ENGINEERING PROGRAM DATA

Following tabulated data (program-wise) as per given format is submitted as a desired:

Table-VI: Laboratory Details (PROGRAM-WISE)

Name of Engineering Program: **BE Electrical (Electronics)**

Number of Total Engineering & Non-Engineering Program: **42**

Number of Lab Courses: **21**

Number of Laboratories: **19**

Name of Lab
1. Basic Electrical Engineering Lab
2. Digital logic design lab
3. Electrical machines lab
4. Microprocessor and microcontroller lab
5. Digital signal processing lab
6. Measurement & instrumentation lab
7. Communication lab
8. Control system lab
9. Projects lab
10. Advanced electronics lab
11. Power electronics lab
12. Basic electrical lab
13. Engineering drawing lab (AUTO CAD)
14. Applied physics lab
15. Programmable logic controller lab
16. Antenna lab/micro wave lab
17. Computer networks lab
18. Computer lab
19. Chemistry lab

Basic Electronics Lab

Lab Engineer: Engr. Muhammad Junaid

Lab Asstt: Zeeshan Hanif

Lab Courses: Opto Electronics
Basic Electronics Engineering
Circuit Analysis I
VLSI

Type of Workstation: Basic Electronics Workstation

No of Workstation: 08

Sr. no	Equipment Name	Specification and Utilization	No of Items/Units
1. 1.1.	Basic Electronics Trainer Model: ICP-102	To perform the basic electronics experiments	8
2.	Digital Multimeters	To perform the electronics experiments	8
3.	Oscilloscope 20 MHz, 100 MHz	Waveform review analogue	4
4.	Oscilloscope 40 MHz	Waveform review analogue	4
5.	Function Generator	To generate electrical waveforms analogue	8
6.	DC Power Supply	Source of electrical power	3
7.	Analogue Power Supply	Source Electric Power	4

BASIC ELECTRIONICS

1. Basic introduction.
2. Diode Characteristics.
3. Zener diode.
4. Half wave rectifier.
5. FW rectifier.
6. Series clippers study.
7. Parallel clippers study.
8. Unbiased clamper.
9. Biased clamper.
10. Transistor.
11. LED Characteristics.
12. BJT Characteristics.
13. Voltage Doublers.
14. Common Emitter Amplifier.

Digital Logic Design Lab

Lab Engineer: Engr. Muneeb Ejaz

Lab Asstt: Waseem Arshad

Lab Courses: Digital Logic Design

Type of Workstation: Digital Electronic Logic Trainer

No of Workstation: 10

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1. 1.1.	Digital Electronics Trainer Model: IPC-185 AD	For DLD Lab experiments	10
2.	Logic Trainer Model: EES-2001	For DLD Lab experiments	10
3.	Digital Logic Trainer Model: IPC-180 DL	For DLD Lab experiments	10
4.	Logic Probes	Waveform review analogue	6
5.	Stripper	To generate electrical waveforms analogue	1
6.	Misc	Multimeter, Nose pliers, Pliers	4,2,1

Digital Logic Design

1. AND gate operation.
2. OR gate operation.
3. NOT gate operation.
4. NAND gate operation.
5. NOR gate operation.
6. XOR gate operation.
7. Half adder operation.
8. Full adder operation.
9. Half subtraction operation.
10. Full subtraction operation.
11. D latch and flip-flop operation.
12. JK flip-flop operation.

Electric Machine Lab

Lab Engineer: Engr. Waqas Ahmad Sheikh

Lab Asstt: Umer Khalid

Lab Courses: Electric machine I & II
Electromechanical System

Type of Workstation: DC Machine, AC Machine

No of Workstation: 5 + 5

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1. 1.1.	AC Motor / Generator Model IPC-2100-MG	To perform Electric Machines Lab, Experiments on AC Motor/ Generator	5
2.	DC Motor / Generator Model IPC-2100-MG	To perform Electric Machines Lab, Experiments on AC Motor/ Generator	5
3.	Misc	All requisite spares and test equipment	

ELECTRIC MACHINE LAB

LIST OF EXPERIMENTS

1. DC Generator (Separately Excited)
2. DC Shunt Generator (Self Excited)
3. DC Series generator (Self Excited)
4. DC Compound Generator (Self Excited)
5. DC Compound Generator (Separately Excited)
6. The Resistance Test (Synchronous Generator)
7. Frequency and Voltage Control of AC Generator
8. AC Generator Open Circuit Test
9. AC Generator Short Circuit Test
10. AC Generator $\mathbf{V_{out}}$ / $\mathbf{I_f}$ Characteristics
11. AC Generator $\mathbf{V_{out}}$ / Speed Characteristics
12. AC generator voltage regulation

Microprocessor & Microcontroller Lab

Lab Engineer: Engr. Maaz tahir Malik

Lab Asstt: Raheel Sikandar

Lab Courses: Microprocessor & Microcontroller
FPGA-Based System Design

Type of Workstation: Trainer, Microcontroller and PC

No of Workstation: 25

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1. 1.1.	Microprocessor Trainer 8086 based Model: IPC-8603	To run embedded applications	5
2.	Microcontroller Trainer 8051 based Model: IPC-8605	To run embedded applications	10
3.	PC (Pentium IV)	To save data of embedded applications	10

MICROPROCESSOR AND MICROCONTROLLER LAB

1. Tow led blinking
2. Running led
3. How to right data on ports / register
4. Write byte to register, copy byte to register
5. How to rotate bit of any port / register
6. How to plus number in 8051
7. How minus number in 8051
8. How to multiply number in 8051
9. How to divide number in 8051
10. How to use logic instruction
11. How to interface alphanumeric LCD to 8051
12. How to send data using uart (Serial Communication)
13. How to interface matrix keypad
14. Design a trafic light system
15. How to drive multiplexed 7 segment displays with microcontroller

Digital Signal Processing Lab

Lab Engineer: Engr. Maaz Tahir Malik

Lab Asstt: Muhammad Ali

Lab Courses: Digital Signal Processing
(Hardware and Software Based)

Type of Workstation: DSP Kits
PCs with MATLAB

No of Workstation: 25

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1. 1.1.	PC (Pentium IV)	To perform experiments related to DSP	23
2.	MATLAB software	To perform simulations	**
3.	DSP Trainer with kit	To perform experiments related to DSP	2

Digital Signal Processing

1. Introduction to Matlab and its basic commands
2. Introduction of different type of discrete time signals and their plotting
3. Generation of sinusoidal signals in Matlab
4. Introduction to different operation on sequence on sequences and plots
5. Generation of complex exponential signals
6. Sampling of discrete time signals in Matlab
7. Study of convolution
8. AM of a sinusoidal signal
9. Signal of smoothing in Matlab
10. Study of Z-transform in MATLAB
11. Plotting of frequency modulated signals using MATLAB
12. Study of ASK and PSK signal using MATLAB

Measurement & Instrumentation Lab

Lab Engineer: Engr. Ali Jamil

Lab Asstt: Waseem Arshad

Lab Courses: Measurement & Instrumentation

Type of Workstation: Trainer, Pressure Set, PC

No of Workstation: 10

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1. 1.1.	Transducer Sensor Application Trainer	To perform sensor applications	3
2.	Transducer Pressure Set	To perform sensor applications	1
3.	Transducer Position + Force Set	To perform weight and force sensor applications	1
4.	Transducer Position + Synchronous Sender	To perform position and synchronous sensor applications	1
5.	PC (Pentium IV)	To perform M & I experimentation	2
6.	Process Simulation Trainer	To perform instrumentation experiments	2
7.	Instrumentation Trainer	To perform advance Instrumentation equipments	2
8.	Bread Board Trainer	To perform experiments equipments	4
9.	AC Voltage Regulator	To variable supply	4

MEASUREMENTS AND INSTUMENTS LAB

1. DC Bridge – Wheat Stone' s Bridge
2. DC Bridge – Kelvin's double Bridge

3. AC Bridges – Maxwell's inductance –Capacitance Bridge
4. AC Bridge
5. Study of transients
6. Study of LDVT
7. Instrumentation Amp
8. Cal. Of single phase Energy Meter
9. Cal. of current t/r
10. DAC
11. Study of pressure transducer
12. Measurement of 3 phase power
13. Measurement of power factor
14. Iron loss measurement

Communication System Lab

Lab Engineer: Engr. Maaz Tahir Malik

Lab Asstt: Muhammad Ali

Lab Courses: Analogue & Digital Communication

Type of Workstation: Analogue & Digital Trainer, Exchange Trainer

No of Workstation: Digital Exchange Trainer 04
Computer Sets 10

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1. 1.1.	Analogue & Digital Trainer Model: IPC-AM-300	To perform basic communication experiments	5
2.	Digital exchange Trainer	To perform basic communication experiment	5

Note: One local Telephone No has been provided to perform online Telephone exchange practical.

COMMUNICATION SYSTEM

1. Introduction to basic equipment
2. Introduction to Digital comm…
3. Introduction to nosie

4. Sampling

5. Introduction to AM 3000

6. A/D conversion

7. To study line coding

8. Pluse time modulation

9. Two channel TDM

10. FSK

11. PSK & ASK

12. PCM

13. Envelope detector

14. SSB

15. To Study PABX.(DET)

16. AM

Control System Lab

(Hardware and Software Based)

Lab Engineer: Engr. Ali Jamil

Lab Asstt: Waseem Arshad

Lab Courses: Control System
Digital Control System

Type of Workstation: DC Motor Control Station

No of Workstation: 12

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	PC Systems	To perform control experiments	5
2.	DC Motor drive for PID Control	To perform control experiments	2
3.	Oscilloscope	To perform control experiments	1
4.	Power Supplies	To perform control experiments	3
5.	Function Generator	To perform control experiments	3

.

CONTROL SYSTEMS

1. Introduction to MATLAB control tool box
2. Introduction to simulink Part I
3. Introduction to simulink part II
4. Introduction to modeling of control system part I
5. Introduction to modeling of control system part II

6. Introduction to modeling of control system part III

7. Introduction to PID controllers Part I

8. Introduction to PID controllers Part II

9. Introduction to PID controllers Part III

10. Introduction to root locus Part I

11. Introduction to root locus Part II

12. Introduction to root locus Part III

13. Introduction to frequency response Part I

14. Introduction to frequency response Part II

15. Introduction to frequency response Part III

16. Introduction to state space response

Project Lab

Lab Engineer: Engr. Muneeb Ejaz

Lab Asstt: Zeeshan Hanif

Lab Courses: Final Year Project

Type of Workstation: Drilling Workstation, Trainer

No of Workstation: 7

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Project Board Trainer	Different types of experiments for Final Year Projects	21
2.	Solar Panel	To be used in Projects	1
3.	Clamp Meter	To perform Project Lab experiments	1
4.	Soldering Stations	To be used in projects	2
5.	Drill Stations	To be used in projects	2
6.	Bench Wise	To be used in projects	-
7.	Alkaline Batteries	To be used in projects	5

.

Advance Electronics Lab

(Software Based)

Lab Engineer: Engr. Muhammad Junaid

Lab Asstt: Zeeshan Hanif

Lab Courses: Microelectronics Technology
Basic Electronics
Integranted Electronics

Type of Workstation: Electronics Workstation

No of Workstation: 8

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Bread Board, Oscilloscope, etc	To perform different types of experiments related to Electronics	-
2.	MATLAB Software	Simulink and Control Toolkit to perform control experiments	-
3.	Controller Simlulation Software	To perform Simulations	-

Power Electronics Lab

Lab Engineer: Engr. Muhammad Junaid

Lab Asstt: Rana Aqib Ali

Lab Courses: Industrial Electronics
Power Electronics

Type of Workstation: Power Electronics

No of Workstation: 10

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Transformer Trainer Model: IPC-314-T	To perform different types of experiments for Final Year Projects	2
2.	Power Electronics Trainer Model: IPC-550-PE	Simulink and Power Libraries to perform Power experiments	1
3.	Dual Trace Oscilloscope	To perform Simulations	9
4.	Bread Board	To perform circuit analysis and board design	8
5.	Digital Multimedia	To perform Power Electronics experiments	8
6.	Dual Mode DC Power Supply	To perform Power Electronics experiments	10
7.	Function Generator	To perform Power Electronics experiments	10

Power Electronics

S.NO	DESCRIPTION
1	**INTRODUCTION to Pspice Part I** a. Introduction to Pspice b. Input files, Nodes, and circuit elements c. Elements models and sources d. Output variables and type of analysis e. Pspice output analysis
2	**Introduction to Pspice Part II** a. Format of a circuit file b. Format of output files c. Examples of Pspice simulation
3	**INTRODUCTION to Pspice Part III** a. DC sweeps and transient analysis in Pspice b.AC analysis in Pspice c. Output Markers and noise analysis

4	**Rectifier Part I** a. Diode models in Pspice b. Simulation of single phase half wave rectifier with RL load in Pspice
5	**RECIFIER PART II** a. Simulation of single phase bridge rectifier with RL load in Pspice
6	**RECTIFIER PART III** a. Simulation of three phase bridge rectifier in Pspice
7	**DC to DC converters Part I** a.BJT model in Pspice b. MOSFET model in Pspice c. IGBT model in Pspice d. Simulation of dc buck chopper in Pspice
8	**DC TO DC COVERTERS PART II** a. Simulation of BJT buck boost chopper in Pspice
9	**DC TO DC CONVERTER PART III** Simulation of BJT Buck chopper in Pspice
10	**DC TO DC CONVERTERS PART II** Simulation of mosfet boost chopper in Pspice
11	**PULSE WIDTH MODULATOR INVERTER PART I** Simulation of single phase inverter with PWM control in Pspice
12	**PULSE WIDTH MODULATOR INVERTER PART II** Simulation of three phase inverter with PWM control in Pspice
13	**PULSE WIDTH MODULATOR INVERTER PART III** Simulation of single phase current source inverter in Pspice
14	**CONTROLLED RECTIFIERS PART I** a. Simulation of single phase half –wave controlled rectifier in Pspice b. Simulation of single phase semi converter in Pspice
15	**AC AND DC MOTOR DRIVES PART I** Dc separately excited motor with variable load torques simulation in Pspice
16	**AC AND DC MOTOR DRIVES PART II** Dc separately excited motor with step load torques simulation in Pspice

Basic Electrical Engineering Lab

Lab Engineer:	Engr. Waqas Ahmad Sheikh
Lab Asstt:	Umer Khalid
Lab Courses:	Workshop Practice Circuit Analysis
Type of Workstation:	Domestic Wiring Trainer Basic Electrical Station

No of Workstation: 10

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Domestic wiring Trainer	3' x 2' Panel 2o A, C.B 50V, Voltmeter, Socket Point (use for different type of wiring connection)	10
2.	Digital Storage Oscilloscope	Dual channel 25MHz, 25MS/s (use for measuring & type of wave form)	2
3.	DC Power Supply	Dual channel Model: PS-3030-DD (use as a source of variable DC Power Supply)	6
4.	Function Generator	MFG-3015, 15MHz (use for generationg 3 wave types of AC power at different frequency)	5
5.	Misc	AC variable transformer, Pilers, Cutters, Bread Board	04, 10, 10, 10

BASIC ELECTRICAL ENGINEERING Lab

LIST OF EXPERIMENTS

1. Introduction to the measuring method of resistance and capacitor
2. Verify the following two equivalent form of ohms law
   a. Express I as a function of V and R
   b. Express V as a function of I and R
3. Investigate the characteristics of a series DC circuits
4. Investigate the characteristics of parallel DC circuit
5. Verify experimentally KIRCHHOFF'S VOLTAGE AND CURRENT LAWS
6. Familiar with Star / Delta conversion and calculate power
7. Verify super position principle in DC circuits
8. Verify complete thevenin therom by determine
   a. V_{th} and R_{th} in a DC circuits containing single voltage source
   b. Obtain voltage across and current passing through R_L
9. Verify complete Newton's Theroms and the theory of source transformation.
10. Load the effect of frequency on basic R, L and C component.
11. Verify experimentally

i) $Z = -/ (R^2 + X^2)$ in RL series circuits

ii) Measure the phase angle '0' between V and I.

iii) Following expression hold true for the RL circuits:

$V = V_R + jV_L$

$V = (V_{r2} + V_L^2)$

$V_{R=}V \cos 0 . V_{L=}V \sin 0$

12. To study the working of a Transformer

13. To study the different parts of DC machine

Engineering Drawing Lab

(Software Based)

Lab Engineer: Engr. Waqas Ahmad Sheikh

Lab Asstt: Umer Khalid

Lab Courses: Engineering Drawing

Type of Workstation: CAD

No of Workstation: 40

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	AutoCAD	Computer Aided Design	*

- Available on 40 Computers in Computer Lab

Applied Physics Lab

Lab Engineer: Engr. Maaz Tahir Malik

Lab Asstt: Raheel Sikandar

Lab Courses: Applied Physics

Type of Workstation: Electricity Training Model Kit

No of Workstation: 09

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Basic Electric Trainer Model: IPC-555-HP	To perform Physics experiments	9
2.	Free Fall Apparatus for Physics Experiments	To perform Physics experiments	1
3.	Galvanometer, Ammeter, Voltmeter	To perform Physics experiments	10
4.	Micrometer Screw Gauge, 2 Verniercalliper 4	To perform Physics experiments	-

Physics

1. To determine the resistance of galvanometer using half detection method.
2. Determine the resistance of galvanometer using Kelvin's method.
3. To convert moving coil galvanometer into an M meter reading upto 0.2 Amp.
4. To convert moving coil galvanometer into an M meter reading upto 5 volts.
5. To determine unknown resistance using Carey-Foster bridge.
6. To study the characteristics of RLC series (acceptor) circuits.
7. To study the characteristics of RLC parallel (rejecter) circuits.
8. To measure the high resistance using neon bulb.
9. To study the flow of current in series and parallel resistive circuits.

10. To determine the focal length of concave lens using a convex lens.

11. To determine the focal length of convex lens using displacement method.

12. To determine the focal length the concave lens using a concave mirror.

PLC Lab

Lab Engineer: Engr. Ali Jamil

Lab Asstt: Rana Aqib Ali

Lab Courses: Industrial Electronics Projects

Type of Workstation: PLC Workstation

No of Workstation: 05

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units

1.	PLC Trainer Model: IPC-24-16	To perform different types of basic Electrical Wiring experiments	5
2.	Keyboard	-	5
3.	Mouse	-	5
4.	LCDs	-	5

PLC

1. Power switch.
2. Power indicator.
3. PLC digital.
4. Analog module.
5. Relay 24 vice.
6. Lamp 1 for output.
7. Lamp 2 for output.
8. Lamp 3 foe output.
9. Lamp 4 for output.
10. Fan 24 vdc for output.
11. Solenoid valve 24V DC for output.
12. Limits switch for input (NC).
13. Limits switch for input (NO).
14. Push button for input (NC).

15. Themyster for input.

16. Proximity sensor for input.

17. Selector switches for input.

18. Toggle switch for input.

19. Push switch for input.

20. Voltmeter for input.

21. OVDC jack female.

22. Ampere meter for input.

Antenna & Microwave Lab

Lab Engineer: Engr. Mehtab Ejaz

Lab Asstt: Muhammad Sohail

Lab Courses: Microwave Engineering
Wave Propagation & Antennas

Type of Workstation: Antenna & Microwave

No of Workstation: 10

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Antenna Trainer Model: IPC-AT-5000	To perform types of Experiments related to Antenna Characteristic measurement	5

2.	Spectrum Analyzer	To measure different RF parameters	1
3.	MATLAB (software)	To simulate RF circuits	-
4.	HFSS (software)	To perform Microwave experiments	6

ANTENNA AND MICROWAVE

1. Familiarization with Antenna Trainer.

2. Antenna polarization theory study.

3. Study of dipole antenna and radiation pattern.

4. Study of horn antenna and its radiation pattern.

5. Study of helical antenna and its radiation pattern.

6. Study of yagi-uda antenna and its radiation pattern.

7. Parabolic antenna and its radiation pattern.

8. Study of slotted line, wavelength.

9. Study of ultra high frequency ports in HFSS.

10. Study of microwave strip wave port in HFSS.

11. Study of conical horn in HFSS.

12. Smith Chart.

Computer Network Lab

Lab Engineer: Mr. Asif Gulraiz

Lab Asstt: Muhammad Waqas

Lab Courses: Computer Communication Networks

Type of Workstation: PCs, MATLAB, CAD Proteus, Borlan C++ Simlink & Keil, DEV C++,PS Pies, Lab View, Protage, Pocket Tracer, Electronics Bench Work

No of Workstation: 120 (Software Equipped)

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Windows Server	To perform various experiments	4
2.	Windows Workstation	To perform various experiments	120
3.	LAN Switches	To perform various experiments	10
4.	UPS	-	3

5.	Multimedia Projectors	-	6
6.	Routers	To perform various experiments	4
7.	Printers	-	5
8.	Scanners	-	3

Computer Network Lab

Lab Engineer: Mr. Asif Gulraiz

Lab Asstt: Hashir Hassan

Lab Courses: Introduction to Computer
Computer Programming
Computer Aided Engg Design
Artificial Intelligence
Advance Object Oriented Programming

Type of Workstation: PCs, MATLAB, CAD Proteus, Borlan C++ Simlink & Keil, DEV C++,PS Pies, Lab View, Protage, Pocket Tracer, Electronics Bench Work

No of Workstation: 120 (Software Equipped)

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Windows Server	To perform various experiments	4

2.	Windows Workstation	To perform various experiments	120
3.	LAN Switches	To perform various experiments	10
4.	UPS	-	3
5.	Multimedia Projectors	-	6
6.	Routers	To perform various experiments	4
7.	Printers	-	5
8.	Scanners	-	3

Chemistry Lab

Lab Engineer: Dr. Azam Sheikh

Lab Asstt: Miss. Hira Seerat

Lab Courses: Zero Semesters

Type of Workstation: Basic Chemistry

Sr.no	Equipment Name	Specification and Utilization	No of Items/Units
1.	Burners	To perform Titration and salt detection experiments	10
2.	Burette	To perform Titration detection experiments	20
3.	Pipettes	To perform Titration detection experiments	20
4.	Funnels	To perform Titration and salt detection experiments	20
5.	China Dish	To perform salt detection experiments	20
6.	Wire Gauge	To perform Titration and salt detection experiments	20
7.	Salts, Acids, Basis, pH paper	To perform experiments	On Required

			Basis

Chemistry Lab

1. Identification test scheme for carbohydrates.
2. Analysis (identification) of polysaccharide.
3. Analysis of polysaccharide (starch)
4. Analysis of monosaccharide (glucose).
5. Analysis of disaccharide.
6. Hydrolysis test of sucrose and starch.
7. Identification test scheme for amino acid.
8. Identification test for glycine.
9. Identification test scheme for lipids.
10. Determination of melting point of a compound.
11. Analysis of urea.
12. Analysis of thio urea.
13. Analysis of salicylic acid.
14. Analysis of aspirin.
15. Analysis of Benzoic acid.