

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Scheme of teaching and examination

B.E. V Semester Bio Medical Engineering

S. No.	Board of Study	Subject Code	Subject	Periods per week			Scheme of Exam			Total Marks	Credit L+(T+P)/2
				L	T	P	Theory/ Pract.				
							ESE	CT	TA		
1	Biomedical Engg.	317511 (17)	Basic Clinical Science-II	3	1	-	80	20	20	120	4
2	Electronics & Telecom.	317512(28)	Microprocessor	3	1	-	80	20	20	120	4
3	Biomedical Engg.	317513 (17)	Biomedical Instrumentation	3	1	-	80	20	20	120	4
4	Biomedical Engg.	317514 (17)	Bio Medical Equipments	3	1	-	80	20	20	120	4
5	Management	317515(36)	Management Science	4	-	-	80	20	20	120	4
6	Biomedical Engg.	317516 (17)	Biological Control System	4	1	-	80	20	20	120	5
7	Electronics & Telecom.	317521 (28)	Microprocessor Lab	-	-	3	40	-	20	60	2
8	Biomedical Engg.	317522 (17)	Biomedical Instrumentation Lab	-	-	3	40	-	20	60	2
9	Biomedical Engg.	317523 (17)	Bio Medical Equipments Lab	-	-	3	40	-	20	60	2
10	Biomedical Engg.	317524 (17)	Biological Control System Lab	-	-	3	40	-	20	60	2
11	Humanities	300525 (46)	Personality Development	-	-	2	-	-	20	20	1
12	Biomedical Engg.	317526 (17)	*Practical Training Evaluation and Library	-	-	1	-	-	20	20	1
Total				20	5	15	640	120	240	1000	35

L-Lecture, T-Tutorial,
P-Practical, ESE- End sem. Exam, CT-Class Test,
TA- Teacher's Assessment,

*To be completed after IV Sem. and before the commencement of V Sem.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V

Subject: Basic Clinical Science-II

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.

Code: 317511 (17)

Total Tut Periods: 12

MODULE 1:

Cardiology:

Heart structure and function. Cardiac cycle, various valves and their functions. IABP. Cardiovascular measurements. Prosthetic devices. Monitors. Heart lung machines. Applications Clinical significance, CVP and SWAN catheters.

MODULE 2:

Electrocardiography, source of ECG potentials. Dipole theory, conduction system. Normal and abnormal ECGs Diagnostic applications. Interpretation of ECG, Cardiac pacing Diagnostic indications. Criteria for selection. Therapeutic indications. Complications. Nursing Management of the patient with pacemaker, Temporary pacing, permanent Pacing.

Fibrillation, Atrial, Ventricular, Application of Cardiac assist Devices. Cardiac Catheterization Echo Cardiography. Cine Angiography. Treadmill, Ergo meter, Applications, Clinical significance.

Open heart surgery grafts, bypass surgery Instrumentation used for open-heart surgery, organization of ICU, Clinical aspects.

Suggested Books & References

- ?? Reach / Patton: Biophysics / physiology in volumes.
- ?? Glasser: Medical Physics
- ?? Glasser: Cardiovascular Assist Devices.
- ?? Rushmer: Cardiovascular Dynamics
- ?? Burtorn: Cardio Vascular Physiology / Bio Physics.

MODULE 3:

ENT

Anatomy of ear and central connection. Mechanics of hearing and equilibrium. Auditory receptors and genesis of different potential changes in the internal ear. Audiometer: Principles of equipment and technique of audimetry including Hearing and impedance.

MODULE 4:

Hearing aids: Functional concepts of hearing aids. Ultrasonic binaural sensing aid for the blind. Loudness and quality of sound. Measurements of noise. Noise pollution. Sensorium general role of receptors as transducers, generator potentials, ways and means of communication of signals for conscious brain. Location of filters and amplifiers at various levels for gain of the signal intensity. Cochlear implants.

Electroencephalography. Application of laser in ENT. Application of cryo in ENT. Anatomy Larynx, speech rehabilitation in post Laryngotomy cases. Principles of Stoscopy.

Suggested Books & References

- ?? Chatterji, Human Physiology.
- ?? Cyril A Keele Samson, Eric Neil and Norman Joel's, Wright's applied Physiology. Oxford University Press. 1993.

MODULE 5:

Ophthalmology

Physiology of Eye: Structure of eye, function Generation of signals and transmission to brain
Electro physiology, Aqueous humor production: Intraocular pressure fluctuations.

Equipment Used: A. Vision testing equipment (Computerized & Manual.)

Snellens's Chart, Keratometer, Refractometer, Colour Vision

B. Eye Examination equipment – Slit lamp biomicroscope & Camera, Fundus Camera, Ophthalmoscope – Direct & indirect, Retinoscope, Tonometers – contact & Noncontact, Perimeters-Listers, Bjerrums, Octopus, and Goldmann, Ophthalmodynamometers, Ultrasound Scanners, Synoptophore + Hess chart, Electromagnet, Lathes

C. Specialized equipment used in treatment, Argon laser, Nd- YAG Laser, Contact Lenses, Intraocular Lenses, Operation Microscope, Cryosurgical equipments, Vitrectomy instrument.

Suggested Books & References

?? Person Disease of the eye

?? Duke Elder System of Ophthalmology Vol. VII.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V

Subject: Microprocessor

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class test to be conducted: 2

Branch: Electronics Engg.

Code: 317512 (28)

Total Tut Periods: 12

MODULE: 1

Microprocessor Systems & Architecture

Introduction to Microprocessor architectures of 8085 their Pin configuration and function internal register & flag register. Generation of control signals, Bus Timings, De-multiplexing of address data bus, Instruction Execution Fetch / Execute Cycle, Instruction Timings and Operation Status.

Instruction Set for 8085

Instruction for data Transfer, Arithmetic and Logical Operation, Bitwise Operation, Machine Cycle concept, Addressing Modes, Instruction Format, Stacks Subroutine and Related instructions.

MODULE: 2

Programming of 8085

Elementary Concepts of Assembler, Looping, Counting and indexing Software Counters with Time Delays, Simple Programming using instruction Set of 8085, Debugging and Programs involving Subroutines, Programs for Code (conversion e.g. BCD to Binary to Seven segment Led Display, Binary to ASCII, ASCII & Binary). Program for Addition Subtraction, Programs for Multiplication and Division of Unsigned binary Numbers, Initializing instructions and Programming of parallel I/O Timer, Keyboard & Display interfaces.

Data transfer schemes: Serial, Parallel data transfer schemes.

MODULE : 3

Interrupts

8085 interrupts H/W, S/W interrupts, maskable / non maskable interrupts, vectored / nonvectored interrupts, 8085 interrupts structure, interrupt priorities. RIM and SIM instruction, Pending interrupts. Use of Interrupt and Handshaking Signals in interfacing. Application of interrupts and Illustrative Programs.

MODULE: 4

Architecture of 8086:

CPU architecture; Internal operation; Machine language instruction, instruction execution timings. Addressing Techniques & Addressing Modes of 8086 Microprocessor.

Direct Memory Access:

Significations of DMA pins of 8085 and 8086 Microprocessor, Fundamental of DMA, Types of DMA

MODULE: 5

Assembly language Programming of 8086:

Instruction format: Data transfer instructions, Arithmetic instructions, Branching and looping instructions, NOP and HLT, Flag manipulation instructions: Logical Shift and Rotate instructions. Directives and operators, Assembly process, Translation of assembler instructions.

Suggested Books & References

- ?? K.L. Short, Microprocessors and Programmed logic. Edn II. PHI
- ?? R.C.Gaonkar, Microprocessor Architecture Programming and application with 8085, 8080.
- ?? A.P. Mathur, introduction to Microprocessor Edn III.
- ?? Microcomputer Systems 8086/8088 Families – Architecture Programming and Design: Prentice Hall.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V

Subject: Biomedical Instrumentation

Total Theory Periods: 40

Total Marks in End Semester Exam: 80

Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.

Code: 317513 (17)

Total Tut Periods: 12

MODULE : 1

Classification Selection. Resistive strain gauge. Gauge factor. Displacement capacitance. Inductance. Oscillation and potentiometric transducers, velocity, photoelectric, photo magnetic and piezo electric transducers. Temperature measurement, resistance thermometers. thermistors. Thermocouple and digital transducers.

MODULE : 2

Biochemical transducers- electrodes – principles of working and their characteristics-electrode – electrolyte model – half-cell potential – electrode models – microelectrodes.

MODULE : 3

Amplifiers for biomedical application – Patient – lead device – diode circuits – diode bridge current limiters – JEET limiters – isolated leads.

MODULE : 4

Physiological signals. Characteristics. Basics of ECG, EMG, EEG, PCG and instrumentation for measuring these signals. Measurement of blood pressure: Electronic techniques by indirect and indirect methods. Measurement of blood flow by electromagnetic Doppler and plethymographic methods.

Filters, carriers current and line noise, radio frequency interference, base line shifts. –

MODULE : 5

The readout, recorders – recorder linearity. Recording transients, impedance snatching.

Video display. Introduction of fiber optics. Electrical hazards during bioelectric monitoring. Safety code standards Micro and macro shock and its physiological effects. Leakage currents and protection by use of isolation transformers, equipotential grounding and earth free monitoring.

Suggested Books & References

?? Joseph Dubovy: Introduction to Biomedical Electronics. McGraw Hill book Company, I 978

?? John G. Webster: Medical Instrumentation Application & Design Haughton Mifflin, Co. Boston. USA, I 978

For further reading.

?? Weikowisty Etal: Biomedical Instruments – Theory and Design. Academic press. 1976,

?? R.S. Khandpur: Hand Book of Biomedical Instrumentation. Tata McGraw Hill, 1975.

?? L.A. Gedders & L.E. Baker: Principles of Applied Medical Instrumentation. John Wiley & Sons. NY. USA. 1978.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V
Subject: Bio Medical Equipments
Total Theory Periods: 40
Total Marks in End Semester Exam: 80
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.
Code: 317514 (17)
Total Tut Periods: 12

MODULE : 1

Defibrillators AC defibrillators of capacitance discharge and delay line capacitance discharge with basic circuit diagrams. Types of electrodes and their features. Cardio verters, working principles.

MODULE : 2

Cardiac pacemakers: Asynchronous and Synchronous (demand) Mode of operation. External and Implantable Asynchronous pace makers. Working Principles. Block diagram and circuit diagram of a blocking oscillator asynchronous pacemakers, synchronous pacemakers. Working principles, modes of triggering.

Implantable pace makers: Technical and qualitative requirements of power supplies. Lead wires and electrodes, transcutaneous RF powered Cardiac pacemaker systems, susceptibility of implantable pacemakers to electrical interference and remedial measures.

MODULE : 3

Electro-surgical MODULEs: Principles of cutting, coagulation spark gap. Valve, transistorized generators, Safety features.

Electrical hazards in hospitals: Patient electrical safety, types of hazards, patient isolation, physical effects of current, let – go – current, Micro shocks, different ways for electrical accident to occur, safety instruction circuits, electrical grounding & effects.

LASER: Basic principles, different types of laser, equipments used in surgery, safety.

MODULE : 4

Fiber optics: Principles and applications Endoscopes. Neonatal instrumentation Incubators, Apnoea monitors.

Respiratory Measurements and aids: Principal and Techniques of Impedance Pneumography and pneumotachograph.

MODULE : 5

Hemodialysers: Qualitative requirements, general scheme of operations, types of exchangers, block diagram electronic control & monitoring Systems.

Heart Lung Machine: Governing principles, qualitative requirements, functional details of bubble, thin film, and membrane type of blood oxygenate. Intensive Coronary care concepts: Systems Organization, critical physiological parameters to be monitored, and layout and safety precautions.

Suggested Books & References

- ?? John C. Webster, Medical Instrumentation Leighton, Mifflin Co Boston, USA.
- ?? R.S. Khundpur Hand book of Biomedical Instrumentation, Tata. McGraw hill, Pub.Co.Ltd. , New Delhi, 1992
- ?? R. Aston, principles of Biomedical Instrumentation and Measurements.
- ?? J.G. Webster, Encyclopedia of Medical Devices, Wiley interscience publications, 1988.
- ?? Geddes and Baker, Principles of applied Biomedical instrumentation, John Wiley & Sons 1989.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V
Subject: Management Science
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class test to be conducted: 2

Branch: Management
Code: 317515 (36)
Total Tut Periods: NIL

MODULE : 1

Basis Concepts and Functions of Management Planning

Nature, Purpose and Objectives of Planning, Organizing: nature and Purpose, Authority and Responsibility, Staff bug, Supply of Human Resources, Performance Appraisal, Controlling: System and Process of Controlling, Control Techniques.

MODULE : 2

Human Resource Management

Nature and Scope of Human Resource Planning, Training and Development, Recruitment and Selection, Career Growth, Grievances, Motivation and its types, Need for Motivation, Reward and Punishment, Models for Motivation, Leaders: Kind of Leaders, leadership styles, Roles and Function of Leaders. Conflict Management, Kinds and cause of Conflict Settlement of Conflict, Group and Team Working, Organizational Design and Development.

MODULE : 3

Marketing Management

Marketing Environment: Consumer Markets and Buyer Behavior, Marketing Mix, Advertising and Sales Promotion, Channels of Distribution.

Financial Management and Accounting Concepts

Book Keeping, Financial Statement Analysis, Financial Ratios, Capital Budgeting, Break-Even Analysis.

MODULE : 4

Production / Operation Management

Planning and Design of Production and Operation Systems, Facilities Planning, Location, Layout and Movement of Materials, Materials management and Inventory Control, Maintenance management, PERT & CPM.

Management Information System

Role of information in decision making, Information system planning, Design and Implementation, Evaluation and Effectiveness of Information System.

MODULE : 5

Statistical Quality Control, TQM and ISO Certification

Strategic and Technology Management

Need, Nature, Scope and Strategy, SWOT analysis, value and concepts.

Suggested Text Books & References

- ?? Kotler Philip, "Marketing Management", Prentice hail of India 1997.
- ?? Luthans Fred, "Human Resource Management", McGraw Hill, Inc. 1997.
- ?? Stephen, P. Robbins, "Organizational Behavior Concepts, Controversies and Application", Prentice Hall, Englewood, Cliffs, New Jersey, 1989.
- ?? Khan, M.Y., and Jam, P.K. " Financial Management", Tata McGraw Hill, 1997.
- ?? Porter Michael, "Competitive Advantage", The Free Press, 1985
- ?? Porter Michael, "Competitive Strategy", The Free Press, 1985
- ?? Bhushan, Y.K., "Fundamentals of Business Organization and Management", Chand S. and Sons, 1998.
- ?? Ahuja, K.K., "Industrial Management", Kharina Publishers, 1998.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V
Subject: Biological Control System
Total Theory Periods: 50
Total Marks in End Semester Exam: 80
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.
Code: 317516 (17)
Total Tut Periods: NIL

MODULE : 1.

Introduction to Control Systems: Open loop and closed loop system- Control system illustrations, Servo control and regulatory type systems related terms, Block diagram representation of Control system, Transfer function, Block reduction techniques and Signal flow graphs. Introduction of AC-DC servo motors, characteristics of feed back non feed back control system.

MODULE : 2

Introduction to Physiological control system, Physiological system differential equations, Modeling the body as compartments, behavior in simple compartmental system, pharmacy kinetic model, urea distribution model, basics of zero order and first order chemical kinetic behavior.

The Human thermal systems. Heat production. Loss of heat to environment. Heat transfer within the body. Thermo regulation.

MODULE : 3.

Stability : Concept of stability, Necessary conditions for stability, Pole-zero locations in S-plane for stability study ; Routh and Routh Herwitz stability criteria.

Time Domain Analysis: Use of standard test signals for time response study; Time response 2nd order system. Performance specification steady state error constants. Root locus technique-concept and construction of root locus and driving stability information.

MODULE : 4.

Frequency Domain Analysis:

Closed loop frequency response performance specifications; frequency response curve; Relation between time and frequency domain specification. Polar plot; Bode plots-gain margin and phase margin for stability determination.

Derivation of transfer function from Bode plots. Nyquist stability Criterion-Stability and relative stability study lines using Nyquist plots.

MODULE : 5.

Respiratory models and system. Cardiovascular control system. Skeletal muscles servomechanism Biological receptors.

Suggested Books & References

- ?? The Applications of control theory of physiological system. Howard T. Milhorn Saunders. 1966
- ?? Automatic control systems, Benjamin C.KUO, Prentice Hall, India 46th Ed. 1985.
- ?? Biological Control systems, analysis John. H. Milsun, McGraw Hill 1966.
- ?? Bio-Medical Engg. Principles. David Ocooney. Marcel Dekken INC. New York and Basel.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V
Subject: Microprocessor Lab
Total Practical Periods: 40
Total Marks in End Semester Exam: 40
Minimum number of class test to be conducted: 2

Branch: Electronics Engg.
Code: 317521 (28)

List of Experiment to be Performed

I. Microprocessor 8085 & 8086

1. Introduction to MASM/TASM.
2. Arithmetic operation – Multi byte Addition and Subtraction, Multiplication and Division – Signed and unsigned Arithmetic operation, ASCII – arithmetic operation.
3. Logic operations – Shift and rotate – Converting packed BCD to unpacked BCD, BCD to ASCII conversion.
4. By using string operation and Instruction prefix: Move Block, Reverse string, Sorting, Inserting, Deleting, Length of the string, String comparison.
5. DOS/BIOS programming: Reading keyboard (Buffered with and without echo) – Display characters, Strings.

II. Interfacing

1. 8259 – Interrupt Controller :- Generate an interrupt using 8259 timer.
2. 8279 – Keyboard Display :- Write a small program to display a string of characters.
3. 8255 – PPI :- Write ALP to generate sinusoidal wave using PPI.
4. 8251 – USART :- Write a program in ALP to establish Communication between two processors.

Chhattisgarh Swami Vivekanand Technical University, Bilal (C.G.)

Semester: V
Subject: Biomedical Instrumentation Lab
Total Practical Periods:40
Total Marks in End Semester Exam: 40
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.
Code: 317522 (17)

Experiments to be performed: (minimum 10 experiments)

1. To measure the respiration rate of Human Body.
2. To observe respiratory signal waveform of different blocks of Respiration -rate Monitor.
3. To study the abnormalities (Tachypnea, Apnea) present in Human Respiration system.
4. To study lead I , II, III of standard bipolar lead configuration in ECG kit.
5. To study chest lead of standard Uni -polar leads configuration.
6. To Demonstrate the measurement of normal heart rate using ECG simulator ST-2352.
7. To study EMG waveforms of Human body
8. To study EMG waveforms generated by EMG Simulator
9. To observe ECG waveform of Human Body.
10. To observe Phonocardiogram of Human body.
11. To hear Phonocardiogram signals sound of Human body.
12. To study the abnormalities (Tachycardia, Bradycardia) occurs in Human cardio-Vascular systems.

**Chhattisgarh Swami Vivekanand Technical University,
Bhilai (C.G.)**

Semester: V
Subject: Biomedical Equipment Lab
Total Practical Periods:40
Total Marks in End Semester Exam: 40
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.
Code: 317524 (17)

STUDY, OPERATION AND TROUBLE SHOOTING OF:

1. ECG Monitor
2. EEG,EMG
3. Pace Maker
4. DC Defibrillator
5. Short Wave Diathermy Unit
6. Ultrasound Diathermy Unit
7. Safety Evaluation Circuits
8. Audiometer
9. Hearing Aids
10. Pneumo tachograph and signal conditioners (PFT)
11. Ultra Sound Scanner
12. Electro surgical generators.

Chhattisgarh Swami Vivekanand Technical University, Bhilai (C.G.)

Semester: V
Subject: Biomedical Control System Lab
Total Practical Periods:40
Total Marks in End Semester Exam: 40
Minimum number of class test to be conducted: 2

Branch: Biomedical Engg.
Code: 317524 (17)

Experiments to be performed:

1. For the given Block diagram find transfer function and draw its Step & Impulse Response.
2. Show Step Response and Impulse Response for the DC Motor in the LTI Viewer.
3. Draw the Bode Plot for given transfer function and find its Gain & Phase Margin.
4. Draw the Nyquist Plot for the given transfer function.
5. For the given block diagram find its transfer function & Compare its Open- and Closed-Loop Impulse Response.
6. Design the root locus for the given transfer function and analyze it.
7. Design the case studies for DC servo motor.
8. Design the case studies for AC servo motor.
9. View the LTI system as matrix and make its Conversion to
 - (i)state space
 - (ii) transfer function.
 - (iii) zero-pole-gain.
10. Add the given two LTI system array.

USE MATLAB CONTROL SYSTEM TOOL BOX.

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Semester : B.E. V

Subject : Personality Development

No. of Periods : 2 pds/week

Total Marks in End Semester Exam. : NIL

Minimum number of class tests to be conducted: Two

Branch : Common to All Branches

Code : 300525 (46)

Tutorial Periods : NIL

Objective: The course is introduced to develop one's outer and inner personality tremendously and enrich the abilities to enable one to meet the challenges associated with different job levels. Personality Development is essential for overall development of an individual apart from gaining technical knowledge in the subject.

MODULE – I

Personality concepts:

- **What is Personality** - its physical and psychic aspects. How to develop a positive self-image. How to aim at Excellence. How to apply the cosmic laws that govern life and personality.
- **How to improve Memory.** How to develop successful learning skills. How to develop and effectively use one's creative power.
- How to apply the individual **MOTIVATORS** that make you a self-power personality.

MODULE - II

Interpersonal Skills:

- **Leadership:** Leaders who make a difference, Leadership: your idea, What do we know about leadership? If you are serious about Excellence. Concepts of leadership, Two important keys to effective leadership, Principles of leadership, Factors of leadership, Attributes.
- **Listening:** Listening skills, How to listen, Saying a lot- just by listening, The words and the music, How to talk to a disturbed person, Listening and sometimes challenging.
- **How to win friends** and influence people, How to get along with others. How to develop art of convincing others. How can one make the difference. How to deal with others particularly elders. Conflicts and cooperation.

MODULE - III

Attitudinal Changes:

- **Meaning of attitude,** benefits of positive attitudes, how to develop the habit of positive thinking.
- **Negative attitude and wining:** What is FEAR and how to win it. How to win loneliness. How to win over FAILURE. How to win over PAIN. How to win over one's ANGER and others anger. How to overcome CRITICISM. What is stress and how to cope up with it? What is crisis and how to manage it.
- How to apply the **character MOTIVATORS** that elevate you and your personality to the top, the art of self motivation.
- How to acquire **mental well-being.**
- How to acquire **physical well-being.**
- How to formulate effective **success philosophy.**

MODULE -IV

Decision Making:

How to make your own LUCK. How to plan goals/objectives and action plan to achieve them. How to make RIGHT DECISION and overcome problems. How to make a Decision. Decision making : A question of style. Which style, when ? People decisions : The key decisions. What do we know about group decision making ? General aids towards improving group decision making. More tips for decisions of importance.

MODULE - V

Communication Skills:

- **Public Speaking:** Importance of Public speaking for professionals. The art of Speaking - Forget the fear of presentation, Symptoms of stage fear, Main reason for speech failure, Stop failures by acquiring Information; Preparation & designing of speech, Skills to impress in public speaking & Conversation, Use of presentation aids & media.
- **Study & Examination:** How to tackle examination, How to develop successful study skills.
- **Group discussions:** Purpose of GD, What factors contribute to group worthiness, Roles to be played in GD.

Reference Books:

1. How to develop a pleasing personality by Atul John Rego, Better yourself books, Mumbai, 2000.
2. How to Succeed by Brian Adams, Better Yourself books, Mumbai, 1969.
3. Basic Managerial skills for all by E. H McGrawth, Prentice Hall India Pvt Ltd, 2006.
4. The powerful Personality by Dr Ujjwal Patni & Dr Pratap Deshmukh, Medident Publisher, 2006.
5. Great Words win Hearts by Dr Ujjwal Patni, Fusion Books, 2006.
6. Personality : Classic Theories & Modern Research; friedman ; Pearson Education 2006.
7. How to win friends and influence people by Dale Carnigie, A.H. Wheeler 2006.