



DEPARTMENT OF  
**POLYMER & SURFACE  
ENGINEERING**

**ABOUT THE DEPARTMENT**



**PROFESSOR R.N.JAGTAP**

*B.Sc. Tech, M.Sc. Tech, Ph.D Tech*  
 Professor of Paint Technology  
 Head of the Department of Polymer & Surface Engineering

The department was established in the year 1946 and was offering a B.Sc (Tech) course for two years in Technology of Plastics and Technology of Paints, Pigments and Varnishes. In 1952, along with other divisions three years B. Sc (Tech) program was introduced. Earlier it was known as Paints, Pigments and Varnishes (PPV) Section. The B.Sc. (Tech.) courses were converted into post-B.Sc. three-year courses in 1966 and finally converted into B. Tech. programmes, which are post-HSSC (12th Grade) in 1998. M.Sc. Tech. in Chemical Technology came into existence in the year 1961. The M.Sc. (Tech.) courses were converted into post-B.Tech. four year courses in 2002. The department also offer Ph.D.Tech. and Ph.D. Sci. degrees

In the beginning of the department Dr. T. N. Mehta was the only staff member. Later on, the division progressed under stewardship of Late Professor

N.R. Kamath who was a visionary. After him Professor S. P .Potnis carried the torch with great ability. From 1991 to 2005, Professor D. D. Kale was head of the Division who shared a major contribution for the developmental developments. Prof V. C. Malshe, Professor M.A. Shenoy, Professor P. A. Mahanwar are the past HODs of Polymer & Paints Departments respectively. From 1st August 2015 Professor R.N Jagtap is the Head of Department.

The intake strength was only four students per year in Polymer and surface engineering Technology branches. Later on, the strength was increased to 8 per year and now it is 16 per year in each of these two technology courses. The department received a grand donation of 1 crore from Plastindia Foundation, Mumbai in 1997 to initiate the new program – three semesters M. Sc (Tech) in Plastics Processing in addition to regular technology course. In the year 1999, the department received donation of modern equipments worth USD 100,000 from Gratag Macbeth of USA in association with Advanced Graphics Systems, India. Today, this department boosts of being

the best equipped laboratory comparable with or better than laboratories in many advanced countries.

**MAJOR THRUST OF RESEARCH AREAS:**

- Polymer Recycling, Blends, Rheology, Polymer Processing.
- Synthesis of Nanomaterials and nanocomposites
- Ecofriendly coatings, Hybrid coatings
- Structure property relationship
- Living Radical Polymerization, Synthesis of Functional monomers
- Polymer Blends and alloys
- Polyurethane Dispersion, Anticorrosive Coatings.
- Particulate Polymer Composites, Bionanocomposites, Biodegradable Polymers and Composites, Speciality Coatings.
- Electrical insulation, Water-soluble Resins Structure
- Property Correlations of Coatings, Electrospinning



**PROFESSOR R. N. JAGTAP**

*B.Sc. Tech, M.Sc. Tech, Ph.D Tech*  
 Professor of Paint Technology  
 Head of Department, Department of Polymer & Surface Engineering,

**SUBJECTS TAUGHT:**

- Paint Tech. III
- Paint Tech. II
- Technology of Printing Inks
- Corrosion Science and Prevention
- Environment Friendly Coatings
- High Performance Coatings
- Advanced Paints Technology II
- Advanced Surface Coating Technology II

**RESEARCH INTERESTS:**

- Living Radical Polymerization for Tailor-made Polymers, Nanomaterials and

- Nanocomposite, Recycling of e-waste, Antimicrobial Paints, Heat reflective coatings, Corrosion, Eco friendly coating

**RESEARCH STUDENTS:**

- Ph.D.(Tech.) - 07
- Ph.D.(Sci.) - 04
- M.Tech. - 11

**RESEARCH PUBLICATIONS:**

- International - 07
- Peer-reviewed - 05
- Conference proceeding - 04

**PATENTS :**  
 International -2

**SPONSORED PROJECTS:**  
 Government -3  
 Private -2

**PROFESSIONAL ACTIVITIES:**  
 Member of UAA  
 Member Governing council of ICPE  
 Member of IPI  
 Member of Colour society  
 Member of DSIR



**PROFESSOR P. A. MAHANWAR**

*Ph.D. (Tech)*  
 Professor of Polymer Technology

**SUBJECTS TAUGHT:**

- Polymer Science & Technology I
- Structure property relationship
- Colorants and Additives For Polymers
- Advanced Polymer Science
- Polymer Processing & Technology II

High Polymer Chemistry

**RESEARCH INTERESTS:**

- Synthesis and Characterization of specialty polymers for Controlled release, Surface coatings, Nanocomposites, Bionanocomposites, Utilization of non conventional

energy for polymerization, Super Absorbents

**RESEARCH STUDENTS:**  
 Ph.D.(Tech.) : 08  
 Ph.D.(Sci.) : 06  
 M.Tech. : 11

**RESEARCH PUBLICATIONS:**  
 International - 69  
 National - 03

Books - 1  
Conference proceeding - 07

**PATENTS :**  
Indian - 6

**SPONSORED PROJECTS:**  
Government - 02  
Private - 03

**PROFESSIONAL ACTIVITIES:**

Hon. President, Color Society, Mumbai.

Member Board of Governors, UDCT Alumni Association, Mumbai.

Member, Technical Advisory Committee Ministry of Science & Technology, Government of India, New Delhi

Course Co-ordinator DPAT, Garware Institute University of Mumbai

Permanent Invitee: Indian Small Scale Paint Association (ISSPA)

Indian Resin Manufacturers Association (IRMA)

All India Printing Ink Manufacturers Association (AIPMA)

All India Plastics Manufacturers Association

Hon. President: Indian Paint and Coating Association (Western Region)

Life Member: Indian Plastics Institute

Member Secretary: All Plastics Recycler's Association (APRA)

Life Member: Society of Polymers

Life member: Society of Plastics Engineers

nanocellulose (whiskers, particles and nanofibers) etc. using conventional & cavitation approach and its applications in polymer (synthetic as well as biopolymer) composites and coatings to enhance their performance properties.

Synthesis of Polyamide hot melt adhesives and its applications. Modification of fly ash and its applications in polymer composites and coatings to enhance their performance. Synthesis of Nanoemulsions using conventional methods as

well as acoustic cavitation like polystyrene, PMMA etc. Discoloration and dewaxination of Shellac Preparation of conductive coatings.



**DR. S. T. MHASKE**

*B.Sc. Tech., M.Sc. Tech., Ph.D. (Tech)*

Associate Professor in Technology of Plastics & PPV

**SUBJECTS TAUGHT:**

Compounding and Polymer Processing - I, Polymer & Processing Technology - III, Analysis & Characterization of Polymers, Synthesis & Characterization of Polymers, Paints Processing, Packaging and Nanotechnology

**RESEARCH INTERESTS:**

Novel approached synthesis of Nano particles, Polymer melt Rheology, Cellulose based Polymer Nanocomposites, Bio Nanocomposites, Synthesis of resins from renewable resources,

Water Borne Coatings, Insulating Varnishes, Conductive coatings, Anticorrosive coatings, Polymer Processing and Coloration and Colour Matching

**RESEARCH STUDENTS:**

Ph.D.(Tech) - 14

Masters - 13

Ph.D.(Sci.)- 02

**RESEARCH PUBLICATIONS:**

International -11,  
National - 00,  
Conference Proceedings 1  
Peer-reviewed -10

**PATENTS:**

Nataional: 03 (Filed)

**SPONSORED PROJECTS:**

Government: 04

Private: 03

**PROFESSIONAL ACTIVITIES:**

Secretary, Indian Plastics Institute, Mumbai Chapter.  
Member The Color Society, India

Governing Member, The Society for Polymer Science, India

Visiting Faculty in Amravati University  
Visiting Faculty for Indian Plastics Institute

**RESEARCH ACTIVITIES:**

At present most of the work is being done on synthesis of nanomaterials such as Titanium dioxide, zinc oxide,



**SHRI. ADARSH RAO**

M. Tech (pursuing Ph.D.)

Assistant Professor in Polymer Technology

**SUBJECTS TAUGHT:**

Technology of Thermoplastics - I

Technology of Thermoplastics - II

Technology of Thermoplastics - III

Synthesis & Characterization of resins & polymers-I

Synthesis & Characterization of resins & polymers-II

Synthesis & Characterization of

resins & polymers-III

Processing of Polymers-I

Processing of Polymers-II

Processing of Polymers-III

Compounding and Polymer Processing-II

**RESEARCH INTERESTS :**

Controlled/LivingRadical Polymerization

Polymer Nanocomposites,

Nanocoatings,

Polymer blends and alloys.

**RESEARCH PUBLICATIONS:**

International- 1

National - 2

**SPONSORED PROJECTS:**

Private- 1

**PROFESSIONAL ACTIVITIES:**

Member of Color Society

Member of UDCT Alumni Association



**DR. ANAGHA SABNIS**

Ph. D. (Tech)

Assistant Professor

**SUBJECTS TAUGHT:**

B.Tech.:

Intumescent and Electrical Insulation Coatings

Pigments and Additives for

polymers

Paints Tech. I

Additives for Coatings

Industrial Coatings

Advanced Surface Coatings

Analysis and Characterization of Raw Materials for Polymers and Paints

Analysis of Paints

Processing of Paints I

Processing of Paints III  
Processing of Paints IV

**RESEARCH INTERESTS:**

Resin Synthesis from renewable resources,  
Water Borne Coatings,  
Conductive coatings,  
Anticorrosive coatings,  
Electric Insulation Coatings

flame retardant coatings  
recycling of Polymer waste

**RESEARCH STUDENTS:**

Ph.D.(Tech.) : 04  
M.Tech. : 09

**SPONSORED PROJECTS**

Government – 01  
Private - 01

**RESEARCH PUBLICATIONS:**

International - 12  
Conference proceedings -03

**PROFESSIONAL ACTIVITIES:**

Member of Colour Society  
Member of ACS  
Member of UAA



**DR. VIKRANT SHERTUKDE**

M.Sc (University of Mumbai), Ph.D. (Institute of Chemical Technology, Mumbai), DHE (University of Mumbai)  
Emeritus fellow (All India Council of Technical Education),  
Dept. of Polymer & Surface Engineering

**SUBJECTS TAUGHT**

Polymer Science & Technology II  
Polymer Science & Technology III  
Technology of Thermosets – I  
Technology of Thermoset Polymers- III  
Technology of Elastomers  
Packaging & Decoration of plastics  
Polymer Blends & Alloys

Smart Polymer

**RESEARCH INTERESTS :**

Nanocomposites,  
Polymer blends & alloys,  
Recycling of plastics,  
Synthesis of specialty polymers,  
Surface & interfacial energy studies in polymeric systems.

**RESEARCH STUDENTS :**

Ph.D. (Tech.) - 02  
Ph.D. (Sc) - 04  
M.Tech. – 08

**RESEARCH PUBLICATIONS:**

International - 03  
Conference proceedings -08  
SPONSORED PROJECTS:  
Government- 01  
Private - 02

**PROFESSIONAL ACTIVITIES:**

Life Member of UAA  
Life Member Colour Society  
Ex-Secretary Colour Society  
Ex-Education committee  
Chairman Colour Society

**SUPPORT STAFF**



Mr. A.K. Dicholkar  
Lab assistant



Mr. S. Hasaye  
Lab assistant



Mr. M.A. Ansari  
Lab assistant



Mr. D.V. Karande  
Lab assistant



Mr. C.S. Kumbhar  
Lab assistant



Mr. B.S. Satardekar  
Lab assistant



Mr. P. D. Patkare  
Lab assistant



Mr. D.R. Kadam  
Instrument Mechanic

**STUDENTS' SEMINARS/PROJECTS/HOME PAPERS**

**SEMINAR (B.TECH.) POLYMER ENGINEERING & TECHNOLOGY**

Sr. No.	Name of Student	Seminar Topic
1	Vijayalakshmi Natarajan	A Literature Review of Benzoxazine Resins
2	Ankit Mishra	Form Stable Phase change Polymers Composites
3	Dhruva Marathe	Recent Advances in the manufacture of Light Emitting Polymers and their Applications.
4	Anvay Patil	Advances of Polymers in Separation Technology
5	Akshata Kulkarni	High Barrier Packaging for Cosmetic Applications
6	Shrirang Chhatre	Biomimetic Polymers
7	Darshil Shah	Nitroxide mediated polymerization
8	Jevin Shah	Polymers in Electromagnetic Interference(EMI) shielding
9	Parag Utekar	Synthesis of Different Polymers for Nano and Micro circuits and their Applications
10	Harish Gabale	Green Approach to synthesis of Polyethylene Terephthalate
11	Foram Prajapati	UV curable and LED curable Adhesives
12	Kiran Kundaram	An Overview – Porous Polymers
13	Kailash Arole	Recycling of Electronic Waste

14	Aashay Chaukekar	Biocompatible/Bioactive polymers and their medical applications
15	Neil Chavan	Polymer Composites with Natural Fillers and their Applications
16	M Archish	Recent Developments in Electrospinning of Polymers

#### SEMINAR (B. TECH.) SURFACE COATING TECHNOLOGY

Sr. No	Name of Student	Seminar Topic
1	SHINDE-SANKET-VILAS	Recent development in Hyper branched Polyurethane
2	PHADKE-SHANTANU	Review Literature on Coatings with Enhanced Efficiency for Solar Panel
3	PODUVAL-SACHIN-JAYARAM	Polymeric nano and microcapsules and applications in control release coatings
4	SONI-RUSHI-UMESHKUMAR	Printing Inks synthesis and their Application on Plastics and Porcelain
5	VIGNESH-VISHAL-V SHANKAR	Utilization of Seedlac for Coating Applications
6	KHANDELWAL-AYUSHI-RAKESH KUMAR	Overview of Hybrid Coatings
7	NIKAM SHANTANU PRATAP	Protective Coatings for Oil and Gas Pipelines
8	JAIN SWARNIM VILAS	Review literature on Side Chain Crystallisable (SCC) Polymers
9	BELHEKAR-NEHA-ANILKUMAR	Water based controlled release coatings
10	KOWSHIKRAMAN-SETURAMAN	Refinish coating for car, ship, and plane
11	SHARMA-RASHMI-SATISH	Utilization of nanomaterials in Reaction Injection Moulding
12	RAUT-ANIKET- MADHUKAR	Recent Developments in Anti-Carbonation Coatings
13	LINGAYAT-PANKAJ-JAGANNATH	Coatings used for stone based on alkoxy silane
14	KHARAT-SHUBHAM-MOTIRAM	Literature review on Associative thickeners for water-based coatings
15	AHUJA-GAURAV-PARASRAM	Self-Cleaning/Smart Coatings based on modified acrylate monomers
16	AHER-KIRAN-SANJAY	Coatings with radiation and thermal resistance
17	EDLABADKAR-VAIBHAV-ARUN	Pre-treatments of Plastics for coating application.
18	UMBARKAR-RACHANA-RAMKRISHNA	Recent developments in Water based Epoxy Resins

#### PROJECT (B. TECH.) POLYMER ENGINEERING & TECHNOLOGY

Sr. No	Name of Student	Project Topic
1	Vijayalakshmi Natarajan	Synthesis of MMA-DVB beads and microcapsules via suspension polymerization and their study for particle size and microencapsulation properties
2	Ankit Mishra	Microencapsulation of Stearic Acid as Phase Change Polymers
3	Dhruva Marathe	Compatibilization Study of Polycarbonate/Poly(Styrene-co-acrylonitrile) blends
4	Anvay Patil	Effect of EVA concentration on the properties of Hot Melt Adhesives synthesized using low purity dimer acid and ethylene diamine
5	Akshata Kulkarni	Development of Heat Stable Packaging for Cosmetic Packaging Application
6	Shrirang Chhatre	Effect of Molecular Weight of Polymer on the fibre diameter of Electrospun Poly(Acrylonitrile) synthesized by ATRP
7	Darshil Shah	Development of pH indicator based colorimetric film for volatile amine detection in sea food
8	Jevin Shah	Methods of Preparation of Polyethylene wax
9	Parag Utekar	Study of Blends of Polycarbonate and Acrylonitrile Butadiene Styrene
10	Harish Gabale	Effect of addition of dibasic acids on the properties of Hot Melt Adhesives
11	Foram Prajapati	Synthesis and Characterization of LED curable adhesive using BAPO as an alternative photoinitiator
12	Kiran Kundaram	Effect of Compatibilizer and MMT ratios on Mechanical Properties of PP/PBT blend
13	Kailash Arole	Chemical Indicating material by covalently bonding the sensing material to polymer matrix
14	Aashay Chaukekar	Synthesis and Characterisation of PLA-PEG copolymer
15	Neil Chavan	A Study of PBT Composites with Mica and Talc Fillers
16	M Archish	To study the effect of MMT clay on properties of LDPE/EPDM blends

#### PROJECT (B. TECH.) SURFACE COATING TECHNOLOGY

Sr. No.	Name of Student	Project Topics
1	SHINDE-SANKET-VILAS	Studies in Polyurethane UV Curable Coating.
2	PHADKE-SHANTANU	Improvement in efficiency of photovoltaic solar cell by using tungsten oxide nano-rods.
3	PODUVAL-SACHIN-JAYARAM	Polymeric Micro and Nano Capsules and their applications in controlled release coatings

4	SONI-RUSHI-UMESHKUMAR	A study on Polyvinyl Chloride plastisol for strippable coatings on metal substrate
5	VIGNESH-VISHAL-V SHANKAR	Synthesis and characterization of a ricinoleic acid based reactive diluent for a U.V curable polymer film.
6	KHANDELWAL-AYUSHI-RAKESH KUMAR	Studies in Hybrid Coatings
7	NIKAM SHANTANU PRATAP	Synthesis of thermosetting acrylic coatings using ATRP.
8	JAIN SWARNIM VILAS	Synthesis of Side Chain Crystallizable (SCC) Polymer using Polyglycidylmerthacrylate and Stearyl amine.
9	BELHEKAR-NEHA-ANILKUMAR	Microencapsulation of cypermethrin to synthesize mosquito repellent additive for interior wall paints
10	KOWSHIKRAMAN-SETURAMAN	Inverse emulsion polymerization: A study on parameters for synthesis of stable inverse emulsion and factors affecting molecular weight.
11	SHARMA-RASHMI-SATISH	Jute fibres as a raw material for extraction of micro/nanocrystalline cellulose.
12	RAUT-ANIKET-MADHUKAR	Studies in Anti Carbonation coatings
13	LINGAYAT-PANKAJ-JAGANNATH	RAFT polymerization of some More Activated Monomers (MAM) with synthesis of RAFT agent and its application
14	KHARAT-SHUBHAM-MOTIRAM	Study and synthesis of matting agent for paints.
15	AHUJA-GAURAV-PARASRAM	Superhydrophilic polyacrylate nanocomposite latex for self-cleaning action
16	AHER-KIRAN-SANJAY	To study the properties of polyurethane varnish
17	EDLABADKAR-VAIBHAV-ARUN	Synthesis of inorganic-organic hybrid coating via sol-gel process
18	UMBARKAR-RACHANA-RAMKRISHNA	Synthesis of water soluble epoxy resin derived from cardano

#### RESEARCH PROJECTS PH.D. (TECH)

Sr.	Name of Student	Previous Institute	Title	Guide
1	Mundhe Chaitanya M	ICT	Synthesis and Development Polymer Composites	V. V. Shertukde
2	Nikam Pramod C.	UDCT, North Maharashtra University, Jalgaon	Thermally Stable Polymer Composites	V. V. Shertukde
3	Jamdar Sahyog Vandana	Institute of Chemical Technology, Matunga	Studies in depolymerization of polymer wastes for coating applications	A. S. Sabnis

4	Wazarkar Kunal Dattatray	Institute of Chemical Technology, Matunga	Development of Biobased monomers for coating applications	A. S. Sabnis
6	Balgude Dinesh Bapuji	Institute of Chemical Technology, Matunga	Modifications of Renewable Resources for Coating Applications	A. S. Sabnis
8	Sharma Bhuvnesh	UPTU, Lakhnau	Development of high radiation high temperature and higher stress resistance polymer blend and composite for reactor, gasket and o ring	P. A. Mahanwar
9	Gaikwad Pravin	ICT	Studies in thermoplastic microfiber and nanofiber composites	P. A. Mahanwar
10	Fuke Chandan	ICT	Study of Electron beam and chemical crosslinked heat shrinkable sheets for Electronic application.	P. A. Mahanwar
11	Gorasia Khushi	ICT	Studies in synthesis of conducting polymer nanofiber and coating for flexible batteries	P. A. Mahanwar
12	Samarth Nikesh	ICT	Development of Chlorine resistant polymer Blend	P. A. Mahanwar
13	Bhatnagar Manoj Praharaj	ICT	Polymer Nanofiber Synthesis and their Composites for Multitude Applications	P. A. Mahanwar
14	Karad Dnyandeep	ICT	Fiber Reinforced Composites.	P. A. Mahanwar
16	Mali Manoj	ICT	Development of Polymer Composites	S. T. Mhaske
17	Shah Nidhi	ICT	Structure Property Behavior of Polymer Nanocomposites	S. T. Mhaske
19	More Aarti	ICT	Chemical modification of silane, polyesteramide, epoxy based resins and its application as industrial coatings	S. T. Mhaske
20	Lal Sumit	UDCT, NMU, Jalgaon	Modification of Biopolymer and its Potential Application for Sustainable Developments	S. T. Mhaske
21	Patil Ajit	UICT NMU, Jalgaon	Modification of Biopolymers by Atom Transfer Radical Polymerization Technique.	S. T. Mhaske

22	Phalak Ganesh	UICT NMU, Jalgaon	Modification of renewable materials as a green alternative for petrochemical based materials used in coating applications	S. T. Mhaske
23	Patil Deepak	UICT NMU, Jalgaon	Utilization of Biomaterials for Coating Applications	S. T. Mhaske
24	Tated Sumit	ICT	Modification & Application of Biopolymers	S. T. Mhaske
25	Rishabh Chaudhary	ICT	Integrated biorefinery for production of kafrin and evaluation of biopolymer application	S. T. Mhaske
26	Swapnil Kokate	ICT	Development of sustainable technologies in polymer and chemical engineering	S. T. Mhaske
27	Arjit Gadgeel	ICT	Stimuli responsive polymers in intelligent devices	S. T. Mhaske
28	Wagh Santosh	North Maharashtra University, Jalgaon	Development Novel Multifunctional Additives	R.N.Jagtap
29	Nakula S.Bhutad	Institute of Chemical Technology	Synthesis of Micro-encapsulation and its applications	R.N.Jagtap
30.	A.R.Rao	Institute of Chemical Technology	Study the synthesis, characterization and applications for copolymers by CRP technique	R.N.Jagtap
31.	Amarjeet Patil	UDCT Jalgaon	Study the synthesis, characterization and applications for copolymers by living radical polymerization technique	R.N.Jagtap

#### RESEARCH PROJECTS PH.D. (SCIENCE)

Sr.	Name of Student	Previous institute	Title	Guide
1	Rane Ulka G.	Institute of Chemical Technology	Synthesis and Modification of Epoxy Based Hybrid FR coating	V. V. Shertukde
2	Dhanvijay Prarthana	Institute of Chemical Technology	Studies in multi-functional Additives	V. V. Shertukde
3	Gharat Vaishnav Dhanaji	Institute of Chemical Technology	Synthesis of polymer supported catalysts	V. V. Shertukde
4	Kelkar Sunder	ICT	Synthesis of polylactic acid from renewable resources.	P. A. Mahanwar
5	Telvekar Adesh	ICT	Development of high temperature stable polymer for Aerospace application	P. A. Mahanwar

6	Bansode Savita	ICT	Biodegradable & Biocompatible polymer nanofiber for scaffold.	P. A. Mahanwar
7	Snehal Yedurkar	Mumbai University		P. A. Mahanwar
8	Priyanka Oberoi	Mumbai University		P. A. Mahanwar
9	Satavalekar Sneha	Mumbai University	Synthesis of polymeric materials using renewable resources	S. T. Mhaske
10	Singh Hitesh K	Mumbai University	Shape selective isolation and surface chemical modification of nanocellulose	S. T. Mhaske
11	Lokhande Gunawant P.	North Maharashtra University, Jalgaon	Synthesis of Novel multipurpose Additives for coating application by CRP technique	R. N. Jagtap
12	Chambhare Sachin U.	Sant Gadage Baba Amaravati University, Amaravati	Studies in RAFT polymerization	R. N. Jagtap
13	Saindane Poonam B.	S.N.D.T Mumbai	Study on Control radical polymerization for Coating application	R. N. Jagtap
14.	Raghunath Ingale		Synthesis of Novel Monomers for surface Coating Application	R. N. Jagtap

#### M. TECH. SEMINARS

Sr. No.	Roll No.	Name of the Student (Beginning with Last name)	Seminar Topic	Seminar Supervisor
1	15POL2002	SatdiveAjinkya Madan	Recent Development in TPV for Automobile Applications	Prof. (Dr.) R. N. Jagtap
2	15POL2003	Prajapati Jignesh Nitin	Advancemnt in non polar plastics for paintability	Prof. (Dr.) R. N. Jagtap
3	15POL2004	GautampurkarAnshul Anant	Studies in High Impact and High Voltage outdoor Polymeric Inulators	Dr. P. A. Mahanwar
4	15POL2005	Bakshi Ashok Kumar	Comparative study between Natural Fiber and Synthetic Fiber for FRP Composite	Mr. A. R. Rao
5	15POL2006	Chaudhari Tushar	Overview of a biobased monomers for polymer & coating application	Dr. P. A. Mahanwar
6	15POL2007	Chauhan Mukesh	Intelligent Packaging	Dr. S.T Mhaske
7	15POL2009	Shukla Stuti	Phase Change Materials	Dr. S. T. Mhaske

8	15POL2010	GaidhaniApurv Nitin	Study of polymeric flocculants for the reclamation of used motor oil	Dr. A. S. Sabnis
9	15POL2011	Samant Tanmay Atmaram	recycling of polymers	Mr. A. R. Rao
10	15POL2012	Bramhecha Indrajit Chandrakant	High Temperature Resistant Polymers	Dr. P. A. Mahanwar
11	15POL2013	Kulkarni Chinmay Pradeep	Chemical sensors	Dr. S. T. Mhaske
12	15POL2014	Khanna Arush	Volatile Corrosion inhibitor films for packaging application	Dr. V. V. Shertukde
13	15POL2015	Shaikh Rizwan Irfan	Volatile Corrosion Inhibitor Paper, Foam and Wax	Dr. A. S. Sabnis
14	15POL2016	Kulkarni MadhumitaSubodh	Volatile Corrosion inhibitors and desiccant for packaging application	Dr. A. S. Sabnis
15	15POL2017	Bhagat AjitBabarao	Nano cellulose as RO membrane material	Dr. S. T. Maske
16	15POL2018	Bhosle Nikita Pratap	Synthesis of Bio-Based PEF	Prof. (Dr.) R. N. Jagtap
17	15POL2019	Golait Nitin Dnyaneshwar	Polyaniline Nanofibers: Synthesis, Properties, and Applications	Mr. A. R. Rao
18	15SUR2001	Rahangdale Nitin Pralhad	BPA free epoxy resin	Dr. S. T. Mhaske
19	15SUR2002	MestrySiddhesh Umesh	Extraction of Natural Colorants	Prof. (Dr.) R. N. Jagtap
20	15SUR2003	GangopadhyaySukanya	Volatile Corrosion Inhibitor Coatings for packaging application	Dr.A.S.Sabnis
21	15SUR2004	Patil Anup Subhash	Rheological additives for solvent and water born coating	Dr. P. A. Mahanwar

#### M. TECH. PROJECT

Sr. No.	Roll No.	Name of the Student (Beginning with Last name)	Project Topic	Project Supervisor
1	15POL2002	SatdiveAjinkya Madan	Decolorisation of CNSL	Dr. S. T. Maske
2	15POL2003	Prajapati Jignesh Nitin	Development of TPV/TPE for automotive application	Dr. S. T. Maske

3	15POL2004	GautampurkarAnshul Anant	Studies in High Impact and High Voltage outdoor Polymeric Insulators	Dr. P. A. Mahanwar
4	15POL2005	Bakshi Ashok Kumar	Bio-fiber based epoxy composite and its mechanical and thermal performance studies.	Dr. V. V. Shertukde
5	15POL2006	Chaudhari Tushar	Synthesis of polymers from biobased monomeric compounds	Dr. A. S. Sabnis
6	15POL2007	Chauhan Mukesh	Environmentally degradable Polyolefins	Prof. (Dr.) R.N Jagtap
7	15POL2009	Shukla Stuti	Synthesis of Polymeric Phase Change Material for household application	Prof (Dr.) R. N. Jagtap
8	15POL2010	GaidhaniApurv Nitin	Synthesis of polyethylene wax from waste plastic and its characterization	Prof. P.A. Mahanwar
9	15POL2011	Samant Tanmay Atmaram	Study of mechanical properties of hybrid epoxy composites using low gsm glass fibers	Dr. V. V. Shertukde
10	15POL2012	Bramhecha Indrajit Chandrakant	Studies in synthesis of high temperature Polymers and their applications	Dr. A. S. Sabnis
11	15POL2013	Kulkarni Chinmay Pradeep	Sensors for various applications	Prof. (Dr.) R.N Jagtap
12	15POL2014	Khanna Arush	Studies in development of volatile corrosion inhibitors Films for packaging application	Prof. (Dr.) P.A. Mahanwar
13	15POL2015	Shaikh Rizwan Irfan	Studies in recalamation of used engine oil using polymeric flocculants	Prof. (Dr.) P.A. Mahanwar
14	15POL2016	Kulkarni MadhumitaSubodh	Studies in the development of volatile corrosion inhibitors and polymeric desiccants for packaging application	Prof. (Dr.) P.A. Mahanwar
15	15POL2017	Bhagat AjitBabarao	synthesis of polyamide hot melt adhesive	Dr. S. T. Maske

16	15POL2018	Bhosle Nikita Pratap	Synthesis of Bio-mass Derived 5-Hydroxymethylfurfural and its Catalytic conversion to 2,5-Furandicarboxylic Acid-A replacement to Terephthalic acid	Dr. S. T. Maske
17	15POL2019	Golait Nitin Dnyaneshwar	Study Thermo-mechanical Properties of Light Weight Polyurethane Foam Sandwich Composites	Dr. V. V. Shertukde
18	15SUR2001	Rahangdale Nitin Pralhad	Synthesis of tungsten oxide nanoparticles & there application in Gorilla Glass coating	Prof. (Dr.) R. N. Jagtap
19	15SUR2002	MestrySiddhesh Umesh	Synthesis of Biobased Resins	Dr. S. T. Maske
20	15SUR2003	GangopadhyaySukanya	Studies in the Development of volatile corrosion inhibitor coatings for packaging application	Prof. (Dr.) P.A. Mahanwar
21	15SUR2004	Patil Anup Subhash	Synthesis and application of BPA free epoxy resin from biobase material	Dr. A. S. Sabnis

#### PLACEMENT AND HIGHER STUDIES B.TECH POLYMER

Roll No	Name	Company/University	CTC/Stipend
12POL1001	Vijayalakshmi N	IIM, Lucknow	Self Funded
12POL1002	Ankit Mishra	Pidilite Industries- Graduate Engineering Trainee	5 lac
12POL1003	Dhruva Ajit Marathe	TU Delft	Self funded Masters
12POL1004	Anvay Arun Patil	University of Akron	25,000\$
12POL1006	Akshata Rajesh Kulkarni	University of Akron	25,000\$
12POL1008	Shrirang Chhatre	University of Delaware	27,500\$
12POL1009	Darshil Shah	Columbia University	Self Funded
12POL1010	Jevin Shah	IIT, Bombay	Self Funded
12POL1011	Parag Utekar	Pidilite Industries- graduate Engineering Trainee	5 lac
12POL1012	Harish Gabale	Atul Industries	3.6 lac
12POL1013	Foram Prajapati	Gharda Chemicals- Graduate Engineering Trainee	2.65 lac
12POL1014	Kiran Kundaram	P S Takecare- Business Development Executive	4.5 lac

12POL1015	Kailash Arole	UPSC	NA
12POL1016	Aashay Chaukekar	JOB	NA
12POL1017	Neil Rohidas Chavan	IIT Bombay	NA
12POL1018	Archish Muralidharan	University of Colorado Boulder	28,250\$

#### PLACEMENT AND HIGHER STUDIES B.TECH SURFACE COATINGS

Sr No.	Name	Company/University	CTC/Stipend
1	SHANTANU PHADKE	Carnegie Mellon University	-
2	SWARNIM JAIN	MBA	-
3	AYUSHI KHANDELWAL	DOW Chemicals- Manufacturing and Engineering Development (Project Engineer)	9.2 lpa
4	NEHA BELHEKAR	Higher Studies	-
5	KOWSHIKRAMAN S	Job	-
6	PANKAJ LINGAYAT	Higher Studies	-
7	GAURAV AHUJA	Kupsa Coatings - Graduate Engineering Trainee	4.62 lpa
8	KIRAN AHER	Pidilite Industries- Graduate Engineering Trainee	4.32lpa
9	VAIBHAV EDLABADKAR	Sudarshan Pigments- Graduate Engineering Trainee	4 lpa
10	RACHNA UMBARKAR	IIT Kharagpur law	-
11	SANKET SHINDE	JOB	-
12	SACHIN PODUVAL	UC San Diego	Self funded MS
13	RUSHI SONI	Missouri S&T Rolla	Fully funded PhD
14	VISHAL VIGNESH	University of Florida, Gainesville	\$1500 per semester (MS)
15	SHANTANU NIKAM	University of Akron	Self funded MS
16	RASHMI SHARMA	SUNY Stony Brook	Self funded MS
17	ANIKET RAUT	SUNY Stony Brook	Self funded MS
18	SHUBHAM KHARAT	M.Tech ICT	

#### GOVERNMENT AGENCIES:

No.	Sponsor	Title	Duration	Total Amount (Rs.)	Principal Investigator
1.	BRNS	High energy radiation assisted depolymerization of polyethylene terephthalate for coating applications	2 years	21,00,000	A. S. Sabnis

2.	BRNS	Development of volatile organic compound (VOC) free radiation indicator labels along with prototype product manufacturing.	3 years	25,00,000	S.T Mhaske
3.	DST, Govt of India	Synthesis and characterization of nano-cellulose and its application in biodegradable polymer composite films for food packaging	3 years	32,73,000	S.T Mhaske
4.	TEQIP, CoE	Synthesis of Metal Oxide Nanoparticles		23,00,000	S.T Mhaske
5.	DBT under Indo-Australia	Integrated Biorefinery for Production of Sorghum Seed Protein	2 years	1,17,00,000/-	S. T. Mhaske
6.	AICTE, New Delhi	Development of Conducting Polymer nanofibers by Electrospinning and Polymer Nano fiber composites for Fuel Cells	2013-2016	9,90,000	P. A. Mahanwar
7.	BRNS	Development of Heat Shrinkable cable and sheets for electrical and electronic application	2014-2017	35,00,000	P. A. Mahanwar
8.	RGST	Development of Controlled Release formulations of Agrochemicals	2015-2018	53,00,000	P. A. Mahanwar
9.	BRNS	Clay Filled LLDPE Nanocomposites Film For Modified Atmospheric Packaging with Improved Barrier Properties in Food Application	3 years		R.N Jagtap
10.	UGC-DRS	Controlled Radical Polymerization	5 years		R.N Jagtap
11.	BRNS	Green approach for recycling of e-waste through radiation processing	1 year		R.N Jagtap

#### PRIVATE AGENCIES

No.	Sponsor	Title	Duration	Total Amount (Rs.)	Principal Investigator	Research Fellow
1.	Unilever	Shape Selective Isolation and Surface Chemical Modification of Nanocellulose	3 YEARS	37,00,000/-	S.T Mhaske	Singh Hitesh

2.	Evonik	Responsive Polymers based Intelligent Devices	3 YEARS	22,00,000/-	S.T Mhaske	Gadgeel Arjit
3.	BASF HongKong	Synthesis of PEN from HNDA and blends with PET	2015-2016	19,00,000/-	S.T Mhaske	
4.	Hindustan Unilever Ltd	Development of Polymer blend for enhance performance in water filter application-	2015-2016	6,00,000	P. A. Mahanwar	Nikesh Samarth
5.	Kansai Nerolac Paints Ltd.	Developments carbonation methods	2 years	2,50,000	R.N Jagtap	
6.	Apcotex	Improvement of Barrier Properties of paper	6 months	2,50,000	R.N Jagtap	
7.	Asian Paints ltd.	Studies in anticarbonation coatings	2 years	1,20,000	R.N Jagtap	
8.	Momentive Ltd. Bangalore	Determination of Weathering resistance of Emulsion paints	3 Years	2,00,000	R.N Jagtap	
9.	Shell India Markets Pvt.Ltd	Investigation the efficacy of "soluble" nano-particles in thermosetting resins'	1 year	10,00,000	A.S. Sabnis	

#### PUBLICATIONS

No.	Title and Authors	Journal	Vol. No.	Pages	Year
1.	Modified poly (butyl methacrylate-b-glycidyl methacrylate) dispersant for solvent-based paint by Reverse Atom Transfer Radical Polymerization Gunawant P. Lokhande, R.N. Jagtap*	Progress in Organic Coatings	90	359-368	2016
2.	Synthesis of N-(2Amino benzothiazole) methacrylamide monomer and its copolymers for Antimicrobial coating application by RAFT polymerization. Gunawant P. Lokhande, R.N. Jagtap*	International Journal of Polymeric Materials and polymeric Biomaterials	65	391-401	2016
3.	Design and synthesis of polymeric dispersant for water-borne paint by Atom Transfer Radical Polymerization. Gunawant P. Lokhande, R.N. Jagtap*	Designed Monomers and Polymers	19	256-270	2016

4.	UV-Curable behavior of phosphorous and nitrogen based reactive diluent for epoxy acrylate oligomer used for flame retardant wood coating. Sachin Chambhare, Gunawant P. Lokhande, R.N. Jagtap*	Journal of Coatings Technology and Research		-	DOI: 10.1007/s11998-015-9777-x
5.	A.R. Kulkarni and P.A. Mahanwar	J. Polym. Mater.,	32(1)	-	2016
6.	M. R. Parvaiz, S. Mohanty, S. K. Nayak and P. A. Mahanwar	Materials Science and Engineering A,	528 (13-14)	4277-4286	2015
7.	S. Bose and P. A. Mahanwar	J. of Materials Science	40	6423-6428	2015
8.	V. B. Patil, M. M. Sayyed, P. A. Mahanwar, P. P. Wadgaonkar and N. N. Maldar	Journal of Polymer Research,	18 (4)	549-557	2015
9.	More, A.P., Kokate, S.R., Rane, P.C., Mhaske, S.T. Studies of different techniques of aminolysis of poly(ethylene terephthalate) with ethylenediamine.	Polymer Bulletin		1-14	2016
10	More, A.P., Mhaske, S.T. Anticorrosive coating of polyesteramide resin by functionalized ZnO- Al <sub>2</sub> O <sub>3</sub> -Fly ash composite and functionalized multiwalled carbon nanotubes.	Progress in Organic Coatings	99	240-250	2016
11	Kadam, P.G., Mhaske, S.T. Effect of extrusion reprocessing on the mechanical, thermal, rheological and morphological properties of nylon 6/ talc nanocomposites.	Journal of Thermoplastic Composite Materials	29-(7)	960-978	2016
12	Wasekar, P.A., Kadam, P.G., Mhaske, S.T. Preparation of zinc and calcium hydroxide-modified fly ash and its utilization as filler in nylon 6.	Journal of Thermoplastic Composite Materials	29-(7)	913-934	2016
13	Singh, H.K., Yeole, K.V., Mhaske, S.T. Synthesis and characterization of layer-by-layer assembled magnesium zinc molybdenum nanocontainer for anticorrosive application.	Chemical Engineering Journal	295	414-426	2016

14	More, A.P., Mhaske, S.T. Chemical Modification of Silane-Based Coating with Inhibitor for Anticorrosive Application.	Arabian Journal for Science and Engineering	41-(6)	2239-2248	2016
15	Murudkar, V.V., Gaonkar, A.A., Deshpande, V.D., Mhaske, S.T. Comparison of dielectric properties of polydimethylsiloxane (PDMS) grafted polyacrylates/nano alumina and nano silica composites.	AIP Conference Proceedings	1728		2016
16	Pinjari, D.V., Pandit, A.B., Mhaske, S.T. Ultrasound assisted green synthesis of zinc oxide nanorods at room temperature.	Indian Journal of Chemical Technology	23-(3)	221-226	2016
17	Kapoor, P., Mhaske, S.T., Joshi, K. Modification and characterisation of pre-hydrolysed silanes by acrylate utilizing sol-gel process.	Progress in Organic Coatings	94	124-130	2016
18	Savvashe, P., Kadam, P., Mhaske, S. Effect of nano-alumina concentration on the mechanical, rheological, barrier and morphological properties of guar gum.	Journal of Food Science and Technology	53-(4)	1948-1956	2016
19	Utekar, P., Gabale, H., Khandelwal, A., Mhaske, S.T. Hot-melt adhesives from renewable resources: A critical review	Reviews of Adhesion and Adhesives	4-(1)	104-118	2016
20	Satavalekar, S.D., Savvashe, P.B., Mhaske, S.T. Triester-amide based on thiophene and ricinoleic acid as an innovative primary plasticizer for poly(vinyl chloride)	RSC Advances	6-(116)	115101-115112	2016
21	Yeole, K.V., Agarwal, I.P., Mhaske, S.T. The effect of carbon nanotubes loaded with 2-mercaptobenzothiazole in epoxy-based coatings.	Journal of Coatings Technology Research	13-(1)	31-40	2016
22	KV Yeole, LH Mahajan, ST Mhaske	Polymer Composites	3 (2)	186-190	2015
23.	PG Nihul, ST Mhaske#, VV Shertukde	Iranian Polymer Journal, ,	23 (8)	599-608	2015
24.	KV Yeole, LH Mahajan, ST Mhaske	Polymer Composites	3 (2)	186-190	2015

25.	Aarti More, Ravindra kute, Shashank Mhaske	Pigment and Resin Technology	23(11)	869-879	2015
26.	Aarti P. More, Ravindra A. Kute & Shashank T. Mhaske	Iranian Polymer Journal	23(1)	59-67	2015
27.	Preparation and analysis of novel hydrogels prepared from the blend of guar gum and chitosan: cross-linked with glutaraldehyde, S. S. Rithe, P. G. Kadam and S. T. Mhaske*	Advances in Materials Science and Engineering: An International Journal (MSEJ)	1	-	2014
28.	Synthesis of a secondary plasticizer for poly(vinyl chloride) by recycling of poly(ethylene terephthalate) bottle waste through aminolyticdepolymerization, S. R. Shukla*, P. U. Kapadi, S. T. Mhaske, M. N. Maliand A. More.	Journal of Vinyl and Additive Technology	-	-	2015
29.	Ester-amide based on ricinoleic acid as a novel primary plasticizer for poly(vinyl chloride), P. B. Savvashe, P. G. Kadam, S. T. Mhaske.	Journal of Applied Polymer Science	-	1-12	2015
30.	Epoxidized rice bran oil (ERBO) as a plasticizer for poly(vinyl chloride) (PVC) , Pratiksha G. Nihul, Shashank T. Mhaske, Vikrant V. Shertukde	Iranian Polymer Journal	23	599-608	2014
31.	Synthesis and Characterization of Imide Containing Hybrid Epoxy Resin with Improved Mechanical and Thermal Properties, U.G.Rane, A.A.Sabnis1, and V.V.Shertukde	International Journal of Polymer Science			2014
32.	Synthesis and characterization of slip additive functioning as an intercalating agent, Prarthana U. Dhanvijay, Vaishnav D. Gharat, Vikrant V. Shertukde	International Journal of Plastics Technology	18	100-112	2014
33.	Wazarkar K., Kathalewar M., Sabnis A., Flammability behavior of unsaturated polyesters modified with novel phosphorus containing compounds	Polymer Composites	In press	-	2015
34.	Wazarkar K., Kathalewar M., Sabnis A., Improvement in flame retardancy of polyurethane dispersions by newer reactive flame retardant	Progress in Organic Coatings	In press	-	2015

35.	Wazarkar K., Kathalewar M., Sabnis A., Reactive Modification of Thermoplastic and Thermoset Polymers Using Flame Retardants: An overview	Polymer-Plastics Technology and Engineering	In press	-	2015
36.	Mehta, B., Kathalewar, M., Sabnis, A., Cyclic Carbonated Soyabean Oil as Plasticizer for PVC for Replacing Di-octyl Phthalate	Journal of Polymer Materials	31	17-29	2015
37.	Kathalewar, M., Sabnis, A., Effect of molecular weights of phenalkamines on the curing, mechanical, thermal and anticorrosive properties of epoxy based coatings	Progress in Organic Coatings	84	79-88	2015
38.	Synthesis and characterization of cardanol based aqueous 2K polyurethane coatings , Balgude, D.,Sabnis, A.,Ghosh, S.K.	European Polymer Journal	85	620-34	2016
39.	Development of epoxy-urethane hybrid coatings via non-isocyanate route, Wazarkar, K.,Kathalewar, M.,Sabnis, A	European Polymer Journal	84	812-27	2016
40.	Investigation of CNSL-Based hybrid sol in conventional polymeric material, Balgude, D.,Sabnis, A.	Journal of Renewable Materials	2		2016
41.	Urea-phenol-formaldehyde microcapsules containing linseed oil for self-healing anticorrosive coating applications, Patil, D, Sabnis A,	Advanced Materials Letters			2016
42.	Microencapsulation: an emerging technique in the modern coating industry, Wazarkar, K.,Patil, D.,Rane, A.Kathalewar, M. ,Sabnis, A.	RSC Advances	6	964-79	2016
43.	Preparation of novel CNSL-Based urethane polyol via nonisocyanate route: Curing with melamine-formaldehyde resin and structure-property relationship, Kathalewar, M.,Sabnis, A.	Journal of Applied Polymer Science	132		2015
44.	Non-isocyanate polyurethane (NIPU) from tris-2-hydroxy ethyl isocyanurate modified fatty acid for coating applications, Pathak, R.,Kathalewar, M.,Wazarkar, K.,Sabnis, A.	Progress in Organic Coatings		160-69	2015

45	Effect of $\gamma$ -irradiation on glycolysis of PET waste and preparation of ecofriendly coatings using bio-based and recycled materials, Jamdar, V., Kathalewar, M., Jagtap, R.N., Dubey, K.A., Sabnis, A	Polymer Engineering and		2653-60	2015
46	RAFT copolymerization of amphiphilic poly (ethyl acrylate-b-acrylic acid) as wetting and dispersing agents for water borne coating, Saindane, P., Jagtap, R.N. Designed Monomers and Polymers	Progress in Organic Coatings	79	106-114	2015
47	Surface morphology & mechanical properties of some unique natural fiber reinforced polymer composites-a review Pai A.R., Jagtap, R.N.	Journal of Materials and Environmental Science	6	902-917	2015

#### PATENTS

No.	Inventors	Title	Country	Funding Agency
1.	Mhaske Shashank Tejrao Kadam Pravin Gopal Vaidya Parth Nitin Savvashe Prashant Bhairavnath	Novel poly(ester-amide) hot melt adhesive using castor oil. Patent No : 128/MUM/2015	India	POLYFIBRE LIMITED
2.	Mhaske Shashank Tejrao, Kadam Pravin Gopal, Vaidya Parth Nitin, Savvashe Prashant Bhairavnath	Novel poly(ester-amide) hot melt adhesive using ricinoleic acid. Patent No : 127/MUM/2015	India	POLYFIBRE LIMITED

#### IN-HOUSE FACULTY RESPONSIBILITIES (MEMBERSHIP OF VARIOUS IN-HOUSE COMMITTEES)

**PROFESSOR R. N. JAGTAP**  
Arranging visiting faculties and visiting professors  
Maintaining and refurbishment of the research labs  
Smooth conduct of the class and practicals  
Placement incharge

**SHRI A.R.RAO**  
Timetable Committee

Factory visits coordinator  
B.Tech Syllabus committee  
Departmental Representative  
Accreditation committee

**DR. V. V. SHERTUKDE**  
Chairman Instrumentation committee  
Inplant Training supervisor

**DR. S. T. MHASKE**  
Instrumentation committee  
TEQIP Coordinator

#### SEMINARS/LECTURES/ CONFERENCES/SYMPOSIA/ WORKSHOPS/SUMMER

#### OR WINTER TRAINING SCHOOLS ATTENDED/ ORAL OR POSTER PRESENTATIONS

Nikesh Samarth won Young Researcher Awards at International Conference on Advances in Science and Engineering (ICASE 2017), Regent's International College, Bangkok, January 20 – 22, 2017.  
Snehal Yedurkar won Best oral presentation award at International Conference

on Advances in Science and Engineering (ICASE 2017), Regent's International College, Bangkok, January 20 – 22, 2017.  
Sukanya Gangopadhyay, Arush Khanna, Madhumita Kulkarni and Prakash Mahanwar won Best Paper Awards at Fourth International Conference On Polymer Processing And Characterization 2016, International Unit on Macromolecular Science and Engineering (IUMSE) Mahatma Gandhi University, Kottayam, Kerala, India  
Apurva Gaidhani won Best Poster Awards at Fourth International Conference On Polymer Processing And Characterization 2016, International Unit on Macromolecular Science and Engineering (IUMSE) Mahatma Gandhi University, Kottayam, Kerala, India  
**Sravya Nuguri** Final Year Polymer

Runner-up in Kryotech-IIT Kharagpur for presenting the best design for polio vaccine storage.

- Winner in Industry Defined Problem for providing a solution to-“Develop a highly abrasion resistant and scratch resistance transparent coating for Polycarbonate Surfaces” for Crizal- Essilor Lens Company organised by VORTEX-ICT-2016.
  - Runner-up at Environ, Kshitij- IIT Kharagpur-2016 for providing an effective way to reduce the carbon footprint via “Microalgal Carbon Sequestration”
  - Winner in Papyrus Presentation Competition on the topic- “Depolymerisation of Brominated Epoxy and Polycarbonate using Ultrasonication technique”.
- Sumeet Gupta** Final Year Coatings

Manifesto(Poster presentation, Vortex 2016) – 1st Prize  
Dhawal Unune Final year PSE Asian Paints paper Competition- 1st Prize, OYCE Poster Presentation- 1st Prize, Rangotsav Poster-1st Prize, UMIT TPP- 1st Prize  
Sainath Jadhav Final Year Polymer Industrial Defined Problem(Vortex 2016)-1st Prize  
Abhinay Bhagat Final Year Polymer Duet Dance at Pratibhimb VJTI-1st Prize  
Mayuri Porwal Third Year Polymer  
Selected as prestigious S.N. Bose Scholar Programm, 2017  
M.V.Joshi Platinum Jubilee Endowment Award (2016 for securing highest marks in SEM 1 and 2)  
Professor M.A.Nabar Prize for standing first in Chemistry 2016  
Pratik Mantri Third Year Polymer  
Jr. Industry Defined Problem Vortex 2015 :1st Prize

#### EVENTS ORGANIZED

Sr. No.	Title of Workshop/Seminar/Conference	Speaker	Date of Event
1.	ICT –IRMA WORKSHOP “Influence of Resins on Coating Performance	Several Invited Speakers	2nd April, 2016
2.	Advances in Polymers and Coatings: Rangotsav 2016	Plenary Lectures, Paper / Poster Presentations	19th – 20th January, 2016
3.	Workshop on “SKILL DEVELOPMENT IN SORTING, SEGREGATION AND PROCESSING OF PLASTIC WASTE”	Several Invited Speakers	March 13,, 2016

## APC RANGOTSAV 2016



## ICT-APRA ONE DAY WORKSHOP

Welcome of Chief Guest



Talk of Prof. P. A. Mahanwar



Invited Lecture



Invited Lecture



Invited Lecture



Invited Lecture



2nd April, 2016.

## INDUSTRIAL CONSULTANCY

Company	Area of Advice	Period	Faculty
Saint Gobain Ltd	Expert Advice	6 months	R.N. Jagtap
Neber Solutions Ltd	Expert Advice	3 months	R.N. Jagtap
Technova Imaging sys	Expert Advice	3 months	R.N. Jagtap
Krishna Chemicals and Paints	Expert Advice and Testing	1 year	R.N. Jagtap
Paulson paints	Testing	1 year	R.N. Jagtap
Hindustan org. Chem. Ltd.	Testing and Characterization	3 months	R.N. Jagtap
Vinatti organics	Testing and Characterization	2 years	R.N. Jagtap
Bhalendra Traders	Expert Advice	6 months	R.N. Jagtap
ICI	Expert Advice	6 months	R.N. Jagtap

TSIL	Expert Advice	6 months	R.N. Jagtap
Chemixil Corporation	Expert Advice	6 months	R.N. Jagtap
Enercon	Expert Advice	5 months	R.N. Jagtap
Indofil	Testing and characterization	1 year	R.N. Jagtap
Ishaan Industries	Testing and characterization	1 year	R.N. Jagtap
BASF	Expert Advice	6 months	R.N. Jagtap
SIB Associate	Expert Advice	6 months	R.N. Jagtap
Akzo Nobel	Testing	6 months	R.N. Jagtap
Sri. Vineer spot	Expert Advice	4 months	R.N. Jagtap
BASF	Expert Advice		Anagha S Sabnis
Pidilite Industries	Expert Advice		Anagha S Sabnis
Pidilite Industries	Expert Advice		Anagha S Sabnis

## SHORT ABSTRACT ON SALIENT FEATURES OF RESEARCH WORK

Guide: **Professor R. N. Jagtap**  
 Name of the student: Ingle **Raghunath Pralhad**  
 Degree: Ph. D. (Science)

Thesis title: **Water Based Pressure Sensitive Adhesive**

**Abstract:** Pressure sensitive adhesives (PSAs) chemistry spin around the long chain acrylate such as poly (butyl acrylate), poly (2-ethylhexyl acrylate) and poly (iso-octyl acrylate) having Tg less than -55°C. The long chain acrylate possesses lower water solubility therefore miniemulsion is preferred as compare to conventional emulsion polymerization. Controlled living radical polymerization was utilised to prepare homopolymers and copolymers of derived molecular weight and molecular weight distribution. The synthesized emulsions were characterized thoroughly. The synthesized emulsions were employed as pressure sensitive adhesive.

The adhesive properties were tested on low surface energy materials (such as PET, BOPP and plasticized PVC) and higher energy surface materials (such as uncoated paper, coated paper and aluminium). The effect of molecular weight and molecular weight distribution of polymers on adhesive properties of higher surface energy materials. The various functional materials were used for low surface energy materials. The chain extensions of polymers were carried out to study adhesive properties to aluminium. The adhesive properties of PSAs were evaluated by lap shear strength, peel strength, tack measurement and shear holding strength.

Name of the student: **Sachin U. Chambhare**  
 Degree: **Ph. D. (Science)**  
 Thesis title: **Studies in RAFT Co-polymerization for coating applications.**

**Abstract:** Free radical polymerization with reversible addition-fragmentation chain transfer [RAFT] polymerization, receiving more attention among the other controlled polymerization techniques. Like nitrogen mediated polymerization [NMP] and Atom transfer radical polymerization [ATRP] RAFT polymerization technique can be used wide range of monomers having different functionalities, variety of solvents and initiators for polymerization. RAFT mediated controlled radical polymerization is based on equilibrium between active and dormant species, achieved by a degenerative chain transfer process, by using various chain transfer agents like dithioester, dithioxanthate and dithiocarbamate. RAFT polymerization is widely used for the synthesis of block Co-polymers having

definiteMolecular weight, narrow polydispersity and with complex architecture like star, block,microgeland hyperbranched with high purity. Thus by selecting the appropriate RAFT agent, we are able to synthesize the block co-polymers of definite molecular weight and narrow polydispersivity which can be used for solvent and water borne coatings.

Name of the student: **Lokhande Gunawant Pandharinath**  
Degree: **Ph. D. (Science)**  
Thesis title: **Synthesis of Copolymer for the Coating applications using control**

**Abstract:** The development of control-living polymerization methods has been a long standing goal in polymer chemistry. All these methods are based on establishing a rapid dynamic equilibrium between a minute amount of growing free radicals and large majority of dormant species the dormant species may be alkyl halides in ATRP thioester as in reversible addition fragmentation chain transfer process (RAFT) alkoxy amine as in nitroxide mediated polymerization (NMP) or stable free radical polymerizations (SFRP) a control radical polymerization include activation and deactivation step and generated free radicals propagates and terminates as in conventional free radical polymerization. By using this method average molecular weight of polymer made bywell control while maintaining relatively narrow molecular weight distribution. The main

aim use and synthesize of different type of initiator for polymerization process and their rates on the polymerization process for synthesis block Copolymers.

Name of the student: **Poonam B. Saindane**  
Degree: **Ph. D. (Science)**  
Thesis title: **Study on Controlled Radical Polymerization**

**Abstract:** Controlled radical polymerization is also termed as living polymerization is a popular method for synthesizing block copolymers since the polymer can be synthesized in stages, each stage containing a different monomer. Additional advantages are predetermined molar mass and control over end-groups. Several new methods were discovered which allowed the development of living polymerization using free radical chemistry. These techniques involved catalytic chain transfer polymerization, iniferter mediated polymerization, and stable free radical mediated polymerization (SFRP), atom transfer radical polymerization (ATRP), reversible addition-fragmentation chain transfer. RAFT (Reversible Addition-Fragmentation chain Transfer) is a form of controlled free radical polymerization (CRP) which helps in achieving controlled molecular weight distribution and low polydispersity index.RAFT is a user- and, environmentally-friendly process that does not require expensive and contaminating additives unlike other controlled free radical

polymerization processes This technique helps in synthesizing macromolecules with complex architectures including block, graft, comb, and star structures with predetermined molecular weight by using suitable raft agent. This techniques help to synthesis additives which act as efficient wetting and dispersing agent, rheology modifier, thickener, decorative and architectural paint and many more.

Student's Name: **Mr. Dipak S. Tathe**  
Thesis Title: **Modified biosources material for coating applications**

Degree: **Ph. D. (Science)**  
**Abstract :**

The declining petroleum reserves, fluctuating price of petroleum based products and the stringent environmental rules and regulations have prompted to the utilization of the natural renewable resources in both scientific and industrial communities, most importantly they are biodegradable. The various natural materials are available such as, carbohydrates, Vegetable oil, Rosins, Lignin, Tannin etc. Among these, vegetable oils are easily available renewable material. Vegetable oil is triglyceride of fatty acids consisting of several reactive groups that are anenable to chemical reactions ie. ester groups, C=C double bonds, allylic positions and the -position of ester groups. These can be used to polymerize triglycerides directly or to modify the triglyceride structure.

These derivatives of oil or modified oil have been used in automotive, lubrication, biomedical and oil field etc. Oils derived from cashew nut, natural rubber, Pongamia glabra, karanja, rapeseed, Annona squamosa, Moringa oleifera along with some traditional vegetable oils like linseed, soybean, coconut, castor, sunflower, palm oils have been successfully utilized to produce different types of industrial polymers in addition to other products.

Vegetable oils are natural high molecular weight compound, but it has some drawback in coatings such as adhesion and hardness. Therefore, in this research we modified the different oils such as Prosopis Juliflora oil, Balanites roxburgii oil, Abelmoschus ficulneus oil, castor oil, cottonseed oil, cardanol etc. with epoxy, silane, hydroxyl, isocyanate, allylic monomers etc. and used in the solvent based coatings, UV curable coatings and additives for paint.

Student's Name: **Ingale Raghunath Pralhad**  
Thesis Title: **Synthesis of Novel Monomers for surface Coating Application**

Degree : **Ph.D. Sci.**

**Abstract:**

The interest in the novel monomer is increases because of their unique properties. Inrecent years, there are hundreds of organic reactions are reported in the literature. Trying to exploit some of the reaction like Baylis-Hillman reaction, Heck Reactions,

Sonogashira Coupling, Suzuki Coupling etc. for synthesizing some monomers. In this project we envisage a possibility of substituting existing costly & carcinogenic monomers with the novel monomers which exhibit almost same properties like high temperature resistant, ant graffiti coating, antibacterial coating etc. These novel monomerswhich may contain functional groups.

In order to meet the requirement of the final coating applications copolymers are employed. In this different endeavor different Novel monomers and their corresponding copolymerized by polymerization technique. These binders would be employed as part of coating materials may be for High Temperature Resistance Coating, Antibacterial coating and Hygienic Coating etc.

Name of the student: **Amit M. Gawde**  
Degree: **M.Tech**  
Thesis title: **Study the Surface Properties of Polypropylene Blends and composites**

**Abstract:** Polypropylene (PP), a member of Polyolefin's family is lightest amongst all. PP passes higher softening temperature, lower shrinkage and excellent environmental crack resistance. This versatile polymer is used for molded articles for house hold and medical application; however, largest applications are in films like Biaxial oriented polypropylene (BOPP) and automobile components. This chemically neutral polymer, gives edge of advantage in many applications, but poses serious

limitation while decorating these objects. In order to alter the topology for improving the paint adhesion on this chemically inert material, surface preparation and treatment is necessary. However for bigger objects like automobile bumpers Chlorinated polypropylene (CPP) coat as primer is essential. In this endeavour the extra step of surface treatment and surface preparation is eliminated which adds Volatile organic compound (VOC) in the atmosphere and may deteriorate the mechanical properties of the object. For this blend and nanocomposites of PP are made in order to alter the surface characteristics and with the help of advanced characterization tools like Atomic force Microscopy (AFM) and Contact angle measurement the properties are evaluated.

Name of the student: **Tyagee K. Chavan**  
Degree: **M.Tech**  
Thesis title: **Synthesis and Characterization of Polyimide Membrane**

**Abstract:** Polyimides prepared from reaction of dianhydride and diisocynates is a one step process and easier to synthesise than the standard two step process with reaction of dianhydride and diamine. Project aims to prepare high molecular weight polyimide membranes form Pryomellitic Dianhydride (PMDA) and 4,4'-Diphenylmethane Diisocynate (MDI). Using various solvents and catalyst the molecular weight can be tailored. The membrane solution then casted on various

non-woven fabric support to determine the compatibility and permeability. Characterization of the yield polymer will be performed for Molecular weight distribution using Gas Permeation Chromatography (GPC). Also fourier transform infrared (FTIR) spectroscopy and nuclear magnetic resonance(NMR) is to be carried out. By preparing a conventional membrane module, flux and selective permeability will be determined. The prepared membranes will have application in ultrafiltration, nanofiltration and reverse osmosis.

Name of the student: **Devendra M. Sonawane**

Degree: **M.Tech**

Thesis title: **Oxo-degradable High Density Polyethylene**

**Abstract:** High density polyethylene (0.941 g/cm<sup>3</sup>) is widespread used in liquid food packaging, carrier bag, industrial sack, piping system, etc and it is the world's third largest commodity plastic and worldwide consumption of HDPE is projected to be around 97.4 billion pounds in 2015. The disposal after use causes several environmental issues because of its recalcitrant nature. The rate of biodegradation of this polymer dumped in the open environment is very slow due to the strong intermolecular bond that does not allow the microbes to access them easily. Many conventional techniques are adopted to disposed plastics which include incineration, pyrolysis, landfill, and recycling which involves many technical and economical problems.

Research is going on to find out Oxocatalyzed environmental degradation of HDPE film for packaging application. The project deals with synthesis of catalyst or pro- oxidant to make HDPE Film oxo-degradable. The pro- oxidant filled HDPE films were characterized for Fourier transform infrared spectroscopy (FTIR), QUV Weatherometer, X-ray Diffraction (XRD) to find out oxo- degradation of HDPE Films.

Name of the student: **Siddhant R. Bhavsar**

Degree: **M.Tech**

Thesis title: **Improvement in Barrier Properties of Paper Coatings**

**Abstract:** Increased environmental concerns over the use of certain synthetic packaging, with consumer demands for both higher quality and longer shelf life have led to increased interest in alternative packaging materials research. Polymer/Clay Nanocomposite can be used as barrier coatings on paper packaging materials. These Polymer/Clay Nanocomposite coatings may retard unwanted moisture transfer in food products, are good oxygen barriers, are biodegradable, and have potential to replace current synthetic packaging material. Polymer/Clay Nanocomposite (PCNC) suspensions were prepared via a simple mixing approach of nanoclay and polymer latexes. The XRD measurements indicated that, under certain conditions, the chemically modified nanoclay could be exfoliated in the

composite. The effects of the variables, such as clay and polymer varieties, clay contents, etc., on the nanoclay exfoliation, were correlated. It was found that the nanoclay properties and their interactions with the polymer matrix played a vital role in determining the PCNC's barrier performances. The possible mechanism of exfoliation of the nanoclay was discussed.

Guide : **Dr. S.T. Mhaske**

Name of the student: **Kunal Yeole**

Degree: **Ph.D (Tech)**

Thesis title:

**Abstract:** Recently, waterborne coatings have gained increasing importance due to strict environmental regulations on the emission of volatile organic compounds from solventborne coatings. With the environmental criteria becoming stricter waterborne coating has been gaining importance in the modern coating industry. The use of waterborne coatings has made it possible to control pollution, to reduce risks of fire and to improve aspects of occupational health and safety. To maintain constant product quality and to develop new products, structural characterization and measurement of barrier properties of these new coatings become crucial. Waterborne coatings usually contain different additives and an appropriate choice among various alternatives of these additives brings a challenge to both manufacturers and researchers.

Epoxy resin is one of the most important materials in coating industry. The manufacture of its waterborne emulsion has received considerable attention in industrial field. There are two ways to produce waterborne epoxy emulsion. One is dependent on the external emulsifier to make the resin dispersed in water. The other is by way of chemical modification to introduce polar groups which confer water dispersibility to the resin. The former technology is simpler and cheaper, while the latter one can achieve very fine and well distributed emulsion (nm particles).

A novel waterborne modified epoxy coating was prepared by using different types of silanes like 3-glycidoxy propyl tri methoxy silane (GPTMS), MPTMS, etc., a termination agent of adduct, and liquid epoxy resin. The structure of the curing agent was characterized. The synthetic process and the effects of the amount of silanes on the properties of curing agent and performances of cured film were studied.

Name of the student : **Pravin G Kadam**

Degree: **Ph.D (Tech)**

Thesis title: **Polymer Nanocomposites: Preparation And Applications**

**Abstract:** Poly (vinyl chloride) (PVC) /Thermoplastic polyester elastomer (Hytrel) blend system prepared in 50:50 composition was found to have a highest possible elongation at maximum load owing to molecular compatibility but had lower strength and modulus. In

order to improve the strength and modulus nano-alumina was added as a reinforcing agent in concentrations as 1, 3, 5 and 7 phr. The prepared nanocomposites were characterized for mechanical, thermal, rheological, morphological and electrical properties. The 5 phr nano-alumina loaded PVC/Hytrel blend had optimal improvement in its strength values, but above that concentration nano-alumina started forming aggregates which is evident from scanning electron micrographs. Tensile strength and tensile modulus were found to have increased by about 20% and 97% respectively; whereas elongation at maximum load decreased by 50%, indicating the effect of nano-alumina as reinforcing agent in the PVC/Hytrel system. The onset degradation temperature, viscosity, surface resistivity and volume resistivity increased whereas degradation weight loss (%) decreased with increase in nano-alumina concentration in PVC/Hytrel blend system.

Name of the student : **Nidhi Shah**

Degree: **Ph.D (Tech)**

Thesis title: **Structure Property Behavior of Polymer Nanocomposites**

**Abstract:** Polymer nanocomposites represent a new alternative to conventionally filled polymers. Because of their nanometer sizes and filler dispersion, nanocomposites exhibit fascinating properties when compared to the controlled polymers or their traditional

composites. The study deals with synthesis of different nanoparticles, compatibilizers & their characterization. The synthesized nanoparticles will be used in different polymer matrix & compatibilizers will be used for uncompatibilized blends. Thus, the understanding of the links between the nanostructure, the flow properties of the melt and the solid-state properties is critical to the successful development of polymer nanocomposite products. The overall objective of this work is to try to quantify the structure-processing-property linkages in polymer nanocomposites.

Name of the student : **Manoj Mali**

Degree: **Ph.D (Tech)**

Thesis title: **Development of Polymer Composites**

**Abstract:** Nanotechnology has been dominating in automotive industry from last many years due to their enhanced properties against conventional materials. Nanocomposites are versatile in nature they are used in automotive Industry (Thermoplastic Vulcanizate CASE). Thermoplastics vulcanizates are made by dynamic vulcanization of Polypropylene and Ethylene propylene diene monomer (EPDM). The use of nanocomposites in vehicle parts and system is expected to reduce weight and promote recycling. The weight and energy savings are the enhanced physical properties that nanocomposites offer, such as stiffness, strength and dimensional stability,

that set them apart from conventional fiber reinforced or mineral-filled materials. Property enhancement in nanocomposites occurs at very low nanoparticles loadings up to 5%.

Name of the student : **Ajit Patil**  
Degree: **Ph.D (Tech)**

Thesis title:

**Abstract:** Polymers touch every aspect of our lives. Knowingly or unknowingly, every individual today relies on polymers to meet his needs. Though polymers are legion, sometimes they cannot fulfill the demand, depending on their properties. Improvements in polymers are tremendously important because they will widen the scope of application. There are two main approaches: construction of new molecules that are likely, from their molecular composition, to have the desired properties, and modification of properties of existing large-scale polymers. The two predominant modes of polymer modifications are grafting and crosslinking. In other words, modification is essential to meet various challenges, as it is very difficult to get new polymers. The next generation awaits polymer modification as it opens up new possibilities. Among several Controlled Radical Polymerization (CRP) technologies developed, atom transfer radical polymerization (ATRP) could be the promising method due to its versatility. ATRP has emerged as one of the most powerful techniques in polymer science for synthesis and modification. Polymers

with predetermined molecular weight, narrow molecular weight distribution as well as desired composition and molecular architecture can be prepared by using ATRP.

Name of the student : **Sneha Satavalekar**

Degree: **Ph.D (Sci)**

Thesis title: **Synthesis of polymeric materials using renewable resources**

**Abstract:** Plasticizers like di-ethyl hexyl phthalate (DEHP), di octyl phthalate (DOP) are important additives in application of PVC. Some hazardous properties of them restrict their use in medical devices and children toys etc. Replacement of these plasticizers with heterocyclic diesters can act as alternative for these materials. Also diesters of long chain diols of oils can be treated as alternative diester system for plasticizer of PVC. Their final implementation has to be checked by mechanical and rheological studies.

Name of the student : **Aarti More**

Degree: **Ph.D (Tech)**

Thesis title: **Chemical modification of silane, polyesteramide, epoxy based resins and its application as industrial coatings**

**Abstract:** Resin is one of the four main ingredients of paint on which various coatings properties are depend. In industrial coatings few of the popular resins are epoxy, polyurethane, silicone, acrylic etc. The modification of these conventional resins is carried out in some cases to overcome

the drawbacks or in some cases to incorporate certain properties into coatings. Modification can be carried for various purposes and by various routes such as for flame retardant coating, for antimicrobial coatings, modification with hyperbranched polymer, modification with inorganic materials, Modification with specific monomers having certain groups present in it. With such modifications one or more properties can be incorporated into coating simultaneously hence coating can be used for high performance application.

Name of the student : **Ganesh Anil Phalak**

Degree: **Ph.D (Tech)**

Thesis title:

**Abstract:** Shellac is natural resin obtained from insects has been used over many centuries for wide range of applications. Earlier in nineteenth century was used in furniture application. Afterwards this resin used in electrical, food, medical, printing ink etc. Now a day because of its biodegradable property it is used in Coating application. In this research work, colour of shellac improved by bleaching process, because it is very difficult to used dark brown colour shellac in paint. This shellac resin modified with different types of resins.

Name of the student : **Sushmit Rithe**

Degree: **M.Tech**

Thesis title: **High Performance Coating for Solar Application**

**Abstract:** Paint coatings for solar absorbers have attracted interest since the introduction of the

concept of spectral selectivity. According to this concept, the most viable solar absorber coatings for solar collectors are based on the absorber-reflector tandem technique. In this technique, selectivity is achieved through successive deposition of highly reflecting and solar absorbing materials. Because bulk aluminium or copper sheets are excellent low emitting substrates, many tandem coatings have been developed in the past by electrodeposition (black nickel and black chrome), chemical conversion (black copper and black iron) and spray pyrolysis (PbS). However, due to the environmental and health problems associated with these techniques, present absorber coatings are produced by vacuum based, deposition techniques. The absorber-reflector tandem concept is directly applicable for paints because it provides TSSS paint coatings using the controlled deposition (spraying, brushing, coil coating) of suitably diluted pigment dispersions (i.e., paints) onto a low-emitting metal substrate.

Name of the student : **Arjit Gadgeel**

Degree: **M.Tech**

Thesis title: **Depolymerization and degradation of polymer in solution.**

**Abstract:** A new trend of degradation has been very useful for many purposes, which holds the waste utilization, properties enhancement of other material and deriving utility products from waste materials. In this work PVC (Polyvinyl

Chloride) was partially dechlorinated and degraded by solvolysis recycling. The dechlorination of the PVC with ethylene glycol were obtained at a temperature of 1900C followed with the ultrasonic degradation. Dechlorination avoid the HCl formation whereas the ultrasonication cause the chain scission. Study of depolymerization of product is done by means of solvation recycling using ultrasonic energy, precipitation method and catalyst action in the solution.

Name of the student : **Pooja Gawal**

Degree: **M.Tech**

Thesis title:

**Abstract:** Synthesis of polymers from bio based resources is a big step towards ensuring sustainability.

Karanja oil, with their chemical versatility and economic viability is perfect resource. Polyetheramides from this oil, having excellent Chemical, mechanical and adhesion properties promise to have variety of applications in both, the field of coatings and adhesives.

Name of the student : **Pradnya Rane**

Degree: **M.Tech**

Thesis title:

**Abstract:** Over the last several decades, the process of recycling polymer waste has been attracting the attention of many scientists working on this issue. Polymer recycling is very important to reduce the ever increasing volumes of polymer

waste coming from many sources and to generate value-added materials by converting them into valuable materials. Poly(ethylene terephthalate) (PET) occupies the top of the list of polymers to be recycled due to its easy recycling by different ways, which, in accordance, give variable products that can be introduced as starting ingredients for the synthesis of many other polymers. PET can be recycled by hydrolysis, acidolysis, alkalolysis, aminolysis, alcoholysis and glycolysis. In this study aminolysis is carried out with different amines like and monomers obtained utilized for various applications.

Name of the student : **Swapnil Kokate**

Degree: **M.Tech**

Thesis title: **Synthesis of Nano Silver and its application in Polymer**

**Abstract:** Nanoparticles of various metals have bactericidal effect. That effect can be used for the Purification of water. Nano particle of silver can kill the bacteria such as E-coli, which are responsible for water borne diseases. If that nanoparticle is coated on polymers having high surface area can be used as water filters at very cheaper rates.

Name of the student : **Parth Kapoor**

Degree: **M.Tech**

Thesis title: **Synthesis and Modification of Inorganic-Organic Hybrid Polymers by Silanes and Polysiloxanes**

**Abstract:** Sol-gel technology is coming up as a promising option for coatings and has

gained a rapid and demanding growth during last decade. Organic/inorganic hybrid materials prepared by the sol-gel approach have rapidly become a fascinating new field of research in materials science. The explosion of activity in this area in the past decade has made tremendous progress in both the fundamental understanding of the sol-gel process and the development and applications of new organic/inorganic hybrid materials. Polymer-inorganic nanocomposite present an interesting approach to improve the separation properties of polymer material because they possess properties of both organic and inorganic such as good permeability, selectivity, mechanical strength, and thermal and chemical stability. Composite material derived by combining the sol-gel approach and organic polymers synthesis of hybrid material for coating application are the main focus area of this research.

Guide: Professor **Dr. A.S. Sabnis**  
 Name of the student: **Mukesh Kathalewar**  
 Course: **Ph.D (Tech.)**  
 Project Title: **Synthesis of sustainable functional materials for coating applications**  
**Abstract:** The synthesis of new platform chemicals that are based on renewable resources has been accepted as a strategy to contribute to sustainable development due to the anticipated depletion of fossil oil reserves and rising oil prices. Cardanol which is separated by double vacuum distillation of

Cashew nut shell liquid contains a characteristic long aliphatic alkyl chain at the meta position of phenolic ring that confers attractive properties such as good processability and high solubility in organic solvents and also influences many chemical transformations introducing novel functionalities. Some recent studies report its application in preparation of phenolics, epoxy, vinyl ester resins, phenalkamines etc. In this project we have developed multifunctional epoxy resins, silicone containing epoxy resin, polyols and used them as coating component. The cyclic carbonate derived from cardanol derivative was used to prepare non-isocyanate polyurethane (NIPU) and Hybrid-NIPU coatings. Amido-amines from cardanol based on thiol-ene chemistry and the polymeric phenalkamines were used as epoxy curing agent.

Name of the student: **Vandana Jamdar**  
 Course: **Ph.D (Tech.)**  
 Project Title: **Studies in Depolymerization of Polymer Wastes for Coating Applications**  
**Abstract:** Polyethylene terephthalate (PET) and Polyurethane (PU) foam are the most commonly recyclable polymers gives an excellent opportunity to yield novel oligomeric or monomeric materials by chemical depolymerization processes. Further these recycled products having variety of functionalities can be utilized for partial or complete replacement of raw

materials for synthesis of various resin chemistries for coating applications.

In this project our aim is to investigate the depolymerization of polymeric materials like Polyethylene terephthalate (PET) and Polyurethane (PU) foam using various glycols with varying functionalities and non conventional amines by chemical recycling processes using conventional heating, microwave and high energy radiations assisted processes. Further we intend to study process optimization & modification for better efficiency of processes and reaction products. Finally, we propose to utilize these recycled materials for preparation of novel functional polymers through various chemistries for their application in coatings. The properties obtained of these various coatings would be studied as a function of type and structure of the glycol or amine used. The protocol developed through this project would establish a method for reuse and recycle the polymeric wastes with value addition.

Name of the student: **Dinesh Balgude**  
 Course: **Ph.D (Tech.)**  
 Project Title: **Modification of Renewable resources for coating application**  
**Abstract:** Considering tremendously increasing environmental regulations and dramatic price fluctuation of fossil resources, exploration of naturally available material can be the obvious option to develop various chemistries for modern

coating industry. The aim of the proposed work is to replace the petroleum derived feed stock with CNSL(a renewable resource) for polymer/ resin synthesis as well to develop water based formulations based on modified CNSL to replace the organic solvents used in coating formulations. The applications in water based system involve development of chemistries such as alkyd, polyurethane dispersion, emulsion etc. with improved performance. Further, we propose one-pot process for dispersion less synthesis of various types of water based coatings via sol-gel chemistry. The synthesized coating will have pigments chemically bonded with the respective chemistry which would help to enhanced performance properties.

Name of the student: **Nikitha Mhadeshwar**  
 Course: **M.Tech**  
 Project Title: **Studies in functional monomers for emulsion polymerization**  
**Abstract:** The study aims to investigate the effect of various monomers on properties of emulsion for coating applications. In this project, two monomers based on acrylate and acetate were used and their effect in conventional emulsions were studied. Both the monomers were incorporated in various amounts and their effect on % conversion, emulsion stability, particle size and overall film properties were investigated.  
 Guide: Professor **P.A. Mahanwar**  
 Name of the student: **Samarth Nikesh Bhashkarrao**

Degree: **M.Tech**  
 Thesis title: **Synthesis of phthalate free plasticizer using Soyabean oil & Linseed oil via green chemistry and its application for PVC particulate composites**  
**Abstract:** PVC plasticized with Di-Octyl Phthalate (DOP) is widely used polymer in industry. Phthalate based plasticizers are hazardous for human health, hence their used has been banned. Research is going on to find out alternative plasticizers for this application. The project deals with synthesis of green plasticizer via Epoxidation of soyabean oil and Linseed oil and their modified derivatives. This modified oil (SBO/LO) is used for plasticization of PVC and fly ash composite with varying amount of DOP. The Plasticized PVC will be characterized for Fourier transform infrared spectroscopy (FTIR), Optical microscopy (OM), X-ray diffraction (XRD), thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC).

Name of the student: **Pache Ruchika Dhanraj**  
 Degree: **M.Tech**  
 Thesis title: **“Synthesis of phthalate free plasticizer using Karanja oil & Rice bran oil via green chemistry and its application for PVC particulate composites”**  
**Abstract:** Plasticized PVC is widely used polymer in industry for flexible applications. Di-Octyl Phthalate (DOP) is commonly used as plasticizer for PVC. Due to migration and toxicity of phthalate

plasticizers, their used has been banned. Hence extensive research is going on to find alternative plasticizers which are able to replace conventional plasticizers. Vegetable oils are best alternative as they are biodegradable, inexpensive and abundantly available. The project deals with synthesis of green plasticizer by Epoxidation of Karanja and Rice bran oil and their modified derivatives. The modified oil (RBO/KO) is used for plasticization of PVC and fly ash composite with varying amount of DOP. The Plasticized PVC will be characterized for Fourier transform infrared spectroscopy (FTIR), Optical microscopy (OM), X-ray diffraction (XRD), thermogravimetric analysis (TGA) and differential scanning calorimetry (DSC).

Name of the student: **Kelkar Sunder Tukaram**  
 Degree: **PhD (Sci.)**  
 Thesis title: **Synthesis of Poly lactic acid (PLA) from renewable resources**  
**Abstract:** Poly(L-Lactic acid), (PLA) is a biodegradable, biocompatible and compostable polyester, which has a bright future as an environmentally friendly thermoplastic. PLA finds promising applications in packaging, consumer goods, fibres and in biomedicine because of its excellent mechanical properties, compatibility, transparency and biodegradability. This polymer can replace the conventional polymer used for packaging of food material like disposable containers, cups ,plates which

are mostly prepared from polystyrene foam, polyethylene bags etc. as these polymers degrades very slowly they produce large amount of the solid waste, which is the growing threat for world. The limitation in use of the PLA as alternative for conventional polymer is its cost. In order to make these polymers cheaper and to minimize its dependency for lactic acid monomer on fossil resources, lactic acid should be prepared from renewable resources. LA can currently be produced either by chemical synthesis or by fermentation from biomass, and the latter one is prevailing.

In present work we are trying to get lactic acid from renewable biomass like mango kernels and tamarind seeds, which can be used for producing poly lactic acid. It will reduce the cost of the raw material and also provide new and cheap agro waste as raw material for lactic acid production.

Modification of PLA to get better properties by co polymerization with PU, blending of other polymers and natural fibres in commercial PLA is also studied.

Name of the student: **Gaikwad Pravin Ramesh**

Degree: **P.hD (Tech.)**

Thesis title: **Studies in Thermoplastic Micro and Nano fibril composites.**

**Abstract:** Fiber reinforced polymer (FRP) composites are becoming very popular due to their ease of fabrication, economy and superior mechanical properties. Particularly fiber

reinforcement as Micro and Nano scale in thermoplastic polymer matrix offer advantages in numerous engineering applications. Natural fibers (NF) have recently give more attraction to researchers, engineers and scientists as an alternative reinforcement as FRP composites. Nowadays, these NF fibers are exploited as a replacement for the conventional fiber such as glass, aramid and carbon due to their low cost, fairly good mechanical properties, high strength to weight ratio, non-abrasive, ecofriendly and biodegradability characteristics. Electrospinning has been recognized as an efficient technique for the fabrication of polymer nanofibers. Our main aim of this research work is to study the effect of Natural and Synthetic fibers on the properties of High Density Polyethylene (HDPE) and Polypropylene (PP) reinforced composites. These chopped Polyethylene Terephthalate (PET) and Henequen (NF) microfibers without treatment and with surface treatment using coupling agent as VinylTrimethaOxisilane (VTMO) as well as Glycidoxy functional methoxy silane (GPTS) are being used as reinforcement in polymer matrix and to be characterized for overall properties of FRP composites. PET electrospun nanofibers are also to be added in HDPE/PP polymer matrix and to be characterized accordingly.

Name of the student: **Vijay Lala Kapse**

Degree: **M.Tech**

Thesis title: **Radiation Processing of Polyolefin blends and composites for automobile application**

**Abstract:** Polyolefins are playing very important role in automobile sector from several years. To use this polymer blends or composite in automobile applications numbers of modifications are necessary in existing polymers for improved performance. Radiation processing (by Electron beam, Gamma Rays & X-rays) of polymers has been used for many years for modification of polymers. The aim of the current research work is to develop radiation process-able blends and composite of polyolefin for automobile applications.

The project deals with formation of blend and composites of polyolefin ( LDPE, LLDPE, HDPE &PP) and EPDM with different loading of TPR fillers & mineral fillers ( CaCO<sub>3</sub>) and radiation processing of formed blends & composites for different radiation dose, followed by mechanical testing, DSC ,TGA and XRD analysis.

Name of the student: **Vinayak Mahadeo Kamble**

Degree: **M.Tech**

Thesis title: **Study of Effect of High Energy Irradiation (Gamma & Electron Beam) on catalytic Pyrolysis of waste plastics into Fuel.**

**Abstract:** The consumption of the plastic materials is growing due to their versatile properties (relatively low cost, light weight and durability) in various applications (packaging,

electrical and electronics, agriculture and health care). Therefore, plastic waste amount continuously increases in municipal and industrial waste, creates a large burden on environment because of both contamination and area required to land-filling the waste. The recycling of waste plastics has attracted much interest as an alternative method for their disposal and management over the last few decades. As plastic comprise the calorific value to that of fuel, so the recovery of the fuel like product is an effective method of recycling. Basically pyrolysis is used for production of fuel but the amount of energy require to cracking is high enough. Considering radiation technology, had ability to alter the structure of polymeric materials (cross-linking, Grafting and degradation) can be efficiently applicable for recycling of plastic waste. So the combination of both radiation technology and pyrolysis become an alternative method for conversion of fuel from plastic waste. This research work gives an idea about the alternate method for recovery valuable product from the plastic waste at low energy consumption by using radiation processing.

Guide: **Professor V.V.Shertukde**  
Name of the student: **Akash A. Dongre**

Degree: **M.Tech**

Thesis title: **Synthesis and study of acrylate copolymers used as viscosity index improvers and pour point depressant for different base stocks.**

**Abstract:** Polymeric additives

were synthesized as a viscosity index improvers and pour point depressant for different base stocks, these additives syntheses by homo polymerization of Cetyl acrylate and copolymerization of Cetyl acrylate with Styrene, Maleic anhydride and Methyl methacrylate (MMA). The structure of the prepared compound was confirmed by I.R Spectroscopy. The molecular weight of the prepared Homopolymer and copolymer was determined by gel permeation chromatography (GPC). Viscosity was determine by using Cone and Plate Rheometer. The efficiency of the prepared compounds as a viscosity index improvers and pour point depressant was investigated were investigated by ASTM D 2270 - 04 and ASTM D-97.

Name of the student: **Rakhi Sonkusare**

Degree: **M.Tech**

Thesis title: **Study of synthesis and characterization of polyurethamide resin from renewable raw materials and its applications.**

**Abstract:** Vegetable oil based adhesive emerged as an environmentally friendly substitute for petrochemical-based materials. Linseed oil and the blend of linseed oil and moringa oleifera seed oil based adhesive have been studied extensively and compare their properties. Most of the research work on moringa oleifera seed oil has explored its applications in pharmaceutical feild. This work representing new area of application of moringa oil seed

oil for polymeric resin, in which we attempted to synthesize seed oil based poly(urethane fatty amides) adhesive. Polyol was prepared by hydroxylation and alcoholysis to further react with isocyanate to form adhesives resin. Polyol and polyurethane analysis was performed using spectroscopic techniques, such as FTIR and <sup>1</sup>H NMR, GPC, TGA. Shear strength tests with oil-based adhesives of solid wood and plywood were studied and compared. The overall resistance of the chemical properties of oil-based polyurethane adhesives in response to hot water, acid, and alkali was studied and compared.

Name of the student: **Sushil Vijay Patil**

Degree: **M.Tech**

Thesis title: **Preparation and Characterization of Heat and Corrosion Paints**

**Abstract:** Industrial applications such as Chimneys, Automobile silencers, Boilers, Exhausts where normal operating temperature exceeds above 300-400OC; at this high temperature general industrial paint does not stand satisfactory and needs a special development of paint which can sustain this high temperature successfully. In the market scenario presently silicone based heat resistant paints are available up to 600 - 700OC, but their cost is too high. Therefore it is proposed to prepare the paint which can sustain this temperature successfully at lower cost.

This study will present an overview of the development

of the silicone-epoxy systems which offer heat and corrosion resistance. Silicone resin is blended with epoxy, acrylic and MF resin at various compositions having pigmentation like aluminum paste, carbon black and TiO<sub>2</sub>. Paint will be characterized for Heat resistances, Corrosion resistance, Solvent resistance, Chemical resistances, and Mechanical properties. The heat and corrosion resistances have been evaluated by using electrochemical impedance spectroscopy (EIS) and scanning electron microscopy (SEM).

Name of the student: **Alpesh U. Vala**

Degree: **M.Tech**

Thesis title: **Synthesis and Characterization of Polyesteramide**

**Abstract:** New aromatic Poly (Ester Amide) (PEA) synthesis from 4-Amino Benzoic Acid (PABA), Hydroxy benzoic acid and some aliphatic compounds. These monomers carry out Direct Polycondensation reaction in reaction mixers with Diphenylchlorophosphate/ Phosphorus oxychloride as a catalyst, Pyridine as an

activating agent, in solvent system Dimethylformamide (DMF). This method gives Poly (Ester Amide) of different morphology with fairly high average molecular weight, Glass transition temperature and degradation temperature. This polymer has ester, amide and aromatic groups on their chemical structure which are of a degradable character and provide good thermal and mechanical properties. This yield polymer will characterize by different methods like FTIR Spectroscopy (Functional group analysis), X-Ray Scattering (Nature of material), Differential Scanning Calorimeter & Thermo Gravimetric Analysis (Thermal properties), Gel Permeation Chromatography (Molecular Weight), Parallel Plate Rheometer (Viscoelastic behavior) and Nuclear Magnetic Resonance (Polymer Structure & Impurities). This polymer will have expected applications in biomedical application, LCP Polymers and other engineering applications etc.

Name of the student: **Sahil Pinjari**

Degree: **M.Tech**

Thesis title: **Synthesis and Study of New Schiff Base Epoxy Resin for Anticorrosive Coating Applications**

**Abstract:** An Epoxy resin are synthesis from Bisphenol-A which is hazardous to human health. New Schiff base are synthesis to replaced Bisphenol-A, which are good corrosion inhibitor, modified with nano material used as a component of binder of new organic coatings. The structure of synthesized compounds was confirmed by means of spectroscopic (NMR) and Fourier transform infrared (FTIR). Synthesized epoxy resins were cured with different crosslinking agents. The thermal stability and characteristics of the prepared Schiff base monomers and polymers as well as their epoxy resins were measured and evaluated by DSC and TGA analysis. Physical, mechanical and Anticorrosion, thermal properties of coatings based on new epoxy resins were determined. Results were compared with those for one selected commercial epoxy resin.

#### MAJOR ACCOMPLISHMENTS:

Department Selected for getting DST-FIST Development Grant

Pioneered Technology of interfolic compatibilization in polymers.

Published 42 International peer-reviewed research papers in the journal of international repute and attended three international conferences at abroad.

## PHOTO GALLERY

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