DEPARTMENT OF MATHEMATICS

Specific Achievements of the Department:

(i)   Twelve Research schemes in the Department from l969 to till date on different topics from different organizations like CSIR, New Delhi, CST UP, UGC, DST, ICMR were running and completed successfully. In the   above schemes several people were appointed as Research Assistants, JRFs, Scientists, Research Associates and they completed work under the supervision of different investigators. Many JRF completed their Ph. D. thesis in the above said schemes and many quality research papers have been   published in the National and International Journals.

(ii)   A number of conferences and seminars, summer and winter schools   have been organized by the department and attended by participants from various industries, academic institutions, research laboratories etc.

1. **A** 30-hours Lecture Series on "Mathemetical Modelling and System Simulation" exclusively on Saturdays and Sundays (Feb 20 to March 31, 2010) HBTI Kanpur.
    Co-Ordinator   **-Dr. Ram Autar**

2. An Expert lecture on "A Tribological Study of Microcirculation**"** by Prof. P. N. Tandon, retired Prof and Head, Maths Deptt., HBTI Kanpur and Visitor Professor of Brunei University, Feb. 16,2010.

3. A Refresher Course on **" Applied Mathematical Techniques for Chemical Sciences" April 11-15, 2007**

    Convener   **-**Dr. Ram Naresh , Mathematics

    Co-Convener   **-**Dr. Deepak Srivastav, Plastic Tech.

4. A Workshop on **"Application of Mathematics in Engineering   and Techniques**", Sep 8, 2007 by Mathematics department under the Networking Cell, TEQIP, Word Bank Project.

    Co-Ordinator   **-Prof. Shyam Lal**

    Dy Co-Ordinators   **-Dr. S. U. Siddiqui**
                                    -Dr. Rekha Bali
                                    -Dr. Ram Autar

5. A Workshop on **"Role of Mathematics in Science and Technology"** Oct 24, 2007 by Mathematics department under the Community & Economy cell, TEQIP, Word Bank Project

        Co-Ordinator   **-Prof. Shyam Lal**

        Dy Co-Ordinator   **-Dr. S. U. Siddiqui**
                                     -Dr. Rekha Bali
                                     -Dr. Ram Autar

6. A Lecture on **"Mathematical Validation of Pranayam"** by Prof. V.K. Katiyar, Professor, Mathematics Department, IIT Roorkee was organized by Mathematics Department in collaboration with Yoga Club, CSA under Community and Economy Cell,World Bank Project,HBTI, Kanpur on 21st Nov. 07.

7. A Seminar on"World Mathematical Year" on December 31, 2000.

8. A Seminar to Commemorate the 74th birthday of Prof. Harish Chandra on 11 October 2000.

9. Seventh Annual Conference of Vijnana Parishad of India on October 24-26, 1997.

10. Recent Trends in Mathematics and Applications & National
     Symposium on Dedication of Prof. J.N. Kapur to Mathematics and Mathematics education on September 1993.

(iii) The Faculty members of the department have also been invited/attended and presented papers in various National Conferences and International Conferences in USA, Japan, Singapore and Brunei etc.

(iv) Fifty three Ph.D. students have been supervised by the Faculty of the department and awarded Ph.D. Degrees till now.

LIST OF Ph.D. STUDENTS PRODUCED BY THE MATHEMATICS DEPARTMENT, H.B.T.I., KANPUR (TILLNOW)

S.No.	Title	Year	Candidate's Name	Guide
1.	Analytical study of momentum and heat transfer problems in non-newtonian fluids	1971	Sri M.D.Rai Singhaniya	Prof. P. N. Tandon
2.	Analytical study of simultaneous transfer problems in non-newtonian fluids	1973	Sri O. P. Singh	Prof. P. N. Tandon

3.	Analytical study of transfer process in non-newtonian fluids	1973	Sri A.K. Chaturvedi	Prof. P. N. Tandon
4.	Certain dual,triple and quadruple integral equations and series	1973	Sri T. N. Trivedi	Prof. A. P.Dwivedi
5.	Analytical study of some problems in Hemo-dynamics	1975	Sri V.K. Kapoor	Prof. P. N. Tandon
6.	Momentum and heat transfer problems in non-newtonian fluids	1975	Sri S. C. Pokhariyal	Prof. P. N. Tandon
7.	Analytical studies of some lubrication problems	1976	K. Verma	Prof. V. K. Kapoor
8.	Some integral and series equations and their applications in the mathematical theory of elasticity	1978	Sri J. P. Sharma	Prof. A. P.Dwivedi
9.	Mathematical models for some problems in cardiovascular systems	1980	Smt. Kusum Agarwal	Prof. P. N. Tandon
10.	A study of film lubricated bearing	1980		Prof. V. K. Kapoor
11.	Applications of lubrication theory to human joints	1980	Sri S. Jaggi	Prof. P. N. Tandon
12.	Analytical study of some transfer processes in two phase flow	1981	Sri V.K. Katiyar	Prof. P. N. Tandon
13.	Certain integral equations of mixed boundary value problems arising in mathematical physics	1981	Sri V. B. Singh	Prof. A. P.Dwivedi
14.	Mathematical studies of some lubrication problems	1981	J.S. Yadav	Prof. V. K. Kapoor
15.	Study of integral equations and problems of elasticity	1982	Sri S. P. Kushwaha	Prof. A. P.Dwivedi
16.	Mathematical models in cardiovascular dynamics	1982	Sri T.S. Pal	Prof. A. P.Dwivedi
17.	Analytical study of physiological flows	1983	Sri J. Prakash	Prof. P. N. Tandon
18.	Studies of drag reduction phenomenon	1983	Sri A.K.Kulshrestha	Prof. P. N. Tandon
19.	Some contributions to biological fluid transport processes	1983	Ms. Manju Agarwal	Prof. V. K. Kapoor

20.	A study of rheological behaviour of physiological fluids	1983	Sri J.K. Mishra	Prof. P. N. Tandon
21.	Study of Fourier series equations and integral and their applications in elasticity	1984	Miss P.Gupta	Prof. A. P.Dwivedi

22.	Some mixed boundary value problems of elastic strip containing Griffith cracks	1984	Sri D.N. Gupta	Prof. A. P.Dwivedi
23.	Certain integral and sequence equations involving special functions.	1984	Sri R.G. Gupta	Prof. A. P.Dwivedi
24.	A study of integral applications	1986	Sri B.D. Shukla	Prof. A. P.Dwivedi
25.	Some crack problems opened by forces at crack faces in a rectangular domain	1986	Sri D.N. Gupta	Prof. A. P.Dwivedi
26.	A study of thermal behaviour of biological systems	1986	Sri N. K. Gupta	Prof. P. N. Tandon
27.	A Biomechanical study of some problems in two phase flow		Lila C. Josef	Prof. P. N. Tandon
28.	Study of some integral equations and crack problems of elasticity	1987	Mr. S.C. Shukla	Prof. A. P.Dwivedi
29.	Mathematical models of the functional state of the physiological transport processes	1988	Km. P. Nirmala	Prof. P. N. Tandon
30.	Analytical study of Flow and Diffusion in modeled physiological systems	1988	Km. Rekha Agarwal	Prof. P. N. Tandon
31.	Analytical study of Diffusion processes in eye and brain	1989	Km. Manju Purwar	Prof. P. N. Tandon
32.	Some aspects of bone in growth by electrical stinuiation	1989	Smt. T. D. Gupta	Prof. P. N. Tandon
33.	Fluid dynamics of eye and cerebrospinal fluid	1990	Sri Ram Autar	Prof. P. N. Tandon
34.	Some mixed boundary value problems over multiply connected domains	1992	Sri Puspendrea Tripathi	Prof. A. P.Dwivedi
35.	A study of the physiological lubrication diffusion phenomenon in synovial joints	1992	Km. Amita Chaurasia	Prof. P. N. Tandon
36.	A study of some recent aspects and microcirculation	1992	Ms. Kiran Kushwaha	Prof. P. N. Tandon
37.	Models of capillary tissue exchange systems	1992	Mrs. Mamta Mishra	Prof. P. N. Tandon
38.	A study of certain non-newtonian fluids in reference to physiological	1993		Prof. P. N. Tandon
39.	Study of some integral and series	1993	Miss. Sarita Pandey	Prof. A.

	equations and their applications			P.Dwivedi
40.	Some Mathematical models on selestive predation : the effect of age structure on stability	1993		Dr. M. Saleem
41.	Mathematical analysis of diffusion in microcirculation	1993	Sri S.U. Siddiqui	Prof. A. P.Dwivedi
42.	A study of recent aspects of microcirculation	1992	Mr.T. Boswal	Prof. P. N. Tandon
43.	A Numerical study of flow and diffusion through arteries (normal and pathological)	1994	Mr.U.V. S. Rana	Prof. P. N. Tandon
44.	Oscillation is predator Prey systems with selection predation	1994	Mr. R. K. Pandey	Dr. M. Saleem
45.	Certain integral equations and series and mixed boundary value problems of elasticity	1995	Km. Rolli Singh	Prof. A. P. Dwivedi
46.	Study of generalized integral equations and series equations and their applications	1998	Km. Jyotsana Chandel	Prof. A. P. Dwivedi
47.	Study of some special class of integral and series equations and their applications	1999	Mr.R.P. Srivastava	Prof. A. P. Dwivedi
48.	Some problems on heat and mass transfer	1999	Mr. Ajay kumar Shukla	Dr. Rekha Bali
49.	Study of generalized series equations and applications	2001	Mrs. Tarunnaum Siddiqui	Prof. A. P. Dwivedi
50.	The transmission dynamics of AIDS epidemic : Some nonlinear mathematical models	2004	Mr. Sandeep Omar	Dr. Ram Naresh Tripathi
51.	Mathematical modelling of Transport Phenomenon with reference to biomechanics.	2008	Ms. Sapna	Dr.S.U.Siddiqui
52	Removal of Air Pollutants from the atmosphere by precipitation: Mathematical models and their analysis.	2008	Mr. Shyam Sunder	Dr. Ram Naresh
53.	Mathematical Modeling of the transmission of AIDS epidemic Nonlinear models and their analysis.	2009	Mr. Agraj Tripathi	Dr. Ram Naresh

(v)   Ph. D. Topics on which Research Scholars are working

Sl.No.	NAME	SUPERVISOR NAME	TOPIC	PRESENT STATUS
1.	S.K.Sharma	Dr. Rekha Bali	Mathematical Modeling of heat and mass transfer phenomena in synovial joint.	Synopsis approved
2.	Usha Awasthi	Dr. Rekha Bali	Mathematical study of flow and oxygen transport in blood vessels in the presence of magnetic field.	Synopsis approved
3.	Swati Mishra	Dr. Rekha Bali	Some flow and diffusion problems in very narrow capillaries with application to physiological systems.	Synopsis approved Work in progress
4.	Rashmi Srivastava	Dr. Ram Autar	Mathematical Modelling of fluid flow in the Eye.	Thesis submitted
5.	Deepti Tandon	Dr. Ram Autar	Modelling and Analysis of Transport phenomena in eye.	Synopsis approved, Work in progress
9.	Surabhi Pandey	Dr. Ram Naresh	Mathematical modeling of the spread of carrier dependent infectious diseases: Environmental and demographic effects.	Synopsis approved, Work in progress
10.	Dileep Sharma	Dr.Ram Naresh	Mathematical modeling of the spread of AIDS epidemic in a variable size population.	Synopsis approved, Work in progress
11.	Shailesh Mishra	Dr.S.U.Siddiqui	Mathematical study of blood flow in diseased and normal blood vessels.	Synopsis approved, Work in progress
12.	Narendra Kumar Verma	Dr.S.U.Siddiqui	Mathematical analysis of Pulsatile blood flow in stenosed and catheterized blood vessels.	Synopsis approved Work in progress
13.	Shivangi Dixit	Dr. Ram Naresh		Work in Progress
14.	Swati Srivastava	Dr. Ram Autar		Work in Progress

<u>Honour/Distinctions received by the Faculty :</u>

(i)   Dr. S.U.Siddiqui was awarded Jawahar Lal Nehru Memorial Gold Medal for his paper entitled "Microstructural and peripheral layer viscosity effects on blood flow through a tube with small constriction" by the Institution of Engineers, India, 1984-85.

(ii)   Dr. Ram Naresh was honoured two times with "Best paper award" for his research paper presentation at conference of Bharata Ganita Parishad, 2002 and VPI Conference,1997.

<u>Lectures Delivered by Faculty :</u>

i)   **Dr. Rekha Bali** delivered a lecture on **"Matrices and system of algebraic equations"** in Refresher course on **"Applied Mathematical Techniques for Chemical Sciences"** organized by Networking cell, TEQIP, World Bank Project, HBTI, Kanpur on April 11-15, 2007.

ii)   **Dr. Ram Naresh** delivered invited lecture on **"Mathematical Modelling"** in a Conference on the eve of Birthday Celebration of **Prof. Harish Chandra,** at VSSD College, Kanpur, Oct. 11, 2007.

iii)   **Dr. Rekha Bali** delivered a lecture on **"Introduction to Numerical Analysis"** in the   Workshop on "Role of Mathematics in science and Technology" held at 24th Oct. 2007 in   Deptt of Mathematics, HBTI, Kanpur. under the aegis of Community & Economy cell, TEQIP, World Bank Project, HBTI, Kanpur.

iv)   **Dr. Rekha Bali** delivered a lecture on **"Numerical Methods and Analysis"** on 19.12.07 in Short term training programme for the staff of Polytechnic under Faculty Development   Programme   from l7.12.07 -- 20.12.07   at Institute of Research, Development & Training, Kanpur.

v)   **Dr. Rekha Bali** delivered   lectures in a Lecture Series on "Mathemetical Modelling and System Simulation" exclusively on Saturdays and Sundays (Feb 20 to March 31, 2010) HBTI Kanpur.

vi)   **Dr. Ram Autar** delivered   lectures in a Lecture Series on "Mathemetical Modelling and System Simulation" exclusively on Saturdays and Sundays (Feb 20 to March 31, 2010) HBTI Kanpur.

vii)   **Dr. Ram Naresh** delivered   lectures in a Lecture Series on "Mathemetical Modelling and System Simulation" exclusively on Saturdays and Sundays (Feb 20 to March 31, 2010) HBTI Kanpur.

viii)   **Dr. S. U. Siddiqui** delivered   lecture in a Lecture Series on "Mathemetical Modelling and System Simulation" exclusively on Saturdays and Sundays (Feb 20 to March 31, 2010) HBTI Kanpur.

Broad areas of Research Interests of the Faculty:

1. Mathematical Modeling
2. Fluid Mechanics
3. Biomechanics
4. Integral equations and applications to continuum mechanics
5. Population dynamics and ecological problems
6. Studies of drag reduction phenomenon and its application to real system.
7. Fluid dynamics of eye and cerebrospinal fluid
8. Momentum, heat and mass transfer in non-Newtonian fluids
9. Hydrodynamics theory of lubrication.

Research Projects:

1. **Major research project sponsored by UGC**

   Title of the Project   Mathematical Modeling of the microcirculation.
   Period   Three Years (Running)
   Amount of Grant   Rs. 4,82,800-]
   Principal Investigator   **Dr. Rekha Bali**

2. **Major research project sponsored by UGC**

   Title of the Project   Mathematical modeling of Blood Flow under normal & Stenotic Conditions.
   Period   Three Years (Running)
   Amount of Grant   Rs. 5,15,000
   Principal Investigator   **Dr. S. U. Siddiqui**

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