Microprocessor & Application

Subject Code
11306

<table>
<thead>
<tr>
<th>Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Periods per week</td>
</tr>
<tr>
<td>L</td>
</tr>
<tr>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Periods in one session</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
</tr>
</tbody>
</table>

Full Marks : 100
Annual Exam. : 80
Internal Exam. : 20

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Introductions to combinational and sequential logic Circuits.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Organisation and hardware of simple microcomputers.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Introduction 8085.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Microprocessor Software Concepts.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Peripheral Interfacing and Timers.</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Assembly Language Programming.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>A/D and D/A converters.</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Introduction to Advanced Microprocessors.</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Applications.</td>
<td></td>
</tr>
</tbody>
</table>

Total : (60)
CONTENTS:

PREREQUISITES:

00.01 Knowledge of digital circuits.
00.02 Boolean Algebra.
00.03 Map Simplifications.

TOPIC: 01 – INTRODUCTIONS TO COMBINATIONAL AND SEQUENTIAL LOGIC CIRCUITS:

01.01 Combinational Logic Circuits.
01.01.01 Half Adders, Full Adders.
01.01.02 Flip Flops : SR Flip flop, D-Flip Flop, JK flip flop, T flip flop, Edge Triggered flip flops.
01.02 Sequential Circuits.

TOPIC: 02 – ORGANISATION AND HARDWARE OF SIMPLE MICROCOMPUTERS.

02.01 Basics of microcomputer.
02.02 Micro Computer Architecture :
02.02.01 Micro Computer Bus.
02.02.02 Clock Signals.
02.03 Single Chip Microprocessor.
02.03.01 Register Section.
02.03.02 Control Unit.
02.03.03 ALU.
02.03.04 Functional Representation.
02.04 Memory.
02.04.01 RAM.
02.04.02 ROM.
02.04.03 Read & Write (RW) Operator.
02.04.04 Memory arrays.
02.05 I.O. Units.

**TOPIC: 03 – INTRODUCTION 8085:**

03.01 Architecture & Pin Diagram.
03.02 Chip Architecture.
03.03 Register Structure.
03.04 Memory Addressing.
03.05 8085 Addressing Modes.
03.06 8085 Instruction sets.
03.07 8085 Instruction timing and execution.
03.08 8085 Interrupt System.
03.09 8085 DMA.
03.10 8085 SID & SOD lines.

**TOPIC: 04 – MICROPROCESSOR SOFTWARE CONCEPTS:**

04.01 Instruction formats.
04.02 Addressing Modes.
04.03 Instruction Types.
04.04 Data Transfer Instructions.
04.05 Arithmetic Instructions.
04.06 Logical Instructions.
04.07 Prog. Control Instructions.
04.08 Input / Output Instructions.
04.09 Introduction to assembly language programming.

**TOPIC: 05 - PERIPHERAL INTERFACING AND TIMERS:**

05.01 Intel 8251, 8255, 8253 and 8259 chips.
05.02 555 Timers.
TOPIC: 06 – ASSEMBLY LANGUAGE PROGRAMMING:

TOPIC: 07 – A/D AND D/A CONVERTERS:

07.01 Successive approx type A/D.
07.02 Counter type A/D.
07.03 Dual Slope Type A/D.
07.04 Sample and Hole Circuits A/D.

TOPIC: 08 – INTRODUCTION TO ADVANCED MICROPROCESSORS.

08.01 8085, 68000, Z800.
08.01.01 Architecture.
08.01.02 Instruction Set.
08.01.03 Addressing Modes.
08.01.04 Advanced features.
08.01.05 Stacks.

TOPIC: 09 – APPLICATIONS.

09.01 A few examples.

Books Recommended:

1. Digital Computer System - Malvino
2. Introduction to Microprocessor - Prof. B. Ram
3. Microprocessor Architecture - Gaonkar
4. Microprocessor and Microcomputer - Lui and Gibson
### SCHEME OF EXAMINATION FOR FINAL EXAMINATION

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
Subject Code 11310(B)

Theory

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>L T P/S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 0 0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No. of Periods in one session 60

Full Marks : 100
Annual Exam. : 80
Internal Exam. : 20

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Sensors.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Microprocessor based data acquisition.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Process Control.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Programmable Logic Controller.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Electronic Graphic Recording Systems.</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Instruments Errors.</td>
<td></td>
</tr>
</tbody>
</table>
CONTENTS:

**TOPIC: 01 – SENSORS:**

01.01 Electrical sensors for:
(a) Mechanical acquisition,
(b) Hydraulic acquisition,
(c) Pneumatic acquisition.
01.02 Analog sensors.
01.03 Digital sensors.

**TOPIC: 02 – MICROPROCESSOR BASED DATA ACQUISITION:**

02.01 Instrumentation amplifier.
02.02 Multiplexers.
02.03 Sample and hold circuit.
02.04 D/A Converter.
02.05 A/D Converter.
02.06 Data acquisition system.

**TOPIC: 03– PROCESS CONTROL:**

03.01 Process controller.
03.02 Hardware data logging.
03.03 Microcomputer as process controller.
03.04 Supervisory control.
03.05 Direct digital control.
03.06 Cascade control.

**TOPIC: 04 – PROGRAMMABLE LOGIC CONTROLLER:**

04.01 Introduction.
04.02 Architecture.
04.03 Features.
04.04 Programming.
04.05 Applications.
TOPIC: 05 - ELECTRONIC GRAPHIC RECORDING SYSTEMS:

05.01 Introduction.
05.02 Balancing arrangement.
05.03 XY Recorder.
05.04 Types and briefs of permanent recording systems.

TOPIC: 06 – INSTRUMENTS ERRORS.

06.01 Introduction.
06.02 Classification.
06.03 Statistical behaviour.

Books Recommended:

1. Microprocessor with Application in Control. - Ahson.
2. Microprocessor in Instruments & Control. - Bibbero

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 80

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
Subject Code
11310(A)

Theory

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L  T  P/S</td>
<td>100</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

No. of Periods in one session
60

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Introduction to 16 BIT Microprocessor.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Data and Address-BUS Configuration.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Addressing Modes.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Interrupt Processing.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Peripheral Interfacing Chips.</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Architecture of 68000 Motorola processor in detail.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Organisation of Instruction Sets.</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Architecture for standard peripheral devices.</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>I/O Control.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>System Design with few industrial examples using 8086 and 68000 processors.</td>
<td></td>
</tr>
</tbody>
</table>
CONTENTS:

TOPIC: 01 – INTRODUCTION TO 16 BIT MICROPROCESSOR:

01.01 Intel 8086 Architecture.
01.02 Intel 8088 Architecture.
01.03 Pipeline Architecture.
01.04 Bus interface unit and execution unit.

TOPIC: 02 – DATA AND ADDRESS-BUS CONFIGURATION:

02.01 Memory segmentation.
02.02 Memory address generation details.
02.03 Logical and Physical address generation.
02.04 I/O Port addresses.
02.05 Memory mapping.
02.06 Data, Code and Stack segmentation.

TOPIC: 03 – ADDRESSING MODES:

03.01 Instruction set in detail and Addressing Modes.
03.02 Assembler directives.
03.03 Programming examples.

TOPIC: 04 – INTERRUPT PROCESSING:

04.01 Hardware Interrupt.
04.02 Software Interrupt.
04.03 Internal Interrupt.
04.04 Types of Interrupt.
04.05 Interrupt enabling and disabling.
TOPIC: 05 - PERIPHERAL INTERFACING CHIPS:

05.01 Intel 8255.
05.02 Intel 8253.
05.03 Intel 8259.
05.04 Intel 8251.
05.05 Interfacing of these chips with processor.
05.06 Digital interfacing.
05.07 Analog interfacing.
05.08 Industrial control applications.

TOPIC: 06 – ARCHITECTURE OF 68000 MOTOROLA PROCESSOR IN DETAIL.

06.01 Introduction.
06.02 Reference in 68000.
06.03 Memory Address.
06.04 Instruction formats.
06.05 Addressing Modes.
06.06 Instruction Sets.
06.07 STACK, Read and Write Cycle Timing.

TOPIC: 07– ORGANISATION OF INSTRUCTION SETS:

07.01 Addressing modes.
07.02 Assembly language programming.
07.03 Examples for sorting logical operations.
07.04 Control loops.
07.05 Interrupt and exception programming.
TOPIC: 08 – ARCHITECTURE FOR STANDARD PERIPHERAL DEVICES:

08.01 Chip 6820.
08.02 Chip 6821 Parallel interfacing adapter.
08.03 Chip 6850 Asynchronous commn. Serial interface.

TOPIC: 09 – I/O CONTROL:

09.01 I/O control using parallel interface.
09.02 I/O control using memory mapped I/O control for data acquisition.
09.03 Data output through binary I/O lines.

TOPIC: 10 – SYSTEM DESIGN WITH FEW INDUSTRIAL EXAMPLES USING 8086 AND 68000 PROCESSORS.

Books Recommended:

1. Intel Manual of 8086
2. Microprocessing and Interfacing. - Hall
3. 6800 Assembly Lan. Programming. - Leventhal
4. Microprocessor - Lui & Gibson
5. Motorola Manufacturing Data Sheets.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
Subject Code: 11302

Theory

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L T P/S</td>
<td>100</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

No. of Periods in one session: 60

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Introduction.</td>
<td>(05)</td>
</tr>
<tr>
<td>02</td>
<td>Fundamental Properties.</td>
<td>(06)</td>
</tr>
<tr>
<td>03</td>
<td>P C B Modeling.</td>
<td>(06)</td>
</tr>
<tr>
<td>04</td>
<td>Physical Parameter Modeling.</td>
<td>(05)</td>
</tr>
<tr>
<td>05</td>
<td>D. C. Analysis of Linear Network.</td>
<td>(06)</td>
</tr>
<tr>
<td>06</td>
<td>Solution of Simultaneous Equations.</td>
<td>(05)</td>
</tr>
<tr>
<td>07</td>
<td>D. C. Analysis of Non Linear Circuits.</td>
<td>(05)</td>
</tr>
<tr>
<td>08</td>
<td>Modeling of Semi Conductor Components.</td>
<td>(06)</td>
</tr>
<tr>
<td>09</td>
<td>Transient Analysis of Linear &amp; Non Linear Circuits.</td>
<td>(06)</td>
</tr>
<tr>
<td>10</td>
<td>Circuit Modeling.</td>
<td>(05)</td>
</tr>
<tr>
<td>11</td>
<td>Sensitivity &amp; Optimization.</td>
<td>(05)</td>
</tr>
</tbody>
</table>

Total: (60)
CONTENTS:

**TOPIC: 01 – INTRODUCTION:**

01.01 Device Modeling.
01.02 State of the Art of techniques.
01.03 Simulation in IC design.

**TOPIC: 02 – FUNDAMENTAL PROPERTIES:**

02.01 Poisson's Equation.
02.02 Continuity Equation.
02.03 Carrier Transport Equation.
02.04 Carrier concentration.

**TOPIC: 03 – PCB MODELING:**

03.01 Introduction.
03.02 Single Layer PCB layout using AutoCAD.
03.03 Multi Layer PCB layout using AutoCAD.

**TOPIC: 04 – PHYSICAL PARAMETER MODELING:**

04.01 Carrier Mobility Modeling.
04.02 Carrier Generation & Recombination Modeling.
04.03 Thermal Generation Modeling.

**TOPIC: 05 - D.C. ANALYSIS OF LINEAR NETWORK:**

05.01 Introduction to common techniques.
05.02 Hybrid formulation technique.
TOPIC: 06 – SOLUTION OF SIMULTANEOUS EQUATIONS:

06.01 Introduction to different techniques.
06.02 Gaussian Elimination.
06.03 L U decomposition.
06.04 Exploiting scarcity of matrices.

TOPIC: 07 – D. C. ANALYSIS OF NON LINEAR CIRCUITS:

07.01 Introduction non-linear equation.
07.02 Newton Rapson technique for many variable.
07.03 Linearised equivalent of non-linear circuits.
07.04 Linearised equivalent of hybrid formulation.

TOPIC: 08 – MODELING OF SEMI CONDUCTOR COMPONENTS:

08.01 Modeling of P N Junction.
08.02 Modeling of various diodes.
08.03 Modeling of B J T.
08.04 Modeling of F E T.
08.05 Modeling of M O S devices.

TOPIC: 09 – TRANSIENT ANALYSIS OF LINEAR & NON LINEAR CIRCUITS:

09.01 Sine small signal analysis.
09.02 Linear Formulation.
09.03 Steady State Formulation.
09.04 Numerical Solution of Ordinary Differential Equation.
09.05 Associated circuit models for inductor.
09.06 Associated circuit models for capacitor.
TOPIC: 10 – CIRCUIT MODELING: [05]

10.01 Modeling of circuits having passive and active components.

TOPIC: 11 – SENSITIVITY & OPTIMIZATION: [05]

11.01 Introduction to sensitivity.
11.02 Introduction to optimization.
11.03 Various approaches to sensitivity & optimization.
11.04 Sensitivity analysis.
11.05 Optimization techniques.

Books Recommended:

1. Computer Aided Analysis of Electronic Circuits. - Chua & Lin
2. Analysis & Simulation of Semi Conductor Devices. - Siefried & Selberher
3. Computer Aided Electronic Circuit Design. - Raghuram
4. AutoCAD. - Rice
5. AutoCAD. - Oumera

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 80

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.


## Subject Information

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>11311</th>
</tr>
</thead>
</table>

### Practical

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks : 50</th>
<th>Annual Exam. : 40</th>
</tr>
</thead>
<tbody>
<tr>
<td>L   T   P/S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0   0   3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### External Exam.

- Internal Exam. : 10

### Scheme of Examination for Final Examination

- F.M. : 40

### CONTENTS

- Same as theory paper (11302).

---

1
Digital Electronics & Microprocessor Lab.

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Practical</th>
<th>No. of Periods in one session</th>
</tr>
</thead>
<tbody>
<tr>
<td>11313</td>
<td></td>
<td>60</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L T P/S</td>
<td>50</td>
<td>40</td>
<td>10</td>
</tr>
</tbody>
</table>

CONTENTS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Operation of Mono stable multivibrator circuit.</td>
</tr>
<tr>
<td>02</td>
<td>Operation of Bi stable multivibrator circuit.</td>
</tr>
<tr>
<td>03</td>
<td>Operation of Astable multivibrator circuit.</td>
</tr>
<tr>
<td>04</td>
<td>Operation of Schmitt trigger circuit.</td>
</tr>
<tr>
<td>05</td>
<td>Operation of Comparator circuit.</td>
</tr>
<tr>
<td>06</td>
<td>Operation of Integrator circuit.</td>
</tr>
<tr>
<td>07</td>
<td>Operation of Blocking Oscillator circuit.</td>
</tr>
<tr>
<td>08</td>
<td>Operation of Shift registers and counters.</td>
</tr>
<tr>
<td>09</td>
<td>Operation of EPROM eraser.</td>
</tr>
<tr>
<td>10</td>
<td>Operation of Multiplexers ICs.</td>
</tr>
<tr>
<td>11</td>
<td>Operation of D/A converter.</td>
</tr>
<tr>
<td>12</td>
<td>Operation of A/D converter.</td>
</tr>
<tr>
<td>13</td>
<td>Operation of R-2R ladder network.</td>
</tr>
<tr>
<td>14</td>
<td>Operation of Sample and Hold circuit.</td>
</tr>
<tr>
<td>15</td>
<td>Operation of Delta modulation circuit.</td>
</tr>
<tr>
<td>16</td>
<td>Operation of seven segments display circuit.</td>
</tr>
</tbody>
</table>

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

F.M. : 40
# Digital Electronics & Microprocessor Lab.

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>11314</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Sessional</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Periods in one session --</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P/S</th>
<th>Full Marks : 50</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Annual Exam. : 30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>--</td>
<td>Internal Exam. : 20</td>
</tr>
</tbody>
</table>

## CONTENTS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Operation of Mono stable multivibrator circuit.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Operation of Bi stable multivibrator circuit.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Operation of Astable multivibrator circuit.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Operation of Schmitt trigger circuit.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Operation of Comparator circuit.</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Operation of Integrator circuit.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Operation of Blocking Oscillator circuit.</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Operation of Shift registers and counter.</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Operation of EPROM eraser.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Operation of Multiplexers ICs.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Operation of D/A converter.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Operation of A/D converter.</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Operation of R-2R ladder network.</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Operation of Sample and Hold circuit.</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Operation of Delta modulation circuit.</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Operation of seven segments display circuit.</td>
<td></td>
</tr>
</tbody>
</table>
Digital Electronics -II

Subject Code
11304

Theory

<table>
<thead>
<tr>
<th>No. of Periods</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Per week</td>
<td></td>
</tr>
<tr>
<td>L T P/S</td>
<td></td>
</tr>
<tr>
<td>3 0 0</td>
<td></td>
</tr>
</tbody>
</table>

No. of Periods in one session 60

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Multivibrator Circuit.</td>
<td>(08)</td>
</tr>
<tr>
<td>02</td>
<td>Linear and Non Linear Wave Shaping Circuits.</td>
<td>(06)</td>
</tr>
<tr>
<td>03</td>
<td>Memories.</td>
<td>(12)</td>
</tr>
<tr>
<td>04</td>
<td>Input / Output Devices.</td>
<td>(10)</td>
</tr>
<tr>
<td>05</td>
<td>A / D and D / A Conversion.</td>
<td>(12)</td>
</tr>
<tr>
<td>06</td>
<td>Compact Disks.</td>
<td>(04)</td>
</tr>
<tr>
<td>07</td>
<td>Digital Display.</td>
<td>(08)</td>
</tr>
</tbody>
</table>

Total: (60)
CONTENTS:

TOPIC: 01 – MULTIVIBRATOR CIRCUIT: [08]

01.01 Introduction.
01.02 Transistor and Multivibrator circuits.
01.03 F E T based Multivibrator circuits.
01.04 Schmitt Trigger circuit.
01.05 555 IC based above circuits.
01.06 CMOS based Multivibrator Circuits.

TOPIC: 02 – LINEAR AND NON LINEAR WAVE SHAPING CIRCUITS: [06]

02.01 Voltage comparater.
02.02 Voltage time base generator.
02.03 Current time base generator.
02.04 Blocking oscillator.
02.05 Delay lines.

TOPIC: 03– MEMORIES: [12]

03.01 Classification in different aspects.
03.02 Semi conductor dynamic, static memories.
03.03 Shift register memory unit.
03.04 Magnetic core memories.
03.05 Magnetic tape.
03.06 Magnetic diskette.
03.07 Paper tapes.
03.08 Read only memories: PROM, EPROM.
03.09 EPROM Eraser.
03.10 Access time.
03.11 Storage capacity.
TOPIC: 04 – INPUT / OUTPUT DEVICES:

04.01 Punched Card.
04.02 Paper tape, Magnetic tape, Magnetic drum & recording devices.
04.03 Digital recording devices.
04.04 CRT Terminals.
04.05 Decoder, encoder and Multiplexer.
04.06 Universal product coding.
04.07 Serial and Parallel data transfer.
04.08 U A R T.
04.09 Bi-directional buffer.
04.10 Parity and encoder.
04.11 74150, 74156, 74139, 74155, 74246, 4511, 40147 Ics.

TOPIC: 05 – A / D AND D / A CONVERSION:

05.01 Introduction.
05.02 Sampling theorem.
05.03 Weighted register D/A Converter.
05.04 R-2R Ladder D/A Converter.
05.05 Inverted ladder D/A converter.
05.06 A/D converter: parallel comparator, successive approx., counting, Dual slope type.
05.07 Converter using volt. to frequency conversion.
05.08 Sample and hold circuit.
05.09 Delta modulation.
TOPIC: 06 – COMPACT DISKS:  
06.01 Hard disk.
06.02 CD ROM.
06.03 CCD charged coupled devices.
06.04 Storage charge.
06.05 Storage capacity and transfer of charges.
06.06 Input and Output arrangement.

TOPIC: 07 – DIGITAL DISPLAY:  
07.01 LED, LCD, Light detectors displays.
07.02 Magnetic bubble display.
07.03 Seven segment display.
07.04 C R T Terminal.
07.05 Page reader and page scanner.

Books Recommended:

1. Digital Principle and Application. - Malvino and Leach.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
# Electronics Measurement-II

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>11303</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Theory</th>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L  T  P/S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3   0   0</td>
<td>100</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

**Rationale:**

**Objective:**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>High Frequency Measurement.</td>
<td>(12)</td>
</tr>
<tr>
<td>02</td>
<td>Electronic Measurement.</td>
<td>(06)</td>
</tr>
<tr>
<td>03</td>
<td>Digital Measuring Instrument.</td>
<td>(10)</td>
</tr>
<tr>
<td>04</td>
<td>Instruments for Generation and Analysis of waves.</td>
<td>(06)</td>
</tr>
<tr>
<td>05</td>
<td>Transducers and Sensors.</td>
<td>(08)</td>
</tr>
<tr>
<td>06</td>
<td>Optical Measuring Instruments.</td>
<td>(06)</td>
</tr>
<tr>
<td>07</td>
<td>Data Acquisition System (DAS).</td>
<td>(12)</td>
</tr>
</tbody>
</table>

**Total:** 60
CONTENTS:

TOPIC: 01 – HIGH FREQUENCY MEASUREMENT: [12]

01.01 Introduction.
01.02 Resonance method.
01.03 Measurement of inductance by reactance variation method.
01.04 Measurement of capacitance by reactance variation method.
01.05 Measurement of effective resistance by variation method.
01.06 T Network.
01.07 Parallel T network.
01.08 Bridge T network.
01.09 Q measurement.
01.10 Measurement of frequency.
01.11 Radio receiver characteristics measurement.
01.11.01 Sensitivity.
01.11.02 Selectivity.
01.11.03 Fidelity.
01.11.04 Noise figure.

TOPIC: 02 – ELECTRONIC MEASUREMENT: [06]

02.01 Electronic voltmeters (average and peak reading) VTVM.
02.02 Rectifier-Amplifier and amplifier-rectifier type VTVM.
02.03 Transistor voltmeters.
02.04 Differential voltmeter.
02.05 Small current measurement.
02.06 Electronic Galvanometer.
02.07 Electronic frequency meter.
TOPIC: 03 – DIGITAL MEASURING INSTRUMENT:

03.01 Digital Vs. analog systems.
03.02 Diode matrix.
03.03 Digital display system.
03.04 Digital read out system.
03.05 Digital frequency meter.
03.06 Period measurement.
03.07 Time interval measurement.
03.08 Digital voltmeter: Introduction and types.
03.08.01 Ramp.
03.08.02 Integrating.
03.08.03 Potentiometer etc. type.

TOPIC: 04 – INSTRUMENTS FOR GENERATION AND ANALYSIS OF WAVES:

04.01 Basic oscillator circuit.
04.02 Pulse and square wave generator.
04.03 Signal/function generator.
04.04 Signal/function wave analyser.
04.05 Harmonic distortion analyser.
04.06 Spectrum analyser.

TOPIC: 05 – TRANSDUCERS AND SENSORS:

05.01 Introduction and classification.
05.02 Electrical phenomenon employed in transducer.
05.03 Linear variable differential transformer.
05.04 Rotary variable reluctance transducer.
05.05 Variable reluctance transducer.
05.06 Synchros resolvers.
05.07 Tachometer.
05.08 Strain gauges.
05.08.01 Rosette.
05.08.02  Wire wound.
05.08.03  Pirani gauge.
05.08.04  Semi Conductor types.
05.09.    Seismic accelerometer.
05.10.    Thermisters.
05.11    Microphones (different type of introduction only)
05.12    PH measurement transducer.
05.13    Gas analyser.

**TOPIC: 06 – OPTICAL MEASURING INSTRUMENTS:**

06.01  Black body.
06.02  Primary and secondary standards.
06.03  Measurement of lumen intensity.
06.04  Photo emissive cell.
06.05  Photo conductive cell.
06.06  Photo voltaic cell.

**TOPIC: 07– DATA ACQUISITION SYSTEM (DAS):**

07.01  Classification.
07.02  Components of analog DAS.
07.03  Components of digital DAS.
07.04  Uses of DAS.
07.05  Digital to analog converter.
07.06  Analog to digital converter.
07.07  Multiplexing equipment.
07.08  Use of recorder in digital system.
07.09  Encoder.
07.10  Introduction to telemetry equipments.
07.11  P L C and Proframing.
07.12  Weighing system and its element types of weighing system.
Books Recommended:


SCHEME OF EXAMINATION FOR FINAL EXAMINATION

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
Inplant Training and Visit to Works

Subject Code
11317

Sessional
No. of Periods in one session
4 weeks continuous

L T P/S

Full Marks : 100
Annual Exam. : 60
Internal Exam. : 40

Rationale:
A student is required to develop his knowledge skill and attitudes gained while joining through different course. It is desirable to expose the students to the world of work to be familiar with the real life situations and understand the problem there in. The “In plant training and visit to work “being introduced for the final year part time diploma technicians for Electronics Engineering with the above objective in view. This course will help the students to observe how the technical, managerial, quality control safety and other principle, are being applied in real life situation. They will be able to observe the technique of decision making on the shop floor. He will also, be able to observe the technique of decision making on the shop floor. He will, also be able to observe how his sub-ordinate perform in their day to day work and co-ordinate shop floor activities. The course will also, help bring attitudinal changes in a student.

Objective:
A student will be able to:

- Understand the working of the machines, tools and equipments more clearly.
- Write down the specifications of the machines, tools, equipments.
- Know the process of material storing / material management.
- Learn to maintain office records / filing.
- Know the process of planning, implementation and monitoring.
- Learn the skill shop floor co-ordination.
- Know the skill of office management and inventory Control.
- Understand the process of production.
- Know the skill of quality control.
Know the organizational set-up and plant Lay-out.
Find out Characteristics, Functions, and activities of those industries.
Find out opportunities and method of recruitments.
Know the source of raw materials and markets for industries.
Find out the special characteristics of the industries.
Observe and understand special machines, which they may not have been in their institutes.
Observe the energy consumption in on industry method to same energy.
Try to learn techniques to save energy.
Observe the environment Pollutants and learn how to minimize environmental Pollution.

CONTENTS

Student should preferably visit and undergo training in the following industries:-

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Microwave Tower Stations.</td>
</tr>
<tr>
<td>02</td>
<td>Radio Stations.</td>
</tr>
<tr>
<td>03</td>
<td>T. V. Stations.</td>
</tr>
<tr>
<td>04</td>
<td>Telephone Exchange.</td>
</tr>
<tr>
<td>05</td>
<td>Railway Signaling System Station.</td>
</tr>
<tr>
<td>06</td>
<td>Wireless Transmission &amp; Distribution System.</td>
</tr>
<tr>
<td>07</td>
<td>Any other Industry which may be useful to the electronics Engineering technicians and are comfortably situated.</td>
</tr>
</tbody>
</table>

REPORT WRITING:

A report on “In Plant Training” should include

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Introduction.</td>
</tr>
<tr>
<td>02</td>
<td>Plant Lay-out and organization.</td>
</tr>
<tr>
<td>03</td>
<td>Planning for Product/Maintenance/Repair.</td>
</tr>
<tr>
<td>04</td>
<td>Shop floor training.</td>
</tr>
<tr>
<td>05</td>
<td>Testing and quality control facility.</td>
</tr>
</tbody>
</table>
Special observations which are special characteristics of the plant viz. material storing etc.

Conclusion-
- Observations
- Typical Characteristics
- Area of Weakness
- Suggestions

SCHEDULE FOR TRAINING:

- Planning/Office Management - One Week
- Shop floor - Two Weeks
- Testing/Quality Control/Stores - One Week

The report on visit to works should be presented and assessed in the form of Seminar.

SCHEME OF EXAMINATION

Marks Distribution

<table>
<thead>
<tr>
<th>Marks Distribution</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal</td>
<td>40 %</td>
</tr>
<tr>
<td>Regularity</td>
<td>10 %</td>
</tr>
<tr>
<td>Discipline</td>
<td>10 %</td>
</tr>
<tr>
<td>Report</td>
<td>10 %</td>
</tr>
<tr>
<td>Viva</td>
<td>10 %</td>
</tr>
<tr>
<td>External</td>
<td>60 %</td>
</tr>
<tr>
<td>Report/Journal</td>
<td>20 %</td>
</tr>
<tr>
<td>Viva</td>
<td>40 %</td>
</tr>
</tbody>
</table>
# ELECTIVE
Medical Electronics

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>11310(D)</strong></td>
<td>No. of Periods per week</td>
</tr>
<tr>
<td></td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Periods in one session</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60</td>
<td>100</td>
<td>80</td>
</tr>
</tbody>
</table>

## Rationale:

## Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Body Skeleton.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Muscle Physiology.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Heart Physiology.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Respiration.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Neuro Physiology.</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Recording Techniques.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Measurement &amp; Recording of Non-Electrical Systems.</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Electronic Instruments affecting Human Body.</td>
<td></td>
</tr>
</tbody>
</table>
CONTENTS:

**TOPIC: 01 – BODY SKELETON:**

01.01 Nerve Physiology.
01.02 Membrane Potential.
01.03 Action Potential.
01.04 Function of Nerve Junctions.
01.05 Functions of Neo-Neural Junctions.

**TOPIC: 02 – MUSCLE PHYSIOLOGY:**

02.01 Function of Skeleton & Smooth Muscle.
02.02 Function of Cardiac Muscle.
02.03 Cardiac Rhythmic Contraction.

**TOPIC: 03 – HEART PHYSIOLOGY:**

03.01 Introduction to Heart function.
03.02 Blood flow.
03.03 Arterial Pressure.
03.04 E C G.

**TOPIC: 04 – RESPIRATION.**

**TOPIC: 05 - NEURO PHYSIOLOGY:**

05.01 Introduction.
05.02 Function of Spinal Cord.
05.03 Cord Reflexes.
TOPIC: 06 – RECORDING TECHNIQUES:

06.01 Introduction.
06.02 Electro-Cardiac Graph.
06.03 Electro Mypho Graph.
06.04 Electro Encyclo Graph.

TOPIC: 07 – MEASUREMENT & RECORDING OF NON-ELECTRICAL SYSTEMS:

07.01 Measurement & recording of biological parameters.
07.02 Bio-Telemetry.
07.03 Safety while recording.
07.04 Patient monitoring.
07.05 Intensive care unit.
07.06 Special techniques for measurement of non-electrical parameters.

TOPIC: 08 – ELECTRONIC INSTRUMENTS AFFECTING HUMAN BODY:

08.01 Simulator.
08.02 Defibrillator.
08.03 Pace maker.
08.04 Diathermy.
08.05 Blood pumps.
08.06 Myo electric control of paralysed muscles.

Books Recommended:

1. Bio Medical Electronics - Cromwell & others.
## SCHEME OF EXAMINATION FOR FINAL EXAMINATION

**F.M. : 80**

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
ELECTIVE
Mining Electronic

Subject Code
11310(C)

Theory

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L  T  P/S</td>
<td>100</td>
<td>80</td>
<td>20</td>
</tr>
<tr>
<td>3  0  0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Basic Quantity Measurement.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Environmental Measurement.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Sensors.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Telemetering of Gases.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Detectors.</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Transport System Monitoring.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Surveillance of Electrical System.</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Electromagnetic Distance measuring Instruments.</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Special Instruments.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>MIS Systems.</td>
<td></td>
</tr>
</tbody>
</table>
CONTENTS:

TOPIC: 01 – BASIC QUANTITY MEASUREMENT:

01.01 Measurement of temperature.
01.02 Measurement of pressure.
01.03 Measurement of humidity.
01.04 Measurement of Air Velocity.
01.05 Introduction to anemometer.

TOPIC: 02 – ENVIRONMENTAL MEASUREMENT:

02.01 Introduction.
02.02 Monitoring and recording of methane.
02.03 Monitoring and recording of carbon mono-oxide.
02.04 Measuring of Oxygen and other gas quantities.

TOPIC: 03 – SENSORS:

03.01 Classification of gas sensors.
03.02 Solid state sensors.
03.03 Gas analysis.
03.04 Ionisation chamber.

TOPIC: 04 – TELEMENTERING OF GASES:

04.01 Introduction.
04.02 Common ways of telementering of gases.

TOPIC: 05 - DETECTORS:

05.01 Introduction & Classification.
05.02 Early detectors of ground fires.
05.03 Smoke/fire detectors.
05.04 Detection of rock movements.
05.05 Detection of change in pressure.
TOPIC: 06 – TRANSPORT SYSTEM MONITORING:

06.01 Introduction & Classification.
06.02 Tub transport system.
06.03 Conveyer belt transport system.
06.04 NDT for wire ropes.

TOPIC: 07 – SURVEILLANCE OF ELECTRICAL SYSTEM:

07.01 Introduction.
07.02 Surveillance of underground electrical systems.
07.03 Surveillance of ground electrical system.
07.04 Surveillance of communication system.
07.05 Insulation monitoring.
07.06 Fault detection in different section.

TOPIC: 08 – ELECTROMAGNETIC DISTANCE MEASURING INSTRUMENTS:

08.01 Introduction.
08.02 Commonly used instruments.

TOPIC: 09 – SPECIAL INSTRUMENTS:

09.01 Principle of thyristor controlled winders.
09.02 Principles of Shavels.
09.03 Principle of Excavators.

TOPIC: 10 – MIS SYSTEMS:

10.01 Introduction to control dispatch system.
10.02 Signaling in mines.
10.03 Different types of transmitters used in mines.
10.04 Different types of receiver used in mines.
10.05 Important safely signals used in mines.
### Scheme of Examination for Final Examination

**F.M. : 80**

#### Distribution of Marks

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Microwave Tubes.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Microwave Semi Conductor Devices.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Microwave Components and Antennas.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Microwave Transmission.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Microwave Measurements.</td>
<td></td>
</tr>
</tbody>
</table>

CONTENTS:

**TOPIC: 01 – MICROWAVE TUBES:**

01.01 Introduction.
01.02 Microwave frequency band spectrum.
01.03 Klystron.
01.04 Reflex Klystron.
01.05 Travelling Wave tubes.
01.06 Magnetron.
TOPIC: 02 – MICROWAVE SEMI CONDUCTOR DEVICES:

02.01 Microwave Diodes.
02.01.01 Varactor Diodes.
02.01.02 Tunnel Diodes.
02.01.03 Gunn Diodes.
02.01.04 Avalanche effect diodes.
02.02 High frequency limitation of transistors.
02.03 Microwave transistor performance and applications.
02.04 Simulated omission devices.
02.05 M A S E R.

TOPIC: 03– MICROWAVE COMPONENTS AND ANTENNAS:

03.01 Coaxial Lines.
03.02 Wave guides.
03.02.01 Rectangular.
03.02.02 Circular.
03.03 Wave guide corners and Tees.
03.04 Cavity and resonator tuners and windows.
03.05 Directional couplers.
03.06 Filters.
03.07 Terminators.
03.08 Matched loads.
03.09 Attenualtors.
03.10 Phase Shifter.
03.11 Gyrator.
03.12 Circulator.
03.13 Antennas.
03.13.01 Parabolic.
03.13.02 Horn.
03.13.03 Slot.
03.13.04 Lens antennas.
**TOPIC: 04 – MICROWAVE TRANSMISSION:**

04.01 Maxwells equations.
04.02 Modes of propagation in rectangular and circular wave guides.
04.03 Transmission through rectangular wave guide.
04.04 Cut off and guide wavelength.
04.05 Phase and group velocity.

**TOPIC: 05 - DETECTORS:**

05.01 Measurement of impedance.
05.02 Measurement of frequency.
05.03 Voltage standing wave ratio.
05.04 Power attenuation.

**Books Recommended:**

1. Microwave Communication. - Angelkos & Everhar.
2. Foundation of Microwave Communication. - Collins.
5. Microwave Theory & Measurement - Heyward Packard.

**SCHEME OF EXAMINATION FOR FINAL EXAMINATION**

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
# Power Electronics

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>11307</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory</strong></td>
<td></td>
</tr>
<tr>
<td>No. of Periods per week</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>T</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
</tr>
</tbody>
</table>

| No. of Periods in one session | 50 |

| Full Marks | 100 |
| Annual Exam. | 80 |
| Internal Exam. | 20 |

**Rationale:**

**Objective:**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Regulated Power Supply.</td>
<td>(05)</td>
</tr>
<tr>
<td>02</td>
<td>Large Signal Amplifier.</td>
<td>(08)</td>
</tr>
<tr>
<td>03</td>
<td>Thyristors.</td>
<td>(06)</td>
</tr>
<tr>
<td>04</td>
<td>Power Switching Devices and Triggering Circuits.</td>
<td>(07)</td>
</tr>
<tr>
<td>05</td>
<td>A C Power Control and Motor Speed Control.</td>
<td>(05)</td>
</tr>
<tr>
<td>06</td>
<td>Line Commutated Converters.</td>
<td>(04)</td>
</tr>
<tr>
<td>07</td>
<td>Inverters.</td>
<td>(07)</td>
</tr>
<tr>
<td>08</td>
<td>Choppers.</td>
<td>(06)</td>
</tr>
<tr>
<td>09</td>
<td>Speed Control of D. C. Motor.</td>
<td>(01)</td>
</tr>
<tr>
<td>10</td>
<td>Speed Control of A. C. Motor.</td>
<td>(01)</td>
</tr>
</tbody>
</table>

**Total:** (50)
CONTENTS:

**TOPIC: 01 – REGULATED POWER SUPPLY:**

01.01 Sorics Regulators.
01.02 Shunt Regulators.
01.03 Over load and over voltage protection.
01.04 Switching mode regulators.
01.05 Use of 723, 309, 79xx series Ics for regulated power supply.

**TOPIC: 02 – LARGE SIGNAL AMPLIFIER:**

02.01 Introduction.
02.02 Classification.
02.03 Class A, B, AB and C amplifier.
02.04 Harmonic Distortion.
02.05 Transformer Coupled Amplifier.
02.06 Push Pull Amplifier.
02.07 Cross over distortion and its elimination.

**TOPIC: 03 – THYRISTORS:**

03.01 Thyristor family, symbol and working.
03.02 Silicon controlled rectifier operation.
03.03 SCR characteristics.
03.04 Two transistor analogy.
03.05 Methods of turning on.
03.06 Turn off mechanism.
03.07 Device ratings.
03.08 Gate characteristics.
03.09 Series and Parallel operation of SCR.
03.10 Equalising Circuits.
TOPIC: 04 – POWER SWITCHING DEVICES AND TRIGGERING CIRCUITS:

04.01 Diac.
04.02 Triac.
04.03 U J T.
04.04 Relaxation Oscillator.
04.05 Use of Diac and Triac.
04.06 Resistance turn on circuit.
04.07 R C turn on circuit.
04.08 Saturated core turn on circuit.

TOPIC: 05 - A C POWER CONTROL AND MOTOR SPEED CONTROL:

05.01 Phase control.
05.02 Full wave control circuit.
05.03 Half controlled bridge circuit.
05.04 Dual Converters.
05.05 Phase control circuit for regulated power supplies.

TOPIC: 06 – LINE COMMUTED CONVERTERS:

06.01 Line commuted circuit.
06.02 Effect of source impedance.
06.03 Inverter operation.
06.04 Slip power recovery scheme for speed control of induction motor.
06.05 Frequency changer.
TOPIC: 07– INVERTERS:

07.01 Forced commutation inverters.
07.02 Classification of forced commutation.
07.03 Parallel inverter.
07.04 Polyphase inverter.
07.05 Series inverter.
07.06 Self commutated inverter.
07.07 Bridge inverter single and three phase.
07.08 Inverter applications.

TOPIC: 08 – CHOPPERS:

08.01 On off control.
08.02 Rotor on off control chopper circuit.
08.03 Improved on off circuits.
08.04 Step up chopper circuit.
08.05 Multi phase circuit.
08.06 Two quadrant Choppers.
08.07 A C Choppers.

TOPIC: 09 – SPEED CONTROL OF D. C. MOTOR.

TOPIC: 10 – SPEED CONTROL OF A. C. MOTOR.

Books Recommended:

1. SCR - Gentry and Others.
2. Thyristor and Their Application - Ramamoorthy.
5. SCR - Sugandhi and Sugandhi
<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
Power Electronics Lab.

Subject Code
11316

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Series regulated power supply.</td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Shunt regulated power supply.</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Characteristics of S C R.</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Operation of controlled rectifier.</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Study of parallel inverter circuit.</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Study of series inverter circuit.</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Operation of various speed control methods of induction motor.</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Speed control of D C motor.</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Speed control of synchronous motor.</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Operation of magnetic amplifier.</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Input / Output characteristics of OP AMP.</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Amplifier circuit operation using 723 and 309 IC.</td>
<td></td>
</tr>
</tbody>
</table>

CONTENTS

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>02</td>
<td>50</td>
<td>30</td>
<td>20</td>
</tr>
</tbody>
</table>

No. of Periods in one session
50
Project Work and its Presentation in Seminar

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Sessional</th>
<th>No. of Periods in one session</th>
</tr>
</thead>
<tbody>
<tr>
<td>11318</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. of Periods per week</td>
<td>Full Marks : 100</td>
<td></td>
</tr>
<tr>
<td>L   T   P/S</td>
<td>Annual Exam. : 60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internal Exam. : 40</td>
<td></td>
</tr>
</tbody>
</table>

Rationale:

The Project work and its presentation in seminar is an important subject for a Diploma holder technician. The course is designed to help a students develop confidence, skill in report writing, skill to analyse, design, estimating and costing, deciding a process etc, the course will also help in developing communication skill, skill of quality documentation.

Objective:

A student will be able to:

- Identify a Problem
- Analyse the Problem
- Develop logical approach to solution of a Problem.
- Design of a product
- Make estimate of materials and processes and calculate the cost of production and decide the price of the product.
- Manufacture / assemble /fabricate the product in the workshop.
- Test the product for its quality.
- Prepare a project report (Computer printed / typed)
- Present in the form of seminar.
CONTENTS

S.No.   Topics

01   To make a bridge rectifier.
02   To make/assemble a voltage stabilizer.
03   To make/assemble stabilizer for refrigerator.
04   To make a timer circuit IC 555.
05   Electronic Regulator for Ceiling Fan.
06   To fabricate a circuit for characteristics for NPN/PNP transistors.
07   Bi-stable Multivibrator
08   Half & Full adder, substractor & Comparator.
09   8:1 Multiplexer.
10   Realising Railway Signaling System.

REPORT WRITING:
A report must include

S.No.   Topics

01   Introduction.
02   Design.
03   Estimating of materials.
04   Calculation of cost of the materials.
05   Operation time estimation.
06   Cost of Operation.
07   Process of Manufacture / Assembly / fabrication.
08   List of tools/equipments used with specification.

OR
A project on live industrial problems that may be—
  - Technical
  - Human Relation
  - Welfare
  - Safety
  - Any other
The Project Report should consist of :-

01 Introduction.
02 Problem statement.
03 Background of Industry.
04 Organisational set –up.
05 Plant Lay –out.
06 Reason for selecting a problem.
07 Analysis of Problem.
08 Probable solution.
09 Best solution possible.
10 Any other.

Project work/ project report should be presented in the from of a seminar for developing confidence and communication skill among the students.

NOTE:-

Project work will be allotted to the students just in the beginning of the session. Each student will be give a separate work under the supervision of a teacher. Total number of students may be divided among the number of teachers available. The teacher concerned will select separate problem for each student under him and allot it to him at the beginning of the session. The work allotted should be completed with in scheduled time. i.e. by the end of the session. Problems selected should preferably conform to the syllabus. If it is outside of the syllabus then it must be within the field of electronics engineering.
Radio & Television Engineering Lab.

Subject Code
11312

Practical

No. of Periods
per week

Full Marks : 50
Annual Exam. : 40
Internal Exam. : 10

CONTENTS

S.No.        Topics                                                                 Periods
01           Study of operation of CTV.                                             
02           Video tape recorder circuit operation.                               
03           Study of pattern generator.                                           
04           Familiarization with Black and White T. V. Receiver.                  
05           Familiarization with Colour T. V. Receiver.                           
06           Study and serving of CRT, deflection and high voltage section.       
07           Study and serving of horizontal & vertical sections.                  
08           Alignment of I F and frequency response curve.                       
09           Study and serving of sound section.                                   
10           Study and serving of VHF & UHF tuner circuit.                        
11           Study of Chrome section and colour sync. Circuit.                    
12           Study of typical yagi antenna.                                         
13           Study of Remote control circuit.                                       
14           Study of VCR circuit.                                                  
15           Study of video recording room.                                         

SCHEME OF EXAMINATION FOR FINAL EXAMINATION F.M. : 40
# Radio & Telecommunication System

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Elements of Communications.</td>
<td>(06)</td>
</tr>
<tr>
<td>02</td>
<td>Radio Receiver.</td>
<td>(05)</td>
</tr>
<tr>
<td>03</td>
<td>Propagation of Waves.</td>
<td>(08)</td>
</tr>
<tr>
<td>04</td>
<td>Antenna.</td>
<td>(06)</td>
</tr>
<tr>
<td>05</td>
<td>Radar and Navigation Aids.</td>
<td>(08)</td>
</tr>
<tr>
<td>06</td>
<td>Satellite Communication.</td>
<td>(05)</td>
</tr>
<tr>
<td>07</td>
<td>Analog Transmission.</td>
<td>(04)</td>
</tr>
<tr>
<td>08</td>
<td>Digital Transmission.</td>
<td>(04)</td>
</tr>
<tr>
<td>09</td>
<td>Switching.</td>
<td>(06)</td>
</tr>
<tr>
<td>10</td>
<td>Communications in the office.</td>
<td>(04)</td>
</tr>
<tr>
<td>11</td>
<td>Imperfections.</td>
<td>(04)</td>
</tr>
</tbody>
</table>

**Total:** (60)

---

**Rationale:**

**Objective:**

<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Theory</th>
</tr>
</thead>
<tbody>
<tr>
<td>11305</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L T P/S</td>
<td>100</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

No. of Periods in one session: 60
CONTENTS:

**TOPIC: 01 – ELEMENTS OF COMMUNICATIONS:**

01.01 Principle of heterodyning.
01.02 Mixers.
01.03 Converters.
01.04 Radio Transmitters.
01.04.01 Block Diagram.
01.04.02 Operation and performance of AM and FM Transmitters.
01.04.03 Power Supply.

**TOPIC: 02 – RADIO RECEIVER:**

02.01 Block diagram of AM and FM Radio Receivers.
02.02 Principle of Operation.
02.03 Different stages i.e. R. F. Section, I F Stage, Local Oscillator, mixer, tuning, band selection and switch, Volume Control.

**TOPIC: 03 – PROPAGATION OF WAVES:**

03.01 Introduction to various modes of propagation.
03.02 Ground wave propagation.
03.03 Space wave propagation.
03.04 Tropospheric wave propagation.
03.05 Refraction by tropospheric wave.
03.06 Tilt of surface wave.
03.07 Sky wave propagation.
03.08 Ionospheric propagation.
03.08.01 Introduction.
03.08.02 Critical frequency.
03.08.03 Maximum usable frequency.
Characteristics of ionospher.
Virtual height.
SKIP distance.
Tropospheric scattering system.

**TOPIC: 04 – ANTENNA:**

04.01 Introduction.
04.02 Power patterns.
04.03 Radiation intensity.
04.04 Directivity.
04.05 Gain.
04.06 Field Pattern.
04.07 Phase Pattern.
04.08 General equation for field of a point source.
04.09 Introduction to working principle of- Helical, Biconical, Horn, lense, Long wire, Yagi type of Antennas.

**TOPIC: 05 – RADAR AND NAVIGATION AIDS:**

05.01 Radio Direction finding.
05.02 Elements of RADAR System.
05.03 Radar Equation.
05.04 Radar transmitting system.
05.05 Radar antenna and scanning.
05.06 Duplexer.
05.07 Radar Receiver.
05.08 Moving Target Indicator.
05.09 Radar range and becons.
05.10 Instrument landing system.
05.11 Application of infrared techniques to navigational aids.
TOPIC: 06 – SATELLITE COMMUNICATION:

06.01 Introduction.
06.02 Need.
06.03 Low orbitting satellites.
06.04 Geo stationary satellite.
06.05 Choice of frequency bands.
06.06 Satellite broadcasting.
06.07 Remote sensing : basic principle.

TOPIC: 07 – ANALOG TRANSMISSION:

07.01 DC signalling, AC signalling and Band Width, Transmission media, attenuators and repeaters, Modems.

TOPIC: 08 – DIGITAL TRANSMISSION:

08.01 Digital Channels and PCM, Optical Fibre Transmission Systems, Integrated Services Digital Network (ISDN), ISDN Services & Applications, Broad Band Networks.

TOPIC: 09 – SWITCHING:

09.01 Telephone Switching-Strogger : Switching Systems, Crossbar Switching, Electronic space, Division switching, Speech digitization and transmission, Time Division Switching, Optical Fibre Systems, Traffic Engg., Telephone Networks, Data Networks.

TOPIC: 10 – COMMUNICATIONS IN THE OFFICE:

10.01 PBX switching, LAN, Electronic Mail and Document Communications, Enhanced voice and Video Services.
TOPIC: 11 – IMPERFECTIONS:

11.01 Noise and Distortion, Line Failures, Detection and Correction of Data Errors, Delays and Blocking.

Books Recommended:

3. Telecommunications and the Computers, PHI. - James Martin.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
Signal System

Subject Code
11308

No. of Periods in one session
60

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L T P/S</td>
<td>100</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Signals &amp; their representation.</td>
<td>(05)</td>
</tr>
<tr>
<td>02</td>
<td>Introduction to Linear System.</td>
<td>(05)</td>
</tr>
<tr>
<td>03</td>
<td>Fourier Series &amp; Transforms.</td>
<td>(08)</td>
</tr>
<tr>
<td>04</td>
<td>Laplace Transforms.</td>
<td>(06)</td>
</tr>
<tr>
<td>05</td>
<td>Inverse Laplace Transformations.</td>
<td>(07)</td>
</tr>
<tr>
<td>06</td>
<td>Sampled-Data System &amp; the Z-Transformations.</td>
<td>(07)</td>
</tr>
<tr>
<td>07</td>
<td>Mathematical modelling of physical systems.</td>
<td>(06)</td>
</tr>
<tr>
<td>08</td>
<td>State Variable Representation.</td>
<td>(08)</td>
</tr>
<tr>
<td>09</td>
<td>Random Signals.</td>
<td>(04)</td>
</tr>
<tr>
<td>10</td>
<td>Noise.</td>
<td>(04)</td>
</tr>
</tbody>
</table>

Total: (60)
CONTENTS:

**TOPIC: 01 – SIGNALS & THEIR REPRESENTATION:**

01.01 Basic Continuous time Signals.
01.02 Basic discrete time Signals.
01.03 Linear time invariant Signals.
01.04 Random Signals.

**TOPIC: 02 – INTRODUCTION TO LINEAR SYSTEM:**

02.01 Introduction.
02.02 Linear System from a physical point of view
02.03 Linear System from a Mathematical point of view

**TOPIC: 03 – FOURIER SERIES & TRANSFORMS:**

03.01 Fourier series expansion.
03.02 Symmetry expansion.
03.03 Exponential form of Fourier series.
03.04 Fourier Integral & Fourier Transform.
03.05 Analysis by Fourier Methods.
03.06 Gibb’s Phenomena.
03.07 Concept of phase & Frequency spectrum.
03.08 Introduction of discrete Fourier transform of aperiodic and periodic signals.

**TOPIC: 04 – LAPLACE TRANSFORMS:**

04.01 Introduction.
04.02 Conversion from F-transform to L-transform.
04.03 The shifting Theorem & its applications.
04.04 The gate function.
04.05 L-transform of periodic functions.
04.06 L-transform of operations.
TOPIC: 05 - INVERSE LAPLACE TRANSFORMATIONS:

05.01 Introductions.
05.02 Heaviside’s expansion Theorem.
05.03 Analysis of system response.
05.04 Initial & Final Value Theorem.
05.05 The convolution integral.
05.06 The Super position integral.
05.07 Inverse L-transformations of some irrational functions.

TOPIC: 06 – SAMPLED-DATA SYSTEM & THE Z-TRANSFORMATIONS:

06.01 Introduction.
06.02 The Z-transformations.
06.03 Z-transformations of some important functions.
06.04 The shifting Theorem.
06.05 The initial & final value Theorem.
06.06 Introductions to difference equations.
06.07 Solution of difference equations.
06.08 Pulse transfer functions.

TOPIC: 07-- MATHEMATICAL MODELLING OF PHYSICAL SYSTEMS:

07.01 System response & transfer function.
07.02 Block diagram representations.
07.03 Rule for block diagram transformations Signal flow graph.
07.04 Mason’s gain formula & its applications.
TOPIC: 08 – STATE VARIABLE REPRESENTATION: [08]

08.01 Concept of state, state variable & state model, Difference between state variable & phase variable, state model for linear continuous time systems, Transition and resolvant matrix, Solution of state equations, Eigen values & eigen vectors.

TOPIC: 09 – RANDOM SIGNALS. [04]

09.01 Introduction.
09.02 Properties.
09.03 Correlations of signal (Auto-correlation & cross-correlation), gaussian probability density function-gussian noise, white noise.

TOPIC: 10 – NOISE. [04]

10.01 Introduction & type of noise.
10.02 Noise figure, S/N ratio, Calculation of noise figure.

Books Recommended:

### SCHEME OF EXAMINATION FOR FINAL EXAMINATION

**F.M. : 80**

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.
GOVERNMENT OF BIHAR

DEPARTMENT OF SCIENCE & TECHNOLOGY

STATE BOARD OF TECHNICAL EDUCATION

BIHAR, PATNA

COURSE OF STUDY

FOR

PART – III Diploma

IN

Electronics Engineering

THREE YEARS DIPLOMA COURSE
# Provisional

Scheme of Teaching and Examination for 3-years (w. e. f. Session 2003-2004) of
PART-III DIPLOMA in ELECTRONICS ENGINEERING BRANCH

## THEORY

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>SUBJECTS</th>
<th>SUBJECT CODE</th>
<th>TEACHING SCHEME</th>
<th>EXAMINATION – SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Periods per week</td>
<td>Periods in one session (year)</td>
</tr>
<tr>
<td>1.</td>
<td>Professional Studies &amp; Entrepreneurship</td>
<td>00301</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>2.</td>
<td>CADD</td>
<td>11302</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>3.</td>
<td>Electronics Measurement-II</td>
<td>11303</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>4.</td>
<td>Digital Electronics-II</td>
<td>11304</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>5.</td>
<td>Radio &amp; Telecommunication System</td>
<td>11305</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>6.</td>
<td>Microprocessor &amp; Applications</td>
<td>11306</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>7.</td>
<td>Power Electronics</td>
<td>11307</td>
<td>02</td>
<td>50</td>
</tr>
<tr>
<td>8.</td>
<td>Signal System</td>
<td>11308</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>9.</td>
<td>T. V. Engineering</td>
<td>11309</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>10.</td>
<td>Elective*</td>
<td>11310</td>
<td>03</td>
<td>60</td>
</tr>
</tbody>
</table>

Total :- 1000

* A. Advanced Microprocessor  
B. Advanced Instrumentation & Measurement  
C. Mining Electronics  
D. Medical Electronics  
E. Microwave Engineering

## PRACTICAL

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>SUBJECTS</th>
<th>SUBJECT CODE</th>
<th>TEACHING SCHEME</th>
<th>EXAMINATION – SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Periods per week</td>
<td>Periods in one session (year)</td>
</tr>
<tr>
<td>11.</td>
<td>CADD Lab.</td>
<td>11311</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>12.</td>
<td>Radio &amp; T. V. Engineering Lab.</td>
<td>11312</td>
<td>03</td>
<td>60</td>
</tr>
<tr>
<td>13.</td>
<td>Digital Electronics &amp; M. P. Lab.</td>
<td>11313</td>
<td>03</td>
<td>60</td>
</tr>
</tbody>
</table>

Total :- 150

(i)
## SESSIONAL

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>SUBJECTS</th>
<th>SUBJECT CODE</th>
<th>TEACHING SCHEME</th>
<th>EXAMINATION – SCHEME</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Periods per week</td>
<td>Periods in one session(Year)</td>
</tr>
<tr>
<td>14.</td>
<td>Digital Electronics &amp; M. P. Lab.</td>
<td>11314</td>
<td>--</td>
<td>20</td>
</tr>
<tr>
<td>15.</td>
<td>Professional Studies &amp; Entrepreneurship</td>
<td>00315</td>
<td>02</td>
<td>50</td>
</tr>
<tr>
<td>16.</td>
<td>Power Electronics Lab.</td>
<td>11316</td>
<td>02</td>
<td>50</td>
</tr>
<tr>
<td>17.</td>
<td>In Plant Training &amp; Visit to Work</td>
<td>11317</td>
<td>04 weeks Continuous</td>
<td>40</td>
</tr>
<tr>
<td>18.</td>
<td>Project Work &amp; its presentation in Seminar</td>
<td>11318</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total :</td>
</tr>
</tbody>
</table>

| Total Periods per week | 42 | Total Marks = 1500 |
Television Engineering

Subject Code

11309

Theory

<table>
<thead>
<tr>
<th>No. of Periods per week</th>
<th>Full Marks</th>
<th>Annual Exam.</th>
<th>Internal Exam.</th>
</tr>
</thead>
<tbody>
<tr>
<td>L   T   P/S</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3   0   0</td>
<td>100</td>
<td>80</td>
<td>20</td>
</tr>
</tbody>
</table>

No. of Periods in one session: 60

Rationale:

Objective:

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Topics</th>
<th>Periods</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Introduction.</td>
<td>(04)</td>
</tr>
<tr>
<td>02</td>
<td>Monochrome Picture Tube.</td>
<td>(08)</td>
</tr>
<tr>
<td>03</td>
<td>Basic T V Broadcasting.</td>
<td>(08)</td>
</tr>
<tr>
<td>04</td>
<td>T. V. Receiver.</td>
<td>(06)</td>
</tr>
<tr>
<td>05</td>
<td>Colour Television.</td>
<td>(08)</td>
</tr>
<tr>
<td>06</td>
<td>Remote Control.</td>
<td>(04)</td>
</tr>
<tr>
<td>07</td>
<td>Receiver Power Supply.</td>
<td>(05)</td>
</tr>
<tr>
<td>08</td>
<td>Special Circuits.</td>
<td>(06)</td>
</tr>
<tr>
<td>09</td>
<td>Alignment &amp; Servicing Equipments.</td>
<td>(05)</td>
</tr>
<tr>
<td>10</td>
<td>Receiver Servicing.</td>
<td>(06)</td>
</tr>
</tbody>
</table>

Total: (60)
CONTENTS:

**TOPIC: 01 – INTRODUCTION:** [04]

01.01 Elements of T. V. System.
01.02 Analysis and synthesis of T. V. Picture.
01.03 Composite video signal.
01.04 Signal transmission and channel bandwidth.

**TOPIC: 02 – MONOCHROME PICTURE TUBE:** [08]

02.01 Characteristics and required control.
02.02 Camera tubes.
02.02.01 Image orthicon.
02.02.02 Vidicon.
02.02.03 Plumbicon.
02.02.04 Comparison between one another.

**TOPIC: 03 – BASIC T V BROADCASTING:** [08]

03.01 Block diagram of T. V. Transmission.
03.02 Principle of operation.
03.03 T. V. Signal propagation.
03.04 Antennas used for transmission.
03.05 Antenna used for reception.
03.06 Signal repeaters.

**TOPIC: 04 – T. V. RECEIVER:** [06]

04.01 Classification.
04.02 Block diagram.
04.03 Different sections.
04.04 Tuners.
04.05 Choice of I F.
04.06 A G C Circuit.
TOPIC: 05 – COLOUR TELEVISION:

05.01 Compatibility.
05.02 Three colour theory.
05.03 Colour Camera.
05.04 Colour receiver tubes.
05.05 Colour T. V. Transmitter and receiver block diagram.
05.06 Colour signal transmission and reception.
05.07 Different standard systems.
05.08 PAL system details.

TOPIC: 06 – REMOTE CONTROL:

06.01 Introduction.
06.02 Special Circuits.
06.03 Booster amplifier.
06.04 Automatic brightness Control.

TOPIC: 07 – RECEIVER POWER SUPPLY:

07.01 Different types.
07.02 Low voltage power supply circuits.
07.03 High voltage power supply circuits.
07.04 Transistorised power supply.
07.05 Switched mode power supply.

TOPIC: 08 – SPECIAL CIRCUITS:

08.01 Closed circuit T V.
08.02 Cable T. V.
08.03 V C P and V C R Monitors.
08.04 T. V. Games support circuit.
08.05 Tele text.
08.06 Teleconferencing: Introduction only.
TOPIC: 09 – ALIGNMENT & SERVICING EQUIPMENTS:  [05]

09.01 Alignment & Servicing Equipments.
09.02 Pattern generator.
09.03 Sweep generator.
09.04 Vectroscope.
09.05 High voltage probes.

TOPIC: 10 – RECEIVER SERVICING:  [06]

10.01 Troubleshooting procedures for monochrome T. V.
10.02 Troubleshooting procedures for colour T. V.
10.03 Safety precautions.

Books Recommended:

4. Television. - Dhakne.

SCHEME OF EXAMINATION FOR FINAL EXAMINATION  F.M. : 80

<table>
<thead>
<tr>
<th>Types of Questions</th>
<th>DISTRIBUTION OF MARKS</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Test Knowledge</td>
<td>Test Skill</td>
</tr>
<tr>
<td>Objective type</td>
<td>10</td>
<td>05</td>
</tr>
<tr>
<td>Short Answer type</td>
<td>05</td>
<td>10</td>
</tr>
<tr>
<td>Long Answer type</td>
<td>20</td>
<td>10</td>
</tr>
<tr>
<td>Total Marks</td>
<td>35</td>
<td>25</td>
</tr>
</tbody>
</table>

The above table refers to the annual examinations only.