



**MAHARASHTRA STATE BOARD OF TECHNICAL EDUCATION, MUMBAI**  
**TEACHING AND EXAMINATION SCHEME FOR POST S.S.C. DIPLOMA COURSES**

**COURSE NAME : ELECTRONICS ENGINEERING GROUP**

**COURSE CODE : EJ/EN/ET/EX/DE**

**DURATION OF COURSE : 6 SEMESTERS**

**WITH EFFECT FROM 2009-10**

**SEMESTER : FIFTH SEMESTER**

**DURATION : 16 WEEKS**

**PATTERN : FULL TIME - SEMESTER**

**SCHEME : E**

SR. NO.	SUBJECT TITLE	Abbreviation	SUB CODE	TEACHING SCHEME			EXAMINATION SCHEME									
				TH	TU	PR	PAPER HRS	TH (01)		PR (04)		OR (08)		TW (09)		SW (16005)
								Max	Min	Max	Min	Max	Min	Max	Min	
1	Principles of Computer Architecture and Maintenance	PCA	12186	03	--	02	03	100	40	--	--	--	--	25@	10	50
2	Microcontrollers	MIC	12187	03	--	02	03	100	40	50#	20	--	--	25@	10	
3	Digital Communication	DCO	12188	03	--	02	03	100	40	--	--	25#	10	25@	10	
4	Industrial Electronics	IEL	12189	03	--	02	03	100	40	--	--	--	--	25@	10	
5	Audio Video Engineering	AVE	12190	03	--	02	03	100	40	--	--	25#	10	25@	10	
6	Maintenance of Electronic Equipments	MEE	12191	--	--	04	--	--	--	50@	20	--	--	--	--	
7	Professional Practices - V	PPR	12192	--	--	02	--	--	--	--	--	--	--	50@	20	
8	Industrial Project & Entrepreneurship Development	IPD	12193	01	01	02	--	--	--	--	--	--	--	25@	10	
<b>TOTAL</b>				<b>16</b>	<b>01</b>	<b>18</b>	--	<b>500</b>	--	<b>100</b>	--	<b>50</b>	--	<b>200</b>	--	<b>50</b>

Student Contact Hours Per Week: 35 Hrs.

**THEORY AND PRACTICAL PERIODS OF 60 MINUTES EACH.**

Total Marks : 900

@ Internal Assessment, # External Assessment, No Theory Examination.

Abbreviations: TH-Theory, TU- Tutorial, PR-Practical, OR-Oral, TW- Termwork, SW- Sessional Work

- Conduct two class tests each of 25 marks for each theory subject. Sum of the total test marks of all subjects is to be converted out of 50 marks as sessional work (SW).
- Progressive evaluation is to be done by subject teacher as per the prevailing curriculum implementation and assessment norms.
- Code number for TH, PR, OR and TW are to be given as suffix 1, 4, 8, 9 respectively to the subject code.

**COURSE NAME : DIPLOMA IN ELECTRONICS ENGINEERING GROUP**  
**COURSE CODE : ET/EN/EJ/EX/IE/IS/IC/DE/EV/MU/IU/ED/EI**  
**SEMESTER : FIFTH FOR ET/EJ/EN/EX/IS/IC/IE/DE/EV/MU AND SIXTH FOR IU/ED/EI**  
**SUBJECT TITLE : PRINCIPLES OF COMPUTER ARCHITECTURE AND MAINTENANCE**  
**SUBJECT CODE : 12186**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

**NOTE:**

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)

**Rationale:**

The aim of the subject is to teach the basic working of the computer motherboard, peripherals and add-on cards.

The subject helps the students to do the maintenance of the Computer, peripherals and its add-on cards.

The students will be able to select the proper peripheral as per their specification and requirement.

This is the core subject. The pre-requisite of the subject is Microprocessor.

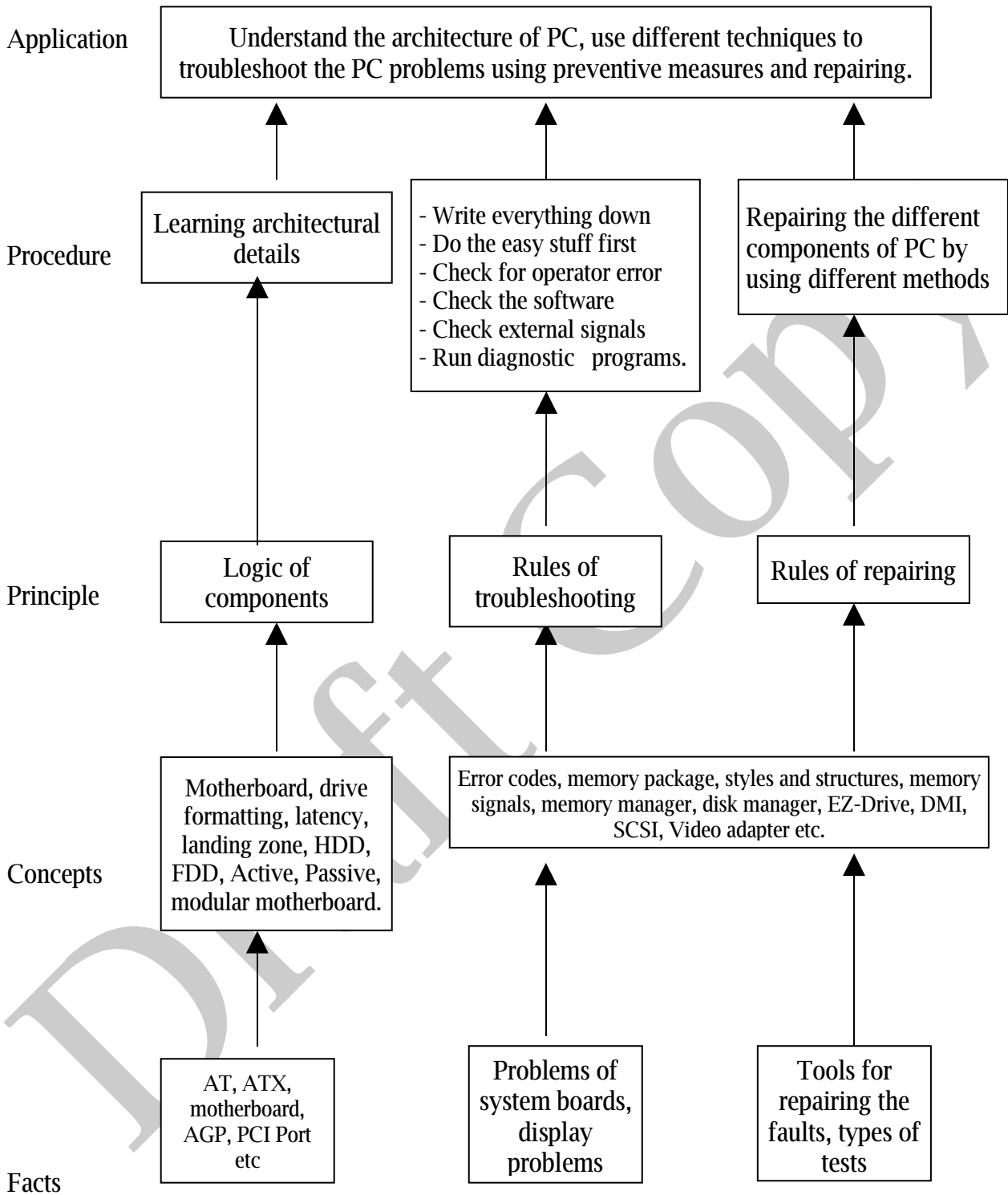
The subject is practical oriented and will develop the debugging skills in the students.

**Objectives:**

The student will be able to:

1. Debug and repair the faults in system.
2. Assemble the system.
3. Load the operating system and device drivers in the system.

**Learning Structure:**



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## Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	<b>Motherboard And Its Components</b> 1.1 Different types of PC configurations and their comparison 1.2 Chipset basic, chipset Architecture : North/South Bridge architecture and Hub architecture 1.3 Architecture of Intel chipset 915 G& 945 G 1.4 Overview and features of ISA, PCI-X, PCI-Xpress, AGP, Processor Bus (no pin description) Comparison between PCI and PCI Express 1.5 Logical memory organization : Conventional memory, Extended memory, Expanded memory (No memory map) 1.6 Concept of cache memory : Internal cache, External cache (L1, L2, L3 cache) 1.7 Overview and features of SDRAM, DDR, SDRAM, DDR2, SDRAM, DDR3 1.8 BIOS Basics	08	16
02	<b>Storage Devices And Its Interfacing</b> 2.1 Recording Technique : RM, MFM, RLL Perpendicular magnetic recording <ul style="list-style-type: none"> <li>✕ Hard disk construction and working</li> <li>✕ Terms related to Hard Disk : Track, Sector cylinder, cluster, Head parking, MBR, Zone recording</li> <li>✕ Formatting, Low level formatting, High level formatting, partitioning</li> </ul> 2.2 Hard disk drive interface : features of parallel AT attachment (PATA), Serial AT Attachment (SATA), External SATA (no pin discription) <ul style="list-style-type: none"> <li>✕ CDROM drive : Construction, recording</li> <li>✕ DVD : Construction, Recording</li> </ul>	08	20
03	<b>Display Devices &amp; Interfacing</b> 3.1 CRT colour monitor : Block diagram and function of each block 3.2 Characteristics of CRT monitor : Dot pitch, Resolution, Video bandwidth, Horizontal scanning frequency, Interlaced versus non interlaced monitor 3.3 Advantages of CRT display over LCD display 3.4 LCD monitor : functional block diagram of LCD monitor, working principal, advantages and disadvantages Types : Passive matrix and Active matrix, Important characteristics : Resolution, Refresh rate, Response time. 3.5 Basic block diagram of a video accelerator card	05	12
04	<b>Input &amp; Output Devices</b> Construction, working & Installation of : 4.1 Keyboard. 4.2 Mouse: Mechanical, Optomechanical, New optical 4.3 Scanner: Types, Flat bed, Block diagram and specifications.	08	16

	4.3 Modem: Internal and External: Block diagram and specifications. 4.4 Printer: Dot matrix, Inkjet, Laser: Block diagram and specifications		
<b>05</b>	<b>Power Supplies</b> 5.1 Block diagram and working of SMPS. 5.2 Signal description and pin diagram of AT and ATX connectors 5.3 Power supply characteristics: Rated wattage, Efficiency, Regulation, Ripple, Load regulation, line regulation 5.4 Power problems : Blackout, Brownout, surges and spikes 5.5 Symptoms of power problems 5.6 Protection devices : Surge suppressor : working 5.7 UPS : Block diagram, working, Types, Rating	<b>04</b>	<b>12</b>
<b>06</b>	<b>Interfaces</b> 6.1 SCSI, SCSI cables and connectors, SCSI drive configuration. 6.2 USB features 6.3 RS232 : (Voltages & 9 pin Signal description) 6.4 Centronics (interface diagram, signals and timing waveform) 6.6 Firewire features	<b>05</b>	<b>12</b>
<b>07</b>	<b>Pc Diagnostic, Testing And Maintenance And Tools</b> 7.1 Preventive Maintenance : Active Preventive maintenance, passive preventiv maintenance, periodic maintenance procedure 7.2 Preventive maintenance of peripherals of PCs. 7.3 Fault finding and troubleshooting of the above peripherals 7.4 ESD (Electrostatic discharge), RFI protection 7.5 Working of logic probe, logic purser, current	<b>10</b>	<b>12</b>
<b>Total</b>		<b>48</b>	<b>100</b>

**Practical:**

Skills to be developed:

**Intellectual Skills:**

1. Sequencing of steps
2. Methods of Fault Finding

**Motor Skills:**

1. Follow Proper Procedure.

**List of experiments:**

1. Study of components of Pentium IV motherboard
2. Study of HDD, its installation and partitioning
3. Study of Display adapter
4. Study of Keyboard
5. Study of Mouse and its types
6. Study of Flat bed scanner

7. Study of printers (Any one type, preferably Laser printer)
8. Study of modems
9. Study of SMPS
10. Study of UPS
11. Study of preventive maintenance of peripherals of PC

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**Learning Resources:****Books:**

<b>Sr. No.</b>	<b>Author</b>	<b>Title</b>	<b>Publisher</b>
01	Mike Meyers, Scott Jernigan	Managing & Troubleshooting PCs	Tata McGraw Hill
02	Bigelow	Bigelow's Troubleshooting, Maintaining & Repairing PCs	Tata McGraw Hill
03	Mark Minasi	The Complete PC Upgrade & Maintenance Guide	BPB Publication
04	D. Balasubramanian	Computer Installation & Servicing	Tata McGraw Hill
05	Scott Mueller	Upgrading & Repairing PCs	Pearson Education



**COURSE NAME : DIPLOMA IN ELECTRONICS ENGINEERING GROUP**  
**COURSE CODE : ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU/IU/ED/EI**  
**SEMESTER : FIFTH FOR ET/EN/EX/EJ/IE/IS/IC/DE/EV/MU AND SIXTH FOR IU/ED/EI**  
**SUBJECT TITLE : MICROCONTROLLERS**  
**SUBJECT CODE : 12187**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	50#	--	25 <sup>@</sup>	175

**NOTE:**

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)

**Rationale:**

This subject comes under the technology area. The prerequisite of this subject is the thorough knowledge of architecture of 8085 Microprocessor and its programming. The peripheral devices of 8085 microprocessor such as PIO 8155 and 8255 and data converters are covered in this subject. The knowledge of interfacing of peripherals will help the students in acquiring the design skills and for applications like stepper motor control and temperature control systems.

The technology of microprocessor has led to a single chip Microcontroller technology. MCS-51 family architecture, details of 8051 Microcontroller and its programming is covered in this subject. Use of assembler and simulator for programming of Microcontroller will make the students equipped for the development of embedded systems.

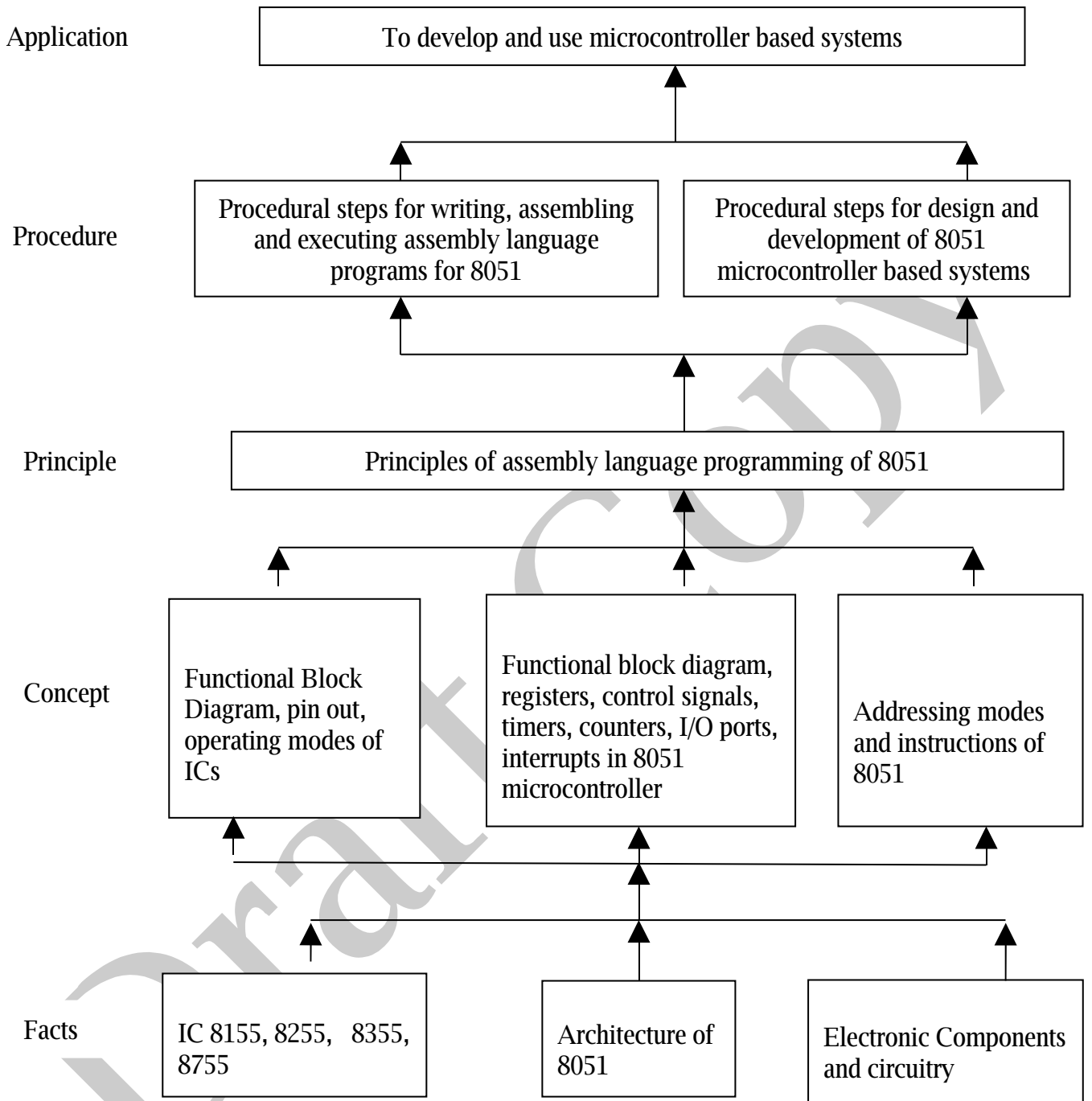
**Objectives:** The student will be able to:

1. Use data transfer techniques.
2. Describe architecture and operation of microcontroller 8051.
3. Develop assembly language programs using instruction set of 8051.
4. Design and develop microcontroller based systems.

5. Explain various applications of microcontrollers.

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**Learning Structure:**



## Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	<b>Peripheral Devices</b> 1.1 Need of peripheral 1.2 Data Transfer Techniques Serial and Parallel Hand shaking, Polling, Interrupt driven & device driven Microprocessor controlled with DMA (Only concept of DMA; no chip details) Synchronous and Asynchronous Simplex & Duplex Baud rate - Define	02	06
02	<b>Programmable I/O Devices</b> 2.1 IC 8155 ô Block Diagram, pin out, operating modes, Simple I/O programs and Interfacing with 8085 Microprocessor. ô Minimum system configuration of 8085 Microprocessor. ô IC 8255 Block Diagram, pin out, operating modes, Simple I/O programs and Interfacing with 8085 Microprocessor. ô Comparison of 8155 & 8255 peripheral. 2.2 Interfacing of A to D Converter with 8085 Microprocessor. 1) Using Handshaking 2) Using interrupts ô Interfacing of D to A Converter with 8085 Microprocessor and pgm for different waveform generation using 8255. ô Practical Applications using 8085 Microprocessor. - For Stepper Motor Control operation - For Temperature Control operation.	12	24
03	<b>Introduction to Microcontroller</b> 3.1 Comparison of Microprocessor, Microcontroller. 3.2 Evaluation of Microcontroller 3.3 Terminology: - RISC, CISC, VLIW, Harvard and Von Neumann Architectures 3.4 Memory types:- EEPROM and FLASH 3.5 Specification & comparison of 8051, 8751 & 8951.	02	04
04	<b>8051 Microcontroller</b> 4.1 MCS-51 Architecture and details (from intel manual) 4.2 Pin configuration and pin function of 8051. 4.3 Function of Clock, Oscillator, Registers, Register bank mapping, DPTR, Flags, Stack, PC, Ports 4.4 Concept of Data Memory and Program Memory 4.5 Connections of External Memory and timing diagram. 4.6 8051 Boolean Processors	14	20
05	<b>MCS-51 Addressing Modes and Instructions</b> 5.1 8051 Addressing modes	08	20

	5.2 8051 Instruction Set 5.3 Simple Programming ( in assembly language)		
<b>06</b>	<b>Assembly language programming</b> 6.1 Development systems tools Editor, Assembler, Linker 6.2 Creating various files to run the 8051 program (asm, obj, lst and hex files) 6.3 8051 Data Types and Directives (DB, ORG, EQU, END etc.) 6.4 Software Simulators of 8051	<b>02</b>	<b>06</b>
<b>07</b>	<b>MCS-51 Timers/Counters, Interrupts and Serial Communication</b> 7.1 Study of Timer SFRs (TMOD, TCON, TLX, THX) 7.2 Timer modes of 8051 and programming of 8051 timers. 7.3 Generation of time delay. Power saving options of 8051 ( study of PCON)	<b>08</b>	<b>20</b>
	<b>Total</b>	<b>48</b>	<b>100</b>

**Practical:**

Skills to be developed:

**Intellectual Skills:**

1. Reading
2. Sourcing of Web sites

**Motor Skill:**

1. Testing
2. Measurement

**List of Practical:**

- 1) 8155 Interfacing :( I/O Mode, Generation of square and sine wave using Timer mode)
- 2) 8255 Interfacing: (I/O Mode and BSR Mode Operations)
- 3) Generation of square, triangular and sine wave using DAC
- 4) Any one application of A to D converter Interfacing.
- 5) Stepper Motor Control
- 6) Addition, Subtraction, Multiplication and Division operations
- 7) Packing and unpacking of 8 bit data
- 8) Finding seven segment code using look up table
- 9) Square wave generation using internal timer of 8051

**Learning Resources:**

**Books:**

Sr. No.	Author	Title	Publisher
01	Deshmukh	Microcontrollers: Theory & Applications	Tata McGraw-Hill

02	Predko	Programming & Customizing 8051 Microcontroller	Tata McGraw-Hill
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**COURSE NAME : DIPLOMA IN ELECTRONICS ENGINEERING GROUP**  
**COURSE CODE : ET/EN/EX/EJ/DE/ED/EI**  
**SEMESTER : FIFTH FOR ET/EN/EX/EJ/DE AND SIXTH FOR ED/EI**  
**SUBJECT TITLE : DIGITAL COMMUNICATION**  
**SUBJECT CODE : 12188**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	25#	25@	150

**NOTE:**

- Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.
- Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)

**Rationale:**

Digital communication systems are becoming increasingly attractive because of ever- growing demand for data communication. Digital transmission offers data processing option and flexibility not available with analog transmission.

This is technology group subject, which will enable student to comprehend facts, concepts & working principle of digital communication system. This subject familiarizes the student with information theory, measurement of information rate & capacity. This subject helps the student to understand the concept of various pulse modulations, Digital modulation techniques, coding methods and error control, multiplexing & multiple access techniques and S.S. modulation. The knowledge acquired by students will help them to apply it in various modern communication systems.

**Objectives:** The students will be able to:

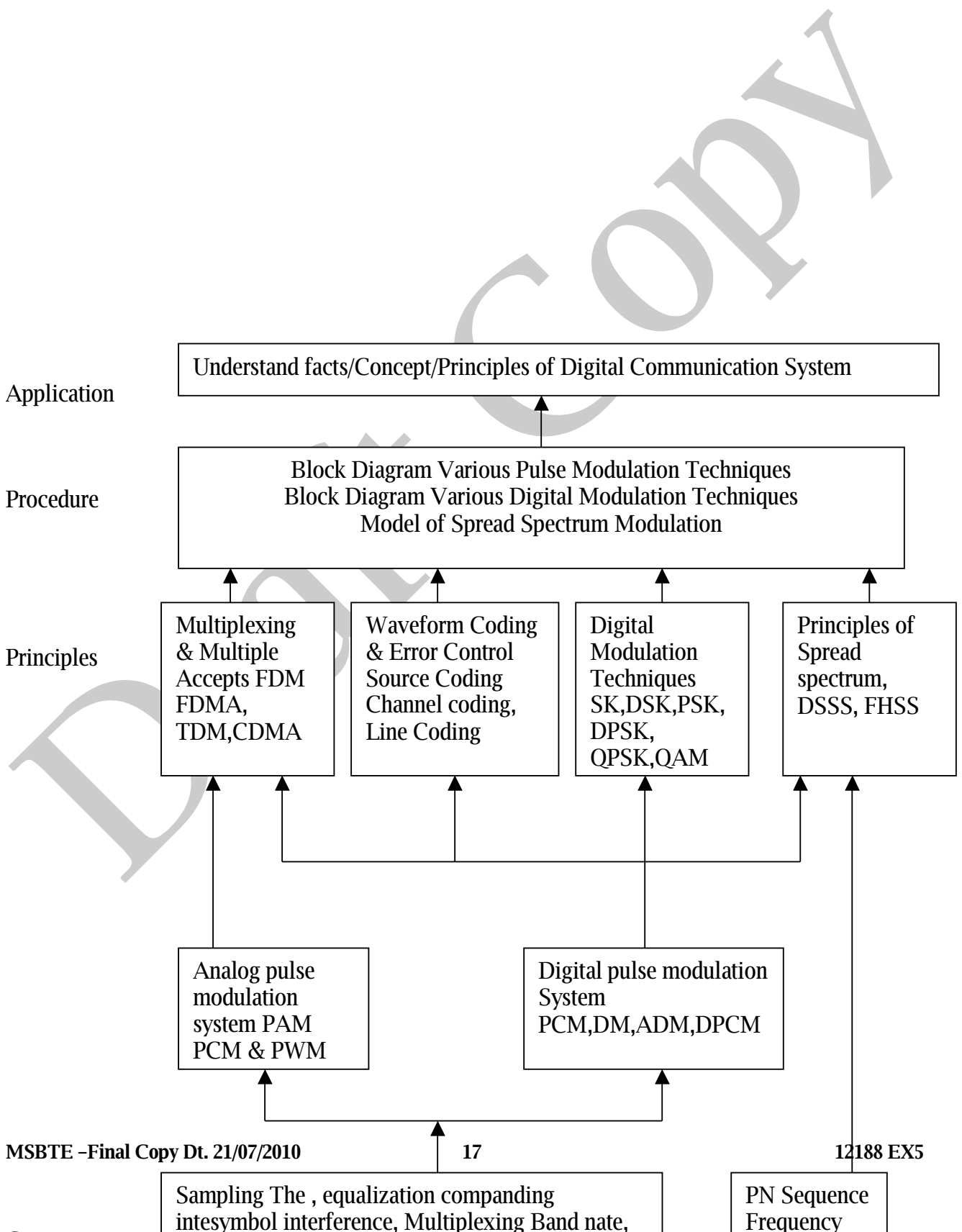
1. Compare analog communication system with digital communication system.
2. Define channel capacity and entropy.
3. Explain sampling theorem.
4. Compare PAM, PWM, PCM.
5. Describe PCM.
6. Draw the block diagram of PCM, DM, ADM, and DPCM.
7. Draw block of PSK transmitter & receiver. Compare ASK, FSK, PSK.
8. Draw block diagram for QFSK, QAM DP

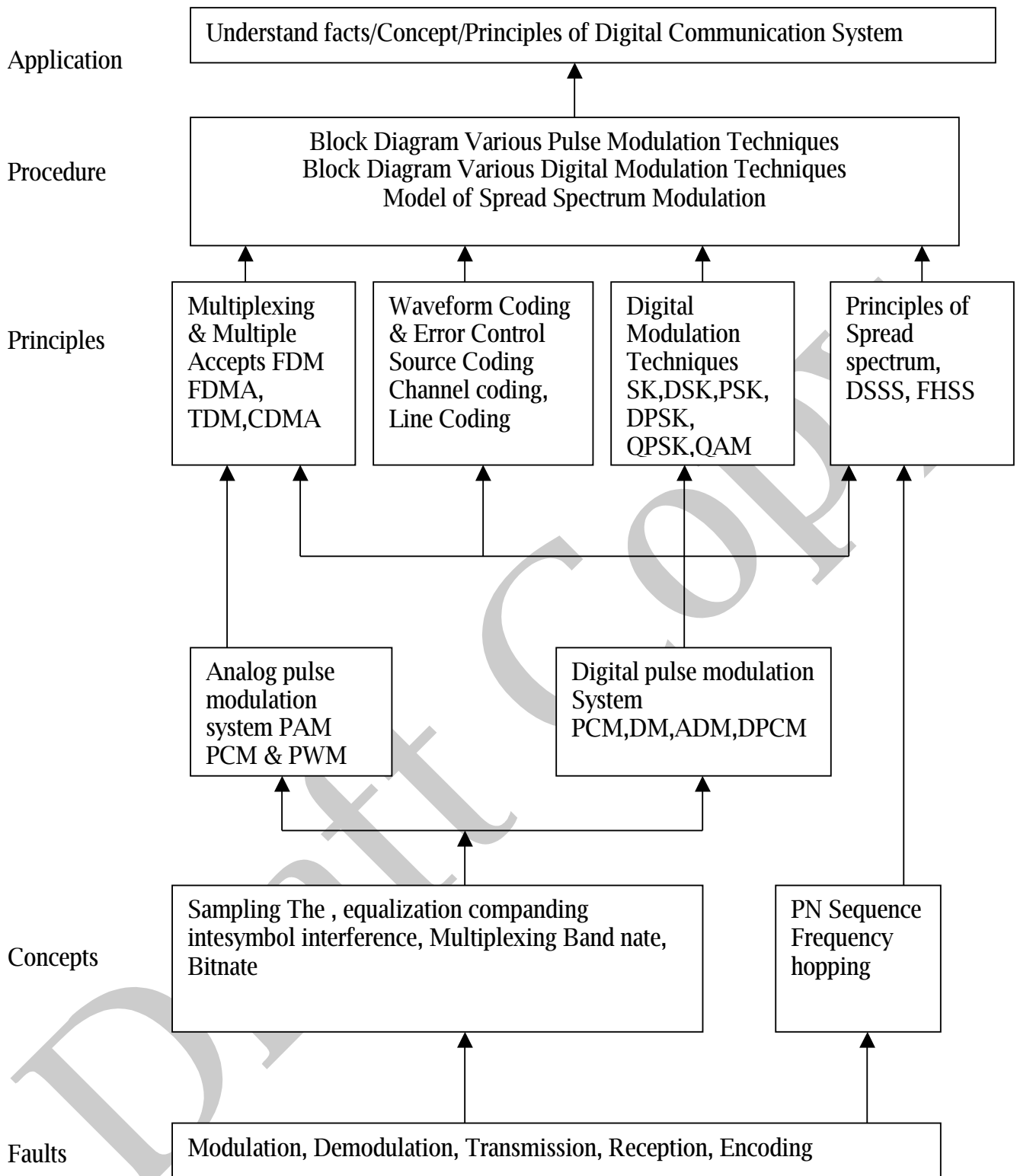
9. Describe the various types of coding methods & error detection and correction.
10. Explain need of multiplexing.
11. Explain concept of TDMA, FDMA, and CDMA.
12. Define PN sequence.
13. Explain spread spectrum modulation.
14. Differentiate Direct sequence spread spectrum signal & frequency spread spectrum.
15. List the application of S.S. modulation.

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**Learning Structure:**





**Contents: Theory**

Chapter	Name of the Topic	Hours	Marks
01	<b>Introduction of Digital Communication</b> 1.1 Basic digital communication system, block diagram 1.2 Channel capacity-definition, Hartley's law, Shannon-Hartley theorem, Channel capacity equation, channel noise and its effect, entropy	04	08

	1.3 Advantages and disadvantages of digital communication		
02	<b>Pulse Communication</b> 2.1 Introduction, comparison with Continuous Wave Modulation, advantages 2.2 Sampling theorem, Nyquist rate, aliasing, natural & flat top sampling. 2.3 PAM, PWM, PPM definition, generation, block diagram, waveform analysis, and their comparison. 2.4 Pulse code modulation- block diagram of PCM transmitter & receiver, sampling quantization, quantization error, companding, inter symbol interference 2.5 Delta modulation- block diagram of DM, slope overload, granular noise. 2.6 ADM, DPCM, block diagram and its working.	14	26
03	<b>Digital Modulation Techniques</b> 3.1 ASK, FSK, PSK definition & waveforms, their transmitter and receiver block diagram and working. 3.2 M-ary encoding. 3.3 QPSK, QAM, DPSK block diagram of transmitter and receiver and working. 3.4 Bandwidth for each modulation technique and their comparison.	12	20
04	<b>Coding methods and Error control</b> 4.1 Baud rate, Bit rate. 4.2 Line coding - unipolar, bipolar -NRZ, RZ, Manchester 4.3 Source coding, ASCII, EBCDIC and baudot code. 4.4 Channel coding, Error, Causes of error and its effects, error detection & correction using parity, Hamming code & simple numerical.	06	16
05	<b>Multiplexing and Multiple Access</b> 5.1 Need of Multiplexing, TDM, FDM definition block diagram and their comparison. 5.2 Introduction to WDM. 5.3 Access technique TDMA, FDMA, CDMA (only concepts), advantages of TDMA over FDMA.	06	14
06	<b>Spread spectrum modulation (Only Descriptive treatment)</b> 6.1 Introduction, PN Sequence. 6.2 Model of spread spectrum modulation system. 6.3 Direct sequence spread spectrum signal. 6.4 Frequency hop spread spectrum, slow frequency hopping, and fast frequency hopping. 6.5 Application S. S. modulations.	06	16
<b>Total</b>		<b>48</b>	<b>100</b>

**Practical:**

Skills to be developed:

Intellectual Skills:

1. Selection of appropriate sample
2. Selection of Equipment

### 3. Interpretation of waveforms

#### Motor Skills:

1. Accurate Observation
2. Setting up of equipment

#### List of Practical:

1. Observe waveforms of Pulse Amplitude modulation (using natural sampling & flat top sampling).
2. Observe waveforms of Pulse width modulation (using natural sampling & flat top sampling)
3. Observe waveforms of Pulse Position modulation (using natural sampling).
4. Observe waveforms of Pulse code modulation and demodulation.
5. Observe waveforms of Delta modulation.
6. Observe waveforms of Adaptive delta Modulation.  
\* Observe waveforms with change in amplitude of modulating Signal & Change in Sampling frequency.
7. Observe waveforms of ASK modulation & demodulation.
8. Observe waveforms of FSK modulation & demodulation.
9. Observe waveforms of PSK modulation & demodulation.
10. Observe waveforms of QPSK modulation & demodulation.
11. Observe waveforms of QAM modulation & demodulation.

#### 12. Any one of the following:

1. Error detection & correction using parity bits.
2. Error detection & correction using hamming codes
3. To generate following different line codes and decode them.

1. NRZ (Unipolar) 2. Bipolar NRZ 3. RZ (Unipolar) 4. Bipolar RZ

#### 13. Any one of the following:

1. Time division multiplexing/ de multiplexing system.
2. Frequency division multiplexing/ de multiplexing system.

#### Learning Resources:

##### Books:

Sr. No.	Author	Title	Publisher
01	Wayne Tomasi	Electronic communication system	Pearson Education
02	Louis E. Frenzl	Electronics Communication	Tata McGraw Hill
03	Roddy Collen	Communication System	Prentice Hall of India
04	Amitabha Bhattacharya	Digital Communication	Tata McGraw Hill
05	K. Sam. & Shanmugar	Digital & Analog Communication	Jhon wiley & sons
06	B. Sklar	Digital Communication Fundamentals & Applications	Pearson Education
07	Siman Haykin	Digital Communication	Jhon wiley & sons
08	J.S. Chitode	Digital Communication	Technical Publication, Pune
09	Fronuzen	Data Communication Networking	Tata Mc-graw Hill

**COURSE NAME : DIPLOMA IN ELECTRONICS ENGINEERING GROUP**

**COURSE CODE : ET/EN/EX/EJ/DE/ED/EI**

**SEMESTER : FIFTH FOR ET/EN/EX/EJ/DE AND SIXTH FOR ED/EI**

**SUBJECT TITLE : INDUSTRIAL ELECTRONICS**

**SUBJECT CODE : 12189**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	--	25@	125

**NOTE:**

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

**Rationale:**

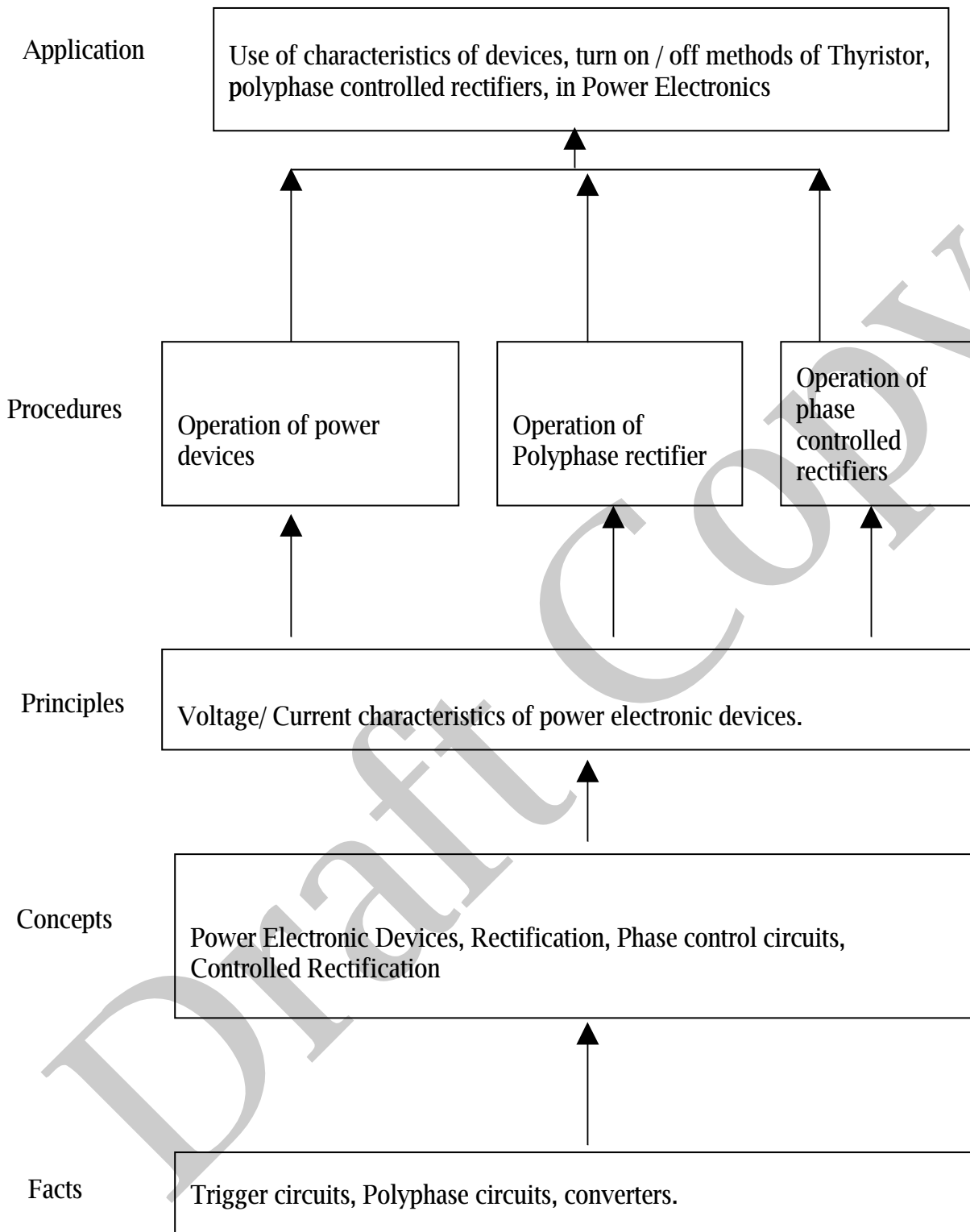
This subject is classified under Technology group. It intends to teach operating principles and applications of power electronic devices like diac, triac, power transistor, power MOSFET, IGBT. It also teaches polyphase rectifiers, and controlled rectifiers. This subject knowledge is required in power electronics and drives. Understanding of this subject will provide skills to control drives and understand various power devices.

**Objectives:**

Student will be able to

1. Draw V/I characteristics of power electronic devices.
2. Describe the turn on / off methods of Thyristor.
3. Draw polyphase controlled rectifiers and their waveforms.
4. Explain working principle of controlled rectifiers.

**Learning Structure:**



## Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	<b>Power electronics</b> 1.1 Introduction to power electronics. 1.2 Power transistor: Structure of vertical power transistor, I- V characteristics of power transistors, second breakdown, SOA: Safe operating Area.	02	04
02	<b>Thyristor family devices</b> 2.1 Brief introduction to Thyristor family devices: TRIAC, SUS, SCS, SBS, LASCR, PUT, GTO. 2.2 Construction, Symbol, working and static V/I characteristics of UJT, PUT, SCR, Diac, Triac, IGBT, MOS controlled thyristors, GTO. The two transistor analogy of SCR.	10	22
03	<b>Turn ON and Turn OFF methods of Thyristor</b> 3.1 Introduction to Turn ON and Turn OFF methods of Thyristor. 3.2 Turn on methods –Forward Voltage triggering, Gate triggering, dv/dt triggering, thermal triggering of Thyristor. 3.3 Gate trigger circuits –General block diagram of a thyristor gate trigger circuit, Resistance firing circuit, Resistance Capacitance firing circuit, Resistor Capacitor full wave trigger circuit. SCR triggering using UJT, PUT. Synchronised UJT triggering. 3.4 Thyristor Turn OFF methods –Class A, B, C, D, E, F. 3.5 Introduction to chopper 3.5.1 Classification and brief working of step and step down chopper	16	34
04	<b>Polyphase Rectifiers</b> 4.1 Need and Use of Polyphase Rectifiers. 4.2 Circuit diagram and waveforms of 4.2.1 Three phase half wave Delta –Wye rectifier 4.2.2 Six phase star half wave rectifier 4.2.3 Three phase Delta –Wye Bridge Rectifier	04	08
05	<b>Phase controlled Rectifiers</b> <b>Circuit diagram and waveforms of:</b> 5.1 Single phase half wave controlled rectifier (one - quadrant) with R, RL load. Effect of free wheeling diode. 5.2 Single phase full wave controlled rectifier (two –quadrant converters) 5.2.1 Midpoint converters (M 2 connection) R, RL load. Effect of free wheeling diode. 5.2.2 Bridge configurations (B 2 connection) 5.2.3 Fully controlled bridge circuit with inductive load (R L load) 5.2.4 Rectifying mode 5.2.5 Inverting mode 5.2.6 Single Phase half controlled Bridge rectifier i. Half controlled bridge rectifier with Resistive load ii. Half controlled bridge rectifier with R L load	16	32

	(No mathematical derivations) 5.3 Introduction and classification of inverter 5.3.1 Working principal and operation of series, parallel inverter		
<b>Total</b>		<b>48</b>	<b>100</b>

**Practical:**

Skills to be developed:

**Intellectual skills:**

- 1) Able to select proper instruments
- 2) Compare the characteristics under various conditions

**Motor skills:**

- 1) Make accurate measurements
- 2) Adjust the meters to read zero at start
- 3) Draw graphs

**A) List of Practical:**

- 1) To plot V/I characteristics of Diac.
- 2) To plot V/I characteristics of Triac.
- 3) To plot V/I characteristics of SCR.
- 4) To find out values of latching and Holding current of SCR.
- 5) To plot V/I characteristics of IGBT.
- 6) To study SCR phase control circuit.
- 7) To study full wave mid -point circuit with resistive load.

**B) Mini project:**

- 1) Synchronized UJT triggering circuit.
- 2) Develop light dimmer circuit using diac and Triac.

**Learning Resources:**

**Books:**

Sr. No	Author	Title	Publisher
01	M D Singh K B Khan Chandani	Power Electronics	Tata McGraw-Hill
02	Muhammad H. Rashid	Power Electronics Circuits Devices and Applications	Prentice Hall of India
03	G K Mithal Dr Manisha Gupta	Industrial and Power Electronics	Khanna Publishers
04	S N Biswas	Industrial Electronics	Dhanpat Rai and Sons
05	Harish C. Rai	Industrial and Power Electronics	Umesh Publications



**COURSE NAME : DIPLOMA IN ELECTRONICS ENGINEERING GROUP**

**COURSE CODE : ET/EN/EX/EJ/DE/ED/EI**

**SEMESTER : FIFTH FOR ET/EN/EX/EJ/DE AND SIXTH FOR ED/EI**

**SUBJECT TITLE : AUDIO VIDEO ENGINEERING**

**SUBJECT CODE : 12190**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
03	--	02	03	100	--	25#	25@	150

**NOTE:**

- **Two tests each of 25 marks to be conducted as per the schedule given by MSBTE.**
- **Total of tests marks for all theory subjects are to be converted out of 50 and to be entered in mark sheet under the head Sessional Work. (SW)**

**Rationale:**

The state of the art in Audio & Video system will enable the students to comprehend, the fact, concept, working principle and its application in various types of modern electronic system. The knowledge acquired by students will help them to be familiar with designing concepts and repairing of audio & video system.

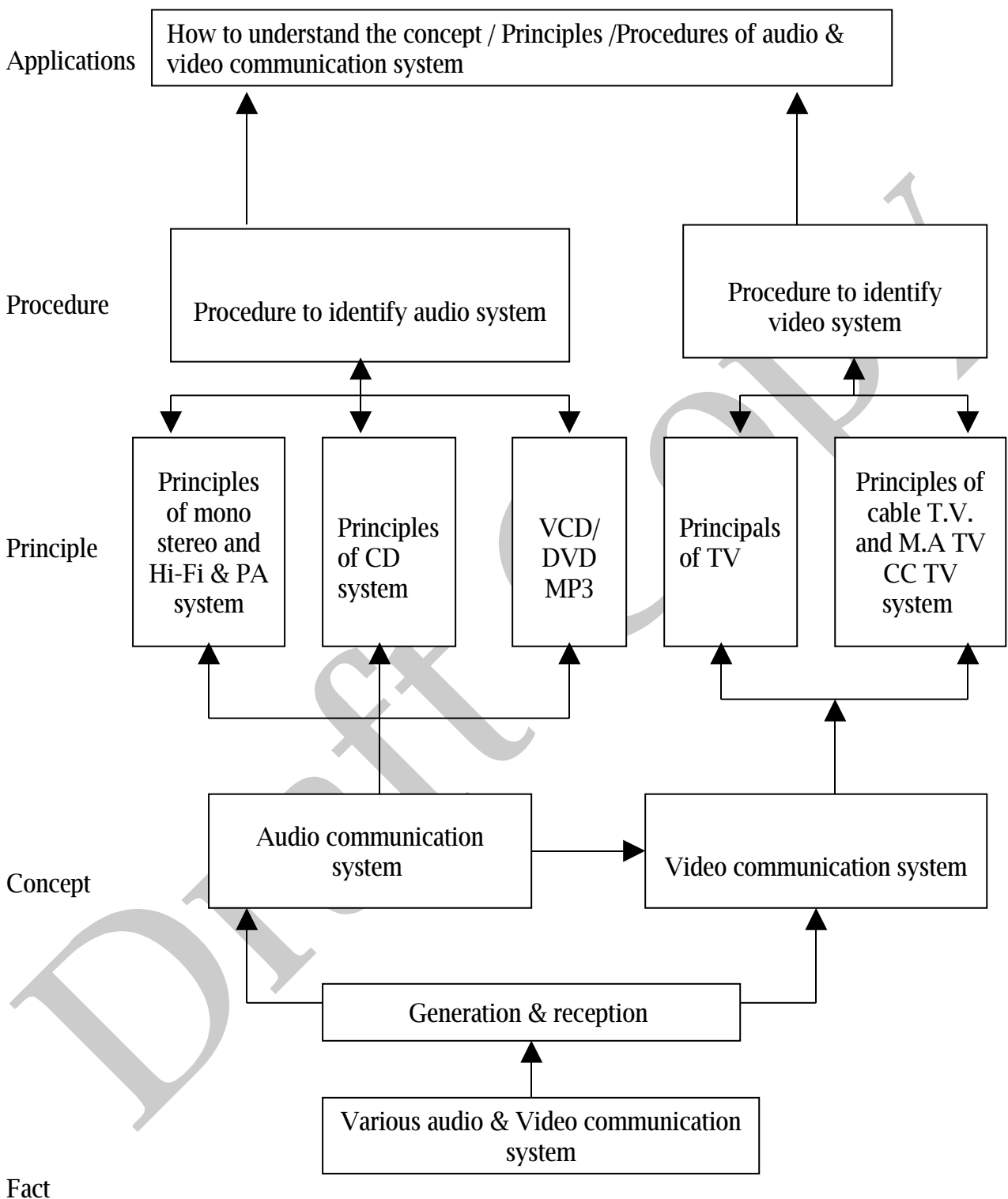
The low cost video system VCR, cameras have brought about video revolution in the field of home entertainment, education, training, advertising and electronic newsgathering. Dramatic developments in flat panel display, reduction in the cost of image scanning system, LCD display and integrated subsystems is going to affect our communication capabilities and life-style in a big way. This revision had to take into account all these wider implications.

**Objectives: The student will be able to:**

1. Describe the basic idea & fault finding about the audio amplifier which are used in office, public places to address the people.
2. Digital & stereophonic sound system including graphic equalizer, Distinguish between stereo & Hi-fi Amplifier.
3. CD player mechanism & fault finding in CD player with advance technique MP3 player & DVD unit.
4. Colour Television details & fault finding in color Television system.

5. This will also touch the advance topic of the plasma LCD Television system & flat panel display.

**Learning Structure:**



## Contents: Theory

Chapter	Name of the Topic	Hours	Marks
01	<b>Hi Fi Audio Amplifier</b> 1.1 Introduction to Amplifiers: Mono, Stereo, Public Address. 1.2 Difference between stereo amplifier & Mono amplifier. 1.3 Block diagram of Hi Fi amplifier & explanation 1.4 Controls available on it & its function & other facility available on it like (Mic in, Aux.in, earphone in) 1.5 Graphic equalizer concept, circuit diagram and operation. (5 Point Circuit diagram) 1.6 Dolby NR recording system 1.7 Types of speaker –its comparison only I) woofer, II) Mid-range, III) Tweeter 1.8 Cross over network circuit & its function	07	12
02	<b>CD player</b> 2.1 CD –material used, size 2.2 Block diagram of CD player & explanation. 2.3 Principle & working of detection used in CD player. 2.4 Component used for CD mechanism. I) CD pick-up assembly, II) gear system, III) drive motors, IV) CD lens. 2.5 Function of controls. 2.6 Parts, function of remote control (transmitter unit) & function of receiver used in CD player. 2.7 Advantages of florescent display system used in CD player.	07	12
03	<b>TV Fundamentals</b> 3.1 Concept & explanation of following: Aspect ratio, image continuity, interlace scanning, scanning periods –horizontal & vertical, vertical resolution, horizontal resolution. 3.2 Vestigial sideband transmission, bandwidth for Colour signal, brightness, contrast, viewing distance luminance, hue, saturation, compatibility. 3.3 Colour theory, primary colors & secondary colors, Grassman's law, additive Colour mixing subtractive Colour mixing. 3.4 Composite Video Signal explain with waveform: Pedestal height, Blanking pulse, Colour burst, Horizontal sync pulse details, Vertical sync pulse details, Equalizing pulses, CCIR B standards for Colour signal transmission & reception. 3.5 TV channel allocation for band I & band III.	08	20
04	<b>TV Transmitters &amp; Receiver</b> 4.1 Audio and Video signal transmission 4.2 Positive and Negative modulation 4.3 Merits and Demerits of Negative modulation 4.4 Introduction to television camera tube (working & principle only) a) Vidicon b) Plumbicon	08	16

	<p>c) Solid State camera based on CCD.</p> <p>4.5 Color Picture tube (working &amp; principle only).</p> <p>a) PIL</p> <p>b) Delta gun picture tube.</p> <p>4.6 Block diagram of monochrome TV transmitter (Function of each block)</p> <p>4.7 Block diagram of Colour TV transmitter.</p> <p>4.8 Block diagram of monochrome TV Receiver.</p>		
05	<p><b>Colour TV</b></p> <p>5.1 :</p> <ul style="list-style-type: none"> <li>- Block Diagram &amp; operation of color TV receiver (PAL D type)</li> <li>- Explain Yagi Uda Antenna.</li> <li>- Explain block diagram of PAL-D decoder.</li> </ul>	12	16
	<p>5.2 :</p> <ul style="list-style-type: none"> <li>- Circuit diagram of chroma signal amplifier, Burst pulse blanking, Colour killer control, Basic Circuit for Separation of U &amp; V signals. ACC Amplifier. Colour signal matrixing, RGB drive amplifiers.</li> <li>- EHT generation: circuit explanation for line output stage using transistor or IC in Colour TV.</li> <li>- Comparisons between NTSC, PAL &amp; SCAM Systems.</li> </ul>		08
06	<p><b>Cable Television</b></p> <p>6.1 Working principle &amp; specification of following components: Dish antenna, LNBS, Multiplexer, Attenuators Connectors (two ways &amp; three ways), Amplifier &amp; cable.</p> <p>6.2 MATV, CATV &amp; CCTV.</p> <p>6.3 Design concept for cable TV network.</p> <p>6.4 Block diagram of dB meter with working principle.</p> <p>6.5 Direct to Home System (DTH) Introduction &amp; Block Diagram</p>	06	16
<b>Total</b>		<b>48</b>	<b>100</b>

**Practical:**

**Intellectual Skills:**

1. Reading
2. Sourcing of Web sites

**Motor Skill:**

1. Testing
2. Measurement

**List of Practical:**

1. Study and observe the given component layout of a Hi Fi amplifier system.
  - a) Trace the output stage of given Hi Fi amplifier system.
  - b) Voltage analysis of a given Hi Fi amplifier.
2. Fault Finding (three different faults) in a Hi Fi Audio amplifier:
  - a) By Signal injection method.

- b) Confirmation of faulty stage by voltage analysis method.
3. To plot frequency response of graphic equalizer
  4. Draw and study drive mechanism layout of CD Player.
  5. Fault finding in CD player (Three different faults)
  6. Tracing of chroma section in given TV receiver.
  7. Tracing of picture tube and video amplifier in given TV receiver with multimeter.
  8. Tracing of horizontal section in given TV receiver with multimeter.
  9. Voltage analysis of picture tube, chroma section and horizontal section.
  10. Fault finding in given Colour TV :
    - a) No color b) Red Colour only c) Blue color only d) Green color only.
    - e) Magenta color only f) Cyan only g) Yellow only h)No raster. No Sound.
  11. a) Fault in HSYNC section.  
b) Fault in VSYNC section.
  12. Fault in SYNC separator.
  13. Installation of DTH System.
  14. Estimate the cost, layour of Cable TV.
  15. Collect information about Set Top box used for Cable TV at home.

**Learning Resources:**

**Books:**

Sr. No.	Author	Title	Publisher
01	A.M Dhake	Television & Radio Engineering	Tata McGraw-Hill
02	R.G Gupta	Television Engg and Video System	Tata McGraw-Hill
03	R.G Gupta	Audio Video Systems	Tata McGraw-Hill
04	R.R Gulati	Modern TV Pratices	New age International
05	S. Sharma	Basic Radio and Television	Tata McGraw-Hill
06	R.R Gulati	Colour Television Principles and Pratices	New age International
07	Bernard Grob	Basic Television and Video System	Tata McGraw-Hill
08	R.R Gulati	Mono Chrome and Colour Television	New age International
09	Manohar Lotia	Modern CD Player Servicing Manual	BPB Publication

**COURSE NAME: DIPLOMA IN ELECTRONICS ENGINEERING GROUP (EXCEPT EV)**

**COURSE CODE : ET/EN/EJ/EX/IE/IS/IC/DE/MU/ED/EI/IU**

**SEMESTER : FIFTH FOR ET/EN/EJ/EX/IE/IS/IC/DE/MU AND SIXTH FOR  
ED/EI/IU**

**SUBJECT TITLE: MAINTENANCE OF ELECTRONIC EQUIPMENTS**

**SUBJECT CODE: 12191**

### Teaching and Examination Scheme

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS.	TH	PR	OR	TW	TOTAL
--	--	04	--	--	50 @	--	--	50

#### Rationale:

This subject will develop the basic skills of maintenance of electronic equipments also provides the necessary knowledge and competence in fault finding, systematic repair of electronic test equipment.

Also give the knowledge of maintenance management of service dept/ service enterprises working in industry / as a profession.

#### Objective:

Students will be able to:

1. To develop tracing, testing, maintenance and trouble shooting knowledge.
2. To develop analysis of circuit working
3. To develops different fault finding technique like, visual inspection, Tracing voltage analysis , Signal analysis
4. Able to find the equivalent components with the help of data book.
5. Effective use of internet
6. Effective use of computer, operation manual, service manual.

**Contents:**

Chapter	Name of the Topic	Hours
01	<p><b>Reliability aspects of electronic equipment</b></p> <ul style="list-style-type: none"> <li>▪ Traditional bathtub reliability curve</li> <li>▪ Generalized reliability curve</li> <li>▪ Mean time to fail</li> <li>▪ Failure rate</li> <li>▪ Mean time between failure</li> <li>▪ Mean time to repair</li> <li>▪ Mean time to restore system</li> <li>▪ Thermal acceleration</li> <li>▪ Electrical acceleration</li> <li>▪ Damp heat acceleration</li> <li>▪ Practical reliability</li> <li>▪ Quality standards</li> <li>▪ Maintenance policy</li> <li>▪ Preventive maintenance</li> <li>▪ Corrective maintenance</li> <li>▪ Qualitative Maintenance</li> </ul>	04
02	<p><b>Maintenance Management</b></p> <ul style="list-style-type: none"> <li>▪ Maintenance policy</li> <li>▪ Equipment service options</li> <li>▪ Types of contract</li> <li>▪ General contract provision</li> <li>▪ Maintenance organization</li> <li>▪ Training Maintenance Personal</li> <li>▪ Planning of spare parts inventory</li> <li>▪ Assessing spare parts requirement</li> <li>▪ Essentials of a good equipment management programme</li> <li>▪ Planning for new equipment</li> <li>▪ Acquisition process</li> <li>▪ Planning of utilities</li> <li>▪ Incoming inspection</li> <li>▪ Inventory control</li> <li>▪ User training</li> <li>▪ Technical training</li> <li>▪ Management of service manual and reference library</li> <li>▪ Maintenance Arrangement</li> <li>▪ Calibration Check</li> <li>▪ Preventive Maintenance</li> <li>▪ ALERT Issue</li> <li>▪ Quality Assurance</li> <li>▪ Installation procedure</li> <li>▪ Environmental considerations</li> <li>▪ Humidity</li> <li>▪ Altitude</li> <li>▪ Shock and vibrations</li> </ul>	10

	<ul style="list-style-type: none"> <li>▪ Protection from electro-magnetic interference</li> <li>▪ Safety</li> <li>▪ Service and maintenance laboratory</li> <li>▪ Work bench</li> <li>▪ Power for work bench</li> <li>▪ Lighting</li> <li>▪ Storage</li> <li>▪ Maintenance system overview</li> <li>▪ Log book</li> <li>▪ Performa for recording specifications</li> <li>▪ Performa for preventive maintenance</li> <li>▪ Performa for corrective maintenance</li> <li>▪ Data Analysis</li> <li>▪ Information Tags</li> <li>▪ Personal Safty</li> </ul>	
03	<p><b>Fundamental Troubleshooting Procedure</b></p> <ul style="list-style-type: none"> <li>▪ Reading of block diagram</li> <li>▪ Reading of circuit diagram</li> <li>▪ Reading of working diagram</li> <li>▪ Di-assembly</li> <li>▪ Re-assembly</li> <li>▪ Trouble shooting process</li> <li>▪ Fault establishment</li> <li>▪ Fault correction</li> <li>▪ Fault finding aids</li> <li>▪ Service, Maintenance &amp; Instruction manuals</li> <li>▪ Test and measuring Tools</li> <li>▪ Pre Trouble shooting technique</li> <li>▪ Preliminary observation</li> <li>▪ Functional area approach</li> <li>▪ Split half method</li> <li>▪ Divergent path</li> <li>▪ Convergent path</li> <li>▪ Feed back path</li> <li>▪ Systematic troubleshooting checks</li> <li>▪ Check control selting</li> <li>▪ Checks associated equipments</li> <li>▪ Visual check <ul style="list-style-type: none"> <li>▪ Calibration</li> <li>▪ Isolates the troubling circuit</li> <li>▪ Measurement</li> <li>▪ Individual components</li> </ul> </li> </ul>	14
04	<p><b>Trouble shooting procedure</b></p> <ol style="list-style-type: none"> <li>1. Visual inspection</li> <li>2. Measure <ul style="list-style-type: none"> <li>▪ Voltage levels</li> <li>▪ Presence of signal &amp; the signal waveform</li> </ul> </li> <li>3. Component failure</li> </ol>	02



	<ul style="list-style-type: none"> <li>▪ Out of circuit test</li> <li>▪ In circuit Test</li> </ul> <p>4. Signal Tracing</p> <p>5. Functional analysis</p>	
05	<p><b>Trouble shooting aids</b></p> <p><b>Tools</b></p> <ul style="list-style-type: none"> <li>▪ Service manual</li> <li>▪ Circuit diagram</li> <li>▪ Circuit board location</li> <li>▪ Voltage analysis</li> <li>▪ Fault finding flow check</li> <li>▪ Diagnostic software</li> <li>▪ List of replace able parts</li> </ul> <p><b>Data manuals</b></p> <p>Trouble shooting technique</p> <ul style="list-style-type: none"> <li>▪ Voltage analysis</li> <li>▪ Signal injection</li> <li>▪ Signal tracing</li> </ul>	02
<b>Total</b>		<b>32</b>

**Note:** Theory is to be covered during Practical Period

**Practical:**

1. Testing of resister, capacitor and inductance by using multimeter and LCR meter, CRO.
2. Testing of Transistor by using multimeter and transistor TESTER, CRO
3. Testing of IC using IC tester
4. Testing of variable resistors, connector, switches, by using multimeter.
5. Testing of diodes, zener diode, varactor diode, VDR, Photo diode, Tunnel diode, LDR, Thermister, 7 segment display, FET, MOSFET, SCR, Triac with help of multimeter (testing Zig)
6. LAY OUT OF Components in given power supply
  - Tracing of voltage regulation section in given power supply
  - Voltage analysis in given power supply
  - Fault finding in given power supply by voltage analysis method
  - Fault finding in power supply by voltage analysis method.
7. LAYOUT of components for given function generator
  - Tracing of alternation section used in function generator
  - Voltage analysis in given function generator
  - Fault finding in function generator by voltage analysis method
  - Fault finding in function generator by voltage analysis method
  - Fault finding in function generator by voltage analysis method.
8. Layout of components for given CRO
  - Tracing a vertical section used in CRO
  - Voltage analysis in CRO
  - Signal Tracing in CRO
  - Fault finding in CRO by voltage analysis method

- Fault finding in CRO by voltage analysis method
  - Fault finding in CRO by voltage analysis method
  - Fault finding in CRO by signal Tracing method.
9. Visit web site to get information about manufactures, Specification and cost. Which will be filled in tabular form for following measurement and Testing equipments ( ANY 5)
1. logic analyzer
  2. logic probe
  3. logic pulser
  4. logic chip
  5. Waveform generator
  6. Pattern generator
  7. IC Tester
  8. Curve Tracer
  9. RF power meter
  10. Field strength meter
  11. Distortion factor meter
  12. Accessories for SMD soldering and disordering
  13. Soldering & disordering station
  14. Digital storage oscilloscope
  15. Spectrum analysis
10. Draw the layout with the help of computer
1. Performa for recording specification in log book
  2. Performa for preventive maintenance
  3. Performa for corrective maintenance
  4. Performa for data analysis
  5. Layout for service department
  6. Layout for store department
  7. Layout for servicing table
11. Find equivalent components by using data book/ Internet (at least five components in each type)
1. Transistors
  2. Diodes
  3. FET/MOSFET
  4. IC TTL
  5. IC CMOS
12. Prepare fault finding flow chart using computer (at least for two faults in each equipments)
- Power supply
  - Function generator
  - CRO
13. Collect the catlog from market/ Internet and write down the information about specification manufacture, cost for the following (at least five from each group)

(A)

Resister

Capacitor

Inductors

Transformer

LCD Display

LED Display

Microprocessor

Micro controller

Diode  
Darlington Tr  
FET  
MOSFET  
IGBT  
Photo devices  
TTL IC  
CMOS IC  
Thyristors

Switches  
Fuses  
IC Sockets  
Solder materials  
Soldering station  
Desolder (widing pump)  
heak sink

**(B)**

Pliers  
Cutters  
Spanners (Wrenches)  
Screw drivers  
Jewelers screw drivers  
Hack jaw  
Hand drill & drills  
Files

Hand held power tools & whole complement of drilling, grinding, polishing, soldering and cutting attachment

**(C)**

Brushes  
Blades  
Sponge  
Inspection mirror  
Magnifying glass  
Thread  
Sleeves

**(D)**

Contact cleaners  
Control cleaners  
Lubricants (WD40, LPSI)  
Flux remover  
Tunner cleaner  
Adicheives  
Solvent release  
Silicon rubber

**Industrial Visit:**

1. Any service dept. in electronic factor
2. Any service enterprises in your city related with electronic goods.

**Learning Resources:**

**Books:**

Sr. No.	Author	Title	Publication
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01	R.G. Gupta	Electronic Instruments & System	Tata MacGraw Hill
02	R.S. Khandpar	Trouble Shooting Electronic Equipment	Tata MacGraw Hill
03	G.C. Loveday	Electronic Testing & Fault Diagonis	Longman scientific and technical

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**COURSE NAME : DIPLOMA IN ELECTRONICS ENGINEERING GROUP**  
**COURSE CODE : ET/EJ/EN/EX/DE/IE/IC/IS/EV/MU/ED/EI/IU**  
**SEMESTER : FIFTH FOR ET/EJ/EN/EX/DE/IE/IC/IS/EV/MU AND SIXTH FOR ED/EI/IU**  
**SUBJECT TITLE : PROFESSIONAL PRACTICES-V**  
**SUBJECT CODE : 12192**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
--	--	02	--	--	--	--	50@	50

**Rationale:**

Most of the diploma holders join industries. Due to globalization and competition in the industrial and service sectors the selection for the job is based on campus interviews or competitive tests.

While selecting candidates a normal practice adopted is to see general confidence, attitude and ability to communicate and attitude, in addition to basic technological concepts.

The purpose of introducing professional practices is to provide opportunity to students to undergo activities which will enable them to develop confidence. Industrial visits, expert lectures, seminars on technical topics and group discussion are planned in a semester so that there will be increased participation of students in learning process.

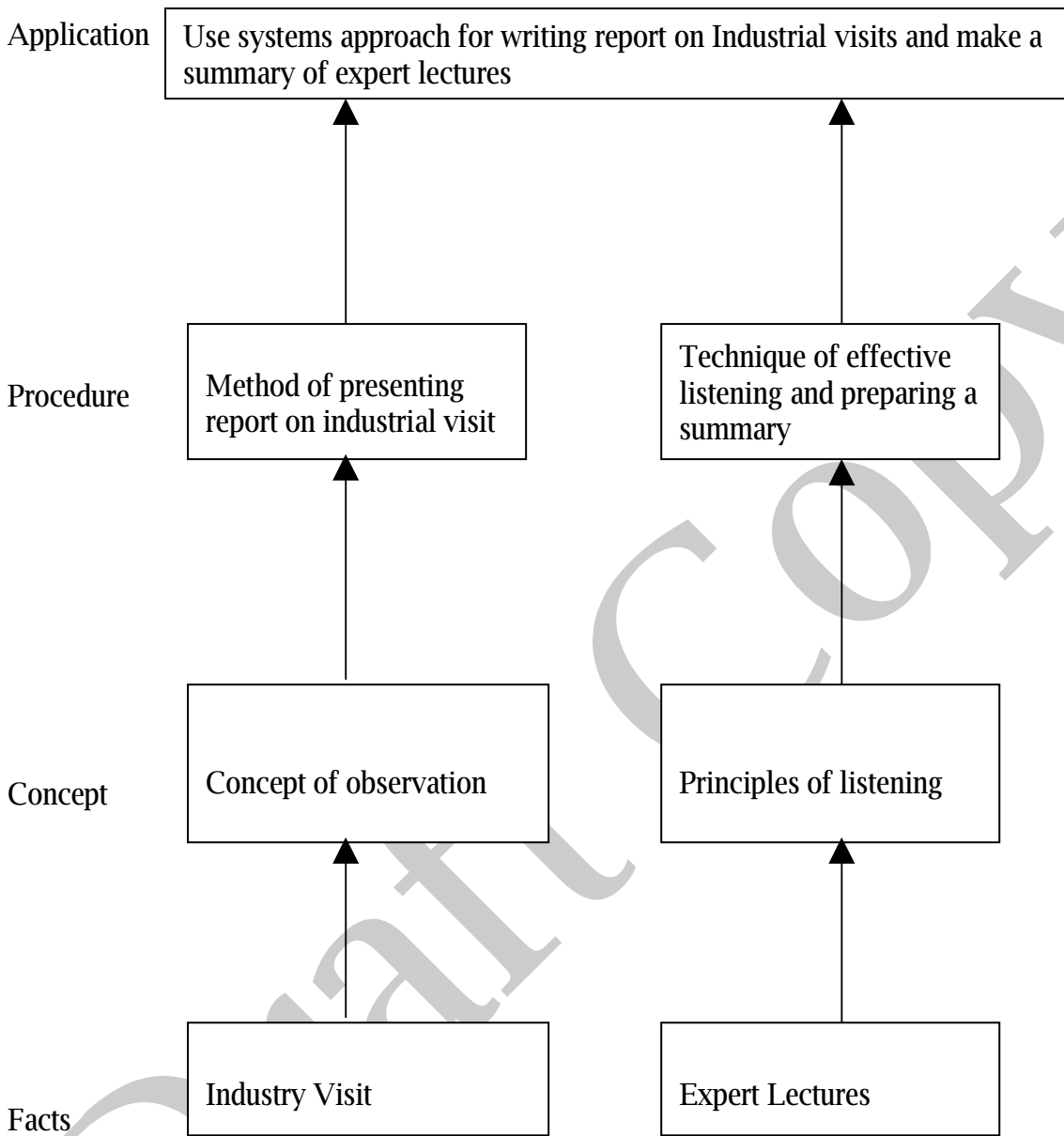
**Objectives:**

The student will be able to:

1. Acquire information from different sources.
2. Prepare notes for given topic.
3. Present given topic in a seminar.
4. Interact with peers to share thoughts.
5. Prepare a report on industrial visit, expert lecture.

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**Learning Structure:**



Sr. No.	Activity
01	<p><b>Structured industrial visits shall be arranged and report of the same should be submitted by the individual student, to form a part of the term work.</b>            Following are the suggested type of Industries/ Fields -(Any three visits)</p> <ul style="list-style-type: none"> <li>i) Data Acquisition System</li> <li>ii) Sugar Mill, Paper Mill, Cement Industry</li> <li>iii) Satellite Earth Station</li> <li>iv) Railway Station Control Room</li> <li>v) Digital RPM Meter Manufacturing Unit</li> <li>vi) Industry where Digital Drives are used</li> <li>vii) Digital Counters</li> </ul>
02	<p><b>The Guest Lecture/s from field/industry experts, professionals to be arranged (2 Hrs), minimum 2 nos. from the following or alike topics. Students should submit a brief report on the guest lecture as part of Term Work</b></p> <ul style="list-style-type: none"> <li>a) Emerging Technology</li> <li>b) Peripheral Devices</li> <li>c) Blue Tooth Technology</li> <li>d) Energy Crisis and Alternative Energy Sources</li> <li>e) Digital Invertors</li> <li>f) Total Quality Management</li> <li>g) Six Sigma</li> </ul>
03	<p><b>Information Search ,data collection and writing a report on the topic</b></p> <ul style="list-style-type: none"> <li>a) CDMA</li> <li>b) GPS</li> <li>c) Manufacturing process of ICs</li> <li>d) WLL Technology</li> </ul>
04	<p><b>Group Discussion:</b>            The students should discuss in group of six to eight students and write a brief report on the same as a part of term work. The topic of group discussions may be selected by the faculty members. Some of the suggested topics are -</p>
05	<p><b>Seminar:</b>            Seminar topic should be related to the subjects of fifth semester Each student shall submit a report of 5 to10 pages and deliver a seminar (Presentation time -10 minutes)</p>



**COURSE NAME : DIPLOMA IN ELECTRONICS ENGINEERING GROUP**  
**COURSE CODE : ET/EJ/EN/EX/IE/IC/IS/EV/DE/MU/ED/EI/IU**  
**SEMESTER : FIFTH FOR ET/EJ/EN/EX/IE/IC/IS/EV/DE/MU AND SIXTH FOR ED/EI/IU**  
**SUBJECT TITLE : INDUSTRIAL PROJECT AND ENTREPRENEURSHIP DEVELOPMENT**  
**SUBJECT CODE : 12193**

**Teaching and Examination Scheme:**

Teaching Scheme			Examination Scheme					
TH	TU	PR	PAPER HRS	TH	PR	OR	TW	TOTAL
01	01	02	--	--	--	--	25@	25

**Notes:**

1. One theory and one tutorial hour are for Entrepreneurship Development (EDP). Twenty five marks for term work are for report prepared under EDP
2. Two practical hours are for industrial project

**Content:**

**Part A) Industrial Project**

Following activities related to project are required to be dealt with, during this semester.

1. Form project batches & allot project guide to each batch. (Max. 4 students per batch)
2. Each project batch should select topic / problem / work by consulting the guide & / or industry. Topic / Problem / work should be approved by Head of department.
3. Each project batch should prepare action plan of project activities & submit the same to respective Guide
4. At the end of semester, each project batch should submit the action plan and abstract of the project along with list of materials required if project involves fabrication or other facilities required in other kinds of project.
5. Action Plan should be part of the project report.

## **Part B: Entrepreneurship Development**

### **Rationale:**

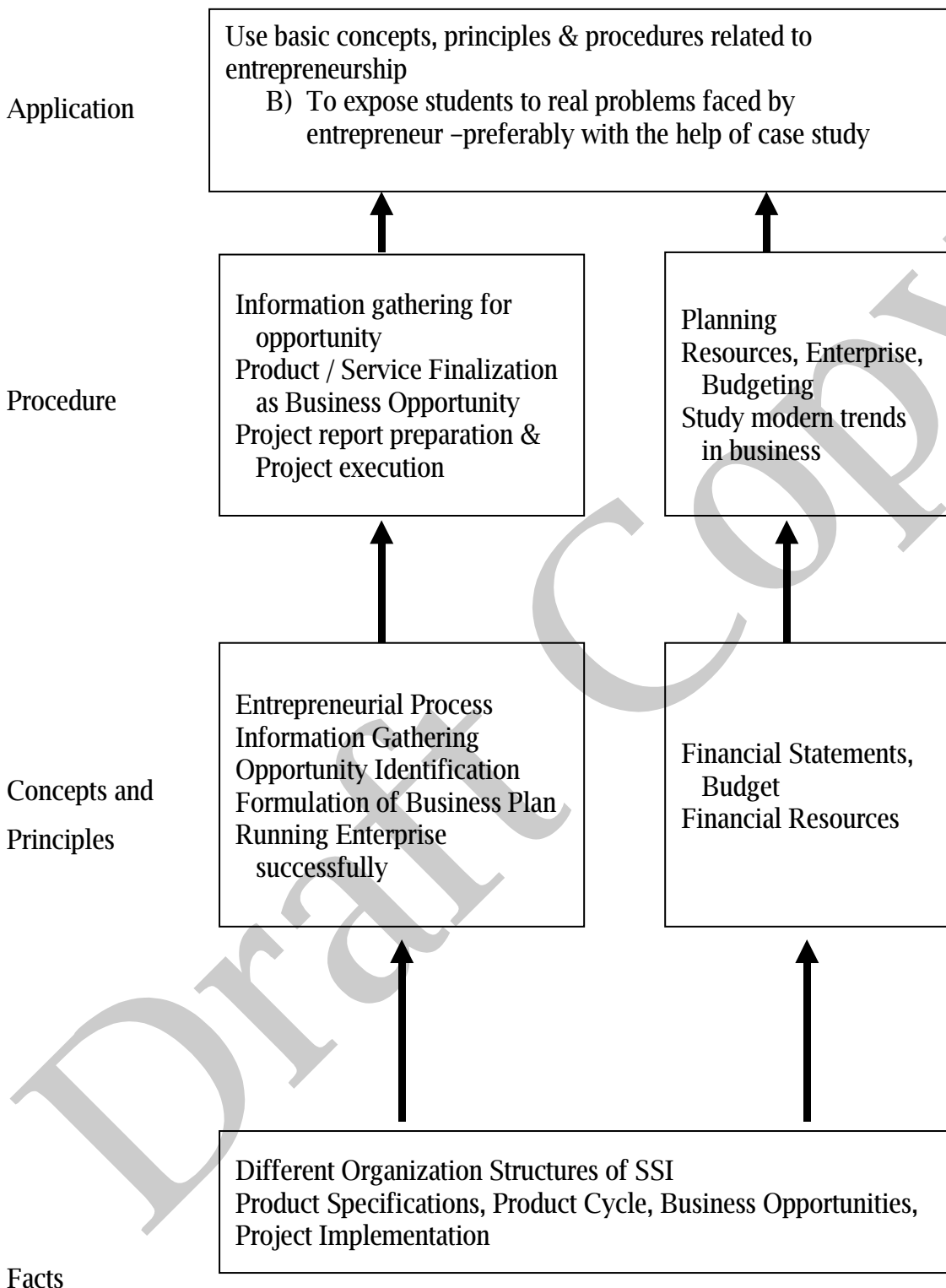
Globalization, liberalization & privatization along with revolution in Information Technology, have thrown up new opportunities that are transforming lives of the masses. Talented and enterprising personalities are exploring such opportunities & translating opportunities into business ventures such as- BPO, Contract Manufacturing, Trading, Service sectors etc. The student community also needs to explore the emerging opportunities. It is therefore necessary to inculcate the entrepreneurial values during their educational tenure. This will help the younger generation in changing their attitude and take the challenging growth oriented tasks instead of waiting for white-collar jobs. The educational institutions should also demonstrate their uniqueness in the creation of enterprising personalities in their colleges. This subject will help in developing the awareness and interest in entrepreneurship and create employment for others.

### **Objectives:**

Students will be able to

- 1) Identify entrepreneurship opportunity.
- 2) Acquire entrepreneurial values and attitude.
- 3) Use the information to prepare project report for business venture.
- 4) Develop awareness about enterprise management.

**Learning Structure:**



Contents: Theory

Chapter	Name of the Topic	Hours
01	<p><b>Entrepreneurship, Creativity &amp; Opportunities</b></p> <p>1.1) Concept, Classification &amp; Characteristics of Entrepreneur</p> <p>1.2) Creativity and Risk taking.</p> <p>    1.2.1) Concept of Creativity &amp; Qualities of Creative person.</p> <p>    1.2.2) Risk Situation, Types of risk &amp; risk takers.</p> <p>1.3) Business Reforms.</p> <p>    1.3.1) Process of Liberalization.</p> <p>    1.3.2) Reform Policies.</p> <p>    1.3.3) Impact of Liberalization.</p> <p>    1.3.4) Emerging high growth areas.</p> <p>1.4) Business Idea</p> <p>Methods and techniques to generate business idea.</p> <p>1.5) Transforming Ideas in to opportunities transformation involves</p> <p>    Assessment of idea &amp; Feasibility of opportunity SWOT Analysis</p>	03
02	<p><b>Information And Support Systems</b></p> <p>2.1) Information Needed and Their Sources.</p> <p>    Information related to project, Information related to support system, Information related to procedures and formalities</p> <p><b>2.2) Support Systems</b></p> <p>    2.2.1 Small Scale Business Planning, Requirements.</p> <p>    2.2.2 Govt. &amp; Institutional Agencies, Formalities</p> <p>    2.2.3 Statutory Requirements and Agencies.</p>	03
03	<p><b>Market Assessment</b></p> <p>3.1) Marketing -Concept and Importance</p> <p>3.2) Market Identification, Survey Key components</p> <p>3.3) Market Assessment</p>	02
04	<p><b>Business Finance &amp; Accounts</b></p> <p><b>Business Finance</b></p> <p>4.1) Cost of Project</p> <p>    P Sources of Finance</p> <p>    P Assessment of working capital</p> <p>    P Product costing</p> <p>    P Profitability</p> <p>    P Break Even Analysis</p> <p>    P Financial Ratios and Significance</p> <p><b>Business Account</b></p> <p>4.2) Accounting Principles, Methodology</p> <p>    1) Book Keeping</p> <p>    2) Financial Statements</p> <p>    3) Concept of Audit,</p>	03

<b>05</b>	<b>Business Plan &amp; Project Report</b> 5.1) Business plan steps involved from concept to commissioning- Activity Recourses, Time, Cost 5.2) <b>Project Report</b> 1) Meaning and Importance 2) Components of project report/profile ( <b>Give list</b> ) 5.3) <b>Project Appraisal</b> 1) Meaning and definition 2) Technical, Economic feasibility 3) Cost benefit Analysis	<b>03</b>
<b>06</b>	<b>Enterprise Management And Modern Trends</b> 6.1) <b>Enterprise Management:</b>  1) Essential roles of Entrepreneur in managing enterprise 2) Product Cycle: Concept And Importance 3) Probable Causes Of Sickness 4) Quality Assurance : Importance of Quality, Importance of testing 6.2) <b>E-Commerce</b>  Concept and process 6.3) <b>Global Entrepreneur</b>	<b>02</b>
<b>Total</b>		<b>16</b>

Sr. No	Assignments
1	Assess yourself-are you are entrepreneur?
2	Prepare project report and study its feasibility

### Learning Resources:

#### 1) Books:

Sr. No	Author	Name Of Book	Publisher
1	J.S. Saini B.S.Rathore	Entrepreneurship Theory and Practice	Wheeler Publisher
2	E. Gorden K.Natrajan	Entrepreneurship Development	Himalaya Publishing.
3	Preferred by Colombo Plan Staff College for Technician Education.	Entrepreneurship Development	Tata Mc Graw Hill

4	J.B.Patel D.G.Allampally	A Manual on How to Prepare a Project Report	EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : <a href="mailto:ediindia@sancharnet.in/olpe@ediindia.org">ediindia@sancharnet.in/olpe@ediindia.org</a> Website : <a href="http://www.ediindia.org">http://www.ediindia.org</a>
5	J.B.Patel S.S.Modi	A Manual on Business Opportunity Identification & Selection	
6	S.B.Sareen H. Anil Kumar	National Directory of Entrepreneur Motivator & Resource Persons.	
7	Gautam Jain Debmuni Gupta	New Initiatives in Entrepreneurship Education & Training	
8	P.C.Jain	A Handbook of New Entrepreneurs	
9	D.N.Awasthi , Jose Sebastian	Evaluation of Entrepreneurship Development Programmes	
10	V.G.Patel	The Seven Business Crisis & How to Beat Them.	

## 2) Video Cassettes

NO	SUBJECT	SOURCE
1	Five success Stories of First Generation Entrepreneurs	EDI STUDY MATERIAL Ahmadabad (Near Village Bhat , Via Ahmadabad Airport & Indira Bridge), P.O. Bhat 382428 , Gujrat,India P.H. (079) 3969163, 3969153 E-mail : <a href="mailto:ediindia@sancharnet.in/olpe@ediindia.org">ediindia@sancharnet.in/olpe@ediindia.org</a> Website : <a href="http://www.ediindia.org">http://www.ediindia.org</a>
2	Assessing Entrepreneurial Competencies	
3	Business Opportunity Selection and Guidance	
4	Planning for completion & Growth	
5	Problem solving-An Entrepreneur Skill	

## Glossary:

### Industrial Terms:

Terms related to finance, materials, purchase, sales and taxes.

### Components of Project Report:

1. Project Summary (One page summary of entire project )
2. Introduction (Promoters, Market Scope / requirement)
3. Project Concept & Product (Details of product)
4. Promoters (Details of all Promoters- Qualifications, Experience, Financial strength)
5. Manufacturing Process & Technology
6. Plant & Machinery Required
7. Location & Infrastructure required
8. Manpower (Skilled, unskilled )

9. Raw materials, Consumables & Utilities
10. Working Capital Requirement (Assumptions, requirements)
11. Market ( Survey, Demand & Supply )
12. Cost of Project, Source of Finance
13. Projected Profitability & Break Even Analysis
14. Conclusion.

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