

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
04	3	1	0	BSC 101	ENGINEERING PHYSICS-I	BSC

UNIT I

Interference: Coherent sources, conditions for sustained interference, Analytical treatment of interference, Division of Wave-Front – Fresnel’s Biprism, Division of Amplitude-Interference by a plane parallel film, Wedge-shaped film, Newton’s Rings, Michelson Interferometer, applications (Resolution of closely spaced spectral lines, determination of wavelengths).

UNIT II

Diffraction: Difference between interference and diffraction Fraunhofer and Fresnel diffraction. Fraunhofer diffraction through a single slit, Plane transmission diffraction grating, absent spectra, dispersive power, resolving power and Rayleigh criterion of resolution.

UNIT III

Polarisation: Polarised and unpolarised light, Uniaxial crystals, optic axis, double refraction, Nicol prism, quarter and half wave plates, Detection and Production of different types of polarized light, Polarimetry; Optical and specific rotation, Biquartz and Laurent’s half shade polarimeter.

Laser and Fibre Optics: Spontaneous and Stimulated emission, Laser principle, Einstein’s coefficients, characteristics of laser beam-concept of coherence, spatial and temporal coherence, He-Ne and semiconductor lasers (simple ideas), applications. Propagation of light in optical fibres, numerical aperture, V-number, single and multimode fibres, Elementary idea of attenuation and dispersion, applications.

UNIT IV

Electrostatics: Dielectric polarization, dielectric relaxation process, types of polarization, relation between E,P and D, Gauss’s law in the presence of a dielectric, Energy stored in a uniform electric field, dielectric losses and variation with frequency.

Electrodynamics: Maxwell’s field equations –significance, differential and integral form, Maxwell’s equations in different media- free space, dielectric and conductor.

UNIT V

Special Theory of Relativity: Inertial and non-inertial frames, Galilean transformations, Michelson’s Morley Experiment, Postulates of Special Theory of Relativity, Lorentz transformations, Consequences of LT (length contraction and time dilation), addition of velocities, variation of mass with velocity, mass energy equivalence.

Text and Reference books:

1. Perspectives of Modern Physics - Arthur Beiser (TMH)
2. Optics – Ajoy Ghatak (TMH)
3. Modern Physics for Engineers – S.P.Taneja (R. Chand)
4. Engineering Physics – Satya Prakash (Pragati Prakashan)
5. Modern Engineering Physics – A.S.Vasudeva (S. Chand)
6. Engineering Physics (Vol-1)- S.L. Gupta (Dhanpat Rai)
7. Fundamentals of Physics – Resnick & Halliday (Asian Book)
8. Introduction to Electrodynamics – D.J. Griffith (Prentice Hall)

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
04	3	1	0	BSC 102	ENGINEERING MATHEMATICS-I	BSC

UNIT I

Differential Calculus: Asymptotes (Cartesian Coordinates Only), Curvature (Cartesian Coordinates Only), Concavity, Convexity and Point of Inflexion (Cartesian Coordinates Only), Successive differential.

UNIT II

Differential Calculus: Partial Differentiation, Euler's Theorem on Homogeneous Functions, Approximate Calculations, Maxima & Minima of Two and More Independent Variables, Lagrange's Method of Multipliers.

UNIT III

Integral Calculus: Surface and Volumes of Solids of Revolution, Double Integral, Double Integral by changing into polar form, Areas & Volumes by Double Integration, Change of Order of Integration, Beta Function and Gamma Function (Simple Properties).

UNIT IV

Differential Equations: Differential Equations of First Order and First Degree - Linear Form, Reducible to Linear form, Exact Form, Reducible to Exact Form, and Linear Differential Equations of Higher Order with Constant Coefficients Only.

UNIT V

Differential Equations: Second Order Ordinary Differential Equations with Variable Coefficients, Homogeneous and Exact Forms, Change of Dependent Variable, Change of Independent Variable, and Method of Variation of Parameters.

Text and Reference books:

1. Advanced Engineering Mathematics, Erwin Kreyszig, Wiley 9th Edition.
2. Calculus and Analytical Geometry, Thomas and Finney, Narosa Publishing House. New Delhi.
3. A Text Book of Differential Equations, M.Ray and Chaturvedi, Students Friends & Co. Publisher, Agra
4. Higher Engineering Mathematics, B.V.Ramana, Tata McGraw Hill.

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
04	3	1	0	ESC 101	ELECTRONIC COMPONENTS & DEVICE	ESC

UNIT- I

Semiconductor Diode: Depletion layer, V-I characteristics, ideal and practical, diode resistance, capacitance, Diode Equivalent Circuits, Transition and Diffusion Capacitance), Zener Diodes breakdown mechanism (Zener and avalanche).

Diode Applications: Series, Parallel and Series-Parallel Diode Configurations, Half and Full Wave rectification, parameters of half wave and full wave rectifiers, Zener diode as shunt regulator.

UNIT- II

Bipolar Junction Transistor: Transistor Construction and working Operation. Common Base, Common Emitter, Common Collector Configurations and their comparison. Input and output Characteristics of different configuration. Dc load line analysis and biasing. Common emitter amplifier.

UNIT- III

Number System: Binary number system: Binary to decimal and decimal to binary conversion, Arithmetic operations of binary numbers, 1's and 2's complement, Representation of binary numbers as electrical signals. Octal number system: Octal to decimal conversion, decimal to octal conversion, binary to octal conversion, octal to binary conversion, advantages of octal number system. Hexadecimal number system: binary to hexadecimal and hexadecimal to binary conversion.

UNIT- IV

Logic Gates and Boolean algebra: Circuit, symbol and truth tables of OR, AND, NOT, X-OR, NAND, NOR, X-NOR. Bubbled gates. Realization of a function using logic gates. Laws of Boolean algebra. De Morgan's Theorem. Duals. Minimization of a function by Boolean algebra and K-map.

UNIT- V

Operational Amplifiers: Introduction, Differential Amplifier Circuits, Op-Amp Basic, Practical Op-Amp Circuits (Inverting Amplifier, Non-inverting Amplifier, Unit Follower, Summing Amplifier, Integrator, Differentiator). Differential and Common- Mode Operation. Introduction to Field effect Transistor.

Text and Reference books::

1. Ravish R Singh, "Basic Electrical and Electronics Engineering", TMH publication.
2. B.L. Theraja, "Basic Electronics solid state", S. Chand publication.
3. J.B. Gupta, " Basic Electrical and Electronics Engineering.

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
04	3	1	0	ESC 102	ENGINEERING MECHANICS	ESC

UNIT-I

Introduction of Engineering Mechanics: Basic concepts System of Forces- Coplanar Concurrent Forces - Components in Space - Resultant- Moment of Forces and its Application Couples and Resultant of Force System - Equilibrium of System of Forces- Free body diagrams- Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT –II

Friction: Types of friction - Limiting friction - Laws of Friction - static and Dynamic Frictions - Motion of Bodies - Wedge, Screw jack and differential Screw jack.

Transmission of Power: Belt Drivers - Open, Crossed and compound belt drives -length of belt - tensions - tight side - slack side - Power transmitted and condition for maximum power.

UNIT -III

Center of Gravity & Moment of Inertia: Centroids - Theorem of Pappus- Centroids of Composite figures - Centre of Gravity of Bodies - Area moment of Inertia: - polar Moment of Inertia - Transfer - Theorems - Moments of Inertia of Composite Figures - product of Inertia - Transfer Formula for product of Inertia. Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia - Mass moment of inertia of composite bodies.

UNIT -IV

Kinematics: Rectilinear and Curve linear motion - Velocity and Acceleration - Motion of a Rigid Body - Types and their Analysis in Planar Motion.

Kinetics: Analysis as a particles and Analysis as a Rigid Body in Translation - Central Forces of motion - Equations of Plane Motion - Fixed Axis Rotation - Rolling Bodies - Work-Energy Method - Equation for Translation - Work-Energy application to Particle Motion, Connected System- Fixed axis Rotation and Plane Motion.

UNIT -V

Mechanical Vibrations: Definitions, Concepts - Simple Harmonic motion - free vibrations - Simple and compound pendulums - torsional vibrations.

Shear Force & Bending Moment Diagrams & Trusses: Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple. Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections.

Text and Reference books::

1. R. C. Hibbler – Engineering Mechanics: Statics & Dynamics.
2. R.K. Rajput, Engineering Mechanics S.Chand & Co.
3. Engineering Mechanics - Schaum's series - McGrawHill Publications.
4. Engineering Mechanics by S.Timashenko, D.H. Young and J.V. Rao
5. Engineering Mechanics: N.H.Dubey

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
04	3	1	0	ESC 103	COMPUTER FUNDAMENTALS	ESC

UNIT I

Introduction to Computer: Definition of Computer, Evolution of Computer, Generations of Computer, types of Computer, classification of Computer, Input/output Devices, Arithmetic and Logical Unit, Central Processing Unit, Control Unit, Memory, Several Registers. Hardware and Software.

Introduction to Software and Hardware, types of Software, difference between System Software and Application Software, Files, types of Files, Random Access File, Direct Random Access File, Pseudo code.

UNIT-II

Operating System and Memory: Introduction to Operating System, Functions of Operating System, Types of Operating system, Introduction to Linux, Introduction to Memory, Primary Memory, types of Primary Memory, Secondary Memory, types of Secondary Memory, Extended Memory, Flash Memory.

UNIT III

Number System and Arithmetic Core: Binary Number System, Octal Number System, Hexadecimal Number System, BCD Codes, Addition, Subtraction, Multiplication and Division of Binary Number Systems.

Conversions: Conversion of Decimal to Binary, Binary to Decimal, Decimal to Octal, Binary to Octal, Octal to Decimal, Decimal to Hexadecimal, Hexadecimal to Decimal.

UNIT IV

Boolean Algebra And Logic Gates: Basic Boolean functions, Logic Gates, AND, OR, NAND, NOR Gates, Logic Circuits, Converting expression to Logic Circuits, Universal NAND Gate, Universal NOR Gate , Exclusive OR and Equivalence functions, Design of Combinational Circuit, Full and Half Adder, Parallel Binary Adder.

UNIT V

Programming and Languages: Introduction to Programming, Procedural Programming, Structural Programming, Object Oriented Programming, Machine Level Language, Assembly Language, Higher Level Language, Translator, Assembler, Linker, Loader, Advantages and Limitations of Programming Languages, Algorithms and Flow Charts.

Text and Reference books::

1. E Balagurusamy Fundamentals of Computer TMH Publications.
2. Rajaraman, V. (2004). Introduction to Information Technology. PHI.
3. PK Sinha Computer Fundamentals Sixth Edition BPB Publications.
4. Norton, P. (2001). Introduction to computers. TMH
5. Ram, B. (2003). Computer Fundamentals. New Age Publications

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
00	2	0	0	MC-I	ENVIRONMENTAL STUDIES	MC

UNIT I

Multidisciplinary Nature Environmental Studies: Definition, scope and importance. Need for public awareness.

Natural Resources: Renewable and Non-Renewable Resources: Natural resources and associated problems:

- Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
- Water resources: Use and over-utilization of surface and ground water.
- Mineral resources: Use and exploitation, environmental effects of extracting and mineral resources, case studies.
- Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems.
- Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources. Case studies.
- Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conservation of natural resources.

UNIT II

Ecosystems:

Concept of an ecosystem. Structure and function of an ecosystem. Producers, consumers and decomposers.

- Energy flow in the ecosystem. Ecological succession. Food chains, food webs and ecological pyramids. Nutrient cycling; biogeochemical cycle, N₂ Cycle, H₂O Cycle, Carbon cycle.
 - a) Introduction & characteristic features, structure and function of the following ecosystem/ Biomes: α) Forest ecosystem b) Grassland ecosystem c) Desert ecosystem d) Aquatic ecosystems (fresh & Marine)

UNIT III.

Biodiversity and its Conservation:

- Introduction – Definition: genetic, species and ecosystem diversity.

- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Bio geographical classification of India.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation. Hot-spots of biodiversity. Endangered and endemic species of India.
- Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts. Conservation of biodiversity: in-situ and ex-situ conservation of biodiversity.

UNIT IV

Environmental Pollution:

- Definition, Causes, effects and control measures of: a) Air pollution b) Water pollution c) Soil pollution d) Noise pollution e) Nuclear hazards
- Role of an individual in prevention of pollution.
- Solid waste Management: Causes, effects and control measures of urban and industrial wastes. Disaster management: floods, earthquake, cyclone and landslides.

UNIT V

Social Issues and the Environment:

- Sustainable development; From Unsustainable to Sustainable development urban problems related to energy. Water conservation, rain water harvesting, watershed management. Resettlement and rehabilitation of people; its problems and concerns.
- Environmental Issues and possible solutions. Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents.
- Environment Protection Act. Air (Prevention and Control of Pollution) Act. Water (Prevention and Control of Pollution) Act
- Wildlife Protection Act.
- Public awareness & measures.

Text and Reference books:

1. Perspectives in Environmental Studies by A. Kaushik and C. P. Kaushik, New age international publishers.
2. Environmental Studies by Benny Joseph, Tata McGraw Hill Co, New Delhi
3. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
4. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela 2008 PHI Learning Pvt Ltd.
5. Environmental Science by Daniel B. Botkin& Edwards A. Keller, Wiley INDIA edition.
6. Fundamentals of Ecology by Odum, E.P., Barrick, M. and Barret, G.W. Thomson Brooks/Cole Publisher, California, 2005.

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
03	3	0	0	HSMC 101	COMMUNICATIVE ENGLISH	HSMC

UNIT I

Basic Functional English

1. The English 'Alphabet' with emphasis on Vowels' and their sounds.
2. Introduction to various Parts of Speech – Noun, Verb, Adjective, Adverb, Pronoun, Preposition, Conjunction, Interjection.
3. Simple Present Tense.
4. Introduction to sentence composition – Subject and Predicate, Subject-Verb agreement, construction of Simple Sentences.
5. Articles – Uses and exceptions.
6. Vocabulary – Synonyms, Antonyms, Homonyms.
7. Commonly Mispronounced and misspelled words.
8. Common technical/ scientific/ legal terminologies
9. Question Formation – Close ended, open ended, and tag questions.

UNIT II

Communicative English

1. English in every-day communication – greeting people, introducing oneself, giving public speeches and presentations, public speaking, making an argument, persuading someone, participating in interviews and group discussions, situational role plays, etc.
2. Politeness and etiquette in daily communications – Minding the Ps and Qs (please, quite, kindly, excuse me, pardon me, thank you, bless you, pleasure, etc).
3. *May* and *Can* for permission and possibility; *Could* for permission and possibility in the past; *Could* for politeness in the present.
4. *May* and *Might* for possibility; *Can* and *Be able to* for ability.
5. *Ought*, *Should*, *Must*, *Have to*, *Had to*, and *Need to* for obligation.

UNIT III

Reading Comprehension

1. Close reading and comprehension.
2. Summary paraphrasing. CV writing, official letters, memo, precise, and reports.
3. Analysis and interpretation of key texts.

UNIT IV

Oral Presentation

1. Oral presentation (with PPTs or PREZI) of reports, arguments, summary and analysis of texts, etc.

2. Extempore, speech delivery, Just a Minute Exercise
3. Group Discussion and PI

UNIT V

Introduction to Business Communication:

Definition, objectives, importance, elements, process, forms, models, levels of analysis of business communication, principles of effective communication, barriers to communication. Types of communication, formal and non-formal, verbal and non-verbal.

Text and Reference books:

1. Communication Skills for Engineers and Scientists, Sangeeta Sharma & Binod Mishra, PHI Learning Pvt. Ltd.
2. English for Engineers: Made Easy, Aeda Abidi & Ritu Chaudhary, Cengage Learning, (New Delhi)
3. A Practical Course for Developing Writing Skills in English, J.K. Gangal, PHI Learning Pvt. Ltd., New Delhi.
4. Intermediate Grammar, Usage and Composition, Tickoo, A. E. Subramaniam & P. R. Subramaniam, Orient Longman (New Delhi)
5. The Written Word, Vandana R. Singh, Oxford University Press (New Delhi)
6. The Great Short Stories edited by D.C. Datta, Ram Narain Lal Publishers (Allahabad)
7. Professional Communication, Kavita Tyagi & Padma Misra, PHI Learning Pvt. Ltd., New Delhi.
8. "Learn Correct English: Grammar, Usage and Composition" by Shiv K. Kumar & Hemalatha Nagarajan, Pearson (New Delhi).
9. "Current English Grammar and Usage with Composition" by R.P. Sinha, Oxford University Press (New Delhi).
10. "Grammar of the Modern English Language", by Sukhdev Singh & Balbir Singh, (New Delhi).

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Credits	L	T	P	Course Code	Course Title	Category of Course
02	0	0	3	ESC 104	WORKSHOP	ESC

Carpentry Shop

1. T – Lap joint
2. Bridle joint

Foundry Shop

1. Mould of any pattern
2. Casting of any simple pattern

Welding Shop

1. Gas welding practice by students on mild steel flat
2. Lap joint by gas welding
3. MMA welding practice by students
4. Square butt joint by MMA welding
5. Lap joint by MMA welding
6. Demonstration of brazing

Machine Shop Practice

1. Job on lathe with one step turning and chamfering operations
2. Job on shaper for finishing two sides of a job
3. Drilling two holes of size 5 and 12 mm diameter on job used / to be used for shaping
4. Grinding a corner of above job on bench grinder

Fitting and Smithy Shop

1. Finishing of two sides of a square piece by filing
2. Tin smithy for making mechanical joint and soldering of joint
3. To cut a square notch using hacksaw and to drill three holes on PCD and tapping

Text and Reference books :

1. Mechanical Workshop Practice, K.C. John, PHI Learning , New Delhi.
2. Elements of Workshop Technology Hajra & Choudhary, Media Promoters & Publisher.
3. Workshop Technology , W.A.J.Chapman, CBS Publisher & Distributor New Delhi.

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
01	0	0	2	BSC 103	PHYSICS-I LAB	BSC

List of Experiments:

1. To determine the specific rotation of Glucose (Sugar) solution using a polarimeter.
2. To convert a Galvanometer in to an ammeter of range 1.5 amp. and calibrate it.
3. To convert a Galvanometer in to a voltmeter of range 1.5 volt and calibrate it.
4. To study the variation of a semiconductor resistance with temperature and hence determine the Band Gap of the semiconductor in the form of reverse biased P-N junction diode.
5. To measure the height of a terrestrial objects using Sextant.
6. To find out the horizontal component of earth's magnetic field by using tangent galvanometer.
7. To determine the wave length of monochromatic light with the help of Fresnel's biprism.

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
01	0	0	2	ESC 105	ELECTRONIC ENGINEERING LAB	ESC

List of Experiments:

1. Study of Multimeter and measuring electrical quantities with the help of multimeter.
2. To observe sine wave, square wave, triangular wave and ramp wave forms on the C.R.O and to measure the frequency of waveforms.
3. To obtain the V-I characteristics of PN Junction diode.
4. To obtain the V-I characteristics of Zener diode.
5. To observe waveform at the output of half wave rectifier with and without filter capacitor. To measure DC voltage, DC current, ripple factor with and without filter capacitor.
6. To observe waveform at the output of full wave rectifier with and without filter capacitor. To measure DC voltage, DC current, ripple factor with and without filter capacitor.
7. To observe waveforms at the output of clipper and clamper circuits.
8. To obtain common emitter characteristics of NPN/PNP transistor.
9. To obtain common base characteristics of NPN/PNP transistor.
10. Verify the truth table of AND, OR, NOT, NOR and NAND gates.

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
01	0	0	2	HSMC 102	LANGUAGE LAB-I	HSMC

List of Experiments:

1. Phonetic Symbols and Transcriptions
2. Word Formation
3. Affixes
4. Listening and speaking Skills.
5. Words often Mis-spelt and Mis- Pronounced
6. One Word for Many.
7. Synonyms and Antonyms.
8. Seminar Presentation.
9. Group Discussion.
10. Job Interview

Text and Reference books:

1. Advanced Manual for Communication Laboratories and Technical Report Writing, D. Sudha Rani, Pearson, (New Delhi)
2. A Course in Phonetics and Spoken English, J. Sethi & P.V. Dhamija, PHI Learning Pvt. Ltd. (New Delhi)
3. English Language Laboratories: A Comprehensive Manual, Nira Konar, PHI Learning Pvt .Ltd. (New Delhi)
4. Communication Skills for Engineers and Scientists, Sangeeta Sharma and Binod Mishra, PHI Learning Pvt. Ltd.(New Delhi).
5. Oxford English Learning Package.(With CDs: Headway Series)
6. Tata McGraw Hills English Learning Package (With CDs) 7. “Oxford Advanced Learners’ Dictionary” published by Oxford University Press (New Delhi)

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
00	0	0	0	MC-II	ENVIRONMENTAL STUDIES LAB	MC

List of Experiments:

1. To determine the hardness of water by HCL method.
2. To determine the hardness of water by EDTA method.
3. Determination of CO in a water sample.
4. Measurement of pH of a given sample by pH-meter.
5. To determine free and residual chlorine in a given water sample.
6. Measurement of dissolved oxygen in water.
7. Measurement of conductivity of a given sample by conductivity meter.
8. Measurement of fluoride in water.
9. Measurement of nitrate in water.
10. Determination of sulphate in water.
11. Evaluation of Reverse Osmosis (RO) Process by TDS measurement.

B. Tech. I Semester

Credits	L	T	P	Course Code	Course Title	Category of Course
00	0	0	0	GP-P-101	SEMINAR/GENERAL PROFICIENCY (GP)	HSMC

OBJECTIVE: To enhance and groom one's outer and inner self to bring about a positive change in one's life. OR Boosting one's confidence, learning fine etiquettes and manners, adding style and grace to the way one looks, talks and walks and overall imbining oneself with positively, liveliness and peace

ACTIVITIES

Orientation: Face to face with future- Need & Importance of soft skills in the career of Engineering graduate

Change Management: Different aspects of change in life & how to incorporate positive change in one's life as per environment

Attitude Development: Programming one's mind for positive results

Self Esteem: Understanding and changing self image for betterment

Self Analysis: Significance & Techniques of SWOT

Goal Setting: To set & pursue well defined objectives for one's life

Time Management: Understanding value of time & managing it-List time savers & time wasters

Dress & Appearance: Significance & application of Occasion wise dressing. Understanding & improving self appearance

Manners & etiquettes: Dinning & Social etiquettes

Introduction to Aptitude & Vocabulary Building

Text and Reference books:

1. Unlimited Power by Anthony Robbins
2. Awaken the giant within you by Anthony Robbins
3. Success Never Ends, Failure is Never Final by Robert Schuller
4. How to read a person like a book by Oscar Bruce
5. Body Language by Allen Pease