

PROFILE OF DR. INDIRA NIGAM

- 1. Name : Dr. INDIRA NIGAM**
- 2. Date of Birth : 24th January 1964**
- 3. Designation : Professor**
- 4. Residential Address : 111/323, ASHOK NAGAR, KANPUR-208012.
Phone No.- 0512-2541889.**
- 5. Office Address: Plastic Technology Department,
Harcourt Butler Technological Institute,
KANPUR 208002.
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6. Educational Qualifications:

Board/ University	Exam./Degree	Year	Subjects/ Field of Specialization	Percent Marks/ Div./Rank
U.P. Board Allahabad	High School	1979	Hindi, Eng., Maths, Science, Bio.	78% I div. with distn.
U.P. Board Allahabad	Intermediate	1981	Hindi, Eng., Maths, Phys., Chem.	70.8% I div.
KANPUR UNIV.	B. Sc.	1983	Physics, Chem- istry, Maths	67% I div.
H.B.T.I., KANPUR	B. Tech	1986	Chemical Technology (Plastic Technology)	80.8% I div. with distn., I rank
H.B.T.I., KANPUR	M. Tech.	1989	Chemical Technology (Plastic Technology)	88.8% I div. with distn., I rank
H.B.T.I., KANPUR	Ph..D.	1994	Chemical Technology (Plastic Technology)	

7. Employment Record:**Teaching Experience:**

University/College	Designation	Period
Department of Plastic Technology,H.B.T.I.,KANPUR	Lecturer	Oct.1995-Oct1999
Department of Plastic Technology,H.B.T.I.,KANPUR	Senior Lecturer	Oct.1999-Oct.2004
Department of Plastic Technology,H.B.T.I.,KANPUR	Assistant Professor	Oct.2004-Oct.2007
Department of Plastic Technology,H.B.T.I.,KANPUR	Associate Professor	Oct.2007-till date

Professional Experience:

Organization/Employer	Designation	Period
Thapar Corporate R & D Center(TCRDC), Patiala	Research Engineer	May1995-Oct1995
Krishna Engineering Pvt. Ltd.,KANPUR	Technical Manager	July 1993- May1995
CSIR,NEW DELHI	Senior Research Fellow	July 1990-June1993
MHRD, NEW DELHI	Senior Research Fellow	Dec. 1989-June1990
Chem. Eng. Dept. IIT, Kanpur	Research Assistant	July1986-April 1987

Research Experience:

Research Projects

Sl. No.	Title	CoInvestigator (if any)	Agency	Period	Grant/amount mobilized (Rs. Lakh)
1.	'Synthesis & Characterization of copolymer of Styrene and Maleic Anhydride'		Dhupar Chemicals Pvt. Ltd. Kanpur	2000 - 2003	Rs. 0.1 lakhs
2.	'Corrosion Resistant Coatings based on Polyacrylate /Nano-clay composites (PNC)' The project cost is Rs 5.5 lakhs.	Prof. J.S.P.Rai	All India Council of Technical Education (AICTE) New Delhi.	2009-2012	Rs. 5.5 lakhs

Research Guidance/ Supervision of Ph.D. students

Sl. No.	Topic	Other supervisor (if any)	Thesis Submitted /in progress
1.	Studies on Synthesis of Modified Copolymer of Styrene and Maleic Anhydride	Late Prof. D Agarwal Paint Tech Dept. H.B.T.I. Kanpur	Awarded in 2011
2.	Effect of Higher Acrylates on the Synthesis and Characterization of Crosslinkable Copolymers of MMA and Diacrylate/ Dimethacrylates'.Anhydride'	Prof J.S.P.Rai, Plastic Tech Dept. H.B.T.I. Kanpur	Awardred in 2012
3.	Studies on Synthesis and characterization of Copolymers of MMA with diacrylate/ dimethacrylate	Prof J.S.P.Rai, Plastic Tech Dept. H.B.T.I. Kanpur	Thesis in progress
4.	Synthesis and Characterization of Copolymers of fullerene with vinyl monomers using Bismuthoniumylide as a novel initiator'	Dr. D.S. Bagh, Scientist D, DMSRDE Kanpur	Thesis awarded in 2014

Published Papers

Sl. No.	Title of the papers published	Name of the Journal/Book/ Paper	Status of the journal & place of publication	Publication Details i.e. Volume, Issue, Year
1.	Rheological Studies of Blends of Polycarbonate and Poly (acrylonitrile butadiene styrene I. Nigam and G.N. Mathur	Polymer	International journal	35 (12),2631 (1994).
2.	Synthesis and Evaluation of an Interpolymer Anionic Reverse Osmosis Membrane Derived from Poly (vinyl alcohol) and poly (styrene sulfonic acid) I. Nigam and G.N. Mathur	CHEMCON-89 Secretariat for Annual Convention of AICHE	National journal	14, 34(2009)
3.	Blends Effect of Rubber-Content of ABS on Properties of PC/ABS Blends : I. Rheological, Mechanical and Thermal Properties I. Nigam, D. Nigam and G.N. Mathur,	Polymer Plastic Technology and Engineering	International journal	44(5)815-832,(2005)
4.	Synthesis and Characterization of Alkali Modified Styrene Maleic Anhydride for Dispersion of TiO ₂ Suman Kumari, D. Nigam, D. Agarwal and I.Nigam	J.A.P.Sc.	International journal	103(5), 3194-3205 (2006)
5.	Copolymers of Styrene and Maleic Anhydride : Reactivity Ratio, Physical Behavior and Spectral Properties Suman Kumari , D. Nigam , D. Agarwal and Indira Nigam,	Paint India	National Journal	November 2008, 69-85.
6.	Swelling Behaviour of Poly(MMA-co-BA-co-PPGDA) polymers Sweta Bajpai, J. S. P. Rai and Indira Nigam	J.A.P.Sc.,	International journal	112(4) 2374-2384 (2009).
7.	Synthesis and Characterization of Methyl methacrylate-n-Butylacrylate lattices Sweta Bajpai J. S. P. Rai and Indira Nigam	Int. J Plastic Technology	International journal	12(2), 1039-1045 (2009).
8.	Copolymerization of Fuuereene (C ₆₀) and Methyl methacrylate (MMA using Triphenyl bis uthonium ylide as a Novel	J. Macromol. Sc. A: Pure & Appl. Chem.	International journal	47(5) (2010).

	initiator and characterization of the copolymers (C ₆₀ -MMA) R. Katiyar, D.S.Bag and I. Nigam			
9.	Synthesis and characterization of Poly(MMA-co-EHA-co-PPGDA) latices	Journal of Applied Polymer Science	International journal	122(1)676-684 (2012)
10.	Synthesis And Characterization Of Crosslinkable Copolymers Of Mma With Diacrylate/Dimethacrylate	Malaysian Polymer Journal	International journal	Vol. 7 No. 1, p 34-41, 2012
11.	Thermal Properties of Fullerene (C ₆₀) containing Poy (akyl methacrylate)	Thermochimica Acta	International journal	Vol.557 April 2013 55-60

Conference/Seminar/Workshop/Symposia

Sl.No.	Title of the paper presented	Title of conference /seminar	Organized by	Date	Status of participation paper
1.	Blends of Polycarbonate and Poly (ethylene terephthalate) : Thermal Analysis and Determination of Polymer-Polymer Interaction Parameter	10th National Symposium on Thermal Analysis	DMSRDE, Kanpur	Dec. 1995	Attended & presented a paper
2.	Viscoelastic Properties and Morphology of Blends of Polycarbonate and Poly (ethylene terephthalate)'	National Conference on Electron Microscopy	DMSRDE, Kanpur	Dec. 1998	Attended & presented a paper
3.	Rheological Properties of Blends of Polycarbonate and Poly (ethylene terephthalate)	MACRO-2000	DMSRDE, Kanpur	9 th -11 th Dec. 2000	Attended & presented a paper
4.	Biodegradable Polymers	New Horizons in Bioscience	DG College Kanpur	29 th - 30 th Nov. 2005	Presented a An Invited Lecture
5.	Synthesis & characterization of crosslinkable copolymer of MMA and diacrylate/dimethacrylate	Polymer-2006 National Conference of SPS, India	IACS Kolkata	9 th -10 th Feb. 2006	Attended & presented a paper

6.	Water resistant films of crosslinked copolymer of MMA & EHA	POLY-2008, APA International Conference on Advances in Polymer Science & Technology	IIT, Delhi & Asian Polymer Assoc.	28 th - 31 st Jan. 2008	Attended & Presented a paper
7.	Effect of polymeric emulsifier on synthesis and properties of crosslinkable copolymers	13th International Association of Colloid & Interface Scientists Conference on Surface and Colloid Science and 83rd ACS Colloid and Surface Science Symposium	IACIS & ACS Columbia University New York, USA	14 th - 19 th June 2009	Attended & presented a paper
8.	Effect of PPGDMA on water resistance of MMA/EHA Copolymers	National Seminar on surfactants & chemicals	Oil Tech Assoc of India & AIChE	27 th - 28 th Feb. 2010	Attended & presented a paper
9.	Emulsion Copolymer Of Acrylate Copolymers	National Seminar on Introduction to Green Chemistry: Introduction, Theory & Practice	Dept. of Chemistry VSSd College Kanpur	22 nd - 23 rd Oct. 2010	Attended & presented Paper
10.	Nanocomposites Based On Crosslinkable Polyacrylate Copolymers	Polymer Science and Engineering: Emerging Trends, PSE-2010'	University Institute of Chemical Engineering and Technology Punjab University Chandigarh.	26-27 th Nov. 2010	Attended & presented Paper
11.	Synthesis and characterization of Poly(MMA-co-EHA-co-PPGDA) Latices	Third International Multicomponent Polymer Conference(IMPC-2012)	Centre for Nanoscience and nanotechnology Mahatma Gandhi University, Kottayam , Kerala	23-25 th March 2012	Attended & presented Paper
12.	Synthesis and characterization of Fullerene containing Hydrogels	'International conference on Polymers Frontiers of Sci. and Tech. APA-2013'	UICET, Punjab Uni., Chandigarh	21 st - 23 rd Feb. 2013	Attended & presented Paper

13.	Hydrophobicity of Fullerene containing Hydrogels	'International conference on Advancements in Polymeric Materials APM-2013	CIPET, Lucknow	1-3 rd March 2013	Attended & presented Paper
14.	Water resistant polymer coatings	First symposium on Advances in Sustainable Polymers (ASP-14)	IIT, Guwahati	10-11 th Jan. 2014	Attended & presented Paper
15.	Thermoresponsive Smart Hydrogels	APA International Conference on Polymers: Visions & Innovations (APA-2014)	IIT, Delhi & Asian Polymer Assoc.	19 th - 21 st Feb. 2014	Attended & presented Paper
16.	Fullerene containing Polymers: Synthesis & characterization	Conference on MMSBT (Microscopy in Material Science & Biomimetic Technology)	DMSRDE, KANPUR & AMST	26-28 th Feb. 2015	Presented an invited talk
17.	Amine modified Copolymers of styrene maleic anhydride for absorption of metals from waste water	International conference on Advancements in Polymeric Materials (APM 2016)	CIPET & LARPM Bhubaneswar at CIPET Ahmedabad	12-14 th Feb. 2016	Attended & presented Paper

Refresher courses attended

S.No.	Name of Refresher Course	Name of Organizing Institute	Date	Object
1.	Applications Of Computers in Textiles	ISTE, N.Delhi and GCTI, Kanpur	5 th -17 th June 2000	Exposure to Computer applications
2.	Textiles in 21 st Century	ISTE, N.Delhi and GCTI, Kanpur	3 rd -15 th July 2000	Exposure to latest polymer Fibers
3.	Optical Fibers and its Applications	TTTI, Chandigarh & ISTE, N.Delhi	17 th -21 st Sept. 2001	Basic Concepts of Optical fibers, their manfg methods, uses & future prospects & uses
4.	Technological Developments in Textiles	ISTE, N.Delhi and GCTI, Kanpur	24 th -5 th Jan. 2002	Latest developments in Textiles

5.	Eco-Friendly Chemical Technologies	AICTE,N.Delhi & H.B.T.I. Kanpur	11 th -24 th March2002	Hazards of various Industries and latest Technologies to overcome these
6.	Scientific computing with MATLAB	Mech Eng. Dept., IIT Kanpur	7 th -11 th May 2004	To get knowledge of MATLAB so as to use it in analysis of experimental results
7.	SERC School on Modeling of Industrial Reactors	DST and Chem Eng Dept IIT Kanpur	12 th - 17 th July 2004	To get concepts of modeling of industrial reactors for different types of reactions
8.	QIP Short term course 'Functional Nanomaterials: Science & Technology	IIT Roorkee	3 rd -7 th Feb. 2007	To get concepts of nanomaterials & their uses in various fields
9.	Workshop on Latest developments in NMR and Mass spectroscopy	CDRI, Lucknow	1 st - 2 nd Dec.2008	To get knowledge of advances in analysis by NMR & Mass spectroscopy
10.	QIP Short term course 'Futuristic Nanopolymers:	IIT Kanpur	8 th -12 th Dec.2008	To get concepts of nanopolymers & their uses in various fields
11.	FDP on Essentials of teaching learning process	Dept. of Humanities	18 th -23 rd March 2013	To learn about methods to improve teaching
12.	FDP on Management and Capacity enhancement for administrations	IIM Lucknow Noida Campus	21 st -25 th Oct. 2013	To get concepts of Management useful for technical institutions
13.	QIP On Intellectual Property Rights	Science & Technology Center, UP CST, Lucknow	17 th -18 th Dec. 2013	To get knowledge of Patents, Copyright, other IPRs
14.	FDP on Engineering Education: Opportunities, challenges & Future Directions	Mechanical Engineering Department a H.B.T.I. Kanpur under TEQIP-II	7 th -12 th March 2014	To get prospects of engineering education and efforts needed to improve it

Refresher courses organized

Worked as one of the co-ordinators alongwith Dr. G. Bartrya to organize a refresher course on 'Curriculum Development and Evaluation Methods in Technical Education' organized by Plastic Technology Department and Mechanical Engineering Department a H.B.T.I. Kanpur under TEQIP-II from 1st to 6th July 2013

8.Fellowship of academic bodies and professional societies:

- i) Indian Plastic Institute (IPI), Kanpur Subchapter
- ii) Society of Polymer Science SPS),
- iii) Indian Society of Technical Education

- iv) Association of Paints and Coatings Tech
- v) Oil Technology Association of India

9.Honours and Awards:

- i) Ram Raghuvir Saran Memorial Gold Medal for First rank in the discipline of Plastic Tech. in B. Tech.
- ii) Institute Award for First rank in the discipline of Plastic Tech. in M. Tech.

(INDIRA NIGAM)

Annexure I

SUMMARY OF M.TECH. PROJECT

Title: SYNTHESIS AND EVALUATION OF AN INTERPOLYMER ANIONIC REVERSE OSMOSIS MEMBRANE DERIVED FROM POLY(VINYL ALCOHOL) AND POLY(STYRENE SULFONIC ACID)

Guide: Prof. G.N. Mathur

H No. 117/11, N-Block, KDA Colony,
Kakadeo, Kanpur-208025.

Summary: Reverse Osmosis is widely being used for desalination of water. The cellulose acetate is the most commonly used material for making membranes for desalination. Due to its poor strength. Poor compact resistance and biodegradability, a number of new materials have been investigated by scientists for efficient reverse osmosis.

An interpolymer anionic membrane was prepared from poly(vinyl alcohol) as a membrane matrix and poly(styrene sulfonic acid) as an ionic component. The solution casting method was adopted to prepare the membranes. A mixture of water and ethanol, taken in the ratio of 2:1, was selected as a casting solvent. The membrane was found by casting the polymer solution on a polypropylene film placed on a rimmed glass plate. The solvent was evaporated at 100⁰C for a proper period ranging from 1 to 3 hours.

An apparatus was also designed and got fabricated to investigate the reverse osmosis performance of the prepared membranes. The whole apparatus was made of stainless steel. The apparatus consisted of a reverse osmosis cell to hold the membrane. A leather sheet was used to support the membrane so that the membrane would withstand the pressure applied during experiments. The effective area of membrane in the cell was 7 cm² and apparatus was designed to operate at pressure up to 300psi.

The effect of composition of casting solution and heat curing period on the reverse osmosis performance of formed membranes was studied. The optimum composition of casting solution was obtained by keeping poly(vinyl alcohol) and poly(styrene sulfonic acid) ratio as 3:2 and 5% polymer concentration in it. The membrane heat cured for a period of 2 hours has given the best performance among all the membranes investigated under applied pressure of 89 psi with 0.25 percent aqueous NaCl solution.

Annexure II

SUMMARY OF DOCTORAL PROJECT

Title: RHEOLOGICAL CHARACTERIZATION OF BLENDS OF POLYCARBONATE WITH VARIOUS POLYMERS

Guide: Prof. G.N. Mathur

H No. 117/11, N-Block, KDA Colony,
Kakadeo, Kanpur-208025.

Summary: A literature survey was done to study the blends of polycarbonate with various polymers and on basis of previous investigations, the blends of Polycarbonate(PC) and ABS[Poly (acrylonitrile butadiene styrene)] and Polycarbonate (PC) and PET[Poly (ethylene terephthalate)] were selected for studies

The flow properties of these blends were studied on Haake System 90 Microprocessor controlled Torque Rheocord. The ABS and PET both were found to improve the flow properties of PC and thus power requirements would be reduced if ABS or PET were blended with PC. The mechanical properties viz. tensile strength, impact strength and physical properties viz. water absorption, density of these blends were determined as per ASTM methods. The mechanical properties of PC were found to suffer with addition of ABS and PET ; the extent depended on the composition of blend. The water absorption of PC was improved by addition of PET and density decreased with addition of ABS thus giving volume/weight advantage. The compatibility of these blends was studied by determining glass transition temperature by TA Instruments Differential Scanning Calorimeter (DSC), and by transitions in viscoelastic properties obtained by TA Dynamic Mechanical Analyzer(DMA) and Rheovibron. The results obtained indicated that the blends of PC/ABS had partial miscibility. The composition containing 10% or more than 70% ABS showed better compatibility as compared to other compositions . In case of PC/PET blends, the blends were found to be immiscible in all compositions although those containing more than 70 % PET showed better phase adhesion as shift in the transitions of two phases towards each other was observed for these blends. The details of phase morphology was studied by Scanning Electron Microscopy. These results were used to obtain macro-micro property correlation for these blends. The conclusions drawn from these investigations were that the blends containing less than 10% ABS had flow properties better than that of PC giving 15 % reduction in viscosity. Although the properties like tensile strength and elongation at break were lost the extent of loss was only 3%. These blends showed higher than additive value of impact strength. The viscoelastic properties as well as glass transition behaviour indicated good compatibility in this composition range which was confirmed by well dispersed phase structures in morphological analysis. These blends can replace PC in applications where tensile strength and water resistance are not critical. The blends of PC/ABS having more than 70% ABS have advantage of about 40% reduction in viscosity and good phase adhesion along with lower cost. These blends with inferior mechanical properties as compared to PC may find limited applications. The blends of PC/PET having more than 70 % PET showed 25% improvement in flow properties with only 8-9% loss in mechanical properties. These blends, having better elongation at break and

water resistance as compared to PC can find suitable applications accordingly where humidity resistance is more critical than mechanical properties,

Annexure-III

Professional Experience

[I] Research Experience

1. Worked as Research Assistant on a Project 'Enhancement of Heat Transfer via Turbulence Promotion of In-line Propellers' aDepartment of Chemical Engineering, Indian Institute of Technology, Kanpur for one year. The job responsibility included literature survey related to various methods for enhancement of heat transfer in heat exchangers, designing, implementation and standardization of experimental set-up.
2. Two years of research experience as post-graduate student (M.Tech.) which includes one year research work on project entitled 'Synthesis and evaluation of an Interpolymer Anionic Reverse Osmosis membrane derived from poly (vinyl alcohol) and poly (styrene sulfonic acid).(Annexure I).
3. Four year of research experience as doctoral student and as Senior Research Fellow of CSIR New Delhi. The title of project was 'Rheological Characterization of Blends of Polycarbonate with various Polymers ' (Annexure II)

[II] Industrial Experience

1. Two years of experience of working at Krishna Engineering Pvt. Ltd. Kanpur as Technical Manager. The job responsibility included looking after day to day production. Quality control and inspection of various engineering plastic components produced for LML Pvt. Ltd. and Indian Railways on Injection Moulding Machines. Supervised research and development projects of RDSO, Lucknow and Defence regarding substitution of traditional materials like glass, with plastics and worked for approval of company from RDSO for supply of these components to Indian Railway.
2. Five months experience of working as Research Engineer at Thapar Corporate R&D Centre, Patiala. Job responsibility included handling of projects sponsored by corporate industries of Thapar group viz Crompton Greaves Ltd., Greaves India Ltd. and Baarpur Industries Ltd. The project was based on problems related these industries. During this tenure visited NAL Bangalore for reviewing the development of a project based on Nomex Papers used in transformers and delivered a lecture entitled 'Substitution of Metals with Plastics' at HRD programme organized by Crompton Greaves Ltd, Mumbai on 6-8 Aug. 1995.

[III] Academic Experience

1. Teaching experience at Department of Plastic Tech. for about eighteen years (October 1995 to till

date). During this period taught various subjects in the curriculum of B.Tech. course in Plastic Tech (Chemical Tech.) Supervised various laboratory classes of B.Tech. Plastic Tech. Students, in which experiments based on synthesis, characterization, processing and testing of polymers are done.

2. Participated in examination of B.Tech. Plastic Tech. students as paper setter, invigilator and evaluator of answer books and as internal examiner in various practical examination.
3. Modified syllabus of B.Tech. Plastic Tech course time to time at departmental level.
4. Arranged industrial training for pre-final year students of B.Tech. Plastic Tech. students in various relevant industries/organizations.
5. Acted as member of anti-ragging team
6. Acted as member of verification team for stock verification in Central Library, World Bank scheme and various departments of the institute.
7. Participated as executive member in various committees in the organization of Polycon 2002 held at Plastic Technology Department, HBTI in Sep.2002
8. Delivered lecture on 'High Performance Engineering Thermoplastics' at Short Term Course on High Performance Polymers Materials' at CEP DRDO at DMSRDE Kanpur 9-13th Nov. 1998.
9. Delivered lectures on 'Thermosetting resins for FRP' at a short terms course on FRP-training Programme' at STEP-H.B.T.I., from Dec. 21st 1998 to 16th Jan. 1999.
10. Delivered lectures on various topics at IRDT and STEP, H.B.T.I., from time to time.
11. Coordinated a short term course on "HOUSE HOLD ADHESIVES" conducted by STEP-H.B.T.I. from 18th April 2002 to 18th June 2002.
12. Delivered lectures on 'Composite Materials for Defence Applications' at CEP DRDO at DMSRDE Kanpur, 27th September 2004.
13. Delivered lectures on Polymerization Engineering' at CEP DRDO at DMSRDE Kanpur, In 21st November 2004.
14. Delivered lectures on .Microemulsion Polymerization' at CEP DRDO at DMSRDE Kanpur, In 25th November 2009.

[IV] Administrative Experience

1. Working as Assistant Superintendent Examination in class test and end semester exams of HBTI from 2008 till date
2. Working as Observer and Assistant Superintendent Examination in UP SEE for many years
3. Worked as Warden at girls hostel from 2011 to 2015
4. Working as Convener Literary Sub-council of Council of Student Activity since 2010
5. Worked as Assistant Dean Research & Development from 2013 to 2015

[V] Research Supervision Experience

1. Guided one M.Tech. Student as a co-guide on the project entitled "Studies on Blends of ABS/PVC" in 1996-97.
2. Guided three students for Ph.D.
 - (i) Ms. Suman Kumari.
Topic of her research was 'Studies on Synthesis of Modified Copolymer of Styrene and Maleic Anhydride'.
Co-guide: Late Prof. D Agarwal Paint Tech Dept., H.B.T.I. Kanpur
The thesis has been awarded by U.P. Technical Univ. Lucknow.
 - (ii) Ms. Sweta Bajpai,
Topic of her research was 'Effect of Higher Acrylates on the Synthesis and Characterization of Crosslinkable Copolymers of MMA and Diacrylate/Dimethacrylates'. Anhydride'
Co-guide: Prof J.S.P.Rai, Plastic Tech Dept., H.B.T.I. Kanpur

The thesis has been awarded by U.P. Technical Univ. Lucknow.

(iii) Ms. Rashmi Katiyar

Topic of her research was 'Synthesis and Characterization of Copolymers of fullerene with vinyl monomers using Bismuthoniumylide as a novel initiator'

Co-guide: Dr. D.S. Bagh, Scientist D, DMSRDE, Kanpur

The thesis has been awarded by U.P. Technical Univ. Lucknow.

(iv) Ms. Stuti Srivastava

The topic of her research is 'Synthesis and Characterization of Cross-linkable Copolymers based on MMA and Diacrylate/Dimethacrylates of Ethylene Glycol'.
Co-guide: Prof J.S.P. Rai, Plastic Tech Dept. H.B.T.I. Kanpur.

The preliminary literature survey has been done. The synopsis of work has been approved in the RDC of Applied Chemistry of UP Technical University, Lucknow. The experimental work has completed.

