

Department of Polymer Science

Faculty:

Name	Qualification	Specialization
Prof. Sidhharth Sirohi	ME (DCE, Delhi University) Ph.D.(IIT Delhi)	Controlled Polymerization, Nanoencapsulation & Composite Nanofibres
Dr. S.K. Shukla	M.Sc. (Chemistry), Ph.D. (Gorakhpur Univ.)	Conducting polymers and Bio-Polymers
Dr. Susmita Dey Sadhu (Teacher-In-Charge)	M.Sc. (Chemistry) (Burdwan University) Ph.D. (IIT Kharagpur)	Polymer Blends and composites, Polymer Nanocomposites, Recycling, Polymer in packaging
Dr. Krishna Dutt	M.Sc. (Polymer Science and Chemical Technology) Ph. D. (CCS Univ., Meerut)	Polymer Recycling, Thermoplastic Elastomer, Rubber Technology, Biodegradable Polymers
Dr. Anil Barak	M.Sc. (Chemistry), Ph.D. (University of Delhi)	Anionic Polymerization, Controlled Radical Polymerization and Nano Composites
Dr. Prem Lata Meena	M.Sc. (Chemistry),Jai Narain Vyas University, Jodhpur, Rajasthan Ph.D. (University of Delhi)	Inorganic Polymers
Dr. Umesh Kumar	M.Sc. (Chemistry), Ph.D. University of Delhi	Nano-hybrid Polymers

B.Sc. (H) Polymer Science course is unique multidisciplinary course running successfully in Bhaskaracharya College of Applied Sciences since 2004. No other College of Delhi University offers this course. The broad components of course include Polymer Technology, Polymer Processing Fibre Science, Rubber Technology, Chemical Technology and Polymer Blends & Composites. This program is designed to provide fundamental understanding of polymer science, engineering and technology. Students who pass out are well placed in various Polymer Industries and Academic Institutions in India and abroad. It gives an exposure to the students to latest developments in polymeric materials to develop skilled manpower for the fast expanding polymer industry in India.

Department of Polymer Science has well equipped laboratories to train the students with synthesis, processing and testing of different polymers. The facility of laboratories is enough to meet the requirements of industrial standards. A few notable equipments are:

- Injection Molding Machine
- Compression Molding Machine
- Two-Roll Mill
- Single Screw Extruder
- Heat Distortion Temperature/Vicat Softening Point Apparatus
- Tensile Tester
- FTIR Spectrometer
- Rota evaporator
- TG-DTA-STA7300
- UV-Visible Double Beam Spectrophotometer
- Digital Rockwell Hardness Tester
- Hand lay Transfer molding machine
- Oscillating Disc Rheometer, ODR
- Universal Testing Machine, UTM
- Melt Flow Index Tester, MFI
- Falling Dart Impact Tester
- Izod/Charpy Impact Tester

- Incubator
- Spray Guns (Pressure and Suction)
- Mechanical Stirrer
- Dielectric Strength Analyzer
- Hot Plates with stirring
- Vacuum Oven- Digital Temperature Controller
- B-one Touch Viscometer
- Optical Microscope
- Abrasion Resistance Tester
- Double water Distillation Unit
- Hydraulic Pellet
- Muffle Furnace
- Fuming Hood (Modern Lab)
- Magnetic stirrer with temperature controller
- Flammability Tester
- Ubbelohde Viscometers with Temperature Controlled Bath
- Opacity Tester
- Carbon Content Measuring Apparatus, etc.

Apart from the experiments mentioned in the syllabus, students are also trained in handling, maintenance and trouble-shooting of various equipments available in the laboratories. The Department also organized different visits and activities of Polymer Science students to nurture their talents.

The syllabus is designed in such manner so as to give the students an understanding of the theoretical as well as the experimental studies of polymer science enabling them to compete at the global level. Many students get benefited by the internship in industries and research laboratories during their course of study in college.

The objectives of course are:

- To understand the basics of polymer science and polymer synthetic techniques.
- To enable the skilled manpower for polymer industries with sufficient knowledge.
- To provide ample knowledge and understanding to pursue a career as polymer scientists.
- To understand & explore more applications of polymers in the society.
- To characterize the chemical and physical properties of polymers

Employment opportunities for polymer science students exist in the following areas

- Polymer manufacturing (IOCL, GAIL, Reliance, etc.)
- Polymer processing (Supreme, Moser Baer, Havels, etc.)
- Mold and Die designing (Hivec, Rhino, Solid Works, etc.)
- Fibre Technology (Aditya Birla, Arvind Mills, Vardhman Textiles)
- Rubber Technology (Bridgestone, MRF, JK Tyre, etc.)
- Paints & Coatings & Adhesives (Berger, Asian, Dupont, Pidilite etc.)
- Performance evaluation & quality assurance
- Marketing and sales
- Polymer waste management (Banyan Nation, Jet Polymer Recycling etc)

The Department organized several industrial and academic talks under the banner of PEARLS Society of Department.

A few of activities organized by the Department are:

- Department of Polymer Science (PEARLS) in association with Indian Institute of Packaging, Delhi organized First webinar of webinar series 2021-22 on July 12, 2021 through Microsoft Teams Platform. Dr. Tanweer Alam, Director, IIP, MOCI,

GOI delivered talk on “Career in Packaging” & Mr. Madhab Chakraborty, Joint Director & Regional Head, IIP Delhi delivered a talk on “Scope of Plastics in Food

Packaging”

- Department of Polymer Science conducted classes for PG Entrance/GATE Examination during 3- 24 April 2021 (on each Saturday) via Microsoft Teams
- PEARLS (Society of Department of Polymer Science) organized e-Farewell Meet for 3rd year students on April 13, 2021 via Microsoft Team Platform.
- Department of Polymer Science (Under the aegis of IQAC & DBT Star College Scheme) organized 5th webinar of webinar series 2020-21 & virtual workshop on the topic “Small-Angle X-ray Scattering Analysis” on March 15, 2021 through Microsoft Teams. Dr. Gajender Saini, CRNTS, Indian Institute of Technology Bombay, Mumbai, India was the invited speaker for the event.
- Department of Polymer Science organized a 05 days Inter College Workshop and Hands on “Instrumental Analysis of Materials” during March 15-19, 2021. The Workshop was organized in association with Department of Instrumentation & Department of Food Technology & Department of Biochemistry under the aegis of DBT Star College scheme.
- Department of Polymer Science organized 02 days Inter College Workshop and Hands on Training on “Development and Testing of Packaging film” on March 11-12, 2021. The Workshop was organized in association with Department of Instrumentation & Department of Food Technology under the aegis of DBT Star College scheme.
- PEARLS (Society of Department of Polymer Science) organized its annual festival & seminar on March 4, 2021 via Microsoft Team Platform.
- PEARLS (Society of Department of Polymer Science) organized its annual Alumni Meet on March 03, 2021 via Microsoft Team Platform.
- Department Polymer Science organized a Campus Darshan (Campus Visit) of 1st year students on 17th February 2021. The students visited laboratories of the department and learnt initial know how of equipment’s. I-cards and books were issued to students on the day of visit.
- Department Polymer Science organized IV Webinar of Webinar Series -2020-21 on January 16, 2021 via Microsoft Team Platform. Dr. Anirban Ganguly (Lead Scientist, SABIC, Bangalore) delivered talk on “Polycarbonates & Its Blends” in the webinar.
- Department Polymer Science organized interaction programme for 1st year students on 9th January 2021 via Microsoft Team Platform.
- Department Polymer Science organized 3rd Webinar of Webinar Series -2020 on 29th December 2020 via Microsoft Team Platform. Dr. Amit Kumar (DGM Havells India Ltd.) delivered talk on “Polymers for Electrical & Electronic Appliances” in the webinar.
- Department Polymer Science organized 2nd Webinar of Webinar Series -2020 on 17th October 2020 via Microsoft Team Platform. Prof. Kushal Sen (Dept. Textile Technology and Fibre Engineering, IIT Delhi) delivered talk on “Online Teaching and Learning: Resources & Challenges” in the webinar.
- Department Polymer Science organized First Webinar of Webinar Series -2020 on 10th October 2020 via Microsoft Team Platform. Sh. Kuldeep Negi (DGM(Mktg-GPTC) GAIL(India)Ltd)) delivered talk on “Indian Polymer Industry- Opportunities, Challenges & The Way Forward” in the webinar.
- Department Polymer Science & Department Food Technology jointly organized an online webinar on May 12, 2020 via. Webex Platform. Prof. A. K. Ghosh (Department of Material Science and Engineering, IIT, Delhi) and Mr. Saroop Chand (Adriotic, Noida) delivered talks in the Webinar.

Outreach Programmes

Industrial and Academic Visits

The department maintains active linkages with the Polymer industries in India. These visits are carried out in every semester for the students which helps them to learn the latest technologies and gain the practical knowledge of their theoretical understanding. Some of the prominent industries where visits have been conducted are: Relaxo Footwears Limited, Asian Paints, UFlex, Recycling Industries, Indian Oil, GAIL, Tyre Industries etc. In addition to these, academic visits are also carried out for better understanding of the curriculum. The visits are carried out in the prominent research institutes like IIT Delhi, University Science Instrumentation Centre (USIC), Delhi Institute of Tool Engineering (DITE), Indian Institute of Packaging (IIP) etc.

Alumni Interaction

The department has a regular and active interaction with its alumni spread all over the world. Department organises Alumni meet in each academic year and the outgoing batches gets benefitted with these fruitful interactions. Alumni share their industrial and academic experiences with their juniors which helps and motivate them.

Other extension activities

Workshops, seminars, summer/ winter internships and symposia are organized from time to time to strengthen the industry-academia relationship.

GE1 - Paper-2: Chemistry of Polymers ○It gives the basic knowledge of polymer science and material science. Students of Chemistry, Food Technology, Biomedical Sciences, Microbiology, Biochemistry, Botany, Zoology, Instrumentation and physics will be benefitted by opting this paper.

- This course is designed to understand the synthesis techniques of polymers along with their production, properties and suitable applications of thermoset and thermoplastic polymers. Along with the basic challenges' students will be trained to handle and formulate polymer for industrial applications.

GE2 – Paper 7: Biomedical application of polymers

- In this paper students will acquire knowledge of biopolymers and biodegradation along with application and testing of biopolymers. ○Students of Chemistry, Food Technology, Biomedical Sciences, Microbiology, Biochemistry, Botany, Zoology will be benefitted by opting this paper. ○Students will be able to apply the knowledge of various biomaterials for a desired bio-application. In addition they'll understand the basic concepts and requirement of biomaterials and biocompatibility.

B.Sc. (H) POLYMER SCIENCE PROGRAMME STRUCTURE & COURSE DISTRIBUTION

Semester	Core Course (14)	Ability Enhancement Course (AEC) (2)	Skill Enhc. Course (SEC)(2)	Discipline Specific Elective (DSE) (4)	Generic Elective (GE) (4)
I	Introduction to Polymer Science	English/MIL Communication or EVS			GE-1
	Raw Materials of Polymers				

II	Polymer Technology	English/MIL Communication or EVS			GE-2
	Unit Operations				
III	Polymer Rheology		SEC -1		GE-3
	Polymer Additives				
	Polymer Degradation				
IV	Polymer Processing & Mold Design		SEC -2		GE-4
	Polymer Testing				
	Recycling and Waste Management				
V	Polymer Characterization			DSE-1	
	Specialty Polymers			DSE-2	
VI	Polymer Blends and Composites			DSE -3	
	Fibre Science and Rubber Technology			DSE-4	

CORE COURSES –14 (six credits each) – Each course has 4 Periods/week for Theory, 4 Periods/week for Practical

SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS
			T=Theory Credits P=Practical Credits
I	C-101	Introduction to Polymer Science	T=4 P=2
	C-102	Raw Materials of Polymers	T=4 P=2
II	C-201	Polymer Technology	T=4 P=2
	C-202	Unit Operations	T=4 P=2
III	C-301	Polymer Rheology	T=4 P=2
	C-302	Polymer Additives	T=4 P=2
	C-303	Polymer Degradation	T=4 P=2
IV	C-401	Polymer Processing & Mold Design	T=4 P=2

VVI	C-402	Polymer Testing	T=4 P=2
	C-403	Recycling and Waste Management	T=4 P=2
	C-501	Polymer Characterization	T=4 P=2
	C-502	Specialty Polymers	T=4 P=2
	C-601	Polymer Blends and Composites	T=4 P=2
	C-602	Fibre Science and Rubber Technology	T=4 P=2
			Credits: 14□6 = 84

***Generic Electives Courses (GE)– 4 (six credits each) – offered by other Departments**
Each course has 4 Periods/week for Theory, 4 Periods/week for Practical

Generic Elective Papers (GE) (Minor-Polymer Science) (any four) for other Departments/Disciplines: (Credit: 06 each – 4T + 2P)

GE: Paper 1- Basics of Polymer Science

GE: Paper 2- Chemistry of Polymers

GE: Paper 3- Polymer Testing and Characterization

GE: Paper 4- Polymer Modifiers and Waste Management

GE: Paper 5- Product Manufacturing and Processing

GE: Paper 6- Material Sciences

GE: Paper 7- Biomedical Applications of Polymers

GE: Paper 8- Fibres and Rubbers

GE: Paper 9- Polymers in Packaging

GE: Paper 10 - Polymers for electrical and electronic applications

Discipline Specific Elective Courses (DSE) – 4 (six credits each)

Each course has 4 Periods/week for Theory, 4 Periods/week for Practical

SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits
V, VI	DSE: Paper 1	Conducting Polymer	T=4 P=2
	DSE: Paper 2	Fibre Manufacturing Technology	T=4 P=2
	DSE: Paper 3	Paints, Coatings and adhesive	T=4 P=2
	DSE: Paper 4	Polymeric Nanomaterials	T=4 P=2
	DSE: Paper 5	Tire Technology	T=4 P=2
	DSE: Paper 6	Packaging Technology	T=4 P=2
	DSE: Paper 7	Fabrication of Polymeric products	T=4 P=2

	DSE: Paper 8	Polymer in Biomedical Applications	T=4 P=2
	DSE: Paper 9	Dissertation	P=6
Credits: 4 × 6 = 24			

SKILL ENHANCEMENT ELECTIVE COURSES (SEC) – 2 (four credits each)

SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits
III-IV	SEC: Paper 1	Biopolymers	T=2 P=2
	SEC: Paper 2	Estimation of Polymers and Polymeric Compounds	T=2 P=2
	SEC: Paper 3	Wire and Cable Technology	T=2 P=2
	SEC: Paper 4	Footwear Technology	T=2 P=2
			Credits: 2 × 4 = 08

ABILITY ENHANCEMENT COURSES (AEC) – 2 (4 credits each)

SEMESTER	COURSE CODE	NAME OF THE COURSE	CREDITS T=Theory Credits P=Practical Credits
I-II	AECC1	English/MIL Communication or EVS	T = 4
	AECC2	English/MIL Communication or EVS	T = 4
			Credits: 2 × 4 = 08

TOTAL CREDITS = 148

Discipline Specific Elective Courses: (Credit: 06 each) (4 courses to be selected)-DSE 1-4

DSE 1 & DSE 2: Any two of the following

- DSE: Paper 1- Conducting Polymers
- DSE: Paper 2- Fibre Manufacturing Technology
- DSE: Paper 3- Paints, Coatings and adhesive
- DSE: Paper 4- Polymeric Nanomaterials

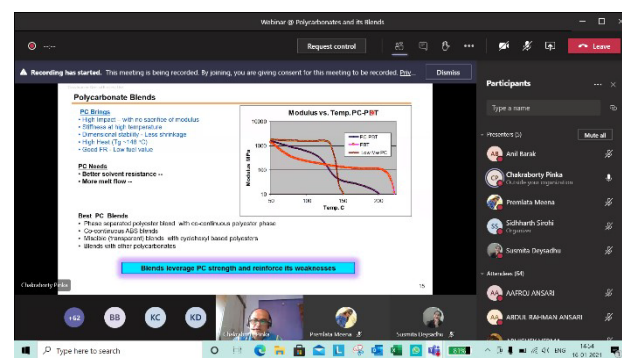
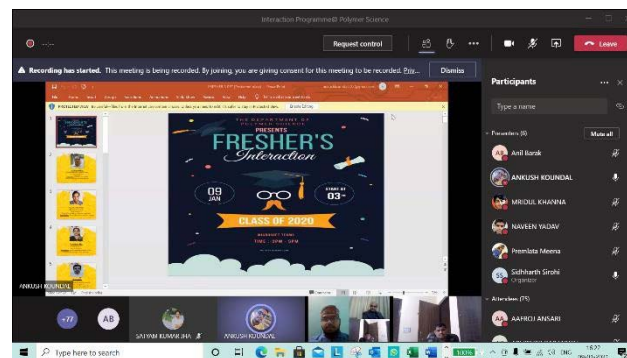
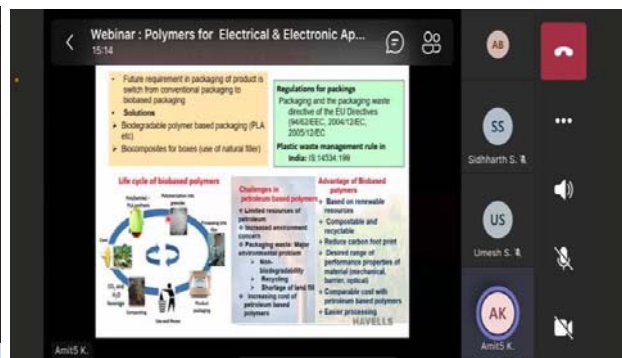
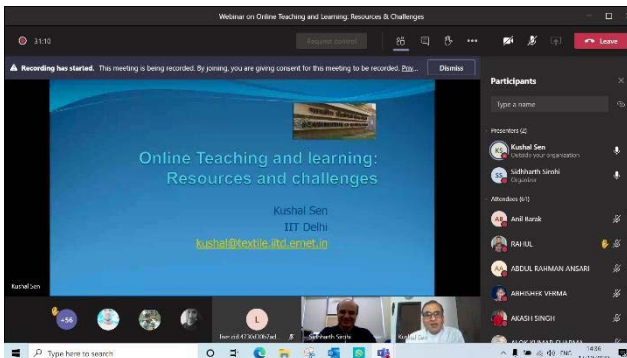
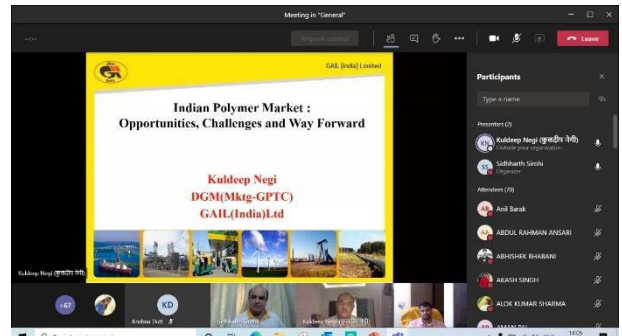
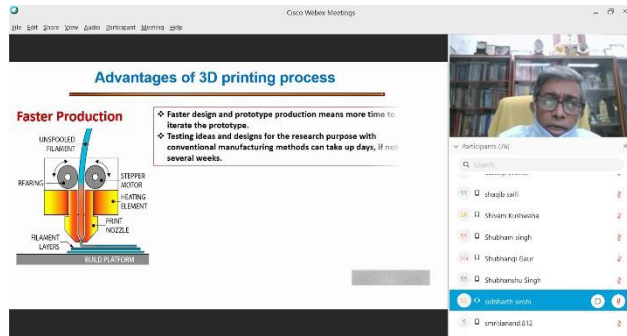
DSE 3 & DSE 4: Choose any two of the following

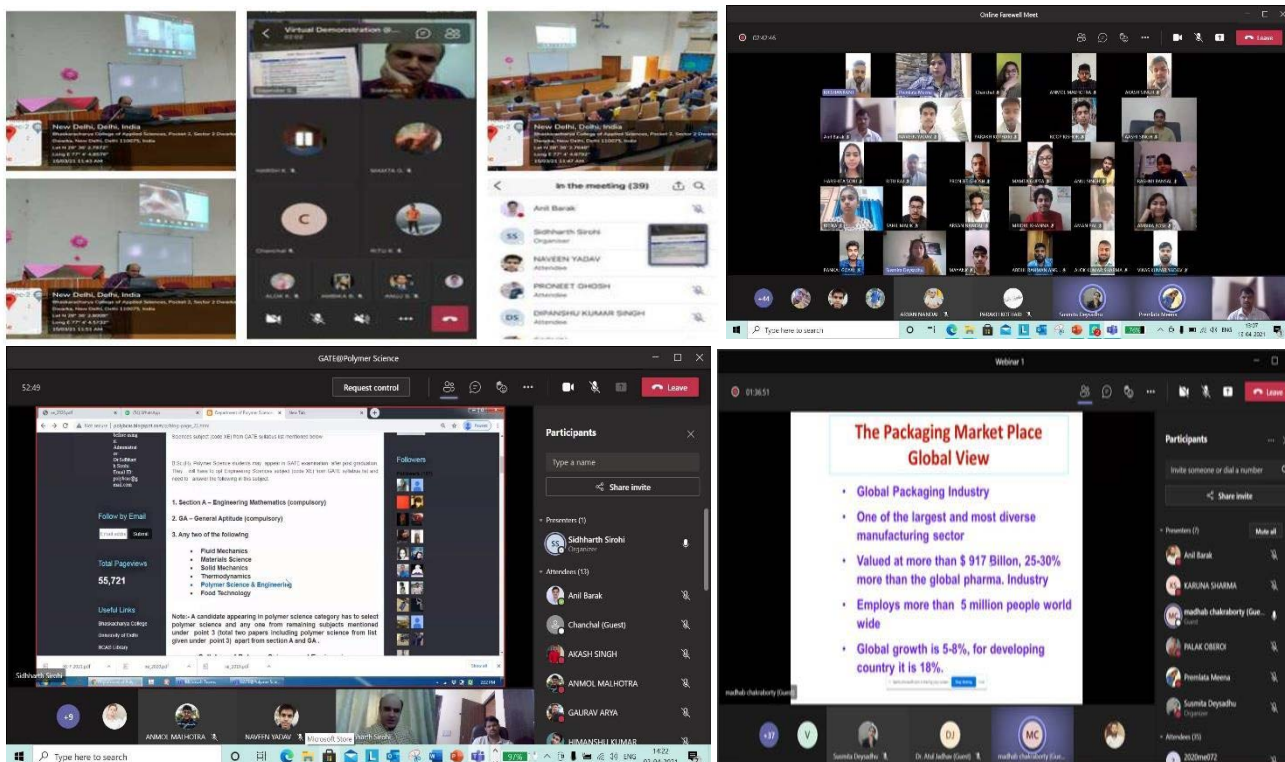
- DSE: Paper 5- Tire Technology
- DSE: Paper 6- Packaging Technology
- DSE: Paper 7- Fabrication of Polymeric products
- DSE: Paper 8- Polymer in Biomedical Applications
- DSE: Paper 9- Dissertation

The college will offer four DSE papers in semester V (DSE: Paper 1-4) and five DSE papers in semester VI (DSE: Paper 5-9). Out of which two papers in each semester i.e., V & VI are to be selected.

Students may also opt for a dissertation as a DSE course in Semester VI. It will be a six-credit course. The number of students who will be allowed to opt for this paper will vary depending upon the infrastructural facilities and may vary each year. The college may announce the number of seats for project work well in advance and choose students for the same. It will involve experimental work under the supervision of a faculty member and will involve eight hours of work per week. The project will be evaluated by internal and external examiners and the report should be sent to examiners in advance (prior to the day of examination).

For more details regarding syllabus and scheme please refer to: [http://du.ac.in/du/uploads/RevisedSyllabi1/Annexure-95.%20\(Polymer%20Science\).pdf](http://du.ac.in/du/uploads/RevisedSyllabi1/Annexure-95.%20(Polymer%20Science).pdf)
 For more details Polymer science Department's Blog may be referred at <http://polybcas.blogspot.com>





Special achievements of students graduating this year:

1. Mr. Mridul Khanna, Mr. Anmol Malhotra, Mr. Ankush Koundal & Mr. Pritish Jain won 2nd place in the 2021 “Make the Case” Student Team Case Study Competition showcasing highimpact initiative that prevent plastic waste in India on March 30, 2021.
2. Ms. Chanchal secured 2nd position in Polymer Trivia held in “CROSSLINK 2020-The Annual Tech Fest” organized by PEARL Society of Department of Polymer Science held on Feb. 3-4, 2020.
3. Ms. Chanchal secured 1st position in chess (girls) & 1st position in Cricket (Girls) InterDepartmental Sports competition held at Bhaskaracharya College of Applied Sciences on Jan. 23, 2020.
4. Ms. Mamta Gupta received certificate of Appreciation for volunteer-ship for the admission 2020-21 by University of Delhi.
5. Ms. Mamta Gupta secured 1st position in the poster making competition on the topic “Live it or born it- Say No to Tobacco” in the event organized by Modern and Fine Arts Club in association with Anti-Tobacco Cell & Film Club of Bhaskaracharya College of Applied Sciences on the occasion of National Science Day held on 26th Feb., 2021 through Microsoft Teams.
6. Mr. Naveen Yadav received certificate of appreciation in the National Level E-Quiz on “Indian Space Research Organisation” and scored 80% in the event organized by Research

cell on the occasion of Indian Space Science Week Celebration (5th – 12th August, 2020) at Bhagini Nivedita College University of Delhi.

7. Mr. Naveen Yadav received certificate of appreciation for contributing as a volunteer in Discipline Committee at SRIJAN 2020 (Annual Cultural Festival) held on Feb. 25-26, 2020 at Bhaskaracharya College of Applied Sciences.
8. Mr. Akash Singh, Mr. Proneet Ghosh, Mr. Shubhanshu Singh & Ms. Smriti Anand received acceptance letters for two-year full time Master Programme in Advanced Materials Innovative Recycling (AMIR) for 2022-23 at University of Bordeaux, France.
9. Mr. Shubhanshu Kumar Nigam appointed as the Quality Control Inspector in Ascent India, Manufacturer of Plastic & Rubber Hoses, Tubes & Pipes at Bawana, Delhi-110039.