



## Message from HoD's Desk...



# CHEM NEWS Issue 11



A Newsletter from the Department of  
Chemistry, VNIT Nagpur, 2022, Issue 11

DOWN TO CHEMISTRY...

Published on 15<sup>th</sup> JULY, 2022



Welcome to the Department of Chemistry, VNIT Nagpur! We, the Department of Chemistry, feel our enthusiasm to publish the **11<sup>th</sup> issue** of our departmental newsletter, "**CHEM NeWS**." I, as a head of the department would like to thank all the faculty members, non-teaching staffs and students for their limitless support and sincere efforts for the betterment and development of department. On this occasion, I congratulate all the team members of the editorial board for bringing up this issue in a better shape.

### Overview of the Department...

Department of Chemistry has started the journey from the inception of the institute, initially it has been serving to cater the need of engineering students of various branches. The Department started new program for undergraduate (B.Tech.) in Chemical Engineering in the year of 2006. Later on, the post-graduation program (M.Sc.) in Chemistry for two years duration was commenced in the year of 2012. More than sixty Ph.D. degrees have been awarded till 2019. At present thirty students are pursuing their research work to attain their doctoral degree. The highly motivated students, who understand the research dynamics and upgrade their skills, are strengthening the department's back bone. In their curriculum they are encouraged to take part in different projects to supplement theoretical knowledge with practical experiences. In order to interact with the outside world, the department has active collaboration with the academic as well as research organizations in India and abroad. The department is organizing Continuous Educational Events like STTP courses, Seminars, and conferences. The curriculum is taught by the distinguished faculty members with the combination of academic excellence and diverse research exposure in working different areas of science and technology with complete dedication and commitment. The research field includes Organic synthesis, Solid state chemistry, Crystal engineering and Nano-materials, Polymers and elastomeric composites, Inorganic Chemistry, Photo-catalysis and Bioinorganic Catalysis, Biophysical Spectroscopy and Photobiology, Chemical Thermodynamics, Resource Recovery and Environmental remediation, Bio-catalysis and Organic Chemo-Sensor, Electro-analytical Chemistry. The faculty members of the department have been awarded various national and international research fellowships. They have also authored many books and participated in national and international conference. The publication of their research works in various SCI index journals are the regular activities of the Department. Many R&D projects are being funded by different funding agencies viz. SERB, DST, MHRD, UGC, BRNS, CSIR, etc. Department has well-equipped laboratories with modern instrumental facilities and has been recognized by DST-FIST Sponsored Department since 2017!

### FACULTY MEMBERS

**DR. ANUPAMA KUMAR (HoD)**  
**DR. SURESH S. UMARE**  
**DR. JAYANT D. EKHE**  
**DR. SUJIT K. GHOSH**  
**DR. RAMANI V. MOTGHARE**  
**DR. CHAYAN DAS**  
**DR. ATUL V. WANKHADE**  
**DR. UMESH R. PRATAP**  
**DR. SANGESH P. ZODAPE**  
**DR. SUSANTA K. NAYAK**  
**DR. S. LAXMI GAYATRI**  
**DR. ABHISHEK BANERJEE**  
**DR. SANDIPAN HALDER**

## Recent Publications...

1. "Highly efficient hydrotalcite-based adsorbent for aqueous-phase cationic dye removal: structural features, kinetics and isotherm study" Ankur Malik, Raju Dutta, Rishika Aggrawal, Renuka Singh, Sumit Kumar Pal and **Chayan Das**,\* *Int. J. Environ. Sci. Technol.* **2022**, (Springer) <https://doi.org/10.1007/s13762-021-03843-9>
2. "Enhancing the material performance of chloroprene rubber (CR) by strategic incorporation of zirconia" Shubham Ambilkar, Gopal Dhakar, Bharat P Kapgate, Amit Das, Sakrit Hait, Rupesh S Gedam, Kasilingam Rajkumar, **Chayan Das**,\* *Materials Advances*, **3**, 2434-2446 (2022), (RSC) <https://pubs.rsc.org/en/content/articlehtml/2022/ma/d1ma00793a>
3. "Structural and Physico-chemical Properties of Electroactive Polyamide/multi-walled Carbon Nanotubes Nanocomposites" Chavhan Jitendra, Rathod Ramesh, Vipin Tandon, **Suresh S. Umare** and Awanikumare Patil, *Surfaces and Interfaces* **2022**, **29**, 101765.
4. "Tailoring Photoactivity of Polymeric Carbon Nitride via Donor- $\pi$ -Acceptor Network" Toshali Bhojar, Dong Jin Kim, B. Moses Abraham, Surendar Tonda, Nilesh R. Manwar, Devthade Vidyasagar and **Suresh S. Umare**, *Applied Catalysis B: Environmental*, **310** (2022) 121347.
5. "Supercapacitor activity studies of a unique triangular oxo-vanadate-bisphosphonate composite with activated carbon" Dewendra Thakre, Anjana Anandan Vannathan, **Abhishek Banerjee**, Sib Sankar Mal, *Ionics*, **2022**, **28**, 4001-4010.
6. "Molybdenum Chalcogenides for Photo-Oxidative Desulfurization of Liquid Fuels Under Ambient Conditions: Process Optimization, Kinetics, and Recyclability Studies" Yesleen Gupta, Zakiullah Zaidi, Laxmi Gayatri Sorokhaibam, **Abhishek Banerjee**, *Cat. Lett.*, **2022**, [doi.org/10.1007/s10562-022-04015-1](https://doi.org/10.1007/s10562-022-04015-1).
7. "Assembly of a coordination polymer with sulphate-capped pentamolybdate units and copper: Synthesis, Structure, Magnetic and Catalytic studies" Yesleen Gupta, Zakiullah Zaidi, Sakshi Mehta, Pranay R Chandewar, Nikhil Kumar, Avijit Kumar Paul, Debaprasad Shee, Abhishek Mondal, Laxmi Gayatri Sorokhaibam, **Abhishek Banerjee**, *Dalton Trans.*, **2022**, **51**, 7255-7267.
8. "Synthesis of Ag<sub>2</sub>V<sub>4</sub>O<sub>11</sub> nanoflakes mediated photoactivation of peroxymonosulfate ion for enhanced dye degradation and intrinsic bactericidal activity", Rudra P. Singh, Purna S. Khagar, Adarsh K. Mourya, Swapnil K. Warkhade, Sangesh P. Zodape, Umesh R. Pratap, **Atul V. Wankhade**, *Materials Science in Semiconductor Processing*, **2022**, **143**, 106526.
9. "Organophosphate eradication by phytochemical cocktail stabilized biocompatible silver nanoparticles loaded polydopamine via peroxidase mimicking activity", Purna Khagar, Ashutosh D. Bagde, Bhupesh Sarode, Atul V. Maldhure, **Atul V. Wankhade**, *Inorganic Chemistry Communications*, **2022**, **141**, 109622.
10. "Photocatalytic C-H Carboxylation of 1,3-Dicarbonyl Compounds with Carbon Dioxide Promoted by Nickel (II) Sensitized  $\alpha$ -Fe<sub>2</sub>O<sub>3</sub> Nanoparticles" Saini, Sandhya; Das, Ranjita; **Kumar, Anupama**; Jain, Suman Lata, *ACS Catalysis*, **2022**, **12**, 4978-4989. (Impact factor 13.084)

11. "Valorization of Punica granatum (Pomegranate) peels : A case study of circular bioeconomy" Shivali Singh Gaharwar, **Anupama Kumar**, Sachin A. Mandavgane, Rashmi Rahagude, Shital Gokhale, K.Yadav, and A.P.Borua, Biomass Conversion and Biorefinery; **2022**, DOI 10.1007/s13399-022-02744-2. (Impact Factor 4.987)
12. "An insight into the thermodynamic investigation of important metabolite (KCl)-methyl nicotinate in aqueous solution at various temperatures." Anuja Jain, Umesh R. Pratap, Atul V. Wankhade, **Sangesh P. Zodape**, Journal of Chemical Thermodynamics and Thermal Analysis, **2022**, 6, 100055.
13. "Solvation properties of 1-butyl 2, 3-dimethyl imidazolium chloride ionic liquid in aqueous and aqueous glycine solutions at different temperatures using volumetric and compressibility parameters." Anuja Jain, **Sangesh P. Zodape**, Journal of Molecular Liquids **2022**, 363, 119817.
14. "Cryptic Solvation Dynamics of Potential Antineoplastic Azapodophyllotoxin: Short and Long Range Charge Transfer and Distinct H-bonding Motifs Demystify its Swinging Emissive Behaviour", Smruti Gupta, Kapil Ganorkar, Naina Sehra, Ajay Kumar, **Sujit Kumar Ghosh** J. Photochem. Photobiol. A: Chem **2022**, 422, 113556. (International Collaboration).
15. "Electro-Oxidation and Determination of Ciprofloxacin at f-MWCNT@ Poly-Aniline Glassy Carbon Electrode". Prashu Jain, **RV Motghare**, Journal of The Electrochemical Society, **2022**, 169 056515 <https://doi.org/10.1149/1945-7111/ac6bbf>.
16. "Copper(II) complexes with NNN and NNO Schiff base ligands as efficient photodegradation agents for methylene blue, preferential BSA binder and biomaterial transplants" K. Jana, U. Pramanik, K. S. Ingle, R. Maity, S. Mukherjee, **S. K. Nayak**, S. Chandra Debnatha, T. S. Maity, B. C. Samanta Journal of Photochemistry and Photobiology A: Chemistry, **2022**, 422, 113565.
17. "2,2' -Bipyridyl Chelated Ru(II)-Annulated NHC Complex of 1- Methyl-2-Pyridin-2-Yl-2H-Imidazo[1,5-a]Pyridin-4-Ylidene: Synthesis, Structure, Optical Properties, and DFT Interpretation" B. Kumar Rana, J. Dinda, P. K. Mahapatra, D. Chopra, V. Bertolasi, K. M. Bairagi, **S. K. Nayak**, H. S. Das, S. Giri and G. Roymahapatra, Eng. Sci., **2022**, 17, 204–215.
18. "Cu@MTPOF as an Efficient Catalyst for the C–S Coupling of 2-Mercaptobenzimidazole with Aryl Halides and 2-Halobenzoic Acids" Dani, S. H., **Pratap, U. R.** Catal. Lett. **2022**, <https://doi.org/10.1007/s10562-022-04092-2>.

### Book Chapters...

1. One book chapter entitled "Case Study: Fruit and vegetable waste valorization" by Shivali S. Gaharwar, Vijay N. Mohakar, Anupama Kumar has been accepted for the book by Elsevier on "Nutraceutical from fruit and vegetable waste".
2. Book Chapter entitled "Scenario of Global Waste Production: Biogenic and Non-biogenic" by Manisha G. Verma, Ranjita S. Das, Anupama Kumar has been accepted for publication in the book "Green and Sustainable Approaches using Wastes for the Production of Multifunctional Nanomaterials" published by Elsevier.

## Granted Patent...

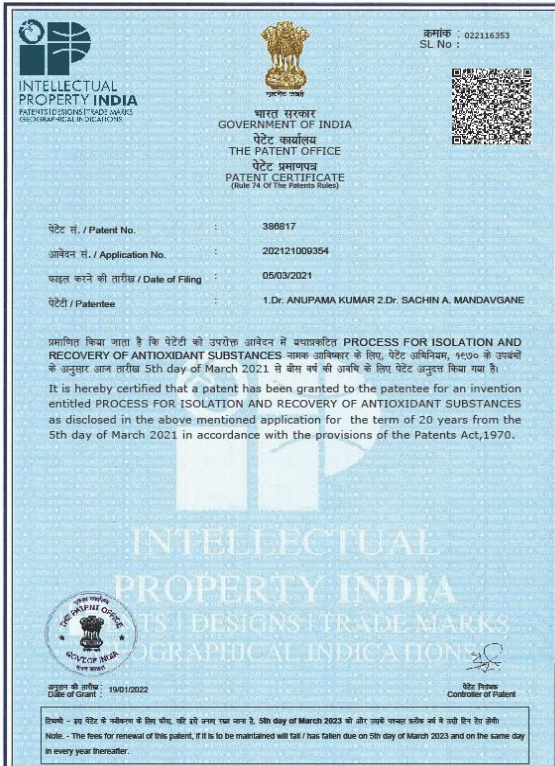
Indian Patent Awarded on “**PROCESS FOR ISOLATION AND RECOVERY OF ANTIOXIDANT SUBSTANCES**” on 19<sup>th</sup> January, 2022 (**Patent No. 386817**)

Any herbal extract has key bioactive components in ppm or ppb levels and selective separation of the same in a cost-effective way is a challenge. The Patent is on the process for the isolation of antioxidant substances such as polyphenols from the peels of fruits and vegetables. The ultra-dilute polyphenol mixture obtained is then purified by constructing a special polymer matrix. The developed process may help in the sustainable valorization of the peels, which are generated in huge amount and are otherwise treated as “waste”.

Indian Patent Awarded on “**BIOREFINERY PROCESS, COMPONENTS THEREOF AND PRODUCTS THEREFROM**” on 18<sup>th</sup> May, 2022 (**Patent No. 397096**)

The second patent describes a biorefinery process for producing value-added products from fruit and vegetable waste, with description of various components, method of use and products derived using this biorefinery system with zero waste thus depicting Circular bioeconomy.

A team of research scholars led by **Dr. Anupama Kumar**, from the department of Chemistry and **Dr. Sachin A. Mandavgane**, from the department of Chemical Engineering worked in collaboration to develop this unique process for which two Indian Patents have been granted. For the development of this process, research scholars **Praful Dadhe, Rashmi Rahagude** and **Ranjita S. Das** were involved.



INTELLECTUAL PROPERTY INDIA  
PATENTS | DESIGNS | TRADE MARKS  
GEOGRAPHICAL INDICATIONS

भारत सरकार  
GOVERNMENT OF INDIA  
पेटेंट कार्यालय  
THE PATENT OFFICE  
पेटेंट प्रमाणपत्र  
PATENT CERTIFICATE  
(Rule 74 of The Patents Rules)

कमर्क : 022116353  
SL No :

पेटेंट सं. / Patent No. : 386817  
आवेदन सं. / Application No. : 202121006354  
प्रदत्त करने की तारीख / Date of Filing : 05/03/2021  
पेटेंटी / Patentee : 1.Dr. ANUPAMA KUMAR 2.Dr. SACHIN A. MANDAVGANE

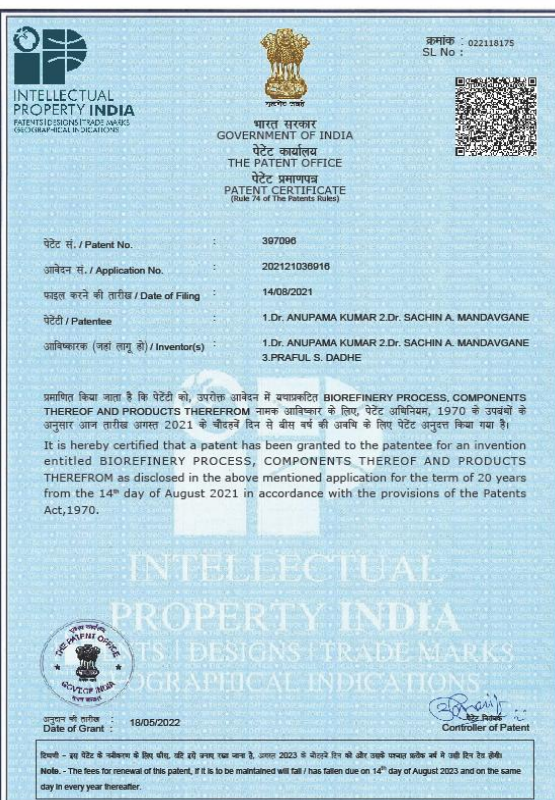
प्रमाणित किया जाता है कि पेटेंटी को उपरोक्त आवेदन में बयानबद्ध PROCESS FOR ISOLATION AND RECOVERY OF ANTIOXIDANT SUBSTANCES नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबन्धों के अनुसार आज तारीख 5th day of March 2021 से बीस वर्ष की अवधि के लिए पेटेंट अनुदान किया गया है।  
It is hereby certified that a patent has been granted to the patentee for an invention entitled PROCESS FOR ISOLATION AND RECOVERY OF ANTIOXIDANT SUBSTANCES as disclosed in the above mentioned application for the term of 20 years from the 5th day of March 2021 in accordance with the provisions of the Patents Act,1970.

INTELLECTUAL PROPERTY INDIA  
PATENTS | DESIGNS | TRADE MARKS  
GEOGRAPHICAL INDICATIONS

अनुदान की तारीख : 19/01/2022  
Date of Grant : 19/01/2022

डिप्टी कंट्रोलर ऑफ़ पेटेंट्स  
Deputy Controller of Patents

नोट - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, 5th day of March 2023 को और उसके पचास प्रतिशत में से उद्धृत किए गए लेखी।  
Note - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 5th day of March 2023 and on the same day in every year thereafter.



INTELLECTUAL PROPERTY INDIA  
PATENTS | DESIGNS | TRADE MARKS  
GEOGRAPHICAL INDICATIONS

भारत सरकार  
GOVERNMENT OF INDIA  
पेटेंट कार्यालय  
THE PATENT OFFICE  
पेटेंट प्रमाणपत्र  
PATENT CERTIFICATE  
(Rule 74 of The Patents Rules)

कमर्क : 022118175  
SL No :

पेटेंट सं. / Patent No. : 397096  
आवेदन सं. / Application No. : 202121036916  
प्रदत्त करने की तारीख / Date of Filing : 14/08/2021  
पेटेंटी / Patentee : 1.Dr. ANUPAMA KUMAR 2.Dr. SACHIN A. MANDAVGANE  
आविष्कारक (यहां लागू हो) / Inventor(s) : 1.Dr. ANUPAMA KUMAR 2.Dr. SACHIN A. MANDAVGANE 3.PRAFUL S. DADHE

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में बयानबद्ध BIOREFINERY PROCESS, COMPONENTS THEREOF AND PRODUCTS THEREFROM नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबन्धों के अनुसार आज तारीख अगस्त 2021 के चौदहवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदान किया गया है।  
It is hereby certified that a patent has been granted to the patentee for an invention entitled BIOREFINERY PROCESS, COMPONENTS THEREOF AND PRODUCTS THEREFROM as disclosed in the above mentioned application for the term of 20 years from the 14<sup>th</sup> day of August 2021 in accordance with the provisions of the Patents Act,1970.

INTELLECTUAL PROPERTY INDIA  
PATENTS | DESIGNS | TRADE MARKS  
GEOGRAPHICAL INDICATIONS

अनुदान की तारीख : 18/05/2022  
Date of Grant : 18/05/2022

डिप्टी कंट्रोलर ऑफ़ पेटेंट्स  
Deputy Controller of Patents

नोट - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, अगस्त 2023 के चौदहवें दिन को और उसके पचास प्रतिशत में से उद्धृत किए गए लेखी।  
Note - The fees for renewal of this patent, if it is to be maintained will fall / has fallen due on 14<sup>th</sup> day of August 2023 and on the same day in every year thereafter.

## Invited Talks...

- Dr. S. S. Umare has delivered an invited talk entitled "Chemicals use, Environmental issues, Policies and Remedial Measures" at Science forum VNIT Nagpur, on 21<sup>st</sup> April 2022.
- Dr. S. S. Umare has delivered an invited talk entitled "Role of Students in Environmental Protection" at Department of Chemistry, Maharashtra Institute of Technology, Aurangabad, on 4<sup>th</sup> June 2022.
- Dr. S. S. Umare has delivered an invited talk entitled 'Homostuctural Grahpic Carbon Nitrite for CO<sub>2</sub> reduction, Dye Degradation and Energy Storage Application' in National Conference on Current Trend in Chemical Sciences, 28<sup>th</sup> -29<sup>th</sup> June 2022, at Department of Chemistry, Sant Gadge Baba Amravati University, Amravati, the lecture was delivered on 29<sup>th</sup> June, 2022.
- Dr. Anupama Kumar has Delivered a Guest Lecture entitled as "Can Polymers have Memory?" at Sevadal Mahila Mahavidyalaya on 19<sup>th</sup> April, 2022.



## Achievements...

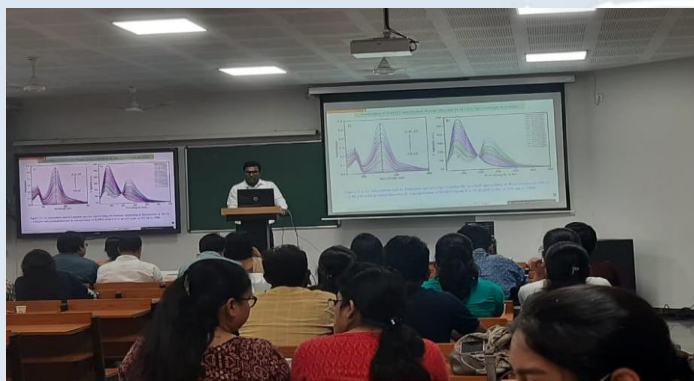
Dr. Anupama Kumar has been awarded **Best Oral Presentation award** at the International Conference on Advances in Chemical and Materials Sciences-(ACMS-2022) during 14<sup>th</sup> -16<sup>th</sup> April, 2022. This international event was organized by Indian Institute of Chemical Engineers, Kolkata in association with National Institute of Technology, Jalandhar Heritage Institute of Technology, Kolkata Osmania University College of Technology. The title of the presentation was **Valorization of potato peels using customized Molecularly Imprinted Solid-Phase Extraction for specific segregation of 4 hydroxy benzoic acid (antioxidant)**.

## Research Project Funded...

Research project entitled as “**Development of Photo detector for low intensity light levels in UV/VIS/IR wavelength regions**” (ID YS/PD-IP/333) from Indian Space Research Organization (ISRO) under S-TIC program. The funding has been granted to **Dr. Susanta Kumar Nayak** (Co-PI) and **Dr. Nikhil Deep Gupta** (PI) of worth 22.00 Lakh for the duration 24 months.

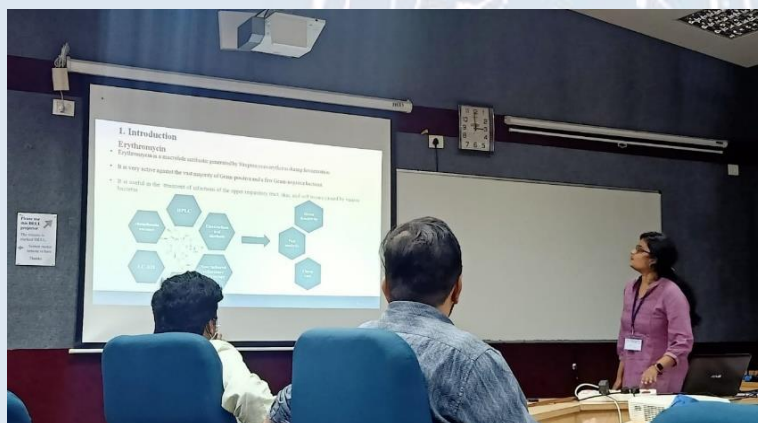
## Doctoral Degree...

**Mr. Kapil S. Ganorkar** successfully defended his Ph.D. thesis, entitled “**In Silico Design, Synthesis, Photophysical Exploration of a Thiosemicarbazone Derivative and the Mechanism of Cytotoxicity against Human Lung Cancer Cell Line**” on 29<sup>th</sup> June 2022, under the supervision of **Dr. Sujit Kumar Ghosh**.



## Oral presentation by Ph.D. Scholar...

**Ms. Prashu Jain** delivered oral presentation entitled “**Electrocatalytic behaviour of self-assembled Cu-chitosan/f-MWCNT on GCE for voltammetric determination of erythromycin**” in National Symposium on Electrochemical Science and Technology (NSEST-21) at the Department of Inorganic and Physical Chemistry, IISc., Bengaluru, during 24<sup>th</sup> – 25<sup>th</sup> June 2022.



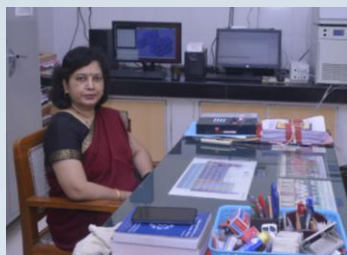
## Achievements of M.Sc. students...

MSc. Current Batch (2020-2022)

- Two students qualified qualified **GATE 2022**
- Training & Placement (**Campus Recruitment 2022**)

1. **Sayanti Senapati** - Metlok Pvt Ltd
2. **Pallavi Dubey** - Aarti Industries Ltd
3. **Rehan** - Real Academy
4. **Anisha** - Real Academy
5. **Yedle Dnyanasagar Hari** - Aarti Industries Ltd
6. **Rahul Chakrawati** - Aarti Industries Ltd

## Faculty Members Got Promoted..



**Dr. Anupama Kumar**  
promoted to "Professor"



**Dr. Sujit Kumar Ghosh**  
promoted to "Professor"



**Dr. Chayan Das**  
promoted to "Associate Professor"



**Dr. Ramani V. Motghare**  
promoted to "Associate Professor"



**Dr. Atul V. Wankhade**  
promoted to "Associate Professor"



**Dr. Umesh R. Pratap**  
promoted to "Associate Professor"

## Editorial Board

**Dr. SANDIPAN HALDER**

ASSISTANT PROFESSOR

E-Mail: sandipanhalder@chm.vnit.ac.in

**Mr. SIBASISH MANNA**

Research Scholar

sibasishmannachem@gmail.com