Autonomous Programme Structure (Modified) of
F. Y. B. Tech. (Common to All Programmes)
A. Y.: 2019-2020

F. Y. B. Tech. Semester –I									
Course Code	Course Title	Teaching Scheme Hours / Week			Examination Scheme			Marks	Credit
		Lecture	Tutorial	Practical	In Semester	End Semester	Practical / Oral		
BS 1101	Engg. Mathematics - I	3	1	0	50	50	0	100	4
BS 1102	Physics - I	2	1	0	50	50	0	100	3
BS 1103	Chemistry- I	2	1	0	50	50	0	100	3
ES 1101	Basic Electrical and Electronics Engg. - I	3	0	0	50	50	0	100	3
ES 1102	Fundamentals of Programming Language - I	1	0	0	25	0	0	25	1
ES 1103	Engg. Graphics	2	0	0	25	25	0	50	2
ES 1104	Environmental Studies	2	1	0	50	50	0	100	3
BS 1104	Physics and Chemistry Lab - I	0	0	2	25	0	0	25	1
ES 1105	Basic Electrical and Electronics Engg. Lab - I	0	0	2	0	0	25	25	1
ES 1106	Fundamentals of Programming Language - I	0	0	2	0	0	25	25	1
ES 1107	Engg. Graphics Lab	0	0	2	0	0	25	25	1
NC 1101	Value Education	1	0	0	0	0	0	0	0
	Total	**16**	**4**	**8**	**325**	**275**	**75**	**675**	**23**
	Grand Total	**28**			**675**			**675**	**23**

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BS-1101 ENGINEERING MATHEMATICS I

Teaching Scheme:
Teaching: 3 Hrs/week
Tutorial: 1 Hr/week

Examination scheme:
In-Semester: T1-25Marks,
T2-25 Marks
End-Semester: 50 Marks

Course Objective: Mathematics is a necessary path to scientific knowledge which opens new perspective of mental activity. Our aim is to provide sound knowledge of engineering mathematics to make the students think mathematically and strengthen their thinking power to analyze and solve engineering problems in their respective areas.

Course outcome: Students will be able to

CO1	Solve the system of Linear equations by using the matrix method and apply it to check Linear Dependence, Independence of the vectors.
CO2	Calculate eigen values, eigen vectors and apply it to diagonalize a matrix.
CO3	Analyze roots of algebraic equations by applying De Moivre's theorem and analyze the function of complex numbers .
CO4	Compute power series expansions by using higher order derivatives.
CO5	Calculate partial derivatives and use to analyze maxima, minima of a given function.

Unit-I: Matrices **(07)**

Matrices, Rank of the matrix, Echelon Form, Normal form, Inverse of the Matrix, System of linear Equations, linear independence and Dependence, Linear Transformation, Rotation & Translation Matrices.

Unit-II: Applications of matrices **(06)**

Eigen Values, Eigen Vectors, Cayley Hamilton Theorem, Diagonalization and applications in finding powers of matrix .

Unit-III: Complex Numbers and its Applications **(08)**

Argand's diagrams, De moivre's Theorem and its applications, Hyperbolic functions, Separation of real and imaginary parts of functions of complex numbers, Inverse Hyperbolic Functions, Logarithm of Complex Numbers.

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Unit-IV: Differential Calculus (05)

Successive Differentiation, Methods of finding nth derivative of functions, Leibnitz's Theorem, Taylor's series, Maclaurin's Series.

Unit-V: Partial Differentiation (07)

Partial Differentiation, Chain Rule, Composite function, Euler's theorem on homogeneous Functions, Total derivatives .

Unit-VI: Jacobian and its applications (08)

Jacobian, Partial derivatives using Jacobian, Errors and Approximations, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Text Books:

1. **Higher engineering Mathematics,** B.S. Grewal, Khanna publishers, Delhi
2. **Higher Engineering Mathematics** B. V. Ramana, Tata McGraw Hill Publications.
3. **Advanced Engineering Mathematics** Erwin Kreyszig , Wiley Eastern Ltd. (8th Student Edition)

Reference Books:

1. **Advanced Engineering Mathematics** ,C.R. Wylie , McGraw Hill Publications, New Delhi.
2. **Advanced Engineering Mathematics** ,Peter V. ONeil , Thomson. Brooks / Cole, Singapore (5th edition) .

BS1102 Physics - I

Teaching Scheme:

Lectures: 2 Hrs / Week

Tutorial: 1 Hr / Week

Examination Scheme:

In - Semester: **50** Marks

End - Semester: **50** Marks

Credits: 3

Course Objectives:

1. To introduce undergraduate students of engineering to the principles, notions, basic physical ideas, mathematical relations and applications of Classical Physics, specifically pertaining to the theories of Electromagnetic Radiation, Optics, Special Relativity
2. To point out some of the contexts in which Classical Physics fails to account for certain experimental observations thereby requiring Quantum Physics to take over

Course Outcomes:

By taking this course, the learner will be able to —

CO — 1: Use the laws of Electrostatics and Electromagnetic Radiation to draw conclusions pertaining to the behaviour of elementary static and dynamic charge distributions.
CO — 2: Apply the laws of physical optics in situations involving two and more coherent sources superimposed to produce interference, diffraction and polarisation patterns.
CO — 3: Justify the use of the principles of special relativity in situations involving elementary particles moving at speeds comparable to the speed of light.
CO — 4: Judge the relevance of quantum mechanical principles and methods in finding out interferometric behaviour and allowed energy states of particles with arbitrary spins.

Unit - I: Electromagnetic Radiation and Interference: **(4)**

Expression for the electric field beyond Coulomb's law; The dipole radiator; Physics of interference - Two dipole radiators

Unit - II: Diffraction and Polarisation: **(4)**

The resultant amplitude due to n equal oscillators; Diffraction Grating; The electric vector of light; Birefringence; Polarisers

Unit - III: Capacitance and Dielectrics: **(4)**

Electrostatic energy; Capacitance of a Parallel-Plate Capacitor; The dielectric constant; The polarization vector

Unit - IV: Special Relativity: **(4)**

The Lorentz transformation; Slowing of clocks; Contraction of length; Relativistic energy

Unit - V: Quantum Behaviour - I: Particles and Waves: **(4)**

Experiments with bullets, waves and electrons; The uncertainty principle

Unit - VI: Quantum Behaviour - II: The Magnetism of Matter: **(4)**

The precession of atomic magnets; Angular momentum in Quantum Mechanics; The magnetic energy of atoms; Quantized magnetic states

Text Book:

R. P. Feynman, R. B. Leighton and M. Sands, **'The Feynman Lectures on Physics - Volume 1 and 2'**, *Pearson Education* (2006)

Reference Books:

1. J. Walker, D. Halliday, R. Resnick, **'Principles of Physics'**, *Wiley Student Edition* (10th Edition)
2. H. Young and Roger Freedman, **'University Physics'**, Pearson Addison Wesley (12th Edition)

BS-1103 Chemistry I

Teaching Scheme:
Lectures: 2 Hrs/Week
Tutorial: 1 Hr/Week

Examination Scheme:
In-Semester: **50** Marks
End-Semester: **50** Marks

Credits: 3

Course Objectives:

The Chemistry course is designed such that the learners develop a sound background of fundamental chemical principles relevant in the engineering context. The course facilitates undergraduates to learn chemical bonding theories, methods of analysis and evaluate role of chemical substances. The students will learn to analyze chemical processes related to engineering applications. Further the course inculcates basic problem solving skills involving chemistry principles.

Course Outcomes:

1. Apply bonding theories to interpret the structure and properties of molecules.
2. State laws and write chemical equations related to chemical processes.
3. Analyse chemical systems qualitatively and quantitatively.
4. Apply principles of chemistry for some engineering applications.
5. Critique on the role of a chemical substance for a particular function.

Unit – I: Chemical Bonding **(05)**

Types of bonds - primary & secondary types with examples, hybridization based on valence bond theory, VSEPR theory, molecular orbital theory with respect to bonding in homo and hetero nuclear diatomic molecules.

Unit – II: Coordination Chemistry **(05)**

Introduction,Classification of ligands, naming coordination compounds, Werner and Sidgwick theory, VBT and it's Applications.

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Unit – III: Electro chemistry **(05)**

(a) Fundamentals of an electrochemical cell, EMF of cell, reference and indicator electrodes,

(b) Battery Technology

Primary & secondary cell, battery characteristics, Rechargeable batteries:Lead-acid and Lithium-ion battery, Fuel Cell technology.

Unit – IV: Instrumental methods of Analysis-I **(05)**

Basic principles,instrumentation and applications of pHmetry & Potentiometry, conductance in solution and conductometric titrations

Unit – V: Water Analysis and Purification **(06)**

Hardness in water, effect of hard water in boilers, water softening techniques (Permutit and Ion exchange method) and membrane based processes.

Unit – VI: Photochemistry **(04)**

Photochemical reactions, Laws of Photochemistry and quantum yield, energy transfer in photochemical reaction with examples.

Text Books:

1. Arun Bahl & G.D. Tuli, **Essentials of Physical Chemistry,** *S.Chand Publications* (2014)
2. S.S. Dara **'Engineering Chemistry'** *S. Chand Publications (2010)*
3. Puri, Sharma, Kalia **'Principles of Inorganic Chemistry'**: *Milestone Publications* (2009)
4. B.S. Chauhan **'Engineering Chemistry'** :*Univ Sc Press.*(third edition)2009
5. Shashi Chawla **'A Text Book Of Engineering Chemistry'**: *Dhanpat Rai & Co.*(2015)
6. Jain and Jain **'A Text Book Of Engineering Chemistry'** *Dhanpat Rai & Co.*
7. Gurdeep Chatwal **'Instrumental methods of Chemical Analysis'** *Himalaya publ.house*

Reference Books:

1. Steven S. Zumdahl, **'Chemistry concepts and applications',** *Cengage learning publication* (2009)
2. Ram D. Gupta,**'Hydrogen fuel'***C.R.C.Publications*(2009)
3. Puri, Sharma, Pathania **'Principles of Physical Chemistry'** *: Vishal Publ. Co.*(2015)
4. Robert D. Braun*' **Instrumental methods of analysis'** Pharmamed press* (2010)

ES1101 Basic Electrical and Electronics Engineering - I

Teaching Scheme:

Lectures: 3 Hrs/Week

Examination Scheme:

In-Semester: **50** Marks

End-Semester: **50** Marks

Credits: 3

Course Objectives:

1. To make students familiar with the fundamental concepts of electric and magnetic circuits.
2. To educate the students about the realization of basic theoretical concepts & laws in real physical world.
3. To educate the students about the construction and applications of diode
4. To educate the students about the construction and applications of BJT

Course Outcomes:

After completion of course, students will be able to

1. Calculate energy consumption for electro-thermal and electro-mechanical systems as well as analyze the temperature effect on resistance
2. Calculate magnetic circuit parameters
3. Apply the knowledge of relevant laws and principles for calculating electric circuit parameters.
4. Compute parameters of sinusoidal and non-sinusoidal alternating current
5. Describe working principle, characteristics and simple aplications of semiconductor diodes and transistors

Unit – I: Introduction to electrical systems **(05)**

Review of basic electrical terms, Effect of temperature on resistance, Resistance temperature coefficient, insulation resistance, Work, Power and energy calculations for thermal, mechanical and electrical systems.

Unit – II: DC Networks **(07)**

Kirchoff's laws, Mesh and Nodal Analysis, Thevenin , Norton and Superposition Theorems, maximum power transfer therom, Network Simplifications using star-delta / delta-star transformations.

Unit – III: Electromagnetism and Magnetic Circuits **(06)**

Magnetic field due to electric current, Force on a current carring conductor, Electromagnetic induction, direction and magnitude of induced EMF, magnetomotive force and magnetic field strength, relative and absolute permeability, reluctance, series and parallel magnetic circuits, magnetic materials and B-H curve, self and mutual inductance, coupling coefficient,energy stored

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in magnetic circuits .

Unit – IV: Electrostatics and AC fundamentals **(06)**

A: Electrostatic field, electric flux density, electric field strength, permittivity. Capacitor and capacitance, dielectric strength and breakdown voltage, capacitors in series and parallel,composite capacitors, energy stored in capacitors, charging and discharging of capacitors and time constant.

B: Generation of alternating emf, waveform terms and definations, average value and rms values for sinusoidal and non sinusoidal currents and voltages, phasor representation of an alternating quantity.

Unit – V: Diodes and rectifiers **(06)**

Overview of Semiconductor physics and p-n junction theory, Junction diode, construction and characteristic of p-n junction diode, zener diode, LED, photodiode, Half wave,full wave and bridge rectifiers, need of capacitor filter, rectifier operation with capacitor filter, zener diode as a voltage regulator, block diagram of Regulated power supply

Unit – VI: Junction Transistor Amplifiers **(06)**

Bipolar junction transistor, Construction of BJT, Types of biasing:-fixed bias and self bias circuit, BJT characteristics for-CE,CB,CC configurations, relationship between α and β, load line for a transistor, application of transistor as a switch and amplifier.

Text Books:

1. Hughes, **'Electrical and Electronic Technology'**, *pearson education,* (9^{th} edition), (2009)

Reference Books:

1. D.P. Kothari and I.J. Nagrath, '**Basic Electrical Engineering**', *McGraw-Hill,* (3^{rd} edition), (2010)
2. A.E.Fitzgerald, A.Grabiel,'**Basic Electrical engineering**',*McGraw-Hill,* (5^{th} edition), (2009)
3. Floyd, '**Electronic Devices and Circuits**', *pearson education, (*7^{th} edition),(2008)

ES 1102 Fundamentals of Programming Languages - I

Teaching Scheme:
Practical: 1 Hr. / Week

Examination Scheme:
Insem: 25 Marks
Credits: 1

Course Objectives:	
1.	Learn the fundamentals of building blocks of computer.
2.	Understand how to formulate the programming language statements from description of a problem in English.
3.	Understanding of decision and iteration interpretation in a programming language.
4.	Understand basic building blocks of simple website.

Course Outcomes:	
1.	Students will be able to write algorithm based on given problem statement
2.	Students will be able to analyze the problem and apply appropriate programming constructs
3.	Students will be able to implement algorithm for simple problem statement
4.	Students will be able to test program for different inputs

Unit	Description	No. of Hours
1	**Introduction to Programming** Introduction to computer, Anatomy of a computer: Hardware and software, Operating system, Types of programming languages: Machine language, Assembly language, High level languages, Selection of language, Algorithm: As a program, As a flow-chart, Pseudo code	02
2	**Writing First C Program** Structure of a C program, Writing C program, Introduction to library functions in C, Files generated in C program, Comments, Indentation	02
3	**Variables and Operations** C language variables: Numeric, Character, Declaring and Initializing variables, Constants: Integer, Floating point, Character, String Operators: Arithmetic, Relational, Equality, Logical, Unary, Conditional, Bitwise, Assignment, Comma, sizeof, Operator precedence variable scope: Local and Global scope, Type casting and conversion	03
4	**Control flow in C Language** Conditional branching statements: if statements, if-else Statement, Switch case, Iterative statements: while loop, do-while loop, for loop, Nested loops, break and continue statements	03
5	**Arrays** Introduction to Arrays, Accessing Array elements, Internal representation of Arrays in C, Working with one-dimensional array, Introduction to two-dimensional arrays	02

6	**Introduction to Website Development** Introduction to blogging and WordPress : Creating a simple website, Content creation, Pages and Blogs, Page linking, Comments, Adding contents like Multimedia, Presentations, Themes	02

Text Books:	
1.	Reema Thareja, **'Introduction to C programming',** *Oxford University Press* (2nd edition), (2015)
2.	Pradeep Day, '**Computer Fundamentals and programming in C**', *Oxford University Press*, (2nd edition) (2013)

Reference Books:	
1.	B Kernighan, D Ritchie, '**C programming Language**', *Prentice Hall Software Series*, (2nd edition) (1988)

ES 1103 Engineering Graphics

Teaching Scheme
Practical: 2 Hrs/week

Examination Scheme
In semester: 25 marks
End semester: 25 marks
Credits: 2

Course Objectives:

Students will be able to

1 Apply theory of projections and standard conventions in engineering drawing
2 Understand the methods to draw various engineering curves
3 Develop the visualization and interpretation skills for the physical objects
4 Develop free hand sketching skills

Course Outcomes:

After completing the course students will be able to draw

1 Orthographic projections of an object.
2 Engineering curves by applying the given method.
3 Isometric views and development of surfaces of the given object.
4 Free hand sketches of simple machine elements.

Unit I	Layout and sizes of drawing sheets, drawing instruments, types of lines used in drawing practice, dimensioning systems, representation of tolerances, standard codes by B.I.S (SP-46).	**(02)**
Unit II	Construction of ellipse, parabola, hyperbola, involute, cycloid, archimedean spiral, helix on cone and cylinder.	**(05)**
Unit III	Theory of projections, methods of obtaining orthographic views,sectional orthographic projections.	**(08)**
Unit IV	Isometric axes, Isometric scale, isometric projections and views, construction of isometric view from given orthographic views.	**(08)**
Unit V	Parallel line development, radial line development, methods to transfer points for development of prisms, pyramids, cylinder and cone.	**(05)**
Unit VI	Free hand sketching of front view and/or top view of standard machine elements – thread forms, hexagonal headed bolt and nut, screws, shaft and keys, spring, welded and riveted joint.	**(02)**

Text Books:

1. N. D. Bhatt and V. M. Panchal,**'Engineering drawing, plane and solid geometry'**, *Charotor Publication House.*
2. 2) R. K. Dhawan,**'A text book of Engineering Drawing'**, *Pearson Education Inc.*
3. 3) P.S. Gill, **'Engineering Graphics'**, *Kataria and sons Publications.*

4. 4) M.L.Dabhade, **'Engineering Graphics'**, *Vision Publications.*

Reference Books:

1. Warren J. Luzzader, **'Fundamentals of Engineering Drawing'**, *Prentice Hall of India, New Delhi.*
2. Fredderock E. Giesecke, Alva Mitchell, **'Principles of Engineering Graphics'**,*Maxwell*
3. Dhananjay A. Jolhe, **'Engineering Drawing'**, *Tata McGrawHill Publishing Co. Ltd.*

ES 1104 ENVIRONMENTAL STUDIES	
Teaching Scheme:	**Examination Scheme:**
Lectures: 2 Hrs/Week	In-Semester: 50 Marks
Tutorial: 1 Hr/Week	End-Semester: 50 Marks
	Credits: 3

Course Objectives:

1. It is an interdisciplinary approach to understand environment.
2. It enhances the ability to understand Environmental Problems.
3. Understand the relevance and importance of natural resources in the sustenance of life on earth and living standard.
4. To develop the ability and understand role of Individual in Environmental Protection.

Course Outcomes:

A student should be able to:

1. Develop an understanding of environmental pollutions and hazards due to engineering/technological activities and general measures to control them.

2. Analyse the relationships between environmental laws across multiple sectors (local, state, national and international)

3. Develop an understanding of different natural resources including renewable and non-renewable resources.

4. Identify suitable controlling measures for different types of solid wastes.

5 .Improve fundamental knowledge of the inter-relationships between the built environment and natural environment.

6. Discuss an action plan for sustainable alternatives that integrate science, humanities and social perspective

Unit – I: Multidisciplinary nature of environmental studies	**(05)**

- Scope and importance
- Human Interface with the natural environment and its impact
- Environmental Issues – Types of Pollution : Causes and Effects – Air, Water, soil, Noise, Thermal, Marine pollution, Nuclear Hazard, Greenhouse Effect, Global Warming, Climate Change

Unit – II: Environmental Laws and policies	**(03)**

Environmental Laws in India- Environmental Protection Act, Air(Prevention and Control of Pollution) Act, Wild Life Protection Act, Forest Conservation

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Act
- International Agreements and Laws – Kyoto Protocol, Montreal Protocol
- Role of an individual in the conservation of natural resources and in preventing pollution
-

Unit – III: Natural Resource Management	**(05)**

- Energy Resources – Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies
- Solar Energy – Direct method of solar energy collection, Process of photovoltaic energy conservation, Solar energy conservation Technologies and application
- Water Resources – Water conservation, Rain water Harvesting and watershed management, Water Harvesting Techniques, case studies

Unit – IV: Solid Waste Management	**(04)**

- Generation and characteristics of Waste
- Types of waste – Solid waste, Industrial waste, Construction and demolition waste, Special waste, Hazardous waste, E-waste
- Waste Disposal Methods – Landfills, Incineration, biological reprocessing, recycling, ocean dumping, Plasma Gasification

Unit – V: Sustainable Development	**(04)**

- Meaning of Sustainable development and framework to measure sustainable development
- Urbanization and its Effects on environment
- Integrated Built Environment, Building rules and Bye-Laws, Principles of building planning
- Environmental Impact Assessment

Unit – VI: Smart City and Green Buildings	**(05)**

- Concept , Features and Advantages of Green Buildings, Rating systems of Green Buildings
- Engineering Materials – Traditional, Eco-friendly and Smart materials used in construction
- Concept and features of smart city, selection process, strategy

Text Books:

Shashi Chawla **– A Textbook of Environmental Studies** – *McGrawHill Education, Sixth reprint,2015*

Reference Books:

R.Rajagopalan – **Environmental Studies from Crisis to Cure** – *Oxford Publication, Third edition,2016.*
Ajith Sankar R.N.- **Environmental Management** - *Oxford Publication, First edition,2015.*
D.L. Manjunath – **Environmental Studies**- *Pearson Education*
Erach Bharucha- **Text Book of Environmental Studies** – *UGC, Universities Press*
D.K. asthana ,Meera Asthana – **A Text Book Of Environmental Studies** – *S.Chand*
Dr. J.P. Sharma – **Environmental Studies** – *University Science Press*
Dr. Suresh K. Dhalmeja -**Environmental Studies** – *S.K.Kataria & Sons*
Anubha Kaushik, C.P.Kaushik- **Perspectives in Environmental Studies** – *New Age International Publishers*
Shah, Kale, Patki – **Building planning and Built environment** -*Tata McGraw Hill*
Shashi Chawla – **A Textbook of Environmental Studies** – *McGrawHill Education*

MC 1101 Value Education	
Teaching Scheme:	**Examination Scheme:**
Lectures: 1 Hr /Week	In-Semester: **Nil**
Tutorial: Nil	End-Semester: **Nil**
	Credits: Nil

Course Objectives:

1. To make understand importance of values in human behavior.
2. To understand adjustments required in one self and others to uphold values in society.
3. To understand importance of values in Family Life
4. To understand ethics required by professionals in work place.

Course Outcomes:

1. Students will appreciate importance of values in all walks of life.
2. To develop women professional with strong ethics and above all be a good human being.
3. To help students to develop their own value system and action plan based on it.
4. To understand the impact of the Moral role of students in nation building and being a responsible citizen.
5. Understand effects of Global issue like Terrorism, Environment, different cultures etc.

Unit – I: Values and Self Development	**(03)**

Value Education – Definition - relevance to present day - Concept of Human Values - self introspection - Self esteem.

Unit – II: Family values	**(03)**

Components, structure and responsibilities of family - Neutralization of anger - Adjustability- Threats of family life - Status of women in family and society - Caring for needy and elderly - Time allotment for sharing ideas and concerns.

Unit – III: Ethical values	**(03)**

Professional ethics - Mass media ethics- Advertising ethics -Influence of ethics on family life - psychology of children and youth – Leadership qualities - Personality development.

Unit – IV: Social values	**(03)**

Faith, service and secularism - Social sense and commitment -Students and Politics -Social awareness, Consumer awareness, Consumer rights and responsibilities - Redressal mechanisms

Unit – V: Effect of international affairs on values of life/ Issue of Globalization	**(03)**

Modern warfare -Terrorism. Environmental issues - mutual respect of different cultures, religions and their beliefs.

Text Books:

1. Chakraborty, S.K., **'Values and Ethics for Organizations Theory and Practice'**, *Oxford University Press, New Delhi,* (2001)

Reference Books:

1. T. Anchukandam and J. Kuttainimathathil (Ed) **'Grow Free Live Free'**, *Krisitu Jyoti*

Publications, Bangalore (1995)

2. Mani Jacob (Ed) **'Resource Book for Value Education'**, *Institute for Value Education, New Delhi* (2002).

3. S. Ignacimuthu, **'Values for Life'** *Better Yourself Books, Mumbai, (1991).*