NEWSLETTER

BIOFOCUS

DEPARTMENT OF BIOTECHNOLOGY

VOLUME 02

2024 - 2025

"LIFE BEGINS IN THE BIOTECH LAB – WHERE INNOVATION MEETS DISCOVERY!"

KUMARAGURU
college of technology
character is life

Each of those obstacles would always be more tangible than contributions I hadn't yet made. Obstacles have shape and structure; you can see them. One's future impact, by contrast, remains invisible, hypothetical, at least until the future finally arrives.

Katalin Kariko,
BREAKING THROUGH: MY LIFE IN SCIENCE

In this Issue

1 Message

1.1 Vision, Mission, HOD's Message & From the Editorial Desk

1.1.1 About the Department

The Department of Biotechnology is a pioneering department, which harnesses and nurtures specific skill sets that integrates life science and technology, and the curriculum is constantly upgraded to suit the demands of the industry. Faculty members are trained both in reputed institutes and industries periodically in a constantly evolving field of engineering relevant to biotechnology. Currently, the Department of Biotechnology offers B.Tech.(Biotechnology), M.Tech.(Biotechnology) and Ph.D.(Full/Part-time) with a well-structured and balanced curriculum focusing on the major areas viz., Healthcare, Nutrition, Bioprocess Technology and Environmental Biotechnology.

1.1.2 From the HOD's Desk

The Department of Biotechnology commenced its academic and scientific journey in the year 2002, and built up ambience and infrastructural facilities for effective academic and research activities over the period. Our students have excelled in curricular, co-curricular and extra-curricular activities. The faculty members engage in effective curriculum delivery and research on socially relevant projects. Most of our graduates get placed in life science related companies and the rest pursue higher studies in reputed institutes in India and abroad. Our graduates, spread all over the world, are the dynamic ambassadors of our performance.

Dr. ***Vinohar Stephen Rapheal***, Associate Professor & Head

1.1.3 Vision

Strong teaching and research foundation in the area of biotechnology and allied fields through knowledge dissemination to students and the public and to scale new heights in the frontier areas of health and environment and ethics for welfare of humankind globally.

1.1.4 Mission

1. Develop dynamic curriculum and syllabus to promote innovative and create practices.
2. Encourage students for innovation and setting start-ups and equip leadership an entrepreneurial skills
3. Train students on issues related to social welfare.

1.1.5 From the Editorial Desk

Post the success of the previous issue the Biofocus Newsletter [2023-24] is back with much more interesting stories and happenings in the department. In this issue, key events and inside story of the event is also elaborated. Write-ups and special pages from students are been compiled together.

Dr. ***Ram K*** , Assistant Professor-III & Editor-Biofocus

Paper Publication by Faculty

2

- **August 2024**
  - Kuppusamy, B., Gopalakrishnan, S., **Natesan, S.,** Rajamohan, N., Rajasimman, M., Yusuf, M., & Kamyab, H. (2024). Valorization of sugarcane bagasse cellulose to synthesize novel graphene oxide-based composite for remediation of atrazine-Optimization studies. Journal of Environmental Chemical Engineering, 12(3), 112767.
  - **Kothandan, R.**, ... & Selvaraj, D. (2024). Gene network analysis combined with preclinical studies to identify and elucidate the mechanism of action of novel irreversible Keap1 inhibitor for Parkinson's disease. Molecular Diversity, 1-18.
  - Admane, N., **Kothandan, R.**, & Biswas, S. (2024). Amyloid transformations of phenol soluble modulin Îś1 in Staphylococcus aureus and their modulation deploying a prenylated chalcone. Scientific Reports, 14(1), 18587.
- **September 2024**
  - **Veerichetty, V.**, P. A., & Saravanabavan, I. (2024). Identification of bioactive compounds by GC-MS of Nelumbo nucifera leaf extract and virtual screening of EGFR/VEGFR2 dual inhibitors. Biotech Research Asia, 21(3).
- **October 2024**
  - Ragupathi, H., Pushparaj, M. M., Gopi, S. M., Govindarajan, D. K., & **Kandaswamy, K.** (2024). Biofilm matrix: a multifaceted layer of biomolecules and a defensive barrier against antimicrobials. Archives of Microbiology, 206(11), 432.
  - Govindarajan, D. K., Eskeziyaw, B. M., **Kandaswamy, K.**, & Mengistu, D. Y. (2024). Diagnosis of Extraintestinal pathogenic Escherichia coli pathogenesis in urinary tract infection. Current Research in Microbial Sciences, 100296.
- **November 2024**
  - Salomon, B., **Sudhakar, P.,** Bergemalm, D., Andersson, E., Granno, O., Carlson, M., & Halfvarson, J. (2024). Characterisation of IBD heterogeneity using serum proteomics: A multicentre study. Journal of Crohn's and Colitis, jjae169.
- **January 2025**
  - Kabila, N., **Thirumurugan, A.,** Samrot, A. V., & Prakash, P. (2025). Starch nanocrystals from cassava peel and their use as carrier system for quercetin. Vegetos, 1-10.

2.0.6 Book Chapter

- Senthil, K. K., Muthukumaran, V., Thirumalai, R., **Sathishkumar, T.,** & Santhosh, S. (2024). Investigation of surface hardness of AISI 316L SS from QPQ complex salt bath treatment process using response surface methodology. In Challenges and Opportunities in Industrial and Mechanical Engineering: A Progressive Research Outlook (pp. 841-849). CRC Press.
- Karuppannan, S., & **N, S.** (2024). Influence of domestic food waste intrusion on microbes producing cellulose. Biomass Conversion and Biorefinery, 1-10.

3 Faculty Participation

3.1 Faculty Participation in FTP, STTP, Workshop and Other Training Programs

- **September 2024**
  - Dr. N. Saraswathy and Dr. P. Muthukumaran attended an FDP on Universal Human Values (UHV) from September 23 to September 30, 2024 (8 days, offline), which involved lectures and training.
  - Dr. D. R. Manimaran engaged in a Professional Development Program (PDP) on Eco-tourism and Recreational Enterprising at NITTTR, Chennai, from September 23 to September 27, 2024 (5 days, online).
- **October 2024**
  - Dr. T. Sathish Kumar completed an AICTE-approved FDP on Overview and Integration of Cellular Metabolism (NPTEL) from July to October 2024 (12 weeks, online).
  - Dr. D. R. Manimaran participated in the District Level Disaster Management Training Programme at Adithya International School, Idigarai, Coimbatore, from October 6 to October 7, 2024 (2 days, offline).
- **November 2024**
  - Dr. M. Shanmugaprakash participated in a Five-Day National Workshop on Recent Advances in 3D Printing for Tissue Engineering Applications at the School of Basic and Applied Sciences, Dayananda Sagar University, Bengaluru, Karnataka, from November 11 to November 15, 2024 (5 days, offline).
- **January 2025**
  - Dr. K. Ram attended the DBT-Sponsored Workshop on Chemo-informatics and System Biology Approaches for Drug Discovery at the Department of Biotechnology, Anna University, AC Tech Campus, Chennai, from January 6 to January 10, 2025 (5 days, offline).

4 Notable Events

Photo. 4.1: Students of Batch 2022-26 B.Tech Biotechnology attended a internship at Spinos Life Science, Coimbatore.

Photo. 4.2: Dr. M. Shanmugaprakash at the workshop -Recent Advances in 3D Printing for Tissue Engineering Applications

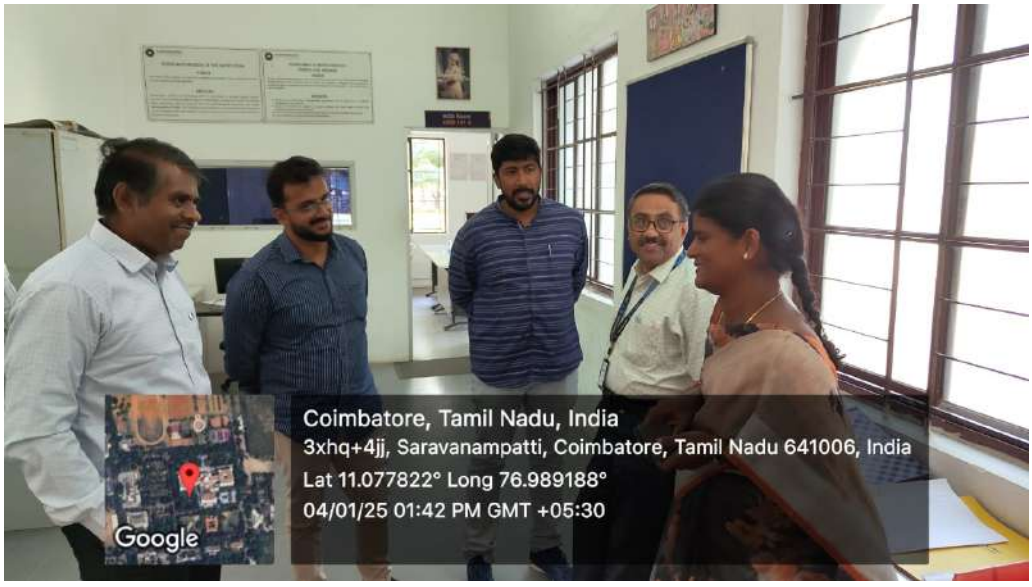


Photo. 4.3: Alumni Visit – Mr. M. Pratap [Batch 2012] visited the department and served as expert for Project Review.

3D Printing 5

3D printing, also known as additive manufacturing, has revolutionized biotechnology, enabling the development of complex biological structures with precision. This technology has accelerated advancements in tissue engineering, drug development, and organ transplantation.

Latest Developments

- **Bioprinting of Organoids:** Scientists have successfully printed functional organoids, such as miniature liver and kidney models, aiding in drug screening and personalized medicine.
- **3D Printed Scaffolds:** Advanced biomaterials and hydrogels are being used to print scaffolds for tissue regeneration, improving the success rate of implants and prosthetics.
- **Artificial Organs:** Researchers are developing bioprinted heart tissues and pancreatic cells, paving the way for future organ transplants without the need for donors.
- **Personalized Medicine:** 3D printing allows the creation of customized drug delivery systems, enhancing targeted therapy and patient compliance.
- **Biosensors and Lab-on-a-Chip Devices:** Microfluidic devices and biosensors manufactured using 3D printing enable rapid disease detection and diagnostics.

3D printing in biotechnology is a transformative innovation, offering solutions for regenerative medicine, drug testing, and personalized healthcare. With continuous advancements, this technology is poised to redefine the future of medical and biotechnological applications.

My Experience 6

6.1 A Transformative Learning Experience: Five-Day Workshop on 3D Printing for Tissue Engineering Applications

Venue: Dayananda Sagar University, Bangalore sponsored by DST-SERB

The world of biomedical engineering is rapidly evolving, and this report details my experience at the five-day national workshop on "Recent Advances in 3D Printing for Tissue Engineering Applications." This comprehensive program provided **insights into revolutionary technologies shaping the future of tissue engineering and biomedical applications**.

6.2 Day 1: Setting the Stage for Innovation

The workshop, organized by DST-SERB under Dr. S. Geetha Priya's guidance, commenced with an inaugural session. Dr. Ashok Kumar's keynote address on "3D Printing: Opportunities and Challenges" highlighted:

- **The potential of 3D printing in personalized medicine**
- **Development of patient-specific implants**
- **Regulatory and ethical considerations** in implementation

6.3 Day 2: Understanding the Fundamentals

Mr. Varun from the School of Design led sessions covering:

- Historical evolution of 3D printing technologies
- **Comprehensive overview of materials**: plastics, metals, and ceramics
- **Hands-on training in model design and preparation**
- Practical troubleshooting techniques

6.4 Days 3-4: Exploring Cutting-Edge Techniques

These intensive days focused on:

- **Advanced printing techniques**:
  - Fused Deposition Modeling (FDM)
  - Stereolithography (SLA)
  - Selective Inhibition Sintering (SIS)
- **Multi-material printing processes**
- Post-processing techniques and their impact on mechanical properties
- **Integration of 3D printing in education and research**

6.5 Day 5: Real-World Applications and Future Prospects

The final day featured presentations by Prof. Dr. Vignesh Muthuvijayan and Dr. Janani Radhakrishnan, covering:

- **Cutting-edge applications in tissue engineering**
- Development of biocompatible scaffolds
- Organ-on-chip models
- **Material-cell interactions and biological compatibility**

6.6 Key Takeaways

- **3D printing technology is revolutionizing patient-specific biomedical solutions**
- **Practical experience in model design and troubleshooting is essential**
- **Multi-material and biocompatible printing advances are crucial for tissue engineering**
- **Ethical and regulatory frameworks need development** for clinical implementation
- **Integration with research and education accelerates innovation**

This workshop provided invaluable insights into the intersection of 3D printing and tissue engineering. The combination of theoretical knowledge and practical experience has equipped participants with the tools needed to contribute to future biomedical advancements. The experience reinforced the transformative potential of 3D printing in medical applications and the importance of continued innovation in this field.

7 Industry Initiatives

7.1 Expert Talks, One-credit Courses

Photo. 7.1: Empowering Future Innovators: Dr. Saravanan Ilangovan leads an insightful session on Informatics in Regulatory Affairs and Drug Discovery

1. Session on **Opportunities and Persisting avenues in Clinical Research and Data Management** on 19-09-2024 by Mr. Vasanth Kumar Padmanabhan and Team, AstraZeneca and Sanofi Healthcare India Private Limited Bangalore was conducted. Around 200 students and Faculty participated in the event.

2. One credit course on **Informatics Tools and Techniques in Regulatory Affairs and Drug Discovery** on 21-09-2024 & 22-09-2024 (SESSION 1) and 28-09-2024 & 29-09-2024 (SESSION 2) by guest speaker Dr. Saravanan Ilangovan, Associate Director (Global Lab Informatics) at Elanco Pvt. Ltd., Bengaluru, was conducted. Around 45 students participated in the event.

3. Expert Talk Session in collaboration with IIC, KCT entitled **How to Plan for Start-up and Legal & Ethical Steps** on 23-08-2023 by Dr. J. Fathima Benazir, Chief Scientific Officer and Co-founder, Azooka Labs, Bengaluru, was conducted. Around 53 participants attended the event.

4. Expert Talk Session (A core placement training initiative) entitled **Expected Employable Skillsets for Pharma and Biotech Industries** on 18-07-2023 by Mr. M. Kannan, Manager, Healthium Medtech Ltd., Bengaluru, was conducted. Around 50 students and faculty members participated in the event.

7.2 Industry Internships

Photo. 7.2: Bioignite - Active Participation of Students

7.2.1 BioNEST - Molecular Biology Training

Students of Batch 2022-26 attended the **BioIgnite - 6 days hands-on training programme on Molecular Biology** , organized by PSG-STEP , BioNEST, PSG College of Technology, Coimbatore

Photo. 7.3: Bioignite - Students with the BioIgnite Coordinator

7.2.2 Rapture Biotech, Bangaluru

Students of Batch 2022-26 attended the training programme in Rapture Biotechnology, Bangaluru

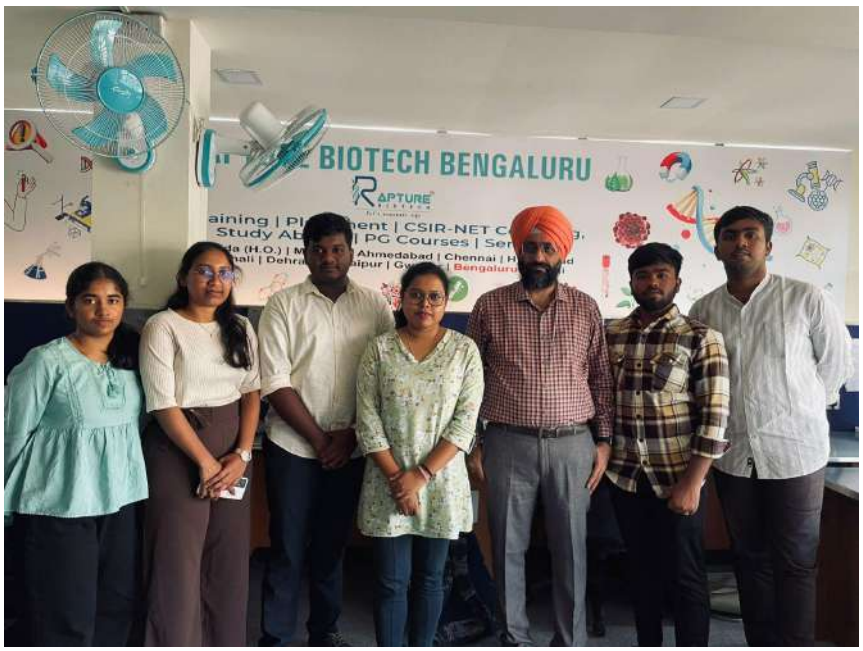


Photo. 7.4: Students along with the Organizer from Rapture Biotech

8 New Facility

Inverted Fluorescent Microscope

- **Brand:** Carl Zeiss
- **Model:** Axio Vision A1
- **Magnification:** High-resolution imaging
- **Compatible Dyes:** SYTO/PI
- **Cost:** ~16 Lakhs

Gel Documentation Apparatus & Electrophoresis System

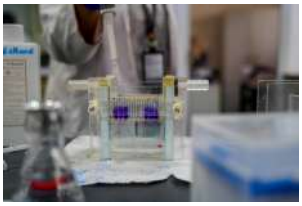
- **Brand:** BIORAD
- **Model:** GelDoc GO
- **Cost:** ~7 Lakhs

Workstation

- **Brand:** Lenovo
- **Model:** ThinkStation P720
- **Cost:** ~6 Lakhs

Laminar Flow Biosafety Cabinet

- **Cost:** ~1 Lakh



8.1 Prizes Won

8.1.1 ICFBB-24, SIET, Coimbatore

A team of first-year M.Tech Biotechnology students from our institution has secured the Third Place in the International Conference ICFBB-24, held at Sri Shakthi Institute of Engineering and Technology on December 13, 2024. Congratulations to the brilliant team: Kathirvelan V (24MBT004),Amuthavalli Naayaki M (24MBT001), Neha Sri S.R (24MBT010), Sankarapriya M (24MBT013), Sheeja J (24MBT014)

8.2 Students Outreach

8.2.1 Visit to United Age Home

A team of student of Batch 2022-26 visited United Old Age Home

Gut Health Story 9

9.1 The Hidden Power of Gut Health

Alex had always struggled with fatigue, mood swings, and frequent stomach issues. No matter how much sleep he got or how healthy he tried to eat, something always felt off. Frustrated, he decided to visit a nutritionist, who introduced him to the fascinating world of gut health.

"Your gut is like a second brain," the nutritionist explained. "It influences your digestion, immune system, and even your mood. Hippocrates once said, 'All disease begins in the gut,' and modern science is proving how right he was."

As Alex started focusing on his gut microbiome by incorporating probiotic-rich foods, fiber, and reducing processed sugars, he noticed profound changes. His energy levels soared, his digestion improved, and his mood stabilized. The transformation felt nothing short of miraculous.

"The gut microbiome is like a garden," said Dr. Michael Ruscio in Healthy Gut, Healthy You. "Feed it right, and it flourishes. Neglect it, and weeds take over." Inspired by this wisdom, Alex continued his gut-friendly lifestyle, realizing that true wellness started from within.

Months later, he no longer suffered from constant fatigue or digestive discomfort. His journey had taught him that gut health was not just about foodâĂŤit was about overall well-being. "Taking care of your gut is one of the best investments in your health," he reflected, sharing his newfound knowledge with friends and family.

In the end, Alex learned that the key to feeling great wasn't a complicated diet or expensive supplements. It was a simple shift in awareness and a commitment to nurturing the trillions of microbes that called his gut home.

The KCT-Gut Man

Rethink: Do you think the probiotics in commercially available curd are sufficient to support long-term gut health, or are there better alternatives?"

Write to us if you got an answer - `bioinfokct@gmail.com`

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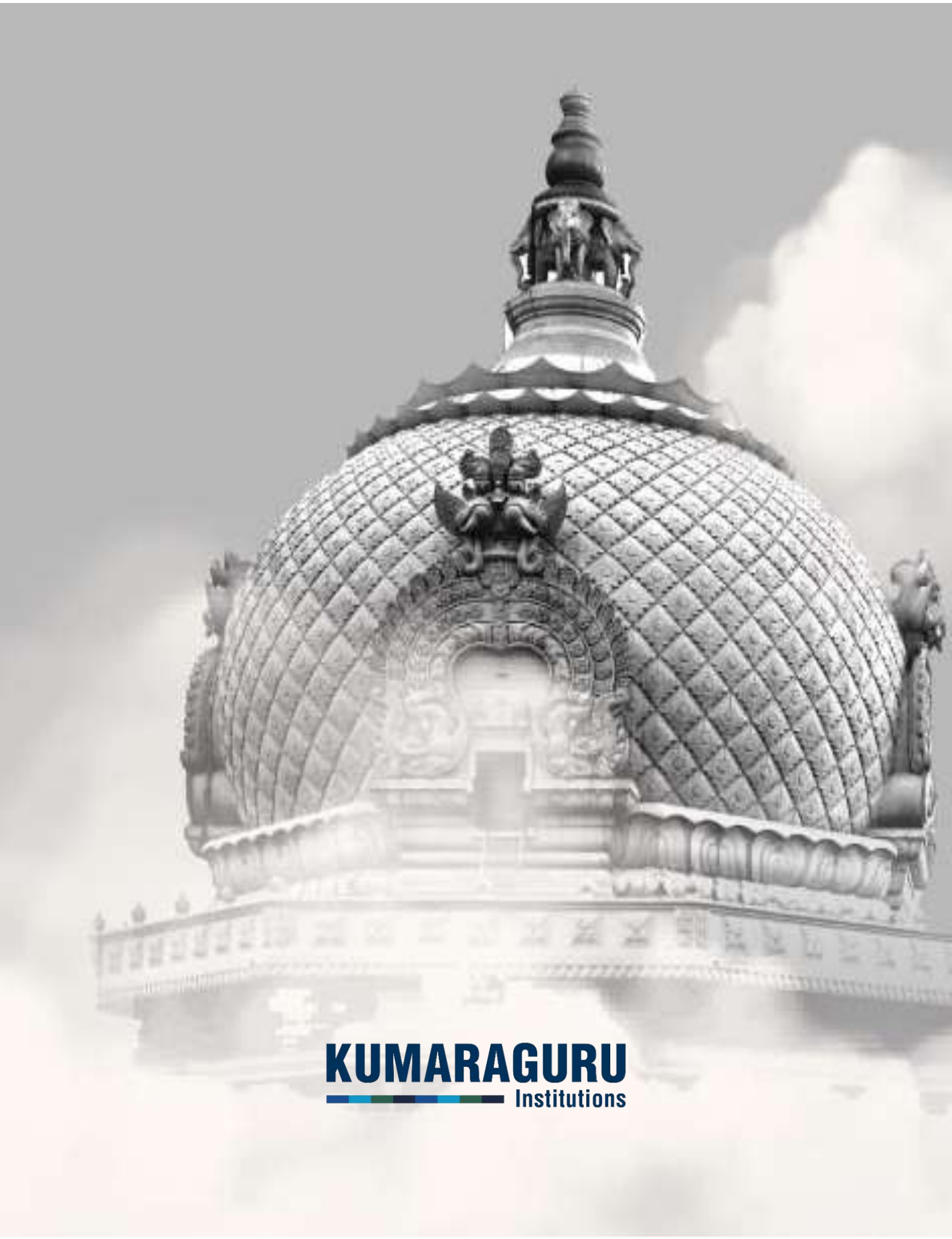
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