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Engineering
Digital Library

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Contents

Engineering Digital Library: Courses

Engineering

LIB 3: 01 Materials Engineering

Materials

- Ceramic and Sintered Materials
- Classification of Materials
- Composite Materials
- Corrosion
- Iron and Steel
- Lubrication
- Non-Ferrous Metals
- Polymers

Properties of Materials

- Characteristics of Materials

Structure of Materials

- Interpretation of Test Results
- Materials Testing - Hardness and Non-Destructive Testing
- Materials Testing - Tensile and Impact Testing
- Microstructure of Alloys
- Microstructure of Metals
- Microstructures of Steel
- Solutions and Phases

LIB 3: 02 Engineering Drawing

Drawing Elements

- Drilling and Finishes
- Fluid Power Diagrams
- Machine Elements
- Permanent Connections
- Screws and Threaded Components

Engineering Drawing

- Basic Geometric Construction
- Co-ordinate Systems
- Dimensions
- Drawing Analysis
- Drawing Standards
- Roughness
- Sectional Views

Engineering

LIB 3: 03 Fluid Power

Fluid Power

- Calculations of Hydraulic Power
- Calculations of Pressure and Flow Rate
- Electropneumatics
- Fluid Power Cylinders
- Fluid Power Formulas
- Logic Controls
- Pneumatics Diagrams, Series and Parallel Circuits and Time Delays

LIB 3: 04 Manufacturing Engineering

Basics of CNC

- Preparatory Programming - Turning

CNC Programming

- A- and B-Axes
- C-Axis
- CNC and the Basics of Programming
- CNC Milling
- CNC Programming for Milling
- CNC Programming for Turning
- CNC Turning
- Cycle Programming - Milling
- Cycle Programming - Turning
- Multiple Axis Turning and Milling
- Preparatory Programming - Milling
- Programming Linear and Tangential Start-Up and Coast-Down - Milling

Information Technology

- Charting Data
- Planning and Organizing Work Processes
- Process Planning

Joining

- Forces in Threaded Joints
- Forces on Threads
- Formula and Calculation of Tightening Torque
- Joining Procedures
- Joining with Glues
- Joining with Keys and Splines
- Joining with Pins, Bolts and Rivets
- Joining with Soldering
- Joining with Threads
- Lapping
- Screw Connections
- Soldering Equipment and Safety

Engineering

Manufacturing Processes

- Bending
- Bending Operation Calculations
- Cutting and Angles of Cutting
- Cutting Metal
- Cutting Speed for Drilling
- Determining Data for Grinding
- Determining Data for Milling
- Determining Data for Turning
- Drilling
- Environmental Protection
- Erosive Manufacturing Processes
- Finishing Processes
- Forces on the Cutting Tool
- Forging
- Forming - Material Use and Scrap
- Forming Calculations
- Forming Procedures
- Grinding - Processes and Machines
- Hard Metal Cutting
- Honing
- Machine Tools and Terminology
- Manufacturing Processes
- Milling - Processes and Machines
- Primary Metal Shaping Processes
- Reading Machine Diagrams
- Safety and Protective Measures

Welding

- Arc Welding
- Gas Welding
- Gas-Shielded Welding
- Joining with Welding

LIB 3: 05 Machine and Instrument Engineering

Bearings

- Bearing Assemblies and Fit
- Bearings
- Calculation of Forces on Bearings
- Joining Hubs to Shafts
- Plain Bearings
- Rolling-Element Bearings
- Seals and Gaskets

Engineering

Electronics Test Equipment

- Signal and Pulse Generators

Engineering Science

- Calculating Work, Power and Efficiency
- Energy, Work and Efficiency
- Manufacturing Facilities
- Mass and Volume Flow Rate
- Material Conversion
- Mechanical Units

Gears

- Adjustable Speed Transmission
- Clutches
- Gear Calculations
- Gear Design Factors
- Gear Drives
- Simple and Compound Gears

LIB 3: 06 Inspection, Maintenance and Quality Management

Inspection Technology and Quality Management

- Accuracy
- Calculating Lengths
- Calculation of Clearances and Fits
- Clearances and Fits
- Measurement Tolerances
- Measuring Lengths
- Quality Management

Maintenance

- Diagnostics and Troubleshooting
- Fault Repair
- Maintenance and Accident Prevention
- Maintenance Documentation
- Maintenance Inspection
- Maintenance Principles
- Mechanical Breakdown

LIB 3: 07A Industrial Control Systems

Feedback Control Systems

- Characteristics of an Air Flow Transducer
- Characteristics of an Air Pressure Transducer
- Characteristics of an IC Temperature Sensor
- Characteristics of an NTC Thermistor
- Controller Responses

- Effect of Loading on the Potentiometer Output Voltage
- Environmental Measurement
- Light Controlled System
- On/Off Control Systems
- ON/OFF Heater System
- Positional Resistance Transducers
- Proportional Control - Step Input Response

Number Systems

- Hexadecimal and Binary Number Systems

LIB 3: 07B Industrial Control PLCs

Fieldbus Systems

- Introduction to Fieldbus
- Profibus DP

Industrial Network Systems

- HMI Interactions
- HMI Panel Alarms
- HMI Panel Data Logging
- HMI Panel Monitoring and Supervising
- HMI Panel Process Control
- HMI Panel Real-time Data
- HMI Panel Recipes
- HMI Panel Sharing PLC Data
- HMI Panel Trend Analysis
- HMI Panel Trends
- Industrial Network Security
- Industrial Networks
- Introduction to SCADA
- Networking Industrial Control Devices
- PETRA II Fault Finding - Worksheet 1
- PETRA II Fault Finding - Worksheet 2
- PETRA II Fault Finding - Worksheet 3
- PETRA II Fault Finding - Worksheet 4
- PETRA II Fault Finding - Worksheet 5
- PETRA II Fault Finding - Worksheet 6
- PETRA II Fault Finding - Worksheet 7
- PETRA II Fault Finding - Worksheet 8
- PETRA II Plant Control Program (Two PLCs and HMI)
- Smart Sensors

Engineering

PLC Advanced Industrial Control

- Carrying Out Tests on the PETRA II Parts
- Complete PETRA II Control Program
- Configure STEP 7 PLC Tags
- Moving a Part Round the PETRA II
- PETRA II Plant Control Program (Single PLC)
- Programming the PETRA II Carriage
- Programming the PETRA II Transfer Arm

PLC Conveyor System Control

- Analog Inputs
- Analog Outputs
- Construction and Function of a PLC
- Counters
- Counting Parts
- Create a New Project
- Create a New STEP 7 Project
- Create a STEP 7 Project
- Enter a Ladder Program
- Enter a STEP 7 Ladder Program
- Flip-Flop Latches
- Global Variables
- Identifying the Requirements
- Introduction to PLCs
- Ladder Programming
- Latches
- Latching an Airlock
- Memory Stores
- Run a Ladder Program
- Run a STEP 7 Ladder Program
- Sequence Control System

PLC Part Sorting Control

- Creating a New Project
- Creating a STEP 7 Project
- Sorting Parts

Programmable Logic Control

- Basic Structure of a PLC
- Components of a Sequence Control System
- Connecting a PLC
- Converting Logical Circuit to Functional Plan
- GRAFCET Sequence Control Systems
- PLC Programming
- Programmable Logic Controllers (PLC)
- Programmable Logic Controllers (PLCs)

Electronics

LIB 3: 08 Electronic Systems

Alarm Systems

- Components of Intruder and Fire Alarms
- Installing Intruder Alarms and Fire Alarms

Closed Loop Control

- An Example On/Off Control System
- Automatic Temperature Control
- RC Circuit Responses

Components

- Alternative Components
- Characteristics of Non-Linear Components
- Maintenance Information and Component Selection
- Problem Solving - Identify Electronic Components
- Problem Solving - Recognize and Select Components

Energy and Power

- Extending System Life
- Small Energy Sources

Fault Finding Electronic Systems

- Electronic Systems Maintenance
- Fault Conditions
- Fault Location Techniques
- Faults and Fault Finding Aids
- Problem Solving - Testing and Fault Finding on Electronic Components

Signal Processing

- Analog Signal Processing
- Electronic Systems
- Inputs, Outputs and Processes
- Measurement of Non-Electrical Quantities

LIB 3: 09 DC Circuits

Capacitor Circuits

- Calculating Total Capacitance
- Capacitance of Capacitors
- Capacitor Discharge Curve
- Capacitor Timing Circuits
- Capacitors
- Capacitors in Series and Parallel
- Charging and Discharging a Capacitor
- Interconnection of Capacitors
- Resistance and the Time Constant

Electronics

Electrical Energy and Power

- Calculating Electrical Power for a Load
- Calculation of Electrical Power
- Electrical Power

Inductor Circuits

- Inductors - Graphs and Equations

Resistance

- Applications of Ohm's Law
- Calculating Resistance Color Code Values and Tolerance
- Calculating the Resistor Value for an LED Lamp Circuit
- Changing the Resistance in an LED Circuit
- Color Code and Tolerance
- Electrical Power and Resistor Color Coding
- Gradient of Linear Voltage-Current Graphs
- Investigating a Characteristic Graph for a Resistive Component
- Investigating Whether Resistors are in Tolerance
- Measuring Resistance
- Non-Linear Resistances
- Relationship between Voltage, Current and Resistance
- Resistance and Conductance
- Resistance and Conductance Reciprocal Calculations
- Resistance Characteristics
- Resistor Characteristics and Applications
- Resistors

Voltage and Current

- Basic Electrical Quantities in Circuits
- Circuit Diagrams
- Electric Current and Safety
- Electrical Principles
- Handling Voltage Calculations
- Introduction to Electric Current
- Measurement in Circuits
- Measuring Current in a Circuit
- Measuring Voltage
- Potential Difference and Voltage

Electronics

LIB 3: 10 Electrical Networks

Internal Resistance

- Internal Resistance
- Internal Resistance of Power Sources

Kirchhoff's Laws

- Calculations using Kirchhoff's First Law
- Calculations using Kirchhoff's Second Law
- Current Behavior at a Node
- Kirchhoff's First Law
- Kirchhoff's Second Law

Measuring Instruments

- Absolute and Relative Measurement Errors
- Calculating the Extension of the Range of a Voltmeter
- Calculating the Extension of the Range of an Ammeter
- Extending the Range of a Voltmeter
- Handling Measurement Errors
- Measurement of Resistance using a Wheatstone Bridge
- Measurement of Voltage using a Wheatstone Bridge - Method 1
- Measurement of Voltage using a Wheatstone Bridge - Method 2
- Measuring Current and Extending Ammeter Range

Series and Parallel Lamps

- Parallel Circuits
- Series Circuits

Series and Parallel Resistors

- Calculation of Resistors in Parallel
- Calculation of Resistors in Series
- Characteristics of Series and Parallel Connections
- Mathematical Approach to Series and Parallel Circuit Simplification
- Parallel Circuit Calculations
- Parallel Resistor Circuits
- Resistors in Parallel
- Resistors in Series
- Series and Parallel Equivalent Resistance
- Series and Parallel Resistor Combinations
- Series Circuit Calculations

Superposition Principle

- Applying the Superposition Principle

Electronics

LIB 3: 11 AC Circuits

AC Principles

- Alternating Current Equations
- Amplitude and Timebase Settings of an Oscilloscope
- Calculating the Effective Values of Alternating Voltages and Currents
- Effective Values of Alternating Voltages and Currents
- Introduction to Alternating Current
- Measuring with an Oscilloscope
- Peak, Peak-to-Peak and RMS Values
- Period and Frequency

Capacitor Circuits

- Calculations on Capacitive Reactance with Graphical Representation
- Capacitors in AC Circuits
- Graphical Representation and Equations of RC Circuits
- RC Circuits

Inductor Circuits

- Calculations on Inductive Reactance with Graphical Representation
- Graphical Representations and Equations of RL Circuits
- Inductors in AC Circuits
- RL Circuits

RLC Circuits

- Calculating Power in RLC Circuits
- Calculating the Resonant Frequency of an LC Oscillator Circuit
- Graphical Representation and Equations of RLC Circuits
- Graphical Representation of Phase Difference and Power
- LC Oscillator Circuit
- Phase Difference and Power
- Power in RLC Circuits
- RLC Circuits

LIB 3: 12 Magnetism and Electromagnetism

DC Motor

- Characteristics of the DC Motor
- DC Motor Operation
- DC Motor-Generator

Fault Finding Electromagnetic Devices

- Fault Finding Electromagnetic Devices W1
- Fault Finding Electromagnetic Devices W2
- Fault Finding Electromagnetic Devices W3
- Fault Finding Electromagnetic Devices W4

Magnetic and Electromagnetic Principles

- Electromagnetic Induction and the Solenoid
- Electromagnetism
- Field Shape and Direction for an Electromagnet
- Field Strength of an Electromagnet
- Hall Effect Sensor
- Magnetic Flux and Flux Density
- Magnetic Flux and Flux Density Calculations
- Magnetic Principles
- Reed Switch and Relay
- Self Inductance of Inductors

Microphones and Speakers

- Microphones and Speakers

LIB 3: 13 Electrical Engineering

Electrical Connections in Buildings

- Bus System
- Components of an Electrical Installation
- Electrical Installation in Residential Buildings
- Light and Lighting
- Planning Lighting Systems

Electrical Safety and Accident Prevention

- American Wire Gauge
- Cables and Wires
- Circuit Breakers
- Consumer Units
- Dangers of Electric Current for Humans
- Dealing with a Victim of an Electric Shock
- Designing for Safety
- Earthing Systems
- Effect of Electric Current on the Human Body
- Electrical Cables
- Grounding
- Ingress Protection and IP Codes
- Lockout and Tagging of Electrical and Mechanical Hazards
- Minimum Safe Cross-Sectional Area of Wires
- Re-Testing to Electrical Standards
- Safeguards against Electric Shock

Equipment Protection

- Line Surge Protection

Generating and Distributing Electric Energy

- Energy Distribution Calculations
- Production, Transmission and Distribution of Electrical Energy

Electronics

LIB 3: 14 Linear Electronics

Amplifiers
- Distortion and Signal Conflicts

Analog ICs
- Analog Switches
- IC Sensors

Fault Finding Linear Electronic Circuits
- Fault Finding Linear Electronic Circuits W1
- Fault Finding Linear Electronic Circuits W2
- Fault Finding Linear Electronic Circuits W3
- Fault Finding Linear Electronic Circuits W4
- Fault Finding Operational Amplifier Circuits W1
- Fault Finding Operational Amplifier Circuits W2
- Fault Finding Operational Amplifier Circuits W3
- Fault Finding Operational Amplifier Circuits W4
- Planning a Fault Location Strategy

Operational Amplifier Circuits
- Characteristics of a Differential Amplifier
- Characteristics of DC Amplifiers
- Comparator
- High Frequency Performance of an Operational Amplifier
- Inverting and Non-inverting Operational Amplifier Circuits
- Investigating Inverting Op-amp circuits
- Investigating Non-Inverting Op-amp Circuits
- Operational Amplifier with AC input
- Operational Amplifiers
- Signal Conditioning Amplifiers

Power Supplies
- A DC Power Supply
- Power Supply Filtering

LIB 3: 15 Semiconductors

Diodes
- Diode Characteristics
- Diode Operation
- Diode Rectifier Calculations
- Diode Rectifiers
- Light Emitting Diodes
- PN Junction Theory
- Rectifier Circuits
- Simple Rectifier Circuit

Electronics

Display Devices
- 7-Segment Display and Decoder
- A 7-Segment Display
- Optoelectronic Display Devices

Fault Finding Semiconductor Circuits
- Fault Finding Semiconductor Circuits W1
- Fault Finding Semiconductor Circuits W2
- Fault Finding Semiconductor Circuits W3
- Fault Finding Semiconductor Circuits W4
- Fault Finding Transistor Amplifiers W1
- Fault Finding Transistor Amplifiers W2
- Fault Finding Transistor Amplifiers W3
- Fault Finding Transistor Amplifiers W4

Integrated Circuits
- Integrated Circuit Packages

Optical Sensors
- Charge-Coupled Devices (CCD)

SCRs
- Characteristics of Thyristors
- Diacs and Triacs

Transistor Amplifiers
- Class A Transistor Amplifier
- Class B and AB Transistor Amplifiers
- Class C Transistor Amplifier
- Classes of Transistor Amplifiers
- Effects of Feedback in a Transistor Amplifier Circuit
- Gain, Loss and Noise

Transistors
- Analyzing Transistor Characteristics
- Bipolar Transistor Characteristics
- Comparison of Electronic and Electromechanical Switches
- Field Effect Transistor Amplifier
- Field Effect Transistor Operation
- PNP Transistor Switch

LIB 3: 16 Power Electronics

Contactors
- Construction of a Contactor
- Controlling Contactors
- Current Flow in Latching Circuits
- Latching in Contactor Circuits
- Selection of Contactors

Electronics

Energy and Power

- Efficiency Formulas for Electric Motors
- Efficiency of Electric Motors

Frequency Converters

- Commissioning of Frequency Converters
- Connecting a Frequency Converter
- Construction and Function of Frequency Converters
- EMC
- Frequency Converter Parameters
- Frequency Filters

Motor Protection

- Interlock Systems
- Motor Drive Protection Circuit
- Motor Installations and Safety
- Motor Protection

Motors and Motor Control

- Analog Interfacing
- Characteristics of a DC Permanent Magnet Motor
- Characteristics of a DC Solenoid
- Characteristics of an Air Valve
- Characteristics of an Induction Motor
- Connecting a Motor
- Derivative Control Ramp Response
- Digital Control
- Integral Control Step Response
- Linear and Rotational Motion
- Motor Drive Connection Components
- Motor Starting and Speed Control
- PID Control Step Response
- Proportional Position Control
- Proportional Speed Control

Three-phase AC

- Delta Calculations
- Delta Connection
- Generation of Three-phase AC
- Representation of Three-phase AC

LIB 3: 17 Digital Electronics

Combinational Logic

- Basic Logic Functions and Their Algebra
- Boolean Algebra
- Boolean Algebra and De Morgan's Theorems
- Building EXOR Gates from Other Gates

- Characteristics of a Schmitt Inverter Gate
- Characteristics of the EX-OR and EX-NOR Circuit
- Circuits involving Combinational Logic
- Combinational Logic
- Equivalent Logic Circuits
- Karnaugh Maps
- Logic Families
- Logic Gates

Digital Systems

- Analog to Digital Conversion
- BCD UP/DOWN Counters and 7-Segment Decoder/Driver/Displays - Exercise 2.2
- Binary Counters and 7-Segment Displays
- Binary-Coded Decimal Counters
- Characteristics of an Analog Comparator
- Decoder Operation
- Demultiplexer Operation
- Digital to Analog Conversion
- Encoder Operation
- Encoder-Decoder System
- Encoders and Decoders
- Glitches in Digital Systems
- Multiplexer Operation
- Multiplexer-Demultiplexer System
- Multiplexers and Demultiplexers
- Race Hazards
- Ramp Generator
- Signal Converters

Fault Finding Digital Circuits

- Calculating Expected Operating Conditions
- Fault Finding A/D and D/A Circuits W1
- Fault Finding A/D and D/A Circuits W2
- Fault Finding A/D and D/A Circuits W3
- Fault Finding A/D and D/A Circuits W4
- Fault Finding Aids
- Fault Finding Aids and Reporting
- Fault Finding Encoding/ Decoding Circuits W1
- Fault Finding Encoding/ Decoding Circuits W2
- Fault Finding Encoding/ Decoding Circuits W3
- Fault Finding Encoding/ Decoding Circuits W4
- Fault Finding Multiplexing/ Demultiplexing Circuits W1
- Fault Finding Multiplexing/ Demultiplexing Circuits W2
- Fault Finding Multiplexing/ Demultiplexing Circuits W3
- Fault Finding Multiplexing/ Demultiplexing Circuits W4
- Faults in Ring Counter Circuits
- Faults in Shift Register Circuits
- Signal Tracing Techniques

Interfacing
- Bi-directional Line Drivers
- Industry Standards
- Interfacing in Digital Circuits

Number Systems
- Calculations in Binary
- Conversion Between Number Systems

Sequential Logic
- Asynchronous Counters
- Binary Counters
- Bistable Devices
- Characteristics of a D-Type 2-bit Shift Register
- Characteristics of a D-Type Flip-Flop
- Characteristics of a J-K Flip-Flop
- Counting with Bistables
- D-Type Flip-Flop
- Integrated Circuit Memory
- Shift Registers

Signal Processing
- Digital Signal Processing

LIB 3: 18 Telecommunications

Antennas
- Antenna and Broadband Options
- Installing Antenna and Broadband Connections

Digital Data Transmission
- Digital Data Transmission
- Flow Control

Electronic Communication Principles
- AM Transmission
- Electronic Communication Systems
- Optical Transmission
- Phase Locked Loops
- Simplex and Duplex Transmission

Fault Finding Telecommunication Circuits
- Fault Finding Telecommunication Circuits W1
- Fault Finding Telecommunication Circuits W2

Fiber Optics
- Fiber Optic Cables

Electronics

LIB 3: 19 Microprocessors

Architecture and Operation of a Microprocessor
- Architecture
- Principles of Operation

Developing PIC Programs
- Controlling a Motor
- Debugging Programs
- Full Washing Machine Sequence

Memory
- Embedded Computers and RAM/Flash Memory

Microprocessor System Applications
- Microprocessor System Applications

Number Systems, Instructions and Subroutines
- Instruction Groups
- Number Systems

Program Development
- Designing a Program
- Entering and Running a Program

LIB 3: 20 Circuit Construction and Testing

Automatic Light Circuit
- Building and Testing an Automatic Light Circuit

Baby Alarm
- Building a Baby Alarm

Building Circuits on Printed Circuit Boards
- Building Circuits on PCB
- Constructing the Continuity Tester on PCB

Building on Breadboard
- Breadboarding
- Building the Automatic Light Circuit on Breadboard
- Planning an Automatic Light Circuit on Breadboard

Building on Stripboard
- Building and Testing the Anti-Theft Device
- Building Circuits on Stripboard
- Planning an Anti-Theft Device

Electronics

Diagnosing Fault Conditions

- Fault Rectification

Electronic Problem Solving

- Problem Solving - Construct an Electronic Circuit
- Problem Solving - Plan, Construct and Test an Electronic Circuit
- Problem Solving - Produce an Electronic Circuit Diagram

Flashing Doorbell Circuit

- Building a Flashing Doorbell Circuit
- Flashing Doorbell Circuit

Freezer Temperature Warning Circuit

- Building the Freezer Temperature Warning Circuit on Breadboard

Improved Automatic Light Circuit

- Building and Testing an Improved Automatic Light Circuit

Intruder Alarm

- Intruder Alarm Circuit
- Latched Buzzer Circuit
- Simulated Latched Buzzer Circuit

Lamp Circuit

- Simple Lamp Circuit

LED Lamp Circuit

- Building an LED Lamp Circuit

Polarity Tester

- Building and Testing a Polarity Tester

Power Supplies

- A Simple AC to DC Converter
- AC to DC Concepts and Principles
- Circuit Breakers and Fuses

Road Crossing Controller

- Road Crossing Controller

Safety and Accident Prevention

- Risk Assessment of Electrical Dangers
- Safe Working Practices

Simulators

- Computer Based Design and Testing

Electronics

LIB 3: 21 Electronic Principles (D3000 Practice)

AC Principles

- Alternating Supply with Pure Resistance Loading
- Alternating Supply with Pure Resistance Loading - Exercise 2.1
- Alternating Supply with Pure Resistance Loading - Worksheet 1
- Ground Return Currents - Exercise 11.3
- Resistances in Parallel - Exercise 2.4
- Resistances in Series - Exercise 2.3
- Sinusoidal Alternating Waveforms - Exercise 1.1
- Sinusoidal Alternating Waveforms Peak and RMS Values - Exercise 1.2

Capacitor Circuits

- AC Supply with Pure Capacitive Loading - Exercise 4.1
- AC Supply with Pure Capacitive Loading - Worksheet 2
- Capacitor AC Voltage Divider Circuit - Exercise 4.5
- Capacitors in Parallel on an AC Supply - Exercise 4.3
- Capacitors in Series on an AC Supply - Exercise 4.4
- Resistance-Capacitance Circuits on AC Supplies - Parallel - Exercise 6.2
- Resistance-Capacitance Circuits on AC Supplies - Series - Exercise 6.1

Electrical Energy and Power

- Power Dissipated in a Lamp Circuit - Exercise 9.2
- Power in a Resistor - Exercise 3.1
- Power in a Resistor - Worksheet 1

Electrical Networks

- AC Applied to a Resistance Bridge - Exercise 6.2
- Characteristics of a Combined DC and AC Supply - Exercise 3.2
- Characteristics of a Dual Voltage DC Supply - Exercise 3.1
- Circuit Solution using Thevenin's and Norton's Theorems - Exercise 4.1
- DC and AC Bridges - Worksheet W7
- DC and AC Bridges - Worksheet W8
- Dual Voltage DC and Combined AC/DC Supplies - Worksheet W2
- Dual Voltage DC and Combined AC/DC Supplies - Worksheet W3
- Internal Resistance of a DC Source - Exercise 1.1
- Internal Resistance of an AC Source - Exercise 1.2
- Power Transfer to a Load from a DC Source - Exercise 2.1
- Power Transfer to a Resistive Load from an AC Source - Exercise 2.2
- Resistors Connected in Parallel - Exercise 6.1
- Resistors Connected in Series - Exercise 5.1
- Series-Parallel Circuit Exercise - Exercise 10.1
- Series-Parallel Circuit Exercise - Worksheet 10
- Series-Parallel Circuit Exercise - Worksheet 9
- Series-Parallel Connected Circuits - Exercise 7.1
- Series-Parallel Connected Circuits - Worksheet 4
- Series-Parallel Connected Circuits - Worksheet 5
- Series-Parallel Connected Circuits - Worksheet 6

Electronics

Electromagnetic Devices

- Back EMF - Exercise 8.2
- Core Materials - Exercise 1.2
- Current Ratio - Exercise 5.3
- Direction of Current - Exercise 6.2
- Economy Resistor Value - Exercise 7.3
- Effect of Core Material on Inductance - Exercise 4.2
- Effect of Frequency on Coil Impedance - Exercise 4.4
- Effect of the Number of Turns on Inductance - Exercise 4.3
- Electromagnet - Exercise 2.1
- Electromagnets - Worksheet W1
- Energizing the Solenoid - Exercise 6.1
- Examination of Permanent Magnets - Exercise 1.1
- Familiarization with the Hall Effect Probe - Exercise 1.4
- Force on a Conductor and the Motor Principle - Worksheet W7
- Force on a Conductor and the Motor Principle - Worksheet W8
- Frequency Response of Core Materials - Exercise 5.2
- Full-Step Sequence - Exercise 9.1
- Half-Step Sequence - Exercise 9.2
- Hold-on Contacts - Exercise 7.2
- Impedance of the Coil at Low Frequency - Exercise 4.5
- Induced EMF - Exercise 3.1
- Magnetic Field - Exercise 1.3
- Magnetic Field Plot - Exercise 2.3
- Magnetomotive Force - Exercise 2.2
- Motor Used as a DC Generator - Exercise 8.3
- Mutual Inductance - Exercise 5.1
- Reactance - Exercise 4.1
- Relay - Worksheet W4
- Relay - Worksheet W5
- Relay - Worksheet W6
- Self-Inductance - Exercise 3.2
- Simple DC Motor - Exercise 8.1
- Simple Relay Operation - Exercise 7.1
- Solenoid - Worksheet W3

Inductor Circuits

- AC Supply with Pure Inductive Loading - Exercise 5.1
- AC Supply with Pure Inductive Loading - Worksheet 3
- AC Supply with Pure Inductive Loading - Worksheet 4
- Inductance with Square Wave and Sinusoidal Voltage Input - Exercise 3.2
- Inductors in Parallel on an AC Supply - Exercise 5.3
- Inductors in Series on an AC Supply - Exercise 5.2
- Resistance - Inductance Parallel Circuits on an AC Supply - Exercise 7.2
- Resistance-Inductance Circuits on AC Supplies - Series - Exercise 7.1
- Resistance-Inductance Circuits on AC Supplies - Worksheet 5
- Resistance-Inductance Circuits on AC Supplies - Worksheet 6
- Resistance-Inductance Filters - Exercise 9.2

Resistance

- Controlling a Lamp with a Variable Resistor - Exercise 9.1
- Controlling a Lamp with a Variable Resistor - Worksheet 7
- Controlling a Lamp with a Variable Resistor - Worksheet 8
- Ohm's Law - Exercise 2.1
- Resistance Measurement using a Wheatstone Bridge - Exercise 11.1
- Resistance Measurement using a Wheatstone Bridge - Worksheet 11
- Resistance Measurement using a Wheatstone Bridge - Worksheet 12
- Resistor Color Coding for Low Power Resistors - Exercise 4.1
- Resistor Color Coding for Low Power Resistors - Worksheet 2
- Resistor Color Coding for Low Power Resistors - Worksheet 3

RLC Circuits

- Capacitance and Inductance fed from Square and Sinusoidal Inputs - Exercise 3.1
- Inductance-Capacitance Parallel Circuit on an AC Supply - Exercise 8.2
- Inductance-Capacitance Parallel Circuit on an AC Supply - Exercise 8.3
- Resistance-Inductance and Resistance-Capacitance Filter Circuits - Exercise 9.1
- Resistance-Inductance and Resistance-Capacitance Filter Circuits - Worksheet 10
- Resistance-Inductance-Capacitance Circuits on AC Supplies - Exercise 8.1
- RLC Circuits on AC Supplies - Worksheet 7
- RLC Circuits on AC Supplies - Worksheet 8
- RLC Circuits on AC Supplies - Worksheet 9

Transformer

- Application of Transformers to Impedance Matching - Exercise 10.3

LIB 3: 22 Linear Electronics (D3000 Practice)

Comparator Circuits

- Difference Amplifier - Worksheet W10
- Schmitt Trigger - Exercise 9.1
- Schmitt Trigger with Alternating Input - Exercise 9.2

Difference Amplifier

- Difference Amplifier - Worksheet W8
- Difference Amplifier - Worksheet W9
- Differential Mode - Exercise 8.3
- Inverting Mode - Exercise 8.1
- Non-Inverting Mode - Exercise 8.2

Integrator

- DC Input - Exercise 5.1
- Integrator - Worksheet W3

Inverting Amplifier

- Gain and Saturation - Exercise 3.3
- Inverting Amplifier - Alternating Input - Worksheet W2
- Inverting Amplifier Gain and Bandwidth - Exercise 4.2
- Inverting Amplifier with Sinusoidal Input - Exercise 4.1

Non-Inverting Amplifier

- Alternating Signal Input - Exercise 6.2
- Direct Voltage Input and Offset Null Control - Exercise 6.1
- Non-Inverting Amplifier - Worksheet W4
- Non-Inverting Amplifier - Worksheet W5

Operational Amplifier

- Basic Operational Amplifier - Worksheet W1
- Closed-Loop Amplifier - Exercise 1.3
- Comparator - Exercise 1.2
- Referenced Comparator - Exercise 2.2

Oscillators

- LC Oscillator - Exercise 1.1
- RC Ladder Oscillator - Exercise 1.2

RC Filters

- High-Pass Filter - Exercise 2.2
- Low-Pass Filter - Exercise 2.1
- Simple RC Filters - Worksheet W1
- Simple RC Filters - Worksheet W2

Rectification

- Effect of Varying Load - Exercise 1.2
- Simple DC Power Supply - Exercise 1.1

Summing Amplifier

- Scaling - Exercise 7.2

LIB 3: 23 Semiconductors (D3000 Practice)

Diodes

- Bridge Rectifier - Exercise 3.1
- Bridge Rectifier - Worksheet 4
- Diode Forward Characteristic - Exercise 1.1
- Diode Reverse Characteristic - Exercise 1.2
- Effect of Reservoir Capacitor - Exercise 3.2
- Half-Wave Rectifier - Exercise 2.1
- Half-Wave Rectifier - Worksheet 3
- Negative Power Supply - Exercise 2.3
- P-N Junction Diode - Worksheet 1
- P-N Junction Diode - Worksheet 2
- Reservoir Capacitor - Exercise 2.2

Electronics

Display Devices

- Bar Graph Display - Exercise 2.1
- Display Devices - Worksheet W2
- Liquid Crystal (Seven Segment) Display - Exercise 2.2

Transistor Amplifiers

- Alternating Signal Applied - Exercise 8.2
- Alternating Signal Drive - Exercise 2.2
- Alternating Signal Drive - Exercise 4.2
- Alternating Signal Drive - Exercise 5.3
- Alternating Signal Drive - Exercise 7.3
- Alternating Signal Drive - Worksheet W7
- Analog Switch with Direct Voltage Applied - Exercise 8.1
- Base Potential Divider Biasing and Stabilizing - Exercise 1.4
- Base Potential Divider Stabilized Amplifier - Exercise 7.2
- Bias Stability - Exercise 7.2
- Bias Stabilization - Worksheet 7
- Bias Stabilization - Worksheet 8
- Channel and Junction Resistances - Exercise 6.1
- Collector Feedback Biasing and Stabilizing - Exercise 1.3
- Collector Feedback Stabilization - Exercise 7.1
- Common Collector Amplifier (Emitter Follower) - Exercise 8.1
- Complementary PNP/NPN Pair - Worksheet W2
- Constant Current Sink - Worksheet W3
- Darlington Pair Emitter Follower - Worksheet W1
- DC and Quiescent Conditions - Exercise 4.1
- DC Transfer Characteristic - Exercise 5.2
- Differential Amplifier - Worksheet W4
- Directly Coupled (DC) Amplifier - Worksheet W5
- Directly Coupled (DC) Amplifier - Worksheet W6
- Emitter Decoupling Capacitor - Exercise 7.3
- Fault Diagnosis - Preparatory Investigation 1
- Fault Diagnosis - Preparatory Investigation 2
- Frequency Response of a Two-Stage Amplifier - Exercise 9.2
- JFET Characteristics - Exercise 6.2
- JFET Common Source Amplifier - Worksheet W8
- JFET Common Source Amplifier - Worksheet W9
- Need for Bias - Exercise 6.2
- Output Characteristic - Exercise 3.2
- PNP Common Emitter Amplifier - Exercise 8.2
- Quiescent Conditions - Exercise 3.1
- Quiescent Conditions - Exercise 5.1
- Quiescent Conditions - Exercise 7.1
- Quiescent Conditions and DC Drive - Exercise 2.1
- Quiescent Voltages and Currents - Exercise 1.1
- Signal Operation - Exercise 1.2

Transistors

- Regenerative Switch - Exercise 10.2

LIB 3: 24 Power Electronics (D3000 Practice)

AC Motors

- AC Motor Principles, and the Three-Phase Synchronous Motor - Exercise 6.1
- AC Motor Principles, and the Three-Phase Synchronous Motor - Worksheet 6
- Capacitor Offset - Exercise 7.2
- Delta Connection of a 3-Phase Synchronous Motor to Wye Supply - Exercise 6.3
- Other AC Motors - Exercise 9.1
- Power Factor Correction - Exercise 8.1
- Power Factor Correction - Worksheet 8
- Single-Phase Synchronous Motor - Exercise 7.1
- Single-Phase Synchronous Motor - Worksheet 7

Power Transistors

- Audio Amplifier - Power Output - Exercise 4.2
- Audio Amplifier - Waveforms - Exercise 4.1
- Audio Power Amplifier - Worksheet W5
- Audio Power Amplifier - Worksheet W6
- Comparison of FET to BJT - Exercise 5.2
- Controlling a Lamp - Exercise 1.1
- Current Booster - Alternating Drive - Exercise 3.2
- Current Booster - DC Drive - Exercise 3.1
- Current Booster - Worksheet W4
- Duty Cycle Controller - Worksheet W3
- Duty Cycle/Load Power - Exercise 2.2
- MOSFET Characteristics - Exercise 5.1
- Power Dissipated in the Transistor - Exercise 1.2
- Power MOSFET - Worksheet W7
- Power Transistor - Worksheet W1
- Power Transistor - Worksheet W2

SCR Bridge Circuits

- Commutating Effects of Load on a Bridge Circuit - Exercise 2.6
- Effect of a Commutating Diode on a Half Controlled SCR Bridge Circuit - Ex 2.7
- Fully Controlled SCR Bridge with Capacitive/Resistive Load - Exercise 2.5
- Fully Controlled SCR Bridge with Inductive/Resistive Load - Exercise 2.4
- Fully Controlled SCR Bridge with Resistive Load - Exercise 2.2
- Half Controlled SCR Bridge with Resistive Load - Exercise 2.3
- SCR Bridge Circuits - Worksheet W2

SCR, Diac, Triac and UJT

- Controlled Angle Firing of a Thyristor - Exercise 7.2
- Lamp Dimmer - Exercise 9.2
- Optocoupler - Exercise 8.2
- Pulse Transformer - Exercise 8.1
- Silicon Controlled Rectifier - Worksheet W8

Single and Bi-phase Control

- Effect of Differing Loads on a Full-wave Bi-phase Rectification Circuit - Ex 1.5
- Effect of Differing Loads on an SCR Circuit - Exercise 1.3
- Full-wave Bi-phase Rectification Power Limiting Control - Exercise 1.4
- Operation of an SCR Firing Circuit - Exercise 1.2
- Single and Bi-phase Control - Worksheet W1

Three-Phase Rectifiers and Inverters

- Dual-Polarity Supplies - Exercise 10.4
- Full-Wave Rectifier - Exercise 10.3
- Half-Wave Rectifier - Exercise 10.1
- Negative DC Supply - Exercise 10.2
- Over-Current Protection - Exercise 11.2

Three-Phase Supplies

- 3-Wire Connection of a 3-Phase Supply (Delta/Delta Connection) - Ex. 2.2
- 3-Wire Connection of a 3-Phase Supply (Delta/Delta Connection) - Exercise 2.2
- 6-Wire, 3-Wire and 4-Wire Connections, Delta/Delta Connection - Exercise 2.1
- 6-Wire, 3-Wire and 4-Wire Connections, Delta/Delta Connection - Worksheet 1
- 6-Wire, 3-Wire and 4-Wire Connections, Delta/Delta Connection - Worksheet 2
- Delta/Wye Connection - Exercise 3.1
- Delta/Wye Connection - Worksheet 3

LIB 3: 25 Digital Electronics (D3000 Practice)

Combinational Logic

- Characteristics of a Schmitt Inverter Gate - Exercise 9.1
- Characteristics of the EX-OR and EX-NOR Circuit - Exercise 1.1
- Characteristics of the Half Adder Circuit - Exercise 1.2
- Characteristics of the Wired-AND Circuit - Exercise 10.1
- Characteristics of the Wired-NOR Circuit - Exercise 10.2
- Diode AND and OR Gate Characteristics - Exercise 3.1
- Diode Logic - Worksheet 4
- Diode-Transistor Logic (DTL) - Worksheet 5
- Diode-Transistor Logic (DTL) - Worksheet 6
- Diode-Transistor Logic Gate Characteristics - Exercise 4.2
- Equivalent Logic Circuits 1 - Exercise 6.1
- Equivalent Logic Circuits 2 - Exercise 6.2
- Equivalent Logic Circuits 3 - Exercise 6.3
- EX-OR and EX-NOR Gates - Worksheet 1
- EX-OR and EX-NOR Gates - Worksheet 2
- EX-OR and EX-NOR Gates - Worksheet 3
- EX-OR and EX-NOR Gates - Worksheet 4
- Four-Variable Karnaugh Maps - Exercise 7.3
- Karnaugh Maps - Exercise 7.1
- Open Collector Gates - Worksheet 10
- Open Collector Gates - Worksheet 9
- Series and Parallel Connection of Switches - Exercise 2.1

Electronics

Digital Systems

- 2-bit Equal-Input Magnitude Comparator Circuit - Exercise 5.1
- Binary/BCD Counters and 7-Segment Decoder/Driver/Displays - Exercise 2.1
- Binary/BCD Counters, and 7-Segment Decoder/Driver/Displays - Worksheet 6
- Binary/BCD Counters, and 7-Segment Decoder/Driver/Displays - Worksheet 7
- Binary/BCD Counters, and 7-Segment Decoder/Driver/Displays - Worksheet 8
- Binary/BCD Counters, and 7-Segment Decoder/Driver/Displays - Worksheet 9
- Characteristics of a 1 to 1-of-4-line Demultiplexer Circuit - Exercise 3.2
- Characteristics of a 2-1 Multiplexer Using Three State Logic - Exercise 7.2
- Characteristics of a 2-4 Line Decoder Circuit - Exercise 2.2
- Characteristics of a 4-2 Line Encoder Circuit - Exercise 2.1
- Characteristics of a 4-bit Magnitude Comparator IC - Exercise 5.3
- Characteristics of a 4-input Multiplexer Circuit - Exercise 3.1
- Characteristics of a 4-input Priority Encoder Circuit - Exercise 4.1
- Characteristics of a Frequency Counter System - Exercise 5.2
- Characteristics of a Monostable IC (74LS123) - Exercise 1.4
- Characteristics of a Multiplexer/Demultiplexer Circuit - Exercise 3.3
- Characteristics of a Single-Bit Magnitude Comparator Circuit - Exercise 5.2
- Characteristics of a Three State Logic Bi-Directional Switch - Exercise 7.3
- Characteristics of a Three State Logic Circuit - Exercise 7.1
- Characteristics of a Timer/Counter System - Exercise 5.3
- Characteristics of a Triangular Waveform Generator System - Exercise 5.4
- Characteristics of an Analog Comparator IC (311) - Exercise 3.1
- Characteristics of an Analog Integrator IC (3140) - Exercise 3.2
- Characteristics of an Analog Switch IC (211) - Exercise 1.1
- Characteristics of an Analog Switch, S - R Bistable System - Exercise 1.5
- Characteristics of an Astable IC (4047) - Exercise 1.3
- Characteristics of an Incremental A-D Converter System - Exercise 4.2
- Characteristics of an S - R Latch IC (74LS00) - Exercise 1.2
- D-A Converter IC and an A-D Converter Circuit - Worksheet 11
- Determination of a 4-Bit Code Using a Magnitude Comparator - Exercise 5.4
- Encoder and Decoder Circuits - Worksheet 5
- Encoder and Decoder Circuits - Worksheet 6
- Encoder and Decoder Circuits - Worksheet 7
- Fault Diagnosis - Triangle Waveform Generator Circuit - Worksheet 12
- Full Adder Circuits - Exercise 6.1
- Full Adder Circuits - Exercise 6.2
- Full Adder Circuits - Worksheet 13
- Magnitude Comparator Circuits - Worksheet 12
- Multiplexer and Demultiplexer Circuits - Worksheet 8
- Multiplexer and Demultiplexer Circuits - Worksheet 9
- Priority Encoder Circuits - Worksheet 10
- Priority Encoder Circuits - Worksheet 11
- Signal Converters - Exercise 4.1

Interfacing

- CMOS Input and Output Characteristics - Exercise 8.2

Number Systems

- Number Systems - Measurement of Voltage Levels - Exercise 1.1
- Number Systems - Worksheet 1
- Number Systems - Worksheet 2

Sequential Logic

- Binary Counters - Exercise 5.1
- Binary Counters - Worksheet 11
- Binary Counters - Worksheet 12
- Characteristics of a Binary Up Counter with Reduced Count - Exercise 5.3
- Characteristics of a Binary Up Counter with Reduced Count 2 - Exercise 5.4
- Characteristics of a D-Type 2-bit Shift Register - Exercise 4.1
- Characteristics of a D-Type Flip-Flop - Exercise 2.1
- Characteristics of a D-Type with D Connected to Q - Exercise 2.2
- Characteristics of a J-K 4-bit Binary Counter - Exercise 5.2
- Characteristics of a J-K 4-bit Shift Register - Exercise 4.2
- Characteristics of a J-K Flip-Flop - Exercise 3.1
- Characteristics of a J-K Flip-Flop Connected as a D-Type - Exercise 3.2
- Characteristics of a J-K Flip-Flop Connected as a T-Type - Exercise 3.3
- Characteristics of a NAND Gate S-R Latch - Exercise 1.1
- Characteristics of an S-R Latch IC - Exercise 1.2

LIB 3: 26 Microprocessors (D3000 Practice)

Developing PIC Programs

- Analog to Digital Conversion - Exercise 15
- Digital to Analog Conversion - Exercise 16
- EEPROM Programming - Exercise 14
- Interrupts - Exercise 10
- Keyboard Scanning - Exercise 12
- Logic Systems - Exercise 8
- Simple Closed Loop Process Control - Exercise 17

Programming Applications

- Basic Input/Output - Exercise 7
- Program Development - Exercise 6

The PIC Development System

- Interfacing - Exercise 5
- PIC Software - Exercise 4

The PIC Microcontroller

- Microprocessors, Microcomputers and Microcontrollers - Exercise 1
- Number Systems - Exercise 3
- Overview of PIC Microcontrollers - Exercise 2

Electronics

LIB 3: 27 Avionics (D3000 Practice)

Single Engine Aircraft Battery Power System

- Electronics/Avionics Busbar Isolation - Exercise 2.2
- Power Distribution - Exercise 2.1
- Single Engine Aircraft Electrical Systems - Worksheet W1
- Single Engine Aircraft Electrical Systems - Worksheet W2
- Single Engine Power Distribution Systems - Worksheet W3
- Single Engine Power Distribution Systems - Worksheet W4

Single Engine Aircraft Fuel Flow Measurement

- Fuel Measurement Using a Tank Resistor - Exercise 7.1
- Fuel Quantity and Fuel Flow Measurement - Worksheet W10
- Fuel Quantity and Fuel Flow Measurement - Worksheet W9
- Optical Rotor Fuel Flow Measurement and Digital Display - Exercise 7.2

Single Engine Aircraft Fuel Quantity Measurement

- Fuel Measurement Using a Capacitor Bridge - Exercise 6.1
- Fuel Measurement Using a Capacitor Bridge, Displayed Digitally - Exercise 6.2
- Fuel Quantity Measurement Using a Capacitor Bridge - Worksheet W8

Single Engine Aircraft Power Consuming Circuits

- Early Internal Lighting Systems - Exercise 5.1
- Electrical Landing Gear Control and Indication Systems - Exercise 7.2
- Flap Control Systems - Exercise 8.1
- Flap Control Systems - Worksheet W13
- Hydraulic Landing Gear Control and Indication Systems - Exercise 7.1
- Landing Gear Control and Indication Systems - Worksheet W12
- Landing, Taxi and Anti-Collision Lights - Exercise 6.3
- Single Engine Auxiliary Power Supply Systems - Exercise 3.2
- Single Engine External Lighting Systems - Worksheet W10
- Single Engine External Lighting Systems - Worksheet W11
- Single Engine Internal Lighting Systems - Worksheet W9

Single Engine Aircraft Power Generation System

- A Typical 1979 Alternator System - Exercise 4.2
- A Typical Alternator System From 1963 To 1968/69 - Exercise 4.1
- Cessna Single Engine Electrical Power Systems - Worksheet W7
- Cessna Single Engine Electrical Power Systems - Worksheet W8
- Single Engine Power Supply Systems - Worksheet W5
- Single Engine Power Supply Systems - Worksheet W6

Single Engine Aircraft Stall Warning Systems

- A Stall Warning System using a Vane Switch - Exercise 1.1
- Single Engine Aircraft Stall Warning Systems - Worksheet W1

Single Engine Aircraft Take-Off Warning Systems

- Basic Logic Gates - Exercise 2.1

Single Engine Aircraft Temperature Measurement

- Nickel Wire Sensor Temperature Systems - Worksheet W4
- Nickel Wire Sensor Temperature Systems - Worksheet W5
- Nickel Wire Temp Sensor - Ratiometer and Analog Display - Exercise 4.3
- Nickel Wire Temp Sensor - Wheatstone Bridge and Analog Display - Exercise 4.1
- Nickel Wire Temp Sensor - Wheatstone Bridge and Digital Display - Exercise 4.2

LIB 3: 28 Electronic Systems (Series 9 Practice)

Components

- Amplifier and Loudspeaker
- Applying Power to a Device
- DC Operated Buzzer
- Light Dependent Resistor - LDR
- Logic Source Switches
- Output Driver
- Relay
- Seven Segment Display (Digital Signals)

Signal Processing

- Analog Signals
- Automatic Light Switch System
- Combined Analog/Digital Signals
- Creating a Reference Voltage
- Digital Signals
- Fire Detector (Sprinkler) System
- Latching Switch System
- Lighting/Temperature Failure Warning System
- Sensor Voltage Divider

LIB 3: 29 Electronic Principles (Series 9 Practice)

AC Circuits

- Alternating Current - AC
- Alternating Voltage Values
- Capacitor on an AC Supply
- Capacitors in Parallel
- Capacitors in Series
- Capacitors with AC Applied
- Inductors with AC Applied
- Plotting Frequency Responses of RC and RL Circuits
- Capacitor Charge Time
- Capacitor on a DC Supply
- CR Integrator

- Investigation of a Wheatstone Bridge
- Kirchhoff's Current Law
- Kirchhoff's Voltage Law
- Other Ways to Calculate Power
- Resistor Measurements
- Series-Parallel Combinations

Magnetism and Electromagnetism

- Attraction and Repulsion
- Electromagnet Field Plot
- Electromagnetic Induction
- Investigating Change-Over and Latching Circuits
- Investigation of a Basic Transformer
- Other Magnetic Materials

LIB 3: 30 Linear Electronics (Series 9 Practice)

Current Amplifier Circuits

- Improving the performance of Push-pull Amplifier (1)
- Improving the performance of Push-pull Amplifier (2)
- Measuring Power in Single-ended and Push-pull Amplifiers
- Operation of a Current Amplifier

Operational Amplifier Circuits

- AC Comparator
- Feedback Amplifier
- Gain-Bandwidth Product in Practice
- Investigation of an Integrator
- Non-Inverting Amplifier
- Regenerative Comparator Under AC Conditions
- Regenerative Comparator Under DC Conditions
- Slew Rate Limitation of an Amplifier

LIB 3: 31 Semiconductors (Series 9 Practice)

Diodes

- Half-Wave Rectifier

SCRs

- Capacitor Commutation
- CR Phase Shift Control Circuit
- DC Control of an SCR with AC Applied
- Silicon Controlled Rectifier - SCR

Transistor Amplifiers

- Common Collector Amplifier - Emitter Follower
- Differential Amplifier Under AC Conditions
- Differential Amplifier Under DC Conditions

- Elimination of Crossover Distortion
- Emitter Decoupling Capacitor
- Emitter Follower Circuits
- Investigation of the Amplifier with an Applied Signal
- JFET Common Source Amplifier Investigation
- Loading a Voltage Divider
- Measurement of Quiescent Voltages
- Simple Current Biasing

Transistors

- Current Gain Characteristic
- Darlington Pair Switch Circuit
- Investigation of an N-channel JFET
- NPN Transistor Switch
- Output Characteristic
- Regenerative NPN/PNP Switch

LIB 3: 32 Digital Electronics (Series 9 Practice)

Combinational Logic

- AND Gate From NAND Gates
- Boolean Expressions From Logic Circuits
- Combinational Logic Circuits
- Diode Logic
- Diode Transistor Logic (DTL)
- Logic Gate Switches
- NOR Gate From NAND Gates
- NOT Gate From a NAND Gate
- Operation of the Schmitt NOT Gate
- OR Gate From NAND Gates

Digital Systems

- 1-4 Line Demultiplexer
- 2-1 Multiplexer
- 2-4 Line Decoder
- 4-1 Line Multiplexer
- 4-2 Line Encoder
- 4-Bit Binary Full Adder
- 4-Bit Magnitude Comparator
- Analog Switch
- Analog to Digital Converter
- Astable IC Circuit
- BCD Counter and 7-Segment Decoder
- Bi-Directional Switch
- Digital to Analog Converter
- Encoder-Decoder Circuit
- Full Adder
- Half Adder
- Monostable IC Circuit

- Multiplexer-Demultiplexer Circuit
- Seven-Segment Display

Number Systems

- Practical Investigation of Number Systems

Sequential Logic

- 3-Bit Down-Counter
- 3-Bit Up-Counter
- Binary Counter IC
- D-Type (Data) Flip-Flop
- Modulo-N Counter

LIB 3: 33 Microprocessors (Series 9 Practice)

Developing PIC Programs

- Defining Device Type and Clock Speed
- Introduction to Interrupts
- Loops and Conditional Branching
- Programming Fundamentals

PIC Microcontroller

- Arithmetic and Logic Operations
- Commands to set up an Interrupt on Portb
- Creating Delays

The PIC Development System

- Introduction to the PIC Basic Software
- Introduction to the PICShell Software
- Introduction to the Software and Hardware

The PIC Microcontroller

- Features of a PIC
- Introduction to PICs

Support

LIB 3: 61 Engineering Mathematics

Algebra
- Algebra - Simple Formula
- First, Second, and Third Order Brackets
- Rule of Three (Direct Proportion)
- Rule of Three (Inverse Proportion)

Angles
- Angular Measure
- Calculating with Angles
- Measuring Angles

Approximation
- Approximations

Arithmetic
- Adding and Subtracting
- Multiplication and Division of Decimal Numbers
- Multiply Sums

Equations
- Addition Method for Solving Simultaneous Equations
- Calculate the Unknown Variable in an Equation
- Distributive Law
- Equating Method for Solving Simultaneous Equations
- Multiply Out Brackets
- Performing Calculations
- Sign Rules for Mathematical Operations

Factorization
- Simple Factorization

Fractions
- Add and Subtract Fractions with Different Denominators
- Add and Subtract Fractions with the Same Denominator
- Convert Decimal Numbers to Fractions
- Convert Fractions to Decimal Numbers
- Convert Improper Fractions into Mixed Numbers
- Convert Mixed Numbers into Improper Fractions
- Expand Fractions
- Fractions - Addition and Subtraction
- Fractions - Multiplication and Division
- Simplify Fractions

Graphs and Charts
- Graphs - Pie Chart
- Graphs - Square Law
- Graphs - Straight Line Graphs

Support

Indices
- Indices
- Indices - Addition and Subtraction
- Indices - Letter Notation
- Indices - Multiplication and Division
- Indices - Powers of 10
- Powers

Length, Area and Volume
- Calculate the Area of a Complex Shape
- Calculate the Area of a Rectangle
- Calculate the Perimeter of a Rectangle
- Calculate Volume
- Lengths, Surface Area and Volume
- Lengths, Surface Area, and Volume
- Lengths, Units and Prefixes

Number Systems
- Binary and Decimal Conversions

Percentages
- Calculate Percentage Increases
- Calculate Percentage Reductions
- Calculate Percentages of Values
- Parts per Thousand
- Percentages

Phasors
- Phase Angles
- Phasor Diagrams

Trigonometry
- Basic Trigonometry
- Lengths and Pythagoras' Theorem
- Pythagoras' Theorem

LIB 3: 62 English Language Skills

Language
- Language Acquisition

Reading
- Citing Strong and Thorough Evidence
- Determining a Writer's Perspective
- Evaluating Arguments and Specific Claims Made in a Text
- Identifying and Analyzing Ideas in a Text

Support

Speaking and Listening

- Discussing Different Perspectives
- Engage in a Two-Way Conversation
- Engaging in Group Discussions
- How to Introduce Yourself
- Justifying Decisions with Reasoning
- Listening and Understanding
- Planning, Writing, Presenting, and Evaluating
- Presenting a Perspective to an Audience

Writing

- Arguing a Perspective
- Creating an Informative Text
- Formal Letters with a Perspective
- Informing an Audience
- Presenting a Persuasive Perspective

LIB 3: 63 Business Skills

Cost Accounting

- Marginal Cost Calculations

Economics

- Economic Flow Models
- Economic Measures
- Economic Systems
- Location Factors
- Monetary Policy and Price Level Stability
- Needs, Wants and Demand
- Pricing and Types of Markets
- Production Factors

Financial Accounting and Bookkeeping

- Accounting - Valuation Principles
- Accruals and Pre-Payments
- Balance Sheet Accounting
- Balance Sheet Changes
- Inventory Accounting: The Periodic Method
- Inventory Accounting: The Perpetual Method
- List Price Determination
- Profit and Loss Accounts
- Purchase Cost Calculations

Fundamentals of Business Organization

- Business Organizational Structure
- Business Process Optimization
- Corporate Mission and Goals
- Quality and Environmental Management

Support

Investing and Financing

- External Financing
- Financing Rules
- Internal Financing
- Investment Analysis
- Investment Planning
- Profit and Loss Analysis

Legal Framework

- Breach of Contract
- Contracts and UN Law
- Process Chains and Networks

Procurement

- Controlling Procurement
- International Commercial Terms and Contracts
- Management of Hazardous Substances
- Material Procurement
- Material Requirements Planning (MRP)
- Monitoring Purchasing
- Organizing Procurement
- Purchasing Calculations

Production

- Analytical Techniques
- Controlling Production
- Improving Production
- Product Range
- Product Range Development
- Production Management
- Production Planning
- Production Process Control
- Production Process Planning
- Quality Control

Sales and Marketing

- Advertising and the Marketing Mix
- Communications and the Marketing Mix
- Control of the Customer's Order
- Distribution and the Marketing Mix
- Marketing Planning
- Pricing Strategies
- Product and the Marketing Mix
- Product Promotion
- Sales and Marketing Measures

Social Skills

- Common Courtesy
- Dress Code

- Handle Collective Property
- Personal Space
- Punctuality

LIB 3: 64 Freight Logistics

Efficiency and Optimization of the Warehouse
- Quality Management in the Warehouse

Event Driven Process Chains
- EPC Diagrams

Human Resources
- Accident Prevention in the Warehouse
- Handling of Hazardous Materials

Information Processing
- Privacy Policy

Internal Transport and Loading
- Conveying
- Internal Transport and Loading Overview
- Loading Systems
- Picking Vehicles and Lifting Equipment
- Securing Loads

Loading
- Loading Goods Overview

Packaged Goods
- Packaging
- Packaging Aids
- Packaging of Goods

Picking Stock
- Key Figures of Picking
- Organization of Picking

Route Planning
- Accompanying Documents
- Event Driven Process Chain for Route Planning
- Freight Costs
- Legal Regulations for Shipping

Stowage Planning
- Planning for Stowage

Support

LIB 3: 65 Workplace Problem Solving

Construction

- Car Park Construction - Calculating Materials
- Installing a Flag Pole
- Perimeter Fencing - Calculating Materials

Customer Service

- Handling a Telephone Call

Distribution

- Calculating Shipping Costs
- Planning Logistics

Finance

- Calculating Costs for a Building Project
- Calculating Stationery Costs
- Calculating VAT Rates
- Comparing Crane Hire Costs
- Phone Contracts - Comparing Deals

Human Resources

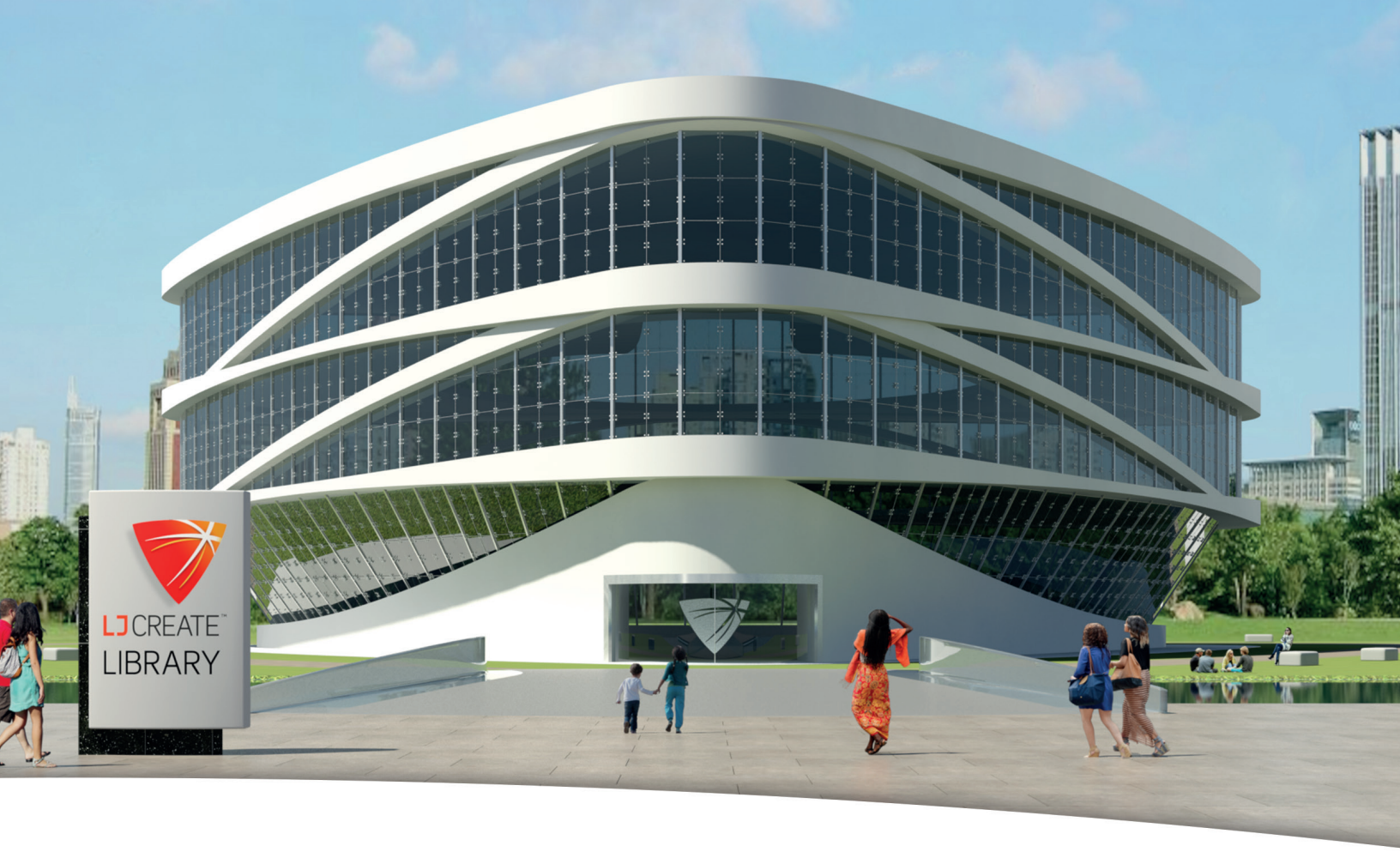
- Attending a Meeting
- Choosing a Computer Monitor
- Improving the Workplace

Production

- Calculating Costs in a Food Factory
- Choosing Packaging for Parts
- Comparing Machine Productivities
- Machine Productivity for Cutting Metal Shapes
- Mass Production - Calculating Quantities
- Paint Mixing - Calculating Materials
- Programming a Drinks Bottling Plant
- Running a Bicycle Parts Production Line
- Running Two Production Lines for Bicycle Parts
- Setting Up a Paint Filling Machine

Sales and Marketing

- Calculating Sales Discounts
- Sales Conversion - Calculating Rates



For more information on our range of learning resources, please contact:

LJ Create

6900 Tavistock Lakes Blvd,
Suite 400
Orlando, FL 32827

T: 1-800-237-3482
E: info@ljcreate.com

ljcreate.com

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