

Faculty of Technology

B. Tech. Biotechnology and Biochemical Engineering

(R 2021) Semester – II

Course Code: BE3272		
Course Title: Basic Electrical, Electronics and Instrumentation Engineering Laboratory		
Sl. No.	Description of Equipment	Required numbers (for batch of 30 students)
1.	Verification of ohms and Kirchoff's Laws 1. DC Regulated Power supply (0 - 30 V variable) 2. Bread Board 3. Resistors 4. Multimeter 5. Connecting wires	1 1 As per Circuit diagram 1 As Required
2.	Three Phase Power Measurement 1. Three Phase Variable Load, 2. Ammeters 0-10 A, MI, 3. Wattmeters 0-5 A, 300V, 4. Voltmeter 0-300v,MI 5. Connecting wires	1 2 2 1 As Required
3.	Load test on DC Shunt Motor. 1. Ammeter MC (0-20A) 2. Voltmeter MC (0-300)V 3. Rheostat 7.5 Ω , 10 A 4. Tachometer 5. Field Rheostat 175 Ω , 1.5 A 6. Connecting wires	1 1 1 1 1 As Required
4.	Load test on Self Excited DC Generator 1. DC shunt generator(0- 300V) 2. Ammeter (0-30 A), (0-2A) 3. Voltmeter (0-30V) 4. Rheostat 175 Ω , 250 Ω 5. Tachometer 6. Connecting Wires	1 1 1 1 1 As Required
5.	Load test on Single phase Transformer 1. Ammeter (0-30) A, (0-5) A 2. Voltmeter (0-150)V, (0-300)V 3. Wattmeter – 300V, 5A, UPF 4. Autotransformer 5. Single phase Transformer 6. Connecting Wires	1 1 1 1 1 As Required
6.	Load Test on Induction Motor 1. Ammeter MI (0-20A) 2. Voltmeter MI (0-300)V 3. Wattmeter – 300V, 30 A 4. Tachometer – Digital 5. Connecting Wires 6. Single phase Induction motor	1 1 1 1 As Required 1

7.	<p>Characteristics of PN and Zener Diodes</p> <ol style="list-style-type: none"> 1. PN Diode (BY127, OA79), Zener diode (6.8V, 1A) 2. Resistor 1 KΩ, 100Ω 3. Bread Board 4. DC Regulated Power supply (0 - 30 V variable) 5. Multimeter 6. Connecting wires 	<p>1 1 1 1 1 As Required</p>
8.	<p>Characteristics of BJT</p> <ol style="list-style-type: none"> 1. Transistor (No-BC548) 2. Resistors- 1kΩ, 470KΩ, 1MΩ 3. Bread Board DC Regulated Power supply (0 - 30 V variable) 5. Multimeter 6. Connecting wires <p>Characteristics of SCR</p> <ol style="list-style-type: none"> 1. D C Power Supply (0-128 V), (0-32V), 2. Voltmeter (0-100V) 3. SCR TYN604 4. Digital multimeter 5. Ammeters (0-100mA, 0-25mA, 0-1mA) 6. Resistors 1KΩ, 1KΩ 7. Bread board 8. Connecting Wires <p>Characteristics of MOSFET</p> <ol style="list-style-type: none"> 1. MOSFET (2N7000) 2. Bread board 3. resistor (1KΩ, 100KΩ) 4. DC power supply (0-30V) 5. Multimeter 6. Bread board 7. Connecting Wires 	<p>1 1 1 1 1 As Required</p> <p>1 1 1 1 1 1 As Required</p> <p>1 1 1 1 1 As Required</p>
9.	<p>Design and analysis of Half wave and Full Wave rectifiers</p> <ol style="list-style-type: none"> 1. Diodes (Si-1N4007) – 4 2. Resistor 1KΩ 3. Capacitor 100μF 4. Digital Multimeter 5. CRO 6. Transformer (6-0-6)V 7. Bread Board 8. Connecting Wires 	<p>1 1 1 1 1 1 1 As Required</p>
10.	<p>Measurement of displacement of LVDT</p> <ol style="list-style-type: none"> 1. LVDT Kit 2. Multimeter 	<p>1 1</p>

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(R 2021) Semester – III
BT3361 Biochemistry Laboratory

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Autoclave	1
2.	Hot Air Oven	1
3.	Incubators	2
4.	Incubator Shaker	1
5.	Colorimeter	2
6.	Laminar Flow Chamber	2
7.	pH meter	1
8.	Weighing balance	1
	<p>Glassware: Test tubes (atleast 10 per student) Beakers – 50 ml, 100 ml, 250 ml one each per student, 500 ml and 1000 ml atleast 5 per batch of 20 students Watch glasses one per student Petridishes as required, glass cuvettes as needed Burette – one per student Glass pipette – one each in 0.5 ml, 1 ml, 5 ml and 10 ml with suitable pipette aid. TLC plate as required for the experiment. Chemicals: glucose, fructose, galactose, maltose, starch, amino acids, DNA, RNA, lipids and commercial enzymes as required. Other chemicals as per the requirement of the standard protocol and commercial kit procured from the vendor followed/ utilised by the department</p>	

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(R 2021) Semester – III

BT3362 Cell And Microbiology Laboratory

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Autoclave	1
2.	Hot Air Oven	1
3.	Incubators	2
4.	Light Microscopes	4
5.	Incubator Shaker	1
6.	Colorimeter	2
7.	Laminar Flow Chamber	2
8.	Centrifuge	1
9.	Fluorescence Microscope	1
10.	Weighing balance	1
11.	Haemocytometer	1
12.	pH meter	1
	Glassware: Petridish, Test tubes, Microscopic slides, Inoculation , loop, Gas burner Conical flask (250ml)- 5, Chemicals and media Bacterial culture media, Yeast culture media, 70% ethanol ,antibiotics, Crystal violet, Iodine, Safranin, India ink (capsule staining), Immersion oil	

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(R 2021) Semester – IV

BI3411 Chemical Engineering Laboratory-1(Fluid Mechanics & Heat Transfer)

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Orifice meter	1
2.	Venturimeter	1
3.	Rotameter	1
4.	Double pipe heat exchanger	1
5.	Shell and tube heat exchanger	1
6.	Plate type heat exchanger	1
7.	Fluidized bed column	1
8.	Composite wall	1
9.	Emissivity measurement apparatus	1
10.	Darcy's friction factor apparatus	1
11.	Simple Distillation set up	1
12.	Steam distillation setup	1
	Glassware, Chemicals, Media as required	

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(R 2021) Semester – IV

BT3461 Analytical Instrumentation Laboratory

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Colorimeter	2
2.	UV – visible Spectrophotometer	1
3.	Nephelometer	1
4.	Flourimeter	1
5.	Weighing balance	1
	Glassware, Chemicals, Media as required TLC plate – 5, Chromatography Column - 5 Beaker (100ml) – 5, Test tube (10ml) - 30	

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(R 2021) Semester – V
BT3561 Immunology Laboratory

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Elisa reader or strip Reader	1
2.	Microscopes	8
3.	Microwave oven	1
4.	Hot plate	4
5.	Vortex mixer	4
6.	Table top refrigerated Centrifuge	1
7.	Electrophoresis set up	5
8.	Haemocytometer	2
9.	Centrifuge	1
10	Refrigerator	1
11	Weighing balance	1

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(R 2021) Semester – VI

**BI3611 Chemical Engineering Lab-II (Mass Transfer And Chemical Reaction
Engineering Lab)**

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Dryer	1
2.	Simple Distillation set up	2
3.	Packed bed distillation setup	1
4.	Absorption packed column	2
5.	Batch Reactor	1
6.	Semi batch reactor	1
7.	CSTR	1
8.	PFR	1
9.	Glasswares, stop watch	

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(R 2021) Semester – VI
BI3661 Bioprocess Laboratory

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Autoclave with Digital temperature display	1
2.	Hot Air Oven	1
3.	Incubators	2
4.	Light Microscopes	4
5.	Incubator Shaker	1
6.	Colorimeter	2
7.	Laminar Flow Chamber	2
8.	Cyclomixer	1
9.	UV Visible Spectrophotometer	1
	Chemicals Invertase enzyme, Phosphate mono basic salt, Phosphate di basic salt, Sucrose, Sodium alginate, Calcium chloride, GOD/POD reagent, Nutrient broth, Glucose, Yeast extract, Casaminoacid Ammonium chloride, GlycineMagnesium sulphate, Sodium chloride	

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(R 2021) Semester – VII

BT3761 Downstream Laboratory

Sl.No.	Description of Equipment	Required members (for batch of 30 students)
1.	Centrifuge	1
2.	Cross flow filtration set up	2
3.	FPLC or HPLC	1
4.	Sonicator or French press or Dynamill	1