

## ANNEXURE-4

### INNOVATIONS IN RESEARCH

- **Low Cost Reusable Micro Air Vehicle**

As part of the NPMICAV program of GoI funded by DST and DRDO, Center for Emerging Technology has developed a low cost MICAV for reconnaissance and surveillance using different polymer materials. The 330 mm MICAV is made from a combination of PET, PP and PC fused with Roah cell. Systems can be produced at a very low cost in batch production mode. The systems are produced through a combination of hot pressing, thermo vaccum forming and injection molding.



- **Amphibian:**

A prototype mini amphibian capable of being used for studying marine life as well as for underwater surveillance has been developed based on the funding received from DRDO by the Center for Emerging Technology

- **Novel Additive for Lubricant**

An additive namely zirconium oxychloride has been developed by Center for Emerging Technology to be mixed with base oils to act as a lubricant for surfaces in relative motion. The additive developed exhibits very less stick-slip and frictional behavior desirous of good lubricants.

- **Fire research:**

The Center for Disaster management designed a 2.16 m x 2.16 m Heptane pool fire studies to test performance of firefighting foams for Underwriters Laboratories as per UL 162. These tests are aimed at qualifying new foam formulations or checking the

potency of aged foams in user facilities. Over 70 fire tests have been conducted in an outdoor facility. The data generated is being analyzed to understand the behavior of firefighting foams. The tests conducted at Jain University for characterization of 4 m x 4 m pool fire is considered as an achievement by BARC.

- **Fire retardant materials development:**

Expanded Polystyrene (EPS) is a false roof material commonly used in commercial establishments and presents a fire risk. A gypsum based coating is developed to protect existing EPS false roofs during fire incidents. The coating is subjected to liquid pool fire assault up to 300 kW in a full scale facility and is found to be effective.

- **Biomass Stoves:**

Ejector action of combustion air can be utilized to obtain clean combustion in biomass stoves. Two new biomass combustion technologies based on ejector action: Improved Ejector Induced Gasification and Enhanced Hybrid Ejector Reverse Downdraft Stove (Consisting of additional air supply to grate bottom to enhance biomass gasification, EHERS stove) are developed at Jain University based on ejection concept. These technologies use conditioned biomass fuel and/or pellets and have exhibited exemplary performance at power levels from 1 to 100 kg/h. Concept of utilization of food waste as a binder for production of biomass pellets is tested with success.

- **Seismic Hazard Mapping:**

CDM is working with NDMA, Government of India on seismic hazard mapping.

- **Microbial fuel cell (MFC):**

Suitable for Micro Air Vehicle application, supported by a DRDO grant, is also a presently ongoing innovative project. MFC is a renewable bioenergy source, representing a novel method for simultaneous bioelectricity generation and pollutants treatment over conventional methods. MFCs are energy sources with no net carbon dioxide emission, because the energy obtained from the oxidation of organic matter comes from the environment itself. If MFCs can be made extremely light weight, they can be used in Micro Air Vehicles as power source. Getting the required current and voltage to support the necessary pay-load in a MAV offers, however, major design challenge. A collaborative research project between CPGS and the Center for

Emerging Technologies (CET) of Jain University is presently ongoing which is directed towards addressing these challenges

- **Projects on Energy conservation :**

Center for Nano and Material Sciences, a dedicated research center of the university has taken up projects on sustainable development to meet societal demands with respect to energy production, water treatment and health issues. Some of its innovative projects include, design and development of

- (a) A photoactive float for disinfection of water and elimination of emerging contaminants (pharmaceuticals, personal care products and endocrine disruptive chemicals).
- (b) A nanofiltration and reverse osmosis membrane based panels for complete elimination of heavy metals of serious concern such as cadmium, chromium, lead and arsenic.
- (c) A photo switchable membrane based micro fluidic devices for detection of cancer tumor cells.

**Innovation in Admission:**

The software “ERP package” covers the entire spectrum of the university activity right from the time the student send in his application for joining the course till the final degree certificate is issued. The package covers the complete academic activity including the student placement activity along with the administrative activities of the University.

**Innovation in Examination:**

- The university has brought about an innovation in the conduct of practical examinations so as to do away with the conventional practical examinations. To give more thrust on the performance evaluation of each experiment conducted by the student, the university introduced Continuous Assessment in all Lab courses across the university in 2013. Marks of final lab test is also taken into consideration. This reform has seen that the students have taken the practicals more seriously.
- The software “ERP package” covers the entire spectrum of the university activity right from the time the student send in his application for joining the course till the final degree certificate is issued. Examination Module in the EPR package handles all the activities involved in conducting an examination.

- The latest reform is the use of exhaustive question bank for setting up question papers.

### **Innovation in Teaching Learning process:**

The University has a Center for Virtual Learning and Innovation which caters to the needs of students with the help of web portal where they can access notes, digital lectures, question banks and assignments at the click of a button. Technology Enhanced Learning (TEL) provides vital resources to integrate educational and information technologies into the academic environment. It enhances the mobility and flexibility of the learning process and enables greater responsiveness to the needs of a new generation of learners.

### **Innovative Programs:**

The University has devised 12 UG & 19 PG programs in emerging and innovative areas including PG Diplomas in the domains of technology, basic physical and life sciences, commerce and management, liberal arts and the social sciences.