

## RESUME



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**1. Correspondence** : Professor of Chemical Engineering  
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**Residential Address** : 224, Dakshin Marg, Vidya Vihar Campus, BITS, Pilani

**2. Permanent** : C/o Shri B V Ramana  
House No. 8-9-79, Veerabhadru Nivas  
Pedda Veedhi  
TUNI - 533 401  
(Andhra Pradesh) INDIA.

**Date of Birth** : February 15, 1961.

**Sex** : Male

**Educational Qualifications** :

Degree	University/Institute	Year	Subject	Class
Ph D	IIT, Bombay	1994	Hydrodynamics and Heat Transfer	9.57 CPI in course work
M Tech	CIT, Coimbatore	1985	Chemical Engineering	I
B Tech	A U College of Engineering Andhra University, Waltair	1983	Chemical Engineering	I

**Project Titles:**

- **Ph D Thesis:** Hydrodynamics and Heat Transfer in Single-phase Liquid and Two-phase Gas-Liquid Co-current Downflow through Packed Bed Columns (1989-93).

- **Ph D Seminar:** Single- and Two-phase flow Heat Transfer in Packed Beds (1989-90).
- **M Tech Dissertation:** Studies on Reduction and Acetylation of p-Nitro and p-Nitroso phenols (1983-85).
- **B Tech Project:** Report on the Production of Cobalt Sulfate (1982-83).

#### Professional Experience:

Organization/ Institution	Position	Period	
		From	To
BITS, Pilani	Professor Chemical Engineering Department	01-02-2005	Till date
BITS, Pilani	Associate Professor Chemical Engineering Department	01-02-2000	31-01-2005
Birla Institute of Technology & Science (BITS), Pilani (Rajasthan)	Assistant Professor Chemical Engineering Department	26-08-1996	31-01-2000
DDIT, Nadiad	Senior Lecturer Chemical Engineering Department	04-10-1991	24-08-1996
D D Institute of Technology (DDIT), Nadiad (Gujarat)	Lecturer Chemical Engineering Department	04-10-1985	03-10-1991

**Industrial Tour:** Participated in the Industrial Tour during 4/5 B Tech conducted by Department of Chemical Engineering, AU College of Engineering, Waltair during 25-12-1981 to 08-01-1982 covering the cities Madras, Bombay, and Hyderabad.

**Practical Training:** Undergone Practical Training in Hindustan Zinc Limited, Visakhapatnam (Andhra Pradesh) during 26-05-1982 to 18-06-1982.

#### Abstract of the Doctoral Work carried out at IIT-Bombay, India (1989-93):

The gas-liquid co-current downflow packed bed reactors, often referred to as trickle bed reactors (**TBRs**), are widely used in petroleum and petro-chemical industries. Various flow regimes such as trickle, pulse, spray, and dispersed bubble flow are encountered in a TBR depending upon the flow rates and physical properties of the fluids and the packing geometry. Heat transfer phenomena in TBR are not well understood. The **heat transfer parameters** ( $k_{er}$ , the effective bed thermal conductivity, and  $h_w$ , the wall-to-bed heat transfer co-efficient) depend upon the hydrodynamic properties such as liquid holdup in all the flow regimes and pulse properties (viz., pulse frequency, pulse holdup, and base holdup) in pulse flow regime.

An **experimental set-up** is designed and fabricated for studying the total liquid holdup, pulse properties, and heat transfer characteristics in single-phase liquid and two-phase gas-liquid co-current downflow through packed bed columns. Radial temperature profile is measured for estimating the heat transfer parameters from pseudo-homogeneous two-parameter model. Total liquid holdup is obtained from the RTD measurements using 3% NaCl solution as tracer. Pulse properties are measured by means of electrical conductivity technique. A **PC-based (AT-286) data acquisition system** is used for acquiring the data on RTD and pulse properties. Air-water for two-phase flow, and water for single-phase liquid flow are the systems studied in a 50 mm I.D. column using ceramic spheres (2.59 mm), glass spheres (4.05 and 6.75 mm), and ceramic raschig rings (4 and 6.75 mm) as packing materials. The experiments are carried out over a wide range of flow rates of water (3.16-71.13 kg/m<sup>2</sup>s) and air (0.01-0.898 kg/m<sup>2</sup>s) covering trickle, pulse, and dispersed bubble flow regimes. Heat transfer studies are also carried out with air under wet-bed conditions.

The importance of **total liquid holdup** is brought out, and the drawbacks of estimating this parameter from static liquid holdup (measured at no flow conditions) and dynamic liquid holdup are highlighted. The present experimental data on liquid holdup is compared with the literature correlations to check their validity.

The results of various **pulse properties** are analyzed and compared with the available correlations. New correlations are proposed for pulse frequency, pulse holdup, base holdup, and pulse velocity based on the experimental data of present study along with the data reported in literature.

The reported work on **heat transfer characteristics in single-phase and two-phase downflow through packed beds** is reviewed. The dependency of heat transfer parameters on total liquid holdup and some of the pulse properties in pulse flow regime is explained, and the results on heat transfer parameters are compared with the literature correlations. Based on the different trends observed in each of the flow regimes with gas rate, separate correlations are proposed for different flow

regimes for both the parameters. The stagnant bed effective conductivity and the stagnant wall-to-bed heat transfer coefficient are modeled starting from the basic heat transfer mechanisms, and found to have a good agreement with the experimental values.

Based on the **thermal resistance networks**, predictive formulas for the heat transfer parameters in two-phase co-current downflow through packed beds are derived. The individual liquid phase heat transfer parameters are estimated from the present results of heat transfer measurements in single-phase liquid flow, and correlations are proposed for individual liquid-phase heat transfer parameters. Using individual single-phase heat transfer parameters of solid, gas, and liquid, the heat transfer parameters of two-phase flow are calculated from the **Thermal Resistance Model** and compared with the experimental data of present study as well as that reported in literature on heat transfer parameters and are found to be in good agreement.

**Research Interests:**

1. Evolutionary Computation
2. Biomass Gasification
3. Environmental Engineering
4. Biofiltration
5. Modeling Simulation and Optimization
6. Process Intensification
7. Artificial Neural Networks
8. Computational Fluid Dynamics
9. Multiphase Reactors
10. Energy Integration Analysis
11. Fuel Cells
12. Nano Technology

**Courses Taught (1985 Onwards):**

1. Process Plant Simulation
2. Process Design Decisions
3. Selected Chemical Engineering Operations
4. Introduction to Conflict Management
5. Reaction Engineering
6. Heat Transfer
7. Process Control
8. Transport Phenomena
9. Fluidization Engineering
10. Computer Aided Design
11. Chemical Process Calculations
12. Kinetics & Reactor Design
13. Fluid Flow Operations
14. Chemical Systems Modeling
15. Mass Transfer
16. Computer Applications
17. Chemical Engineering Economics
18. Advanced Heat Transfer
19. Advanced Chemical Engineering Modeling
20. Energy Technology
21. General Chemical Technology
22. Chemical Engineering Materials

**Academic Committees:**

1. Member, Planning Committee for Syllabus & Structure for Industrial Chemistry Course at SBCJ Science College, Cambay affiliated to Gujarat University, Ahmedabad (1993-96).
2. Member, Syllabus & Structure Planning Committee, DDIT Nadiad, 1993-96.
3. Member, Library Committee, BITS Pilani, 1997-98, 1999-2001 & 2002-2003.
4. Member, Academic Counseling Board, BITS Pilani, 1997-98.

5. Member, Research Board, BITS Pilani, 1997-2000 & 2002 onwards.
6. Member, Faculty Recruitment Lectures Committee, BITS Pilani.
7. Member, Higher Degree Admissions Committee, BITS Pilani.
8. Member, Committee for PhD Qualifying Examinations, BITS Pilani.
9. Member, Organizing Committee, Intensive Teaching Workshop, BITS Pilani, 1998-2003.
10. Member, Selection Committee for PS-I Student Co-Instructors, BITS Pilani.
11. Member, Evaluation Committee for PS-II Project Reports, BITS Pilani.
12. Member, Senate, BITS Pilani.
13. Member, Doctoral Advisory Committees, BITS Pilani.
14. Chief Advisor, Sri Vidya Public School, Sri Venkateswara Educational Society, Tuni.
15. Member, Nominations Committee, BITS Pilani, 2003-2004, 2008-2009.
16. Member, Project Team, Center for Desert Development Technology (C-DDT), BITS Pilani.
17. Expert Member, Curriculum Development, MNIT Jaipur, 2008.
18. External Expert Member, Board of Studies, Banasthali University, Banasthali.
19. Expert Member, Peer Committee, National Assessment and Accreditation Council (NAAC), Bangalore, India.
20. Expert Member, Selection Committee for Faculty Recruitment, Banasthali University, Banasthali.
21. Expert Member, Selection Committee for Faculty Recruitment, SVNIT, Surat.
22. Expert Member, Peer Review Committee for The Natural Sciences and Engineering Research Council of Canada (NSERC), Canada
23. Expert Member, Peer Review Committee for National Research Foundation (NRF), International Research Grants, South Africa;
24. Expert Member, Peer Review Committee for Review of Research Proposals, Council of Scientific & Industrial Research (CSIR), New Delhi.

#### **Administrative Positions:**

1. Secretary, QIP Scholars' Forum, IIT Bombay, 1991-92.
2. Coordinator, IAS Training Center, DDIT Nadiad, 1993-94.
3. Advisor-in-Charge, The Institution of Engineers (I), Students' Chapter, DDIT Nadiad, 1985-96.
4. Coordinator, Industrial Training for Final Semester Chemical Engineering Students, DDIT Nadiad, 1993-96.
5. Coordinator, Central Assessment Cell for Examinations, DDIT Nadiad, 1994-96.
6. Professor-in-Charge, Chemical Engineering Association, BITS Pilani, 1996-98.
7. Mentor, Higher Degree (M.E. Chemical Engineering) Student, BITS Pilani, 1996-99.
8. In-charge, Transport Phenomena Laboratory, Chemical Engineering Group, BITS Pilani, 1997-98.
9. Warden, Vishwakarma Bhawan, BITS Pilani, May 1997–February 2003.
10. Mentor, 11 Students of Academic Counseling Board (ACB), BITS Pilani.
11. Group Leader (Head of the Department), Engineering Technology Group, BITS Pilani, 1998-2004.
12. Mentor, Student of DLPD Program (B.S. Process Engineering), BITS Pilani, 1998-2002.
13. Professor-in-charge, Engineering Technology Association, BITS Pilani, 1998-2004.
14. In-charge, Reception for Higher Degree Admissions, BITS Pilani, 1997-2000.
15. In-charge, Workshop, BITS Pilani, 1998-2006.
16. Conducted Examinations for DLPD Collaborative Program BS (Power Engineering) at NTPC-Kawas, November 10-16, 1999.
17. Registration Advisor, BITS Pilani, 1997-2006.
18. Coordinator, Intensive Teaching Workshop, BITS Pilani, 1999-2003.
19. Member, Investigating Committee, Accounts of Petrol Pump, Pilani, 1999.
20. Member, Investigating Committee, Construction Engineer, BITS Pilani, 2000.
21. Group Coordinator, Viva Committee for PhD Candidates, BITS Pilani.
22. Member, Project Planning & Implementation Committee, BITS Pilani–Dubai Campus.
23. Member, Purchase Committee for Workshop Store & Building Store, BITS Pilani, June 2000 onwards.
24. Authorized Officer, Purchase Approval and Bill Passing, ESD, BITS Pilani June 2000 onwards.
25. Member, Supervising Committee, Staff Uniform matters, BITS Pilani, July 2000 onwards.
26. Member, Campus Planning & Maintenance Committee, BITS Pilani.
27. Member, Project Planning & Implementation Committee, BITS Pilani–Goa Campus.
28. Member, Executive Advisory Board, Decision Analyst, Inc. (Marketing Research & Consulting), USA, 2001 onwards.
29. Program Coordinator, Marine Engineering & Nautical Sciences Programs, Distance Learning Programmes Division (DLPD), BITS Pilani, May 2002 – December 2006.
30. Group Leader (Head of the Department), Chemical Engineering Group, BITS Pilani, December 2002 – December 2006.

31. Assistant Dean, Engineering Services Division (ESD), BITS Pilani, April 2003 – December 2006.
32. Member, Selection Committee constituted by the Institute to interview and regularize skilled workers, BITS Pilani, 2004.
33. Coordinator, One Year Work-Integrated Trade Certificate Training Programmes, BITS Pilani, 2004.
34. Member, Enquiry Committee, Theft of fresh papers from the Reprography Store of the Institute, BITS Pilani, 2005.
35. Program Coordinator, BS (Process Engineering), Chambal Fertilizers & Chemicals Limited (CFCL)-Kota, Distance Learning Programmes Division (DLPD), BITS Pilani, April 2005 – December 2006.
36. Program Coordinator, BS (Process Engineering), Hindustan Zinc Limited (HZL)-Udaipur, Distance Learning Programmes Division (DLPD), BITS Pilani, April 2005 – December 2006.
37. Coordinator, Petrotech Society, BITS Pilani, April 2005 onwards.
38. Member, Project Planning & Implementation Committee, BITS Pilani–Hyderabad Campus.
39. Dean, Educational Hardware Division (EHD), BITS Pilani, January 2007-April 2010.
40. Convenor, Committee for Obsolete items Identification, Writing-off from ledgers, and Disposal, BITS Pilani, August 2007 onwards.
41. Member, Selection Committee to Interview and Regularize Skilled Workers, BITS Pilani, 2006 onwards.
42. Convener, Enquiry Committee, Cases on 67 Daily wage workers, BITS Pilani, 2008.
43. Convener, Enquiry Committee, Cases on 3 Daily wage workers, BITS Pilani, 2008.
44. Convener, Enquiry Committee, Staff in Registrar office, BITS Pilani, 2009.
45. Coordinator, Faculty Deployment Workshops, Vision 2020-Mission 2012, August 12-20, 2009.
46. Task Force Leader, Campus Life Thrust Area, Vision 2020-Mission 2012, BITS Pilani, 2009-2012.
47. Dean, Student Welfare Division (SWD), BITS Pilani, 2010.
48. Dean (Officiating), Faculty Division (FD-I), BITS Pilani, 2010.

#### Chief Guest/Keynote Address:

1. **Chief Guest** and delivered the **Keynote Address** at the Inaugural function of 2-day National Seminar on **Eco-friendly Chemical Technologies in New Millennium** organized by UDCT, Amravati University, February 7-8, 2002.
2. **Chief Guest** and delivered the **Keynote Address** on the eve of Human Rights Day on **Influence of Science & Technology on Education** organized by Sri Vidya Public School, Tuni, December 10, 2002.
3. Invited as **Keynote Speaker** to deliver the **Keynote Address** at the International Conference on **Desert Technology (DT-7)**, Umaid Bhawan Palace, Jodhpur, November 9-14, 2003.
4. **Chief Guest** and delivered the **Keynote Address** on **Opportunities and Challenges for Education in India & BITS Philosophy of Education** organized by Sri Vidya Public School, Tuni, June 25, 2004.
5. **Chief Guest** for flag hoisting and receiving the Guard of Honour on 58<sup>th</sup> Republic Day of India celebrations at Vidhyashram Public School, Pilani, January 26, 2007.
6. **Chief Guest** for flag hoisting and receiving the Guard of Honour on 62<sup>nd</sup> Independence Day of India celebrations at Shri Udairam Ji Padia Vidya Mandir (Girls Senior Secondary School), Pilani, August 15, 2008.
7. Invited as **Keynote Speaker** to deliver the **Keynote Address** at the **Workshop on Process Modeling and Simulation**, University of Petroleum and Energy Studies, Dehradun, November 6-7, 2009.
8. **Chief Guest** and delivered the **Inaugural Address** at the Inaugural function of Staff Development Programme on **Innovative Teaching Techniques for Transport Phenomena** organized by ITM Universe, Gwalior, July 12-17, 2010.
9. **Chief Guest**, Sri Krishna Janmashtami Utsav Celebrations, Goenka Vidya Mandir Madhyamik Vidyalaya, Pilani, September 02, 2010.
10. **Chief Guest**, Inaugural Function of **Chem-X-Sere**, IICHe Student Chapter Technical Festival, BITS Pilani, October 01-03, 2010.

#### NAAC Visits as Expert Peer Team Member:

1. Assessors Interaction Meeting, National Assessment and Accreditation Council (NAAC), Bangalore, October 23-24, 2008.
2. University of Petroleum and Energy Studies (UPES), Dehradun, Gurugaon, and Rajahmundry, November 10-15, 2008.
3. Maharaj Vijayaram Gajapathi Raj (MVGR) College of Engineering, Vizianagaram, April 20-22, 2009.
4. Bannari Amman Institute of Technology (BIT), Sathyamangalam, Coimbatore, June 5-7, 2009.
5. University of Calcutta, Kolkata, December 7-10, 2009.
6. Annamacharya Institute of Technology and Sciences (AITS), Rajampet (Kadapa Dist.), February 6-7, 2010.
7. Chaitanya Bharathi Institute of Technology (CBIT), Hyderabad, March 08-10, 2010.
8. Maharshi Dayanand University (MDU), Rohtak, April 27-29, 2010.

#### Conferences/Seminars/Workshops/Package Programs Organized:

1. Faculty Advisor, **Turbulence-95**, Inter-Departmental Seminar Presentation Competition of Technical Papers by students of DDIT, Nadiad, April 7-9, 1995.
2. Convener, One day Seminar on **Total Quality Management (Incorporating ISO – 9000)** jointly organized by Institution of Engineers (INDIA) Gujarat State Center and DDIT Nadiad, May 6, 1995.
3. Organizing Committee Member & Resource Person, **Package Program on Chemical Engineering for Non-Chemical Engineers**, organized by Department of Chemical Engineering & DDIT Alumni Association of DDIT Nadiad, Inder Residency, Ahmedabad, December 21-23, 1995.
4. Coordinator, **State-level Inter-Collegiate Oral Quiz and Seminar presentation competition**, DDIT Nadiad, March 2, 1996.
5. Faculty Advisor, **Turbulence-96**, Inter-departmental Seminar Presentation Competition of Technical Papers by students of DDIT Nadiad, April 6-9, 1996.
6. Organizing Committee Member & Resource Person, **3-Day Course on Chemical Engineering for Non-Chemical Engineers & Chemists**, jointly organized by Department of Chemical Engineering of DDIT Nadiad and Ankleshwar Industries Association, Ankleshwar, July 12-14, 1996.
7. Coordinator, **Seminar and Intensive Course on Process Control and Simulation for Chemical and Metallurgical Industries**, BITS Pilani, April 4-7, 1997.
8. Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, March 17-April 28, 1998.
9. Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, September 08-November 17, 1998.
10. Organizing Committee Member, **One Day Workshop on Passive Solar Architecture** organized by Centre for Renewable Energy & Environment Development (CREED), sponsored by Ministry of Non-conventional Energy Sources (MNES), Government of India, BITS Pilani, February 23, 1999.
11. Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, June 22-July 17, 1999.
12. Coordinator & Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, February 24-April 20, 2000.
13. Coordinator & Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, September 05-November 22, 2000.
14. Organizing Committee Member, **Workshop on “Women and Development in India–Issues & Challenges”** jointly organized by BITS – Pilani and Rajasthan State Commission for Women (RSCW)–Jaipur (supported by UNICEF & IREDA), BITS Pilani, January 19-20, 2001.
15. Resource Faculty Member, **Seminar and Intensive Course (SIC-2001) on “Novel Separation Techniques and their applications to Indian Chemical Industries”** organized by Chemical Engineering Group, BITS Pilani, March 21-23, 2001.
16. Coordinator & Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, September 11-November 28, 2001.
17. Coordinator & Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, February 05-April 23, 2002.
18. Organizing Committee Member, **Seminar on “Reorienting Social Science Education for meeting Societal Objectives: Focus on Professional Education”** jointly organized by BITS Pilani & Indian Association of Social Science Institutions (IASSI) New Delhi, BITS Pilani, March 8-9, 2002.
19. Organizing Committee Member, **International Conference on “Population, Development & Environment”** organized by BITS Pilani and jointly supported by United Nations Population Fund (UNPF)-New Delhi, International Institute for Population Sciences (IIPS)-Mumbai & University Grants Commission (UGC)-New Delhi, BITS Pilani, March 15-16, 2002.
20. Coordinator & Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, September 04-November 27, 2002.
21. Organizing Committee Member, **35<sup>th</sup> Engineers’ Day–Theme: Indian Small Scale Industries in Globalization Scenario**, BITS Pilani, September 16, 2002.
22. Organizing Committee Member, **Asia Regional Workshop on “Improving Mobility for the Rural Poor: Achieving Sustainable Motorized and Non-Motorized Rural Transport”** organized by the Rajasthan Regional National Forum Group of the International Forum for Rural Transport and Development (IFRTD), BITS Pilani, September 23-26, 2002.
23. Organizing Committee Member, **International Symposium on Emerging Trends in Genomics and Proteomics Education & Research**, jointly organized by BITS-Pilani and Uniformed Services University of the Health Sciences (USUHS)-Bethesda (Maryland, USA), BITS Pilani, January 12-13, 2003.
24. Coordinator & Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, February 05-April 23, 2003.
25. Program Committee Member, **Genetic and Evolutionary Computation Conference (GECCO-2003)**, University of Illinois, Chicago, Illinois, USA, July 12-16, 2003.
26. Organizing Committee Member, **36<sup>th</sup> Engineers’ Day–Theme: Improvement in Values in Engineering Profession**, BITS Pilani, September 15, 2003.
27. Organizing Committee Member, National Conference on **Integrated Sustainable Water Resources Planning and Management (ISWRPM-2003)**, BITS Pilani, October 11-12, 2003.

28. Organizing Committee Member, **International Conference on Conflict Resolution: Peace and Development**, organized by BITS-Pilani, Center for International Development and Conflict Management (CIDCM)–Maryland (USA), and Indian Institute of Advance Study (IIAS)–Shimla, in association with Indian Institute of Public Administration (IIPA)–New Delhi, BITS Pilani, October 28-29, 2003.
29. Organizing Committee Member, **Second Conference on Disaster Management Case Histories**, BITS Pilani, November 14-16, 2003.
30. Organizing Committee Member (Publicity Chair), **The Second International Conference on Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2003)**, National University of Singapore, Singapore, December 15-17, 2003.
31. Session Organizer, Special Session on “Evolutionary Computation”, **The Second International Conference on Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2003)**, National University of Singapore, Singapore, December 15-17, 2003.
32. Program Committee Member, **Genetic and Evolutionary Computation Conference (GECCO-2004)**, Seattle, Washington, USA, June 26-30, 2004.
33. Project Coordinator & Resource Faculty, **Academic Refresher Course Programme-I for the Employees of Hindustan Zinc Limited, Udaipur**. Organized by Practice School Division, BITS Pilani, June 10-July 24, 2004.
34. Session Chair, Invited Session on “Engineering Applications of Evolutionary Computation Techniques”, **The Eighth World Multi-Conference on Systemics, Cybernetics and Informatics (SCI-2004)**, Orlando, Florida, USA, July 18-21, 2004.
35. Program Committee Member, **International Conference on Computing, Communications, and Control Technologies (CCCT-2004)**, Sponsored by The University of Texas at Austin and The International Institute of Informatics and Systemics (IIS), Austin, Texas, USA, August 14-17, 2004.
36. Organizing Committee Member, **Asia Regional Workshop on “Promoting Sustainability of Community-based Rural Transport Infrastructure”** organized by the Rajasthan Forum Group (Rajasthan) & BITS Pilani, sponsored by Swiss Agency for Development and Cooperation (SDC) & International Forum for Rural Transport and Development (IFRTD), BITS Pilani, September 6-8, 2004.
37. Organizing Committee Member, **National Seminar on “Meeting Communication Challenges at Workplace”** organized by Languages Group, BITS Pilani, supported by AICTE New Delhi, BITS Pilani, September 10-11, 2004.
38. Organizing Committee Member, **National Conference on “Structural Engineering and Mechanics (SEM-04)”** organized by Civil Engineering Group, BITS Pilani, supported by DST, CSIR, and UGC of New Delhi; and DAE, BRNS, BARC of Mumbai, BITS Pilani, September 24-25, 2004.
39. Project Coordinator & Resource Faculty, **Academic Refresher Course Programme-II for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, October 9–November 22, 2004.
40. Organizing Committee Member, **Symposium on “Prediction in Ungauged Basins for Sustainable Water Resources Planning and Management (PUBSWRPM-2004)”** organized by Civil Engineering Group, BITS Pilani, supported by CSIR and UGC of New Delhi; and Indian National Committee on Hydrology, Roorkee, BITS Pilani, October 30, 2004.
41. Organizing Committee Member, **Advanced Training Programme on “Water Resource Development and Management for NABARD Officers”** organized by Civil Engineering Group, BITS Pilani, November 3-7, 2004.
42. International Program Committee Member, **2004 IEEE Conference on Cybernetics and Intelligent Systems (CIS-2004)**, jointly organized by the IEEE SMC Society Singapore Chapter and IEEE R&A Society Singapore Chapter, Singapore, December 1-3, 2004.
43. Organizing Committee Member (Publicity Chair), **2<sup>nd</sup> International Conference on Autonomous Robots and Agents (ICARA 2004)**, Palmerston North, New Zealand, December 13–15, 2004.
44. Technical Programme Committee Member, **2<sup>nd</sup> International Conference on Autonomous Robots and Agents (ICARA 2004)**, Palmerston North, New Zealand, December 13–15, 2004.
45. Coordinator & Organizing Faculty Member, **Intensive Teaching Workshop**, BITS Pilani, February 10–April 21, 2005.
46. Project Coordinator, **Professional Skills Development Programme for the Junior Executive Trainees of Hindustan Zinc Limited, Udaipur**. Organized by Practice School Division, BITS Pilani, February 21–April 21, 2005.
47. Resource Faculty Member, **Workshop on Energy Saving in Steam Systems**, organized by Centre for Renewable Energy and Environmental Development (CREED), BITS Pilani and Thermax Babcock and Wilcox Limited, Pune, BITS Pilani, April 26-30, 2005.
48. Program Committee Member, **Genetic and Evolutionary Computation Conference (GECCO-2005)**, Washington DC, USA, June 25-29, 2005.
49. Program Committee Member, **International Conference on Management Engineering and Informatics (MEI-2005)**, Texas, Austin, USA, July 24-27, 2005.
50. Program Committee Member, **The 3<sup>rd</sup> International Conference on Computing, Communications, and Control Technologies (CCCT-2005)**, Texas, Austin, USA, July 24-27, 2005.

51. Organizing Committee Member, Seminar on **Entrepreneurship Culture: Issues & Challenges of Small and Intermediate Entrepreneurs (SIEs) at Grassroots Level**, BITS Pilani, September 2-4, 2005.
52. Program Committee Member, **The Third International Conference on Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2005)**, National University of Singapore, Singapore, December 13-16, 2005.
53. Program Committee Member, **The 2<sup>nd</sup> Indian International Conference on Artificial Intelligence (ICAI-2005)**, Pune, India, December 20-22, 2005.
54. Local Advisory Committee Member, **National Conference on Design for Product Life Cycle (DPLC-2006)**, BITS Pilani, February 17-18, 2006.
55. International Program Committee Member, **The 2006 IEEE International Conferences on Cybernetics & Intelligent Systems (CIS-2006)**, jointly organized by IEEE R&A and SMC Singapore Chapters, Bangkok, Thailand, June 7-9, 2006.
56. Advisory Committee Member, **International Conference on Nanotechnology-Materials and Methods (To meet Global Challenges) (CIT NANOTECH-2006)**, CIT Coimbatore, June 23-24, 2006.
57. Program Committee Member, **The 2<sup>nd</sup> International Symposium on Management Engineering and Informatics (MEI-2006)**, Orlando, Florida, USA, July 16-19, 2006.
58. Program Committee Member, **International Symposium on Knowledge Communication and Conferences (KCC-2006)**, Orlando, Florida, USA, July 16-19, 2006.
59. Organizing Secretary, **National Conference on Environmental Conservation (NCEC-2006)**, BITS Pilani, September 1-3, 2006.
60. Coordinator & Resource Faculty, **Academic Refresher Course Programme-III (Academic Development Programme in Basic Process Engineering) for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, November 06–December 05, 2006.
61. Coordinator & Resource Faculty, **Academic Development Programme in Basic Process Engineering-4 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, December 08, 2006–January 09, 2007.
62. Technical Programme Committee Member, **The 3<sup>rd</sup> International Conference on Autonomous Robots and Agents (ICARA-2006)**, Palmerston North, New Zealand, December 12–14, 2006.
63. Coordinator & Resource Faculty, **Academic Development Programme in Basic Process Engineering-5 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, January 12–February 13, 2007.
64. Advisory Committee Member, **13<sup>th</sup> National Conference on Surfactants, Emulsions & Biocolloids with Special Focus on Biomimetic Systems (NATCOSEB XIII-BIMS)**, organized by Chemistry Group of BITS-Pilani in Collaboration with Indian Society for Surface Science and Technology, Jadavpur, Kolkata, BITS Pilani, February 22-24, 2007.
65. Programme Committee Member, **The Second International Symposium on Knowledge Communication and Conferences (KCC-2007)**, Orlando, Florida, USA, July 8-11, 2007.
66. Programme Committee Member, **The 3<sup>rd</sup> International Symposium on Management, Engineering and Informatics (MEI-2007)**, Orlando, Florida, USA, July 8-11, 2007.
67. Technical Advisory Committee Member, **International Conference on Modeling and Simulation (Emerging Methods Towards Frontier Technologies) (CIT ICOMS-2007)**, CIT Coimbatore, August 27-29, 2007.
68. Program Committee Member, **The Second International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2007)**, Zhengzhou Henan Province, China, September 14-17, 2007.
69. International Program Committee Member, **2007 IEEE Congress on Evolutionary Computation (CEC-2007)**, Swissotel The Stamford, Singapore, September 25-28, 2007.
70. Resource Faculty, **Workshop on Advanced Heat and Mass Transfer for the Employees of Engineers India Limited (EIL) New Delhi**, organized by Research & Consultancy Division of BITS Pilani at EIL-New Delhi, October 12-13, 2007.
71. Expert Team Member, Technology Clinic, **2<sup>nd</sup> National Convention on Energising Entrepreneurship Through Innovation**, BITS Pilani, November 2-3, 2007.
72. International Program Committee Member, **The Fourth International Conference on Computational Intelligence, Robotics and Autonomous Systems (CIRAS-2007)**, Palmeston North, New Zealand, November 28-30, 2007.
73. Program Committee Member, **The 3<sup>rd</sup> Indian International Conference on Artificial Intelligence (ICAI-2007)**, Pune, India, December 17-19, 2007.
74. Program Committee Member, **IEEE World Congress on Computational Intelligence (WCCI-2008)**. Sponsored by the IEEE Computational Intelligence Society, co-sponsored by the International Neural Network Society, Evolutionary Programming Society and the Institution of Engineering and Technology, **WCCI 2008** is composed of **the 2008 International Joint Conference on Neural Networks (IJCNN 2008)**, **the 2008 IEEE International Conference on Fuzzy Systems (FUZZ-IEEE 2008)** and **the 2008 IEEE Congress on Evolutionary Computation (CEC 2008)**, Hongkong, June 1-6, 2008.

75. International Program Committee Member, **The 2008 IEEE International Conferences on Cybernetics & Intelligent Systems (CIS 2008)**, Chengdu, China, June 3-6, 2008.
76. Program Committee Member, **The Fifth International Conference on Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2008)**, Linz, Austria, June 19-21, 2008.
77. Program Committee Member, **The First International Multi-Conference on Engineering and Technological Innovation (IMETI 2008)**, Orlando, Florida, USA, June 29-July 2, 2008.
78. Programme Committee Member, **The Third International Symposium on Knowledge Communication and Conferences (KCC-2008)**, Orlando, Florida, USA, June 29-July 2, 2008.
79. Programme Committee Member, **The 4<sup>th</sup> International Symposium on Management, Engineering and Informatics (MEI-2008)**, Orlando, Florida, USA, June 28-July 2, 2008.
80. Programme Committee Member, **The 12<sup>th</sup> World Multi Conference on Systemics, Cybernetics, and Informatics (WMSCI-2008)**, Orlando, Florida, USA, June 29-July 2, 2008.
81. Advisory Committee Member, **International Conference on Soft Skills Development and Academia Perspectives**, BITS Pilani, September 19-20, 2008.
82. Program Committee Member, **The Third International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2008)**, Adelaide, Australia, September 28-October 1, 2008.
83. Advisory Committee Member, **International Convention on Water Resources Development and Management (ICWRDM)**, BITS Pilani, October 23-26, 2008.
84. Coordinator & Resource Faculty, **Academic Development Programme in Basic Process Engineering-6 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, January 07–February 03, 2009.
85. Technical Program Committee Member, **The 4<sup>th</sup> International Conference on Autonomous Robots and Agents (ICARA 2009)**, Wellington, New Zealand, February 10-12, 2009.
86. Coordinator & Resource Faculty, **Academic Development Programme in Basic Process Engineering-7 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, February 04–March 03, 2009.
87. Invited Main Speaker, Workshop on **Application of Advanced Tools/Techniques in Research**, BITS Pilani Goa Campus, Goa, March 6-7, 2009.
88. Resource Faculty, **Academic Development Programme in Basic Process Engineering-8 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, March 14–April 10, 2009.
89. Member, Advisory Committee, **National Workshop on Water Conservation and Sustainable Development of Society (WCSDS-2009)**, Organized by MBM Engineering College, Jai Narain Vyas University, Jodhpur & Department of Environment, Government of Rajasthan, at MBM Engineering College, Jodhpur, March 15, 2009.
90. Program Committee Member, **2009 IEEE Congress on Evolutionary Computation (IEEE-CEC-2009)**, Trondheim, Norway, May 18-21, 2009.
91. Program Committee Member, **Chinese Decision and Control Conference (CDCC-2009)**, Guilin, China, June 17-19, 2009.
92. Resource Faculty, **Academic Development Programme in Basic Process Engineering-9 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, June 29–July 24, 2009.
93. Program Committee Member, **The 2<sup>nd</sup> International Symposium on Academic Globalization (AG-2009)**, Orlando, Florida, USA, July 10-13, 2009.
94. Program Committee Member, **The 3<sup>rd</sup> International Conference on Knowledge Generation, Communication and Management (KGCM-2009)**, Orlando, Florida, USA, July 10-13, 2009.
95. Program Committee Member, **The 4<sup>th</sup> International Symposium on Knowledge Communication and Conferences (KCC-2009)**, Orlando, Florida, USA, July 10-13, 2009.
96. Program Committee Member, **The 5<sup>th</sup> International Symposium on Management, Engineering and Informatics (MEI-2009)**, Orlando, Florida, USA, July 10-13, 2009.
97. Program Committee Member, **The 7<sup>th</sup> International Conference on Computing, Communications and Control Technologies (CCCT 2009)**, Orlando, Florida, USA, July 10-13, 2009.
98. Program Committee Member, **The 13<sup>th</sup> World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI-2009)**, Orlando, Florida, USA, July 10-13, 2009.
99. Program Committee Member, **The 15<sup>th</sup> International Conference on Information Systems Analysis and Synthesis (ISAS-2009)**, Orlando, Florida, USA, July 10-13, 2009.
100. Resource Faculty, **Academic Development Programme in Basic Process Engineering-10 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, August 13-September 09, 2009.
101. International Program Committee Member, **6<sup>th</sup> International Conference on Computational Intelligence, Robotics and Autonomous Systems (CIRAS-2009)**, Incheon, Korea, August 16-18, 2009.

102. International Program Committee Member, **FIRA (Federation of International Robo-Soccer Association) Robo World Congress-2009**, Incheon, Korea, August 16-18, 2009.
103. Program Committee Member, **The 2009 International Conference on Intelligent Computing (ICIC-2009)**, Ulsan, Korea, September 16-19, 2009.
104. International Program Committee Member, **International Conference on Evolutionary Computation (ICEC-2009)**, Madeira, Portugal, October 5-7, 2009.
105. Technical Program Committee Member, **The International Workshop on Bio-inspired Computing and Communications- (BICC 2009), organised in conjunction with IEEE International Conference on Ultra Modern Communications-ICUMT (ICUMT-Workshop-42)**, Saint Petersburg, Russia, October 13-14, 2009.
106. Program Committee Member, **The 4<sup>th</sup> International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2009)**, Peking University, Beijing, China, on October 16-19, 2009.
107. Program Committee Member, **The 4<sup>th</sup> Indian International Conference on Artificial Intelligence (IICAI-2009)**, Tumkur, India, December 16-18, 2009.
108. Resource Faculty, **Academic Development Programme in Basic Process Engineering-1 for the Employees of Bharat Aluminum Company Limited, Korba**, Organized by Practice School Division, BITS Pilani, February 26-March 25, 2010.
109. Program Committee Member, **The 16<sup>th</sup> International Conference on Information Systems Analysis and Synthesis (ISAS-2010)**, Orlando, Florida, USA, April 6-9, 2010.
110. Program Committee Member, **8<sup>th</sup> International Conference on Computing, Communications and Control Technologies (CCCT-2010)**, Orlando, Florida, USA, April 6-9, 2010.
111. Program Committee Member, **The SPRING 4<sup>th</sup> International Conference on Knowledge Generation, Communication and Management (KGCM-2010)**, Orlando, Florida, USA, April 6-9, 2010.
112. Advisory Committee Member, **National Conference on Environmental Conservation and Management (NCECM-2010)**, Poomima College of Engineering, Jaipur, May 10-12, 2010.
113. International Program Committee Member, **15<sup>th</sup> FIRA (Federation of International Robotsoccer Association) Robot World Cup and Congress**, Amrita Vishwa Vidyapeetham, Bangalore, May 15-19, 2010.
114. Resource Faculty, **Academic Development Programme in Basic Process Engineering-11 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, June 21-July 19, 2010.
115. Resource Faculty, **Academic Development Programme in Basic Process Engineering-2 for the Employees of Bharat Aluminum Company Limited, Korba**, Organized by Practice School Division, BITS Pilani, June 25-July 22, 2010.
116. Track Chair & Program Committee Member, **4<sup>th</sup> IEEE intentional conference on Cybernetics and Intelligent Systems (CIS) and the 4<sup>th</sup> IEEE intentional conference on Robotics, Automation and Mechatronics (RAM) (IEEE CIS-RAM-2010)**, Singapore, June 28-30, 2010.
117. Program Committee Member, **The 3<sup>rd</sup> International Symposium on Academic Globalization (AG-2010)**, Orlando, Florida, USA, June 29-July 02, 2010.
118. Program Committee Member, **The SUMMER 4<sup>th</sup> International Conference on Knowledge Generation, Communication and Management (KGCM-2010)**, Orlando, Florida, USA, June 29-July 02, 2010.
119. Program Committee Member, **The 6<sup>th</sup> International Symposium on Management, Engineering and Informatics (MEI-2010)**, Orlando, Florida, USA, June 29-July 02, 2010.
120. Program Committee Member, **The International Symposium on Science 2 and Expansion of Science (S2ES-2010)**, Orlando, Florida, USA, June 29-July 02, 2010.
121. Resource Faculty, **Staff Development Programme on Innovative Teaching Techniques for Transport Phenomena** organized by ITM Universe, Gwalior, July 12-17, 2010.
122. Program Committee Member, **2010 IEEE Congress on Evolutionary Computation (IEEE-CEC-2010)**, Barcelona, Spain, July 18-23, 2010.
123. Program Committee Member, **The 2010 International Conference on Intelligent Computing (ICIC-2010)**, ChangSha, China, August 18-21, 2010.
124. Program Committee Member, **Fifth International Conference on Bio-Inspired Computing: Theories and Applications (BIC-TA 2010)**, Liverpool Hope University, Liverpool, September 8-10, 2010.
125. Program Committee Member, **The 7<sup>th</sup> International Conference on Computational Intelligence, Robotics and Autonomous Systems (CIRAS-2010)**, Bangalore, India, September 15-17, 2010.
126. Program Committee Member, **The Fourth International Conference on Genetic and Evolutionary Computing (ICGEC-2010)** Shenzhen, China, December 13-15, 2010.
127. Program Committee Member, **9<sup>th</sup> International Conference on Computing, Communications and Control Technologies (CCCT 2011)**, Orlando, Florida, USA, March 27-30, 2011.
128. Program Committee Member, **The 17<sup>th</sup> International Conference on Information Systems Analysis and Synthesis (ISAS-2010)**, Orlando, Florida, USA, March 27-30, 2011.

129. Program Committee Member, **The Spring 5<sup>th</sup> International Conference on Knowledge Generation, Communication and Management (KGCM-2011)**, Orlando, Florida, USA, March 27-30, 2011.
130. Program Committee Member, **IEEE SSCI (Symposium Series on Computational Intelligence) Symposium on Foundations of Computational Intelligence (IEEE-SSCI-FoCI-2011)** Paris, France, April 11-15, 2011.
131. Technical Program Committee Member, **IEEE SSCI (Symposium Series on Computational Intelligence) Symposium on Differential Evolution (IEEE-SSCI-SDE-2011)** Paris, France, April 11-15, 2011.
132. Program Committee Member, **Genetic and Evolutionary Computation Conference (GECCO-2011)**, Dublin, Ireland, July 12-16, 2011.
133. Program Committee Member, **The 4<sup>th</sup> International Symposium on Academic Globalization (AG-2011)**, Orlando, Florida, USA, July 19-22, 2011.
134. Program Committee Member, **The 7<sup>th</sup> International Symposium on Management, Engineering and Informatics (MEI-2011)**, Orlando, Florida, USA, July 19-22, 2011.
135. Program Committee Member, **The 2<sup>nd</sup> International Symposium on Science 2 and Expansion of Science (S2ES-2011)**, Orlando, Florida, USA, July 19-22, 2011.
136. Advisory Committee Member, **IEEE International Conference on Process Automation, Computing and Control (IEEE-PACC-2011)**, CIT, Coimbatore, India, July 20-22, 2011.
137. Program Committee Member, **First International Conference on Advances in Computing and Communications (ACC-2011)**, Rajagiri School of Engineering and Technology (RSET), Kochi, Kerala, India, July 22-24, 2011.

#### Sessions Chaired in Seminars/Conferences:

1. Chairman, Technical Session-III (Energy Integration in Distillation Columns), **Seminar and Intensive Course on Process Control and Simulation for Chemical and Metallurgical Industries**, BITS Pilani, April 4-7, 1997.
2. Chairman, Technical Session-III, **Seminar and Intensive Course (SIC-2001) on Novel Separation Techniques and their applications to Indian Chemical Industries**, BITS Pilani, March 21-23, 2001.
3. Panel Discussion on Bio-mass Gasification at the **Intensive Workshop on Testing Evaluation of Biomass Gasifier Systems and Related Laboratory Investigations** organized by Sardar Patel Renewable Energy Research Institute (SPRERI), Vallabh Vidyanagar, April 11-14, 2001.
4. Chairman, Technical Session-IV (Consisting of a Keynote Address on "Pervaporation—a low energy alternative to distillation" by Prof V G Pangarkar-UDCT Mumbai, an Invited Talk on "Eco-Friendly fuels of new millennium by quality improvement and by alternate fuel" by Dr G K Ghoshal-LIT Nagpur, and 5 Technical Papers), **National Seminar on Eco-Friendly Chemical Technologies in New Millennium** organized by UDCT, Amravati University, Amravati, February 7-8, 2002.
5. Co-Chairman, Technical Session-III (Consisting of a Keynote Address on "Emerging Eco-Friendly Technologies for Pulp and Paper Industry" by Dr J D Dhake-Principal, AEC, Chikhali, and 7 Technical Papers), **National Seminar on Eco-Friendly Chemical Technologies in New Millennium** organized by UDCT, Amravati University, Amravati, February 7-8, 2002.
6. Chairman, Paper Presentation Session, **35<sup>th</sup> Engineers' Day—Theme: Indian Small Scale Industries in Globalization Scenario**, BITS Pilani, September 16, 2002.
7. Chairman, Paper Presentation Session, **36<sup>th</sup> Engineers' Day—Theme: Improvement in Values in Engineering Profession**, BITS Pilani, September 15, 2003.
8. Chairman, Session on "Theory of Evolutionary Algorithms (Fr1-SR04: J)", **2003 Congress on Evolutionary Computation (CEC-2003)**, Canberra, Australia, December 8-12, 2003.
9. Chairman, Special Session on "Evolutionary Computation", **The Second International Conference on Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2003)**, National University of Singapore, Singapore, December 15-17, 2003.
10. Chairman, Session on "Evolutionary Algorithms 2 (PS05)", **The Second International Conference on Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2003)**, National University of Singapore, Singapore, December 15-17, 2003.
11. Chairman, Technical Session-3A, National Conference on **Energy Management in Changing Business Scenario (EMCBS-2005)**, BITS Pilani, October 8-9, 2005.
12. Chairman, Chemical Engineering Session, **International Congress of Chemistry and Environment (ICCE-2005)**, Research Journal of Chemistry and Environment, Indore, December 24-26, 2005.
13. Chair Person, Session-I, Plenary Lecture-II, "Drug Discovery & Development in 21<sup>st</sup> Century: Challenges & Opportunities" by Dr B K Trivedi, CSO, DDR, Wockhardt Limited, **National Symposium on Challenges in Drug Discovery Research: Networking Opportunities between Academia & Industries**, BITS Pilani, April 7-8, 2006.
14. Chair Person, Symposium 5.1: Immunology of bacterial and viral diseases, **33<sup>rd</sup> Indian Immunological Society Conference**, AIIMS New Delhi, January 28-31, 2007.

15. Chairman, PTs III - Plenary Talks (Robotics), **International Conference on Emerging Mechanical Technology-Macro to Nano (EMTM2N-2007)**, BITS Pilani, February 16-18, 2007.
16. Chairman, Session XX, **International Conference on the Interface of Chemistry-Biology in Biomedical Research (ISCBC-2008)**, BITS Pilani, February 22-24, 2007.
17. Chairman, Session I, **Photonic Polymers: Materials, Devices and Applications (PPMDA-2008)**, BITS Pilani, April 03-04, 2008.
18. Expert Member, **Curriculum Workshop**, Structure development for B.Tech & M.Tech programmes in Chemical Engineering, MNIT, Jaipur, May 24-25, 2008.
19. Chairman, Session V: Technology and Etiquettes, **International Conference on Soft Skills Development and Academia Perspectives**, BITS Pilani, September 19-20, 2008.
20. Expert Member, **Workshop to draw an action plan for its newly started B.Tech (Chemical Engineering) Programme**, Banasthali University, Banasthali Vidyapeeth, May 3-4, 2009.

#### Invited Lectures/Talks Delivered:

1. Delivered Lectures on "Fluid Flow Operations", **Package Program on Chemical Engineering for Non-Chemical engineers**, organized by Department of Chemical Engineering & DDIT Alumni Association of DDIT Nadiad, Inder Residency, Ahmedabad, December 21-23, 1995.
2. Delivered Lectures on "Heat Transfer", **3-Day Course on Chemical Engineering for Non-Chemical Engineers & Chemists**, jointly organized by Department of Chemical Engineering of DDIT Nadiad and Ankleshwar Industries Association, Ankleshwar, July 12-14, 1996.
3. Delivered Lectures on "Fluid Flow Operations", **3-Day Course on Chemical Engineering for Non-Chemical Engineers & Chemists**, jointly organized by Department of Chemical Engineering of DDIT Nadiad and Ankleshwar Industries Association, Ankleshwar, July 12-14, 1996.
4. Delivered an Invited Talk on "Hydrodynamics and Heat Transfer in Trickle Bed Columns", BITS Pilani, July 24, 1996.
5. Delivered Lectures on "Mathematical Modeling and Simulation", **Seminar and Intensive Course on Process Control and Simulation for Chemical and Metallurgical Industries**, BITS Pilani, April 4-7, 1997.
6. Delivered Lectures on "Computers in Process Control", **Seminar and Intensive Course on Process Control and Simulation for Chemical and Metallurgical Industries**, BITS Pilani, April 4-7, 1997.
7. Delivered an Invited Talk on "BITS Model of Education and its Flexibilities", Sri Prakash Educational Trust, Payakaraopeta, June 08, 2000.
8. Delivered an Invited Lecture on "Character Building and Career Development", Sri Prakash Educational Trust, Payakaraopeta, June 09, 2000.
9. Delivered Lectures on "Novel Adsorbents for solid-liquid separations", **Seminar and Intensive Course (SIC-2001) on Novel Separation Techniques and their applications to Indian Chemical Industries**, BITS Pilani, March 21-23, 2001.
10. Delivered Lectures on "Process Integration", **Seminar and Intensive Course (SIC-2001) on Novel Separation Techniques and their applications to Indian Chemical Industries**, BITS Pilani, March 21-23, 2001.
11. Delivered a Talk on "Knowledge, Experience and Ideas gained at **CHEMCON-2001**", BITS Pilani, January 02, 2002.
12. Delivered a Talk on "BITS Educational System–Role of faculty members", Tolani Maritime Institute, Induri, July 15, 2002.
13. Delivered a Talk on "BITS Model of Education–Flexibilities for students", Tolani Maritime Institute, Induri, July 15, 2002.
14. Delivered a Talk on "Experience and Ideas gained at Joint International Conference of **SEAL'02, ICONIP'02 & FSKD'02**, attended during November 18 – 22, 2002, Singapore", BITS Pilani, January 16, 2002.
15. Delivered a Talk on "BITS Educational System–Role & Responsibilities of Faculty members", RL Institute of Nautical Sciences, Madurai, June 21, 2003.
16. Delivered a Talk on "BITS Model of Education–Philosophy & Flexibilities for students", RL Institute of Nautical Sciences, Madurai, June 21, 2003.
17. Delivered an Invited Presentation on "Optimal Design of Heat Exchangers using Evolutionary Computation Techniques", **Curriculum Development Cell Workshop on "Heat Exchangers Design and Optimization"**, IIT Delhi, March 26, 2004.
18. Delivered Lectures on "Fluid Flow Operations", "Mass Transfer Operations", and "Heat Transfer Operations" of Basic Chemical Engineering Operations, **Academic Refresher Course Programme-1 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, June 10-July 24, 2004.
19. Invited as a Guest Faculty and delivered an invited lecture on "Global Optimization using Stochastic Search Methods" on 16-08-2004, **SERC School / CEP Course on 'Process Optimization, Data Driven Modeling and Advanced Process Control'**, IIT-Bombay, Mumbai, August 16-20, 2004.

20. Delivered Lectures on "Fluid Flow Operations", "Mass Transfer Operations", and "Heat Transfer Operations" of Basic Chemical Engineering Operations, **Academic Refresher Course Programme-II for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, October 9–November 22, 2004.
21. Addressed the students of collaborative programme on BS (Manufacturing Management) at Bharat Forge Limited (BFL), Pune, February 20, 2005.
22. Addressed the students of collaborative programmes on BS (Marine Engineering), and BS (Nautical Technology), TMI, February 21, 2005.
23. Delivered Lectures on "Energy Integration Analysis", **Workshop on Energy Saving in Steam Systems** organized by Centre for Renewable Energy and Environmental Development (CREED), BITS Pilani and Thermax Babcock and Wilcox Limited, Pune, BITS Pilani, April 26-30, 2005.
24. Invited Seminar Talk on "Modified Differential Evolution for Optimization of Process Design and Synthesis Problems", Department of Chemical and Biomolecular Engineering, National University of Singapore (NUS), Singapore, December 3, 2006.
25. Invited Distinguished Speaker, **International Conference on Life Cycle Assessment and Life Cycle Management Methodologies**, The Boulevard, Kuala Lumpur, Malaysia, December 4-5, 2006.
26. Delivered Lectures on "Fluid Flow Operations" and "Mass Transfer Operations", **Academic Refresher Course Programme-III (Academic Development Programme in Basic Process Engineering) for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, November 06–December 05, 2006.
27. Delivered Lectures on "Fluid Flow Operations" and Mass Transfer Operations", **Academic Development Programme in Basic Process Engineering-4 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, December 08, 2006–January 09, 2007.
28. Delivered Lectures on "Fluid Flow Operations" and Mass Transfer Operations", **Academic Development Programme in Basic Process Engineering-5 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, January 12–February 13, 2007.
29. Invited Distinguished Speaker, **National Seminar on Bio Films: Challenges & Applications**, Bharatiya Vidya Bhavan's Bhavan' Research Center in Collaboration with University of Mumbai - Sesquicentennial Celebrations, January 12-13, 2007.
30. Invited Speaker, **Indo-US Workshop on Advances in Computational Optimization and Analysis of Systems**, Indian Institute of Technology (IIT), Kanpur, February 07-09, 2007.
31. Invited Resource Faculty, **Workshop on Advanced Heat and Mass Transfer for the Employees of Engineers India Limited (EIL) New Delhi**, EIL-New Delhi, October 12-13, 2007.
32. Invited Speaker, "Chemical kinetics and dynamics of plasma assisted pyrolysis of assorted, non nuclear waste" at a one-day follow up discussion meeting on **New Research directions in the use of power beams for environmental applications (RPDM-PBEA-2007)** to a Symposium on "Power beams for clean environment and processes" organized by Laser & Plasma Technology Division of Bhabha Atomic Research Centre (BARC), Mumbai on September 18, 2007.
33. Invited Talk, **Differential Evolution Strategies**, Indian Institute of Technology (IIT), Roorkee, October 23, 2007.
34. Invited Lecture, **Bio-inspired Evolutionary Approach for Optimization**, APOGEE-2008, BITS Pilani, March 12, 2008.
35. Invited Peer Team Member, **Assessors' Interaction Meeting** for professional educational experts, National Assessment and Accreditation Council (NAAC), Bangalore, October 23-24, 2008.
36. Invited Speaker, **Indo-French Workshop on Biohydrogen Production** under the aegis of Indo French Center for Promotion of Advance Scientific Research, organized by The Energy and Resources Institute (TERI)-New Delhi, Hotel Jaypee Manor, Mussoorie, November 6-8, 2008.
37. Invited Speaker, **Indo-US Workshop on Materials Design: Measurement, Modeling and Informatics**, organized jointly by School of Materials Science and Engineering, Bengal Engineering and Science University (BESU)-Shibpur and Combinatorial Sciences and Materials Informatics Collaboratory (CoSMIC-IMI), Iowa State University-USA with the support of Tata Steel-Jamshedpur and Stanley Foundation-USA, Kolkata, January 5-7, 2009.
38. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-6 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, January 07–February 03, 2009.
39. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-7 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, February 04–March 03, 2009.
40. Invited Talk, **Practices vs. Performance**, Staff Association, BITS Pilani, February 09, 2009.
41. Invited Lectures on Modelling & Simulation, Traditional Optimization Techniques and their limitations, Population-based search algorithms for optimization, and Energy Integration Analysis, **Workshop on Application of Advanced Tools/Techniques in Research**, BITS Pilani Goa Campus, Goa, March 6-7, 2009.

42. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-8 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, March 14-April 10, 2009.
43. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-9 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, June 29-July 24, 2009.
44. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-10 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, August 13-September 09, 2009.
45. Invited Talk, **Biomass gasification: A conversion technology for production of gaseous fuels**, IIP Golden Jubilee Symposium on "Fossil Economy to Biomass Economy - Opportunities and Challenges", IIP-Dehradun, August 19-21, 2009.
46. Invited Lectures on Overview of Process Modeling & Simulation, and Population-based search algorithms for single- and multi-objective optimization, **Workshop on Process Modeling and Simulation**, University of Petroleum and Energy Studies (UPES), Dehradun, November 6-7, 2009.
47. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-1 for the Employees of Bharat Aluminum Company Limited, Korba**, Organized by Practice School Division, BITS Pilani, February 26-March 25, 2010.
48. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-11 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, June 21-July 19, 2010.
49. Delivered Lectures on "Fluid Flow Operations", **Academic Development Programme in Basic Process Engineering-2 for the Employees of Bharat Aluminum Company Limited, Korba**, Organized by Practice School Division, BITS Pilani, June 25-July 22, 2010.
50. Delivered Lectures on "Introduction to Transport Phenomena" and "Energy Integration Analysis", **Staff Development Programme on Innovative Teaching Techniques for Transport Phenomena** organized by ITM Universe, Gwalior, July 12-17, 2010.

#### Membership of Professional Bodies/Institutions:

1. Life Member of Indian Society for Technical Education (**ISTE**) (LM-15527).
2. Life Member of Indian Institute of Chemical Engineers (**IIChE**) (LM-12583).
3. Corporate Life Member of Institution of Engineers (India) [**IE(I)**] (M-109374/0).
4. Fellow of International Congress of Chemistry and Environment (**FICCE**) (FL/B-5009).
5. Life Member of Indian Environmental Association (**IEA**) (LM-148).
6. Life Member of Society of Operations Management (**SOM**) (LM-96/004).
7. Associate Member of the International Society for Structural and Multidisciplinary Optimization (**AMISSMO**).
8. Member of International Institute of Informatics and Systemics (**IIS**) (M-333298).
9. Member of International Association of Engineers (**IAENG**) (M-61741).
10. Member of Society of Plastics Engineers (**SPE**) Europe.

#### Scholarship/Fellowship Awarded:

1. Ministry of Human Resources Development, Government of India, New Delhi, Research Scholarship for Doctorate, 1989-93.
2. University Grants Commission, New Delhi, Junior Research Fellowship for Master's Degree, 1983-85.

#### Awards/Honors/Distinctions Obtained:

1. **Expert Member, Peer Team**, National Assessment and Accreditation Council (NAAC), Bangalore.
2. **Member**, Board of Studies (**BOS**), Banasthali University, Banasthali, 2008-2011.
3. **Expert Member**, Curriculum Development, MNIT Jaipur, 2008.
4. **Member, Peer Review Committee**, The Natural Sciences and Engineering Research Council of Canada (NSERC), Canada.
5. **Member, Peer Review Committee**, National Research Foundation (NRF), International Research Grants, South Africa.
6. **Expert Member**, Research group evaluation and selection, King Fahd University of Petroleum & Minerals (KFUPM), Dhahran, Saudi Arabia.

7. **Expert Reviewer**, Extra Mural Research Division (EMR-II), Human Resource Development Group (HRDG), Council of Scientific & Industrial Research (CSIR), New Delhi.
8. **Expert Member**, Selection Committee for Faculty Recruitment, Banasthali University, Banasthali.
9. **Expert Member**, Selection Committee for Faculty Recruitment, SVNIT, Surat.
10. Our paper entitled "Convective and Radiative Heat Transfer in Pyrolysis of a Biomass Particle" authored by A S Chaurasia, **B V Babu**, Amanpreet Kaur, and V Thiruchitrambalam, published in Indian Chemical Engineer Journal, Vol. 47 (No. 2), pp. 75-80, April-June, 2005 earned the **Kuloor Memorial Award-2006** awarded for the **Best Technical Paper** published in the Institute's Journal "Indian Chemical Engineer" in its issues for 2005.
11. **National Technology Day** (11<sup>th</sup> May, 2003) Award obtained in recognition of the research work done in the area of 'A New Concept in Differential Evolution (DE) – Nested DE'.
12. Technical Paper entitled "Evolutionary Computation for Scenario-Integrated Optimization of Dynamic Systems" was adjudged the **SECOND BEST PAPER** presented in the 'Modeling Simulation and Control Session' at International Symposium & 54<sup>th</sup> Annual Session of IChE (CHEMCON-2001), CLRI, Chennai, December 19-22, 2001.
13. Technical Paper entitled "Adaptive networks for Fault Diagnosis and Process Control", was adjudged the **BEST PAPER** presented in the Technical Session (Miscellaneous) at International Symposium & 53<sup>rd</sup> Annual Session of IChE (CHEMCON-2000), Science City, Calcutta, December 18-21, 2000.
14. Nine of my following Research Papers have been included as **Successful Applications of Differential Evolution** (Application Nos. 7, 9, 10, 11, 12, 13, 17, 18, 19) on **Homepage of Differential Evolution**, the URL of which is: <http://www.icsi.berkeley.edu/~storn/code.html>: 1. Heat transfer parameter estimation in a trickle bed reactor; 2. Evolutionary Computation for Scenario-Integrated Optimization of Dynamic Systems; 3. Optimal Design of Shell-and-Tube Heat Exchangers using Different Strategies of Differential Evolution; 4. Evolutionary Computation strategy for optimization of an Alkylation Reaction; 5. Optimization of Thermal Cracker Operation using Differential Evolution; 6. Optimization of Non-linear Chemical Processes; 7. Optimization of Water Pumping System; 8. Optimal Design of Gas Transmission Network; 9. Differential Evolution for Multi-Objective Optimization.
15. Stood **FIRST** among the students of SRGJ College, Tuni in the Intermediate Public Examination conducted by Board of Intermediate Education, Hyderabad (AP), 1978.

#### Industrial Consultancy:

1. Technical Consultant for **Sangam (India) Limited Textile Industry, Bhilwara**, for Removal of Color, BOD, and COD from Effluent Treatment Plant, 2009.
2. For discussions on a consultancy project on feasibility study of Jalal Group at Bahrain (Middle East), visited Bahrain during February 11-14, 2005.
3. Consultant for **Maharashtra Electricity Regulatory Commission (MERC), Mumbai** and offering Advisory Services in the 'Study relating to Bagasse Based Co-generation', 2001-2003.
4. Consultant as Panel Expert, [www.chemicalhouse.com](http://www.chemicalhouse.com), leading portals on chemical trade. It is the most vibrant and active site for the Chemical Industry on the net which specializes in exchange of Information in a structured way among the chemical world in more than a Hundred Countries and a Million core chemical manufacturers, traders, scientists, etc, May 2004 onwards.
5. Undertaken and completed the Process and Mechanical Design of Alcohol & Water Towers for the separation of Ethanol-Water mixture by Azeotropic Distillation using Benzene as an entrainer for **Krishna Engineering Works, Nadiad**, 1994-95.
6. Technical Consultant for **P S Traders, Ahmedabad**, for the production of Sweetened Condensed Milk (SCM) under a marketing tie-up with **Cadburys India Limited, Bombay**, and processing tie-up with **Lactose India Limited, Baroda**, 1993-96.
7. Technical Consultant for **P S Milk Processors, Ahmedabad**, for the Plant Design for the Production of various Milk products, 1993-96.

#### Visiting Faculty:

1. For Industrial Chemistry students in Chemical Engineering subjects at SBCJ Science College, Cambay affiliated to Gujarat University, Ahmedabad, 1995-96.
2. DLPD Contact Program of BITS for BS (Process Engineering), Indo Gulf Fertilizers & Chemicals Corporation, Jagdishpur, 1996-98.
3. PS-1 Faculty, Practice School Program of BITS, Nagarjuna Fertilizers & Chemicals Limited, Kakinada, May-July 1997.
4. PS-1 Faculty, Practice School Program of BITS, Century Textiles & Industries Limited, Mumbai, May-July 1998.
5. As a Program Coordinator, visited Tolani Maritime Institute (TMI), Induri for looking into Admissions, Comprehensive Examinations, and other related aspects of BITS Collaborative Programme on BS (Marine Engineering) at TMI, July 13-18, 2002.

6. As a Program Coordinator, visited RL Institute of Nautical Sciences (RLINS), Madurai for looking into Admissions, Comprehensive Examinations, and other related aspects of BITS Collaborative Programme on BS (Marine Engineering) at RLINS, June 19-22, 2003.
7. As a Program Coordinator, visited Tolani Maritime Institute (TMI), Induri for looking into Admissions, Comprehensive Examinations, and other related aspects of BITS Collaborative Programme on BS (Marine Engineering) at TMI, July 09-11, 2003.
8. Visited Bharat Forge Limited (BFL), Pune to discuss the issues related to BITS collaborative programme on BS (Manufacturing Management) at BFL, February 19-20, 2005.
9. As a Program Coordinator, visited Tolani Maritime Institute (TMI), Induri for looking into Grading, Semester evaluation, other related aspects of BITS Collaborative Programme on BS (Marine Engineering), and the proposed BS (Nautical Technology) programme at TMI, February 20-21, 2005.
10. Visited Chambal Fertilizers & Chemicals Limited (CFCL), Badepan (35 Kms from Kota) for discussions on proposed BITS Collaborative Programme on BS (Process Engineering) for their employees, and the proposed Practice School station at CFCL, March 7-9, 2005.
11. Visited National Thermal Power Corporation (NTPC), Antha (20 Kms from Badepan) for discussions on BITS Collaborative Programme on BS (Power Engineering) for their employees, and the proposed Practice School station at NTPC, March 9, 2005.
12. Visited Hindustan Zinc Limited (HZL), Udaipur; Chanderiya Lead Zinc Smelter (CLZS), Chanderiya; Sterlite Technology Centre, Debari; and Zawar Mining Complex, Zawar for discussions on BITS Collaborative Programme on BS (Process Engineering), MS (Management) for their employees, and the proposed Practice School station at HZL, March 27-30, 2005.
13. Visited Chambal Fertilizers & Chemicals Limited (CFCL), Badepan (35 Kms from Kota) for finalizing the admissions into BITS Collaborative Programme on BS (Process Engineering) for their employees, and meeting Practice School students at CFCL, June 5-7, 2005.
14. Visited BITS-Pilani Goa Campus (started in August, 2004 and formally inaugurated by the Honourable Prime Minister of India Dr Manmohan Singh on May 5, 2006) for looking into Chemical Engineering Laboratories and the Workshop facilities. Also visited one of the PS-1 stations of BITS-Pilani, National Institute of Oceanography (NIO) at Goa, May 22-25, 2006.

#### Working Computer Knowledge:

- |                             |  |
|-----------------------------|--|
| 1. Languages                | : FORTRAN, BASIC, PASCAL, C & C++, Visual Studio   |
| 2. Word Processing Packages | : Latex, MS-Word   |
| 3. Professional Packages    | : HYSYS, ASPEN+, FLUENT, GAMBIT, MATLAB, IMSL Sub-routines,<br>MS-Office, ORIGIN, NAG Routines |
| 4. Operating Systems        | : DOS, UNIX, NOS-VE, Windows   |
| 5. Main Frame Computer      | : CDC-CYBER 180/840  |
| 6. Super Computer           | : PARAM-10000  |

#### Short Term Courses Attended:

1. "Small Industry Orientation Training Program" conducted by Small Industry Extension Training Institute (SIETI, Government of India Society), Hyderabad (AP), March 27-29, 1983.
2. QIP Winter School on "Industrial Pollutants and their management" organized by Chemistry Department, IIT Delhi, December 4-18, 1986.
3. ISTE Summer School on "Mineral Resource Appraisal and Development" organized by Mining Engineering Department, IIT Kharagpur (WB), May 25-June 5, 1987.
4. ISTE Summer School on "Microprocessor Applications" organized by Department of Instrumentation and Control Engineering, NSS College of Engineering, Palghat (Kerala), May 16-28, 1988.
5. ISTE Winter School on "Maintenance Management" organized by Production Engineering Department, Annamalai University, Annamalinagar (TN), December 5-16, 1988.
6. ISTE Summer School on "Recent Developments in Heat Exchangers" organized by Mechanical Engineering Department, IIT Madras (TN), June 5-16, 1989.
7. ISTE Workshop on "Industry-Institute Partnership" organized by ISTE Chapter at DDIT Nadiad (Gujarat), April 25-27, 1994.
8. QIP Summer School on "Advances in the Production of Petrochemicals" organized by Chemical Engineering Department, University of Roorkee, Roorkee (UP), June 21-July 5, 1994.
9. "Intrabits Site Training Programme" organized by Centre for Software Development, BITS Pilani, February 7-12, 2000.

**Seminars/Symposia/Workshops/Conferences Attended:**

1. 35<sup>th</sup> Annual Session of IChE (CHEMCON-82), A.U.College of Engineering, Waltair, December 16-19, 1982.
2. All India Seminar on "Risk Management and Public Liability Insurance" jointly organized by IChE Ahmedabad & Baroda Regional Centers and The Oriental Insurance Company Limited, Ahmedabad, Bhaikaka Bhawan, February 14, 1987.
3. Program on "Educational Utilization of Indian Standards in Chemical Engineering" organized by Bureau of Indian Standards, Express Hotel, Baroda, September 26, 1987.
4. National Seminar on "Chemical Industry: Past, Present and Future" organized by IChE Western Region (Bombay, Baroda, Pune, Ahmedabad, and Nagpur) on the eve of Dr HL Roy Birth Centenary Celebrations, Taj Mahal Hotel, Bombay, September 14, 1990.
5. Seminar on "Challenges for Chemical Engineers in India over the next decade" organized by Chemical Engineering Association (ChEA) of IIT Bombay (Silver Jubilee Meeting), Lecture Theatre, IIT, Bombay, March 16, 1991.
6. 44<sup>th</sup> Annual session of IChE (CHEMCON-91), "Radial liquid distribution studies in trickle-bed columns", A.C.College of Technology, Madras, December 18-21, 1991.
7. ChEA Annual Seminar on "Petrochemicals-2000" organized by Chemical Engineering Association of IIT Bombay, Lecture Theatre, IIT Bombay, September 12, 1992.
8. Eighth Symposium on "Lubricants Additives Waxes & Petroleum Specialty Products (8<sup>th</sup> LAWPS Symposium)", IIT Bombay, January 21-23, 1993.
9. One day Seminar on "Recycling of Industrial Waste-Recent trends" organized by DDIT Alumni Association, DDIT Nadiad, March 20, 1993.
10. 47<sup>th</sup> Annual session of IChE (CHEMCON-94), IIT Kharagpur, December 14-17, 1994.
11. Workshop on "Project Finance" organized by DDIT Alumni Association, DDIT Nadiad, June 16, 1996.
12. 14<sup>th</sup> National Conference of Environmental Engineers, "Positive Decision making in waste management towards achieving sustainable development-A Perspective", Institution of Engineers (India), AP Centre, Hyderabad, August 7-9, 1998.
13. 51<sup>st</sup> Annual Session of IChE (CHEMCON-98), AU College of Engineering, Visakhapatnam, December 16-19, 1998.
14. One-Day Workshop on "Passive Solar Architecture" organized by Centre for Renewable Energy & Environment Development (CREED) & Ministry of Non-conventional Energy Sources (MNES), Government of India, BITS Pilani, February 23, 1999.
15. Second Meeting of Vice Chancellors/Directors of Indian & Nepalese Universities, supported by B.P. Koirala Indo-Nepal Foundation, BITS Pilani, April 2-3, 1999.
16. 52<sup>nd</sup> Annual Session of IChE (CHEMCON-99), "1. Genetic Algorithms for Estimating Heat Transfer Parameters in Trickle Bed Reactors" and "2. Automated Design of Heat Exchangers using Artificial Intelligence based Optimization", Panjab University, Chandigarh, December 20-23, 1999.
17. 53<sup>rd</sup> Annual Session of IChE (CHEMCON-2000), "1. Evolutionary Computation strategy for optimization of an Alkylation Reaction" and "2. Adaptive networks for Fault Diagnosis and Process Control" [Adjudged the BEST PAPER presented in the Technical Session (Miscellaneous) at the above Conference], Science City, Calcutta, December 18-21, 2000.
18. Workshop on "Women and Development in India – Issues & Challenges" jointly organized by BITS–Pilani & Rajasthan State Commission for Women (RSCW) – Jaipur (supported by UNICEF & IREDA), BITS Pilani, January 19-20, 2001.
19. Intensive Workshop on "Testing Evaluation of Biomass Gasifier Systems and Related Laboratory Investigations" organized by Sardar Patel Renewable Energy Research Institute (SPRERI), Vallabh Vidyanagar, April 11-14, 2001.
20. 54<sup>th</sup> Annual Session of IChE (CHEMCON-2001), "1. Optimization of Thermal Cracker Operation using Differential Evolution" and "2. Evolutionary Computation for Scenario-Integrated Optimization of Dynamic Systems" (Adjudged the SECOND BEST PAPER presented in the 'Modeling Simulation and Control Session' at the above Conference), CLRI, Chennai, December 19-22, 2001.
21. 2-day National Seminar on Eco-friendly Chemical Technologies in New Millennium, "Eco-friendly chemical technologies in new millennium (Keynote Address as Chief Guest)", UDCT, Amravati University, February 7-8, 2002.
22. International Conference on "Population, Development and Environment" organized by BITS-Pilani (supported by UNPF, IIPS & UGC), "A Model for Efficient Resource Utilization: Development and Validation", BITS-Pilani, March 15-16, 2002.
23. Joint International Conference of 4<sup>th</sup> Asia-Pacific Conference on Simulated Evolution And Learning (SEAL'02), 9<sup>th</sup> International Conference on Neural Information Processing (ICONIP'02) & International Conference on Fuzzy Systems and Knowledge Discovery (FSKD'02), Organized by: School of Electrical and Electronic Engineering, Nanyang Technological University – Singapore, Sponsored by: Asia-Pacific Neural Network Assembly SEAL & FSKD Steering Committees, Lee Foundation, In Co-Operation with: IEEE Neural Network Council, International Neural Network Society European Neural Network Society & SPIE, "A Differential Evolution Approach for Global Optimization of MINLP Problems", Orchid Country Club, Singapore, November 18–22, 2002.

24. Workshop on Conflict Transformation and Citizens' Diplomacy, organized by BITS-Pilani and Center for International Development and Conflict Management, University of Maryland, "Subtle Inner Self-understanding vs. Gross Outer Materialistic Awareness for Peace, Conflict Resolution and Development", BITS Pilani, October 30–November 1, 2003.
25. International Conference on Desert Technology (DT-7), "Influence of Product Yields, Density, Heating Conditions, and Conversion on Pyrolysis of Biomass (Keynote Speaker)", Umaid Bhawan Palace, Jodhpur, November 9-14, 2003.
26. Curriculum Development Cell Workshop on Heat Exchangers Design and Optimization, "Optimal Design of Heat Exchangers using Evolutionary Computation Techniques (Distinguished Speaker)", IIT Delhi, March 26, 2004.
27. SERC School / CEP Course on Process Optimization, Data Driven Modeling and Advanced Process Control, "Global Optimization using Stochastic Search Methods (Distinguished Speaker)", IIT-Bombay, Mumbai, August 16-20, 2004.
28. Workshop on Energy Saving in Steam Systems organized by Centre for Renewable Energy and Environmental Development (CREED), BITS Pilani and Thermax Babcock and Wilcox Limited, Pune, "Energy Integration Analysis", BITS Pilani, April 26-30, 2005.
29. International Conference on Life Cycle Assessment and Life Cycle Management Methodologies, "Life Cycle Inventory Analysis (LCIA) (Keynote Speaker)", The Boulevard, Kuala Lumpur, Malaysia, December 4-5, 2006.
30. National Seminar on Bio Films: Challenges & Applications, Bharatiya Vidya Bhavan's Bhavan' Research Center in Collaboration with University of Mumbai - Sesquicentennial Celebrations, "Biofilms in the Removal of VOCs and Foul Odors (Keynote Speaker)", Mumbai, January 12-13, 2007.
31. Indo-US Workshop on Advances in Computational Optimization and Analysis of Systems, "Improved Differential Evolution for Single- and Multi-Objective Optimization: MDE, MODE, NSDE, and MNSDE (Invited Distinguished Speaker)", Indian Institute of Technology (IIT), Kanpur, February 07-09, 2007.
32. Workshop on Advanced Heat and Mass Transfer for the Employees of Engineers India Limited (EIL) New Delhi, "1. Energy Integration Analysis (HENS): Pinch Technology", "2. Mass Transfer Operations", "3. Energy Conservation Measures in Distillation" and "4. Produced Wastewater-Treatment Technologies", EIL-New Delhi, October 12-13, 2007.
33. One-day follow up discussion meeting on New Research directions in the use of power beams for environmental applications (RPDM-PBEA-2007) to a Symposium on "Power beams for clean environment and processes" organized by Laser & Plasma Technology Division of Bhabha Atomic Research Centre (BARC), "Chemical kinetics and dynamics of plasma assisted pyrolysis of assorted, non nuclear waste (Invited Distinguished Speaker)", Mumbai, September 18, 2007.
34. International Conference on Gas-Liquid and Gas-Liquid-Solid Reactor Engineering (GLS-8), "Lateral Mixing in Trickle Bed Reactors", IIT-Delhi, New Delhi, India, December 16-19, 2007.
35. Curriculum Workshop, Structure development for B.Tech & M.Tech programmes in Chemical Engineering, Invited Expert Member, MNIT, Jaipur, May 24-25, 2008.
36. Assessors' Interaction Meeting for professional educational experts, Invited Peer Team Member, National Assessment and Accreditation Council (NAAC), Bangalore, October 23-24, 2008.
37. Indo-French Workshop on Biohydrogen Production under the aegis of Indo French Center for Promotion of Advance Scientific Research, organized by The Energy and Resources Institute (TERI)-New Delhi, "Biohydrogen-A Clean and Green Energy: Economic Perspective & Optimization Strategies (Invited Speaker)", Hotel Jaypee Manor, Mussoorie, November 6-8, 2008.
38. Indo-US Workshop on Materials Design: Measurement, Modeling and Informatics, organized jointly by School of Materials Science and Engineering, Bengal Engineering and Science University (BESU)-Shibpur and Combinatorial Sciences and Materials Informatics Collaboratory (CoSMIC-IMI), Iowa State University-USA with the support of Tata Steel-Jamshedpur and Stanley Foundation-USA, "Modeling and Evolutionary Optimization for Manufacturing Processes of Polymeric Materials (Invited Speaker)", Kolkata, January 5-7, 2009.
39. Workshop associated with 'National Mission Project on Education through ICT, initiated and sponsored by MHRD (GOI), for developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning', IIT Kharagpur-Kolkata Campus, Salt Lake City, Kolkata, October 8-9, 2009.
40. Workshop on Application of Advanced Tools/Techniques in Research, "1. Modelilng & Simulation", "2. Traditional Optimization Techniques and their limitations", "3. Population-based search algorithms for optimization", and "4. Energy Integration Analysis" (Invited Speaker), BITS Pilani Goa Campus, Goa, March 6-7, 2009.
41. Workshop on Process Modeling and Simulation, University of Petroleum and Energy Studies (UPES), "Invited Talks on Process Modeling & Simulation, and Population-based search algorithms for single- and multi-objective optimization", Dehradun, November 6-7, 2009.
42. Staff Development Programme on Innovative Teaching Techniques for Transport Phenomena, "Introduction to Transport Phenomena" and "Energy Integration Analysis (Chief Guest and Keynote Speaker)", ITM Universe, Gwalior, July 12-17, 2010.

#### Extra-Curricular Activities:

1. Singing, Music Composition, and Playing Guitar lead & CASIO Keyboard.
2. Organizing Committee Member, Cultural Activities Committee, DDIT Nadiad, 1993-96.
3. Convener, DDIT News Letter, DDIT Nadiad, 1995-96.
4. Quiz Master, Technical Quiz Competition organized for The Institution of Engineers (India) Students' Chapter, DDIT Nadiad, 1988-89.
5. Conducting Technical Quiz Competitions, Group Task, and Group Discussion on various topics for students, 1985-96.
6. Organized Industrial Visits and Tours for the students of Chemical Engineering Department, DDIT Nadiad, 1985-96.
7. Judge, Fifth Inter-Bhawan Debate Competition on "Value based rather than Skill based Education provides the foundation for Nation Building", organized by National Service Scheme (NSS) & Vivekananda Seva Samiti (VSS), BITS Pilani, February 1, 1997.
8. Professor-in-charge, Andhra Samiti, BITS Pilani, 1997-2001.
9. Judge, Technical Exhibitions of Engineering Disciplines, APOGEE (A Professions Oriented Gathering over Educational Experiences), A Nation-wide Academic Week held every year during October, BITS Pilani.
10. Judge, Technical Paper Presentation Sessions, APOGEE, BITS Pilani.

#### Software Packages Developed:

1. Menu-driven Software Package for the **Design of Piping Systems** with huge database for roughness parameters and frictional losses for various fittings, joints, and valves.
2. User-friendly Software Package for the **Design of Packed and Tray Absorption Columns** with huge database for physical properties and packing factors.
3. Software Package for **Heat Exchanger Network Synthesis**.
4. Design of **Azeotropic Distillation Column** incorporating **UNIFAC & UNIQUAC Models** for estimating VLE data.
5. **DataBase for Chemical Engineering Systems**.
6. Design of **Single- and Multiple-effect Evaporators**.
7. Software Package for the **Design and Simulation of Agitators**.
8. Computer Aided Design of **Flares**.
9. Expert Systems for **Fault Diagnosis**.
10. Software Package for **Plate-and-Frame Heat Exchangers**.
11. **Artificial Neural Networks** for temperature control in Plate-and-Frame Heat Exchanger.
12. Computer-Aided **Energy Integration Analysis**.
13. **Evolutionary Computation** Algorithms (Simulated Annealing, Genetic Algorithms, and Differential Evolution) for optimization of various non-linear chemical processes.
14. Software Package for the **Design of Shell-and-Tube Heat Exchangers**.
15. Specific Purpose Simulation Package for **Adsorption for Wastewater treatment**.
16. Dynamic Simulation Package for **Biomass Gasification**.
17. Software Packages for **Tearing Algorithms in Decomposition of Networks**.
18. Specific Purpose Simulation Package for **Ammonia Synthesis Reactor**.
19. Computer codes in C, C++, and MATLAB for **Multi-objective optimization** of various engineering problems & test problems using **MODE** (multi-objective differential evolution).

#### Supervision of PhD Doctoral Work: 10

S.No.	Title of the Thesis	Name & ID of the Candidate	Date of Completion
1.	Modeling for Wastewater Treatment by Adsorption using Analytical-, Regression- and Neural Network-Approaches.	V Ramakrishna 1997PHXF405	November 2004
2.	Evolutionary Computation for Optimization of Selected Non-linear Chemical Processes.	Rakesh Angira 2000PHXF011	January 2006
3.	Modeling, Simulation and Optimization of Pyrolysis of Biomass.	Ashish S Chaurasia 2001PHXF404	March 2004
4.	Theoretical & Experimental Investigations for Removal of Pollutants using Adsorption.	Suresh Gupta 2003PHXF008	October 2008
5.	Modeling, Simulation, and Experimental Studies on Downdraft Biomass Gasifier.	Sheth Pratik Nitinchandra 2003PHXF009	December 2009
6.	Studies on Biodegradation and Biofiltration for Removal of Volatile Organic Compounds.	Smita Raghuvanshi 2003PHXF408	June 2010
7.	Pareto Optimal Solutions in Process Design Decisions Using	Ashish M Gujarathi	July 2010

	Evolutionary Multi-objective Optimization.	2004PHXF415	
8.	Recovery of Energy and Useful Products from Gelatin Waste.	S Saravana Sampath 2003PHXF027	Ongoing
9.	Intensification of Recovery of Carboxylic Acids Using Reactive Extraction.	Sushil Kumar 2005PHXF001	June 2010
10.	Simultaneous Design and Control of Non-linear Chemical Processes through Optimization.	Amit Jain 2006PHXF424	Ongoing

**Supervision of ME Dissertation Work: 36**

S.No.	Title of the Project	Name of the Candidate	Date of Completion
1.	Computational Fluid Dynamics Simulations of Multiphase Reactors.	P Srinadh	December 2008
2.	Evolutionary Optimization of Heat Integrated Distillation Column.	V Praneet Reddy	December 2007
3.	Optimization, Simulation, and Modeling of a Process Plant Using HYSYS.	Mansoor Rahaman Mohammed	May 2007
4.	Desalination of Brackish and Gray Water.	Chaudhari Vinod Bhagwan	May 2007
5.	Application of Non-Traditional Optimization Techniques for the Design of Complex Non-linear Chemical Processes.	Aditya Sarin	December 2006
6.	Evolutionary Strategies for Optimal Design of Non-Linear Complex Chemical Processes.	Ameen Shadab Syed Zahiruddin	December 2006
7.	Computational Fluid Dynamics for Fluid Flow and Heat Transfer Characteristics in Packed Bed Reactors.	Amol A Deshpande	May 2006
8.	RTD Studies in Continuous Flow Reactors Using Computational Fluid Dynamics.	K Jayadeep	May 2006
9.	Multi-objective Differential Evolution for finding out the Pareto-Optimal Front.	Tejasvini Kulkarni	December 2005
10.	Modeling, Simulation, and Optimization of Reactive Distillation.	Muzaffar Mahmood Khan	December 2005
11.	Genetic Programming for Optimization of a Chemical Process System.	Karthik S	December 2005
12.	Multi-objective Optimization of Wet Film PET Reactor Using Population Based Search Techniques.	Syed Mubeen J H	May 2004
13.	Multi-objective Optimization of Styrene Reactor Design Using Evolutionary Approaches.	Pallavi Gajananrao Chakole	May 2004
14.	Multi-objective Optimization of Fluidized Catalytic Cracking Unit Using Evolutionary Strategies.	B Anbarasu	May 2004
15.	Modeling and Simulation for the Optimal Design of Biomass Gasifier.	Amanpreet Kaur	May 2003
16.	Multi-objective Optimization using Evolutionary Algorithms.	M Mathew Leenus Jehan	May 2003
17.	Studies on Adsorption of Volatile Organic Compounds using Bio-filtration.	Smita Raghuvanshi	May 2003
18.	Techno-Economic Analysis of the Production Techniques of Hydrogen for Fuel Cells.	Sonny Sachdeva	December 2002
19.	Modeling, Simulation and Design of Nanotubes for Hydrogen Storage	Amit Ashok Gaikwad	December 2002
20.	Modeling of Pyrolysis in Biomass Gasification.	Gaurav Mishra	December 2002
21.	Studies on Bagasse based Cogeneration.	Manish N Mundada	May 2002
22.	Studies on Production of Useful Products from Bagasse.	Ashish M Gujrathi	May 2002
23.	Differential Evolution for Optimization of a Continuous Pulsed Corona Reactor.	Shishir K Haldulkar	December 2001
24.	Studies on Biomass Gasification.	V Thiruchitrambalam	December 2001
25.	Studies on Periodic Operation of a Trickle Bed Reactor.	Pradip B Dhamole	December 2001
26.	Studies on Hydrodynamics and Heat transfer aspects in Trickle Bed Reactors.	Ravindra P Marathe	December 2000
27.	Modeling & Simulation of Membrane Reactors.	Samir R Kale	December 2000

28.	Expert Systems for the Optimal Design of Heat Exchangers (Differential Evolution).	S A Munawar	May 2000
29.	Optimization and Synthesis of Heat Integrated Distillation Column Sequences using Differential Evolution.	Rishindra Pal Singh Vizen	December 1999
30.	Expert Systems for the Optimal Design of Heat Exchangers (Genetic Algorithms).	S A Munawar	December 1999
31.	Studies on Residence Time Distribution and Heat Transfer in Trickle Bed Reactors.	Rakesh Angira	December 1999
32.	Expert Systems for the Optimal Design of Heat Exchangers (Simulated Annealing).	S A Munawar	May 1999
33.	Hydrodynamics and Heat Transfer in Trickle Bed Reactors (Experimental Studies & Analysis of Results).	S D Manjare	December 1998
34.	Hydrodynamics and Heat Transfer in Trickle Bed Reactors (Experimental Setup Installation with Data Acquisition System).	S D Manjare	May 1998
35.	Hydrodynamics and Heat Transfer in Trickle Bed Reactors (Design & Fabrication of Experimental Setup).	S D Manjare	December 1997
36.	Fuzzy Logic Control of an Absorption Column for Air-Carbon Dioxide-Sodium Hydroxide System.	S Phani Madhav	May 1997

### Supervision of BE Thesis Work: 38

S.No.	Title of the Project	Name of the Student	Date of Completion
1.	Process Intensification of Biochemical Processes.	Tarun Rajan Mavely	May 2010
2.	Nano Adsorption For Pollution Abatement	G Prashanth	May 2010
3.	Energy Integration in Distillation Column.	Swamy Shanti Kumar P	December 2009
4.	Green Organizations through Footprints and Technological Solutions.	Abhishek Humbad	May 2009
5.	Modeling, Simulation, and Optimization of a Complex Chemical Process.	G Kranti Priyaker	May 2009
6.	Artificial Neural Networks for Control Strategies of a Chemical Process.	Raghuram Thyagarajan	December 2008
7.	Medical Waste Management: Challenges and Imperatives.	Snehil Sethia	December 2008
8.	Techno-Economic Analysis of Pulp and Paper Industry.	Pragati Bhadauria	December 2008
9.	Evolutionary Approach for the Optimal Design of Heat Exchanger.	B P V N S Manikantha	December 2007
10.	Modeling of Packed Bed Distillation Column Using Artificial Neural Networks.	T V Shashank	December 2007
11.	Artificial Neural Networks for Process Modeling, Design, and Optimization.	Marotkar Manish Keshao	May 2007
12.	Vacuum Membrane Distillation for Desalination of Water.	Pradeep Reddy E.	May 2007
13.	Application of Optimization Tools and Techniques to Management Problems.	Prashant Gullapalli	December 2006
14.	Process Modeling and Control via Artificial Neural Networks.	Siddarth D Shetty	December 2006
15.	Evolutionary Computation Strategies for Multi-objective Optimization.	Ms K Krishna Priya	May 2005
16.	Modeling and Simulation of Adsorption for Pollutant Removal.	Ms Archana S	December 2004
17.	Nuclear & Hazardous Waste Management.	S Karthik	May 2004
18.	Modeling and Simulation of Membrane Reactors.	Aravind Gattu	May 2003
19.	Waste Water Treatment by Adsorption Technique.	S S Ravikumar	December 2002
20.	Evolutionary Computation for Dynamic Optimization of Thermal Cracking Operation.	Avinash Modi	May 2002
21.	Differential Evolution for Multi-Objective Optimization of Industrial Hydrogen Plants.	L Satish	December 2001
22.	Evolutionary Computation for Mass Exchanger Network Synthesis.	Venugopala Rao Gavini	May 2001
23.	Analysis of Combined Heat and Power to Total Site Integration.	V Bhaskar	May 2001

24.	Mathematical Programming Formulations for Heat Exchanger Network Synthesis.	Ch China Koti Reddy	May 2001
25.	Heat Exchanger Network Synthesis using Dual Approach Temperature.	Tushar Prakash Suchak	May 2000
26.	Pollution Prevention Evaluation using Life Cycle Analysis.	N Sunil Kumar Reddy	May 2000
27.	Conceptual Programming Approach for Energy Integration with Hyper Targets.	Ms Meena Kaul	May 2000
28.	Adaptive Neural Networks for Fault Diagnosis and Process Control.	M Shailesh	December 1999
29.	Expert Systems based Optimization for an Alkylation Process.	Gaurav Chaturvedi	December 1999
30.	Simulation of Heat and Power Networks for Total Site Energy Integration.	C Sreedhar	December 1999
31.	Optimization and Control of an Ammonia Synthesis Reactor Using Expert Systems.	R Krishna	May 1999
32.	Development of Water Treatment Technique for removal of metals.	Ms G Sirisha Krishna	December 1998
33.	Development of PC-Based Data Acquisition System for measuring hydrodynamic parameters in a Trickle Bed Reactor.	M Murali Krishna	May 1998
34.	The Power and Energy Scenario in India: An Techno-Economic Outlook.	Shishir Kapoor	May 1998
35.	Optimization of Heat Exchanger Networks using Expert Systems.	Mukundan R	December 1997
36.	Expert System Control of an Exothermic Batch Reactor using Generic Model Control and Globally Linearizing Control.	K Jyotsna	December 1997
37.	A Project Feasibility Report on Polyethylene.	Anuraag Agarwal	December 1997
38.	Design and Fabrication of a Trickle Bed Reactor for the studies on RTD, Pulse Properties, and Heat Transfer aspects.	P Ajay Kumar	May 1997

**Member of Doctoral Advisory Committees for PhD Candidates: 9**

S.No.	Title of the Thesis	Name & ID of the Candidate	Date of Completion
1.	Failure Analysis of Thermosiphon Solar Hot Water System on Account of Scaling; Supervisor: Prof R P Vaid	Vishwas Krishnarao Deshpande 1990PHXF408	Ongoing
2.	Enhancing Resource Conservation & Recycling: A Frontier Approach (A Case of Aluminum Cycle); Supervisor: Mr C S Jagannath	K B Thakur 1994PHXF402	March 2001
3.	Multi Criteria Evaluation of Solar Water Heating System as a Commercially Viable Domestic Water Heating Option in India; Supervisor: Prof M Ramachandran	Morapakala Srinivas 1999PHXF005	October 2007
4.	Mathematical Modeling and Experimental Investigations of Combustion of Biomass based Slurry Fuels in Oil Fired Furnaces; Supervisor: Dr S R Shankapal	Prakash S V 2000PHXF007	April 2007
5.	Studies on Advanced Modeling Techniques for Optimal Reservoir Operation and Performance Evaluation of an Irrigation System; Supervisor: Dr K S Raju	Vasan A 2000PHXF409	November 2005
6.	Solid and Hazardous Waste Management and Utilisation in Iron and Steel Making; Supervisor: Dr Piyush Kant Pandey	Raj Kumar Agrawal 2001PHXF402	September 2005
7.	Design of Occupational Health and Safety Management Systems for Viscose Staple Fiber Division, Grasim Industries Limited; Supervisor: Dr Arun Maity	Samir Ramdas Kale 2002PHXF026	Ongoing
8.	Kinetics and Engineering of Solid Acid Catalyzed Selective Toluene Nitration; Supervisor: Dr K V Raghavan	I Sreedhar 2002PHXF028	March 2008
9.	Modeling and Simulation of Metallocene Catalysed Olefin Polymerization; Supervisor: Dr Arvind K Sharma	Nikhil Prakash 2005PHXF401	Ongoing

**Supervision of Project Work:**

1. Supervised around 350 students for their Projects (Study oriented projects, Computer projects, Lab oriented projects, Special projects, Professional Practice, Professional Assistants; Course projects of Process Plant Simulation, Reaction Engineering, Computer aided design, Fluidization Engineering, etc.).
2. Around 15 Professional Assistants were guided for the projects of the developmental work related to the Institute requirements such as Automation of Workshop Stores & Office, Course Material Preparation for EDD (Educational Development Division, BITS Pilani) Notes Publication, etc.

**Editorial Board Member of International Journals:**

1. Energy Education Science and Technology, 2003 onwards.
2. Research Journal of Chemistry and Environment, 2005 onwards.
3. International Journal of Computer, Mathematical Sciences and Applications, 2006 onwards.
4. Journal on Future Engineering and Technology, 2007 onwards.
5. International Journal of Applied Evolutionary Computation, 2008 onwards.
6. Innovative Energy Policies, 2010 onwards.

**Editorial & Cover Design:**

1. Babu B V, Conservation of Natural Resources, Editorial & Cover Design for December 2006 Issue of International Research Journal of Chemistry & Environment.
2. Babu B V, Materials Engineering//Fluids Engineering/Advanced Technologies in Materials Science, Editorial for August-October 2008 Issue of Journal of Future Engineering and Technology.

**Expert Reviewer & Referee for Research Articles of International Journals:**

1. AIChE Journal (American Institute of Chemical Engineers).
2. Chemical Engineering Science (Elsevier).
3. Computers and Chemical Engineering (Elsevier).
4. International Journal of Heat and Mass Transfer (Elsevier).
5. Heat Transfer Engineering (Taylor & Francis).
6. Chemical Engineering Journal (Elsevier).
7. IEEE Transactions on Evolutionary Computation (IEEE).
8. European Journal of Operational Research (Elsevier).
9. Chemical Engineering Communications (Taylor & Francis).
10. IEEE Transactions on Systems, Man and Cybernetics (IEEE).
11. Industrial & Engineering Chemistry Research (ACS).
12. Applied Thermal Engineering (Elsevier).
13. Chemical Product and Process Modeling (BEP).
14. Journal of Analytical and Applied Pyrolysis (Elsevier).
15. International Journal of Systems Science (Taylor & Francis).
16. Journal of Petroleum Science and Engineering (Elsevier).
17. IEEE-ASME Transactions on Mechatronics (IEEE/ASME).
18. Journal of Hazardous Materials (Elsevier).
19. International Journal of Chemical Reactor Engineering (BEP).
20. ASME Journal of Electronic Packaging (ASME).
21. Bioresource Technology (Elsevier).
22. Energy & Fuels (ACS).
23. Applied Mathematical Modelling (Elsevier).
24. Journal of Environmental Management (Elsevier).
25. Waste Management (Elsevier).
26. International Journal of Environment and Pollution (Inderscience).
27. Progress in Energy and Combustion Science (Elsevier).
28. Journal of The Indian Institute of Science (IISc).
29. Materials and Manufacturing Processes (Taylor & Francis).
30. Transactions on Internet Research (IPSI BgD).
31. The Proceedings of the Pakistan Academy of Sciences (PAS).
32. Environmental Engineering Science (Mary Ann Liebert Inc).

33. Fuel (Elsevier).
34. Quantitative Finance (Taylor & Francis).
35. International Journal of Neural Systems (World Scientific).
36. Indian Chemical Engineer (Taylor & Francis).
37. Institution of Engineers (India) [IE(I)].
38. Current Science (Indian Academy of Sciences).
39. International Journal of Environment and Waste Management (Inderscience).
40. Journal of The Taiwan Institute of Chemical Engineers (Elsevier).
41. Bioresources (NCSU).
42. International Journal of Physical Sciences (Academic).
43. Environmental Science & Technology (ACS).
44. Fuel Processing Technology (Elsevier).
45. Chemical Industry & Chemical Engineering Quarterly (AChE).
46. International Journal of Hydrogen Energy (Elsevier).
47. African Journal of Environmental Science and Technology (Academic).
48. Biofuels, Bioproducts & Biorefining (Wiley).
49. Chemical and Biochemical Engineering Quarterly (CSCE).
50. Journal of Information Science and Engineering (CEPS).
51. International Journal of Applied Evolutionary Computation (IGI-Global).
52. Journal of Chemical Technology & Biotechnology (Wiley).
53. Information Sciences (Elsevier).
54. Applied Soft Computing (Elsevier).
55. Annals of Operations Research (Springer).
56. Desalination and Water Treatment (Desalination).
57. Environmental Technology (Taylor & Francis).
58. Applied Energy (Elsevier).
59. Asia-Pacific Journal of Chemical Engineering (Wiley).
60. Journal of Engineering and Technology Research (Academic).
61. ASME-Journal of Heat Transfer (ASME).
62. Computers & Mathematics with Applications (Elsevier).
63. International Journal of Computer Applications in Technology (Inderscience).
64. Science of the Total Environment (Elsevier).
65. Chemical Engineering Research and Design (Elsevier).
66. Engineering Applications of Artificial Intelligence (Elsevier).
67. Journal of Chemical & Engineering Data (ACS).
68. Bioremediation (Taylor & Francis).
69. Engineering Optimization (Taylor & Francis).
70. Journal of Polymer Research (Springer).

#### Expert Reviewer for Research Articles of International Conferences:

1. Reviewer for the Technical Papers submitted for presentation at **4th Asia-Pacific Conference on Simulated Evolution And Learning (SEAL-2002)**, organized by School of Electrical and Electronic Engineering, Nanyang Technological University, Singapore, Orchid Country Club, Singapore, November 18-22, 2002.
2. Reviewer for the Technical Papers submitted for presentation at the "Genetic Algorithms track" of **Genetic and Evolutionary Computation Conference (GECCO-2003)**, Chicago, Illinois, USA, July 12-16, 2003.
3. Reviewer for the Special Session on "Evolutionary Computation", The Second International Conference on **Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2003)**, National University of Singapore, Singapore, December 15-17, 2003.
4. Reviewer for the Technical Papers submitted for presentation at the "Genetic Algorithms track" of **Genetic and Evolutionary Computation Conference (GECCO-2004)**, Seattle, Washington, USA, June 26-30, 2004.
5. Reviewer for the Invited Session on "Engineering Applications of Evolutionary Computation Techniques", **The Eighth World Multi-Conference on Systemics, Cybernetics and Informatics (SCI-2004)**, Orlando, Florida, USA, July 18-21, 2004.
6. Reviewer for the Technical Papers submitted for presentation at **2004 IEEE Conference on Cybernetics and Intelligent Systems (CIS-2004)**, jointly organized by the IEEE SMC Society Singapore Chapter and IEEE R&A Society Singapore Chapter, Singapore, December 1-3, 2004.
7. Reviewer for the Technical papers submitted for presentation at **2<sup>nd</sup> International Conference on Autonomous Robots and Agents (ICARA 2004)**, Palmerston North, New Zealand, December 13-15, 2004.

8. Reviewer for the Technical papers submitted for presentation at **International Conference on Computing, Communications, and Control Technologies (CCCT-2004)**, Sponsored by The University of Texas at Austin and The International Institute of Informatics and Systemics (IIS), Austin, Texas, USA, August 14-17, 2004.
9. Reviewer for the Technical papers submitted for presentation at **Genetic and Evolutionary Computation Conference (GECCO-2005)**, Washington DC, USA, June 25-29, 2005.
10. Reviewer for the Technical papers submitted for presentation at **Heat Transfer in Components and Systems for Sustainable Energy Technologies (Heat-SET 2005)**, Grenoble, France, April 5-7, 2005.
11. Reviewer for the Technical papers submitted for presentation at **The 9th World Multi-Conference on Systemics, Cybernetics and Informatics (SCI-2005)**, Orlando, Florida, USA, July 10-13, 2005.
12. Reviewer for the Technical papers submitted for presentation at **International Conference on Management Engineering and Informatics (MEI-2005)**, Texas, Austin, USA, July 24-27, 2005.
13. Reviewer for the Technical papers submitted for presentation at **The 3<sup>rd</sup> International Conference on Computing, Communications, and Control Technologies (CCCT-2005)**, Texas, Austin, USA, July 24-27, 2005.
14. Reviewer for the Technical papers submitted for presentation at **The Third International Conference on Computational Intelligence, Robotics, and Autonomous Systems (CIRAS-2005)**, National University of Singapore, Singapore, December 13-16, 2005.
15. Reviewer for the Technical papers submitted for presentation at **The 2<sup>nd</sup> Indian International Conference on Artificial Intelligence (IICAI-2005)**, Pune, India, December 20-22, 2005.
16. Reviewer for the Technical papers submitted for presentation at **The 2006 IEEE International Conferences on Cybernetics & Intelligent Systems (CIS 2006)**, jointly organized by IEEE R&A and SMC Singapore Chapters, Bangkok, Thailand, June 7-9, 2006.
17. Reviewer for the Technical papers submitted for presentation at **19th International Conference on Efficiency, Cost, Optimization, Simulation and Environmental Impact of Energy Systems (ECOS-2006)**, Crete, Greece, July 12-14, 2006.
18. Reviewer for the Technical papers submitted for presentation at **10th World Multi-Conference on Systemics, Cybernetics and Informatics (WMSCI-2006)**, Orlando, Florida, USA, July 16-19, 2006.

#### Book Reviews:

1. 'Heat Transfer' by Ghoshdastidar P S, Oxford University Press India, March 2004.
2. 'McCabe/Unit Operations of Chemical Engineering 7e CR2006, McGraw Hill, New York, July 2004.
3. 'Fundamentals of Chemical Engineering & Technology', Tata McGraw Hill, India, July 2004.
4. 'Fundamentals of Chemical Engineering and Technology', Elsevier, Singapore, July 2007.
5. "Differential Evolution-Fundamentals, Parametric Study, and Applications in Electrical Engineering" by Anyong Qing, John Wiley & Sons, Singapore, December 2007.

#### PhD Thesis Examiner:

1. Ms Jigisha Soni (Parikh), "Studies in Low Temperature Pyrolysis of Biomass Materials", S V National Institute of Technology, South Gujarat University, Surat, 2004; Supervisor: Dr S A Channiwala (Viva-Voce Examination held on May 17, 2005).
2. S V Prakash, "Mathematical Modeling and Experimental Investigations of Combustion of Biomass based Slurry Fuels in Oil Fired Furnaces", BITS Pilani, 2006; Supervisor: Dr S R Shankapal (Viva-Voce Examination held on April 24, 2007).
3. Ms Dipti, "Hybrid Genetic Algorithms and Their Applications", IIT Roorkee, 2007; Supervisor: Dr Kusum Deep (Viva-Voce Examination held on October 23, 2007).
4. Subhrangshu Moitra, "Applications of Genetic and Evolutionary Algorithms in Hot Rolling of Steel Strips", IIT Kharagpur, 2007; Supervisor: Dr N Chakraborty (Viva-Voce Examination held on December 05, 2007).
5. I Sreedhar, "Kinetics and Engineering of Solid Acid Catalyzed Mononitration of Toluene", BITS Pilani, 2007; Supervisor: Dr K V Raghavan (Viva-Voce Examination held on March 19, 2008).
6. Vijay Kumar Lamba, "Simulation & Modeling of Charge Transport in Nano MOSFETs", Guru Nanak Dev University, Amritsar, 2008; Supervisor: Dr Derick Engles (Viva-Voce Examination held on October 23, 2009).
7. Kishalay Mitra, "Midterm Supply Chain Planning under Uncertainty", IIT Bombay, 2009; Supervisor: Dr Ravindra D Gudi (Viva-Voce Examination held on November 04, 2009).
8. Radha T, "Nature Inspired Algorithms and their Applications", IIT Roorkee, 2009; Supervisor: Dr Millie Pant (Viva-Voce Examination held on January 11, 2010).
9. Anjana Kamra, "Algal hydrogen production: Optimisation and feasibility studies", Guru Jambheshwar University of Science and Technology, Hisar, 2010; Supervisor: Dr Anubha Kaushik

**PhD Thesis Reviewer:**

1. Sampat D Manjare, "Studies on Adsorption of Ethyl Acetate Vapor in Molecular Sieves", BITS Pilani, 2003; Supervisor: Dr A K Ghoshal.
2. Raj Kumar Agrawal, "Solid and Hazardous Waste Management and Utilisation in Iron and Steel Making", BITS Pilani, 2004; Supervisor: Dr P K Pandey.
3. A Vasani, "Studies on Advance Modeling Techniques for Optimal Reservoir Operation and Performance Evaluation of an Irrigation System, BITS Pilani, 2005; Supervisor: Dr K S Raju.
4. S V Prakash, "Mathematical Modeling and Experimental Investigations of Combustion of Biomass based Slurry Fuels in Oil Fired Furnaces", BITS Pilani, 2006; Supervisor: Dr S R Shankapal.
5. I Sreedhar, "Kinetics and Engineering of Solid Acid Catalyzed Mononitration of Toluene", BITS Pilani, 2007; Supervisor: Dr K V Raghavan.
6. Samir Ramdas Kale, "Design of Occupational Health and Safety Management Systems for Viscose Staple Fibre Division, Grasim Industries Limited", BITS Pilani, 2009; Supervisor: Dr Arun Maity.

**Sponsored Research Project:**

S.No	Title of the Project	Funding Agency	Participation	Amount (Rs)	Year
1.	National Mission Project on Education through ICT: Developing suitable pedagogical methods for various classes (Process Design Decisions), intellectual calibers and research in e-learning Anchored by IIT-Kharagpur	MHRD	Principal Developer	10,00,000	2009-10
2.	Studies on Adsorption Process for the Removal of Metal Ions from Waste Water and Volatile Organic Compounds from Air by using Suitable Adsorbents	UGC	Principal Investigator	7,11,027	2007-10
3.	Studies on Biomass Gasification	KK Birla Academy	Principal Investigator	3,00,000	2006-07
4.	Improvement of Chemical Engineering Research Laboratories, BITS-Pilani.	DST	Principal Coordinator	23,00,000	2003-08
5.	Upgradation of Laboratory facilities, X-Plan Grant for Chemical Engineering Department, BITS-Pilani.	UGC	Head of the Department	10,00,000	2002-07
6.	Study related to Bagasse based Co-generation.	MERC	Consultant	25,000	2001-02
7.	Data Acquisition system for the measurement of liquid holdup and pulse properties for the studies on heat transfer in packed beds.	UGC	Principal Investigator	11,000	1997-98

**Travel Grants for International Conferences:**

S.No	Title of the Project	Funding Agency	Participation	Amount (Rs)	Year
1.	Travel Grant for attending International Conference during 2002-2003.	AICTE	Presenting a Paper at SEAL-2002, Singapore.	29,867	2001-02
2.	Financial Assistance for Participating in Asia-Pacific Conference on Simulated Evolution and Learning from 18-22/11/2002 in Singapore.	DST	Presenting a Paper at SEAL-2002, Singapore.	11,136	2001-02

**Books/Monographs/Course Material Published:**

1. Godfrey C Onwubolu and **B V Babu**, **New Optimization Techniques in Engineering**, Springer-Verlag, Heidelberg, Germany, 2004. ISBN: 3-540-20167-X (January 2004).
2. **B V Babu**, **Process Plant Simulation**, Oxford University Press India, 2004. ISBN: 0-19-566805-7 (1<sup>st</sup> Print: March 2004; 2<sup>nd</sup> Print: July, 2004; 3<sup>rd</sup> Print: January, 2006; 4<sup>th</sup> Print: April, 2007).
3. **B V Babu** and V Ramakrishna, **Proceedings of National Conference on Environmental Conservation (NCEC-2006)**, BITS-Pilani, 2006.

4. **B V Babu, Process Plant Simulation**, Educational Development Division, BITS-Pilani, 2002 (1<sup>st</sup> Edition: 2002: 2<sup>nd</sup> Edition: 2003).
5. S D Manjare and **B V Babu, Environmental Management Systems**, Educational Development Division, BITS-Pilani, 2005.
6. **B V Babu**, H K Mohanta, Basu Deb Munshi, Rakesh Angira, Madhusree Kundu, A K Jana, Suresh Gupta, Pratik N Sheth, Smita Raghuvanshi, and Priya C Sande, **Chemical Engineering Laboratory Manual**, Educational Development Division, BITS-Pilani, 2006.
7. **B V Babu**, "Improved Differential Evolution for Single- and Multi-Objective Optimization: MDE, MODE, NSDE, and MNSDE". In **Advances in Computational Optimization and its Applications**, Edited by Kalyanmoy Deb, Partha Chakroborty, N G R Iyengar, and Santosh K Gupta. Universities Press, Hyderabad, pp. 24-30, 2007. ISBN: 9788173715853 (February 2007).
8. **B V Babu** and Rakesh Angira, "Optimization of Industrial Processes using Improved and Modified Differential Evolution". In **Soft Computing Applications in Industry**, Edited by Bhanu Prasad, Springer-Verlag, Heidelberg, Germany, pp. 1-22, 2008. ISBN: 978-3-540-77464-8 (February, 2008).
9. **B V Babu** and V Ramakrishna, "Water Crisis: Origin Identification and Management". In **India's Water Crisis**, Edited by K R Gupta, Atlantic Publishers, New Delhi, pp. 60-78, 2008. ISBN: 978-81-269-0958-2 (March 2008).
10. **B V Babu** and Suresh Gupta, "Removal of Heavy Metal Pollutants from Wastewater Using Low Cost Absorbents". In **India's Water Crisis**, Edited by K R Gupta, Atlantic Publishers, New Delhi, pp. 79-123, 2008. ISBN: 978-81-269-0958-2 (March 2008).
11. Suresh Gupta and **B V Babu**, "Simultaneous solution for solid waste management and waste water treatment: Cr(VI) removal as a case study". In **Waste Management: Research Advances to Convert Waste to Wealth**, Edited by A K Haghi, Nova Science Publishers, USA (2009).
12. Pratik N Sheth and **B V Babu**, "Advances in Downdraft Biomass Gasification". In **Advances in Chemistry and Chemical Engineering**, Edited by A K Haghi, Nova Science Publishers, USA (2009).
13. Ashish M Gujarathi and **B V Babu**, "Advances in Optimization and Simulation of Low Density Polyethylene (LDPE) Tubular Reactor". In **Advances in Chemistry and Chemical Engineering**, Edited by A K Haghi, Nova Science Publishers, USA (2009).
14. Ashish M Gujarathi and **B V Babu**, "Multi-objective Optimization of Low Density Polyethylene (LDPE) Tubular Reactor using Strategies of Differential Evolution". In **Handbook of Optimization**, Edited by Ivan Zelinka, Vaclav Snasel, and Ajith Abraham, Springer, Germany (2011).
15. "Chapter-3. Fluid Flow Operations" in the Lecture Notes for **Package Program on Chemical Engineering for Non-Chemical engineers**, compiled by P A Joshi, organized by Department of Chemical Engineering & DDIT Alumni Association of DDIT Nadiad, Inder Residency, Ahmedabad, December 21-23, 1995.
16. "Chapter-3. Fluid Flow Operations" and "Chapter-4. Heat Transfer" in the Lecture Notes for **3-Day Course on Chemical Engineering for Non-Chemical Engineers & Chemists**, compiled by P A Joshi, jointly organized by Department of Chemical Engineering of DDIT Nadiad and Ankleshwar Industries Association, Ankleshwar, July 12-14, 1996.
17. "Chapter-2. Mathematical Modeling and Simulation" and "Chapter-3. Computers in Process Control" in the Course Material of **Seminar and Intensive Course on Process Control and Simulation for Chemical and Metallurgical Industries**, compiled by R K Gupta, B V Babu, and N Chakraborty, BITS Pilani, April 4-7, 1997.
18. "Novel Adsorbents for solid-liquid separations", Proceedings of **Intensive Course (SIC-2001) on Novel Separation Techniques and their applications to Indian Chemical Industries**, BITS Pilani, pp 1-17, March 21-23, 2001.
19. "Process Integration", Proceedings of **Intensive Course (SIC-2001) on Novel Separation Techniques and their applications to Indian Chemical Industries**, BITS Pilani, pp 142-186, March 21-23, 2001.
20. "Basic Chemical Engineering Operations", Lecture Notes compiled by B V Babu, **Academic Refresher Course Programme for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, June 10-July 24, 2004.
21. "Notes for Chemical Engineering Experiments", Compiled by B V Babu, **Academic Refresher Course Programme-II for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, October 9-November 22, 2004.
22. "Basic Chemical Engineering Operations", Lecture Notes compiled by B V Babu, **Academic Refresher Course Programme-II for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, October 9-November 22, 2004.
23. "Energy Integration Analysis", Course Material edited by Dr. Sanjay Vashishtha, **Workshop on Energy Saving in Steam Systems** organized by Centre for Renewable Energy and Environmental Development (CREED), BITS Pilani and Thermax Babcock and Wilcox Limited, Pune, BITS Pilani, April 26-30, 2005.
24. "Chemical Engineering", Lecture Notes compiled by B V Babu, **Academic Refresher Course Programme-III for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, November 06-December 05, 2006.

25. "Chemical Engineering", Lecture Notes compiled by B V Babu, **Academic Development Programme in Basic Process Engineering-4, 5, 6, 7, 8, 9, 10, & 11 for the Employees of Hindustan Zinc Limited, Udaipur**, Organized by Practice School Division, BITS Pilani, December 08, 2006-January 09, 2007; January 07-February 03, 2009; January 12-February 13, 2007; January 07-February 03, 2009; February 04-March 03, 2009; March 14-April 10, 2009; June 29-July 24, 2009; August 13-September 09, 2009; June 21-July 19, 2010 respectively.
26. "Chemical Engineering", Lecture Notes compiled by B V Babu, **Academic Development Programme in Basic Process Engineering-1 & 2 for the Employees of Bharat Aluminum Company Limited, Korba**, Organized by Practice School Division, BITS Pilani, February 26-March 25, 2010; June 25-July 22, 2010 respectively.

#### Research Publications:

(Full Papers are available at <http://discovery.bits-pilani.ac.in/~bvbabu/publications.html>)

1. **Babu, B.V.** and G.Bhaskara Rao  
"Reduction of p-Nitrosophenol by Sodium sulfide"  
Proceedings of 41st Annual session of IChE (CHEMCON-88), M.S.University, Baroda, December 16-19, 1988.
2. **Babu, B.V.** U.V.Shenoy and V.Govardhana Rao  
"Radial liquid distribution studies in trickle-bed columns"  
Proceedings of International Symposium & 44th Annual session of IChE (CHEMCON-91), A.C.College of Technology, Madras, December 18-21, 1991.
3. **Babu, B.V.** and V.Govardhana Rao  
"Prediction of effective bed thermal conductivity and wall-to-bed heat transfer co-efficient in a packed bed under no flow conditions"  
Proceedings of First ISHMT-ASME Heat and Mass Transfer Conference (International) held at BARC, Bombay from Jan 5-7, 1994, edited by A.R.Balakrishnan, Paper No.HMT-94-105, pp. 715-721, Tata McGraw Hill Pub. Co. Ltd. (1994).
4. Shah, K.J. and **B.V.Babu**  
"Prediction of friction factor for flow through circular rough pipes"  
Proceedings of International Symposium & 47th Annual session of IChE (CHEMCON-94), IIT, Kharagpur, December 14-17, 1994.
5. **B.V.Babu**  
"An Eye-opener"  
Letters to the Editor, News Paper Daily 'Indian Express', pp. 2, March 17, 1995.
6. Shelat, M.R. and **B.V.Babu**  
"Cost Optimum Heat Exchanger Networks-Minimum energy and capital using simple models for capital cost"  
Proceedings of International Symposium & 48th Annual session of IChE (CHEMCON-95), IGCAR, Kalpakkam (Tamil Nadu), December 27-30, 1995.
7. Shah, K.J., **B.V.Babu** and V.Govardhana Rao  
"Radial liquid distribution and its analogy with lateral mixing in heat transfer for single- and two-phase flow through packed bed columns"  
Proceedings of International Symposium & 48th Annual session of IChE (CHEMCON-95), IGCAR, Kalpakkam (Tamil Nadu), December 27-30, 1995.
8. Naik, S.D. and **B.V.Babu**  
"Modeling of pulsing flow in trickle bed reactors"  
Proceedings of International Symposium & 48th Annual session of IChE (CHEMCON-95), IGCAR, Kalpakkam (Tamil Nadu), December 27-30, 1995.
9. Dalwadi, K.A. and **B.V.Babu**  
"Computer aided design of Absorption towers"  
Proceedings of International Symposium & 48th Annual session of IChE (CHEMCON-95), IGCAR, Kalpakkam (Tamil Nadu), December 27-30, 1995.
10. **Babu, B.V.**, J.Aamit and P.A.Joshi  
"Computer aided design of Azeotropic Distillation Column"  
Chemical Engineering World, Vol. XXXI (No.3), pp. 67-72, March 1996.
11. Shelat, M.R., Rupesh Mohan and **B.V.Babu**  
"Computer Aided Supertargeting - A step towards Optimal Heat Exchanger Network Synthesis"  
Proceedings of International Symposium & 49th Annual session of IChE (CHEMCON-96), GIDC, Ankleshwar (Gujarat), December 18-21, 1996.
12. Bazi, N.A., B.J.Raichura and **B.V.Babu**  
"Computer Simulation for Agitator Design"

- Proceedings of International Symposium & 49th Annual session of IChE (CHEMCON-96), GIDC, Ankleshwar (Gujarat), December 18-21, 1996.
13. Shukla, J.A. and **B.V.Babu**  
 "Database for Chemical Engineering Systems - A Software Package"  
 Proceedings of International Symposium & 49th Annual session of IChE (CHEMCON-96), GIDC, Ankleshwar (Gujarat), December 18-21, 1996.
  14. Patel, N.L. and **B.V.Babu**  
 "Design of Single- and Multiple-effect Evaporators: A computer program"  
 Proceedings of International Symposium & 49th Annual session of IChE (CHEMCON-96), GIDC, Ankleshwar (Gujarat), December 18-21, 1996.
  15. **Babu, B.V.** and R.Karthik  
 "Artificial Neural Network Model for the Equilibria Prediction in Ternary Mixture Extraction"  
 Proceedings of International Symposium & IChE Golden Jubilee Congress (CHEMCON-97), IIT, Delhi, December 15-18, 1997.
  16. Ramakrishna, V. and **B.V.Babu**  
 "Positive Decision making in waste management towards achieving sustainable development-A Perspective"  
 Proceedings of 14<sup>th</sup> National Conference of Environmental Engineers, Institution of Engineers (India), A.P.Centre, Hyderabad, August 7-9, pp. 9-15, 1998.
  17. **Babu, B.V.** and V.Ramakrishna  
 "Optimum utilization of waste oil for improved thermal efficiency of Bagasse"  
 Journal IAEM, Vol. 25, pp. 59-65, 1998.
  18. **Babu, B.V.** and S.Sangeetha  
 "Artificial Neural Networks for the estimation of heat transfer parameters in trickle bed reactors using Radial Basis Functional Networks"  
 Proceedings of International Symposium & 51<sup>st</sup> Annual Session of IChE (CHEMCON-98), A.U.College of Engineering, Visakhapatnam, December 16-19, 1998.
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