

## **A. INDUSTRY**

**1 Title of the Practice:** Industry aligned project-based learning leading to innovation, incubation of new ideas and startups.

**2. Objectives of the Practice:** To create experimental learning through solving problems of Government, Society, Smart Cities, Industry and other entities.

**3. The Context:** Most employability report and surveys indicate a lack of job readiness among Indian engineering graduates. Engineering students need to learn industry-aligned technologies and learn to find solutions from their early engineering days. This is the only way to produce globally relevant engineers. Solving real-life problems applying current technologies is the way to learn.

**4. The Practice:** Projects are being generated through problem faced by and requirement of Smart cities, industry, government and other entities. These problem statements are studied deeply by a group of faculty members who convert them into real-time project format. The institution has upgraded its infrastructure to meet resources requirements for finding solutions to these generated problems. An ecosystem has been created where students spend long hours with faculty and industry mentors. The institute has established its own large Public Cloud infrastructure (100 Virtual Machine, 400 Cores, 256 GB RAM, 100 TB Storage) on the campus with Big Data handling capabilities (Hadoop, HIVE, SPARK etc installed) to train students on handling and management of the cloud. This provides unique hands-on learning for the student.

The institute has also created a pool of highly experienced industry mentors who have worked in senior positions in organizations like IBM, INTEL, NVIDIA, TATA GROUP and others. Mr Lalit Yagnik, Former Director, IBM – Australia/Singapore/India and our senior faculty Mr Sunil Nanda, former director NVidia & Intel guide students to give industry perspective to these projects. Students also learn to handle real-life projects through participation in National & International hackathons organized by Government as well as Industry.

**5. Evidence of Success:** Above practices has resulted in many new ideas generated by students, which were incubated at the college and converted into startups.

**Low-Cost Full feature Ventilators:** this project conceived and developed by Techno NJR students under the mentorship of Pileri Atamnirbhar Resource Center (**PARC**- A BITS alumni social initiative) is at the final stage of product design. This project has been accepted by the Indian Institute of Management Incubation Udaipur centre under their start-up mentorship programme.

**Wricks:** Low-cost environment-friendly high-quality Pavers and bricks made of Marble slurry (in abundance in Udaipur with India's 75% marble production), demolition and constructions waste and waste plastic. This project is already under IIM, Udaipur incubation center for a mentorship programme and has approval and funding of –

1. Rs.15 Lakh from the Government of Rajasthan
2. Rs. 10 Lakh from AICTE MHRD Innovation Cell
3. Rs. 5 Lakh from Carbon Zero challenge from IIT, Madras
4. Award of Canadian Dollar 12500 from Schulich Business School, Canada in 2021 organised by Schulich with Startup India.

**Lake/Well Water Quality Monitoring System:** This students project was awarded USD 6000 by Intel corporation in international project competition, This IoT system using multiple sensors and cloud connectivity can be installed in Lakes/Wells to get real-time water quality data on various devices – screens, mobile, computers through a web dashboard. This system has been approved by the Mayor of Udaipur for installation and testing in various Udaipur lakes.

**Learning Management System** – A learning management system (portal) was designed and developed by Techno NJR faculty and students which has many advanced features including curation of content, quizzes, assignments, projects, mentorship, forums etc and was approved by IBM India Ltd for their education offerings to students in Indian colleges, universities. It is presently under use by the IBM-ICE division for which IBM is paying to students & faculty startup Prolab. on per student use basis.

**Data Cops** -. The project involved analysing data on crimes against women for all districts in the country to identify hitherto undiscovered trends, identify causes and propose solutions. The group of students proposed a blockchain-based e-FIR system that would help victims seek justice and an emergency alarm/call facility not dependent on the internet. This project was awarded 2nd prize of Rs. 1 Lakh in the Ministry of Electronics and IT competition OpenGovDataHack 2019 by the then Union Minister.

**Augmented & Virtual Reality** A team of students created a virtual reality simulation of IC chip design/productions based on an actual IC Fabrication lab situated in Manipal University, Jaipur. Another group of students created a Virtual Reality Module of BMW engine for the training of Mechanics on BMW engines. BMW India gifted one BMW-7 engine to the institute for developing the training module on virtual reality platform.

**COVID-19 Citizen Isolation Management** in conjunctions with Rajasthan Government.

#### Awards won by Techno NJR Students

Sl. No.	Event	Position	Prize
1	Entrepreneurship Bootcamp – Schulich School of	1st Runner Up	Rs. 7.5 Lakh (12,500 Can \$)

	Business		
2	Intel Hack 2017	Student Innovation Award	Rs.5.5 lakh (\$ 6000 US)
3	Rajasthan DigiFest 4.0 - 2018	Winner	Rs.15 Lakh
4	Rajasthan DigiFest 3.0 - 2017	1st Runner Up	Rs. 10 Lakh
5	Smart India Hackathon - H/W 2018	1st Runner Up	Rs.75000
6-	Smart India Hackathon - S/W 2018	2nd Runner Up	Rs. 50000
7	TechGig Code Gladitors 2018 - Cloud Computing	1st Runner Up	Rs. 1 Lakh
8	TechGig Code Gladitors 2017 - IBM BlueMix	1st Runner Up	Rs. 75000
9	Tech Challenge 2017 - Capgemini	Winner & Runner Up	Rs. 1 Lac
10	HackGSF 2017 - FinTech	Winner	Rs. 20000

**6. Problems Encountered and Resource Required:** To keep faculty aligned with the new technologies and industry requirements is the major challenge. For that, we keep inspiring faculty members to enroll in MOOC, visit industries, meet industry and Commerce chambers to understand industry problem and through this process update their knowledge. The most delightful outcome of 5 years of journey with new ways of learning has been 2500+ online certification done by faculty and students during the COVID-19 lockdown period including many 1st year students.

**7. Notes:** The institution has created a repository of high level and real-life projects for students involving technologies like AI, ML, Data Analytics, Watson, Blockchain, Cloud, Mobile Computing and AR/VR. In addition, good problem statements submitted by various Ministries of Government of India for the Smart India Hackathon in the last 3 years have been converted into student projects with the latest technology stack. As students have been trained in design thinking, they are encouraged to convert real-life problems, they see in society/city into a problem statement and then into a project. Awarded student projects like Lake Monitoring System, Smart Meter Grid project, and Farmers Friend and IC Fabrication lab in VR have emerged through this process only.

## B. RESEARCH

**1. Title of the Practice: Research-based innovative learning**

**2. Objectives of the Practice:** To develop an investigative mindset among students through an indepth understanding of various problems and finding solutions and sharing them with the world through research papers. in High impact journals and refereed conferences.



**3. The Context:** Technologies and science are evolving at an unprecedented pace and India still lacks strong international research as reflected in a global ranking of Indian universities. The Institute has been promoting the writing of Research papers by students & faculty.

**4. The Practice:** The Institute has a strong Research team that hold PhD degrees in their respective fields. They have written more than 30 books and 100+ research papers in High impact journals and conferences. They interact with students regularly to find and assess their interest in deep learning of a subject through writing research papers in a chosen area. The Institute also has MOU's with 10 International Universities and have 14 professors of International universities as Adjunct faculty. Students can also choose to write research papers under their guidance in their area of expertise.

**5. Evidence of Success:**

- Research papers by faculties – The faculty members have published 60+ research papers in SCI/Scopus journals and referred conferences during the last two years.
- Research papers by students – The students have published 20+ research papers in Scopus indexed Elsevier journal and conferences during the last one year.
- Books written by faculties – The faculty members have written 30+ books.
- International patents granted – In 2020-21, nine Australian innovation patents have been granted in the innovation and incubation centre of the Institute.
- Functional international research MOUs – The institute has several functional research MOUs with North Dakota State University USA, Lincoln University College Malaysia, University of South Wales UK, Tsinghua University China, Waseda University Japan, University of Salerno Italy, Asian Institute of Technology Bangkok, Wroclaw University of Science and Technology Poland.
- Student research internships abroad – 30 students were selected to pursue research internship in foreign universities viz. TLIAP-NUS Singapore, Lincoln University College Malaysia, Asian Institute of Technology Bangkok, University of Malaya Malaysia and Tsinghua University China. 5 students visited LUC Malaysia while other visits have been postponed to 2021 due to COVID-19 situation in 2020.
- Recognition of faculty due to research contribution – one faculty has been awarded Honorary D.Sc. degree from Shiraz University of Medical Science, Iran (A reputed University of Govt. of Iran)

**6. Problems encountered and Resources Required:** Students are generally focused on activities that lead to a job rather than writing research papers. The faculty has to spend time convincing students for writing high-level research papers.

**7. Notes:** The institute has created a healthy research atmosphere and collaboration with top foreign international universities.