# List of Major Equipment/Facilities in each Laboratory/Workshop

## Name of the Department:  ELECTRONICS AND COMMUNICATION ENGINEERING

| Sl. No. | Name of the Laboratory/ Workshop | List of Major Equipment/Facilities |
|---|---|---|
| 1 | ELECTRONIC DEVICES&CIRCUITS LAB | Oscilloscopes |
| | | Function  Generators |
| | | Dual Power Supply |
| 2 | COMMUNICATION LAB | Oscilloscopes |
| | | Function  Generators |
| | | Analog and Digital communication trainer kits |
| | | Spectrum analyzer |
| 3 | DIGITAL SIGNAL PROCESSING LAB | Computers |
| | | MAT Lab software |
| | | DSP-Kits |
| 4 | LINEAR AND DIGITAL IC APPLICATIONS LAB | Oscilloscopes |
| | | Function  Generators |
| | | Digital IC Trainer Kits |
| 5 | MICROPROCESSORS LAB | Microprocessor (8086)kits |
| | | Microprocessor Interfacing kits |
| | | Microcontroller kits |
| | | Microcontroller Interfacing kits |
| 6 | ELECTRONIC COMPUTER AIDED DESIGN LAB | Computers |
| | | Mentor Graphics software |
| | | Xilinx Software Vivado |
| 7 | DIGITAL ELECTRONICS LAB | Understanding and experimentation with digital ICs |
| | | Trainer Kits |
| | | Hand held Digital IC Tester |
| 8 | MICROWAVE ENGINEERING LAB | X-Band Microwave Bench setup |
| | | Fiber optic-link trainer kit |
| | | Laser fiber optic trainer |
| | | Oscilloscopes |

# List of Major Equipment/Facilities in each Laboratory/Workshop

**Name of the Department:**

| Sl. No. | Name of the Laboratory/ Workshop | List of Major Equipment/Facilities |
|---|---|---|
| 1 | COMPUTERPROGAMMING LAB-1 | HP Server ML-10 Quad Core,4 GB RAM ,1 TB HDD-1<br>RDP 100AW Client Systems (ARM 1000 MHz Processor),512 MB RAM-30<br>Lenovo Intel DC 2.8 GHz,2 GB RAM 500 GB HDD-2<br>HCL Intel Core 2 Duo 2.8 GHz,1 GB RAM 160 GB HDD-1<br>IBM SYSTEMS- Intel P-IV 2.6GHz 256MB DDR RAM, 40GB HDD-2<br>HCL  Dual Core 512 GB RAM ,80 GB HDD-1<br>LG MY PC Intel P-IV 2.6GHz 256MB DDR RAM, 40GB HDD-5<br>**Total-42**<br>Networking switches-4 24-port(3), 16-port(1)<br>10 KVA UPS-1, 15 KVA UPS-1 |
| 2 | COMPUTERPROGAMMING LAB-2 | HP Server ML-10 Quad Core,4 GB RAM ,1 TB HDD-1<br>RDP 100AW Client Systems (ARM 1000 MHz Processor),512 MB RAM-30<br>IBM SYSTEMS- Intel P-IV 2.6GHz 256MB DDR RAM, 40GB HDD-7<br>HCL  Dual Core 512 GB RAM ,80 GB HDD-4<br>LG MY PC Intel P-IV 2.6GHz 256MB DDR RAM, 40GB HDD-6<br>**Total-48**<br>Networking switches-3<br>24-port(2), 16-port(1)<br>10 KVA UPS-1 |
| 3 | ELCS(English Language Communication skills Lab) | I.HCL Core2duo systems -------55<br>   1.Intel core2duo @ 2.8Ghz<br>   2.2GB DDR-II RAM<br>   3.160GB SATA HDD<br>   4.17" LCD(TFT) Monitor |

| | | |
|---|---|---|
| | | 5.DVD ROM Drive<br>6.HCL keyboard and mouse<br><br>II.HCL Dual Core(DC) Systems------13<br>  1.P-IV DC  E-2140 @1.6Ghz<br>  2.2GB DDR-II RAM<br>  3.80GB SATA HDD<br>  4.52 X CD ROM Drive<br>  5.17" LCD(TFT) Monitor<br>  6.HCL keyboard and mouse<br><br>III.ACER-System------------1<br>  1.Acer-Veriton<br>  2.Desktop I3-6100<br>  3. 4GB RAM<br>  4. 1TB HDD<br>  5.18.5 LED Monitor<br>  6.USB key board and mouse<br><br>IV.ACER-System-------1<br>  1.Acer I5 Desktop<br>  2.Intel core I5-8400 ,8$^{th}$ Gen<br>  3. 8GB RAM<br>  4. 1TB HDD<br>  5.19.5 LED Monitor<br>  6.key board and mouse<br>     **TOTAL SYSTEMS-------70** |
| 4 | IT WORKSHOP LAB | I.HCL Dual Core(DC) Systems-----27<br>  1.P-IV DC  E-2140 @1.6Ghz<br>  2.512MB DDR-II RAM<br>  3.80GB SATA HDD<br>  4.52 X CD ROM Drive<br>  5.17" CRT Monitor<br>  6. keyboard and mouse<br>II.IBM Systems-----------10<br>  1.Intel P-IV @2.6Ghz<br>  2.256MB DDR RAM + 1GB DDR RAM<br>  3.40 GB IDE HDD<br>  4.48 X CD ROM Drive<br>  5.1.44 MB FDD<br>  5.15" IBM CRT Monitor<br>  6.Key board and mouse<br>     **TOTAL SYSTEMS----37** |
| 5 | RESEARCH & | |

| | | |
|---|---|---|
| | DEVELOPMENT LAB | I.ACER-Systems--------31<br>    1.Acer I5 Desktop<br>    2.Intel core I5 @2.8Ghz<br>    3. 8GB RAM<br>    4. 1TB HDD<br>    5.18.5 LED Monitor<br>    6.USB key board and mouse<br><br>II.ACER-System-------1<br>    1.Acer I5 Desktop<br>    2.Intel core I5-8400 ,8$^{th}$ Gen<br>    3. 8GB RAM<br>    4. 1TB HDD<br>    5.19.5 LED Monitor<br>    6.USB key board and mouse<br><br>**TOTAL SYSTEMS ----32** |
| 6 | COMPUTERPROGAMMING LAB-3 | 1)HP Server ML-10 Quad Core<br>4 GB RAM  ------------------1<br>1 TB HDD<br>15.6" LED Monitor<br><br>2)RDP 100AW Client Systems (ARM 1000 MHz Processor)  --------------37<br>512 MB RAM<br>15.6" LED Monitor |
| 7 | Networks Lab | 1)Acer Systems Dual Core 3.2 GHz<br>4 GB RAM  --------------------26<br>320 GB SATA HDD<br>15.6" LED Monitor<br><br>2) Intel Core i5 8400 2.8 GHz<br>8 GB RAM --------------------8<br>1 TB HDD<br>19.5" LED Monitor |
| 8 | Web Development Lab | 1)Acer Veriton Desktop – I3-6100 – processor ------------33<br>HDD-1TB<br>RAM-4GB<br>LED MONITOR – 18.5 "<br><br>2)HCL Dual core processor -------01<br>HDD – 80GB<br>RAM – 512MB |

| | | 3)Intel Core I5-8400 Processor@ 2.80GHz ----------04<br>HDD – 1TB<br>RAM-8GB<br>LED MONITOR – 19.5"<br>-----------------------------------------------------<br>TOTAL SYSTEMS -------38<br>-----------------------------------------------------<br>4)15 KVA UPS (3 Phase)  ----01<br><br>5) HP Laserjet P1007 ---01 |
|---|---|---|
| 9 | Object Oriented Programming Lab | 1)Acer Veriton Desktop – I3-6100 processor<br>HDD-1TB<br>RAM-4GB<br>LED MONITOR – 18.5 "<br>-----------------------------------------------------<br>TOTAL SYSTEMS --------33<br><br>2)15KVA UPS (Single Phase) ----01 |
| 10 | Software Engineering Lab | 1)Pentium Dual Core E5800 processor @3.2 GHz<br>HDD-320GB<br>RAM-2GB DDR3<br>TOTAL SYSTEMS ------34<br><br>2)10KVA UPS  -------01<br><br>3)CANON 2900B Printer-----01 |

**List of Experimental Setup in each Laboratory/Workshop**

**Name of the Department:**

| Sl. No. | Name of the Laboratory/Workshop | Experimental Set up |
|---------|--------------------------------|---------------------|
| 1 | COMPUTERPROGAMMING | Windows Server -2008 |

| | LAB-1 | Codeblocks with MInGW |
|---|---|---|
| 2 | COMPUTERPROGAMMING LAB-2 | Windows Server -2008<br>Codeblocks with MInGW |
| 3 | **ELCS(English Language Communication skills Lab** | **GLOBARENA SOFTWARE**<br>**English Lab**<br>**Career Lab** |
| 4 | **IT WORKSHOP LAB** | **MS-Office -2007**<br>**Latex→>miktex-2.9**<br>**→Texeditor-4.4.1** |
| 5 | **RESEARCH & DEVELOPMENT LAB** | **MS-Office -2007**<br>**Late-→>miktex-2.9**<br>**→Texmaker-4.4.1**<br>**Android Studio-3.6**<br>**Python-3.7**<br>**R-Programming-3.5.2**<br>**Java-1.8**<br>**CodeBlocks-17.12** |
| 6 | COMPUTERPROGAMMING LAB-3 | Windows Server -2008<br>Codeblocks with MInGW |
| 7 | Networks Lab | 1)Windows 7<br>2)Ubuntu<br>3) Codeblocks with MinGW<br>4)Eclipse<br>5)Star UML<br>6)Open Office-4.17<br>7)Java1.8<br>8)Appserv |
| 8 | Web Development Lab | 1)Windows 7<br>2)Ubuntu<br>3) Codeblocks with MinGW<br>4)Eclipse<br>5)Bitnami Lampstack-5.4.45<br>6) Apache Tomcat-7.0.65<br>7)Xampp Server<br>8)Weka<br>9) Open Office-4.17<br>10)Flex-2.5.35<br>11) Bison-3.0.2<br>12)Netbeans 8.2<br>13)Python-3.8.1/3.9.1<br>14)Ruby-1.9.3<br>15)Perl-5.18.2<br>16)TCL-8.6 |

| | | 17) Wireshark-2.6.6<br>18)NMAP-6.40<br>19) Java1.8 |
|---|---|---|
| 9 | Object Oriented Programming Lab | 2)Ubuntu<br>3) Codeblocks with MinGW<br>4)Eclipse<br>5)Bitnami Lampstack-5.4.45<br>6) Apache Tomcat-7.0.65<br>7)Xampp Server<br>8)Weka<br>9) Open Office-4.17<br>10)Flex-2.5.35<br>11) Bison-3.0.2<br>12)Netbeans 8.2<br>13)Python-3.8.1/3.9.1<br>14)Ruby-1.9.3<br>15)Perl-5.18.2<br>16)TCL-8.6<br>17) Wireshark-2.6.6<br>18)NMAP-6.40<br>19) Java1.8 |
| 10 | Software Engineering Lab | 1) Windows 7<br>2) Ubuntu<br>3) Codeblocks with MinGW<br>4)Eclipse<br>5)Star UML<br>6)Ruby-1.9.3<br>7)Perl -5.18.2<br>8)TCL -8.6<br>9)Open Office-4.17<br>10) Java1.8 |

# List of Major Equipment/Facilities in each Laboratory/Workshop

**Name of the Department:  EEE**

| Sl. No. | Name of the Laboratory/ Workshop | List of Major Equipment/Facilities |
|---|---|---|
| 1. | Basic Electrical Engineering lab | DC shunt motor coupled with DC shunt generator with accessories |
| 2. | Power Electronics lab | Storage oscilloscope |
| | | PSPICE Software |
| 3. | Control systems lab | MATLAB Soft ware |
| | | Transfer function of dc generator kit |
| 4. | Elecrtical machines-I LAB | Rectifier with accessories |
| 5 | ElecrticaL machines-2 LAB | Dc shunt motor coupled with Alternator |
| | | Heat run test |
| 6. | Electrical Measurements and instrumentation lab | Dielectric oil testing kit |
| | | PT Testing by comparision method |
| 7. | Power systems lab | Performance and testing of Feeder Protection System |
| | | Performance and testing of Generator Protection System |
| | | Performance and testing of Transformer Protection System |
| 8 | Basic Electrical Simulation Lab | Acer-i5systems-8GB RAM-1TB HDD |
| | | PSPICE Software |
| | | MATLAB Soft ware |
| | | |

# List of Experimental Setup in each Laboratory/Workshop

**Name of the Department:  EEE**

| Sl. No. | Name of the Laboratory/Workshop | Experimental Set up |
|---------|--------------------------------|---------------------|
| 1. | Basic Electrical Engineering Lab | 1. Verification of Ohms Law |
|  |  | 2. Verification of KVL and KCL |
|  |  | 3. Transient Response of Series RL and RC circuits using DC excitation |
|  |  | 4. Transient Response of RLC Series circuit using DC excitation |
|  |  | 5. Resonance in series RLC circuit |
|  |  | 6. Calculations and Verification of Impedance and Current of RL, RC and RLC series circuits |
|  |  | 7. Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer |
|  |  | 8. Load Test on Single Phase Transformer (Calculate Efficiency and Regulation) |
|  |  | 9. Three Phase Transformer: Verification of Relationship between Voltages and Currents (StarDelta, Delta-Delta, Delta-star, Star-Star) |
|  |  | 10. Measurement of Active and Reactive Power in a balanced Three-phase circuit |
|  |  | 11. Performance Characteristics of a Separately/Self Excited DC Shunt/Compound Motor |

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| | | 12. Torque-Speed Characteristics of a Separately/Self Excited DC Shunt/Compound Motor |
| | | 13. Performance Characteristics of a Three-phase Induction Motor |
| | | 14. Torque-Speed Characteristics of a Three phase induction motor |
| | | 15. No load characteristics of a Three phase Alternator |
| 2. | Electrical Circuits Lab | 1. Verification of Thevenin's and Norton's Theorems |
| | | 2. Verification of Superposition, Reciprocity and Maximum Power Transfer theorems |
| | | 3. Locus Diagrams of RL and RC Series Circuits |
| | | 4. Series and Parallel Resonance |
| | | 5. Time response of first order RC / RL network for periodic non – sinusoidal inputs – Time constant and Steady state error determination. |
| | | 6. Two port network parameters – Z – Y parameters, Analytical verification. |
| | | 7. Two port network parameters – A, B, C, D & Hybrid parameters, Analytical verification |
| | | 8. Separation of Self and Mutual inductance in a Coupled Circuit. Determination of Co-efficient of Coupling |
| | | 9. Verification of compensation & Milliman's theorems |
| | | 10. Harmonic Analysis of non-sinusoidal waveform signals using Harmonic Analyzer and plotting frequency spectrum. |
| | | 11. Determination of form factor for non-sinusoidal waveform |

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| | | 12. Measurement of Active Power for Star and Delta connected balanced load |
| | | 13. Measurement of Reactive Power for Star and Delta connected balanced load |
| 3. | Electrical Machines Lab-I | 1.Magnetization characteristics of DC shunt generator (Determination of critical field resistance and critical speed) |
| | | 2. Load test on DC shunt generator (Determination of characteristics) |
| | | 3. Load test on DC series generator (Determination of characteristics) |
| | | 4. Load test on DC compound generator (Determination of characteristics. |
| | | 5. Hopkinson's test on DC shunt machines (Predetermination of efficiency) |
| | | 6. Fields test on DC series machines (Determination of efficiency) |
| | | 7. Swinburne's test and speed control of DC shunt motor (Predetermination of efficiencies) |
| | | 8. Brake test on DC compound motor (Determination of performance curves) |
| | | 9. Brake test on DC shunt motor (Determination of performance curves). |
| | | 10. Retardation test on DC shunt motor (Determination of losses at rated speed) |
| | | 11. Separation of losses in DC shunt motor |
| 4. | Control Systems Lab | 1. Time response of Second order system |
| | | 2. Characteristics of Synchros |
| | | 3. Programmable logic controller – Study and verification of truth tables of logic gates, simple |

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|---|---|---|
| | | Boolean expressions, and application of speed control of motor. |
| | | 4. Effect of feedback on DC servo motor |
| | | 5. Transfer function of DC motor |
| | | 6. Transfer function of DC generator |
| | | 7. Temperature controller using PID |
| | | 8. Characteristics of AC servo motor |
| | | 9. Effect of P, PD, PI, PID Controller on a second order systems |
| | | 10. Lag and lead compensation – Magnitude and phase plot |
| | | 11.Magnetic Amplifier |
| | | 12. Simulation of P, PI, PID Controller. |
| | | 13. Linear system analysis (Time domain analysis, Error analysis) using suitable software |
| | | 14. Stability analysis (Bode, Root Locus, Nyquist) of Linear Time Invariant system using suitable software |
| | | 15. State space model for classical transfer function using suitable software -Verification. |
| | | 16. Design of Lead-Lag compensator for the given system and with specification using suitable software |
| 5. | Electrical Machines Lab II | 1. O.C. & S.C. Tests on Single phase Transformer |
| | | 2. Sumpner's test on a pair of single-phase transformers |
| | | 3. No-load & Blocked rotor tests on three phase Induction motor |

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| | | 4. Regulation of a three –phase alternator by synchronous impedance &m.m.f. methods |
| | | 5. V and Inverted V curves of a three—phase synchronous motor. |
| | | 6. Equivalent Circuit of a single-phase induction motor |
| | | 7. Determination of Xd and Xq of a salient pole synchronous machine |
| | | 8. Load test on three phase Induction Motor |
| | | 9. Separation of core losses of a single-phase transformer |
| | | 10.. Efficiency of a three-phase alternator |
| | | 11. Parallel operation of Single-phase Transformers |
| | | 12. Regulation of three-phase alternator by Z.P.F. and A.S.A methods |
| | | 13. Heat run test on a bank of 3 Nos. of single-phase Delta connected transformers |
| | | 14. Measurement of sequence impedance of a three-phase alternator. |
| | | 15. Vector grouping of Three Transformer |
| | | 16.Scott Connection of transformer |
| 6 | POWER ELECTRONICS LAB | 1.Study of Characteristics of SCR, MOSFET & IGBT, |
| | | 2.Gate firing circuits for SCR's |
| | | 3.Single Phase AC Voltage Controller with R and RL Loads |
| | | 4.Single Phase half controlled &fully controlled bridge converter with R and RL loads |
| | | 5.Forced Commutation circuits (Class A, Class B, |

| | | Class C, Class D & Class E) |
|---|---|---|
| | | 6.Single Phase Cyclo-converter with R and RL loads |
| | | 7.Single Phase series& parallel inverter with R and RL loads |
| | | 8.Single Phase Bridge inverter with R and RL loads |
| | | 9.DC Jones chopper with R and RL Loads |
| | | 10.hree Phase half-controlled bridge converter with R-load |
| | | 11.Single Phase dual converter with RL loads |
| | | 12.(a)Simulation of single-phase Half wave converter using R and RL loads (b)Simulation of single-phase full converter using R, RL and RLE loads (c)Simulation of single-phase Semi converter using R, RL and RLE loads |
| | | 13.(a)Simulation of Single-phase AC voltage controller using R and RL loads (b)Simulation of Single phase Cyclo-converter with R and RL-loads |
| | | 14.Simulation of Buck chopper |
| | | 15.Simulation of single-phase Inverter with PWM control |
| | | 16.Simulation of three-phase fully controlled converter with R and RL loads, with and without freewheeling diode. Observation of waveforms for Continuous and Discontinuous modes of operation. |
| | | 17.Study of PWM techniques |
| 7 | MEASUREMENTS AND INSTRUMENTATION LAB | 1. Calibration and Testing of single-phase energy Meter. |
| | | 2. Calibration of dynamometer power factor meter. |
| | | 3. Crompton D.C. Potentiometer – Calibration of PMMC ammeter and PMMC voltmeter. |
| | | 4. Kelvin's double Bridge – Measurement of resistance – Determination of Tolerance. |

| | | 5. Dielectric oil testing using H.T. testing Kit. |
|---|---|---|
| | | 6. Schering Bridge & Anderson Bridge. |
| | | 7. Measurement of 3 - Phase reactive power with single-phase wattmeter. |
| | | 8. Measurement of displacement with the help of LVDT |
| | | 9. Calibration LPF wattmeter – by Phantom testing. |
| | | 10. Measurement of 3-phase power with single watt meter and two CTs. |
| | | 11. C.T. testing using mutual Inductor – Measurement of % ratio error and phase angle of given<br>CT by Null method.<br>comparison |
| | | 12. PT testing by comparison – V. G. as Null detector – Measurement of % ratio error and phase<br>angle of the given PT |
| | | 13. Resistance strain gauge – strain measurements and Calibration. |
| | | 14. Transformer turns ratio measurement using AC bridges. |
| | | 15. Measurement of % ratio error and phase angle of given CT by comparision |
| | | 16..Measurement of a choke coil using three voltmeters and three ammeters method |
| 8 | POWER SYSTEMS LAB | 1. Characteristics of IDMT Over-Current Relay. |
| | | 2. Differential protection of 1-Φ transformer. |
| | | 3. Characteristics of Micro Processor based Over Voltage/Under Voltage relay. |
| | | 4. A,B,C,D constants of a Long Transmission line |
| | | 5. Finding the sequence impedances of 3-Φ |

| | | synchronous machine. |
|---|---|---|
| | | 6. Finding the sequence impedances of 3-Φ Transformer |
| | | 7. Formation of YBUS. |
| | | 8. Load Flow Analysis using Gauss Seidal (GS) Method. |
| | | 9. Load Flow Analysis using Fast Decoupled (FD) Method. |
| | | 10. Formation of ZBUS. |
| | | 11. Simulation of Compensated Line |
| | | 12.Performance and testing of Transformer Protection System |
| | | 13.Performance and testing of Generator Protection System |
| | | 14.Performance and testing of Feeder Protection System |
| 9 | Electrical systems simulation lab | 1. Design of first and second order circuits in time and frequency domain |
| | | 2. Performance evaluation of medium and long transmission lines |
| | | 3. Symmetrical component analysis |
| | | 4. Transmission Line Fault Analysis |
| | | 5. LG, LL and 3-Φ fault analysis of Transformer Converters |
| | | 6. Short Circuit Analysis of Power system models |
| | | 7. Speed Control of DC Motor |
| | | 8. Speed Control of Induction motor |
| | | 9. Design and analysis of feedback control system |

| | | 10. Transient analysis of open ended line and short circuited line |
|---|---|---|
| | | 11. Load frequency control of single area and two area power system |
| | | 12. Economic Dispatch of Thermal Units |
| | | 13. Design of Single Phase and Three Phase Inverters |
| | | 14. Design of Single Phase and Three Phase Full Converters |
| 10 | POWER SYSTEM SIMULATION LAB | 1. Generation of high frequency transients through RLC circuit |
| | | 2. Voltage distribution across insulator string |
| | | 3. Comparison of lumped and distributed transmission lines |
| | | 4. Calculation of fault currents of transmission line |
| | | 5. Time constant calculation of RL circuit |
| | | 6. Time constant calculation of RC circuit |
| | | 7. Time constant calculation of RLC circuit |
| | | 8. Simulation of Resonance circuit |
| | | 9. Calculation of R, L, C, Zs of 3-phase Transmission Line |
| | | 10. Estimation of TARIFF based on load curve |
| 11 | ELECTRICAL WORKSHOP | 1.Design and fabrication of reactor/ electromagnet for different inductance values. |
| | | 2.Design and fabrication of single phase Induction/three phase motor stator. |
| | | 3.Start delta starter wiring for automatic and |

| | | manual operation. |
|---|---|---|
| | | 4. Wiring of distribution box with MCB, ELCB, RCCB and MCCB |
| | | 5. Wiring of 40 W tube, T-5, LED, Metal Halide lamps and available latest luminaries. |
| | | 6. Assembly of various types of contactors with wiring. |
| | | 7. Assembly of DOL and 3 point starter with NVC connections and overload operation. |
| | | 8. Design and development of 5 V regulated power supply |
| | | 9. Design and development of precision rectifier. |
| | | 10. Design and development of first order/ second order low pass/high pass filters with an application. |
| | | 11. Microcontroller Interface circuit for temperature/level/speed/current/voltage measurement. |
| | | 12. Peak detector using op-amplifiers |
| | | 13. Zero crossing detector using op-amplifiers |
| 12 | Basic Electrical and electronics engineering lab | 1. Verification of KVL and KCL |
| | | 2.(i) Measurement of Voltage, Current and Real Power in primary and Secondary Circuits of a Single-Phase Transformer<br>(ii) Verification of Relationship between Voltages and Currents (Star-Delta, Delta-Delta, Delta- star, Star-Star) in a Three Phase Transformer |
| | | 3. Measurement of Active and Reactive Power in a balanced Three-phase circuit |
| | | 4. Performance Characteristics of a Separately Excited DC Shunt Motor |

| | | |
|---|---|---|
| | | 5.Performance Characteristics of a Three-phase Induction Motor |
| | | 6.No-Load Characteristics of a Three-phase Alternator |
| | | 7.Study and operation of<br>(i) Multi-meters (ii) Function Generator (iii) Regulated Power Supplies (iv) CRO. |
| | | 8.PN Junction diode characteristics |
| | | 9.Zener diode characteristics and Zener as voltage Regulator |
| | | 10.Input & Output characteristics of Transistor in CB / CE configuration |
| | | 11.Full Wave Rectifier with & without filters |
| | | 12.Input and Output characteristics of FET in CS configuration |

# List of Major Equipment/Facilities in each Laboratory/Workshop

## Name of the Department:  H&S

| Sl. No. | Name of the Laboratory/ Workshop | List of Major Equipment/Facilities |
|---------|----------------------------------|-----------------------------------|
| 1. | Applied Physics Laboratory | Hall effect equipment |
| | | Photo electric effect equipment |
| | | Cathode ray oscilloscope |
| | | He-Ne laser |
| | | Function generator |
| | | Rheostat |
| | | Plug keys |
| | | Ammeter |
| | | Commutator |
| | | DC power supply (0-30v) (0-2A) |
| | | DC power supply (5v-1A) |
| | | Deflection Magneto Meters |
| | | Fiber 1mm core,0.5-NA |
| | | High resistance keys |
| | | Inductor (100mH) |
| | | inductor (50mH) |
| | | inductor variable box (1-10mH) |
| | | Capacitor    0.1µf |
| | | Variable capacitor box 0.01-10µf |
| | | Resistance box (1-5k.ohm) |
| | | Resistance box (0.1-10ohm) |
| | | Resistance box(1-10k.ohm) |
| | | Thermometer |
| 2. | Engineering Physics Laboratory | Spectrometer |
| | | Adjustable rectangular slit |
| | | Grating (15000 lpi) |
| | | Prisms |
| | | Magnifying lenses |
| | | Mercury vapour lamp |
| | | Newton rings apparatus (Travelling Microscope) |
| | | Sodium vapour lamp |
| | | DC power supply (0-12v)2A |
| | | Weighing box |
| | | Brass wire |
| | | Spherometer |
| | | Screw gauge |

| | | Meter scale |
|---|---|---|
| | | Vernier callipers |
| | | Steel wire |
| | | Fiber 1mm core,0.5-NA |
| | | Function generator |
| | | Stop clocks |
| | | Digital stop clock |
| | | Spring Constant Apparatus |
| | | Sonometer |
| | | Aspirator bottles |
| | | Beakers |
| | | slotted weights |
| | | Tuning forks set |
| | | Pendulum bobs |
| | | Measuring jar |
| | | Digital multimeters |
| | | Digital Balance |

## List of Experimental Setup in each Laboratory/Workshop

### Name of the Department:  H&S

| Sl. No. | Name of the Laboratory/Workshop | Experimental Set up |
|---|---|---|
| 1 | Applied Physics Laboratory | LASER Diode with powersupply & stands |
| | | LCR kit |
| | | LED characteristics kit |
| | | RC Circuit set up |
| | | Energy gap of semiconductor set up |
| | | Laser Diode characteristics setup |
| | | p-i-n& avalanche photo diode kit |
| | | Solar cell characteristics kit |
| | | Stewart gees apparatus and experimental set up |
| 2 | Engineering Physics Laboratory | Melde's apparatus |
| | | Laser Diode characteristics setup |
| | | Torsional pendulum set up |
| | | Dispersive power of prism experimental setup |
| | | Diffraction grating experimental setup |
| | | Coupled oscillator setup |

| | | Optical fiber communication kit |
| --- | --- | --- |
| | | LASER Diode with power supply & stands |
| | | LCR kit |

# List of Major Equipment/Facilities in each Laboratory/Workshop

## Name of the Department: Mechanical Engineering

| Sl. No. | Name of the Laboratory/ Workshop | List of Major Equipment/Facilities |
|---|---|---|
| 1 | FLUID MECHANICS AND HYDRAULIC MCHINES LAB | Bernoulli's theorem Apparatus, Orifice and Mouth Piece Apparatus, Notch Apparatus, Pipe Friction Apparatus, Impact of Jet Apparatus, Venturimeter and Orificemeter Apparatus, Pelton Wheel Turbine Test Rig, Centrifugal Pump Test Rig, Centrifugal Pump Test Rig Multistage Closed Circuit, Reciprocating Pump Closed Circuit, Francis Turbine Test Rig, Kaplan turbine, Hydraulic RAM test rig ( Hydraulic jump apparatus), Water Hammer |
| 2 | METALLURGY AND MATERIAL SCIENCE LAB | Binocular Metallurgical Microscope, Trinocular Metallurgical Microscope Colour Image Capture System (CCD) Camera Junior Cut-Off Machine Double Disk Polisher Hydraulic Specimen Mounting Press Jominy Quench Apparatus Rockwell & Brinell Hardness Tester |
| 3 | KINEMATICS AND DYNAMICS LAB | Single And Double Rotor, Governor Setup Cam And Follower Setup, Balancing Of Rotating Masses And Vibration Pick Up Whirling Of Shaft Apparatus, Motorized Gyroscope, Forced Vibration Set Up ( Spring, Beam, Exciter, Motor, Strip Chart, Recorder), Journal Bearing Apparatus |
| 4 | PRODUCTION TECHNOLOGY LAB | Injection Molding Machine AC Arc Welding Transformer-TPA 303 Spot Welding Machine-10 KVA Universal Strength Machine Blow Molding Machine Tilting Crucible Furnace Plasma Cutting Machine Multiplaz-3500 Plasma Welding & Cutting Machine, Hydraulic Press Hydraulic Press (Hand Operated) Suitable Dies, Bending Piercing Deep TIG Welding Equipments 300amp Induction Furnace |

| | | Sand Rammer<br>Rapid Moisture Tester |
|---|---|---|
| 5 | ENGINEERING METROLOGY LAB | Tool Makers Micro Scope With Accessories<br>Optical Flat, Magnetic V-Block Size 100x95x70 mm, Interchangeable Anvil Micrometer, Test Mandrel 500 mm Long<br>Surface Roughness Tester SJ-210<br>Dial Indicator Stand with Plug dial Gauge |
| 6 | MECHANICS OF SOLIDS LAB | Universal Testing Machine<br>Pendulum Impact Tester<br>Torsion Testing Machine<br>Spring Testing Machine<br>Brinell Hardness Tester<br>Shear Strength attachment for U.T.M<br>Strain gauge<br>Mitutoyo- dial gauge with magnetic stand (for continuous beam)<br>Rockwell cum Brinell Hardness Tester Model AI-RABI<br>Strain Measurement Instrument |
| 7 | INSTRUMENTATION LAB | Dead Weight Pressure Gauge tester<br>Temperature transducers<br>Displacement transducer (L.V.D.T)<br>Strain gauge transducer<br>Capacitive transducer<br>Photo & Magnetic Pickup transducers<br>McLeod gauge for low pressure measurement<br>Seismic Pickup for the measurement of vibration amplitude<br>Rotameter for flow measurement<br>Temperature Trainer Module<br>LVDT Trainer<br>Temperature Trainer Thermocouple<br>Capacitance Trainer<br>Temperature Trainer RTD<br>Resistance Strain Gauge<br>Capacitive Pick Up |
| 8 | MACHINE TOOLS LAB | Lath Machines (Gujarat make , Cone Pulley drive SS & SC type)<br>12'' Stroke heavy duty Shaping Machine<br>Universal / Horizontal Milling Machine<br>38 mm Capacity Geared Radial Drilling Machine, Mechanical Surface Grinder<br>Universal Tool & Cutter Grinder<br>All Geared Lathe Machine |

| | | Slotting Machine |
|---|---|---|
| | | Planner Machine |
| | | Grinding Machine |
| 9 | CAD/CAM LAB | ANSYS Introductory Multi Physics Software Version 10.0 |
| | | Auto Desk Inventor Professional 11 |
| | | CAM Lab Package Comprising (1 Set & 5 Users) |
| | | Solid Works Education Edition Network |
| | | CNC Lathe Model-Clt100 |
| | | CNC Mill Model-Nmt225 |
| | | Profile Projector |
| | | Dell Optiplex Gx520 NDT Nodes Systems |
| | | Acer core i5 desktop 8GB RAM |
| 10 | THERMAL ENGINEERING LAB | Diesel Engine Cut-Section Model-1cyl, 4Stroke |
| | | Petrol Engine Cut-Section Model- 1 Cyl, 2Stroke |
| | | Diesel Engine Test Rig- 1 Cyl, 4-Stroke; With Electrical Alternator Loading |
| | | Petrol Test Rig – 4 Cyl, 4-Stroke; Hydraulic Dynamometer Loading & Radiation Arrangement |
| | | Diesel Engine Test Rig- 1 Cyl, 4-Stroke; Slow Speed With Retardation Test |
| | | Experimental Refrigeration Test Rig – R134 |
| | | Boiler Cut-Section Model – Lancashire  Boiler |
| | | Boiler Cut-Section Model –Babcock Boiler |
| | | Boiler Cut-Section Model –Cochran Boiler |
| | | Experimental Air-Conditioning Test Rig; With Heat  Pump Facility |
| | | Two Stage Air Compressor Test Rig |
| | | Single Cyl, 4-Stroke Petrol Engine Test Rig With Electric Loading |
| | | Si Engine Test Rig(2-Stroke) |
| | | VCR CI Engine Test Rig |
| | | 2-Stroke Petrol Engine |
| | | Maruti ZEN engine and accessories |
| 11 | HEAT TRANSFER  LAB | Thermal Conductivity of Metal Rod Apparatus |
| | | Stefan Boltzmann Apparatus |
| | | Critical Heat Flux Apparatus |
| | | Composite Wall Apparatus |
| | | Lagged Pipe Apparatus |
| | | Forced Convection Apparatus |
| | | Natural Convection Apparatus |
| | | Thermal Conductivity of Insulating Powder |

| | | Parallel & Counter Flow Heat Exchanger |
|---|---|---|
| | | Emissivity Apparatus |
| | | Heat Pipe Apparatus |
| | | Pin-Fin Apparatus |
| | | Unsteady State Heat Transfer Equipment |
| | | Drop Wise and Film Wise Condensation |
| 12 | FUELS AND LUBRICTANTS LAB | Junker's Gas Calorimeter<br>Penskey martin apparatus<br>Engler's viscometer<br>Red wood viscometer-2<br>High precision balance<br>Cloud point and Pour point Apparatus |
| 13 | ENGINEERING WORKSHOP  LAB | 25mm drilling machine (pillar type), Swage Block, Shearing Machine, Single phase Bench grinder, Cutting machine, Power wood planner machine |
| 14 | MANUFACTURING SIMULATION & PRECISION ENGINEERING LAB (M. Tech) | Flexsim software<br>Process Simulator Software (ProModel)<br>Automod Software<br>Lathe tool dynamometer<br>Hydraulic trainer Kit<br>Pneumatic trainer<br>Programmable Logic Controller<br>Abrasive Jet Machine & Tool Makers Microscope<br>Air compressor<br>Intel pentium P4 dual core integrated intighraphic acceleration 950 2GB RAM |
| 15 | ADVANCED CAD/CAM LAB (M. Tech) | Fanuc Robo Simulation Software<br>CNC Lathe<br>CNC Mill<br>CAM Lab Package Comprising (CAPsturn Ver.8.1, CAPSMILL Ver.8.1, SeeNC Turn Ver.6.1 SeeNC Mill Ver6.1) |
| 16 | Automation Lab (M. Tech) | DOBOT Magician |

# List of Experimental Setup in each Laboratory/Workshop

## Name of the Department:  Mechanical Engineering

| Sl. No. | Name of the Laboratory/ Workshop | Experimental Set up |
|---|---|---|
| 1 | FLUID MECHANICS AND HYDRAULIC MCHINES LAB | 1. Bernoulli's theorem Apparatus <br> 2. Orifice and Mouth Piece Apparatus <br> 3. Notch Apparatus <br> 4. Pipe Friction Apparatus <br> 5.  Impact of Jet Apparatus <br> 6. Venturimeter and Orificemeter Apparatus <br> 7. Pelton Wheel Turbine Test Rig <br> 8. Centrifugal Pump Test Rig <br> 9. Centrifugal Pump Test Rig Multistage Closed Circuit <br> 10. Reciprocating Pump Closed Circuit <br> 11. Sudden Reduction  of Pipe Cross Section <br> 12. Francis Turbine Test Rig <br> 13. Kaplan turbine <br> 14.  Hydraulic RAM test rig (Hydraulic jump apparatus) <br> 15. Water Hammer |
| 2 | METALLURGY AND MATERIAL SCIENCE LAB | 1. Binocular Metallurgical Microscope <br> 2. Micrometer Eye Piece <br> 3. Graph Micrometer <br> 4. Grain Size Micrometer <br> 5. Trinocular Metallurgical Microscope <br> 6. Colour Image Capture System (CCD) Camera <br> 7. Junior Cut-Off Machine <br> 8. Double Disk Polisher <br> 9. Hydraulic Specimen Mounting Press <br> 10. Spare Mould Assembly <br> 11. Belt Grinder <br> 12. Muffle Furnace with Digital Indicator <br> 13. Jominy Quench Apparatus <br> 14. Rockwell & Brinell Hardness Tester |
| 3 | KINEMATICS AND DYNAMICS LAB | 1. Single And Double Rotor <br> 2. Governor Setup <br> 3. Cam And Follower Setup <br> 4. Balancing Of Rotating Masses And Vibration Pick Up <br> 5. Whirling Of Shaft Apparatus <br> 6. Motorized Gyroscope <br> 7. Forced Vibration Set Up ( Spring, Beam, Exciter, Motor, Strip Chart, Recorder) |

| | | 8. Journal Bearing Apparatus |
|---|---|---|
| | | 9. Simple Pendulum |
| | | 10. Compound Pendulum |
| 4 | PRODUCTION TECHNOLOGY LAB | 1. AC Arc Welding Transformer-TPA 303 |
| | | 2. Spot Welding Machine-10 KVA |
| | | 3. Universal Strength Machine |
| | | 4. Blow Molding Machine |
| | | 5. Tilting Crucible Furnace |
| | | 6. Plasma Cutting Machine |
| | | 7. Multiplaz-3500 Plasma Welding & Cutting Machine, Hydraulic Press |
| | | 8. Hydraulic Press (Hand Operated) |
| | | 9. Suitable Dies, Bending Piercing Deep |
| | | 10. TIG Welding Equipments 300amp |
| | | 11. Induction Furnace |
| 5 | ENGINEERING METROLOGY LAB | 1. Tool Makers Micro Scope With Accessories |
| | | 2. Optical Flat |
| | | 3. Three Wire Set |
| | | 4. Surface Roughness Tester SJ-210 |
| 6 | MECHANICS OF SOLIDS LAB | 1. Universal Testing Machine |
| | | 2. Pendulum Impact Tester |
| | | 3. Torsion Testing Machine |
| | | 4. Spring Testing Machine |
| | | 5. Brinell Hardness Tester |
| | | 6. Cantilever Beam |
| | | 7. Simply Supported Beam |
| | | 8. Shear Strength attachment for U.T.M |
| | | 9. Rockwell cum Brinell Hardness Tester Model AI-RABI |
| | | 10. Strain Measurement Instrument |
| | | 11. Continuous Beam |
| 7 | INSTRUMENTATION LAB | 1. Dead Weight Pressure Gauge tester |
| | | 2. Temperature transducers |
| | | 3. Displacement transducer (L.V.D.T) |
| | | 4. Strain gauge transducer |
| | | 5. Capacitive transducer |
| | | 6. Photo & Magnetic Pickup transducers |
| | | 7. McLeod gauge for low pressure measurement |
| | | 8. Seismic Pickup for the measurement of vibration amplitude |
| | | 9. Rotameter for flow measurement |
| | | 10. Temperature Trainer Module |
| | | 11. LVDT Trainer |
| | | 12. Temperature Trainer Thermocouple |
| | | 13. Capacitance Trainer |
| | | 14. Temperature Trainer RTD |

| | | 15. Resistance Strain Gauge |
| | | 16. Capacitive Pick Up |
|---|---|---|
| 8 | MACHINE TOOLS LAB | 1. Lath Machines (Gujarat make |
| | | 2. Cone Pulley drive SS & SC type) |
| | | 3. 12'' Stroke heavy duty Shaping Machine |
| | | 4. Universal / Horizontal Milling Machine |
| | | 5. 38 mm Capacity Geared Radial Drilling Machine |
| | | 6. Mechanical Surface Grinder |
| | | 7. Universal Tool & Cutter Grinder |
| | | 8. All Geared Lathe Machine |
| | | 9. Slotting Machine |
| | | 10. Drill Machine Vice |
| | | 11. Planner Machine |
| | | 12. Grinding Machine |
| 9 | CAD/CAM LAB | 1. ANSYS Introductory Multi Physics Software Version 10.0 |
| | | 2. Auto Desk Inventor Professional 11 |
| | | 3. CAM Lab Package Comprising (1 Set & 5 Users) |
| | | 4. Solid Works Education Edition Network |
| | | 5. CNC Lathe Model-Clt100 |
| | | 6. CNC Mill Model-Nmt225 |
| | | 7. Profile Projector |
| 10 | THERMAL ENGINEERING LAB | 1. Diesel Engine Cut-Section Model-1cyl 4Stroke |
| | | 2. Petrol Engine Cut-Section Model- 1 Cyl, 2Stroke |
| | | 3. Diesel Engine Test Rig- 1 Cyl, 4-Stroke; With Electrical Alternator Loading |
| | | 4. Petrol Test Rig – 4 Cyl, 4-Stroke; Hydraulic Dynamometer Loading |
| | | 5. Diesel Engine Test Rig- 1 Cyl, 4-Stroke; Slow Speed With Retardation Test |
| | | 6. Experimental Refrigeration Test Rig – R134 |
| | | 7. Boiler Cut-Section Model – Lancashire Boiler |
| | | 8. Boiler Cut-Section Model –Babcock Boiler |
| | | 9. Boiler Cut-Section Model –Cochran Boiler |
| | | 10. Experimental Air-Conditioning Test Rig; With Heat Pump Facility |
| | | 11. Two Stage Air Compressor Test Rig |
| | | 12. Single Cyl, 4-Stroke Petrol Engine Test Rig With Electric Loading |
| | | 13. SI Engine Test Rig(2-Stroke) |
| | | 14. VCR CI Engine Test Rig |
| | | 15. 2-Stroke Petrol Engine |
| 11 | HEAT TRANSFER LAB | 1. Thermal Conductivity of Metal Rod Apparatus |
| | | 2. Stefan Boltzmann Apparatus |
| | | 3. Critical Heat Flux Apparatus |
| | | 4. Composite Wall Apparatus |
| | | 5. Lagged Pipe Apparatus |

| | | 6. Forced Convection Apparatus |
|---|---|---|
| | | 7. Natural Convection Apparatus |
| | | 8. Thermal Conductivity of Insulating Powder |
| | | 9. Parallel & Counter Flow Heat Exchanger |
| | | 10. Emissivity Apparatus |
| | | 11. Heat Pipe Apparatus |
| | | 12. Pin-Fin Apparatus |
| | | 13. Unsteady State Heat Transfer Equipment |
| | | 14. Drop Wise and Film Wise Condensation |
| 12 | FUELS AND LUBRICTANTS LAB | 1. Abel's Flash point Apparatus |
| | | 2. Cleavland's Flash point & Fire point Apparatus |
| | | 3. Saybolt Viscometer |
| | | 4. Redwood Viscometer -I |
| | | 5. Penetrometer Apparatus |
| | | 6. Conradson Carbon residue four test apparatus with gas burner |
| | | 7. Bomb calorimeter apparatus with digital thermometer |
| | | 8. Junker's Gas Calorimeter |
| | | 9. Penskey martin apparatus |
| | | 10. Englers viscometer |
| | | 11. Red wood viscometer-2 |
| | | 12. High precision balance |
| | | 13. Drop point Apparatus |
| | | 14. Distillation Apparatus |
| | | 15. Cloud point and Pour point Apparatus |
| 13 | ENGINEERING WORKSHOP LAB | 1. Fitting Section |
| | | 2. Black Smithy Section |
| | | 3. House Wiring Section |
| | | 4. Carpentry Section |
| | | 5. Tin Smithy Section |
| | | 6. Welding Section |
| | | 7. Foundry Section |
| | | 8. General Tools & Equipment |
| 14 | MANUFACTURING SIMULATION & PRECISION ENGINEERING LAB (M. Tech) | 1. Flexsim software |
| | | 2. Process Simulator Software (ProModel) |
| | | 3. Automod Software |
| | | 4. Lathe tool dynamometer |
| | | 5. Hydraulic trainer Kit |
| | | 6. Pneumatic trainer |
| | | 7. Programmable Logic Controller |
| | | 8. Abrasive Jet Machine & Tool Makers Microscope |
| 15 | ADVANCED CAD/CAM LAB (M. Tech) | 1. Fanuc Robo Simulation Software |
| | | 2. CNC Lathe |
| | | 3. CNC Mill |
| | | 4. CAM Lab Package Comprising (CAPsturn Ver.8.1, CAPSMILL Ver.8.1, SeeNC Turn |

| | | Ver.6.1 SeeNC Mill Ver6.1) |
|---|---|---|
| 16 | Automation Lab (M. Tech) | DOBOT Magician |

# List of Major Equipment/Facilities in each Laboratory

## Name of the Department:  Civil Engineering

| Sl. No. | Name of the Laboratory/ Workshop | List of Major Equipment/Facilities |
|---------|----------------------------------|-------------------------------------|
| 1 | SURVEYING LAB | vernier  theodolite, chains, tapes, ranging rods, cross staff, arrows, prismatic compass, optical square, planimeter, box sextants, plane table, Auto level, vernier theodolite 20'sec, TS Geomax, GPS. |
| 2 | CONCRETE & HIGHWAY MATERIALS LABORATORY | Compression Testing Machine, Flow Table Motorised, Concrete Test Hammer, Vicat Apparatus with Dashpot, Blain Air Permeability Apparatus, Le-Chatelier Flask, Water Bath, Compaction Factor Apparatus, Slump Test Apparatus with Tamping Rod & Base Plate, Consistometer, Cylindrical Metal Measures (Sets of 3), Los Angeles abrasion Testing Machine, Universal Penetrometer, Marshall Apparatus, California Bearing Ratio Test Apparatus, Crushing Value Apparatus, Aggregate Impact Tester with Blow Counter, Deval Abrasion Testing Machine, Ductility Testing Machine, Ring & Ball Apparatus, Flash Point (Open) & Fire Point Pensky-Martens Apparatus, Centrifuge Extractor, Lab Oven Thermostatically Controlled, Electronic weighing Balance, Vicat Apparatus with Dashpot, Buoyancy Balance, concrete mixer, CBR Moulds 2, Flexure testing Machine, UPV Pundit Lab, vibrating table, bushnell velocity speed gun, viscometer. |
| 3 | ENGINEERING GEOLOGY LAB | Minerals specimens, Rock specimens, Structural Geology Models, Streak plates, Geological map of India Karimnagar and Warangal, Microscope, Globe. |
| 4 | SOIL MECHANICS LAB | Liquid Limit Device, Plastic Limit Set, Shrinkage Limit Set, Core Cutter, Sand |

| | | Poring Cylinder Apparatus, **Grain Size Analysis Set, Constant Permeability Set,** variable head permeability set, compaction test apparatus light compaction, proctor penetrometer, oven, electronic weighing balance, hand operated extractor, 10KG Conta scale, consolidation apparatus single gang, unconfined compression tester, triaxial outfit motorized, direct shear apparatus, vane shear apparatus, consolidation apparatus 3 gang, proctor compaction (heavy ), Vernier callipers, Desiccators. |
|---|---|---|
| 5 | CAD LAB | **LENOVO SYSTEMS** <br><br> 1)Intel Pentium CPU Dual core 2.8 GHz 2$^{nd}$ <br>   Generation <br> 2)2GB DDR3 RAM <br> 3)500GB HDD <br> 4)18.5" wide screen LCD <br><br> **LG SYSTEMS** <br> 1) Intel P-IV@2.66 GHz processor <br> 2) GB DDR3 RAM <br> 3) 40GB HDD <br> 4) 15"&17" CRT Monitors <br> UPS(12.5 KVA, 30 Minutes Back Up), Networking Equipment. |
| 6 | ENVIRONMENTAL ENGINEERING LAB | B.O.D Incubator, C.O.D Apparatus, Digital Conductivity Meter, Colorimeter, PH Meter, Water Bath, Turbidity Meter, Jar Test, Digital Weighing Balance, Dissolved Oxygen Analyser, Oven, Refrigerator, Auto Clave, Noise level meter. |