

Appendix A

Four Year Degree Course in Engineering and Technology
 Course and Examination Scheme with Credit Grade System
 Fifth Semester B.E. (Electronics Engineering)

| Subject Code | Subject | Teaching Scheme | | | | Examination Scheme | | | | | | | | | |
|-----------------------|--|-----------------|----------|-----------|-------------------|--------------------------|----------------|------------|----|------------|---------------------|---------------|----------------|------------|---------------------|
| | | Hours Per Week | | | Number of Credits | THEORY | | | | | | PRACTICAL | | | |
| | | L | T | P | | Duration of Paper (Hrs.) | Max. Marks ESE | Max. Marks | | Total | Min . Passing Marks | Max. Marks TW | Max. Marks POE | Total | Min . Passing Marks |
| | | | | | | | | MS E | IE | | | | | | |
| EN 501 | Linear Integrated Circuit | 3 | 1 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| EN 502 | Signals & Systems | 3 | 1 | 0 | 4 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| EN 503 | Power Electronics | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| EN504 | Advanced Microprocessors & Interfacing | 3 | 1 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| EN 505 | Theory of Communication Engineering | 3 | 0 | 0 | 3 | 3 | 80 | 10 | 10 | 100 | 40 | -- | -- | -- | -- |
| Laboratories | | | | | | | | | | | | | | | |
| EN 506 | Linear Integrated Circuits | 0 | 0 | 3 | 2 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| EN 507 | Advanced Microprocessors & Interfacing | 0 | 0 | 3 | 2 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| EN 508 | Power Electronics | 0 | 0 | 3 | 2 | -- | -- | -- | -- | -- | -- | 25 | 25 | 50 | 25 |
| EN 509 | Personal Proficiency-II | 0 | 0 | 2 | 2 | -- | -- | -- | -- | -- | -- | 50 | -- | 50 | 25 |
| Total | | 15 | 3 | 11 | | | | | | | | | | | |
| Semester Total | | 29 | | | 24 | | | | | 500 | | | | 200 | 700 |

GONDWANA UNIVERSITY, GADCHIROLI

FACULTY OF ENGINEERING AND TECHNOLOGY

CONSOLIDATED STATEMENT OF VARIOUS PARAMETERS IN TEACHING & EXAMINATION SCHEME OF B.E. (ELECTRONICS ENGINEERING)

| SR. NO. | SEMESTER | NO. OF THEORY SUBJECTS | NO OF LABS/PRACT | TEACHING HOURS(TH) (L+T) | TEACHING HOURS (PRACT) | TOTAL CREDIT | MAX. THEORY MARKS | MAX.PRACT MARKS | MAX. MARKS TOTAL |
|---------|----------|------------------------|------------------|--------------------------|------------------------|--------------|-------------------|-----------------|------------------|
| 1 | I | | | | | | | | |
| 2 | II | | | | | | | | |
| 3 | III | 5 | 3 | 21 | 9 | 24 | 500 | 150 | 650 |
| 4 | IV | 5 | 4 | 20 | 10 | 26 | 500 | 200 | 700 |
| 5 | V | 5 | 4 | 18 | 11 | 24 | 500 | 200 | 700 |
| 6 | VI | 5 | 3 | 20 | 9 | 25 | 500 | 150 | 650 |
| 7 | VII | 5 | 3 | 20 | 8 | 24 | 500 | 150 | 650 |
| 8 | VIII | 5 | 3 | 19 | 12 | 27 | 500 | 250 | 750 |
| | | | | | | | | | |
| | | 30 | 20 | 119 | 59 | 150 | 3000 | 1100 | 4100 |

***Audit course. It is neither considered as passing head nor considered for earning some credit(s). However, this is mandatory to be taken up at the respective college level**

Subject wise Board of Studies Affiliation

| Board of Studies | Subject Codes |
|-------------------------------|---------------------------------|
| APPLIED SCIENCES & HUMANITIES | EN 301,EN 401,EN 505 |
| ELECTRICAL ENGINEERING | EN 303,EN 405,EN 503,EN 603 |
| COMPUTER TECHNOLOGY/CSE | EN604 |
| ELECTRONICS ENGINEERING | Rest all ,except above enlisted |

V Semester B.E.
Electronics Engineering

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : EN 501

Title of the Course : LINEAR ELECTRONIC CIRCUITS

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---------------|----------|-----------|------------------|----------|------------------------------|-----------|-----------|-----------|------------|
| Lecture | Tutorial | Practical | Periods/ week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 1 | 0 | 4 | 4 | 3 | 10 | 10 | 80 | 100 |

| Unit | Contents | Hours |
|------|---|-------|
| I. | Basic Operational Amplifier, Differential Amplifier Stages, Current Source Biasing, Level Shifting Techniques, Common Mode and Differential Mode Gains, Frequency Response and Compensation. | 10 |
| II. | Characteristics of Ideal And Non Ideal Op Amp, Error Measurement of Various Parameters, Linear Application Like Inverting, Non Inverting, Integrator, Differentiator, Differential Amp, Bridge Amplifier, Voltage to Current Converter, Regulators. | 12 |
| III. | Non-Linear Application Like Limiters, Precision Rectifier, Log Amplifier, Antilog Amplifier, Multiplier, Divider, Astable, Monostable, Comparator, Schmitt Trigger, Square to triangular Wave Generator. | 08 |
| IV. | Design of Active Filter. 1 st And 2 nd Order Butterworth Filter, Sinusoidal Oscillators D/A and A/D Conversion Circuits, Sample Hold Circuits. | 08 |
| V. | Application of ICs Like LM741, LM 555 Timer ICs, Phase Locked Loop, LM 566(VCO), LM 339 (Comparator), LM 723 (Voltage Regulator), Regulator IC Series 78xx, 79xx. | 12 |

Reference Books :

1. R. A. Gaikwad, "Op Amps and Linear Integrated Circuits", PHI Publication, 4th Edition
2. D. Roy Choudhary, Shail Jain, "Linear Integrated Circuits", New Age International
3. U. A. Bakshi, A. P. Godse, "Linear Integrated Circuits & Application", Technical Publication Pune
4. K. R. Botkar, "Integrated Circuits", Khanna Publication 9th Edition
5. Coughlin, Driscoll, "Operational Amplifiers and Linear Integrated Circuits", PHI Publication 4th Edition

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code :EN502

Title of the Course : Signals and Systems

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---------------|----------|-----------|--------------|---------|----------------------------|-----|----|-----|-------|
| Lecture | Tutorial | Practical | Periods/week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 1 | 0 | 4 | 4 | 3 | 10 | 10 | 80 | 100 |

| Unit | Contents | Hours |
|--------------|---|-----------|
| 1 | Classification of signals: Continuous time and discrete time, even, odd, periodic and non periodic, deterministic and non deterministic, energy and power. Fourier Transform of Elementary signals: exponential, sine, step, impulse, ramp, rectangular, triangular, signum, sinc. Properties of Fourier Transform, Convolution theorem, sampling theorem. Systems: Definition, Classification: linear and non linear, time variant and invariant, causal and non-causal, static and dynamic, stable and unstable, invertible. Introduction to Laplace Transform, | 9 |
| 2 | Linear Time Invariant Systems: Introduction, Discrete Time LTI Systems: The Convolution sum and the convolution Integral , Properties of Linear Time Invariant Systems, Causal LTI Systems described by Differential and Difference equations Singularity functions | 9 |
| 3 | Fourier Transform Analysis: Fourier Series representation of periodic Signals, The continuous time Fourier transform, discrete Fourier Transform and introduction to FFT. | 9 |
| 4 | Z-Transform: Definition, properties of z-transform, z-transform of standard sequences, inverse Z-transform, relationship of z-transform with Fourier transform, applications of Z-transform to solutions of difference equations, Properties and Applications of Z-transform. | 9 |
| 5 | Time and Frequency Characterization of Signals and Systems :-First & Second order Continuous and Discrete time System ,examples of Time and frequency domain Analysis of systems Sampling: Representation of a continuous –Time Signal by its Samples-Sampling Theorem, Reconstruction of a signal from its samples using interpolation, The effect of understanding : Aliasing, Discrete Time Processing of Continuous Time Signal and Sampling of Discrete time Signal. | 9 |
| Total | | 45 |

Text Books :

1. Signals and Systems by Alan V. Oppenheim, Alan S. Wilsky and S. Hamid Nawab, Publication: Prentice Hall of India Edition: Second Ed., 1997.

Reference Books :

1. Signals and Linear Systems by Gabel R.A. and Robert R.A, John Wiley and Sons, New York, 1987, Edition: 3rd Edition
2. Systems and Signal Analysis by C. T. Chen Publication: Oxford University Press, India, 3rd Edition, 2004
3. Introduction to Signals and Systems by Michael J. Robert, Publication: Tata Mc-Graw Hill, Edition: Second, 2003.
4. Signals and Systems by S. Haykin and B. V. Veen, Publications: John Wiley and Sons, Inc., Editions: Second Edition, 1999.
5. Signals and Systems Analysis using, Transform Methods and MATLAB by M. J. Roberts Tata McGraw-Hill Publishing Company Limited, Second Edition, 2003.

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : EN 503

Title of the Course : POWER ELECTRONICS

FIFTH SEMESTER B.E. (Electronics / Electronics & (Tele) Communication/Instrumentation)

SUBJECT : POWER ELECTRONICS

| Lectures | Tutorial(s) | Practical | Total periods/week (each of 60 minutes duration) | Credits |
|----------|-------------|-----------|--|---------|
| 04 | 01 | 02 | 07 | 05 |

| Unit | Contents | Hours |
|------------|---|-------|
| I | <p>Basics in Power Electronics Engineering Development of Power Controllers, Working Principle & Characteristics of different Power Controllers, Thyristor Family, Two Transistor model of SCR, Gate Characteristic, Turn On , Turn Off Mechanisms & other ratings of SCRs , Relaxation Oscillators using UJT, Basic Firing Circuits for SCR, Application of SCR in obtaining Logic Gates, Flip Flop and Circuit Breaker, AC Power control using TRIAC- DIAC, Basic Firing Circuits for SCR Power Transistor, Power MOSFET & IGBT (Basic properties, characteristics, comparison & applications)</p> | 12 |
| II | <p>Phase Controlled Rectification Principle of Phase Control, Line Commutation, Single phase half wave, Full wave mid –point, Fully controlled with & without freewheeling diode with different types of Loads, Effect of Source inductance, Half Controlled Bridge configurations, Development of expressions for mean current & voltage for different loads, Dual Converter Three Phase fully controlled & half controlled bridge circuits , Development of expressions for mean voltage</p> | 10 |
| III | <p>Inverters Principle of Inversion, Various Techniques of Forced Commutation & their designs, Single phase & Three phase series Inverter, Single Phase Parallel Inverter, Single phase bridge Inverter (All with commutation Circuits), Design of Filter Three phase fully controlled bridge inverters in different modes (without commutation Circuit), Design of complete firing circuit for Three phase Power Control Circuits</p> | 12 |

| | | |
|-----------|--|-----------|
| IV | Choppers & Cycloconverter Principle of Working ,Types of Choppers, Oscillating Chopper, Jones & Morgan’s Chopper, Multi Phase Chopper, Step Up Chopper, AC Chopper, Need & Principle of Working of Cycloconverter using single phase bridge circuits | 08 |
| V | Multiple Connection & Protection Need & methods of multiple connections of SCRs, Design of Equalizing Circuits, Firing Circuits during multiple connection, Gate protection, Over current & over voltage protections of SCR, Design of Snubber Circuit, Converter Faults | 08 |
| | Total | 50 |

Text Books :

- (1) M.H. Rashid, “Power Electronics Circuits, Devices & Applications”, Pearson Education
- (2) C.W. Lander, “Power Electronics”, McGraw Hill
- (3) M. Ramamoorthy, “ Thyristors & their Applications”
- (4) GK Dubey, Doradla, Singh, Joshi “ Thyristorstorized Power Controllers”, New Age International
- (5) Singh, Khanchandani, “ Power Electronics”, Tata McGraw Hill
- (6) SCR Manual by General Electric

Reference Books :

- (1) Philip T. Krein, “Elements of Power Electronics”, Oxford University Press
- (2) Vedam Subrahmanyam, “Power Electronics”, New Age International
- (3) MS Jamil Asghar, “Power Electronics”, Prentice Hall of India
- (4) PC Sen, ‘Modern Power Electronics’, S. Chand Publishers
- (5) PS Bhimra, “Power Electronics”, Khanna Publishers

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 504**

Title of the Course : **ADVANCED MICROPROCESSOR AND INTERFACING**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---------------|----------|-----------|------------------|----------|------------------------------|-----------|-----------|-----------|------------|
| Lecture | Tutorial | Practical | Periods/ week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 1 | | 4 | 4 | 3Hrs | 10 | 10 | 80 | 100 |

| Unit | Contents | Hours |
|------------|---|-------|
| I | Introduction to 16-bit Microprocessor 8086: | |
| | Architecture of 16 bit Microprocessor 8086 , concept of pipelining and memory segmentation , logical address, offset address and physical address, Bus Interface Unit (BIU), Execution Unit (EU), segment registers, Pin functions, Minimum and Maximum mode of operation, addressing modes, , assembler directives,. | 12 |
| II | Instruction set ,Interrupts and Memory Interfacing: | |
| | Instruction set , Assembly Language programming ,Stack structure of 8086, Interrupts and interrupt service routines, processing of interrupt, Internal and External interrupts, Interrupt Priorities, Memory Interfacing Concepts, Interfacing of 8086 Microprocessor with memory ICs. | 8 |
| III | PIO 8255[Programmable Input-Output Port] | |
| | Programmable Peripheral Interface 8255, architecture, signal descriptions and operational modes. Interfacing of 8255 with 8086, Interfacing of ADC & DAC, Stepper motor interfacing; Programmable Interval Timer 8254: Architecture and Signal Descriptions, Operating Modes, Programming and Interfacing. | 10 |
| IV | Programmable Peripheral Devices and Their Interfacing | |
| | Programmable Interrupt Controller 8259: Architecture and Signal Descriptions .Command Words and Modes of Operations. Programming and Interfacing ; Keyboard /Display Controller 8279: Architecture and Signal Descriptions , Modes of operations , Programming and Interfacing. | 10 |
| V | DMA controller & Serial Communication: Interfacing and Programming | |

| | | |
|--|---|----|
| | Architecture of 8257 DMA Controller, Interfacing of 8257 with 8086, brief programming. Architecture and operation of 8251 USART, interfacing with 8086, brief programming. RS 232 Serial Communication Standards. | 10 |
|--|---|----|

Text Books :

1. Advanced Microprocessor and Peripherals- A. K. Ray and K. M. Bhurchandi, Tata McGraw Hill.
2. Microcomputer systems 8086/8088 family, Architecture, Programming and Design - Yu-Cheng Liu & Glenn A Gibson, 2nd Edition- July 2003, Prentice Hall of India
3. The 8086 Family: Design, Programming & Interfacing,--John Uffenbeck, Prentice Hall of India

Reference Books :

1. Microprocessor and Interfacing, Programming & Hardware- Douglas V Hall, 2nd Edition, Tata McGraw Hill.
2. Microprocessors: The 8086/8088, 80186/80286, 80386/80486 and the Pentium Family Bahadure, N. B., - Prentice Hall of India Private Limited

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 505**

Title of the Course : **THEORY OF COMMUNICATION ENGINEERING**

| Course Scheme | | | | | Evaluation Scheme (Theory) | | | | |
|---------------|----------|-----------|------------------|----------|------------------------------|-----------|-----------|-----------|------------|
| Lecture | Tutorial | Practical | Periods/ week | Credits | Duration of paper, hrs | MSE | IE | ESE | Total |
| 3 | 1 | 0 | 4 | 4 | 3 | 10 | 10 | 80 | 100 |

| Unit | Contents | Hours |
|------------|---|-------|
| I | MODULATION TECHNIQUES | |
| | Amplitude modulation, AM-DSB, SSB, SSB-SC, Demodulation of AM signals, Vestigial sideband transmission, Frequency modulation, Demodulation of FM signals, Frequency division multiplexing, Time division multiplexing. | 10 |
| II | ENERGY & POWER DENSITY SPECTRA OF ANALOG AND DIGITAL SIGNALS | |
| | Signal transmission through linear systems, Filter characteristics of linear systems, Distortion less transmission, Ideal and Practical filters, Energy and power density spectrum, Line coding, Manchester coding, Polar coding, Bi-polar coding, NRZ coding, RZ coding, PSD of digital signals, Control of PSD by pulse shaping, Nyquist first and second criteria. | 10 |
| III | PROBABILITY AND RANDOM PROCESS | |
| | Probability, Conditional Probability, Random Variables, Cumulative Distribution function, Probability Density Function & its properties, Statistical averages of Random Variables, Uniform Distribution, Gaussian or Normal Distribution, Introduction to random process. | 10 |
| IV | PULSE COMMUNICATION | |
| | Pulse modulation, PAM, PCM, DPCM, Delta modulation, Adaptive delta modulation, Matched filter detection of binary signals, Optimum receiver, Decision threshold, Error probability, ASK, FSK & PSK systems, DPSK systems, M-ary communication systems. | 10 |
| V | INFORMATION THEORY | |
| | Average information, Information measure, Entropy, Channel capacity of discrete & continuous channel, Shannon's theorem, Hamming codes, Huffman coding, Linear block codes, Cyclic codes, Convolution codes, Trellis diagram. | 10 |

Text Books:

1. Modern Analog & digital Communications, B.P.Lathi
2. Communication Systems: Simon Haykins

Reference Books :

1. Communication System: B.P. Lathi
2. Communication System: A.B. Carlson

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : EN 506

Title of the Course : LINEAR ELECTRONIC CIRCUITS

| Course Scheme | | | | | Evaluation Scheme(Laboratory) | | |
|---------------|----------|-----------|------------------|----------|-------------------------------|-----------|-----------|
| Lecture | Tutorial | Practical | Periods/ week | Credits | TW | POE | Total |
| 0 | 0 | 3 | 3 | 2 | 25 | 25 | 50 |

50 % of the experiments are based on ORCAD or any Equivalent simulation software.

| List of suggested practical's |
|--|
| <ol style="list-style-type: none">1. To Study elementary circuit using Op-amp(Inverting ,Non Inverting amplifiers, voltage follower, Integrator and Differentiator)2. To study square and triangular wave generating circuits.3. To study Op-Amp parameters-I (input impedance, output impedance, slew rate , frequency response)4. To study Op-Amp parameters-II (Input offset voltage, Input offset current, Input bias current, CMRR)5. To study instrumentation amplifier.6. To study log amplifier7. To study wein bridge oscillator8. To study Op-Amp as low pass filter.9. To study Op-Amp as high pass filter.10. To study IC 555 timer. |

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : EN 507

Title of the Course : ADVANCED MICROPROCESSOR AND INTERFACING

| Course Scheme | | | | | Evaluation Scheme(Laboratory) | | |
|---------------|----------|-----------|------------------|----------|-------------------------------|-----------|-----------|
| Lecture | Tutorial | Practical | Periods/ week | Credits | TW | POE | Total |
| 0 | 0 | 3 | 3 | 2 | 25 | 25 | 50 |

List of suggested practical's

1. Write 8086 Assembly language program (ALP) to add array of N hexadecimal numbers stored in the memory. Accept input from the user.
2. Write 8086 ALP to perform non-overlapped and overlapped block transfer (with and without string specific instructions). Block containing data can be defined in the data segment.
3. Write 8086 ALP to convert 4-digit Hex number into its equivalent BCD number and 4-digit BCD number into its equivalent HEX number.
4. Write 8086 ALP for the following operations on the string entered by the user.
a) Calculate Length of the string b) Reverse the string
6. Write 8086 ALP to perform multiplication of two 8-bit hexadecimal numbers. Use successive addition and add and shift method. Accept input from the user.
7. Interfacing and programming: 8255 with 8086, I/O transfer and use of different ports

8. Interfacing and programming: ADC/DAC with 8086

8. Interfacing and programming: 8254 with 8086, use of different timer modes.

9. Interfacing and programming: 8259 with 8086

10. Interfacing and programming of different peripherals: 8279,8257,8251

V SEMESTER B.E. ELECTRRONICS ENGINEERING

Course Code : EN508

Title of the Course : POWER ELECTRONICS LABORATORY

Common for B. E. Electronics/Electrical /Instrumentation Engineering

| Course Scheme | | | | Evaluation Scheme (Laboratory) | | |
|---------------|----------|-----------|---------|--------------------------------|-----|-------|
| Lecture | Tutorial | Practical | Credits | TW | POE | Total |
| 0 | 0 | 3 | 2 | 25 | 25 | 50 |

Course Objectives:

1. To become familiarize and explain the physical principles, operations, structural details and their characteristics of power semiconductor devices.
2. To understand the various techniques of turning on & turning off of the thyristors.
3. To describe the operation of different rectifiers, cycloconverters, inverters and choppers with their applications.

Suggested list of Experiments:

- 1) To study I-V characteristics of SCR.
- 2) To study I-V characteristics of DIAC.
- 3) To study I-V characteristics of TRIAC.
- 4) Phase control of TRIAC using DIAC.
- 5) To study R firing, RC firing and UJT firing circuits.
- 6) To study oscillating chopper.
- 7) To study half controlled half wave bridge rectifier.
- 8) To study full controlled full wave bridge rectifier.
- 9) To study I-V characteristics of Power MOSFET.
- 10) To study I-V characteristics of IGBT.

Course Outcomes:

Students will be able to design and explain different types of power electronics circuits and able to choose particular circuits for controlling and protecting the industrial applications.

FIFTH SEMESTER BE ELECTRONICS ENGINEERING

Course Code : **EN 509**

Title of the Course : **PERSONAL PROFICIENCY II**

| Course Scheme | | | | | Evaluation Scheme(Laboratory) | | |
|---------------|----------|-----------|------------------|----------|-------------------------------|----------|-----------|
| Lecture | Tutorial | Practical | Periods/ week | Credits | TW | POE | Total |
| 0 | 0 | 2 | 2 | 2 | 50 | 0 | 50 |

| Contents |
|---|
| After completing this course the student should get proficiency in Effective communication: Introducing oneself, Asking questions, Giving polite replies, complaining and apologizing, persuading people, taking initiative, seeking permission, inviting friends, praising and complimenting people, expressing sympathy, telephonic conversation Body Language: A frame work for understanding, territories and zone, palm gesture, hand and arm gesture, hand-to face gesture, arm barriers, leg barriers, other popular gesture and action, territorial and ownership gesture, body lowering and status pointers, desks tables and seating arrangement, power plays Proposal and Report writing practices (R and D, project, patent, etc) Concepts and Practical Approaches for “Self Development”: Human Values, Non violent communication, Effective listening and silent communication. Practical Approach -Silence and Quiet time |

Minimum 10 experiments based on above syllabus

1. Practicing effective communication through play, drama
2. Observation of the conversations
3. Learning body language through presentations and drama
4. Participating in one to one conversation
5. Participating in group conversation
6. Demonstration of Audio, Video CDs of well known personalities
7. Audio recording of the conversations and analyzing it offline
8. Video recording of the conversations and analyzing it offline
9. Talking in front of mirror in presence of observers like other batch mates, group leaders and/or teachers
10. Report writing
11. Diary writing a tool for “Self Development through Self exploration and introspection”
12. Case study on Non Violent Communication.

References:

1. Communication skill for technical students, T.M.Farhathullah, Orient Blackswan
2. Communication in English for technical students, TTTI Calcutta , Orient Longman
3. How to write and speak better, Reader's digest, Editor : John Ellison Kahn
3. Body language, Allan Pease, Sheldon press
4. Course Material PPT on, "Self Development Program and Practical approach"