

# **Directorate of Research & Innovation (DRI), Nirma University**

## **Scheme to Promote Research and Innovation Amongst the Students**

### **Objectives:**

The Mission statement of Nirma University emphasizes on all round development of its students. It is accomplished through various means, including the curriculum, skill building trainings & workshops, encouraging student participation in extra and co-curricular activities, etc. Apart from these, it is also necessary to promote the activities of research and innovation amongst the students. In fact, student research is considered as an integral part of a learner-centred institution. Further, it is proved that the involvement of students in research activities enhances their class-room learning, instigate them to independent thinking and boost their confidence.

The research at UG and PG level is also emphasised in the Research Policy of Nirma University. Accordingly, the University and its constituent institutes encourage student research by formal and informal ways. The consistent student performance in prestigious technical competitions like, Robocon, SAE BAJA, ME-Cup (Mitsubishi Electric Cup), Moot Court Competitions, Business Idea Competition is the evidence of efforts in encouraging students for research and innovation.

Considering all these and based on the encouraging results of the student research, it is felt that a structured scheme needs to be developed for further promotion of Research and Innovation amongst the students at all levels.

The comprehensive scheme proposed here are the guidelines to promote research amongst the students, facilities to be provided to the student researchers and proposal for awards & incentives to the students for their outstanding research achievements.

### **Structure to Promote Research and Innovation amongst the Students:**

At present, the students enrolled under the University can be divided into three categories: (i) the Ph.D. Students. (ii) the PG Students, and (iii) the UG Students. It is very much necessary to encourage students at all the three levels for the activities of research and innovation.

At Ph.D. level, the students are carrying out their research work on focussed areas under designated Research Supervisors / Guides with the overall supervision of the Dean – Faculty of Doctoral Studies and Research. The research activities at this level need to be scaled up with more emphasis on quality research outcomes in form of publications, prototypes, patents, etc.

At Post-Graduate level, the research activities are promoted and monitored by the concerned HoI, HoD/Area Chair and Programme Coordinators. These activities need to be strengthened by way of more academic rigour, advanced level courses, improving the lab facilities, emphasizing on the quality of the thesis, encouraging students for publishing in peer reviewed journals, etc.

It is felt that more intensive efforts are required to encourage the UG students to participate in the research activities. The students need to be motivated to participate in Idea Lab activities, project based / experiential learning, internship with premier institutes / research organizations / industries, preparation for career in research, organizing events of research, etc. Looking to the mass of the UG students and the efforts need to be put in, it is proposed to have a senior level faculty as the UG Research Coordinator / UG Research Chair at each constituent institute. This Coordinator should be made responsible to promote research and innovation at the UG level in consultation with the concerned HoI and the Institute Level Research Committee. He/She will also coordinate with the Directorate of Research and Innovation.

### **Ways to Promote Research and Innovation amongst the Students:**

In general, there are two ways of promoting research and innovation amongst the students, i.e. Formal and Informal Ways. The formal ways includes:

- i) Through Curriculum, Courses
- ii) Project Based Learning / Experiential Learning Approach
- iii) Structured Internship, Industrial Training, Field Trips, etc.
- iv) Research Training Programmes, Research Methodology, Paper Writing workshops,
- v) Provision of Scholarship / Stipend for PG, Ph.D. and Post-Doctoral Fellow

It is proposed to further reinforce research at all levels (UG, PG and Ph.D.) by having courses on creativity & innovations, minor & major projects, hands-on-training, internship, industrial visits, etc.

The UG students should be encouraged to pursue their career in research. To achieve this goal, the institutes should offer special elective courses with emphasis on research and innovation to the interested students. Such electives may include: courses like Research Methodology, Course on Wheel, Seminar, Research Projects, Research Surveys, Simulation/Experimental Studies, etc. The course content should cover problem solving, laboratory experiments, design & simulations, hands-on exercises, development of prototypes/models, research reading & writing, etc. It is expected that after completion of such courses, the students should produce publishable/patentable work. It is proposed that

approximately 10 % of the total students should be given the opportunity to take up such courses.

A course on 'Research Methodology' covering the contents such as, Objectives of Research, Types of Research, Identifying Research Topic, Literature Reviewing Techniques, Writing Research Paper, Patents & Copy Rights, Avoiding Plagiarism, Tools for Research, etc. should be given importance at both PG and Ph. D. Level. It is also proposed to organize introductory training programmes on appropriate topics from the above list for the UG students to inculcate research from the beginning.

The Institute of Technology offers a very unique master level programme titled M.Tech. by Research. This programme is aimed at those students who are interested in exposure to in-depth research in different disciplines. The programme emphasizes on multidisciplinary and rigorous learning and research work. More awareness of this programme should be given to the stakeholders including the aspirant candidates of recognized research centres. Further, similar kind of programmes may be initiated at other constituent institutes of the University in an appropriate way.

To promote applied and basic research, the University has started the Ph.D. (Full time / Part time) programmes in Engineering, Management, Pharmacy, Science, Law and Architecture. All the Ph.D. programmes have course work, followed by rigorous research. It is proposed to strengthen the existing Ph.D. programmes by way of attracting meritorious students with worthy stipend, contingency grant, travel grant, etc. Further, the Ph.D. research can be strengthened by way of encouraging the students to publish their work in the journals indexed by the Scopus and Web of Science. Wherever possible, the students may be allowed to go to the Foreign Universities / Research Organizations / Research Laboratories for a short duration to carry-out their research work, to study advanced courses, etc. with proper approvals.

Apart from the formal ways, there are many other ways by which the Research and Innovation can be promoted amongst the students. These includes:

**i) Creating a Blog of Ideas**

It is known that the young minds are very creative and full of enthusiasm. They have many innovative ideas, but due to non-availability of suitable platform, the ideas cannot be implemented. Sometimes, for a single innovative idea, there can be multiple approaches to convert it into product / prototype. Such multiple approaches can be inter-disciplinary in nature and may come from the students of different disciplines. For this, it is necessary to have a Blog of the students' ideas and access to such Blog may be given to all the students and faculty members of Nirma University. With this

background, it is proposed to have a mechanism of collecting students' ideas and sharing it on a common platform. This activity may be further augmented by having competition of best ideas, encouraging students of different discipline / institute to work on these ideas, providing funding to the selected ideas through Idea Lab, etc.

**ii) Through Idea Lab Projects**

Since a few years, an Idea Lab is functional Institute of Technology. The main objective of the Idea Lab is to motivate students to think, conceptualize and realize their ideas. It provides an opportunity to the students to validate their ideas through guided research. The Idea Lab boosts confidence of the students and also encourages them to publish and patent their research work. In last five years, many projects have been funded by the University under the Idea Lab.

Looking to the success of the Idea Lab concept, it is proposed to have such Idea Labs in each constituent institutes of the University. The necessary budget should be allocated to each institute for Idea Lab. The Institute should evolve a structured mechanism for (a) Awareness of Idea Lab amongst the students, (b) Calendar for inviting proposals under the Idea lab, (c) Mechanism for allotment of Fund, (d) Strategy for monitoring the progress of Idea Lab projects, (e) Compilation of the outcomes of the Idea Lab projects in form of a booklet, (f) Mechanism of showcasing the Idea Lab projects through exhibition / social media / website / newspaper, etc.

**iii) Providing Platform to Showcase Research Outcomes / Research Skills**

For promotion of research amongst the students, it is also necessary to provide them platform to showcase their research skills and research outcome. This will also motivate other students to involve themselves to different activities of research and innovation. For showcasing research talent and the research outcomes, the University and constituent institutes should organize technical festivals, events, seminars, workshops and dedicated student conferences on regular basis. In fact, the best project /design / model competition (for final year UG and PG), paper / poster / business idea presentation, moot court competition, doctoral student conference should become the integral part of the annual academic calendar.

These can be strengthened by way of preparing annual calendar of such events, deciding themes, involving students in organizing committee, ensuring maximum student (UG, PG and Ph.D.) participation, proper documentation of the events and the outcomes, budget provision, etc.

**iv) Encouraging the Students to Participate in Competitions / Conferences organized by the Leading Industries / Institutes / Universities / Organizations**

The University students are participating in different competitions / events organized by industries, professional bodies, institutes, etc. and brought many laurels. Considering these, it will be appropriate to formalize this by way of identifying such national / international events, providing necessary mentoring, R & D facilities and support to the students, encouragement by way of awards and incentives, setting up system of peer to peer learning, providing academic support, necessary budget provision in the annual budget, etc.

**v) Encouraging the Students to Apply for the Government R & D Schemes, Research Awards, Membership of Professional Organizations, etc.**

There are many R & D funding schemes available from the Government of India, like INSPIRE, Young Scientist Scheme, Women Scientist Scheme, Prime Minister Scholarship Scheme, Visvesvaraya Ph.D. Scheme, Schemes from the INSA, etc. There are Travel Grants also available to attend International conferences. Apart from these, very prestigious international funding schemes available for the students, including the Fulbright Scholarship, DAAD scholarship, etc. The Institutes should motivate the students to take benefits of such schemes. The students should also be encouraged to apply for the travel grants, prestigious research awards, take the memberships of professional national and international bodies, etc.

**vi) Through Student Associations**

The student associations are very active across the University. Theme based seminars, exclusive student conferences, research orientation programmes may also be organized with the support of industry, R & D Organizations, NGOs and government funding agencies through the Student Associations.

**vii) Leveraging the Alumni Support for Promotion of Student Research**

Nirma University Alumni spreads across the country and has a strong industry reach. Many of its alumni members are in top-level positions in reputed private and public sector as well as R & D organizations. A considerable number of alumni have successful overseas careers also. The senior alumni should be invited to share their experiences with the existing students through guest lectures, seminars, conferences, workshops, etc. They should also be invited as mentors for the student projects, internship, incubates, etc. The Alumni Associations may constitute awards, travel grants, etc. for the outstanding student researchers.

### **viii) Encouraging the Students' Innovation**

Young minds are very creative and they should be encouraged to make innovations by using the principles of science, technology and other means. These innovations may include new ideas, development of gadgets / products, software application, better version of the existing system, new strategy, new model, better technique or enhanced process that result into improving the quality of life, societal benefit, social welfare, etc. It is proposed to encourage the students' innovation by way of organizing a competition of students' innovations. Such competition can be a yearly event, where students make presentation of their innovations before a jury. Based on the novelty of innovation and its application for the societal benefits, three prizes / awards (first / second /third) may be declared. The winners should be felicitated by mementos and Certificates of Appreciation.

### **Ways to Promote Research and Innovation amongst the Students:**

The following ways are to be considered for the students participating / preparing for the prestigious national / international technical / professional competitions:

#### **[A] Academic Support and Leave Consideration**

- i) The students participating in important state /national /international events (research related events) will be given flexibility in submission of Term Assignments, Laboratory Work, etc. Such students may be considered for re-tests under different Continuous Evaluation (CE) components.
- ii) Maximum 10 days leave (in a semester) for the competition preparation
- iii) Leave for the actual number of days plus days for travelling for participating in the competition
- iv) If the leave requirement is more than 10 days for the preparation, the matter will be considered as a special case. Based on the recommendations by the Faculty Mentor, concerned Head / Area Chair and the HoI, the Appeal Committee may condone the leave.

#### **[B] Financial Support**

For the prestigious State /National / International technical / professional competitions, research events, the Institute may provide financial support in terms of purchase of equipment, software, chemical, consumables, books / journals, travel and stay etc. For all such expenses, necessary budget provision is to be made by the concerned Department / Institute for each financial year. The approval for such budget is to be obtained from the Director General.

The food, accommodation and travel expenses will be reimbursed for the participants of the competitions as per the University Policy:

Note: The benefit of above (Leave Consideration and Financial Assistance) will only be given for the prestigious state / national / international competitions, events, etc. based on the level of the event, nature of competition, credentials of the organizers, benefits to the participants and the Institute / University, etc.

#### **[C] Travel Grant for Attending International Conference to the UG and PG Students**

The University has framed guidelines for granting financial aids to the full-time Ph.D. students for attending International seminar / conference. On the similar line, partial financial aid should be given to the UG and PG students for attending and presenting their research outcomes at the prestigious international conferences, provided that the student has received partial financial support from the external agencies. The norms for awarding such financial aids, the procedure for application and approval will remain same as that of the guidelines for granting financial aids to the full-time Ph.D. students (Ref. NU/AC/29312/FDSR/12-83, dated 5/5/12)

#### **Awards and Incentives to the Students for Outstanding Research Achievements:**

Apart from the leave consideration and financial support, the outstanding student researchers and the winners of the national / international technical / professional events should also be encouraged by:

- i) Felicitating such researchers / winners on Annual Day of the Institute with memento
- ii) Highlighting the research achievements of the students on Website, University News Letter / Research Report, Research Wall at Libraries, etc.
- iii) The awards and incentives may be given as proposed below:

#### **Team Events / Competitions**

- Winners of state level prestigious competitions and stood first / second / third should get Rs. 20000/-, Rs. 10000/- and Rs. 5000/-, respectively. The money will be equally divided amongst all the participants. All the participants of a winning team will get Certificate of Appreciation
- Winners of national level prestigious competitions and stood first / second / third should get Rs. 30000/-, Rs. 20000/- and Rs. 10000/-, respectively. The money will be equally divided amongst all the participants. All the participants of a winning team will get Certificate of Appreciation

- Winners of international level prestigious competitions and stood first / second / third should get Rs. 75000/-, Rs. 50000/- and Rs. 25000/-, respectively. The money will be equally divided amongst all the participants. All the participants of a winning team will get Certificate of Appreciation

### **Individual Events / Competitions**

- Winners of state level prestigious competitions and stood first / second / third should get memento and a Certificate of Appreciation.
- Winners of national level prestigious competitions and stood first / second / third should get Rs. 5000/-, Rs. 2000/- and Rs. 1000/-, respectively and a Certificate of Appreciation.
- Winners of international level prestigious competitions and stood first / second / third should get Rs. 10000/-, Rs. 5000/- and Rs. 3000/-, respectively and a Certificate of Appreciation.

### **Appreciating the Efforts of the Faculty Mentors for Guiding / Motivating the Students for the Prestigious State / National / International Events:**

Apart from the student researchers and winners, it is equally important to felicitate the faculty mentors, who guide / motivate the students by putting extra efforts and work beyond office hours. Such faculty members should also be given due weightage and encouragement by:

- i) Felicitating such Faculty Mentors on Annual Day of the Institute with worthy memento
- ii) Highlighting the names of such Faculty Mentors on Website, University News Letter / Research Report, Research Wall at Libraries, etc.