CHANDIGARH COLLEGE OF ENGINEERING & TECHNOLOGY,
(DEGREE WING), CHANDIGARH
e-TENDER NOTICE

Chandigarh College of Engineering & Technology, Sector-26, Chandigarh invites tenders through e-tendering for purchase the Machinery/Equipments/Items for following Departments:-

Name of Department	**Earnest Money** (₹)	**Start Date and Time of uploading of e-tender**	**End Date and Time of uploading of e-tender**	**Date and Time of opening of Online Bid (Technical Bid)**
Civil Engineering	25000/-	28.06.12 at 2.00 P.M.	19.07.12 upto 3.00 P.M.	19.07.12 at 3.00 P.M.
Mechanical Engineering	31000/-	-do-	-do-	-do-
Electronic & Comm. Engg.	3000/-	-do-	-do-	-do-

Detailed Terms and Conditions are available in e-tender document.
The bid document can be downloaded from the website of Chandigarh Administration http:/www.etenders.chd.nic.in however for general information, guidance and reference, the tenderer can approach to office of Principal, Chd. College of Engg. & Tech., Sector-26, Chandigarh (Phone No. 0172-2750943)

Principal

INSTRUCTIONS TO BIDDERS REGARDING E-TENDERING PROCESS

a. Tenders without Digital Signatures will not be accepted by the electronic tendering system. No tender will be accepted in physical form and in case it has been submitted in physical it shall be rejected.

b. Before submission of on line bids, bidders must ensure that scanned copies of all the necessary documents have been uploaded with the bid.

c. Principal, Chd. College of Engg. & Tech., Chandigarh will not be responsible for any delay in online submission of bids due to any reason whatsoever.

d. Bidders should get ready with the scanned copies of EMD as specified in the tender documents. The original instruments in respect of EMD in the shape of FDR or Deposit at Call or Term Deposit Receipt or Demand Draft in favour of the Principal, Chd. College of Engg. & Tech. (Degree Wing), Sector-26, Chandigarh should reach on or before 19-07-2012 by 3.00 p.m.

e. The details of EMD specified in the tender document should be same as submitted online (scanned copies). Otherwise tender will be rejected summarily.

TERMS AND CONDITIONS OF THE TENDER

CCET STANDS FOR CHD. COLLEGE OF ENGINEERING & TECHNOLOGY, CHANDIGARH.

1. The last date and time for receipt of tenders is **19.07.2012 upto 3.00 p.m.** through e-tendering only.
2. Each tender must be accompanied with Earnest Money Deposit of Rs. 25,000/- for Civil Deptt, Rs. 31000/- for Mech Deptt and Rs. 3000/- for ECE Deptt in the shape of FDR or Deposit at Call or Term Deposit Receipt or Demand Draft in favour of the Principal, Chandigarh College of Engineering & Technology, Chandigarh, valid for six months payable at Chandigarh on any Scheduled Bank.
3. The sealed envelope of EMD should bearing the Advertisement No. and should be clearly superscribed as "EMD for Purchase of Machinery /Equipment/Items for Civil Engineering Deptt., Mechanical Engineering Deptt. and Electronic & Communication Engineering Department due on **19.07.2012** should be separately submitted in the office of Principal, Chandigarh College of Engineering & Technology, Sector-26, Chandigarh on or before **19.07.2012 upto 3.00 p.m.**
4. Any attempt direct or indirect, to cast influence, negotiation on the part of the tenderer with the officials/authority to whom he will submit the tender or the tender accepting official/authority before the finalisation of tenders will render the tenderer liable for exclusion from consideration.
5. Tender(s) received without earnest money shall be rejected straightway.
6. Earnest Money deposited with the Chd. College of Engg. & Tech., (Degree Wing), Chandigarh in connection with any other tender will not be considered against this tender.
7. The Public Sector Undertaking of the Central / State Govt. are exempted from furnishing Earnest Money Deposit.
8. This tender is not transferable.
9. The tender i.e. Pre-qualifying-cum-Technical Bid shall be opened at **3.00 p.m. on 19.07.2012** at Chandigarh College of Engineering & Technology (Degree Wing), Chandigarh.
10. Conditional offer shall be rejected.

11. The requirements of the Institute in terms of category of machinery/equipment/items, detailed specifications and quantity are given in **SCHEDULE OF TECHNCIAL SPECIFICATION / REQUIREMENT (AS PER ANNEXURE-I)**. Principal, CCET reserves the right to change the quantity for any/all items without assigning any reason.
12. The tenders not accompanied by Earnest Money or incomplete in any respect will be rejected outrightly.
13. No advance payment will be made. Payment will be made after receipt of machinery/equipment/items, its inspection, installation and testing to the satisfaction of the Technical and Purchase Committees.
14. The quoted prices must be mentioned showing Excise Duty and VAT /sales tax separately.
15. The Principal, CCET reserves all rights to accept or reject any tender without assigning any reason.
16. Rates should be quoted F.O.R. Chd. College of Engg. & Tech., Sector-26, (Degree Wing) Chandigarh including packaging, forwarding, postage and freight etc.
17. The Principal, CCET reserves all rights to reject the goods if the same are not found in accordance with the required description / specifications.
18. In case of violation of any term and condition as mentioned, Earnest Money Deposit of the tenderer shall be forfeited in full or part at the entire discretion of the Principal, Chd. College of Engg. & Tech., Chandigarh.
19. Training for the operation of equipments, if any, shall be provided by the firm free of cost to the faculty / other staff of the college.
20. The defective machinery/equipment/items from the Store of Chd. College of Engg. & Tech., Chandigarh will be lifted at the entire cost & risk of the firm. Chd. College of Engg. & Tech., Chandigarh will not bear any expenses on this account and the machinery/equipment/items lying in the CCET premises will be at tenderers risk and cost.
21. The machinery/equipments/items will be maintained free of charges during the warranty period.

22. **PERFORMANCE SECURITY:-** Performance security @10% of the value of supply order covering the warranty period shall be furnished by the firm in the shape of Bank Guarantee duly pledged in favour of Principal, Chd. College of Engg. & Tech., Chandigarh before / along with supply of machinery/equipments/items. **The performance security should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations.**

23. The CCET would return the Earnest Money Deposit to the successful tendering firm on the submission of the Bank Guarantee. EMD of unsuccessful tenderer will also be returned.

24. Rates quoted in Indian Currency only shall be accepted irrespective of foreign make of machinery/equipment/items which should include all kinds of charges, taxes, duties etc. Financial bids showing the rates in other currency shall not be considered and deemed to be rejected automatically.

25. **PERIOD FOR WHICH THE OFFER WILL REMAIN OPEN:-**
The tendering firms should keep their offers valid for acceptance upto **31.03.2013.** If the firms are unable to keep their offers open for the above said period, they should specifically state the period for which their offers would remain open but such a provision may result in the rejection of their offers.

26. Any conditional tender or any deviation from the terms and conditions of the tender document shall render the tender liable to rejection.

27. The machinery/equipments/items will be installed free of charge by the firm / agent at the designated premises. The cost of material required for installation shall be borne by firm. Material for experimental set up such as Table, Stand etc. should be provided by the firm at its own cost. CCET will not provide any material required for installation. Foundations of equipments wherever necessary shall be provided/constructed by the supplier free of cost.

28. DELIVERY PERIOD:- The Delivery period of the machinery/equipment/items shall be strictly 6-8 weeks from the date of supply order. The delivery period will be extended at the sole discretion of

the Principal, CCET in special circumstances on written request from the firm. Penalty @ 1% per week of the cost / price of machinery/equipment/items for actual period of delay after the due date of supply of machinery/equipments/items will be charged.

29. Installation and demonstration will be done by the supplier to the satisfaction of Head of Department concerned.

30. Warranty period, where applicable, should be clearly specified but not less than 1-year in any case.

31. Any fault or deficiency in the machinery/equipments/items should be rectified by the supplier within two weeks after intimation.

32. Instructional materials and **e-manuals** will be uploaded by the supplier free of cost.

33. The technical broucher for the equipments shall be uploaded along with Pre-qualifying – cum – Technical Bid.

34. <u>INSPECTION OF MACHINERY/EQUIPMENT/ITEMS</u>

The machinery/equipments/items will be inspected only at CCET premises. However, the inspection of machinery/equipments/items at factory site or any other place, if any, shall be carried out at the risk and cost of the Tenderer / Bider. The CCET will not bear any expenses on this account.

35. In the cases of failure or default in the performance or responsibilities or breach of terms and conditions of DNIT or MOU or any agreement of contract between the company / firm / agency / person or any legal entity and CCET, as the case may be, the said company / firm / agency / person or any legal entity shall be black listed in the light of notification issued by Chandigarh Administration vide their letter No. 1927-F&PO(3)-2009/1170 dated 27-02-2009 or any other instructions issued from time to time.

36. **The tenderer has to submit an affidavit (as per Annexure II) regarding non black listing of individual / firm/ company, as the case may be.**

37. **JURISDICTION**

The courts of Chandigarh alone will have the jurisdiction to try any matter, dispute or reference between the parties arising out of this purchase. It is specifically agreed that no Court outside and other than Chandigarh Court shall have jurisdiction in the matter.

38. **Force majure:**- Any failure or omission or commission to carry out provision of this tender by tenderer shall not give rise to any claim by one party against the other if such failure or omission or commission arise from an Act of God; which shall include all Acts of natural calamities such as fire, flood, earthquake, hurricane, or any pestilence or from civil strikes, compliance with any status and / or regulation of the Government, look outs and strikes, riots, curfew, embargoes or from any political or other reason beyond the parties control including war (whether declared or not), civil war or stage of insurrection, provided that notice of the occurrence of any event by either party to the other shall be given within two week from the date of occurrence of such any event which could be attributed to force majure conditions.

Annexure-I

Schedule of Technical Specification / Requirement

(SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF MACHINERY/ EQUIPMENTS/ITEMS AND SCHEDULE OF REQUIREMENT)

1.	Civil Engineering Deptt.	Schedule I
2.	Mechanical Engineering Deptt.	Schedule II
3.	Electronics and Communication Engg. Deptt.	Schedule III

ANNEXURE-II

I/We (Name)_____

Contractor / partner / sole proprietor (strike out word which is not applicable)

or (Firm)/Company _____

do hereby solemnly affirm and declare that the individual firm / companies are

not black-listed by the Union or State Government or any autonomous body.

DEPONENT

Address _____

_____

I/We do hereby solemnly affirm and declare that the above declaration is true and correct to the best of my knowledge and beliefs. No part of it is false and nothing has been concealed.

DEPONENT

Dated:

CHECK LIST DULY FILLED IN TO BE ATTACHED WITH PRE-QUALIFYING-CUM-TECHNICAL BID FOR THE EQUIPMENT OF THE DEPARTMENT OF CIVIL ENGINEERING/MECHANICAL ENGINEERING/ELECTRONICS AND COMMUNICATION ENGG. DEPTTS.

1.	Whether EMD in the shape of FDR or Deposit at Call or Term Deposit Receipt or Demand Draft valid for six months, for the asked-for amount attached?	Yes / No
2.	Whether tender document duly signed by authorized signatory attached?	Yes/No
3.	Whether affidavit duly attested by Notary / Executive Magistrate regarding non-black listing of firm Attached?	Yes/No
4.	Whether a list of institutions / organizations where your firm has supplied this item / equipment / instrument recently, is attached.	Yes/No
5	If you are an authorized agent / dealer / distributor of the firm / company / manufacturer and whether authority letter as issued by them in your favour attached?	Yes/No
6.	Whether Technical broucher of the equipments attached?	Yes/No

Signature of authorized signatory
with seal of the firm

SCHEDULE-I
CHANDIGARH COLLEGE OF ENGG. & TECHNOLOGY, CHANDIGARH
SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF EQUIEPENTS AND SCHEUDLE OF REQUUIRMENT FOR RCC LAB, CIVIL ENGG. DEPTT.

Sr. No	Name of Equipment and Specification	Qty. Required
1.	**Buoyancy Balance** It should consist of rigid support frame, incorporating a water tank mounted on a platform. A mechanical lifting device should be used to raise the water tank through frame height immersing the specimen suspended below the balance. The supply may also be used as standard weighing system in the laboratory i.e. 15 kg X 0.5 g must be operated on 220 V, 50 Hz, single phase AC supply.	01
2.	**Vicat's Apparatus** It should confirm to IS 5513/2542(P2)/2645/1727, BS 12.146/915/1370/4027/4248, ASTM C 91/141/187/308/472 & AASTHO T 129, E 131 with ISI mark. It consist of : Vicat's mould, glass base plate, consistency plunger, initial needle , final needle, mild steel base plate, Vicat's mould with split type with clamping ring.	02
3.	**Le- Chatelier Apparatus** It should confirm to IS 5514. It should consist of a small split cylinder forming a mould 30 mm internal dia and 30 mm height. On either side of the split cylinder two parallel indicating arms with pointed ends should be fixed. Two loops of suitable material and strength soldered to the upper half of the mould on each side of the central split should be provided to facilitate demoulding of the hardened paste specimen after test. The resilience of the mould should be such that the action of a mass of 300 gm applied should increase the distance between the indicator ends of the needle by 17.5 mm± 2.5 mm without permanent deformation. The mould should be supplied complete with two glass plate and lead weights.	02
4.	**Density Bottle-** **(IS: 2720 (Part- I)** Density Bottle of 100 ml, 200 ml with capillary vent leak proof stopper.	01
5.	**Ultrasonic Pulse Velocity Tester -:** **The ultrasonic test equipment should comply with the following standards:** • **EN12504-4 (Europe)** • **ASTM C 597-02 (North America)** • **BS 1881 Part 203 (UK)** • **ISO1920-7:2004 (International)** • **IS1311 (India)** **Transit time measurement** **1. Range 0.1 – 9999 µs** **2.Resolution 0.1 µs** **3.Display 79 x 21mm passive matrix OLED** **5.Transmitter Optimized energizing pulse 125V, 250V, 350V, 500V, AUTO** **Receiver** **1. Selectable gain steps 1x, 10x, 100x, AUTO** **2. Bandwidth 20 kHz – 500 kHz**	01

	3. **Memor** **Non volatile, > 500 measured values** 4. **Regional Settings** **Metric and imperial units supported** **Power Supply** 1. **Battery** **4x AA batteries (>20 hours continuous use)** 2. **Mains** **Via USB charger** 3. **PC** **Directly via USB cable** **Mechanical** **Dimensions** **172 x 55 x 220 mm** **Weight** **1.316kg (incl. batteries)** **Environmental conditions** **Operating temperature -10° to 60°C (0° to 140°F)** **Humidity** **<95% RH, non condensing**	
6.	**Profometer** It should have indicating device, universal probe, probe cable, data transfer cable, Pro-Vista data transfer/display software, headset, carrying strap, carrying case and operating instructions. 1. Measuring Range: Small range up to 100 mm (3.94") deep depending on bar size. 2. Large range: up to 188 mm(7.41") deep depending on bar size. Example 16mm (#5) bar: 80 mm (3.15") deep in small measuring range or 147 mm (5.71") deep in large measuring range. 3. Measuring Accuracy: Better than ±2mm (0.08") or ±5 % for concrete cover. 4. Bar sizing: 8-40 mm (# 3-12) diameter bars at better than ± 1 bar size. 5. Display: 128x 128 pixel graphic LCD with backlight. 6. Memory: Up to 40'000 measured values that can be stored in up to 60 test file locations (Non –Volatile). 7. Data Output- RS232 interface, USB via adapter. 8. Case Dimension: 415 x500 x125 mm(16.3" x 19.7" x 4.9") 9. Weight: net 4.2 kg(9.2 lbs); Shpg 6.2 kg(13.7 lbs). **With Accessories:** Telescopic extension Rod Test Block Marking pen with 3 refills. RS 232/ USB Printer Cable(serial) Interface converter(for parallel printer) Probe cable, 3 m.(10 ft) Path measuring device cable , 3m (10 ft) Upgrade package.	01

SCHEDULE-I

CHANDIGARH COLLEGE OF ENGG. & TECHNOLOGY, CHANDIGARH

SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF EQUIEPENTS AND SCHEDULE OF REQUUIRMENT FOR ENVIRONMENTAL LAB, CIVIL ENGG. DEPTT.

SI. No.	Item Description	Nos.
1	**Hot Air Oven High Temperature** Suitable for application involving high temperature up to 300°C provided with stainless steel chamber , filled with special quality insulation (mineral wool) & controlled by digital temperature controller cum indicator and air circulating fan Size 355x355x355 mm. Capacity 45 Ltrs.	2
2	Fortin's **Barometer** without mercury brass parts	1
3	**Digital Hot Plates** Temp range: 122 to 932°F (50 to 500°C), Top plate dimensions: 4 in x 4 in, Top plate material: Ceramic, Dimensions: 6 in W x 4 in H x 10.25 in D, Power (VAC): 230, Power (Hz): 50/60, CE Compliance: Yes, It includes: 5-ft cord with plug.	1
4	**Refrigerator** 210 Ltrs. LG	1
5	**Digesdhal Apparatus** Digesdhal Apparatus 230V 50/60 HZ **Included:** Digesdhal Main Instrument, Heater Assembly, Vertical Support, Shielded Fuse, Column, Receptacle, Digestion Flasks (2), Flask Weight, Heat Shield, Power Cable 230v, Aspirator, Cooling Pad, Finger Cots (2), Goggles Safety, Instruction Manual, Fractionating Column with Protector, Capillary Funnel, Capillary Funnel Adapter, Vent Trap Body, Vent Trap Cap, Column Baffle, Tubing C-Flex 5 Ft & Extension Tube. Cat. No: 23130-21 Make: Hach, U.S.A.	1
6	**Vacuum Dessicator** Body is constructed of molded fiberglass reinforced polyester. Nine shelf supports are molded into the walls of the cabinet on 1" (25 mm) centers. Side hinged door frame is constructed of epoxy-coated cold rolled steel. Clear 3/8" (9.5 mm) tempered safety glass window is mounted in the door and is fully gasketed. Door lock has polished chrome finish. Brass needle valve has barbed tip and is designed for 1/4" (6.4 mm) ID vacuum tubing. The cabinet is vacuum tested to 25 inches of mercury. Unit includes two 12" (30.5 cm) square aluminum shelves with twelve 7/8" (22 mm) holes to support crucibles, stainless steel pan for granular desiccant and epoxy-coated steel wire support stand.	2

SCHEDULE-I

CHANDIGARH COLLEGE OF ENGG. & TECHNOLOGY, CHANDIGARH

SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF EQUIEPENTS AND SCHEDULE OF REQUUIRMENT FOR GEOTECH LAB, CIVIL ENGG. DEPTT.

Sr. No.	Name of equipments and specification	Qty. required
1.	**Standard Penetration Test Apparatus** SPT should confirms to IS:2131, IS: 9640. Standard Penetration Resistance should measure the number of blows 'N' required to drive a split spoon sampler to a depth of 300 mm using a 65 kg weight falling freely through a height of 750 mm. **The outfit consists of:** **Split Spoon Sampler without Brass liner 50.8 mm OD and 38 mm ID. 1 No**. & should consist of Body split lengthwise. Shoe hardened with an inside cutting edge. Head fitted with a ball check valve. Adapter to connect 'A' type drill rod. Drive Weight Cast Iron, of 63.5 kg, 78 mm bore ID approx. 1 No. Guide Pipe Assembly, Bore 73 mm OD approx. 1 No. Tripod with Pulley and built-in Ladder. 1 No. 'A' Type Drill Rods 0.5 mtrs. 2 Nos. Manila Rope 19mm dia 10 m 1 No. **Split Spoon Sampler with Brass Liner, 50.8 mm OD and 35 mm ID should consist of** Body split lengthwise. Shoe hardened with an inside cutting edge. Head of split spoon sampler with Adapter to connect A-type drill rod. Brass Liner.	01
	a) Drill Rod 1.0 meter long complete with adaptor	04
	b) Drill Rod 1.5 meter long complete with adaptor	03
	c) Drill Rod 3.0 meter long complete with adaptor	02
	d) Drill Rod 0.75 meter long complete with adaptor	02
	e) Drill Rod 0.5 meter long complete with adaptor	02
2.	**Compaction Apparatus** It should confirm. Standards IS:2720 (Part 7), IS:2720 (Part 8) IS:9198, IS:10074 The apparatus consists of Compaction mould, complete Rammer with Collar and Base Plate, made of Gunmetal with 150 mm ID, 127.3 mm height 4.9 kg x 450 mm fall. It should have rammer of 4.9 kg x 450 mm fall as per IS: 9198	01
3.	**Core Cutter** It should confirm to IS:2720 (Part 29) The outfit comprises of Cylindrical Core Cutter made of steel, 100 mm diameter x 130 mm long, Steel Dolly 25 mm high and 100 mm diameter & Rammer with Steel Rod	01
4.	**Relative Density apparatus** It should confirm to IS: 2720 (Part XIV) The outfit consist of Vibrating Table having frequency of approx. 3600	01

	vibrations per min under 115 kg load and Suitable for operation on 220 V, 50 Hz, single phase, AC supply. Cylindrical Metal Unit Weight Mould with 3000 ml capacity with Guide Sleeve with clamp assembly. Surcharge base plate & Handle The total weight should be equivalent to 140g /cm for the Mould being used. Dial Gauge Holder. Calibration Bar, 75x300x3 mm. Dial Gauge 25 mm travel, 0.01 mm least count, with an extension piece.	
5.	**Small Containers** for carrying soil (50 mm dia and 50 mm depth)	15
6.	**Hydrometer as per IS:2720(Part IV)** Used for particle size analysis of soil in suspension. The scale is marked from 0.995 to 1.030 in terms of density of suspension.	02
7.	**Cone Penetrometer** For determination of liquid limit. It consists of: Universal Penetrometer Penetration test cone Penetration test cup	01
8.	**Speedy Moisturemeter** As per IS 2720 (part-2) Range 0- 50% , Gauge Div. = 1% It consists of carrying case fitted with counterpoised balance for weighing sample, scoop for measuring carbide reagent, a set of steel balls and a cleaning brush.	01
9.	**Pick Axe** Approx. 3' length	01
10.	**Plastic Limit Device** A rod of 3mm diameter	01
11.	**IS Sieve Set** **(2mm, 1mm, 425µ, 150 µ, 75 µ)**	01
12.	**Field Shear Test Apparatus** This Apparatus is designed for conducting In-situ Vane Shear test from bottom of bore hole in saturated cohesive deposits, for determining their in-place shearing resistance. The Equipment consists of torque applicator assembly mounted on abase. A gear wheel. which is marked in degrees, holds a torque ring and is geared to a crank.	01

SCHEDULE-I

CHANDIGARH COLLEGE OF ENGG. & TECHNOLOGY, CHANDIGARH

SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF EQUIEPENTS AND SCHEDULE OF REQUUIRMENT FOR TRANSPORTATION LAB, CIVIL ENGG. DEPTT.

S.no	Name of equipments and specification	Qty.
1	Light compaction apparatus Ref. Standard BS:1377 Proctor Mould, 105 mm ID, 115.5 mm height, 1000 ml volume. Rammer- (2.5 KG X 300 mm Fall).	01
2	16.0 mm IS Sieve Ref. Standard IS:460 (45 cm dia).	01
3	Containers 125mm x 60mm (dia and height).	10
4	Ring and ball apparatus Ref. Standard - IS:1205 Appratus consists of Electrical heating with a heater and energy regulator. Suitable for operation on 220 V,50 Hz, single Phase,AC supply. Each unit of heat resistant glass beaker approx. 8.5 cm I.D, 12 cm high, Tapered rings 10 mm dia (2Nos.),Ball Centering Guide (2Nos.), Steel Balls of 9.5 mm dia. (2Nos.),Ring Holder (1No.),Electric Heater (Hot Plate 1No.), Thermometer Ranges : 2˚ C to 80˚ C & 30˚ C to 200˚ C.	01
5	Penetrometer Ref. Standard - IS:1448 (Part 60) Penetrometer with a plunger weighting 47.5g along with 50g and 100g weights, Penetration cone weighing : 102.5 $\pm$ 0.05 g, Penetration needle, Transfer Dish (Copper), Aluminium Sample Cointainers (set of two).	01
6	Trays 26x21x4 cm	04
7	Keys 18-20 dia 20-22 dia	1 each
8	Standard Tar Viscometer(IS: 1206) With variable autotransformer, suitable for operation on 220 volts, 50 hz, single phase supply	01

SCHEDULE-II

CHANDIGARH COLLEGE OF ENGG. & TECHNOLOGY, CHANDIGARH

SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF EQUIEPENTS AND SCHEDULE OF REQUUIRMENT FOR AUTOMATIC CONTROLS LAB OF MECHANICAL ENGG.

S. No.	Equipment Specification for Automatic Controls Lab	Quantity
1	**Flow Control Trainer :** This control unit should demonstrate flow process control experiments with a variable area flow meter. The storage tank should be of capacity 3 litres, the pump should have a power consumption of 18W, maximum flow rate of 8 L/min, max head of 6 m, rotameter 20….250l/min, flow sensor: 0.5 to 3 l.min. The unit should accompany a software which runs under Windows XP with the process schematic with controller configurable as P, PI, PID and step controller. The selection process should be manual, continuous, 2 or 3 point controller programmer .Time functions, Simulation functions and Variable disturbance inputs should be available. The weight should not exceed 20 kgs. A detailed technical manual for the software package and the experimental unit should be provided..	**01 SET**
2	**Temperature Control Trainer:** This trainer should be able to demonstrate temperature control processes equipped with the industrial components. The water circuit should consists of a pump, heater, and two different lengths of process delay. The pump should have a power consumption of 25-60W, a max flow rate of 3.6^3/h, max head of 4 m, screw in heater of 2 Kw. The surface area of the heat exchanger is 2.8 m^2.The heater should have dry running protection and temperature limiter. The air and water heat exchanger should have fans. The fan should have a power output of 250W, max flow rate of 780M^3/H, MAX differential pressure of 430Pa, speed of 2880rpm.The temperature measurement should be aided with thermocouples at various points. The thermocouple should be of J type with temperature from 0deg to 200 deg C. The thyristor power controller has a max load current 25 A. The disturbance variables should be generated by ball valve with the scale in the water circuit. The digital controller should be configurable as switching mode or a continuous mode. The process variables should be analogue signals. The unit should accompany a software which runs under Windows XP with the process schematic with controller configurable as P, PI, PID and step controller. The selection process should be manual, continuous, 2 or 3 point controller programmer .Time functions, Simulation functions and Variable disturbance inputs should be available The weight should not exceed 125kgs Detailed technical manual of the setup and the software should be provided	**01 SET**
3	**MATLAB (software)** Detailed technical manual of the setup and the software should be provided	**01**

SCHEDULE-II

CHANDIGARH COLLEGE OF ENGG. & TECHNOLOGY, CHANDIGARH

SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF EQUIEPENTS AND SCHEDULE OF REQUUIRMENT FOR THEORY OF MACHINES-I LAB of MECHANICAL ENGG

S. No.	Equipment Specification for Labs	Quantity
1	**UNIVERSAL GOVERNOR APPARATUS:** This benchtop unit should be used to demonstrate: (a) Determination the characteristics of sleeve position against speed for all governors. (b) Determination the characteristics curve of radius of rotation against controlling force for all governors. (c) To study the effect of varying the mass of central sleeve for porter and proell governors. (d) To study the effects of varying initial spring compression for Hartnell Governor . The drive should be with an electronically regulated motor fitted in the housing. The speed is to be continuously adjusted by using a 10-turn potentiometer and should be displayed digitally. The governor is to be placed in a chuck on the drive. The centrifugal masses and sleeve forces should be varied by using the accessories to be included. The stroke should be measured by using the marks on the governor shaft. When in operation, a transparent protective lid should cover the rotating centrifugal governor. The unit should only be operated if the lid is correctly fitted. The unit should be a benchtop unit. Technical specifications are: The Rotational speed should range between 60 to 400rpm; DC drive motor: 10-30V Weight : approx. 30 kg. The whole should not occupy more than 420 x 400 x 430 mm. Weight of the whole apparatus should not exceed 30Kg. **Detailed technical manual should be provided.**	**01**
2	**FLYWHEEL APPARATUS:** This unit should demonstrate the basic experiments on uniformly accelerated angular motion can be performed and how to calculate the minimum possible periods of oscillation if the point of suspension may be moved. A flywheel mounted in ball bearings is to be placed in motion by a weight attached to a pulley. The inertia of the flywheel should be determined from the fall time of the weight. The unit should be wall mounted. Due to the clear, robust construction the unit should excellently suit to student experiments. **The technical details are:** Flywheel - D=300mm, height: 40mm, mass: 22.2kg & mass moment of inertia: 0.25kgm²; Pulley D=22mm; of weights - 1x 1N (hanger), 4x 1N & 3x 5N; Base plate wxh: 250x200mm & hole spacing: 230x180mm, D10mm. The whole should not occupy more than 200 x 355 x 300 mm. Weight of the whole apparatus should not exceed 35Kg. **Detailed technical manual should be provided.**	**01**
3.	**CRANK & CONNECTING ROD APPARATUS:** This benchtop unit should demonstrate the conversion of smooth	**01**

	rotary motion into reciprocating motion. The input angle should be set on a ball bearing mounted crank disc made of anodised aluminum and read off on an angle measuring scale integrated into the base plate. A millimeter scale should be fitted for the outlet stroke. Crank radius and connecting rod length can both be adjusted, each should have three positions. The simple insertion of a bolt should enable the swivelling of cylinder to be locked, thus a crank drive with either a fixed or oscillating cylinder should be demonstrated. The components should be attached to a solid, painted base plate. Two metal handles should make the unit easier to carry. Technical specifications are: Crank radius - 25mm, 37.5mm & 50mm; Connecting rod length - 120mm, 140mm & 160mm. The whole should not occupy more than 380 x 280 x 60 mm. Weight of the whole apparatus should not exceed 5Kg. **Detailed technical manual should be provided.**	
4.	**WHITWORTH QUICK-RETURN MECHANISM APPARATUS:** Whitworth's quick return is used to generate uneven reciprocating motion with slow feed and quick return. This benchtop model should clearly demonstrate the transmission behavior of such a layout. The input angle is to be set by turning the crank. The output stroke should be read on a ruler on the slider. The transmission components should be manufactured in aluminum. All axles are to be equipped with ball bearings. Unit should be of low weight & equipped with two handles so as to ease carrying. **Technical details are:** Drive crank radius: 46mm; Slider radius: 55mm; Axle offset drive slider: 30mm; Connecting rod length: 145mm. The whole should not occupy more than 360 x 280 x 60 mm. Weight of the whole apparatus should not exceed 4Kg. **Detailed technical manual should be provided.**	**01**
5.	**SLOTTED LINK APPARATUS:** The demonstration model should generate and investigate pure harmonic reciprocating motion. An anodised aluminium disc to be used as crank should be mounted on ball bearings on a white plate. This disc should have a pointer so that the input angle can be exactly read on the integrated angle measuring scale. The crank pin could be set at different radii on the disc. The slider crank should be attached to the crank pin on one side. On the other side the pin is to be mounted in straight guide that is fitted with a ruler to allow the output stroke to be read off with precision. The model needs to be equipped with plastic feet and is to be placed on the laboratory table for the experiment. There should be two metal handles make the unit easier to carry. Technical specifications are to be: Crank radius- 25mm, 37.5mm & 50mm; Output stroke - 50mm, 75mm & 100 mm. The whole should not occupy more than 380 x 280 x 100mm. Weight of the whole apparatus should not exceed 4Kg. **Detailed technical manual should be provided.**	**01**
6.	**FOUR BAR CHAIN:** Using the four bar chain model, rotary motion is to be converted into oscillatory motion. An anodized aluminum disc should be mounted on ball bearings as a crank. The disc should have a scale so that the	**01**

	input angle can be exactly measured. The crank pin should be set at different radii on the disc. The connecting rod and the oscillating lever, made of black anodized aluminum, should be connected together in different lengths using easy to fit knurled bolts. The oscillating crank is to be attached to a disc with an angle measuring scale. All components are to be fitted to a white plate fitted with plastic feet. The apparatus should be benchtop unit. Two metal handles should make the unit easier to carry. Technical specifications are: Crank radius- 25mm, 37.5mm & 50mm, Swing radius - 50mm, 100mm & 200mm; Connecting rod length- 160mm, 180mm, 200mm & 220mm. The whole should not occupy more than 380 x 280 x 100 mm. Weight of the whole apparatus should not exceed 5Kg. **Detailed technical manual should be provided.**	
7.	**Bifilar / Trifilar Suspension Apparatus** The model should permits oscillations on pendulums with bifilar or trifilar suspension to be investigated. For this purpose a bar, a cylinder, or a hollow cylinder made of galvanised steel should be there to hang from a wall mounted carrier plate made of aluminium and placed in oscillation. The bodies used in the experiments should have strong steel hooks for attachment to the suspension cords. The length of the cords can be rapidly changed and securely fixed using clamping wheels. The beam should oscillate, by translation, in the plane of suspension like an ideal mathematical pendulum. The cylinder and the circular ring should work as rotary pendulums. The setup should not exceed 13 Kgs in weight. Technical specification for machine should be: Bars- lxwxh: 40x40x160mm, mass: 2kg; Cylinder - Dxh: 160 x19mm, mass: 3kg; Hollow cylinder- outer diameter: 160mm, inner diameter: 100mm, height: 41mm, mass: 4kg; Cord thread length: up to 2000mm Base plate- wxh: 200x250mm Detailed technical manual should be provided.	**01**
8.	**WALSCHARET VALVE GEAR** Working model of Walschaert valve gear	**01**
9.	**D-SLIDE VALVE AND PISTON VALVE** Working model of D-slide valve and piston valve in case of steam engine	**01**
10.	**STEPHENSON LINK MOTION AND THE GOOCH LINK MOTION** Working model of Stephenson link motion and the Gooch link motion	**01**

SCHEDULE-III
CHANDIGARH COLLEGE OF ENGG. & TECHNOLOGY, CHANDIGARH
SPECIFICATIONS AND ALLIED TECHNICAL DETAILS OF EQUIEPENTS AND SCHEDULE OF REQUUIRMENT FOR ELECTRONICS AND COMMUNICATION ENGINERING DEPARTMENT

S No	Machinery/ Kit/ Software/ Hardware	Technical specifications	Qty.
1.	Interfacing cards of stepper motor 8051	MOTORSTEP,NEMA 11,UNIPOLAR, 2.8V/0.4A, 7.0 OHM, 1.3MH 1.8 DEGREE,2-Phase, 40 mN.m Holding Torque	10
2.	Klystron power supply	240-420 V variable, current -50 Hz Repeller supply voltage- 5v – 250 v DC continuously with respect to klystron Regulation : .25% for ± 10% variation in main supplies voltage Heater supply: 6.3 v Dc (regulation) Modulation : saw tooth & square wave. Digital display	02
3.	Klystron power source	For X band 8.2 -12.4 GHz	02
4.	Gunn power source	For X band 8.2 -12.4 GHz	02
5.	Mini Cooling fan	120X120X25mm with adjustable stand	05
6.	FREQUENCY DIVISION MULTIPLEXING KITS – (To practically study Frequency Division Multiplexing)	Power supply – 220v/110 V, 50 Hz, Power consumption- 3VA (Approx) Modulating Input Freq. – Sine wave 1KHz – 10 KHz (Variable)with E manuals	04
7.	Breadboard Trainer Kit	**Breadboard**: 172mmX128mm **Tie Points** : 1685 **Power Supply :** i) +5 V/1A ii) +3V to +15V Variable/ 500mA iii) -3V to -15V /500mA Variable **Pulse Generator**: **Frequency range** : 1 Hz to 1 MHz in 6 steps and variable between steps **Amplitude** : 3V to 15V (CMOS), 5 V TTL **Duty Cycle**: 50% TTL /CMOS **Pulsar Switches** : 2 Nos (Push to On preferred). **Data Switches** : 16 Nos(Toggle Switch for both TTL & CMOS) **LED display** : 16 Nos (TTL/CMOS Mode) **Seven Segment Display**: 3 Nos. **Logic Prod** : Logic Level indicator for TTL/ CMOS **Mains Supply** : 230V±10% , 50Hz. **Power Consumption**: within 5VA. **Weight** : within 5 kg .(not an important factor). **Dimensions:** W350mm X B250mm X H120mm (not an important factor). **Accessories:** Mains Cords, Manual to be supplied.	20
