.in

EC-PRJ-008-23-24 8th June 2023

Request for Quotation

To,

Subject: Supply & Installation of Silvaco TCAD software.

Sirs

Indian Institute of technology (Indian School of Mines), Dhanbad is interested for the purchase of the materials/ equipment listed below:

Sl.No.	Detailed Specifications	Quantity
1	**Supply & Installation of Silvaco TCAD software.** **(Specification in Annexure –II)**	01 No

INSTRUCTIONS:

1) Please attach relevant technical literature of the item.
2) Please fill the attached form 01 regarding class of supplier.
3) Please mention warranty/ guarantee period in your offer. Equipment/ material supplied must have minimum warranty/ guarantee of **12 months**.
4) Please attached authorization certificate from OEM.
5) Please mention after sales service information in your offer.
6) ***Please attach a certificate that the quoted price is not more than that of any other Govt. organization/ institution in India. This has to be mentioned in the offer letter clearly***.
7) The rates should be quoted for each item separately as per price schedule attached as annexure I
8) The items/ materials shall be required to be delivered at MECH Department of IIT (ISM) Dhanbad at the risk and cost of the tenderer.
9) Your tender must be **valid for minimum 120 days** from the date of opening of tender.
10) The stores are required to be delivered within 30 days, late delivery may not be accepted.
11) Full details of stores offered should be given in the tender along with supporting & relevant literatures/ Technical Literature.
12) The items offered should be of good quality confirming to BIS standards, wherever applicable.
13) ***Advance payment is not admissible.*** Payment shall normally be made within 3-4 weeks subject to receipt and acceptance & installation (as per Purchase Order Terms) of the ordered materials/items.
14) In the event of the supplier failed to supply the materials or install the same as contractual condition, IIT (ISM) Dhanbad shall have the right to deploy suitable agency/ third party to get the job completed at the risk and cost of the supplier.
15) Tender may please be submitted ***in sealed cover only super scribed with Enquiry No. EC-PRJ-008-23-24 latest by 29.06.2023***
16) The offer must be submitted in the office of Assistant Registrar (Project Purchase Section), Dean(R&D) office, IIT (ISM), Dhanbad– 826004 (Jharkhand, India) only. Please send your offer by Regd.Post/ Speed Post/ Courier along with Courier receipt. Tender/ quotation will be received during IIT (ISM) Dhanbad working hours only (i.e. Monday to Friday). At any circumstances by hand delivery is not acceptable. Late or delayed tenders shall be summarily rejected. Bids sent through Email/Fax or submitted in unsealed cover(s) will not be accepted and such bids will be treated as non-responsive bids.
17) **Performance Bank Guarantee:** A bank guarantee issued by a Nationalized Bank in India towards PBG for an amount equal to 10% of total value of purchase order and valid till the period beyond two months of completion of warranty period should be submitted in favour of **Registrar, IIT (ISM) Dhanbad.**
18) Any other information that you may like to obtain, you are free to contact IIT (ISM) Dhanbad before submission of tender.
19) IIT (ISM) Dhanbad reserves the right to accept and/or to reject any/all tenders without assigning any reason.

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20) **Payment**: will be made within 30-45 days after satisfactory supply, inspection, installation/commissioning/ satisfactory services & acceptance and on submission of pre-receipted tax invoice, delivery challan, warranty certificate and installation report in triplicate

21) **Please attach purchase order copies of the same equipment which you have supplied to any other Govt., public sector and autonomous institutions**.

22) **a) In a tender, either the Indian agent on behalf of the principle/ OEM and the Principle/OEM itself can bid but both cannot bid simultaneously for the same item/product in the same tender.**
b) If an agent submit bid on behalf of the principle/ OEM, the same agent shall not submit a bid on behalf of another principle/ OEM in the same tender for the same item/product.

Assistant Registrar
Project Purchase Section
Dean (R&D) office
IIT(ISM),Dhanbad

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Annexure –I

1. PRICE SCHEDULE FOR GOODS BEING OFFERED WITHIN INDIA

Name of the Bidder_____

NIT Reference No. _____

File Reference No. _____

Sl. No.	Full Description of items with (HSN Code/SAC Code)	Quantity	Unit Price (in INR)	Total Amount (in INR)
1.				
2.				
3.				
Ex-Works Price-				
Packing & Forwarding				
Transportation				
FOR (IIT ISM) Dhanbad				
GST/IGST (their rate(s) as the case may be, clearly specified) Please note that IIT ISM is eligible for Concessional GST as per Notification No. 45/2017-Central Tax (Rate) for CGST, 45/2017-State Tax (Rate) for SGST and 47/2017-Central Tax (Rate) for IGST,				
Insurance up to Destination/handover (in case of fabrication)				
Installation & Commissioning charge				
Training charges, if any				
Additional Warranty Charges, if any				
Annual Maintenance Charge, if any				

*(On the basis of the technical specifications submitted)

Total Bid Price_____ in words_____

Note :

(a) The Price schedule of optional items shall be indicated in a separate sheet in the same Performa.

(b) Cost spare parts may be indicated separately

Signature of Bidder
Name _____

Business

Address_____

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Form-1

Declaration by bidder

(Please specify Class of Supplier and Local Content percentage)

In accordance and manner as specified in Order No. P45021/2/2017-PP (BE-II) dated: 04th June 2020 and 2th March 2021 issued by DIPP, Ministry of Commerce and Industries, GoI.

To,

The Director,

Indian Institute of Technology (Indian School of Mines)

Dhanbad -826004

Respected Sir,

In accordance with the order No. P-45021/2/2017-PP (BE-II) dated 04th June, 2020 and P-45021/2/2017-BE-II-Part (1) (E-50310) dated 4th March 2021 I hereby declare that

I am aware about all provision mentioned in Tender No. MECH-INS-243-21-22 as well as order No. P-45021/2/2017-PP (BE-II) dated 04th June, 2020 and P-45021/2/2017-BE-II-Part (1) (E-50310) dated 4th March 2021 and abides by the same.

I declare that for this tender, I am a **Class-I local supplier / Class-II local supplier / Non-local supplier** (Strike out whichever is not applicable) and classification is based on local content of goods/services/work offered by bidder in this tender.

Local content (in percentage) in offered good/services/work is: _____**%**

***Whereas* 'Local Content'** means the amount of value added in India which shall, unless otherwise prescribed by the Nodal Ministry, be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all customs duties) as a proportion of the total value, in percent.

The services such as transportation, insurance, installation, commissioning, training and after sales service support like ACM/CMC etc. are not included as Local content in case of imported products.

The local content for all inputs which constitute the said goods/services/works has been verified and bidder is responsible for the correctness of the claims made therein.

Date:

Signature:

Name of Authorized Signatory:

Name of Bidder:

Seal of Bidder:

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Annexure –II

I. TECHNICAL SPECIFICATIONS OF THE SOFTWARE

1. Process simulation capability

Sr No.	Item	Description	Vendor's remark
1.1	Semiconductor Fabrication Technologies	This software shall be capable of fast and accurate simulation of all critical fabrication processes used in modern semiconductor technologies including: • RF Devices: HEMT, FET, HBT, FET, BJT, JFET, IGBT, SOI, TFT, Fin-FET etc. • Multiple Gate FETs (MuGFETS): FinFET, FlexFET, Gate-All-Around (GAA) FETs, etc. • IR detector and Sensor devices • Solar cells • Primarily focused on compound semiconductors	
1.2	Processes	It should possess advanced physical models for following processes: • Doping diffusion including rapid thermal annealing (RTA) • Ion implantation • Oxidation with stress effects • Physical etching and deposition, e.g. CVD, PVD, plasma etching, RIE, etc. • Epitaxy and stress formation and strain/stress engineering • Optical lithography These process models shall be capable of • Interactive visualization of 2D structures and distributions as well as 1D cross-sections • Run-time extraction of process parameters • Optimization of process flow and calibration of process models • Easy creation and modification of process flow input decks including automatic control of layout GDS2 mask sequences	

1.3	Process Materials	It should be capable of providing process simulation for variety of materials used in the semiconductor industry like Silicon, III-V, III-N, II-VI, IV-IV but not limited to: • Silicon Carbides (SiC), Compound Semiconductors, e.g. GaN, AlGaN, GaAs, AlGaAs, InGaAs, InP etc. • Silicon, Silicon Germanium (SiGe). • All Schottky and Ohmic contact metals and dielectric/insulating materials used in Semiconductor Nano electronics device technology.	

2. Device simulation Capabilities

Sr No.	Item	Description	Vendor's remark
2.1	Device simulation capability	The device simulation software should be capable of: • Analyzing and characterizing the electrical, optical, and thermal performance of various devices in 2D and 3D. • Fully integrated with process simulation software, comprehensive visualization package and extensive database of examples. • Material parameters and physical models for a wide range of Silicon, III-V, III-N, II-VI, IV-IV like compound semiconductor materials and polymer/organic based technologies. • Compatible with smartSPICE and other device simulators (SPICE)	

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3.Modules:

Sr No.	Item	Description	Vendor's remark
3.1	Physics based Models	• It should cater Physics based models like drift-diffusion, energy balance transport equations, surface/bulk mobility, recombination, impact ionization and tunneling models. • The capabilities of all the physical models should be extended to deep submicron devices. • The models should be capable to calculate all measurable electrical parameters which include gate and drain characteristics, sub-threshold leakage, substrate currents, and punch through voltage, breakdown behavior, kink and snapback effects, low temperature and high-temperature operation, RF/AC parameters and intrinsic switching times. • Boltzmann and Fermi-Dirac statistics with band gap narrowing. • Interface to Drift-diffusion and energy balance transport models with advanced mobility models. • Trap dynamics for DC, transient and AC. Models for Shockley-Read-Hall, optical and Auger recombination, impact ionization, band-to-band tunneling, and Ohmic and Schottky contacts. • DC, AC/RF and transient device characteristics can be simulated. • Calculated DC characteristics include threshold voltage, gain, leakage, punch through voltage and breakdown behavior. • Calculated RF characteristics include cut-off frequency, s-, y-, h- and z parameters, maximum available gain, maximum stable gain, maximum frequency of oscillation and stability factor. • Inclusion of Models for graded and abrupt heterojunctions and simulates binary structures such as MESFETS, HEMT's etc. DC, AC/RF and time-domain solutions for general nonplanar	

		homojunction and heterojunction semiconductor device structures. • It should have provision for Monte Carlo simulation • Interface provision that allows user-defined, composition dependent, models and material parameters. • This module should be capable for both 2D and 3D device simulation.	
3.2	Material Library	• It shall cover materials as per para 1.3 • Library of binary, ternary and quaternary semiconductors as well as other important advanced materials along with material parameters. • Built-in materials library that contains parameters for all well-known semiconductor materials.	
3.3	Thermal Effect Simulation	• It should be able to model heat generation, heat flow, lattice heating, heat sinks, and effects of local temperature on physical constant. • It should provide an ideal environment for design and optimization of power devices. • Applications include characterization of device design, thermal failure analysis and heat sink designs. • This module should be capable for both 2D and 3D device simulation.	
3.4	Optoelectronics Device Simulation	• It should be able to model light absorption and photo generation in non-planar semiconductor devices. • It should account for arbitrary topologies, internal and external reflections and refractions, polarization dependencies and dispersion. • Optical transfer matrix method and EM wave method for coherence effects in layered devices. • It should be applicable to a wide array of device technologies including CCDs, solar cells, photodiodes, photoconductors, avalanche photodiodes, Metal-Semiconductor-Metal photodetectors, phototransistors, microlens coupled detector. • This module should be capable for both 2D and 3D device simulation.	
3.5	Circuit simulation	• It should contain physically-based devices in addition to compact analytical models	

		• It should be compatible to small and large signal analysis of RF devices. • It should contain Compact analytical models for high power circuits including variety of devices such as diode, HEMT, bipolar, thyristor, GTO, MOS and IGBT devices. • This module should be capable for both 2D and 3D device simulation.	
3.6	Noise simulation	• It should be capable of analyzing small-signal noise generated within semiconductor devices. • It should be capable of characterizing small-signal noise sources and extract figure of merit for circuit design. • This module shall preferably be capable for noise device simulations	
3.7	Quantum Mechanical effect simulation	• It should provide a set of models for simulation of various effects of quantum confinement and quantum transport of carriers in semiconductor devices • It should allow quantum mechanical calculation of bound state energies and associated carrier wave functions self consistently with electrostatic potential • Should associate with Schrodinger solvers with Non-Equilibrium Green Function (NEGF) Approach in order to model ballistic quantum transport in 2D or cylindrical devices with strong transverse confinement • This module should be capable for both 2D and 3D device simulation.	
3.8	User defined Models & Library elements	• It should have capability of user defined physical models & material parameters via standard language interface (e.g. C, C++, etc.) • It should have capability of user defined functions such as doping, composition fraction, defect, density of state, temperature and composition dependent band parameters, mobility, recombination and generation models at run-time.	

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4. Other interactive tools

Sr No.		Description	Vendor's remark
4.1	Run time interactive tool	• It should have numerous simulator specific and general debugger style tools, such as powerful extract statements, GUI based process input, line by line runtime execution and intuitive input syntactical error messages. • Should support .str file format for model generation	
4.2	Graphical display and analysis tool	This tool should have following capabilities: • A powerful tool is required to visualize 1D and 2D/3D structures produced by TCAD simulators. • It should provide visualization and graphic features such as pan, zoom, views, labels, and multiple plot support. • Plotting engine should support all common 1D and 2D/3D data views including: 2D/3D contour data, 2D/3D meshed data, smith charts and polar charts. Exports data in many common formats (jpg, png, bmp, SPICE raw file, and CSV) for use in reports or by third party tools. • The simulation result (xy-type) data generated by the software should be in the format compatible for direct export to spreadsheet like MS excel.	

5. Other terms and conditions:

Sr No.	Item	Description	Vendor's remark
5.1	Software compatibility	Software shall preferably be compatible with following workstation/hardware specification • Processor: Dual Intel Xeon E5-2667v4 3.2 2400 8C 1st CPU or Intel i5 / i7 with CPU or equivalent x86 64bit processor • Chipset: Intel H8/Q8 series • RAM: 128GB DDR4-2400 (8x16GB) Reg RAM or 16/32/64 GB or even higher • Hard Disk: 512GB PCIe SSD drive and 3 * 2 TB SATA HDD	

		• Graphics Card: NVIDIA Quadro M 5000 8GB graphic card • OS: Linux - RHEL 7 with subscription (64-bit) or CentOS 7 (64-bit) • Support unlimited cores • TCAD should support .uds file format for model generation link	
5.2	Software license	All modules and sub modules of software should have time based license. Supplier shall provide software up gradation support as and when applicable within the warranty period	
5.3	Software Version	The offered software should be of latest version. The same should clearly be mentioned in detail.	
5.4	Support documents	The offer should be properly supported with relevant technical leaflets, catalogues as well as application notes demonstrating the claims of the quote. Publications by other agency using the offered software may also be indicated/provided.	
5.5	Compliance	Point by point compliance for all RFP specification should be provided with clear indication of compliance/non- compliance unambiguously.	