

ALAGAPPA UNIVERSITY, KARAIKUDI
NEW SYLLABUS UNDER CBCS PATTERN (w.e.f.2017-18)

B.Sc. PHYSICS – PROGRAMME STRUCTURE

Sem.	Part	Course Code	Title of the Course	Cr.	Hrs./ Week	Marks		Total	
						Int.	Ext.		
III	I	731T	Tamil /Other Languages – III	3	6	25	75	100	
	II	732E	English – III	3	6	25	75	100	
	III		7BPH3C1	Core–VI– Optics and Spectroscopy	4	7	25	75	100
			---	Core – VII – General Physics Practical – II	-	3**	--	--	---
				Allied – III (Theory only) (or)	5	5	25	75	100
				Allied–III (Theory cum Practical)	4	3	15	60	75
			Allied Practical – II	-	2**	--	--	---	
	IV		7NME3A/ 7NME3B/ 7NME3C	(1) Non-major Elective – II (A)இலக்கியமும் மொழிப் பயன்பாடும்/ (B) பழந்தமிழ் இலக்கியங்களும்இலக்கியவரலாறும் / (C) Employability Skills	2	1	25	75	100
			7SBS3A1/ 7SBS3A2/ 7SBS3A3	Skill Based Subjects – I	2	2	25	75	100
		V	7BEA3	Extension activities	1	--	100	--	100
		Total (Allied Theory only)		20	30	--	--	700	
		Total (Allied Theory cum Practical)		19				675	
V	III	7BPH5C1	Core – IX – Analog Electronics	4	5	25	75	100	
		7BPH5C2	Core–X–Computer Programming in C	4	5	25	75	100	
		---	Core–XI– General Physics Practical III		3**	--	--	--	
		---	Core–XII- Electronics Practical IV		3**	--	--	--	
		7BPHE1A/ 7BPHE1B/ 7BPHE1C	Elective–I–A) Mathematical Physics (or) B) Non-Conventional Energy Sources (or) C) Laser Physics and Fibre Optics	5	5	25	75	100	
		7BPHE2A/ 7BPHE2B/ 7BPHE2C	Elective–II– A)Communication Electronics (or) B)Numerical methods and statistics (or) C) Solid State Physics	5	5	25	75	100	
	IV	7SBS5A4/ 7SBS5A5/ 7SBS5A6/ 7SBS5A7	(2) Skill Based Subjects – I	2	2	25	75	100	
			(2) Skill Based Subjects – I	2	2	25	75	100	

**இரண்டாம் ஆண்டு - மூன்றாம் பருவம் -
பாடக்குறியீட்டு எண்: 731T
பொதுத் தமிழ் தாள் - 3 - காப்பியமும் புதினமும்**

அலகு 1

- | | | |
|------------------|---|---------------------------------|
| 1. சிலப்பதிகாரம் | - | மங்கல வாழ்த்துப்பாடல். |
| 2. மணிமேகலை | - | பாத்திர மரபு கூறிய காதை. |
| 3. கம்பராமாயணம் | - | சேது பந்தனப்படலம். |
| 4. பெரியபுராணம் | - | கோச்செங்கட்சோழ நாயனார் புராணம். |
| 5. தேம்பாவணி | - | கோலியாத் படலம். |
| 6. சீராப்புராணம் | - | மானுக்குப் பிணை நின்ற படலம் |

அலகு 2 - புதினம்

வேரில் பழுத்தபலா - சு.சமுத்திரம்.

அலகு 3 - இலக்கணம்

யாப்பும் அணியும் செய்யுள் உறுப்புகள், எழுத்து, அசை, சீர், தளை, அடி, தொடை ஆகியன பற்றிய விளக்கம். பாவகை, வெண்பா, ஆசிரியப்பா ஆகியவற்றின் பொது இலக்கணங்கள். அணி, வகைகள், உவமை, உருவகம், வேற்றுமை, பின்வருநிலை, சிலேடை அணிகள்.

அலகு 4 - இலக்கிய வரலாறு

அலகு 1, அலகு 2ல் உள்ள பாடம் தொடர்பான இலக்கிய வகைகள் தொடர்பான இலக்கிய வரலாறு.

அலகு 5 - படைப்பாற்றல்

மரபுக் கவிதை - புதுக்கவிதை படைத்தல்.

**II YEAR – III SEMESTER
COURSE CODE: 732E**

COURSE – III - ENGLISH FOR ENRICHMENT – III

Texts Prescribed

1. *Six Short Stories*, Ed. by the Board of Editors, Harrows Publications, Chennai.
2. *One Act Plays*, Ed. by the Board of Editors, Harrows Publications, Chennai.
3. *Modern English – A Book of Grammar Usage and Composition* by N.Krishnaswamy, Macmillan Publishers.
4. *English for Communication*, Ed. by the Board of Editors, Harrows Publications, Chennai.

Unit I Short Stories

1. Two Old Men – Leo Tolstoy
2. The Diamond Necklace – Guy de Maupassant
3. The Verger – Somerset Maugham
4. The Postmaster – Rabindranath Tagore.

Unit II One Act Plays

1. Riders to the Sea – J.M.Synge
2. The Rising of the Moon – Lady Gregory

Unit III One Act Plays

1. A Kind of Justice – Margaret Wood
2. The Refugee – AsifCurrimbhoy

Unit IV Grammar

Tenses, Voices, Degrees of Comparison

Unit V Composition

Agenda, Minutes, Notice, Descriptive Writing

Allocation of Working Hours per week

Short Stories	- 2 hours
One Act Plays	- 2 hours
Grammar &-	2 hours
Composition	-----
Total	- 6 hours



**II YEAR – III SEMESTER
COURSE CODE: 7BPH3C1**

CORE COURSE VI – OPTICS AND SPECTROSCOPY

Unit I GEOMETRICAL OPTICS

Lens – Spherical aberration in lenses – Methods of minimizing spherical aberration – chromatic aberration in lenses – condition for achromatism of two thin lenses (in and out of contact) – Coma - Aplanatic lens – Eyepieces – Ramsden’s and Huygens’s eyepieces. Dispersion – Angular and Chromatic dispersion – combination of prisms to produce i) dispersion without deviation ii) deviation without dispersion – Cauchy’s dispersion formula– Direct vision spectroscope – Theory of formation of rainbow.

Unit II INTERFERENCE

Conditions for interference – colours of thin films – Air wedge – theory – determination of diameter of a thin wire by Air wedge – test for optical flatness – Newton’s rings – Determination of refractive index of a liquid. Michelson’s Interferometer – theory and its Application (Measurement of wavelength and difference between wavelength of two close lines, thickness of mica sheet) – Jamin’s interferometers – determination of refractive index of gases

Unit III DIFFRACTION

Fresnel’s diffraction –Rectilinear propagation of light – zone plate –diffraction at circular aperture – opaque circular disc – Fraunhofer diffraction at single slit – Double slit – Plane diffraction grating – theory and experiment to determine wavelength – overlapping of spectral lines. Rayleigh’s criterion for resolution – resolving power – resolving power of grating – resolving power of a prism.

Unit IV POLARISATION

Double refraction – Huygens’s explanation of double refraction in uni axial crystals – Nicol Prism – Nicol Prism as polarizer and analyzer – Polaroids and their uses – Quarter wave plates and Half wave plates. Plane, elliptically and circularly polarized light – Production and detection – Optical activity– Fresnel’s explanation of optical activity – Specific rotatory power – determination using Laurent’s half shade polarimeter.

Unit V SPECTROSCOPY

Microwave and infrared Spectroscopy – Rotation of molecules – Rotational Spectra – The rigid diatomic molecules, selection rules – the intensities of spectral lines – Infrared spectroscopy (outlines only) – Raman Spectroscopy – Quantum theory of Raman effect – Classical theory of Raman effect – Molecular Polarisability – pure rotational Raman spectra of linear molecules – vibrational Raman spectra – Applications.

Text Books:

1. Optics and Spectroscopy – R.Murugesan, S. Chand and co., 6thEdition, New Delhi, 2008.
2. A text book of Optics – Subramanyam and Brijlal, S. Chand and co., 22ndEdition, New Delhi 2004.
3. Elements of Spectroscopy – S.L. Gupta, V.Kumar and R.C.SharmaPragatiPrakashan, 13thEdition, Meerut, 1997

Books for Reference:

1. Optics – Sathyaprakash, RatanPrakashanMandhir, VIIthEdition, New Delhi, 1990.
2. Introduction to Molecular Spectroscopy –C.N.Banewell, TMH publishing co. IV Edition, New Delhi, 2006.
3. Molecular structure and spectroscopy – G.Aruldhass, PHI Pvt Ltd, , II Edition, New Delhi, 2007.



**II YEAR – III / IV SEMESTER
COURSE CODE: 7BPH4P1**

**CORE COURSE VII – GENERAL PHYSICS PRACTICAL - II
(University Examinations will be held at the end of Fourth Semester only)**

(Any **FIFTEEN** experiments)

1. Calibration of low range Voltmeter - Potentiometer
2. Calibration of ammeter – Potentiometer
3. Comparison of low resistances – Potentiometer
4. Calibration of high range Voltmeter - Potentiometer
5. Thermo – emf – Potentiometer
6. Carey – Foster Bridge – Temperature Coefficient
7. Field along the axis of a coil – Deflection magnetometer
8. Deflection magnetometer – Tan A and Tan B Position
9. Thermal conductivity – Lee's disc method
10. Thermal conductivity of rubber
11. Specific heat capacity of liquid – Newton's law of cooling
12. Specific heat capacity of liquid – Joule's Calorimeter
13. Spectrometer – Refractive index of a solid prism
14. Spectrometer – Dispersive power of prism
15. Spectrometer – $i - d$ curve
16. Hartmann's interpolation formula
17. Spectrometer - Biprism
18. Spectrometer - Grating – Minimum deviation method
19. Air wedge – thickness of thin wire
20. Newton's ring method – radius of curvature of biconvex lens



PART IV (I) – (C)
NON – MAJOR ELECTIVE – COURSE II
II YEAR – III SEMESTER
COURSE CODE: 7NME3C
COURSE II – EFFECTIVE EMPLOYABILITY SKILLS

Unit I Curriculum Vitae & Facing the Interview

Applying for jobs, Preparing the curriculum Different formats vita, Facing the interviews, Frequently Asked Questions (FAQs).

Unit II Interpersonal Communication

One to one Communication

One to group Communication

Unit III Group Discussion

Listening, Ice-breaking, Leader – Member Moderates his role responsibility, Conflict, Management, Consensus, Steps involved

Unit IV Team Work

Qualities Selection constant & comfort, Orientation Review Tea, Review of the team work

Unit V Motivation

Leadership & Motivation, Behaviour, Motives Managerial Skills

Books for Reference:

1. E.H.McGrath, S.J., “Basic Managerial Skills For All”, Prentice-Hall of India Private Limited, New Delhi 110 001. ISBN-0-87692-498-4.
2. D.K.Sarma, “You & Your Career”, Wheeler Publishing, 755, Anna Salai, Chennai 600002. ISBN 81-7544-170-4. -1999
3. Indian Jaycees, “Skills” Series, published by Indian Jaycees.
4. S.P.Sachdeva, “Interview In A Nutshell”, Sudha Publications (P) Ltd., B-5, Prabhat Kiran, Rajendra Place, New Delhi 110 008.



PART IV (2) – SKILL BASED SUBJECTS (SBS)
GROUP I – SET I
II YEAR – III SEMESTER
COURSE CODE: 7SBS3A1
COURSE I – COMPETITIVE EXAMINATION SKILLS

Objectives:

- To build a sense of awareness among students through proper guidance about various competitive examinations in order to motivate students for prospective career in government and corporate sector.
- To intensively guide students for competitive examinations like TNPSC, UPSC, SSC, RRB, IBPS etc.

Unit I

Public Service Commission: Tamil Nadu Public Service Commission (TNPSC) and its role -History of TNPSC - Constitutional Provisions on the Formation, Functions, and Powers of Public Service Commissions for the Union and for the States - TNPSC and its rules of Procedure.

Eligibility and examination pattern: TNPSC - Union Public Service Commission (UPSC) - Staff Selection Commission (SSC) - Railway Recruitment Board (RRB) – Institute of Banking Personnel Selection (IBPS).

Unit II

Intelligence, creativity & application, testing & assessment - Types, verbal abilities & fluency

Unit III

Numerical ability:

Numbers, simplification, time and work, percentage, fraction, speed and distance, simple and compound interest, ratio and proportion

Unit IV

Spatial and perceptual abilities, situation reaction test

Unit V

Memory and inductive reasoning, Logical reasoning, Coding and Decoding, Direction Test, Syllogism

Books for Reference:

1. Ajay rai, “intelligence tests”, sterling paperbacks, published by sterling publishers pvt. Ltd., l-

10, green park extension, new delhi 110 016., 2001

2. Competition success review magazines.



PART - V - 7BEA3- EXTENSION ACTIVITIES

Extension Activities will be organized for 2 days in the Third Semester. The programme may be organized in any Saturday and Sunday.

A meeting of all the staff of the College (Teaching, Administrative and Technical Staff) be conducted before departing to the camp in which each and every aspect like Programmes to carried out, accommodation, food, medical aid, transport facilities, etc., should be thoroughly discussed.

One credit will be allotted for this Extension Activities. The marks allotted for each camp will be 100. Each student participating in the camp will be evaluated internally for 100 marks. The criteria for evaluation of Extension Activities will be as follows:

S. No.	Criteria	Maximum Marks
1.	Interaction with villagers	10
2.	Participation / Attitude towards work	10
3.	Participation in interaction and discussion	10
4.	Knowledge of problems / issues	10
5.	Organising & decision making ability	20
6.	Expression: a) Cultural programmes	10
	b) Report Writing	20
7.	Ability to adjust and work in a team	10
Total		100

**III YEAR – V SEMESTER
COURSE CODE: 7BPH5C1**

CORE COURSE IX – ANALOG ELECTRONICS

Unit I SEMICONDUCTOR DIODES AND REGULATED POWER SUPPLIES

Semiconductor – p-n junction diode – rectifiers – half and full wave rectifiers – bridge rectifier – efficiency – ripple factor – R-C and π section filter circuits.

Zener diode – characteristics – voltage regulator – regulated power supply using zener diode.

Unit II TRANSISTORS AND BIASING

Transistor action – CB, CE & CC modes – comparison – amplifier in CE arrangement – load line analysis – cut – off and saturation – Relation between α and β – Transistor biasing - base resistor bias - feedback resistor bias - voltage divider bias – JFET – construction and working - characteristic parameters.

Unit III AMPLIFIERS

Single stage amplifier – Phase reversal – DC & AC equivalent circuits – Voltage gain – Classification of amplifiers – Input impedance of an amplifier - RC, transformer, direct coupled amplifiers – Comparison of different types of amplifiers.

Unit IV OSCILLATORS

Transistor audio power amplifier – Difference between voltage and power amplifiers – Performance quantities of power amplifiers – Classification of power amplifiers – Expression for collector efficiency – Class A amplifier – Push – Pull amplifier.

Feedback principle – Negative and positive feedback – current gain and voltage gain in negative feedback amplifier – Barkhasan condition for oscillation – damped and undamped oscillations –Hartley, Colpitt and phase shift Oscillator.

Unit V OPERATIONAL AMPLIFIER

Characteristics of an ideal op-amp – virtual ground - op-amp biasing – Non-inverting & Inverting amplifiers– Applications of op-amp – adder, subtractor, differentiator, integrator.

op-amp signal generators: Phase shift, Hartley, Square wave and triangular wave generators.

Text Books:

1. V.K.Mehta, Principles of Electronics, S.Chand& Co Ltd.,10thEdition, New Delhi, 2007.
2. R.S.Sedha – Text Book of Applied Electronics, S.Chand& Co Ltd., II Edition, New Delhi, 2004.
3. Electronic Devices and Circuits – Salivahanan and Suresh Kumar, McGraw Hill Edn. New Delhi, 2012

Books for Reference:

1. B.L. Theraja – Basic Electronics – S. Chand & Co, V Edition, New Delhi, 2009.
2. Malvino& Leach – Transistor Approximations – International Publication, New Delhi, – 2000.



**III YEAR – V SEMESTER
COURSE CODE: 7BPH5C2**

CORE COURSE X – COMPUTER PROGRAMMING IN C

Unit I FUNDAMENTALS

The character set – identifiers and keywords – data types – constants – variables – declarations – expressions – Library functions.

Operator and expressions: Arithmetic operators – Relational and Logical operator – Assignment operator – Conditional operator and Bit wise operator. Data input and output: The get char functions – the put char function – scanf function – printf function – Gets and puts function.

Unit II CONTROL STATEMENTS and ARRAYS

Branching statement: The if and if – else statement – nested if statement - the switch statement - the goto statement.

Looping statement: while statement - do-while statement- for statement – break statement – continue statement.

Defining an array – declaring, initializing one dimensional – two dimensional – Multidimensional arrays – reading and writing strings.

Unit III FUNCTIONS

Defining a function – Accessing a function – declaration a function - function prototypes – passing Arguments to a function – categories of function - Recursion. Storage classes – Automatic variables – External variables – Static variables- Register variables.

Unit IV Pointers and Structures

Pointers – Pointer declaration – accessing pointer variables – pointers and one dimensional arrays – passing pointers to a function – call by value and call by reference – Arrays of pointers.

Defining a structure – declaring structure variable – accessing structure members - processing structures – arrays of structures.

Unit V Writing Programs

1. Average of set of numbers.
2. Conversion of Celsius to Fahrenheit
3. Factorial of a given number
4. Roots of a quadratic equation
5. Add/Subtract two matrices
6. Evaluation of sine series
7. Smallest and largest number of an array.
8. Sorting numbers in ascending / descending order using function.
9. Arranging the names in alphabetical order.

Text Books:

1. Programming in ANSI C – V. Balagurusamy TMH Publishing Co., III Edition, New Delhi, 2004.
2. Programming in C – D. Ravichandran, New Age International, I Edition, New Delhi, 2002

Books for Reference:

1. Programming in C – Byron Gottfried, TMH Publishing Co., II Edition, New Delhi, 1994.
2. Programming in C – Stephen G. Kochen, Developers Library, III Edition, New Delhi, 1998



**III YEAR – V / VI SEMESTER
COURSE CODE: 7BPH6P1**

**CORE COURSE XI – GENERAL PHYSICS PRACTICAL - III
(University Examinations will be held at the end of Sixth Semester only)**

(Any **FIFTEEN** experiments)

1. Determination of L – Anderson’s Bridge
2. Determination of L – Maxwell’s Bridge
3. Boltzmann’s constant – transistor
4. Band gap of a semiconductor using diode
5. Charge of electron – copper voltmeter
6. Small angle prism – spectrometer
7. $i - i'$ Curve – spectrometer
8. Grating – Normal incidence - spectrometer
9. Series resonance– LCR bridge
10. Parallel resonance – LCR bridge
11. Comparison of low resistance using spot galvanometer/BG/TG
12. Comparison of mutual inductance – spot galvanometer/BG
13. Comparison of capacitance – spot galvanometer/BG
14. Absolute determination of capacitance – spot galvanometer/BG
15. High resistance leakage – spot galvanometer/BG
16. Figure of merit – spot galvanometer/BG/TG
17. Roots of quadratic equation – C programming
18. Biggest / Smallest number of an array – C programming
19. Multiplication of a matrix – C programming
20. Evaluation of sine series – C programming



**III YEAR – V / VI SEMESTER
COURSE CODE: 7BPH6P2**

**CORE COURSE XII – ELECTRONICS PRACTICAL - IV
(University Examinations will be held at the end of Sixth Semester only)**

(Any **FIFTEEN** experiments)

1. CE transistor characteristics
2. Zener diode – characteristics – voltage regulator
3. FET characteristics
4. Bridge rectifier
5. Dual power supply (IC)
6. Regulated power supply using IC
7. Single stage amplifier
8. Hartley oscillator – Transistor
9. Colpitt's oscillator – Transistor
10. Astablemultivibrator using 555 Timer
11. Phase shift oscillator – Op.amp
12. Astablemultivibrator using – Op.amp
13. Differentiator and Integrator – Op.amp
14. Adder and subtractor – Op.amp
15. Logic gates using discrete components
16. Verification of De Morgan's Theorem
17. NAND and NOR as universal gates
18. Logic gates using IC
19. RS and JK flipflops
20. 4 bit binary counter



**III YEAR – V SEMESTER
COURSE CODE: 7BPHE1C**

ELECTIVE COURSE I (C) – LASER PHYSICS AND FIBRE OPTICS

Unit I LASER PHYSICS

Basic principles of LASER – Einstein Coefficients – condition for light amplification – population inversion – Threshold condition. Line shape function – optical resonators (Qualitative only) – three level and four level systems – methods of Q Switching - mode locking - active and passive mode locking (qualitative only).

Unit II LASER TYPE AND OUTPUT MODULATION METHODS

Principle and working and energy level diagram of – Ruby laser – Nd-YaG Laser – He-Ne laser, CO₂ Laser – Semi Conductor Laser.

Unit III LASER APPLICATIONS

Application of laser in industry – Cutting – Welding – Drilling – Surface hardening – Medical applications – Laser as diagnostic & therapeutic tool.

Holography – Theory of recording and reconstruction – Applications of holography – Holographic interferometry in non destructive testing.

Unit IV OPTICAL FIBRES

Basic structure of an Optical fibre – Acceptance angle – Numerical aperture – Propagation of light through an optical fibre – Theory of modes of formation.

Classification of fibres – Step index & graded index fibres – Comparison of the two types – Single mode & multimode fibres – Losses in fibres – Dispersion in fibres – Fabrication of fibres.

Unit V FIBRE OPTIC COMMUNICATION

Optical communication – Advantages – Light sources – Modulation methods – Photo detectors –types of optical couplers – Splicing.

Communication systems (Block diagram) – Repeaters – Fibre cables – Measurements of numerical aperture & optical time domain reflectometers.

Text Books:

1. Laser theory and applications – K.Thyagarajan and A.K.Ghatak, Macmillan India Ltd., I Edn, New Delhi, 1999
2. An introduction to lasers, theory & applications – Avadhanulu M.N., S.Chand& Co, I Edn, New Delhi, 2001.
3. Optical fibres&Fibre optic communication systems – Subir Kumar Sarkar, S.Chand& Co., IV Edn, New Delhi, 2010.
4. Engineering Physics – R.K.Gaur&S.L.Gupta (eighth edition), DhanatRai Publications, VII Edn, New Delhi, 1998.
5. Physics for Engineering – P.K.Palanisamy, Scitech Publications private Ltd. New Delhi

Books for Reference:

1. Introduction to Fibre Optics–AjoyGhatak&K.Thygarajan, Cambridge University Press, New Delhi, 2005
2. Solid State Physics – P.K.Palanisamy, Scitech Publication (India) Private Ltd, New Delhi, 2009



**III YEAR – V SEMESTER
COURSE CODE: 7BPHE2C**

ELECTIVE COURSE II (C) – SOLID STATE PHYSICS

Unit I CRYSTAL STRUCTURE

Definition in crystallography – Lattice points – space lattice – unit cell – Lattice parameters of an unit cell – classification of crystal directions – Miller indices – perpendicular distance between two parallel planes in a cubic crystal lattice – important features of miller indices.

Unit II BONDS IN SOLIDS

Force between atoms – cohesive energy – ionic bond – expression for the cohesive energy of an ionic crystal – Madelung constant.

The Born-Heber cycle – covalent bond – metallic bond – molecular bond – hydrogen bond.

Unit III CONDUCTION AND DIELECTRIC MATERIALS

Physical properties of metals – classification – free electron theory – Weidmann – Franz's law – dielectric parameter – types of polarization – types of dielectric materials.

Clausius-Mossotti equation – application of dielectric materials.

Unit IV SEMICONDUCTORS

Properties of semiconductors – types of semiconductors – effects of electric field on N-type and P-type semiconductors – conductivity in a semiconductor.

The Hall Effect – experimental determination of Hall voltage, carrier concentration and mobility – application of Hall Effect.

Unit V SUPER CONDUCTIVITY

Distinction between conductors and insulators (Bond theory) – Critical temperature – properties of super conductors – Meissner effect – BCS theory.

D.C. Josephson effect – Applications of high temperature super conductors – super conducting magnets

Text Books:

1. Material Science and Engineering – V.Raghavan, 4th Edition – PHI publications, New Delhi
2. Material Science – M.Arumugam, Arunradha publications. Kumbakonam, IIIEdn, New Delhi, 2010.
3. Electric Engineering Materials – Dekker 1st Edition – Prentice hall publications, New Delhi
4. Science of Engineering materials – C.M.Srivastava, C.Srinivasan – 2nd Edition – New age international publications.

Books for Reference:

1. Introduction to Solid State Physics – C. Kittel, Wiley Eastern Limited, 5th Edition, New Delhi, 2004
2. Solid State Physics – S.O. Pillai, New Age International Private Limited, New Delhi, 1997

