Meeting For Procurement of Skill Lab Equipment And Synthetic Cadaver Lab

All Bidders are requested to visit HSCC India Ltd. for discussion on Technical specification (as attached) and commercial terms for Procurement of Skill Lab Equipment and Synthetic Cadaver Lab.

Venue:

HSCC (India) ltd.,
E-6(A), Sector-1,
NOIDA (U.P.) – 201 301.

Date and Time:

20 Dec 2022 at 02:00 PM- 03:00 PM

LIST OF SIMULATORS/ MANNEQUINS

ITEM NO.	NAME OF ITEM	QUANTITY
1	Intramuscular injection simulator for gluteal region	2
2	Intramuscular injection simulator for upper arm (deltoid)	2
3	Injection pad for intramuscular, subcutaneous and intradermal injection	9
4	Adult intravenous injection arm (male)	6
5	Adult intravenous injection arm (Female)	3
6	Antecubital fossa venepuncture pad	9
7	Three vein trainer pad for venepuncture	14
8	Torso mannequin for central venous access (IJV, SCV, femoral)	3
9	Adult arterial arm model	3
10	Urinary catheterization trainer &Enema trainer	9
11	Adult CPR mannequin with feedback	9*
12	AED training mannequin	3
13	Child CPR mannequin with feedback	4
14	Infant CPR mannequin with feedback	4**
15	Automated external defibrillator(AED) trainer	3
16	Heimlich abdominal thrust movement manoeuver model	3
-17	High fidelity adult patient simulation system with inbuilt ultrasound FAST protocol	1
18	ECG rhythm Simulator	2
19	Adult airway management mannequin	6
20	Adult patient care mannequin	2
21	Bone marrow aspiration and biopsy trainer	2
22	Adult lumbar puncture trainer	2
23	Nasogastric tube and tracheostomy care trainer	3
24	Pleural tap, chest tube insertion and needle decompression model	3
25	Trainer for ascitic tap	2
26	Abdominal examination trainer	2
27	Male Pelvic clinical assessment trainer	2
28	Male rectal examination trainer	2

29	Surgical airway management trainer	3
30	Breast examination model	6
31	Suturing arm model	2
32	Suturing Leg model	2
33	Suturing pad	14
34	Knot tying trainer	3
35	Trauma mannequin	1
36	Trauma head mannequin	2
37	Bleeding trauma management trainer	2
38	Trauma wound care trainer	6
39	Abscess drainage trainer	14
40	Adult intraosseous infusion simulator	3
41	Mediolateral episiotomy / perineal repair trainer	9
42	Birthing simulator with postpartum haemorrhage module	2
43	Cervical examination and PAP smear trainer	2
44	Pelvic examination and gynaecological simulator	2
45	Obstetric examination trainer	2
46	Pediatric IV canulation training arm	3
47	Newborn venous access simulator	3
48	Paediatric intraosseous simulator	3
49	Infant intraosseous infusion trainer	3
50	Newborn Lumbar puncture model	2
51	Neonatal intubation trainer	4
52	Infant intubation trainer	4
53	Child intubation trainer	3
54	Patient care mannequin-Infant	2
55	Neonatal resuscitation mannequin	1
56	Preterm task trainer	2
57	Pediatric emergency training system	2
58	Skin pad for demonstrating sebaceous cyst removal, punch biopsy and slit skin smear	14

59	Ear diagnostic simulator	3
60	Nose bleed/ epistaxis trainer	3
61	Operating headlights	3
62	Binocular Indirect Ophthalmoscope (Wireless) with video Display	7
63	Direct ophthalmoscope	7
64	High fidelity birthing simulator with inbuilt ultrasound	1
65	Laparoscopic simulator	1
66	Diabetic foot trainer	2
67	Skill Trainer for Gastroscopy, Colonoscopy and Bronchoscopy (skill model)	2
68	Electronic Shoulder intracavitary injection mannequin	2
69	Electronic Elbow intracavitary injection mannequin	2
70	Electronic Hand & Wrist intracavitary injection mannequin	2
71	Electronic Ankle & Foot intracavitary injection mannequin	2
72	Videoscopic Endotrainer set with accessories	7

*As per MCI Skills training module Program 2019 Page 49 , number required is 4 mannequin per 100 students so 10 mannequins for 240 students are required
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PROJECT FOR ESTABLISHMENT OF CENTRAL SIMULATION LAB ON TURNKEY BASIS
1. Single vendor should quote all the above systems. Vendor should be authorized by the manufacturer to quote the tender and provide warranty and after sales support
2. The bidder shall be responsible for designing & creating the setup. Institute shall provide space with roof and floor only. Partitions & Floorings have to be done by the bidder.
3. Bidders can visit and inspect the site for simulation & Skill Centre before quoting the tender.
4. Bidder will be responsible for creating cold room storage & arrange a system for removal of odors & creating negative pressure in the wet lab.
5. Bidder will be responsible for integration of centralized classroom management system with simulators.
6. The bidder should have experience in installing at least 2 simulation centers at Government medical college in India preferable in Institute of National Importance & The manufacturer of simulators should have experience of installing in atleast 3 complete simulation labs in government medical colleges in India
7. Bidder has to provide a training program with a faculty trained on simulation initially for at least 5 working days at Hospital during installation. (The faculty shall be responsible for training the trainer).Bidder have to train the faculty thrice during the warranty period as per requirement.
8. The simulators should be in functional (95% up-working time).In any case if any repair is needed it should be attend within 48 hours or Hospital will penalize as per the tender clause .
9. Warranty: 5 years (with spares) & CMC for next 5 years(with spares)
10. A necessary three visit per year of company engineer is mandatory in warranty period apart from repair call for calibration. The visit has to be registered in institute Log book ,verified by Central store in-charge.
11. Firm must quote cost of CMC for further 5 years .Bidder will be responsible to inform the institute at least 6months earlier for CMC
12. All purchased software must be up-graded free of cost during the warranty period
13. An undertaking has to be given by supplier that the quoted simulator is of latest technology.
14. Firm must quote cost of consumables (if any) separately valid for 5 years. Rate of consumable should be frozen from the date of order.
15. Bidder should be Indian agent of at least one manufacturer for last 03 years and should submit order copy executed by the bidder for the quoted manufacturer/ principal in last three years.
16. Demonstration is mandatory. Institute reserves the right to choose for onsite/ at installations site demonstration 17. The cost of bid should include the CMC for further five years after the expiry of 5-year warranty. 18. The simulators must be upgradable if required. 19. The process of skill lab setup should be completed within a maximum timeframe of 3 months. 20. The total cost of the aforesaid project including the 5-year warranty (with spares), cost of CMC (withspares) for further five years, cost of consumables, cost of upgradation or any other charges must not exceed INR 25 crore 21. Vendor must arrange for CBME Curriculum based comprehensive digital Teaching and Training

resources with LMS for certifiable skills/hardware and human resource.

SPECIFICATIONS OF SIMULATORS/ MANNEQUINS

1.	**Intramuscular injection simulator for gluteal region**	1. Model should be realistic and teach proper injection techniques and how to avoid nerves and veins. 2. Should have realistic reproduction of an adult lower body structure ranging from waist to knee. 3. One side of the model should show internal structure and the other side is used for injection. One side should be a see-through side which should show internal structure including bones, muscles, nerves and veins. 4. Anatomical landmarks should be identifiable enabling correct localization (iliac crest, gluteal cleft vertex and other landmarks). 5. Should enable anterior, posterior and lateral intramuscular injection training. 6. The skin should be made from a composite material with high elasticity, which should be durable for multi-injection. Should give lifelike feel with various anatomic layers of skin, subcutaneous tissue and fat and muscle while giving injection. 7. Interactive audible and visual signal to guide/ assess technique, 8. Injections should leave no marks. 9. It should allow the user to infuse real fluid as well as drain out conveniently. 10. Buttock Intramuscular Injection Model, should be supplied complete with Syringe, spare skin, drainage bag, storage bag or box
2.	**Intramuscular Injection Simulator Upper Arm (Deltoid)**	1. This simulator should be designed for practice of intramuscular and hypodermic injections on the upper arm. The inner anatomical structure of whole thorax and upper arm should be visible so one can make an accurate choice of injection sites, and avoid injecting to nerves and veins. 2. Simulator should display an upper body structure of adult, from the neck to the waist; take standard position of the upper arm intramuscular injection; 3. Operation side: significant landmarks including acromion and deltoid should be observable and palpable 4. Model should made up of advanced materials, realistic and beautiful, durable, lifelike skin texture, Indian skin tone 5. Available operations should facilitate for Intramuscular injection and give feedback. 6. Practice fluid injections are collected in the supplied reservoir through drainage hole for the purpose (water should be the practice fluid) 7. Easy maintenance. 8. Realistic and soft skin, no needle marking after injection ,500+ stabs per module with 20-26 gauge needles, may be wearable On mannequin (strap) , Able to inject with liquid and have drainage hole ,Able to palpate for anatomical important landmarks, Instruction and Maintenance 9. Material with high tolerance to extreme temperature and able to store at room temperature 10. Injection Model should be supplied complete with Syringe, spare skin, drainage bag, storage bag or box

		11.
3.	**Injection pad for Intramuscular, Subcutaneous & Intradermal Injection**	1. Should perform Intradermal injection; Subcutaneous injection; Intramuscular tissue injection 2. Should have Anatomical layers: skin, subcutaneous tissue and muscular layer. 3. Should have a steady base plate 4. Should have a replaceable tissue layer 5. Should be manufactured from a soft synthetic material that mimics human skin and is lifelike in order to provide realistic practice experience 6. Can be used repeatedly without showing puncture holes 7. Should consist of Real liquid which can be injected into the subcutaneous tissue and can also be squeezed out 8. Should be simple and easy to use 9. Should be supplied complete with Multi-Purpose Injection Trainer, Syringe, box, injection fluid and spare skin and layers
4.	**Adult Intravenous Injection Arm (Male)**	1. Should mimic lifelike adult male arm for providing venous access which permits detailed exercise in venepuncture, starting iv line and inserting over the needle catheter. 2. Should be durable and reusable, with simplified easy venous system setup with one external fluid bag supplying blood to all veins simultaneously. 3. Should be supplied with syringe, canula, butterfly set, infusion set, and liquid bag. 4. Should supply leak free veins. Hand site and veins should be easily removed and replaceable after use. Replacement veins and skin should be available. Alternately sealant fluid to close the punctures should be available. 5. Allow identification of venous anatomy by visual inspection and/or palpation. 6. Should permit venepuncture exercise along various sites-cephalic, basilic, median cubital and dorsum of hand veins. 7. Should allow realistic feeling of needle tip resistance, ie, passage of needle through 3 layers, skin, subcutaneous tissue and vein, and allow realistic feeling of give way when vessel wall is breached, with backflow of blood/ blood like fluid in syringe or intravenous cannula. 8. Allow training in blood sampling, intravenous injection and administration of intravenous fluids.
5.	**Adult Intravenous Injection Arm (Female)**	1. Should mimic lifelike adult female arm for providing venous access which permits detailed exercise in venepuncture, starting iv line and inserting over the needle catheter. 2. Should be durable and reusable, with simplified easy venous system setup with one external fluid bag supplying blood to all veins simultaneously. 3. Should be supplied with syringe, canula, butterfly set, infusion set, and liquid bag. 4. Should supply leak free veins. Hand site and veins should be easily

		removed and replaceable after use. Replacement veins and skin should be available. Alternately sealant fluid to close the punctures should be available. 5. Allow identification of venous anatomy by visual inspection and/or palpation. 6. Should permit venepuncture exercise along various sites-cephalic, basilic, median cubital and dorsum of hand veins. 7. Should allow realistic feeling of needle tip resistance, ie, passage of needle through 3 layers, skin, subcutaneous tissue and vein, and allow realistic feeling of give way when vessel wall is breached, with backflow of blood/ blood like fluid in syringe or intravenous cannula. 8. Allow training in blood sampling, intravenous injection and administration of intravenous fluids.
6.	**Antecubital Fossa Venipuncture Pad**	• Soft tissue strap-on pad should be able to train in venipuncture and should represents the antecubital fossa of the right arm. • Should be Ideal for scenario based training using Simulated Patient • Should have mechanism to prevent needle stick injuries • Should have strap onto the arm of the mannequin. • Veins must be self-sealing for repeated use, re-chargeable via a one-way valve, supplied with mock blood under pressure, and replaceable. • Should be able to teach following skills – o Professional-to-patient communication o Recognition of the vein pattern through palpation o Insertion of a needle o Insertion of cannula o Management of blood flow
7.	**Three Vein Trainer Pad for Venipuncture**	• It should be soft tissue strap-on pad that has 3 straight veins, one of which should be of pediatric size. • It should be supplied with artificial blood under pressure. • It should allow withdrawal of artificial blood and insertion of needle or cannula. • It should have a mechanism to prevent needlestick injuries. • Veins should be self-sealing for repeated use. • Epidermis should be washable using soap and water and easily replaceable. • It should be rechargeable via a one -way value. • It should be useable with standardized/simulated patient by strapping onto the arm or back of the hand.
8.	**Torso manikin for central venous access (IJV, SCV, Femoral access)**	• The central line training manikin should allow students practicing of intravenous access techniques for both advance cardiac life support and trauma situation. • It should enable students to experience realistic procedures. • The puncture areas for IV access should be simulated by soft pads which should be covered by a realistic skin and should simulate the feel of human skin as closely as possible • Manikin veins inside the pads should provide a natural resistance during puncture and a natural flashback of blood. • Manikins veins and skin will self-seal so that the site of puncture is not visible to student.

		• The Manikins pads must pre-filled with simulated blood • It should enable the practice of IV access to the: External jugular vein Internal jugular vein via the anterior, central and posterior approach Subclavian vein Femoral vein • It should have a pulse bulb to enables the trainer to create a palpable pulse in the manikin's arteries • It should allow long catheters can be placed into the manikin. • It should have realistic tissue feel. • The neck pad and femoral pad should be replaceable • It should be supplied with 02neck pad, 02femoral pad, 200-300 ml bottle of simulated blood, User manual and carrying case
9.	**Adult Arterial Arm model**	• Should be a Lifelike reproduction of an adult right arm which should allow for palpation of arterial pulse and practice of arterial puncture • Should have anatomical landmarks include radial artery, ulnar artery and styloid process of radius; • Should Simulate radial arterial puncture and should allow drawing arterial blood samples; • Arterial Puncture Arm should be easy to maintain with spare skin and arteries. • Should be supplied complete with Artery Puncturing Training Arm, Liquid bag Pump Bulb Syringe • Should have realistic needle resistance against tissue and artery wall • Should have natural flash back. • Should have redial artery line placement facility. • It should be supplied with adult arm (1), replacement skin with artery set (1), 2ml syringes (10)
10.	**Urinary Catheterization and enema trainer**	• The Catheterization trainer should be a life-size, pelvis with upper thighs and interchangeable genitalia. • It should have realistic articulation that enables proper positioning while performing procedures. • Genitalia should be interchangeable with connectors and a urinary reservoir. It should facilitate both male and female urinary catheterization procedure. • It should allow perineal care, insertion of vaginal medications, indwelling catheter insertion, care, irrigation, and removal. • Should have accurate anatomical structure including anus, recta and anal columns • Should allow the users to practice enema procedures including: large/small volume enema, retention/non- retention enema • Should allow the user to apply one-way valve to prevent fluid leakage from anus and the liquid can be drawn out easily after use. • Should be supplied complete with -Buttock Pad, -Anal Tube, -Liquid Bag
11.	**Adult CPR Mannequin with Feedback**	• The mannequin should be adult half body torso with modeled hair, realistic in appearance. • It should have a soft nose which can be occluded using the nose pinch technique. • It should be able to facilitate a head tilt/chin lift technique to open the airway and have an articulating jaw to facilitate jaw thrust maneuver. • It should have visible chest rise and wireless feedback during ventilation.

		• It should have a disposable lower airway with an integral one-way valve. • The mannequin should provide audible feedback for chest compression. • The torso should be able to connect with wireless mechanism to connect with smart devices for providing feedback to both student and instructor • The wireless instructor feedback software shall be available for free downloads as many times as required providing real-time wireless feedback on compressions and ventilations. It shall be able to monitor and connect to get the live feedback for 5-10 torso mannequins simultaneously for group training. • It shall help provide improvement suggestions based on CPR performance on the compression depth, rate, release time and chest compression fraction and give indication of too little, correct, or excessive ventilation volumes. • Wireless Student Feedback Software should also be available for free downloads as many times as required providing real-time wireless feedback on compressions and ventilations. • Students should be able to view and monitor their own performance regarding the chest compression depth and rate, incomplete release, ventilation volume. • It should provide summative feedback on the overall CPR score, improvement suggestions and CPR duration. • Should be compliant with latest AHA guidelines .
12.	**AED Training Mannequin**	It should be able to provide training in quality chest compression as per latest AHA and ISA protocols, with basic and advanced airway management skills training, vital signs analysis, spontaneous breathing and controlled by an easy-to-use wireless instructor System, It should include: - Full-body Adult humanoid model with training suit • Airway Management head • Articulating Lower body • Blood Pressure arm and cuff • IV Arm - Wireless control system - 2x AC Adapter, USB Cable - Blood pressure cuff - Artificial Blood and Airway Lubricant - carrying case - User Guide **AIRWAY** - Realistic airway anatomy including cricoid cartilage o Bag-Valve-Mask (BVM) o Oropharyngeal and nasopharyngeal Airway o Supraglottic Airway Devices o Sellick Maneuver - Spontaneous breathing with realistic chest rises and fall o Controllable On/off & breathing rate o SpO_2 and $etCO_2$ settings - “Chin lift” & “Jay thrust and “Head tilt” sensors including tongue fall back - Airway closing mechanism o Overrides an open airway to simulate an obstruction at any time

		o Open or closed airway status operated via wireless control **CIRCULATION** - Eyes for pupil assessment o Normal – Dilated – Constricted - Automatically generated pulses synchronized with ECG o Radial, brachial (right arm only) and carotid pulses both sides o Pulse strengths dependent on BP or set individually o Brachial pulse off when BP cuff pressure is above 20 mmHg o Radial pulse off when BP cuff pressure is above systolic BP level - Auscultated and palpated blood pressure simulation o Korotkoff Sounds synchronized with ECG o Systolic and diastolic pressure may be set individually in steps of 2 mmHg o Systolic 0-300 mmHg/diastolic 0-200mmHg o Auscultative Gap, with on/off feature o Pressure accuracy +/- 4 mmHg o Brachial and radial pulse control, palpated BP function - Defibrillation capabilities (25-360j) o 4 – Lead ECG monitoring o Synchronized variable rate, rhythm abnormalities and duration o Pacing – threshold 20 to 200 mA **QCPR** - Live feedback on Basic life support/ cardio-pulmo. resuscitation parameters - Detailed information about chest compression, compression rate, ventilation volume and combined graphical display - cardio-pulmonary resuscitation Performance Summary - Debriefing Screen notes **Physiological Sounds** - **Lung sounds** breath sounds synchronized with breathing rate o Normal, crackles, pneumonia, stridor, wheeze, rhonchi - Individual lung or bilateral sound selection - **Vocal sounds** – computer generated sounds, mixed with live voice input - **Heart sounds** - synchronized with programmable ECG o Aortic Stenosis, Friction Rub, Austin Flint Murmur, Diastolic Murmur, Systolic Murmur, Mitral Valve Prolapse, Opening Snap 70ms, Normal Intravenous cannulation for dorsum of hand, Basilic, cephalic and median veins **Logging** o Instructor can log activities and CRM skills during training sessions individually o Log files for debriefing sessions o cardio-pulmonary resuscitation log file for detailed debriefing o Downloading of logs for “after actions” review/debriefing via software o Software for detailed summary of student performance Wireless Instructor Faculty Control The system shall have the ability to manage the following parameters: **BLOOD PRESSURE/PULSES** - The user shall be able to set the blood pressure level, and to make it

		gradually change over time. **TEMPERATURE** - The user shall be able to set the temperature level, and to make it gradually change over time. Temperature can be presented in Celsius or Fahrenheit. - Temperature shall be displayed on the Patient Monitor **PULSE OXIMETRY (SpO2)** - The user shall be able to set the peripheral capillary oxygen saturation level, and to make it gradually change over time. **End Tidal CO2 (etCO2)** - The user shall be able to set the $etCO_2$level, and to make it gradually change over time. - etCO2 can be presented in percentage, mmHg or kPa with individual selectable wave forms **SOUNDS** - Heart sounds synchronized with ECG - Auscultated lung sounds synchronized with breathing, 0 - 60 BPM - Individual lung sound selection - Normal or abnormal bowel sounds - Vocal sounds: Computer-generated sounds, recorded vocal sounds and real-time voice input - User generated vocal sounds **Patient Monitor** • The training system shall also have the ability to work with a simulated Patient Monitor. The patient monitor shall display ECG, SpO2, etCO2, BP, Respiration rate and Temperature controllable via wireless device
13.	**Child CPR Mannequin with Feedback**	• The child half body torso should be realistic in appearance with anatomically correct landmarks. • The mannequin should have a soft nose which can be occluded using the nose pinch technique. • The manikin should be able to facilitate a head tilt/chin lift technique to open the airway and have an articulating jaw to facilitate a jaw thrust maneuver. • The manikin should have visible chest rise and wireless feedback during ventilation. • The manikin should have a disposable lower airway with an integral one-way valve. • The manikin should provide audible feedback for chest compression. • It should come with user friendly CPR apps for both student and instructor. • The torso should be able to connect with wireless smart devices for providing both student and instructor feedback. • Instructor app should be able to connect to 5-10 mannequins and learner app to 1 mannequin. • Instructor and student feedback software shall be available for free downloads providing real-time wireless feedback on compressions and ventilations. • Students should be able to view and monitor their own performance for compression depth and rate, incomplete release, and ventilation volume. • It should provide summative feedback on the overall CPR score,

		improvement suggestions and CPR duration. • It shall help provide improvement suggestions based on CPR performance, compression depth and rate, release time, chest compression fraction and indication of ventilation volumes as less, correct or excess. • It should come with padded training mat (1), carry case (1), and user manual (1)
14.	**Infant CPR Mannequin with Feedback**	• The infant full body mannequin should be realistic in appearance with anatomical landmarks. • The mannequin should have a removable full-face mask. • The mannequin should be light weight, with a realistic skin. • The mannequin should have natural obstruction of the airway that allow students to learn the important technique of opening the airway. • The mannequin should allow head tilt/chin lift and jaw thrust man oeuvres. • It should come with user friendly CPR apps for both student and instructor. Instructor app should be able to connect to 5-10 mannequins and learner app to 1 mannequin. • The mannequin should have realistic chest compliance so that students can experience the proper technique required for chest compressions on infants. • It should have wireless feedback for correct compression depth and rate, incomplete release, ventilation volume, foreign-body airway obstruction, summative feedback on overall CPR score, improvement suggestions, CPR duration. • The mannequin should have visible chest rise during ventilation. • The mannequin should allow foreign-body airway obstruction feature to practice the release of a foreign-body obstruction through back blows and chest-thrust techniques. • It should have economical disposable airways for quick and easy clean up. • It should be supplied with full body mannequin (1), carry bag (1), padded training mat (1), and user manual (1).
15.	**Automated external defibrillator (AED) Trainer**	• It should be able to teach and educate a layperson and healthcare provider in the effective use of an automated external defibrillator • It should be latest AHA Guidelines-compliant. • It should be controlled and operated through remote control device. • It should have flexible configuration and scenario builder program that allows the additional creation of custom training scenarios. • Should be able to run on C-cell batteries. • It should have Ten pre-configured sudden cardiac arrest scenarios compatible with training programs developed by internationally recognized responder programs • Should allow manual scenario selection pause/resume function, volume control, motion artifact, low battery or replace battery, loose electrodes connection, shockable or non-shockable rhythms, and error conditions that simulate the red X in the display window • It should be able to work with manikin by providing student feedback as to proper pad placement on the manikins • Should have a Pull-tab status indicator simulates the status window for maintenance training. • Should be supplied with quality soft pack with protocol card for added training realism and durable storage of the equipment. • Manufacturer must conform to the International Quality Certification i.e.

		ISO certificate • CE must be provided.
16.	**Heimlich Abdominal Thrust Maneuver Model**	• Mannequin should be robust, life adult torso with realistic anatomy and response using simulated boluses. • The mannequin should allow for training to perform Heimlich Abdominal Thrust manoeuvre with simulated food boluses. • The adult make torso should be supplied with simulated food boluses (2), talcum powder (1 bottle), tank top (1), carry case (1) and a use manual.

17 : HIGH FIDELITY ADULT PATIENT SIMULATION SYSTEM WITH INBUILT ULTRASOUND FAST PROTOCOL
Human Patient Simulator for Training & Education of undergraduates, Post graduate students & Health professionals in routine and special clinical situations in adult as well as pediatric.
It Should offer sophisticated mathematical models of human physiology and pharmacology and capable of determining automatically the patients response to user actions and interventions:
Human Patient Simulation System should comprise the following:
A. <u>MANNEQUIN:</u> It Should be supplied with two mannequins i). Adult mannequin should represent the physical characteristic of an adult male / female patient with interchangeable genitalia ii). Pediatric mannequin should represent the physical characteristic of pediatric male/female patient with interchangeable genitalia
It should be fully operational in supine &lateral position and can be placed on O. T. Table, ICU Beds, patient trolley.
It should react to intravenous drugs, CPR, defibrillation, intubations ventilation, catheterizations & other procedures.
Should physically demonstrate of various clinical signs (i.e. heart / breath sounds, palpable pulses , chest excursion , airway patency etc.) which should be dynamically coupled with the mathematical models of human physiology and pharmacology. Should respond automatically as per human physiology and should have facility for manual intervention by instructor
iii) The mannequin shall be able to transmit voice sounds. - The instructor shall be able to simulate patient voice and phrases via microphone
B. <u>COMPUTERISED SYSTEM CONTROLLER</u> - Simulation system should be supplied complete with PC console and a hand held Laptop for instructor to control all aspects of simulator from Bedside of the Patient. - The system should have facility to be connected to gases (through cylinders or hospital central gas pipeline) namely oxygen, CO2, Air, N2O, Nitrogen. The mannequin should not use gas cartridges
C. <u>UTILITY SOFTWARE</u> Simulation system should be supplied complete with software for: - Modification of preconfigured scenarios & patient profiles or creating new scenarios & profiles. The system shall be capable of operating automatically as per the patient physiology changes because of action taken by the student on the mannequin which permits the simulation to proceed without instructor interaction. In scenarios as well. - Recording of patients physiology and intervention by student, instructor or central software - Modification of pharmacokinetics & pharmacodynamic parameters of selected drugs:
D. <u>PATIENT MONITOR</u>

Should have facility to be connected to a real patient monitor for monitoring following parameters :

1) 5 Lead ECG
2) NIBP
3) IBP (2ch)
4) SPO2
5) Cardiac Output
6) ST. Segment & Arrhythmia Analysis
7) ETCO2
8) Anesthetic agents (sevoflurane, Halothane, Isoflurane)

E. ANAESTHESIA MACHINE – should be compatible with mannequin

- Should be supplied complete with flow meters for Air, Oxygen, Nitrous Oxide with low flow range and hypoxia guard.
- Electronic anesthesia ventilator for pediatric & adult usage.
- Breathing circuit (02 nos. each) for adult & pediatric patient.
- Vaporizer
- Circle Absorber.

F. DEFIBRILLATOR with ECG Monitoring, integrated adult & pediatric paddles.

G. ICU Ventilator for adult & pediatric Applications with modes eg SIMV, APRV, CPAP and PEEP.

H The system shall be supplied with following

- stethoscope, laryngoscope, LMA, CPR patient bed & trolley with IV stand, Resuscitation cart, Resuscitator, torch and nerve stimulator
- The firm must supply one cylinder each for oxygen CO2, Nitrogen and N2O and must supply Air Compressor

1. AIRWAY SYSTEM for both adult and pediatric mannequin

- Mannequins should provide automatically realistic oropharynx ,naso -pharynx and larynx representing adult and pediatric patient
- Should allow direct laryngoscope, oral and nasal tracheal intubation.
- Should support mainstream endobronchial intubation, esophageal intubation.
- Should allow for activation of laryngospasm activator & airway occluder to create "cannot ventilate, cannot intubate" crisis scenario.
- Should allow instructor to activate tongue swelling of varying degrees.
- Should support the use of Combitubes, lighted stylets and fiber optic intubation tubes.
- Should be able to perform following airway skills

- Controllable open / closed airway, automatically or manually controlled
  - Suctioning (Oral and Nasopharyngeal)
  - Bag mask ventilation
  - Orotrachealintubation
  - Nasotracheal intubation
  - Combitubeplacement
  - LMA placement
  - Endotracheal tube intubation
  - Retrograde intubation
  - First grade fiber-optic intubation
  - Transtracheal jet ventilation
  - Light wand intubation
  - Needle cricothyrotomy
  - Surgical cricothyrotomy

- Variable lungs compliance according to physiological condition and should be stepless - Variableairway resistance according to physiological condition and should be stepless - Stomach distention shall be possible-
2. PULMONARY SYSTEM for both adult and pediatric mannequin
• The patient should breathe spontaneously with a self regulated rate and tidal volume sufficient to maintain a target arterial carbon dioxide which can be adjusted by the instructor.Normal and abnormal breath sounds shall be present • Oxygen Saturation and plethysmogram shall be displayed on the clinical patient monitor • Bilateral chest tube insertion shall be possible
• Should be capable of simulating events such as atelectasis,pneumothorax,asthma, COPD etc.
• The mannequin's lungs should physically consume O_2 ,produce Co_2 and uptake or excrete N_20,sevflurane, isoflurane, and halothane and should be displayed on a clinical monitor
• Independent control of left & right lung to model airway resistance, lung compliance, as well as control of chest wall compliance. Bilateral and unilateral chest rise and fall shall be possible
• The lungs should be realistically modeled with respect to the range of tidal volumes & functional residual capacity.
• Should have facility to superimpose modes of ventilation (spontaneous, assisted & mechanical) one on another and respiratory system should be capable of triggering a ventilator.
• Ventilation should result in appropriate production of expired CO2, which registers correctly on external capnograph.
• Should give appropriate & dose dependent pulmonary response to intravenously injected drugs.
• Should have facility to continuously Calculate patients arterial blood gas & PH
3. CARDIO VASCULAR SYSTEM for both adult and pediatric mannequin
• Should simulate heart sound synchronized to QRS complex of ECG, generate 5 lead ECG from appropriate positions on the patients chest and Should be able to simulate associated abnormalities such as myocardial ischemia, sinus tachycardia &bradycardia, ventricular fibrillation &asystole. • An extensive ECG library shall be available and should change automatically according to physiological response of patients • 12 lead dynamic ECG display shall be possible on a simulated monitor and printout of the same should be possible
• Should have palpable carotid, radial, brachial, femoral pedal pulses synchronous to ECG.
• Should have independent control of left & right radial, brachial, femoral & pedal pulses.
• Should simulate hypovolemia& hypervolemia and right and / or left heart failure.
• Should be able to simulate patients blood pressure that can be measured with cuff of NIBP Monitor, and provide monitoring of haemodynamic parameters. • Blood pressure shall be measurable manually by auscultation of Korotkoff'ssound and automatically through clinical monitor (left arm) • Pulse strength shall be related to blood pressure
4. METABOLIC SYSTEM for both adult and pediatric mannequin
• Should physiologically model Actual blood gases including pH, Pco_2, Po2 accurately corresponding to alveolar concentration of CO2 & O2.
• Should allow instructor to adjust ABG pH level to simulate Metabolic Acidosis and alkalosis
5. GENITO URINARY SYSTEM: for both adult and pediatric mannequin
• Mannequin should allow insertion of urinary catheters, & offer instructor controlled or

automatic scenario controlled excretion of urine and its flow rate.
• Bowel sound shall be available via speakers • Should have interchangeable genitalia
6. NEUROLOGIC SYSTEM:
• Adult and pediatric mannequin should model cardio vascular & respiratory responses to sympathetic &para sympathetic activities.
• Adult mannequin should have electrode attachment for peripheral nerve stimulator.
• Adult mannequin should automatically detect PNS stimulus pattern and generate appropriate thumb twitch response.
7. ADVANCED CARDIAC LIFE SUPPORT SYSTEM for both adult and pediatric **mannequin**
• Should display alveolar & arterial gas concentrations appropriately reflecting efficacy of ventilatory technique employed.
• Should display artificial circulation, cardiac output, Central & peripheral blood pressure, palpable pulses & CO2 return as a result of effective chest compression.
• Should have facility to select & maintain desired cardiac Arrhythmia and central patients response to clinical intervention.
• Should have facility to apply conventional & automatic external defibrillators to the patient and should trigger appropriate patient response and should be viewable on a clinical monitor
• Should have provision to apply transcutaneous pacemakers and pacing & capture should be possible
• Should support all drug required by ACLS algorithm.
8. TRAUMA FEATURES: for both adult and pediatric **mannequin**
• Should simulate constriction & dilation of pupils of each eye in response to changing light stimuli. • Eyes shall include blinking include slow, normal and fast • Eye movement shall be electronically controlled causing sensors to enter movement information into an event log • Pupil shall be synchronous and asynchronous • The manikin shall display convulsions
• Should have provision to perform needle decompression of Tension Pneumothorax, & chest tube placement and management. • Vital signs shall automatically respond to bleeding and therapy events
• Should have facility to perform subxyphoid needle peri-cardiocentesis to resolve acute cardiac tamponade.
• Right arm shall have IV access • IO access shall be possible via tibia and sternum
9. PHARMACOLOGY & DRUG RECOGNITION SYSTEM; for both adult and pediatric **mannequin**
• Should have preprogrammed pharmacokinetic and pharmacodynamic parameter for over 50 (fifty) intravenous medications.
• Should incorporate various intravenous access points such as antecubital, right internal jugular and femoral veins in the mannequin.
• Should have facility to administer injection & intravenous infusions from main PC console or instructors hand held remote control.
• Mannequin should appropriately & automatically respond to incorrect medications.

- Should have drug recognition system to identify drug, its concentration & quantity of dosage given.
- Should have facility to modify/editpharmacodynamic& pharmacokinetic models of existing drugs & to add new drugs.

10.Anesthesia and Scavenging

- Ability to administers anesthetic agents and medical gases
- Lungs should consume oxygen and produce carbon dioxide
- Uptake and distribution of nitrous oxide and volatile anesthetics
- Direct gas exchange within the lungs
- Mechanical ventilation fully supported with automatic responses to CPAP, PSV, PEEP, SIMV, assist control modes and weaning protocols
- Simulator should flow trigger or pressure trigger a ventilator to cycle
- Simulator should be configured to fight the ventilator
- Expired carbon dioxide should be automatically based on patient condition and interventions

11. PATIENT PROFILES & SCENARIOS

- Should have at least 25 pre-configured profiles of patients of various ages, medical history, gender & physiological parameter
- Should have facility to change existing patient profiles and to create new patient profiles.
- It should be possible to capture the current state of patient at any part of simulation session & to use it as new patient.
- Simulator should have at least 50 pre-configured scenarios of events & crises.
- Should have facility to change existing scenarios and to create new scenarios of events & crises.

12 **Simulator Should be supplied complete with Web-based Digital Video & Audio Management System for Recording, Debriefing, Assessment and Evaluation**

- Web based digital video and audio management system for integration and synchronization of simulation exercise including physiological data logs, event logs, pharmacology data logs and patient monitoring data from multi simulators providing complete record for debriefing assessment and evaluation.
- Should provide observation of simulation exercise and Ability to visualize and control the system from a central location.
- The system shall permit X-Rays to be inserted into simulations via stimulated patient monitor
- Should provide of capturing and control of simulation sessions and monitor and control playback in sync with any simulation event, data point or instructor's annotation during debriefing session or when a simulation is taking place
- The system should include:
- Support for real-time video and audio streams
- Record and replay the entire simulation for facilitated debriefing and after-action review
- Broadcast simulation to internal and external locations
- Place-shift and time-shift the simulation recording
- Room-centric recording to follow action in a specific location
- Observe and switch between multiple camera views (real-time, time-shifted) with zoom in/out capability

- Supplied complete with control console, camera, Ethernet network cables, digital audio video recording system.

Software Specifications

1. It should have the facility for Live broadcasts in any browser with as little as half a second of latency.
2. Should have Up to 4 concurrently displayed and synchronized camera streams or 3 cameras and 1 simulator in each room.
3. Should Simultaneously view up to 25 live streams (one from each room) on a center overview screen
4. Should have facility for Widescreen HD video broadcast and recording, full screen mode.
5. On-screen ePTZ controls: click on image to pan and tilt, drag image to zoom in and out ; from multi or single room views. View any configured room securely using SSL certificates
6. It should be able to Connect any simulated or real patient monitor for capturing and broadcasting HD screen image
7. Optical character recognition to turn the video signal from monitor into real-time data streams for visual trend charts and searchable physiological data
8. Use predefined layouts or define your own for identifying key captured values on the connected screen Supports remote site configuration
9. Define pre-set camera angles, which can be jumped to instantly during live action Pause live or recorded view and continue where you stopped ("time shifted live view")
10. Manually start/stop recording or set recording to occur based on a schedule or on user actions
11. Access and control all recorded videos on one page (debriefing, deleting, downloading, renaming or
reassigning videos)
12. Generate and export custom reports covering both group and individual performance, or use one of the many predefined report options
13. Give learners access to their reports at home or on campus
14. Export data from server to work with outside of system
15. Review faculty and standardized patient performance reports for quality assurance and consistency
16. Track the use of simulation center resources (Rooms, Simulators, Personnel, etc.) by client. Generate reports
17. quarterly/by semester/yearly
18. Allow faculty to submit booking requests for specific rooms/resources within the simulation center, to be
19. managed be center administration
20. Follow Learner progress in key skill areas throughout their career within your program

13. Atleast 10 Faculty members should be trained at a manufacturer simulation site for 6days and onsite training should be provided to residents, technician in the institute

14. The firm must have at least 3 installations of the same equipment in India and their performance report has to be submitted

15. Warranty 5 years and CMC for further 5 years must be quoted

Adult Simulator must be include minimum of the following preconfigured Scenarios.

Anesthesia

- Aortic Cross Clamping
- Anaphylaxis in Awake Patient
- Cannot Intubate, Cannot Ventilate
- Cardiac Tamponade
- Emergence Apnea
- Emergence Hypertension

- Emergence with Laryngospasm
- Emergence with Negative Pressure Pulmonary Edema
- Total Spinal Anesthesia
- Local Anesthetic Toxicity During IV Epidural Injection
- Sympathectomy due to Epidural Anesthesia
- Hypoxia due to Bronchospasm During Induction of Anesthesia
- Hypoxia due to Atelectasis in the Obese Patient During Laparoscopy
- Malignant Hyperthermia Under General Anesthesia
- Tension Pneumothorax
- Peripheral Nerve Block Complications
- Anesthesia Machine Failure
- Anaphylaxis Under General Anesthesia
- Awareness During Caesarean Section
- Perioperative Anterior Myocardial Infarction

Obstetric

- Amniotic Fluid Embolism
- Epidural Analgesia
- Pulmonary Aspiration
- Supine Hypotension Syndrome
- Obstetrics Venous Air Embolism
- Pre-Eclampsia

Allied Health

- Angina with Cardiac Arrest
- Asthmatic with Pneumothorax
- Chronic Obstructive Pulmonary Disease (COPD) with Respiratory Failure
- Heart Failure with Pulmonary Edema
- Inferior Myocardial Infarction
- Organophosphate Exposure
- Pneumonia with Septic Shock
- Severe Young Asthmatic
- Splenic Rupture with Pneumothorax
- Stab Wound to the Chest
- Subdural Hematoma
- Anaphylaxis
- Anterior Myocardial Infarction
- Tension Pneumothorax

Advanced Cardiac Life Support (ACLS)

- ACLS Acute Coronary Syndrome
- ACLS Acute Stroke
- ACLS Asystole
- ACLS Bradycardia and Heart Blocks
- ACLS Pulseless Electrical Activity
- ACLS Pulseless Ventricular Tachycardia and Ventricular Fibrillation
- ACLS Respiratory Arrest
- ACLS Supraventricular Tachycardia

- ACLS Ventricular Fibrillation AED
- ACLS Ventricular Tachycardia

Advanced Life Support (ALS)

- ALS Acute Coronary Syndrome
- ALS Acute Stroke
- ALS Asystole
- ALS Bradycardia and Heart Blocks
- ALS Pulseless Electrical Activity
- ALS Pulseless Ventricular Tachycardia and Ventricular Fibrillation
- ALS Respiratory Arrest
- ALS Supraventricular Tachycardia
- ALS Ventricular Fibrillation
- ALS Ventricular Tachycardia

Pediatric Human Patient Simulator must be includes the following preconfigured Scenarios.

Allied Health

- Electrocution
- Accidental Overdose
- Closed Head Injury
- Diabetic Ketoacidosis with Hypoxemia
- Obstructed Airway
- Trauma with Pneumothorax

Anesthesia

- Cannot Intubate Cannot Ventilate
- Epidural High Spinal
- Foreign Body Aspiration
- Hypertension and Tachycardia
- Spontaneous Tension Pneumothorax
- Upper Airway Obstruction
- Pediatric Advanced Life Support (PALS)
- Asthma Attack
- Asystole
- Bradycardia
- Ingestion
- Motor Vehicle Crash
- Pulseless Electrical Activity
- Septic Shock
- Shock
- Supraventricular and Ventricular Tachycardia
- Ventricular Fibrillation

It should have inbuilt ultrasound FAST protocol

17.	**High fidelity adult patient simulation system with inbuilt ultrasound FAST protocol**	**Specifications are above**
18.	**ECG Rhythm Simulator**	• It should be a battery-powered ECG rhythm simulator designed to offer basic, modified, and pediatric and pediatric rhythms with variable pulse strength. • It should offer 28-35 cardiac rhythms with 15-18 modified rhythms including Torsade de Pointes, 4-8 basic rhythms and 5-8 pediatric rhythms. • The basic rhythms include normal sinus rhythm, fast ventricular tachycardia, coarse ventricular fibrillation, slow ventricular tachycardia, fine ventricular fibrillation, and asystole. • The modified rhythms include sinus bradycardia, sinus tachycardia, torsade des pointes, atrial flutter, atrial tachycardia, first degree AV block, second degree 4:3 AV block, second degree2:1/3:1 AV block, third degree AV block, junctional rhythm, junctional tachycardia, normal sinus rhythm with unifocal PVCs, normal sinus rhythm with multifocal PVCs, sinus with coupled PVCs, sinus with premature atrial complex, sinus with premature junctional complex. • The pediatric rhythms include normal sinus rhythm, sinus bradycardia, sinus tachycardia, supraventricular tachycardia, ventricular tachycardia, ventricular fibrillation, and asystole. • It should have feature including paroxysmal, ignore shock, and variable pulse strengths. • It should come with a soft carry case • It should be CE/ISO certified.
19.	**Adult Airway Management Trainer**	• It should be a lifelike adult upper torso and head mounted on a board for demonstration and practice of intubation, ventilation, and suction techniques. • It must have realistic anatomy with nostrils, lips, teeth, tongue, oropharynx, nasopharynx, larynx with glottis opening, vallecula, arytenoids, vocal cords, cricoid ring, trachea including carina, lung, esophagus, and stomach. • It must allow realistic head positioning, it must allow neck flexion, extension, rotation, heads tilt -chin lift and jaw thrust maneuvers. • It should allow realistic and complete training in tracheal intubation procedures through oral as well as nasal route. • It should allow training and practice in the use of supraglottic devices (such as the Laryngeal Mask Airway). • It must simulate realistic complication such as, laryngospasm, vomiting, and with excessive laryngoscope pressure on teeth should produce audio signal. • It must provide realistic checking for proper tube placement with visual inspection of lung expansion during ventilation, and auscultation of breath sounds. It should permit evaluation of endotracheal tube tip position by bronchoscopy. • A separate model for demonstration of airway anatomy must be provided. • It should allow to establish and maintain an open airway by head tilt-chin lift, and jaw thrust man oeuvre. • It should permit realistic practice in lung ventilation with the use of bag mask valve device.

		• It should allow training in clearing the obstructed airway by suctioning liquid foreign matter from oral cavity, oropharynx or nasopharynx and trachea via tracheal tube and permit gastric drainage. • The airway trainer must come complete with a carrying case (1), instruction manual (1), airway cleaning kit (1), lubrication spray (1), concentrated simulated stomach content/vomit (1), airway anatomy demonstration model (1) • Manufacturer must conform to the International Quality Certification i.e. ISO certificate • CE must be provided.
20.	**Adult Patient Care Mannequin**	• It should be a full-body, lifelike mannequin designed to teach skills involved in general patient care and should come with a touch screen simulated patient monitor. • It should have a head with anatomical landmarks, trachea, and esophagus, along with simulated lungs and stomach, to allow the practice of following procedures: a. Irrigation of the eye and ear (simulated) b. Application/Instillation of medication in the eye, ear and nose including nasal packing c. Mouth and denture care procedures d. Insertion and suctioning of nasopharyngeal, oropharyngeal airway e. Insertion, securing and care of endotracheal tubes f. Tracheostomy care and tracheal suctioning g. Various oxygen delivery systems h. NG tube insertion, care, medication administration, Gastric lavage and gavage • Full range of motion for realistic patient handling should be possible. • Interchangeable stomas that depict colostomy, ileostomy and suprapubic cystotomy. • Colostomy may be irrigated and will retain and indwelling catheter • Fingers and toes are spread to allow bandaging • Interchangeable male and female genitalia • It should permit urinary catheterization. It should be able to retain indwelling or straight catheter. • Can be attached to urinary and colon reservoirs via connector valves • Enema procedures may be performed using fluid for realistic return • Anal valves simulate the internal anal sphincter • With female genitalia vaginal douching is possible. • Articulating arm with replaceable skin and infusible vein system allows peripheral intravenous therapy and site care. • Venipuncture is possible in the antecubital fossa and dorsum of the hand. • Deltoid, dorsolateral, and vastus lateralis IM injections should be possible. • Subclavian, jejunostomy and Hickman catheter openings are present. • It should have an articulated blood pressure arm to be able to measure blood pressure by auscultation and palpation method. The pules should be synchronized with programmable ECG. Pulse strength should be dependent on blood pressure. • It should have manually generated carotid pulse and allow multiple cardiac rhythm variations. • It should have following sound capabilities: heart sounds with different

		murmurs synchronized with programmable ECG, auscultated lung sounds (rhonchi, crackles, normal vesicular, etc) synchronized with breathing, individual lung sound selection, normal or abnormal bowel sounds, vocal sounds (computer-generated sounds, recorded vocal sounds, and real time voice input via headset). • It should have wireless control unit capabilities. • It should allow for logging/scenario function with review/debriefing capabilities. • There must be a simulated patient monitor displaying ECG, SpO2, etCO2, BP, Respiration rate and temperature controllable via wireless device along with virtual defibrillation and AED interface. • It should come with ISO, CE/FDA certified 12 lead ECG machine with printer that can be used to show how to perform ECG in a simulated patient. When used in a standardized patient, a real ECG can be taken using it. • It should include full body mannequin (1), wireless control unit (1), one touchscreen simulated patient monitor
21.	**Bone Marrow aspiration and biopsy trainer**	It should be a realistic skills trainer, designed with clinician input to replicate, teach and reinforce the skills needed to perform a posterior iliac crest bone marrow biopsy procedure. The trainer should have features in gaining following skills: a. Palpation of bony landmarks to ensure accurate biopsy needle placement b. Extraction of simulated bone marrow samples c. Posterior iliac crest bone marrow biopsy d. Competency needed for safe biopsy procedures The trainer should have following features: e. Should have pelvis f. Should have lower spine g. Should have right and left iliac crest bones h. Soft, tissue-like outer shell allowing for the palpation of underlying bony landmarks i. Replaceable puncture site skin inserts to allow for multiple needle punctures to be performed Replaceableiliaccrestbonesincorporatingsimulatedbonemarrow
22.	**Adult Lumbar Puncture Trainer**	• The Advanced Epidural & Lumbar Puncture Model should allow training in both Lumbar Puncture and Epidural administration. The model should have following features- • Can feel when the dura has been punctured • Rotatable skin to ensure cost-effective training • Latex free • Palpable sacrum, iliac crests and vertebrae L2-5 • Injection of local anesthetics • Lumbar Puncture • Collect and measure CSF • Epidural Administration • Should enable CSF pressure measurement Ultrasound-guided technique
23.	**Nasogastric Tube and Tracheostomy care Trainer**	The manikin should be designed for instruction in the care of patients with respiratory conditions and the practice of gastrointestinal care procedures via nasal and oral access. Should have the following features – Head should feature anatomical landmarks, trachea, esophagus, simulated lungs,

		and stomach Lungs and stomach may be filled with fluid for realistic practice of many procedures: • NG tube insertion and removal • NG tube monitoring • Feeding tube insertion and removal • Gastric lavage • Nasogastric and esophageal tube insertion, care, and removal • Oropharyngeal and nasopharyngeal insertion and suctioning • Tracheostomy care • Tracheal suctioning Insertion, securing, and care of endotracheal tube
24.	**Pleural Tab, Chest Tube Insertion and Needle Decompression Model**	It should be used for training in surgical or guidewire assisted thoracostomy, and thoracentesis. It should be complete with interchangeable modules, allows for a variety of chest drain insertion techniques to be performed including ultrasound-guided techniques. Skills • Needle decompression of tension pneumothorax • Ultrasound-guided chest drain insertion (Seldinger-type), including insertion of needle under direct vision, and ultrasonic recognition of chest structures • Open, or cut-down chest drain insertion: recognition of correct position, surgical incision, blunt dissection through chest wall, perforation of pleura, and finger sweep • Suture of tube to chest wall • Representation of adult male thorax with arms raised • Suitable for supine, sitting, or leaning forwards positions • Bony and soft tissue landmarks: manubriosternal joint, clavicles, ribs, pectoralis major and latissimus dorsi • Bilateral chest drain and needle decompression pads • Internal ultrasound anatomy including diaphragmatic structures and collapsed lung • Give the impression of breathing under ultrasound when using the Advanced Pad • Works with thoracic seals when using the Standard Pad • Reservoirs can be filled with fluid or mock blood to represent pleural effusion • Compatible with ultrasound machine • For use with liquids – e.g. effusion, or haemothorax • Guidewire insertions will self-seal to allow multiple uses • For open/surgical techniques where effusion or haemothorax are required • Can be sutured • Pleural layer, providing realistic give, or “pop”, on puncture with forceps or finger Improved respiratory swing
25.	**Trainer for Ascitic Tap**	• Landmark or ultrasound techniques can be practiced (side by side) • Internal echogenic anatomy should allow recognition of landmarks under ultrasound • Two 3.5 l3.5-liter bers can be filled with water for drainage practice • Should have realistic tissue and needle response • Should have self-sealing pads to withstand up to 175-225 needle or up to

		100-125 rocket catheter insertions • Should have ability to insert and remove drain • Should allow both supine and lying on side position • Skin surface should be washable using soap and water • Should be Latex free • Should be torso featuring bony landmarks and umbilicus • Internal anatomy should include: o Liver o Spleen o Bowel Floating Bowel
26.	**Abdominal examination trainer**	Product specification: 1. Contains abdomen, pelvis and lower part of thorax 2. Bony landmarks include ribs, costal margin, xiphisternum, pubic crest and anterior superior iliac spines 3. 3 Livers: mildly enlarged, enlarged with smooth edge and enlarged with irregular edge 4. 2 Spleens: mildly enlarged and massively enlarged 5. 2 Enlarged Kidneys 6. Distended Bladder 7. 2 Aortas: normal and aneurysmal 8. Set of 6 Abdominal Pathologies including 4 smooth masses and 2 irregular hard masses 9. Distension Set including ascites bag, gaseous distension bag, pump and foam insert 10. Simplified representation of lower thoracic and lumbar spine Qualities of product- 1. Should have Interchangeable organs and pathologies of varying sizes can be quickly and easily inserted into the abdomen 2. Trainer or Simulated Patient should vary respiratory movement of liver and spleen by the turn of a wheel 3. Training in auscultation of normal and high-pitched or obstructed bowel sounds, renal and aortic bruits - in variable locations 4. Distension set allows for realistic checking for ascites using percussion, shifting dullness or fluid thrill technique and simulation of bowel obstruction on percussion and auscultation 5. Pulse bulb allows simulation of normal and aneurysmal aortic pulse 6. Organs should be feel realistic on palpation and respond appropriately to percussion 7. Real like quality of abdominal skin accommodates stretching for gaseous distension and ascites simulation 8. Should be realistic ballottement of enlarged kidney 9. Abdominal skin is simple to remove, allowing quick and easy changeover of organs 10. Suitable for both bench top use and hybrid use with Simulated Patient 11. Model can be rolled onto side for examination of ascites and shifting dullness Latex free and skin surface is washable using soap and water
27.	**Male Pelvic clinical assessment trainer**	• The trainer should have following features: o Soft tissue genitals and abdominal wall o Soft tissue inserts can be removed and replaced o Can be used in 2 positions (standing and supine)

		○ Skin surface washable using soap and water ○ Should have following anatomical landmarks – ○ Abdomen, pelvis and genitalia ○ Anatomy of the groin with clear anatomical landmarks: ▪ Anterior Superior Iliac Spine (ASIS) ▪ Pubic symphysis and tubercles ○ Genitalia includes: ▪ Penis – both circumcised and non-circumcised ▪ Scrotum – containing testicles with epididymis and vas deferens The model should help in gaining following skills- ○ Examination and evaluation of: ▪ Normal anatomy ▪ Testicular abnormalities ▪ Abdominal and pelvic pain Catheterization
28.	**Male rectal examination trainer**	• Digital examination of the prostate and rectum must be possible • Proctoscope insertion and use Product specifications: • Buttocks, anus and rectum • 2 interchangeable perineums: - Normal for prostate examination - Pathology featuring polyp and carcinoma • 5 interchangeable prostates: - Normal - Bilateral benign - Unilateral benign - Bilateral carcinoma - Unilateral carcinoma Product Qualities: • When in use, the prostate is hidden and cannot be seen by the trainee • Realistic sphincter tone • Palpable sacrum • Prostates can be easily and quickly changed • Trainer can also be presented in 'semi-standing' position • Latex free Washable using soap and water
29.	**Surgical airway management trainer**	Needle and surgical cricothyrotomy skills can be practiced on this model with interchangeable rigid and soft tracheas. And should have following features - • Anatomically accurate landmarks for site training • Interchangeable tracheas facilitate realistic simulation of needle and surgical cricothyrotomy procedures ○ Rigid trachea with simulated lung ○ Soft trachea with simulated lung • Replaceable neck skin allows repeated practice • Mounted on a base • Should be ISO/CE certified Mainnequin should be supplied with: Head, Rigid Trachea with Simulated Lung, Soft Trachea with Simulated Lung,

		Replaceable Neck Skin, Base, and Directions for Use
30.	**Breast Examination Model**	Breast Examination Trainer should provide a highly realistic learning platform for acquiring the skills required to Perform Clinical Breast Examination (CBE). Should feature 6 readily interchangeable and multi-positional pathologies to identify various complications and pathologies, including carcinomas, cysts, fibrocystic disease and fibroadenoma. Should be able to use as both Simulated Patient and benchtop training. Should be used for following skills: • Clinical breast examination (CBE) • Self-breast examination (SBE) • Identification of anatomical landmarks • Identification of lymph nodes (axillary, supra & infraclavicular) • Location and diagnosis of pathologies • Professional-to-patient communication Product should have anatomy as: • Realistic soft tissue breast anatomy • Pathologies to be supplied: carcinomas: 2cm, 3cm, 5cm, cyst, fibrocystic disease, fibroadenoma • Soft tissue breasts look and feel realistic Clavicular and axilla pads for accurate lymph node placement • Can be used with a Standarized Patient • Pathologies can be placed in various predetermined location points and are easily changeable • Hard torso to be supplied for bench top use • Pathologies can be placed in various predetermined location points and are easily changeable • Latex free Skin surface should be washable using soap and water
31.	**Suturing Arm Model**	1. It should have realistic anatomy for suture training. 2. It should have skin, subcutaneous tissue and muscles. 3. It should allow even challenging suture in hard-to-reach places like between the fingers. 4. It should have soft and pliable skin for easy sewing, skin should be tough enough that sutures do not pull out when tightened. 5. It should allow multiple cuts to be made on the arm that can be sutured several times. It should come with needle with suture NO. 96, needle holder (1), forceps (1), steel tray (1), disposable drop sheets (6) simulated skin disinfectant (1), sponge holder (1), gauze pieces (1 packet) and instruction manual (1)
32.	**Suturing Leg Model**	1. It should have realistic anatomy for the suture training. 2. It should have skin, subcutaneous tissue and muscles. 3. It should have realistic skin texture with wrinkles and pores. 4. It should have soft and pliable skin for easy sewing, skin should be tough enough that sutures do not pull out when tightened. 5. It should allow multiple cuts to be made that can be sutured several times. It should come with needle with suture (6), needle holder (1), forceps (1), steel tray (1), disposable drape sheets (6), simulated skin disinfectant (1), sponge holder (1), gauze pieces (1 packet) and instruction manual (1).
33.	**Suturing Pad**	1. A-3-layer skin pad to give a realistic tissue response. 2. It should be suitable for practicing a variety of incisions and suturing

		techniques. 3. It should have realistic tissue response and soft skin with a similar drag and strength to human skin. 4. All layers should have realistic retention of sutures. 5. Skin pad jig should present the skin pad on a curved, life-like profile allowing incisions to 'gape' as in real life. 6. It can be used to practice different types of skin incisions. 7. It can be used to practice variety of suturing techniques such as interrupted, continuous, subcuticular, mattress sutures and stapling. 8. It allows use of adhesive strips. 9. It should be latex free. It should come with needle with suture (6), needle holder (1), forceps (1), steel tray (1), disposable drape sheets (6), simulated skin disinfectant (1), sponge holder (1), gauze pieces (1 packet) and instruction manual (1).
34.	**Knot Tying Trainer**	Skills Gained- • One-handed reef knot technique • Instrument tie • Surgeon's knot • Slip knot • Tying in a small opening • Tying at depth vertically in a large opening • Tying at depth, at an angle, in a large opening Product Features- • Light and compact • Cylinders are transparent to allow the trainer to observe and assess trainee competence • Unique magnetic system to represent tissue strength • Parallel knotting tubes are elastic for a realistic tissue response • Latex free Anatomy • 2 perioperative openings represented by: o Small, shallow fixed cylinder for tying in a small opening o Large, deep removable cylinder, reversible for angled abdominal and gynecological depth tying BSS Kit – Skills Gained- • Knot-tying: one-handed reef knot, instrument tie, surgeon's knot, tying at depth • Suturing techniques: holding/manipulation of needles, interrupted, simple and mattress, continuous, subcuticular • Skin lesions and LA techniques: excising a skin lesion, excising a sebaceous cyst • Hemostasis: clip tie, continuity tie, pedicle transfixion • Tissue handling - bowel: end-to-end interrupted sutures • Fine tissue handling: tendon repair • Abdominal closure and drain insertion: open abdominal wall, insert drain and secure, close abdominal wall with Aberdeen knot • Fine tissue handling: vein patch exercise • Wound management: abscess drainage, traumatic wound debridement

35.	**Trauma Mannequin**	

35 : TRAUMA MANNEQUIN
The human patient simulator should comprise of a life like adult male mannequin, integrated with CPR analysis which must be compliant with latest American Heart Association's guidelines with correct hand placement, depth, and rate of compressions being captured with following specifications:-
1. It should employ multiple models of validated human physiology including cardiovascular system, pulmonary system, neuromuscular system, and central nervous system. The models should allow the patient to exhibit clinical signs (e.g., spontaneous breathing, eyelid blinking) and monitored parameters (e.g., electrocardiogram, blood pressure) and should automatically respond to therapeutic intervention without any/ minimal input from the instructor.
2. The mannequin should be controlled completely wirelessly and should not be connected to any control system/instructor computer through wires/hoses.
3. The mannequin should have a realistic skeletal structure, providing true-to-life articulated motion.
4. The simulator should have facilities to teach the following skills a. Intravenous cannulation b. Head tilt-chin lift, Jaw thrust methods c. Airway skills - Controllable open / closed airway, automatically or manually controlled - Suctioning (Oral and Nasopharyngeal) - Bag-Valve mask ventilation - Orotracheal intubation - Nasotracheal intubation - Combitube placement - LMA placement - Endotracheal tube intubation - Right Mainstream - Retrograde intubation - First grade fiber-optic intubation - Light wand intubation - Needle cricothyrotom - Surgical cricothyrotomy d. External pacing
5. The patient simulator should have a cardiovascular system that automatically calculates dependent variables (e.g., blood pressure, heart rate) in response to changing cardiovascular system status (e.g., bleeding, intravenous fluid administration), including the following:
A baroreceptor reflex that compensates both centrally (e.g., heart rate, cardiac contractility) and peripherally (e.g. systemic vascular resistance, venous capacitance) to maintain circulation and perfusion.
B myocardial oxygen supply (e.g., diastolic blood pressure, arterial oxygen partial pressure) and demand (e.g., cardiac contractility, heart rate) that yields appropriate cardiac response (e.g., cardiac rhythm, cardiac contractility) to myocardial ischemia. Untreated myocardial ischemia should automatically result in cardiovascular decompensation with accompanying cardiac rhythms (e.g., ST- segment depression, ventricular tachycardia, ventricular fibrillation, asystole) and ultimately, cardiovascular collapse.

C Arterial blood gases (e.g., PaO2, PaCO2, and pH) and mixed venous gases (e.g., PvO2, PvCO2) that realistically change.
D Hematocrit should be automatically calculated to reflect oxyhemoglobin saturation and administration of a variety of intravenous fluids, such as whole blood, packed red cells, colloids, and crystalloids.
E. A complete hemodynamic monitoring package that includes the capability to measure and monitor the following: ABP, Left ventricular blood pressure, CVP, Right atrial pressure, Pulmonary artery pressure, Pulmonary artery occlusion (wedge) pressure, cardiac output.
6. The patient simulator should have a pulmonary system that automatically calculates alveolar and arterial gas partial pressures in response to ventilation, fraction of inspired oxygen, intrapulmonary shunt fraction, and metabolic gas exchange (For example, apnea orhypoventilation should automatically result in hypercarbia, hypoxemia, decreasing oxyhemoglobin saturation and tachycardia) A. During spontaneous ventilation, the patient mannequin should breathe with a spontaneously controlled respiratory rate and tidal volume to maintain normocarbia and adequate oxygenation. B. Positive pressure ventilation or return of spontaneous ventilation should automatically reverse apnea with the response appropriate to the rate and tidal volume or ventilation. C. The Patient Simulator should automatically responds to the fraction of inspired oxygen present, such as with smoke inhalation or supplemental oxygen. D. Should have pre-cut for Bilateral chest tube insertion for saving skin replacement. chest tube insertion with fluid output and automatic resolution of physiology .
7. The patient simulator should have a pharmacology system model with automatic calculation of pharmacokinetics and pharmacodynamics for all commonly used intravenous and inhaled medications, yielding appropriate changes in patient clinical signs and monitored parameters. All patient responses to drug administration should be automatic, dose dependent, and follow an appropriate time course even in case of students errors.
8. Patient outcome should be solely based on patient physiology and the treatment administered (e.g., ventilation, oxygen therapy, drug therapy) and should not be influenced by subjective assessment of the operator thus providing objective evaluation of clinical performance and reducing risk of negative training transfer
9. Patient simulator should be equipped with a simulated monitor capable of displaying all of the following parameters: ECG, Invasive Blood Pressures (ABP, CVP, PAP, WedgePressure), Cardiac Output, SpO2, PR/HR, ETCO2, Body and Blood Temperature, NIBP A. The simulated monitor should have configurable alarm limits with accompanying sounds for each parameter. B. The frequency of the pulse tone should be synchronized with the cardiaccycle and the pitch should correlate with the SpO2 value.
10. The mannequin should have a realistic airway (mouth, oropharynx, larynx, esophagus, trachea, carina) resembling to that of an actual human patient. A. Depending on head positioning, choice of clinical tools, and other maneuvers, it should be possible to achieve anywhere from a Cormack Class I (e.g., easy intubation) to a Cormack Class IV (e.g., difficult intubation) airway. B. The mannequin airway should allow use of airway adjuncts (e.g., combitube, laryngeal mask airway) as they are used in real patients, without any special adjustments by the instructor (e.g., activation of posterior swelling to seat the LMA). C. The success or failure of airway management should be automatically reflected in the resulting

ventilation, oxyhemoglobin saturation,and overall cardiopulmonary stability.
11. The patient simulator should have trauma simulation capabilities, such as: A. Surgical cricothyroidotomy B. Articulated mandible C. Articulation in elbow, wrist, knees and elbows D. Simultaneous bleeding at different sites linked to physiology E. Secretions from eyes, ears, mouth. F. Bi-lateral pneumothorax needle decompression at the clinically appropriate location G. Bi-lateral chest tube insertion (with fluid return) at the clinically correct location. Each trauma capability should require minimal instructor input and physiological consequences (e.g., improvement in blood pressure, ventilation, and oxyhemoglobin saturation) should be automatic.
12. The patient simulator should have fully independent left and right lungs. A. One-sided pneumothorax should result in chest distention on one side, with the other side rising and falling with spontaneous breathing. B. The simulator should have independent breath sounds linked to ventilation of each lung for both spontaneous and mechanical ventilation. C. One-lung ventilation should automatically result in appropriate breath sounds, chest excursion, and pulmonary gas exchange. D. Independent bilateral trauma feature (needle decompression / chest tube)
13. The patient simulator should have independent blinking eyes and light reactive pupils. Eye blinking should be automatic and dependent on the underlying patient physiology (i.e., level-of-consciousness, level of neuromuscular blockade). It should be possible to easily set the pupils to different settings (i.e., pinpoint, reactive, non-reactive, blown).
14. The patient simulator should be capable of physically shaking, giving a visible clue of convulsions, tremors, or other similar conditions.
15. The patient simulator should have touch activated, bi-lateral palpable pulses in the following locations: Carotid, Brachial, Radial, Femoral, Popliteal, Pedal (dorsalis and tibialis)
16. The patient simulator should have an advanced cardiac life support system in which: A. Effective chest compressions automatically yield artificial circulation, cardiac output, central and peripheral blood pressures, palpable pulses, and exhaled CO2. B. Ineffective chest compressions yield inadequate cardiac output and circulation and an absence of exhaled CO2. C. Defibrillation energy is automatically identified, quantified, and logged D. Pacing current is automatically identified, quantified, and logged, with appropriate physiological response.
17. The patient simulator should include independent simulations of patients (e.g., young healthy male, pregnant female, elderly patient with coronary artery disease) and injury/disease scenarios (e.g., anaphylactic shock, ruptured spleen, subdural hematonia.) A. It should be possible to combine any patient with any scenario, creating a wide variety of clinical care simulations. B. It should be possible to run multiple conditions simultaneously to create multi-trauma care simulations. C. It should be possible to run multiple injury/disease scenarios simultaneously on a particular patient to create multi-trauma simulations
18 Trauma kit must include: A. One Abdominal Evisceration, One Calf Avulsion, One Open Head Wound,

B. One Lacerated Thigh, One Compound Fracture (Arm), Three Bruising Patches, C. Six Bullet Holes, Three Lacerations, Two Fire Burns, Three Electrical Burns, D. One Spider Bite/Decubitus Ulcer, One Blood Pumping System, Simulated Blood and E. One Set of Wound/Treatment Cards. F. One partial and one fully amputated Arm/Leg.
19. Simulator must have the following in build Learning Module Scenarios: A. Advanced Cardiac Life Support (ACLS) as per latest Guidelines B. Airway Management –I
20 The system shall be supplied with Stethoscope, Laryngoscope, LMA,Resuscitator Bag, Patient Bed (01 no.).

36.	**Trauma Head Mannequin**	1. Trauma head mannequin should be mounted to a base. It should be capable of easy transfer to adult manikins for use in full-body trauma scenarios. 2. It should be anatomically accurate human skull simulator and radio opaque. It should allow training and practice in the recognition and assessment of palpable fractures; open depressed skull fracture; Le Fort I and III; nasal fracture; mandibular fracture; fracture of C-6 vertebra; unequal pupils and hemotympanum.
37.	**Bleeding Trauma Management Trainer**	1. It should be a realistic full body mannequin for training a wide range of advanced trauma life support skills. It should come with a wireless instructor control and simulated patient monitor. 2. It should include a realistic life-size intubation trainer with a flexible tongue, arytenoid cartilage, epiglottis, vallecula, vocal cords trachea, esophagus, and simulated lungs. 3. It should have interchangeable pupils (normal, constricted, blown). 4. It should have a neck opening and a replaceable skin to practice cricothyrotomy techniques. 5. It should have a head that can tilted forward, backward or rotated 90 degrees to either side. 6. It should have a manually inflatable tongue to simulate an obstructed airway. 7. It should allow performing airway skills that include bag valve mask ventilation, oral and nasal endotracheal intubation, oropharyngeal and nasopharyngeal airway insertion, retrograde intubation, light wand intubation, supraglottic device (laryngeal mask airway) insertion, combi tube insertion. 8. It should allow performing trans-tracheal ventilation, needle and surgical cricothyrotomy. 9. Stomach auscultation to verify proper airway positioning should be possible. 10. It should enable suctioning techniques. 11. It should have articulation IV arm with replaceable skin and infusible vein system to allow peripheral intravenous therapy and site care. Venipuncture should be possible in the antecubital fossa and dorsum of the hand. 12. It should have bilateral deltoid, bilateral thigh, ventrogluteal and gluteal intramuscular injection sites. 13. It should have leg that allows practice of intraosseous access and fluid infusion. 14. It should permit tension pneumothorax needle decompression and chest tube insertion training. 15. It should allow cardiac rhythm variations and defibrillation. 16. It should permit manual chest compressions. 17. It must have a 3- or 4- lead ECG dfisplay on patient monitor. 18. It should allow pacing 19. The lung sounds should be synchronized with breathing rate, it should allow individual lung or bilateral sound selection (normal breath sounds, crackles, wheeze). 20. It should have heart sounds synchronized with programmable ECG. 21. It should have computer-generated sounds and allow live voice feed via microphone. 22. It should have articulated blood pressure arm to be auscultated or palpated for measurement of non-invasive blood pressure. 23. The systolic and diastolic pressure may be set.

		24. It should allow palpation of bilateral carotid pulses, brachial and radial pulse on blood pressure arm. 25. The pulses should be synchronized with programmable ECG and pulse strengths dependent on blood pressure. 26. It should be possible to create or modify pre-programmed scenarios and facilitate review and debriefing. 27. It should come with a handheld touchscreen remote for easy pick up and play. 28. It should come with a simulated patient monitor that displays simulated parameters including HR, ECG. SpO2, BP, respiration rate, temperature and etCO2 controllable via wireless device along with virtual defibrillation and AED interface. It must include a basic trauma life support injury module which can simulate dilated pupil, contusions, lacerations, and abrasions, distended jugular vein, flail chest segment, fractures- open and closed burns-1st, 2nd and 3rd degree, impaled object, abdominal evisceration, stab wound, projectile entry/exit (small and large caliber), and blood splats.
38.	**Trauma Wound Care Trainer**	• The model should be realistic soft tissue with skin, fat, and muscle layers. • It should come in a handy, compact clam pack with a lid which can be used to retain the excised tissue and removed foreign bodies. • The wound should contain broken bone with splinters, tendon and fluid filled vein. • It should also contain necrotic tissue and simulated foreign bodies (glass and dirt). It should come with scalpel (1), forceps (1) gauge pieces in a stainless-steel tray (1) simulated foreign bodies (1)
39.	**Abscess Drainage Trainer**	1. The model should permit training in skill of abscess drainage. 2. The abscess must contain simulated pus. It should come with scalpel (1), forceps (1), gauge pieces in a stainless-steel tray (1), glue gun with 10 sticks, simulated pus (5).
40.	**Adult Intraosseous Infusion Simulator**	1. It should be a realistic articulating light-colored adult leg model with simulated tibia and palpable anatomical landmarks (tibial tuberosity, medical malleolus) for training in intraosseous infusion techniques. 2. Simulated tibia should provide realistic resistance as needle enters marrow cavity. 3. Simulated marrow should be inspirable to confirm needle placement. 4. Model should allow training in intraosseous needle insertion and infusion method. 5. Drain plug should be available to drain infused simulated blood/fluid. Model must be supplied with ten replaceable intraosseous pads, four replaceable skin pads, simulated blood (2), lubricating jelly (2), towel (1) 15mm ,25mmm and 45 mm interosseous needles (2 each) with intraosseous gun (2), connectors, instructions for use.
41.	**Mediolateral Episiotomy / Perineal repair trainer**	1. It should be made up of soft material 2. It should demonstrate episiotomy wound in different positions It should be used many times for suturing
42.	**Birthing Simulator with Post-partum haemorrhage module**	Training solution for all skills relating to routine and difficult deliveries and can be used for both hybrid simulation and stand-alone bench top training. It should allow running of scenarios with the ability to record actions and interventions made and time to deliver the baby.

		Traction applied to the baby's head should be measured in Newtons and plotted throughout the scenarios on an easy to see graph. The manikin should allow training and practice in the following types of birth: • Normal • Vaginal breech • Shoulder dystocia with force feedback* • Vaginal assisted (forceps and vacuum devices) • Third stage of labor • Cord prolapse • Urinary catheter placement • IM injection • Communication and teamwork skills The manikin should have the following features – • Suitable for use with Simulated/Standardized Patient • Realistic pelvic floor • Articulating thighs for McRobert's procedure • Stretchable perineum • Soft, flexible birthing canal • Additional modules should be available to upgrade the manikin for training: o Post-Partum Hemorrhage management o C-section o Cervical Dilatation and Effacement • Optional lower legs for all fours position • Should supports bench top training or hybrid simulation • Skin washable with soap and water • Should be Latex free • Should have anatomical landmarks as – o Birth canal and cervix o Ischial spines and pubic bone o Gynaecoid pelvis o Articulating thighs o Fully articulated baby with clavicles, fontanelles, flexible head, detachable umbilical cord and placenta **Simulator for versatile cervical dilation and effacement training, for assessing both the latent and active stages of labour. The attachment should have following features –** • Should have inserts to represent early labour cervixes effacement, dilatation and ripeness in line with Bishop's scoring • Numerous presenting part inserts including flexed, deflexed, brow, face, breech, caput and molding • Realistic pelvic floor • Stretchable perineum • Soft, flexible birthing canal • Dynamic positioning mechanism to allow adjustment of dilation in active labour • Markers to allow tutor to read positioning in situ • Presenting parts and cervix can be set up outside the model for demonstration, then placed inside for examination. PPH Module –

		• Management of post-partum bleeding:
		  ○ Fundal massage
		  ○ Bi-manual compression
		  ○ Hemostatic balloon insertion and management
		• Communication skills with mother when used with Simulated Patient
		• Intramuscular injection
		• Estimating blood loss
		• Blood loss of up to 2 liters can be simulated
		• Air bulbs are used to stimulate blood flow and control atonic state of the uterus
		• Blood loss of up to 2 liters can be simulated
		Air bulbs are used to stimulate blood flow and control atonic state of the uterus

43.	**Cervical examination and PAP smear trainer**	• **Must include** Includes external genital pad, vagina, seven-piece cervix set . • 7-Piece Cervical Set should have following cervical models. 1. Normal 2. Dysplasia 3. Polyp 4. Early Cancer 5. Late Stage Cancer 6. Inflammation 7. Pregnancy • Must have upper and lower support blocks, baby powder, methyl cellulose, blood Powder Packet with 0.15 cc Spoon, syringe, lubricant, and instruction manual.
44.	**Pelvic examination & gynecological simulator**	• It should be full size female lower torso with relevant internal anatomic landmarks • Bi-manual pelvic examination • Palpation of normal and pregnant uterus • Vaginal examination including insertion of speculum • Visual recognition of normal and abnormal cervices • Uterine sounding • IUD insertion and removal • Distal end of vagina facilitates introduction of a female condom or sizing a 75mm ring • Removable introitus add flexibility for addition of multiple ZOE options • Laproscopic visualization and occlusion of fallopian tubes • Minilaprotomy • Antiverted and one reteroverted parous uterus • Normal uterus with short fallopian tubes for palpation exercises • Early pregnancy uteri. One is 6-8 weeks and other is 10-12 weeks • 1 twenty-week pregnant uterus • 5 normal cervices with patent os • 4 abnormal cervices • 6 fallopian tubes • Realistic sculpted and anatomically accurate ovaries and fimbriae • Uterus and cervix feature patented insertion of IUD into uterus “screw” design for fast and easy change out • Washable with soap and water. Latex free
45.	**Obstetric examination trainer**	• Obstetric examination simulator should have life size full body with dimensions approximately 177 (L) × 44(W) × 25 (H) cm and should have the provision of showing the delivery in 4 positions: Supine, Hands

		and knee, Lateral and free style. • The manikin should have joint less ankle for achieving realistic delivery positions. • The simulator should be suitable for providing comprehensive training in external examination of pregnant women, internal examination during stages of delivery, obstetric assistance, perineal suture of birth canal lacerations, palpations of the uterus fundus and breast care procedures • Should have obstetric abdominal palpation model representing 36^{th}-40^{th} week of pregnancy allowing visual diagnosis, palpation and abdominal measurements according to four type of Leopold's maneuveres • Should be supplied with Two fetal models one with inflatable amniotic sac having fetal heart beat and the second fetus for obstetrics practice • It should allow changing the position and orientation of fetus for diagnostic training in various fetal positions and orientation. • Fetus should be lifelike flexible without any joints in knee, hip, shoulder and elbow to simulate normal and breech deliveries and handling of the fetus in the most natural way.Fetal heartbeat should be adjustable from 80-180 bpm • Should have vaginal examination module made of highly realistic material giving real feel of vaginal wall, ischial spine and pubis symphysis can be felt. • Should allow confirmation of bishop score from late stage of pregnancy to the onset of labour. • Should have interchangeable uterus models with varying degrees of dilation for adjusting fetal head engagement allowing assessment of the progression of labor by vaginal examination • Should have obstetric assistance module for practicing protection of perineum, breech extraction. Should have Vulva with urethral orifice for catheter insertion • Should have real soft umbilical cord which should slide away from scissors while cutting, and it should be usable for multiple times to practice tying and cutting • Should have placenta and fetus to practice entire sequence from fetus delivery to tying the umbilical cord, cutting the umbilical cord and delivering the placenta. • The material for the soft birth canal and perineum should provide real life like extensibility to allow practice of normal \ emergency breech extractions. • Should allow practice for Preparation and perineal suturing by conforming the left/right laceration site and level of soft birth canal • Should Enable training in Breast care like palpation of breast and nipple, inspection of breast and mammary gland flexibility, massage of nipple and palpation of the breast. Its parts like Vagina, vaginal wall, ischial spine, pubis symphysis, fetus, Placenta, Umbilical Cord, Perinium, Uterus etc should be made of Highly Realistic Life like material to give feel of a patient.
46.	**Pediatric IV Cannulation training arm**	• Pediatric Multi-Venous IV Training Arm should be lifelike pediatric arm with replaceable skin and multi-vein system designed for peripheral intravenous therapy. • Venipuncture should be possible in the antecubital fossa and dorsum of the hand

		• Accessible veins should include median, basilic and cephalic • Arm should articulate to pediatric manikins and task trainers Kit should include: 1 Pediatric IV Arm - Right, 1 Replacement Skin and Multi-Vein System, 1 Bottle Red Simulated Blood, 1 Can of Manikin Lubricant, 1 Blood Bag with Tubing and Connector, 1 Clamp and Hook, 1 Set of Shoulder Attachment Hardware, 1 Carry Case and Directions for Use
47.	**Newborn venous access simulator**	An anatomically correct representation of a neonate to teach and practice the vascular access in new-borns. Should allow practising the accessing, securing, dressing, site care, and maintenance for standard venipuncture, central catheters, PICC lines, and umbilical catheters. 1. Should have access to median basilic and axillary veins on the right and left arm 2. Should have access to saphenous and popliteal veins 3. Should have access to external jugular and temporal (scalp) veins 4. Realistic flashback of simulated "blood" should confirm the proper needle location in the vein. 5. The umbilicus allows repeated catheterization of the umbilical catheter, with proper placement verified by a blood return.
48.	**Pediatric Intraosseous Simulator**	1.It should be a pediatric size life like lower leg with simulated tibia and anatomical landmarks (tibial tuberosity, medical malleolus). 2. It should be designed to allow intraosseous needle insertion 3. It should be compatible with fluid infusion so that fluid may be infused for realistic flashback. 4. Drain plug should be available to drain infused fluids. 5. It should be supplied with- with one leg and five intraosseous pads, compatible intraosseous needle set of 5, connectors, IV bag with solution set (2), direction for use (1).
49.	**Infant intraosseous infusion trainer**	1. It should be a infant size life like lower leg with simulated tibia and anatomical landmarks (tibial tuberosity, medical malleolus). 2. It should be designed to allow intraosseous needle insertion 3. It should be compatible with fluid infusion so that fluid may be infused for realistic flashback. 4. Drain plug should be available to drain infused fluids. 5. It should be supplied with- with one leg and five intraosseous pads, compatible intraosseous needle set of 5, connectors, IV bag with solution set (2), direction for use (1).
50.	**Newborn lumbar puncture model**	The Advanced neonatal Lumbar Puncture Model should allow training in Lumbar Puncture technique. The model should have following features- 1. The Life form Neonatal Lumbar Puncture Simulator represents 0-1 month old infant placed in a left lateral decubitus position with the neck and knees flexed, approximating the fetal position. 2. The embedded iliac crest should offer realism, with removable spine, spinal canal and skin pad. Lumbar puncture may be performed in the L3-L4, L4-L5, or L5-S1 spaces.

		3. The correct site should be able to be located by palpating the ilia crest and spine. 4. A small "give" should be felt as the spinal needle is advanced into the proper space. 5. Fluid should flow when the needle is in proper position. 6. Latex free
51.	**Neonatal Intubation Trainer**	1. The trainer should be robust, lifelike mannequin head which realistically simulated that of a newborn baby to enable training in intubation skills. 2. It should allow training in both oral and nasal intubation and bag-valve mask ventilation. 3. Correct tube placement can be checked by lung inflation tests. 4. It should be mounted on a base. It should be supplied with neonatal head on a base (1), lung set (2), airway lubricant (2) and instruction manual (1), uncuffed endotracheal tube size 2.5 (10), laryngoscope handle (2), laryngoscope blades # 0 and #1 (1 each), intubation stylet (1), carry case (1).
52.	**Infant Intubation Trainer**	1. The trainer should be robust, lifelike mannequin head which realistically simulated that of a infant to enable training in intubation skills. 2. It should allow training in both oral and nasal intubation and bag-valve mask ventilation. 3. Correct tube placement can be checked by lung inflation tests. 4. It should be mounted on a base. It should be supplied with neonatal head on a base (1), lung set (2), airway lubricant (2) and instruction manual (1), uncuffed endotracheal tube size 2.5 (10), laryngoscope handle (2), laryngoscope blades # 0 and #1 (1 each), intubation stylet (1), carry case (1).
53.	**Child Intubation Trainer**	1. The trainer should be realistic, robust and simulate a six-year -old child's torso for training pediatric intubation skills. 2. It should have anatomical structures including a flexible tongue, arytenoid cartilage, epiglottis, vallecula, vocal cords, trachea, esophagus, and simulated lungs. 3. It should facilitate training of head positioning. Head can be tilted forward, backward, or rotated 90 degrees to either side. 4. The airway should be anatomically accurate to practice skills of oral intubation, nasal intubation, oropharyngeal and nasopharyngeal airway insertion, suctioning techniques. 5. It should allow bag-valve mask ventilation and show realistic rise and fall of the chest. It should be supplied with child's upper torso with head, airway lubricant (1) and instruction manual, uncuffed and cuffed endotracheal tube of size 4 and 5 (2 each), laryngoscope handle 2, laryngoscope blades #2 (1 each of straight and curved type), intubation stylet (1), carry case (1)
54.	**Patient care mannequin-infant**	• It should be an anatomically accurate newborn manikin simulating a term baby. • The intubation head should have a flexible tongue, arytenoid cartilage, epiglottis, vallecula, vocal cords, trachea, esophagus, and simulated lungs. • It should be possible to position the newborn to simulate opening the airway via head tilt, chin lift or jaw thrust • It should allow positive pressure ventilation via bag and mask

		ventilation. • It should be compatible with endotracheal tube intubation, supraglottic device like laryngeal mask airway insertion. • It should allow orogastric tube insertion. • It should show stomach distension (when ET is misplaced) • It should allow suctioning of the nares, nasopharynx, oropharynx, esophagus, and the lungs via an ET tube. • Should allow bilateral and unilateral (with mainstem intubation) chest rise and fall with mechanical ventilation. • It should be possible to do needle thoracentesis/decompression in a simulated tension pneumothorax situation. • It should allow manual chest compression to up to on third of anteroposterior diameter of chest. • It should come with a retractable umbilical cord with two arteries and a vein allowing high and low umbilical artery catheterization. • Palpation of umbilical pulse should be possible. • Umbilical Vein catheterization should be possible via patent umbilicus with facility to allow fluid return through umbilical reservoir. • There should be articulating legs. It should allow intraosseous access with anatomical landmarks of tibial tuberosity and medical malleolus. • The manikin should be supplied in light skin colour. • It should be provided with a compatible congenital anomaly set containing cystic hygroma head skin with insert, cleft lip head skin, forceps head skin, polycystic kidneys, omphalocele insert, myelomeningocele insert to train in techniques of neonatal resuscitation in difficult scenarios. It should be supplied with replaceable umbilical cord (8) clamp (1), airway lubricant (4), blood concentrate (4), intraosseous pads (6) baby clothes (2), instruction manual, carry case (1), lung set, uncuffed endotracheal tube size 2.5 (10), laryngoscope handle (2), laryngoscope blades #0 and #1 (2 each), intubation stylet 2.
55.	**Neonatal resuscitation mannequin**	

55:<u>NEONATAL RESUSCITATION MANNEQUIN</u>

Mannequin:-
• Should be wireless, tether-less & physiological simulator representing newborn to one month baby.
• Should have interchangeable genital.
• Should be able to facilitate bleeding

• Should have inbuilt battery backup.
• Should have wireless instructor control.
• Mannequin should not weigh more than 8 lbs
• Should allow neonatal training needs from well newborn care to S.T.A.B.L.E., NRP and PALS training
• Should have ability to use ventilator in SIMV, CMV, with pressure or Volume control.
• Should be available in three physiologically modeled patients to support simulated scenarios at different post-delivery time periods
1) Post delivery (Delivery to two to five minutes)
2) Newborn (2 minutes to 2 days)
3) Infant (2 days to 1 month)
• Should have realistic articulation in -neck, jaw, shoulders, elbows, hips, knees.
• Should have Forearm pronation & supine-nation
Simulator should have following features:-
A)Airway/ Respiratory system
• Realistic anatomical correct airway
• Bag-valve-mask (BVM) ventilation
• Orotracheal and nasotracheal intubation
• Laryngeal mask placement (LMA)
• Oral and nasal pharyngeal insertion (OPA, NPA) »
• Tracheostomy care and management
• Right main stem intubation with detection
• Laryngospasms
• Stomach distention with esophageal intubation
• Spontaneous breathing
• Bilateral and unilateral chest rise
• Lung auscultventilation sites on anterior chest
• Upper airway sounds of crying, hiccup, gasping, grunting, stridor, wheezing
• Unilateral needle decompression
• Chest tube placement
• Substernal retractions
• Pneumothorax decompression
• Should support mechanical ventilation modes – A/C, SIMV, CPAP, PCV, PSV, NIPPV
• Should support PEEP upto 15 to 30 cm H2O
B)CARDIOVASCULAR SYSTEM
• 3-lead ECG monitoring with real equipment
• 12-lead dynamic ECG display
• Defibrillation, cardio-version and pacing using live equipment with simulated defibrillator (external defibrillation box)
• Heart auscultation
C)Circulation
• Bilateral brachial and femoral pulses
• Umbilical pulses

• IV access at antecubital, foot and scalp
• Umbilical catheterization and infusion
• Unilateral tibial IO access
• Bilateral IM/SQ injections
• Urinary catheterization – continuous infusion and sampling
• Peripheral arterial catheter insertion
• Subclavian catheter placement
• Circumoral cyanosis
• Pulse palpation should be detected and logged in software
D)CPR
• Compliant with latest AHA Guidelines
• CPR compressions should generate palpable pulse, blood pressure, waveform and ECG artifacts
• Should have Realistic chest compression depth and resistance
• Should have advanced CPR Metrics detecting hand placement, rate and depth of compressions, recoil, ventilations and ventilation to compression ratio
• CPR metrics should be visible on the patient monitor so learner can see their performance
• Should have library of cardiac rhythms
E) GASTRIC AND URINARY
• Interchangeable female and male genitalia
• Abdominal distention when incorrectly intubated
• Urinary catheterization with urine output
• Feeding tube placement
F) NEUROLOGIC
• Variable Tristate Eyes
• Manually-manipulated fontanel (depressed, normal, and bulging)
• Crying/Grunting
• Active arm movement
G) SOUNDS
• Normal and abnormal heart, lung and bowel sounds
• RFID technology based
• Pre-recorded vocal sounds
H) PRECONFIGURED SCENARIOS
• Infant Code (one-month old PALS)
• Neonatal Abstinence Syndrome
• Neonatal Code (newborn NRP)
• Pneumothorax
• Poor Perfusion
Should be supplied complete with :-
1. Wireless newborn simulator - 01 no.
2. Software compatible tablet – 02 no.
3. Software platform instructed driven– 01 no.
4. Software License – 01 no.
5. Simulated stethoscope – 01 no

6. Patient monitor computer – 01 no
7. Simulated defibrillator- 01 no.
8. Inbuilt scenarios – 05 to 10 nos.
9. Stand Alone Ventilator for Simulated Scenario with following features
• Should display complete range of basic monitored values
• Should have operator-adjustable parameters for each mode of ventilation common to conventional hospital ventilators
• Should have adjustable screen layout, alarms, and other settings
• Should provide experiential learning skills required to manage and monitor ventilation of a patient, and troubleshoot ventilator issues.
• Should have at least 15 to 20 alarms.
• Should have loops for pressure volume, pressure flow and volume flow.
• Should display waveforms for pressure, flow, volume, electrical activity of diaphragm, SpO2 and CO2.
• Should have maneuvers for inspiratory hold and expiratory hold
Should have following ventilation modes with parameters
• Volume-controlled ventilation (VCV): VT, PEEP, Flow Trigger, RR, Tpause, Ti rise, I:E, FiO2
• Pressure-controlled ventilation (PCV): Pi, PEEP, ΔPsupp, Flow Trigger, RR, Ti rise, I:E, FiO2
• Continuous positive airway pressure (CPAP+PSV): PEEP, ΔPsupp, Flow Trigger, Ti rise, End Inspiration %, FiO2, Tapnea, Pi backup, RR backup, I:E backup
• Volume support ventilation (VSV): PEEP, Flow Trigger, VT, Ti rise, End Inspiration %, FiO2, Tapnea, VT backup, RR backup, I:E backup
• Neurally adjusted ventilatory assist (NAVA): PEEP, Edi Trigger, Flow Trigger, NAVA Level, FiO2, Tapnea, Pi backup, RR backup, I:E backup
• Synchronized intermittent-mandatory ventilation (SIMV): PEEP, ΔPsupp, Flow Trigger, VT, RR, Tpause, Ti rise, I:E, End Inspiration %, FiO2
Stand alone ventilation should be supplied with :
• Ventilator cart
• Medical attachments for breathing circuit with mask and tracheal tube, SpO2 probe, CO2 sample line, O2 hose.
• Tablet for students
• All-in-one monitor
• ventilator software and license
• User guide
• Instructor Tablet & Router
• Physiological Software and license for standalone configuration.

56.	**Preterm task trainer**	1. It should be a realistically proportioned 25-28week preterm model for resuscitation & critical care. 2. It should have anatomically accurate, realistic airway that allows for endotracheal tube insertion, Sellick maneuver and allows right mainstem intubation, positive pressure ventilation. 3. It should allow procedures like suctioning orogastric/nasogastric tube insertion. 4. It should be able to demonstrate both bilateral and unilateral chest rise and fall scenario with mechanical ventilation. 5. It should allow realistic chest compressions. 6. It should have patent, ready to cut umbilicus with venous and arterial access for bolus or infusion with simulated blood flashback upon cannulation of umbilical vein. 7. It should be supplied with simulated blood (1) umbilical cord of appropriate size (1), lubricant (1), cap (1), blanket (1), carry case (1), instruction manual,
57.	**Pediatric emergency training system**	1. It should represent a 6-12 year -old boy/girl that simulates a wide range of conditions from a healthy, talking child to an unresponsive, critical patient without any vital signs to provide case-scenario based training for pediatric emergencies. 2. The child simulator should come with a wireless touch screen remote control, connection box, laptop with operating software and simulated patient monitor (approximately 23-26inches). 3. The manikin should have window-based operating system and be able to run with both laptop and touch screen Wi-Fi enabled handheld remote control. 4. The system should have inbuilt compressor that does not interfere with the auscultation of manikin sound ana not cause unwanted manikin body movement. 5. The system shall provide supplemental wired power capability. 6. The system shall permit pre-recorded multi-media clinical procedural training videos, multi -media images, laboratory values and X Rays to be inserted into simulations via the touch screen patient monitor. 7. The system shall include a profile editor which allows each instructor to specifically configure the simulator and interface to meet their preference and needs. 8. The system shall include a profile editor which allows each instructor to specifically configure the simulator and interface to meet their preference and needs. 9. The simulators airway skills/features shall include realistic airway with anatomical landmarks including oral and nasal passages, flexible tongue, arytenoid cartilage, epiglottis, vallecula, vocal cords, trachea, esophagus, cricoid cartilage, and bilateral lungs. 10. It should allow head tilt and jaw thrust manoeuvres to open airway, nasopharyngeal and oropharyngeal airways insertion, oral and nasal intubation, LMA or ET insertion, bag valve mask ventilation 11. It should have option to show Tongue oedema. 12. It should be possible to insert NG tube. 13. It should show simulate spontaneous breathing with observable chest rise. Facility to set variable respiratory rates. 14. Should have feature of multiple airway sounds synchronized with breathing unilateral and bilateral chest rise and breath sounds 15. There should be possibility of 3 lead ECG monitoring, display of normal and

		abnormal pediatric ECG monitoring, display of normal and abnormal pediatric ECG rhythms, multiple heart sounds synchronized with ECG. 16. Cardiac compressions should generate palpable carotid pulses, BP waveforms 17. Intravenous access and intraosseous access should also be available 18. It should be possible to manually measure blood pressure by auscultation of Korotkoff sounds 19. Bilateral carotid and unilateral brachial and radial pulses should be synchronized with ECG 20. It should come with a simulated patient monitor (approximately 23-26inches) that should display multiple simulated parameters including HR, ECG, SpO2, BP, RR temperature and etCO2, as in a real patient along with virtual defibrillation and AED interface. 21. Facility for interchangeable pupils of normal size, constricted and dilated. 22. Facility to simulate convulsions. 23. The software should include latest PALS scenarios.
58.	**Skin pad for Demonstrating sebaceous Cyst Removal, Punch Biopsy and Slit Skin Smear**	1. It should be a model of skin pad for practicing the full sebaceous cyst removal/punch biopsy/slit skin procedure. 2. It should have a 3-layer skin with epidermis, dermis and subdermal layer containing simulated cysts. It should help learn and practice the skills and procedures that include marking out the cyst, perform punch biopsy, perform slit skin smear, planning and marking the ellipse, incising the skin, sharp dissection, blunt dissection, removal, and closure.
59.	**Ear Diagnostic Simulator**	1. Model should be based on platform that is a combination of hardware and software 2. Model should have lifelike and right ear attachment and middle ear. 3. Model should have a life like Otoscope with the unit. 4. Model must have a dedicated software for training program. 5. Unit should have proper landmark identification program. 6. System should have database of over 70-90 high-resolution images of various ear pathologies. 7. Software of the unit should have detailed educational descriptions and histology images. 8. Model should offer land marking function to highlight specific features to be viewed by the student through an otoscope, encouraging student/instructor interactions. 9. Should have intuitive, easy-to -use graphic interface. 10. System should offer self-learning tool in terms of virtual guide 11. System should have capability to offer unique optics 12. Image of the tympanic membrane- a realistic clinical scenario. 13. System should be sensitive to detect the user's movement and displays the viewed region of the ear drum. 14. Software should verify student progress via lifelike otoscope Trainees. 15. The software should offer advanced quizzes with randomized, realistic clinical scenarios that test both medical and patient interaction skills. Model should have a box type base unit, Right Ear form and Left Ear Form, instrumented Otoscope, Control box, Software package, User manual, Laptop, and a protective Hard Case.
60.	**Nose Bleed/Epistaxis Trainer**	1. The model should be human head model with clear nose features. 2. Should be good for training in cautery and nose packing. 3. Success of cautery, at four sites on septum, identified by light panel.

		4. The trainee must be able to identify the bleeding point, clear it by suction and deal with it either by nasal packing or cautery. 5. The interior of the nose should have capillary tubes for delivering artificial blood at variable rates to four sites on the septum. 6. It should have hard plastic head with soft nasal area, control box and 9v battery, 10ml syringes (4), 50ml syringe (1), blood concentrate and instruction manual. 7. To include following instruments for nasal packing: Anterior Nasal Packing Forceps (Tilley's Forceps), Thudicum Nasal Speculum sizes 2 and 6, Killian Self Retaining Nasal Speculum sizes 2 and 4, Luc's Tongue Depressor 02. These instruments should be made of ss-304, certificate regarding the same to be enclosed. The hinges should be rust proof. The instrument surface should be non-reflective. They should not magnetize with use. Consumables Required-Ribbon gauge for anterior nasal packing (10), Merocele nasal packing with drawstrings (10), stainless steel tray with cover (1), drape sheets (1).
61.	**Operating Headlights**	1. Comfortable and mobile LED Head Light without any cables 2. Luminous intensity of around 2,00,000 lux or more 3. Color Temperature of 5000K. 4. Minimum battery service life of 6 hours after full charge. 5. Batteries capable of being charged easily without powering off 6. Rapid USB charging from wall adaptor or PC 7. Integrated battery status indicators. 8. Continuous digital dimming facility 9. Total weight ≤325g 10. Focus down to about 65mm 11. Comfortable through a removable, washable headband • Spare Batteries
62.	**Binocular Indirect Ophthalmoscope (Wireless) with video Display**	1. Binocular indirect Ophthalmoscope with precision viewing up to 1.0mm pupil size. 2. Spot size :3 integrated spot size small spot, medium spot, and large spot. 3. Filters: 4 integrated filters to choose from red filter, cobalt blue filter, yellow filter, and diffuser. 4. Vertical adjustment. +/-4 0 5. Headband with Rheostat and Articulating Hinge to provide vertical adjustment of the rear band. 6. Integrated flip up adjustment optics, which can be locked at 0°, 12.5°,47°,.50 ,60°. 7. Aperture flip up adjustment levers: can be locked to the desired position required. 8. Locking aperture and filter adjustment (safety clutch): protect mechanism from the forced adjustment while in the lock position. 9. I.P.D range from 46-75 mm 10. Fully integrated camera system which is dustproof, best optics and focus, which can be adjusted to 350 to 550 mm with approx. weight of <250gms. 11. ''C'' mount and processor compact with facility for attachment to VCR, digital printers, pc etc. 12. PC with image capture software 13. Digital printer to be provided along with standard accessories.

		14. Video cable 15. S-VHS cable Accessories a) LED bulb b) Teaching mirror c) Rechargeable Li-on battery transformer with LED indicator d) Transformer compatible with voltage system of AC-220-240 volts e) Large & small depressors f) Carrying case g) Spare rechargeable battery with charger h) +20D lens and +28D • Video display with LCD monitor
63.	**Direct ophthalmoscope**	1. Halogen light for true tissue color and consistent, long -lasting illumination. 2. 6 apertures for general and specialist use. 3. 28 lenses with -25 or +40 diopters for battery resolution, Rubber brow rest. 4. Red free and cobalt blue filter. 5. Dust free sealed optics. 6. Universal convertible handle. Nickel-cadmium rechargeable battery

64:HIGH FIDELITY BIRTHING SIMULATOR WITH INBUILT ULTRASOUND

- Maternal-Fetal Simulator complete with anatomically realistic mother and fetus for comprehensive training in prenatal care, labor and delivery, and postpartum care.
- The Maternal Fetal Simulator should be wireless, high fidelity simulator with an automated delivery mechanism and maternal aesthetics like a real patient.
- The birthing mechanism should be noiseless for realistic labour.
- Should have validated integrated maternal-fetal physiological and pharmacological modeling.
- All maneuvers & interventions should result in appropriate patient response automatically based on underline physiology of patient without any input from the instructor
- Birthing simulator should includes a birthing fetus and a second fetus especially designed for Leopold's maneuvers without connection ports on the head or buttocks.
- Should be fully wireless with on-board fluids, pneumatics, and electrical systems
- Should include software licenses to support scenario writing and editing on any computer
- Maternal fetal simulator should have voice linked to labour and should allow upload of voice files in any local language
- Simulator should support full maternal code as a non-gravid patient and should be supplied with non-gravid abdomen and scenarios for the same.
Simulator should have following features
- Should have realistic birth canal with vulva/perineum supporting accurate fetal descent and rotation
- Should provide Multiple Birthing Positions: lithotomy, sitting, and all-fours
- Should allow vaginal examinations for evaluation of the cervix, fetal station, and position
- Should have static cervices representing various stages of dilation (closed to 10cm); effacement from 0-100%

- Should have palpable uterine contractions which can be detected by palpating the fundus
- Should have facility to allow Instructors to control the rate and duration of contractions
- Birthing fetus should not have any connection port at the head or buttocks for realistic presentation during both vertex and breech deliveries
- Fetus/baby should have open mouth for meconium removal & cyanosis treatment
- Should have a customized fetus for Leopold's Maneuvers with hard head and soft buttocks
- Should support and detect McRoberts Maneuver
- Should have observable pelvic which should be registered in event log
- Should support and detect suprapubic pressure with palpable symphysis pubis
- Obstetric maneuvers like McRoberts Maneuver, suprapubic pressure rotation of anterior and posterior shoulder should be detected and logged in event loop to debriefing purposes
- Should simulate realistic shoulder dystocia due to realistic pelvic bone movement and it should be resolved once posterior arm is extracted
- Internal rotations with detection a Should support delivery of posterior arm during shoulder dystocia b Should allow Zavanelli maneuver with detection and logging in event log c Trendelenburg position with detection and logging in event log d Left lateral tilt with detection and logging in event log e Vertex and breech delivery with no exposed metal parts
- Should have Fetal heart sounds – 4 locations based on fetal presentation
- Should have Articulated fetal body neck (with lateral neck movement), shoulders, elbows, hips, and knees
- Should have clinically accurate fetal size with tactile realism – 5th percentile on the WHO growth chart
- Fetus with palpable fontanel and sagittal suture
- Should allow Forceps application
- Should allow Vacuum extraction without fetal cap
- Should provide fetal neck traction graph to give real time feedback on force applied during vacuum or forcep delivery
- Should allow Fetal airway suctioning
- Fetus should have audible cry upon delivery
- Should display predicted 1-minute and 5-minute APGAR scores based on integrated maternal-fetal physiology
- Should simulate postpartum hemorrhaging, including Class III hemorrhage
- Should allow for assessment of uterine atony (Contracted vs. Boggy Uterus)
- Should have facility bimanual compression and uterine massage detection
- Should exhibit A Uterine blood released upon massage b Uterine massage should automatically decrease rate of blood flow c Uterine massage compression effect d Uterine reversion
- Should support placing an Intrauterine balloon
- Umbilical cord can be cut and clamped
- Episiotomy should be possible
- Should have Intact/fragmented placenta with realistic color, texture and flexibility, placenta can be delivered with gentle traction
- Should have an epidural port for realistic infusion and aspiration
- Should allow to recognize sign for emergency C-section for team training of C- Section.
Mannequin should have following clinical features
a. Respiratory

- Manikin should have realistic upper airway with airway management
- Should have Advanced lungs with mechanical ventilation support
- Should allows use of airway devices such as LMA
- Should Support endotracheal tubes, nasal-pharyngeal and oropharyngeal airways
- Should display spontaneous breathing
- Should have bag-valve-mask
- Should exhibit lung sounds: anterior and posterior
- Should have realistic chest excursion & Exhalation
- Should allow positive pressure ventilation
- Should have advance CPR matrices
b. Circulatory System
- Should support real 4-lead ECG that can be connected to simulator
- Should display 12-lead ECG simulated in software
- Should have bilateral pulses: carotid, radial, and dorsalis pedis; with controllable pulse strength
c. Cardiovascular
- Should allow Chest compressions resulting in appropriate physiological changes.
- Should have advanced CPR metrics to measure the consistency of compressions and ventilations, as well as coronary and cerebral perfusion. Hand placement, chest recoil, and left lateral tilt should be detected and logged by the operating system.
- Should support electrical therapy (defibrillation)
- Should allow Bilateral NIBP measurement
- Should have realistic Heart sounds linked to the physiology of the patient.
d. Nervous System
- Should simulate seizures with rhythmic movement of arms, rapid blinking, and jaw movement
- Should have Reactive pupils
- Should have facility to change the colour according to condition of the patient like yellow for jaundice, red in case of blood clot
- Should have Blinking eyes
- Should have live and pre-recorded speech and should also have ability to import customized vocal sounds into system software
e. Fluids
- Should have inbuilt postpartum bleeding tank at-least (1,800 ml)
- Should have Bilateral IV arms with realistic flashback
- Should have Urinary catheterization
Patient Profiles & Scenarios
- Should be supplied with preprogrammed patient profiles with system software to write patient profiles as per training needs
- Should be supplied with pre programmed clinical scenarios (at least 20 nos.) with system software to modify existing scenario & write new scenarios as per training needs

- Pre programmed clinical scenarios for gravid patient should include:
  a A normal delivery
  b An instrumental vaginal delivery
  c Fetal Tachycardia due to Maternal Pyrexia
  d Maternal cardio-respiratory arrest
  e Fetal central nervous system depression by narcotics given to the mother
  f Eclampsia
  g Major post-partum hemorrhage due to uterine atony
  h Breech delivery
  I Shoulder dystocia
  j Umbilical cord prolapse

Urgent Obstetric simulated clinical Experiences (SCEs)

- Anaphylactoid Syndrome of Pregnancy
- Chronic fetal Hypoxia Associated with Placental insufficiency
- Oxytocin induced uterine tachysystole
- Repetitive deceleration caused by umbilical cord compression
- Uncontrolled gestational diabetic
- Fetal Heart rate signal loss
- Inadvertent monitoring of maternal heart rate
- Major placental abruption
- Maternal hypotension follow Epidural Block
- Maternal Sepsis

- **Pre programmed clinical scenarios for non-gravid patient should include :**
  a Chronic Heart failure exacerbation
  b. Acute Respiratory Distress Syndrome
  c Sepsis with Hypotension
  d. Brain Attack with Thrombolytic Therapy
  e Motor Vehicle Collision with Hypovolemic Shock

Audio Video Recording System

I. Microphone Sensitivity: – 25 dB Dynamic range: 82-90 dB Signal-to-noise ratio: not more than 70 dB Cameras: Two camera to be supplied Computer to be supplied with system for display and control

II. Server Intel Core i5 4690T quad core CPU 2x 1TB internal HD storage with RAID-1disc mirroring 8 GB RAM 2 Gigabit Ethernet ports (LAN, Simulator) 4 gigabit PoE Ethernet ports, up to 15.4 W per port Wi-Fi (802.11n) access point for client access Wi-Fi 802.11n network interface for connecting to wireless simulator DVI/VGA/HDMI input for HD display capture with real time H.264 encoding and OCR XLR audio input with phantom power for high quality Audio capture and real-time AAC encoding Ability to capture and video output (display) Size: portable Wall mountable External 100-240 V 200 W powerSupply

III. System features Scalable from 2 cameras to 200 + cameras 24/7 recording capability Software detects start of simulation activity via simulator connection to a scenario, start of an evets log, addition of team member, start of annotations Software automatically retrieve and stores all recorded video Video recording and associate data are segmented in chapters for easy retrieve Recorded simulation activity is saved forever or until the user decided to delete the file Physiological data recorded in real time including waveform displays and trend charts Annotate live or recorded video with auto-complete text based on post records Pick a category that represents the annotation, assign the annotation to team member Advanced search capabilities to find any specific simulation moment Search by date, time, person, room, physiological data or annotation Cloud based backup services

EVENT LOG:

1. The simulator must include physiological, pharmacological event data that is logged and timed stamped.
2. The log must automatically calculate and log the following items:

· Alveolar and blood gases · Cardiac Output · Heart rate · SPO2 · Invasive blood pressure · Hematocrit and hemoglobin values · Temperatures
3. The event long must be able to be saved and printed.
CONTROL SYSTEM: Control system should be comprised of · Instructors wireless remote control capable driving all software programme · Instructor wireless remote control must be expandable for future software up-gradation.
Should be supplied complete with
a Wireless maternal mannequin - 01 no.
b Software License - 04 nos.
c Fetus for Leopold's maneuvers - 01 no.
d Abdominal for labor - 01 no.
e Abdominal for Post Labor - 01 no.
f Static cervices for vaginal examination - 01 set
g Instructor wireless laptop – 01 no.
h Simulated CTG Monitor – 01 no.
I Delivery Table- 01 no.
J The system shall be supplied with Stethoscope, Laryngoscope, LMA,Resuscitation cart, Resuscitator Bag. **WARRANTY**: Warranty must be provided for 5 years after purchase. Followed by 5 years of Anr maintenance contract.
It should have inbuilt ultrasound

65: LAPAROSCOPIC SIMULATOR

LAPAROSCOPIC SIMULATOR	
1.	**Laparoscopy Simulator should have the following:**
i	An easily movable cart with Powered Adjustable height, it moves up or down based on the surgeons height preference.
ii	Simulator must have the facility to Adjustment Base Position.
iii	24 to 32" flat panel monitor that can be tilted for ease of viewing.
iv	Comprehensive performance evaluation Matrix.
v	at least five trocars instruments with 6 to 10 degrees of freedom and multiple tool selections.
vi	Original Haptic Device with 5 to 10 Degrees of freedom.
vii	Two additional Camera: 0, 30 and 45 degree lens angles.
2.	**Should be supplied with following modules :-**
A	**Essential Skill Module**
	i Camera Navigation
	ii Peg Transfer
	iii Cutting
	iv Clipping
B	**Procedural Skill Module**
	i Adhesiolysis
	ii Running the Bowel Module

C	**Suturing and Knot Tying Module**
	1 Essential Skills
	I) Needle Driving
	a Multiple techniques for adjusting the needle orientation
	b Forehand and backhand as well as left hand and right hand driving skills
	c Adjust parameters to increase or decrease the degree of difficulty and to create own curricula using the model provided
	2. Knot Tying
	I) Appropriate suture behavior and software that detects number and direction of wraps
	II) Extensive knot recognition algorithms
	III) Practice knot tying with a needle on or pulled off the suture
	3. Procedural Skills
	I) Simple Interrupted Stitch
	II) Continuous Stitch
	III) Horizontal Mattress Stitch
	a. Allows the user to practice different stitches using a model that has an external and internal surface
	b. Adjust the parameters to increase or decrease the tissue stiffness as well as tissue sensitivity to injury
	c. Integrates the needle driving and knot tying skills and allows various techniques to close an enterotomy
	4. Loop Ligation
	I) Allows the user to practice the placement of a loop around a vessel
	II) Adjust the parameters to increase / decrease blood flow from the vessel as well as adjust the orientation of the vessel
	III) Markers and metrics can be adjusted to increase or decrease the level of accuracy to place the loop
D	**General Surgery Procedures Module**
	1. Laparoscopic Cholecystectomy
	I) Realistic anatomical deviations
	II) Multiple cases from easy to different level of difficulties'.
E.	Complete procedure including total dissection

66	**Diabetic Foot Trainer**	• The foot model should be realistic soft tissue with skin, fat, and muscle layers. • It should come in a handy, compact clam pack with a lid which can be used to retain the excised tissue and removed foreign bodies. • All grades of Diabetic foot should be demonstrable, including gangrene, superficial ulcer and bone exposed wound. • All layers of the soft tissue, including tendons and veins/arteries should be visible in the respective wounds. One of the wound should also contain necrotic tissue. It should come with scalpel (1), forceps (1) gauge pieces in a stainless-steel tray (1)
67	**Skill Trainer for Gastroscopy, Colonoscopy and Bronchoscopy**	• Skill training model should be good for the training of Gastroscopy and Bronchoscopy • Model should be good for UGI and Colonoscopy procedures with user's own scope • Model should have flexibly mounted head with nasopharyngeal zone (with eyes closed, ear with external auditory canal, dentition, esophagus and trachea) • Model should offer training of intubation (retracting epiglottis) and positioning a laryngeal tube • Should have attachments for the bifurcation with lung balloons to the trachea via bayonet fixing • Must offer airway training using respiratory mask and bag • Model should have upper body with removable chest cover • Model should have lower body with removable elastic abdominal cover • Should come with supports for the installation of the large intestine • Should have foam cuts in the chest and abdominal cavity • Model should have female sex organ • Model should be mounted on a board and fixed by straps. • Model should be capable of positioning in supine, lateral and prone position as well as in angled position • Model should be good for further upgradation Deliverables: Silicone oil, pressure atomizer bottle 12.
68	Electronic Shoulder intracavitary injection mannequin	The Ultrasound Guided Shoulder Injection Trainer allows trainees to acquire the key skills in locating, injecting and aspirating the 4 most commonly treated shoulder sites: glenohumeral joint, subacromial space, acromioclavicular joint, bicipital groove. **OVERVIEW** Eco lucent materials visible under ultrasound, should represent the key internal landmarks. Successful injection can be confirmed by visualizing fluid entering the site, or by aspirating fluid. The quantity of fluid in the Subdeltoid Bursa can be adjusted, from no fluid present to a fluid-filled distension. Depending on level of training. Nerve block functionality – should allow trainees to view and inject around the Suprascapular nerve. The model should include muscles and bones to represent the joint accurately Suitable for postgraduate and specialist trainees/ Residents

		VERSATILITY Each skin should withstand up to 400-500 injections per site **ANATOMY** Adult male torso right shoulder Bicep Tendon Sheath Glenohumeral joint Subcromial/Subdeltoid Bursa Acromioclavicular Joint Suprascapular Nerve **SKILLS GAINED** Patient positioning and management Identification of anatomical landmarks while using ultrasound Ability to inject and aspirate fluids from: - Glenohumeral Joint (accessible from a posterior or anterior approach) - Subdeltoid Bursa (in the Subacromial Space) - Acromioclavicular Joint - Biceps Tendon Sheath (which lies in the Bicipital Groove and surrounds the tendon) Competence using ultrasound technology to perform injections in different planes using different approaches View under ultrasound the suprascapular nerve
69	Electronic Elbow intracavitary injection mannequin	For practicing soft tissue joint injection used for the treatment of injuries and arthritis. The arm can be presented for the treatment of both Golfer's and Tennis elbow. **Overview** • Easy-to-use Feedback Console: LEDs light up when correct injection sites have been acquired, point of maximal tenderness has been palpated and when the ulnar nerve has been hit **Realism** • Flexed right elbow, which rotates on the stand Skills Gained • Patient posture and management • Palpation techniques • Identifying anatomical landmarks and painful areas • Injections for: • Tennis Elbow (lateral epicondylitis) • Golfer's Elbow (medial epicondylitis) • Training in fan or cone infiltration techniques
70	Electronic Hand & Wrist intracavitary injection mannequin	An articulated right hand & wrist to be used for practicing soft tissue joint injection for the treatment of injuries & arthritis. **Overview** • Easy-to-use Feedback Console: LEDs should light up when correct injection sites have been acquired and when the median nerve has been hit **Realism** • Articulated joints **Anatomy** • Simulates normal anatomical reference points for: • carpal tunnel • palmaris longus tendon

		• distal wrist crease • tendon to the flexor carpi radials Skills Gained • Patient posture and management • Identifying anatomical landmarks • Relevance of digital movement for presentation of injection sites • Injection in 4 specific areas: • carpal tunnel • trigger finger/tendon sheath injection • de Quervains sheath • first metacarpal joint • Precise placement of needle to avoid median nerve
71	Electronic Ankle & Foot intracavitary injection mannequin	A foot and ankle for practicing soft tissue injection for the treatment of injuries and arthritis. **Overview** • Easy-to-use Feedback Console: LEDs light up when correct injection sites have been acquired **Anatomy** • Represents normal anatomy as required for palpation purposes Skills Gained • Patient posture and management • Palpation techniques • Identifying anatomical landmarks • Injection sites for: • metatarsophalangeal (MTP) joint • Morton's neuroma • tarsal tunnel • plantar fascia • sinus tarsi • retrocalcaneal bursa • tibiotalar joint • subtalar joint
72	**Videoscopic endotrainer set with accessories**	• The model should be ergonomically designed Video assisted Endo trainer developed for acquiring techniques required in Minimally Invasive Surgery • Model should have inbuilt camera • Model should have at least 5-6 surgical port for instruments • Model should be useful in various surgical workshops for mass training or personalized training. • Model should have versatile design and Port placement useful for training in various surgical specialties such as General surgery, Thoracic, Urology and Gynecology. • Model should be developed for Right and Left surgical hand development to play a surgeon's role. • Model should be easy to install and can attached to any TV/Monitor **Skills to Learn:** • Basic Hand-Eye-Co-ordination and to learn Minimal Access Surgery techniques (Basic or Advanced). • To learn Intra and Extra corporial Endo suturing and knot tying.

Synthetic Cadaver Lab for Undergraduate Anatomy Teaching

Synthetic cadaver Anatomy teaching lab**should have following specifications**

1. Should have as a Full body synthetic Human Cadaver for Comprehensive anatomy teaching of medical students
2. Should be possible to be used as an alternative to human cadavers in basic anatomy classes.
3. The Cadver should include all major skeletal, muscular and cartilaginous structures present in typical human anatomy. Should be a full sized, head-to-toe anatomical model.
4. Tissues of cadaver should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human body.
5. Should be made of real life like tissue material
6. Cadaver should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty. Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.
7. Cadaver should be complete with all bones, joints, muscles, organs and tendons in normal human anatomy. Major nervous system and vascular components should also be present.
8. Should have following feature and components
   i. Structural Features: Skeletal, muscular, fascial and cartilaginous structures of the skull, jaw, cervical spine, rib cage, chest, abdomen, upper and lower back, shoulders, upper arms, forearms, wrists, digits, thoracic spine, lumbar spine, pelvis, thighs, lower legs, feet and toes.
   ii. Anatomical Feature: Every bone, muscle, tendon, fully articulating joints, functioning respiratory system, complete digestive and urinary tracts, visceral organs, reproductive organs, circulatory system and nervous system including the following specifics:
      a) **Nervous Components**:Lateral Cord, Musculocutaneous, Medial Cord, Medial Brachial Cutaneous, Medial Antebrachial Cutaneous, Ulnar, Radial, Superficial Branch, Sciatic, Common, Deep, and Superficial Peroneal, Tibial, Genitofemoral, Iliohypogastric, Ilioinguinal, Lateral Femoral Cutaneous, Obturator, Femoral, Anterior Cutaneous Branches, Saphenous
      b) **Arterial Vasculature**:Aortic arch, Descending thoracic aorta, Renal arteries, Abdominal Aorta, common carotid arteries, Subclavian arteries, Axillary arteries, Brachial arteries, Coronary arteries, Iliac arteries, Radial arteries, Ulnar arteries, Common femoral arteries, Popliteal arteries, Anterior tibial Arteries, Fibular (peroneal) arteries, Posterior tibial arteries
      c) **Venous Vasculature:** Jugular veins, Subclavian veins ,Superior vena cava ,Inferior vena cava , Renal veins ,Common iliac veins ,Internal iliac veins ,External iliac veins ,Cephalic veins, Basilic veins , Cephalic veins ,Great saphenous veins ,Popliteal veins ,Femoral veins ,Anterior tibial veins ,Fibular (peroneal) veins , Posterior tibial veins
9. Construction Materials of the cadaver parts should be Thermoplastic bones with integral fascia sheath. Muscular tissues of organosilicate composite and specialized SynTissuebrand synthetic human skeletal muscle, tendon, fibrous fascia, and bone.
10. The manufacturer should have the facility for customization of cadaver with pathologies or custom colour if needed
11. Size of the cadaver should be minimum 165cm and weight not more than 50 kg.
12. Cadaver should have a life expectancy of atleast five years.
13. Should be supplied complete with Synthetic Human anatomy model Upper and Lower Limb – one no each for comprehensive anatomy teaching and demonstration with following specifications

    a) Should be suitable to be used as an alternative to human cadavers in basic anatomy classes.
    b) The Limb should include all major human skeletal system, bones, muscle, vasculature, nerves, tendon, ligament, fasciae and cartilaginous structures present in typical human anatomy.
    c) Should be have real life like size , shape and texture education grade antomical model
    d) Tissues of arm and leg should mimic mechanical, dielectric and physico-chemical properties of life like live tissue. It should give look and feel of a live human structure
    e) Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty
    f) Should allow Realistic anatomy teaching and training without compromising a live patient.
    g) Anatomy Arm should have following features**:**

i. Structural Features:Skeletal, muscular, vascular, nervous, fascial, and cartilaginous structures of the shoulder, upper arm, forearm, wrist and hand.
ii. Articulating Joints: Shoulder, elbow, wrist and digits.
iii. Construction MaterialsThermoplastic bones with integral fascia sheath. Muscular tissues ofOrganosilicate composite and specialized synthetic human skeletal muscle, tendon, fibrous fascia, and bone.

h) Anatomy Leg should have following features
i. Structural Features: Skeletal, muscular, fascial, and cartilaginous structures of the hemi-pelvis, thigh, lower leg and foot.
ii. Articulating Joints: Hip, knee, ankle and toes of foot.
iii. Construction Materials**:**Thermoplastic bones with integral fascia sheath. Muscular tissues of organo silicate composite and specialized synthetic human skeletal muscle, vessels, nerves, tendons, fibrous fascia and bones.

14.**Education Grade Life like synthetic Organs workstation as follows**

a) Lung Organ

1. Lung model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ.
4. The structural design of lung should be based on an amalgam of CT and MRI images from actual patients.
5. The synthetic tissues used in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Organ should be able to be incorporated into complex model systems for testing breathing circuits, bronchoscopes and respiratory devices.
7. It should be possible to select left or right lung.
8. Should be compatible with all known imaging equipment including x-ray, fluoroscopy, MRI and CT scanners.
9. Should be compatible with all known surgical devices including breathing circuits, lasers, RF ablation, bipolar, monopolar and harmonic devices.
10. Synthetic human tissues should be made from salt, water and fiber, which should feature realistic tactility.
11. Synthetic human tissues should match the acoustical characteristic of real human tissue.
12. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

b) Prostate Organ

1. Prostate model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ.
4. The structural design should be based on CT and MRI images from actual patients
5. The synthetic tissues used in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. The prostate gland should be available in several sizes and should include various pathologies (fluid filled cysts, fibrous cysts, calcified nodules, benign prostate hyperplasia).
7. It should be possible to be in-corporated into model systems for manual digital exam training, radiological imaging acquisition training and device testing.
8. It should be compatible with all known imaging equipment including ultrasound, x-ray, fluoroscopy, MRI and CT scanners.
9. Should be compatible with all known surgical devices including needles, scalpels, lasers, RF ablation, bipolar, monopolar and harmonic devices.
10. Synthetic human tissues should be made from salt, water and fiber, which should feature realistic tactility.

11. Synthetic human tissues should match the acoustical characteristic of real human tissue.
13. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

c) Uterus

1. Uterus model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. It should complex multi-component structure with cervix, inner and outer os, fallopian tubes and ovaries.
7. The organ should be available with patent arterial and venous vasculature, a variety of pathologies and states of pregnancy.
8. It should be able to be incorporated into complex model systems for hysterectomy and pelvic sling surgery training.
9. It should be compatible with all known imaging equipment including MRI, CT, fluoroscopy and ultrasound.
10. Should be compatible with all known surgical devices including lasers, RF ablation, bipolar, monopolar and harmonic devices.
11. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
12. Synthetic human tissues should match the acoustical characteristic of real human tissue.
13. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

d) Esophagus

1. Esophagus model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should be Moist pink mucosa, submucosa, muscularisexterna, and adventitia, approximately 25 cm long.
7. It should be able to be incorporated into complex model systems for the testing of esophageal dilators and stents.
8. Should be compatible with all known imaging equipment including x-ray, fluoroscopy, MRI and CT scanners.
9. Should be compatible with all known surgical devices including dilators, stents, sutures, lasers, RF ablation, bipolar, monopolar and harmonic devices.
10. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
11. Synthetic human tissues should match the acoustical characteristic of real human tissue
12. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

e) Gall Bladder

1. Gall Bladder model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ.
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have Muscular outer shell with inner mucosal lining.
7. It should be able to be incorporated into complex model systems for the investigation of gallstone treatments.
8. Should be compatible with all known imaging equipment in-cluding MRI, CT, fluoroscopy and ultrasound.
9. Should be Compatible with all know surgical devices including lasers, RF ablation, bipolar, monopolar and harmonic devices.
10. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
11. Synthetic human tissues should match the acoustical characteristic of real human tissue.
12. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

f) Kidney

1. Kidney model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have skinned outer structure with separate adrenal glands.
7. The organ should be available with patent and functional renal pelvis, ureter, renal artery and renal veins.
8. Should select left or right kidney and organ complexity.
9. It should be able to be incorporated into complex model systems for kidney transplant training and urinary device testing.
10. Should be compatible with all known imaging equipment including ultrasound, x-ray, fluoroscopy, MRI and CT scanners.
11. Should be compatible with all known surgical devices including lasers, RF ablation, bipolar, monopolar and harmonic de-vices.
12. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
13. Synthetic human tissues should match the acoustical characteristic of real human tissue.
14. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

g) Pancreas

1. Pancreas model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .

4. The structural design should be based on an amalgam of CT and MRI images from actual patients

5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have textured surface with pancreatic notch, head, body and uncinate process.
7. The organ should also be available with bile ducts and the primary arterial and venous trunks.
8. It should be able to be incorporated into complex model systems for pancreatic tumor removal and testing gallstone treatment devices.
9. Should have select organ complexity.
10. Integration with the larger biliary system should be available on the liver.
11. It should be compatible with all known imaging equipment including MRI, CT, fluoroscopy and ultrasound
12. Should be compatible with all known surgical devices including harmonic scalpel, lasers, RF ablation, bipolar, monopolar and harmonic devices.
13. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
14. Synthetic human tissues should match the acoustical characteristic of real human tissue.
15. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

h) Penis

1. Penis model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have shaft with patent urethra, glans, meatus and foreskin.
7. Should incorporated into complex model systems for the testing of medical devices and equipment.
8. Should be compatible with all known imaging equipment including x-ray, fluoroscopy, MRI and CT scanners.
9. Should be compatible with all known surgical devices including lasers, RF ablation, bipolar, monopolar and harmonic devices.
10. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
11. Synthetic human tissues should match the acoustical characteristic of real human tissue.
12. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

i) Small Intestine

1. Small Intestine model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have Duodenum, Jejunum and Ileum and should be preloaded with waste matter.
7. Should have select organ size and color.
8. Should be able to be incorporated into complex model systems for the testing of medical devices and equipment.

9. Should be compatible with all known imaging equipment including x-ray, fluoroscopy, MRI and CT scanners.
10. Should be compatible with all known surgical devices including atraumatic bowel graspers, laparoscopic scissors, harmonic scalpels, scalpels, suction devices, GIA endostaplers, trocars, 30 degree scopes, sutures, various clamps and scissors, hand ports and TA staplers.
11. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
12. Synthetic human tissues should match the acoustical characteristic of real human tissue.
13. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

j) Spleen

1. Spleen model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have skinned outer structure. Should also be available with the splenic vein and artery.
7. Should have anatomy and pathology options.
8. It should incorporated into complex model systems for transplant training and medical device testing.
9. Should be compatible with all known imaging equipment including ultrasound, x-ray, fluoroscopy, MRI and CT scanners.
10. Should be compatible with all known surgical devices including needles, scalpels, lasers, RF ablation, bipolar, monopolar and harmonic devices.
11. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
12. Synthetic human tissues should match the acoustical characteristic of real human tissue.
13. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

k) Stomach

1. Stomach model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ .
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have Multilayered structure with thin muscular outer jacket, thick muscle middle layer and lubricious mucosal lining. Organ includes fundis and anchor points for pyloric and cardiac sphincters.
7. Should have option for Attaching esophagus
8. It should be able to be incorporated into complex model systems for the testing of gastrointestinal devices.
9. Should be compatible with all known imaging equipment including ultrasound, x-ray, fluoros-copy, MRI scanners and CT scanners.
10. Should be compatible with all known surgical devices including endoscopes, lasers, RF ablation, bipolar, monopolar and harmonic devices.

11. Synthetic human tissues should be made from salt, water and fiber, which should feature most realistic tactility.
12. Synthetic human tissues should match the acoustical characteristic of real human tissue.
13. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

l) Trachea

1. Trachea model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ.
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have D-shaped lumenal superstructure, individual hyaline cartilage rings with trachealis muscles, lubricious mucosal layer and muscular jacket material.
7. It should be compatible with all known imaging equipment including x-ray, fluoroscopy, MRI scanners and CT scanners.
8. Should be compatible with all know surgical devices including bronchoscopes, lasers, RF ablation, bipolar, monopolar and harmonic devices.
9. Should be able to be incorporated into complex model systems for the testing of endotracheal tubes, bronchoscopes and drug delivery devices.
10. Should have select construction type, branch complexity and tissue hue below.
11. Synthetic human tissues should be made from salt, water and fiber, which should feature the world's most realistic tactility.
12. Synthetic human tissues should match the acoustical characteristic of real human tissue.
13. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

m) Liver

1. Liver model should be realistic synthetic organ made of real life like tissue material
2. Should be possible to be used as an alternative to human organ in basic anatomy classes.
3. Tissues of organ should mimic mechanical, dielectric and physico-chemical properties of live tissue. It should give look and feel of a live human organ.
4. The structural design should be based on an amalgam of CT and MRI images from actual patients
5. The synthetic tissues employed in construction should be validated against the mechanical, physicochemical, thermal and dielectric properties of living tissue.
6. Should have skinned outer shell with lobed structure. Should also be available with the primary arterial and venous trunks, complete biliary system and a variety of pathologies.
7. Should be available with biliary system options.
8. It should be able to be incorporated into complex model systems for liver transplant training and biliary stent testing.
9. Should be compatible with all known imaging equipment including MRI, CT, fluoroscopy and ultrasound.
10. Should be compatible with all known surgical devices including lasers, RF ablation, bipolar, monopolar and harmonic devices.
11. Synthetic human tissues should be made from salt, water and fiber, which should feature the world's most realistic tactility.
12. Synthetic human tissues should match the acoustical characteristic of real human tissue.

13. Should be biohazard and formaldehyde-free and should not pose any health risks to students/faculty .Should allow Realistic anatomy teaching and training without specialized facilities or compromising a live patient.

The manufacturer should have the facility for this model may also be customized with pathologies, customization of Arm and leg withpathologies, nerves, vessels, and custom colors if needed

15. Cadaver, limbs and organs should have a life expectancy of at least five years and should be manufactured by the same manufacturer.
16. Should be supplied with a Specialized table/Tank for storage of the cadaver in preservation medium
    i. Cadaver tank should be made of rust proof stainless steel SS 304 grade
    ii. Should have a height adjustable tray with minimum size 180 x 70 cm.
    iii. The tank should have depth of at least 40 cm
    iv. Height adjustment should be possible using crank mechanism
    v. The table/tank should be equipped with covers
    vi. Should have lockable wheels for ease of mobility
17. The vendor should undertake Operation and maintenance of Anatomy lab through trained professional for a period of three years from date of installation