R&D
AT
NEW HORIZON COLLEGE OF ENGINEERING

Publication of R&D Cell
New Horizon College of Engineering
2016
New Horizon College of Engineering
R&D Committee: R&D Coordinators

Research & Development Committee (RDC):

RDC has been constituted with approved mandate and responsibilities of providing impetus to the College research and development activities and to provide support, advice and assist the Dean: Research and Development. It has representation from all departments and inter-disciplinary programs. The body has become a vibrant entity to discuss policy issues and the NHCE receives the first level feedback from the faculty. RDC members highlight shortcomings in procedural matters and thus sharpen the performance of the R&D Cell.

The NHCE's R&D activity aims at innovation and technological progress/growth through academic and research collaborations with various Universities, Ministries of Central/State Governments, R&D Establishments and Industries to meet the immediate as well as futuristic needs of the society and industry. The scope and scale of research has been envisaged from the era of student projects/theses and academic researches to sponsored research/funded research projects to interdisciplinary and multi-disciplinary research programs.

The NHCE faculty members, research staff and students conduct research with goals and objectives ranging from intellectual curiosity/creative exploration addressing contemporary challenges, developing technology, or writing scholarly publications. The NHCE gains enormously from these activities and in fact, flourishes on faculty member quest. The NHCE wishes to position itself in the world in near future as one of reputed and prestigious Institution known for its academic pursuit along with performance in the research domain. Consequently, the NHCE has facilitated a healthy ambience for research – both in terms of sustained motivation, state-of-the-art infrastructure and scholastics.

a) Research Idea: Generate a list of best ideas from your research area (topics which are closest to your heart) in which you are really interested. As a Principal Investigator (PI), you should take into account your professional interest/passion in identifying new and important research questions.
Organisation of brainstorming with a group (among peer at department) helps in terms of idea mapping. Moreover, identifying ideas that are innovative in which you will be comfortable requires refinement of your research idea in terms of its implementability within the availability of scarce resources. One could establish an internal review panel as a team to discuss the efficacy of the proposed study. The team will concentrate on the improvement of scientific content of the proposal.

**Funding Agency:** One needs to learn about the funding agency in terms of its mission, research priorities, available financial resources, recent awards and current announcements. Faculty should initiate interaction with the programme manager and seek required information on matching of the research idea and objectives of the agency. Faculty should visit the funding agency, if necessary and volunteer to serve on the review panel. Faculty needs to read and analyze the solicitation of the agency's grant application.
### R&D Coordinators

<table>
<thead>
<tr>
<th>Dept</th>
<th>Name of the Coordinator</th>
<th>Mobile</th>
<th>Email</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mech</td>
<td>Prof. Kamalashish Deb</td>
<td>7760556970</td>
<td><a href="mailto:kamal.kd86@gmail.com">kamal.kd86@gmail.com</a></td>
</tr>
<tr>
<td>CSE</td>
<td>Mr. Muralidhara. S</td>
<td>9482422473</td>
<td><a href="mailto:dhara.me.uvce@gmail.com">dhara.me.uvce@gmail.com</a></td>
</tr>
<tr>
<td>Civil</td>
<td>Prof. Surendra B V</td>
<td>9663758660</td>
<td><a href="mailto:bv_surendra@yahoo.co.in">bv_surendra@yahoo.co.in</a></td>
</tr>
<tr>
<td></td>
<td>Prof. Dayalan</td>
<td>9886719522</td>
<td><a href="mailto:dayalanj.iitm@gmail.com">dayalanj.iitm@gmail.com</a></td>
</tr>
<tr>
<td>EEE</td>
<td>Mr. Duney D Sam</td>
<td>9620977594</td>
<td><a href="mailto:duneydsam@yahoo.com">duneydsam@yahoo.com</a></td>
</tr>
<tr>
<td></td>
<td>Mr. Santhosh</td>
<td>9738481689</td>
<td><a href="mailto:santhosh.14187@gmail.com">santhosh.14187@gmail.com</a></td>
</tr>
<tr>
<td>ISE</td>
<td>Mrs. Swathi B</td>
<td>9620681234</td>
<td><a href="mailto:baswarajuswathi@gmail.com">baswarajuswathi@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Mr. Vikas</td>
<td>8147509324</td>
<td><a href="mailto:vikasbo104@gmail.com">vikasbo104@gmail.com</a></td>
</tr>
<tr>
<td>ECE</td>
<td>Dr. B. Mohan Kumar Naik</td>
<td>9986985232</td>
<td><a href="mailto:mohan72003@gmail.com">mohan72003@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Ms. A. Susmitha</td>
<td>9972699755</td>
<td><a href="mailto:susmitha.academic@gmail.com">susmitha.academic@gmail.com</a></td>
</tr>
<tr>
<td>BT</td>
<td>Prof. R.S. Upendra</td>
<td>9611139872</td>
<td><a href="mailto:rsupendra.nhce@gmail.com">rsupendra.nhce@gmail.com</a></td>
</tr>
<tr>
<td>Auto</td>
<td>Ms. Smitha BS</td>
<td>9880882146</td>
<td><a href="mailto:Smitha.sm.bs@gmail.com">Smitha.sm.bs@gmail.com</a></td>
</tr>
<tr>
<td>MBA</td>
<td>Dr. A.R. Sainath, Professor</td>
<td>9986559798</td>
<td><a href="mailto:Arsainath01@gmail.com">Arsainath01@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Ms. Kerena Anand</td>
<td>9741729688</td>
<td><a href="mailto:kerenaa@newhorizonindia.edu">kerenaa@newhorizonindia.edu</a></td>
</tr>
<tr>
<td>MCA</td>
<td>Dr. R. Chinnayan</td>
<td>7598084146</td>
<td><a href="mailto:vijayachinns@gmail.com">vijayachinns@gmail.com</a></td>
</tr>
<tr>
<td>Library</td>
<td>Mr. Prasanna Kumar</td>
<td>9008636251</td>
<td><a href="mailto:prasannamlib23@gmail.com">prasannamlib23@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Ms. Vijayashree. M</td>
<td>9480201932</td>
<td><a href="mailto:vijayashreemadav@gmail.com">vijayashreemadav@gmail.com</a></td>
</tr>
<tr>
<td>BS&amp;H</td>
<td>Dr. Prasanna Kumar. S (Chemistry)</td>
<td>9448689231</td>
<td><a href="mailto:S_pk77@yahoo.com">S_pk77@yahoo.com</a></td>
</tr>
<tr>
<td></td>
<td>Mr. Anand.K (Mathematics)</td>
<td>9945373291</td>
<td><a href="mailto:anandak.nhce@gmail.com">anandak.nhce@gmail.com</a></td>
</tr>
<tr>
<td></td>
<td>Mr. Ram Chandra Naik (Physics)</td>
<td>7204408041</td>
<td><a href="mailto:rcnaikphysics@gmail.com">rcnaikphysics@gmail.com</a></td>
</tr>
</tbody>
</table>

**For Slider: R&D Related Images of NHCE will be given in Pen drive (separately):**

**Downloads:** (Images of Cover to be shown on RHS of Slider and contents can appear after clicking, will appear as pdf)

- R&D Policy and Vision
- Operational Guidelines for Sponsored Research Projects
- Intellectual Property Rights (IPR) Policy
- Business Incubation Policy for Startups
- R&D Performance Evaluation Matrix
- Compendium of R&D Projects
- Hand Book on Opportunities of R&D Funding
- List of Funding Agencies
- List of R&D Establishments/Labs

**Under Admission:**
PhD and MSc (Engg.) By Research

Those who are wish to pursue PhD or MSc (Engg.) By Research at NHCE can apply twice in a year through the VTU Notifications (June/February). Applications are invited for registration to PhD/MSc (Engg) By Research Programmes under Full time/Part time Research Programmes through notification for registration to research programmes of VTU. Interested candidates may apply for registration through VTU Selection Process (Research Aptitude Test [Entrance Examination] followed by Interview) to pursue their PhD/MSc (Engg) By Research at NHCE which is a Recognized Research Centre of VTU and also an Affiliated College.

Application form shall be downloaded from the website www.vtu.ac.in. However, the interested candidates need to mention the name of proposed Research Supervisor available to Guide the PhD/MSc (Engg) By Research candidates at the Recognized Research Centre (NHCE) and also the proposed title (tentative) of the research/area of interest etc. Kindly visit the concerned Department and interact with PhD Supervisors/Guides available at our Departments then submit your Application to VTU along with necessary details with the consent of the proposed Supervisor/Guide.

For more details, feel free to contact: Dean (R&D), NHCE

Useful Links: For Ph.D and MSc (Engg) By Research

http://vtu.ac.in/ph-d-and-msc-engg/

Model Question Papers: Paper 1, Paper 2

Kindly Remove and Accommodate the following Under “Media Watch” and “Innovations@ NHCE” respectively:

“Media Watch”
The newly opened 7D+ Fun Corner has caught attention with its special effects with respective images (Separately Given in Pen drive)

“Innovations@ NHCE”
R&D Projects of New Horizon College of Engineering Being Commercialized/In Process

• 7D Motion Simulators with 6Degrees of Freedom (6DoF) and 3 Degrees of Freedom (3DoF) Operated by Hydraulic System or Pneumatic System
• Motion Files Acquisition System for 7D Motion Simulators with 6 Degrees of Freedom (6DoF) and 3 Degrees of Freedom (3DoF) Operated by Hydraulic System or Pneumatic System
• Special Purpose Motor Vehicles: Offers Integrated Solutions On-Wheels for Many Applications
• Studies On Capacity Improvement of Solar Updraft Tower
• Solar Still
• Glass Cleaning Automated Robot For High Rise Building Applications
• Experimental Study of Exoskeleton For Ankle And Knee Joint
• Design and Performance Analysis of Solar Powered Trommel Screen
• Carbon Dioxide and Vapors of Olive Oil Powered Solar Cooker
• Bicycle With Flywheel- A New Product Development

CONSERVATION & TRANSPORTATION OF FRESH WATER
ALONG THE COASTAL REGION OF INDIA with respective images (Separately Given in Pen drive)
Sponsored Research Grants & Consultancy Grants

**Sponsored Research Grants & Consultancy Grants for Last 4 Years**

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<tbody>
<tr>
<td>Research Projects</td>
<td>66,79,000.00</td>
<td>11,41,000.00</td>
<td>42,05,876.00</td>
<td>29,31,000.00</td>
<td>1,49,56,876.00</td>
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<tr>
<td>Consultancy Projects</td>
<td>34,35,000.00</td>
<td>28,88,980.00</td>
<td>25,18,400.00</td>
<td>-</td>
<td>88,42,380.00</td>
</tr>
<tr>
<td>Total</td>
<td>1,01,14,000.00</td>
<td>40,29,980.00</td>
<td>67,24,276.00</td>
<td>29,31,000.00</td>
<td>2,37,99,256.00</td>
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Many sponsored research projects and consultancy projects executed by NHCE have been received over whelming appreciation from various sections for its innovative way of execution and cost effectiveness and have also been received many awards/honours. Hence it became imperative to collate all such important research results and consultancy projects of NHCE in the form of Compendium as a record for future reference. Hence, an attempt has been made to showcase the salient features of important sponsored research and consultancy projects executed at NHCE. The Compendium of R&D Projects delineates the innovative components and contributions of R&D team at NHCE and also highlights the importance and significance of various projects for the development/betterment of our country. In the era of knowledge economy, NHCE strives hard to bring in frugal innovation and file highest number of patents to galvanize the culture of creativity and innovation at every campus in India.

**Hand Book On Opportunities of R&D Funding (ISBN 9789384893637, Airwalk Publications, Chennai)**

The various facilities, proactive initiatives to promote research (both sponsored & academic research) and consultancy are unparallel at NHCE. The vibrant R&D culture fosters innovative spirit and kindle the young minds at the campus under able guidance and mentorship of motivated faculty members at all the departments have carved the niche place in India for NHCE. Hence, an attempt has been made to showcase the various opportunities available for sponsored research funding (grants) at national and international level agencies' and also the compilation of funding formats, thrust areas etc to sensitize/strengthen the R&D activities at engineering colleges are highlighted in this hand book. Adequate emphasis were given to academic research (PhD/MS-By Research), Procedures, Regulations, Guidelines, Calendar for PhD Scholars, Manual for Preparation of Thesis, Post Doctoral Degree (DSc/DLitt) Procedures, Publication Tips, Similarity Index, Dispel the
Myths and Realities of Impact Factor, Over View of Plagiarism Detecting Software, IPR and Patents' Filling Formats etc in the hand book. The hand book also contains the DVD which provides the soft copy of the hand book along with appropriate hyper links for the direct access to the funding agencies' websites for ready reference/usages. In the era of knowledge economy, NHCE strives hard to bring in frugal innovation and encourages the young researchers/students to innovate and file highest number of patents to galvanize the culture of creativity and innovation at every campus in India.

Major Milestones in R&D at NHCE
Patents Granted: 10
Patents Filled: 20+
Patents: In Progress: 150+
Research Papers: 749 (International/National Journals and/or Conferences)
Books Published: 51

Innovative Projects Executed/Proposed and Patents Granted/Filled at NHCE

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<tr>
<th>Major Innovative Projects Executed/Proposed and Patents Granted/Filled at NHCE</th>
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<tr>
<td>Multipurpose Expandable Auditorium On Wheels</td>
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<tr>
<td>Motion Simulator (6DoF)-Hydraulic System</td>
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<tr>
<td>Motion Simulator (3DoF)-Pneumatic System</td>
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<td>Inflatable Auditorium On Wheels</td>
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<td>7D+ Simulator with Largest 3D Screen (16’) On Wheels</td>
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<td>Low Bed Trailer Multipurpose Auditorium with Wings Opening On Wheels</td>
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<tr>
<td>Unisex Convertible Bicycle Frames</td>
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<td>Conservation of Fresh Water through Garland of Inter -Connected Tanks Along the Coast of India: Alternative to Inter -Linking of Rivers</td>
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<td>Design Modification of 3Tier Compartment of Railways to Increase the Berths from 72 to 90 with Improved Comfort and 2 Walkways</td>
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<td>Design and Development of Bio -Reactor</td>
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<td>Motion Capture System</td>
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<td>Intelligent Imaging System</td>
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<td>Conservation System for Cutting Fluids and Better Reuse</td>
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<td>Design and Development of Dental Clinic On Wheels</td>
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<td>Design and Development of Kitchen On Wheels</td>
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<td>Promotion of Research and Resource Mobilization for Research</td>
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<td>Nine Departments are Recognized as R&amp;D Centres under VTU for PhD /MSc (By Research)</td>
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<td>R&amp;D Cell headed by Dean – Research &amp; Development</td>
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<td>Faculty Members are Encouraged to Take -Up Research Work and Publish Papers</td>
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<td>Industry Institute Interaction to help the identification of research areas</td>
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<td>Incentives for Patent Filing/Paper Publication and/or Presentation</td>
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<td>College has Received Grants from Various Research Agencies Towards Sponsored research and/or Consultancy Projects</td>
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<td>Increments in Salary when Faculty Upgrades Their Qualifications</td>
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<td>Library Facility with resources like e-journals, print journal, magazines and periodicals, mobile app to use e-facilities</td>
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<td>10% of Institution's Budget is Allocated Towards Supporting Research Activities</td>
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<td>Seed Funding for Research Projects</td>
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<td>Equipment and Research Facilities at the Departments are Utilized by Both Faculty Members and Students</td>
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<td>Faculty development program / training programs every semester</td>
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</table>
What is innovation?

A very simplistic definition of innovation usually means doing something new or novel, different or better with the aim that it will lead to a positive difference. Innovation can be big or small and does not necessarily have to be something ground breaking. Often there is a dynamic relationship between innovation activities and R&D to drive technology breakthroughs.

What is technology innovation?

Technology innovation is essentially a subset of innovation and generally encompasses innovation derived from new applications of existing technology, deployment of new technologies and developments in research through which improved technologies are expanded and brought forth for extensive application.

What is business innovation?

Businesses provide products, services or a new experience to attract and retain customers. Depending on the nature and scale of business operations innovation can mean different things to different business setups. Successful business innovations are often backed by strong intellectual property protection. The exact definition of business innovation would depend on what the business is trying to achieve yet asking the following questions will prove useful:

· What type of new thinking is needed to deliver the strategy?
· Where exactly does the business need to excel?
· How critical is the new product design for the success of the business?
· Is the business venturing into new markets?
· Has the business identified all the intellectual property?
· What about challenging the status quo?

What is a startup?

Startups are often a nascent company that is built around to test business models based on fresh ideas evolved by their entrepreneurial founders. One of the essential attribute of a start up is its ability to grow quickly. Typically they have a very few employees. The capital for the startups is raised by multiple rounds of financing known as funding.
What are the different types of funding available to startups?

Startups can raise capital through a plethora of options. Some of the important ones are discussed here.

**Venture Capital Investing:** Venture capital investing is one of the most popular ways of raising funds by startups where investors (venture capitalists) provide financial capital (venture capital) usually through private equity investments at an early-stage but shows potential for a long term growth prospective.

**Angle investing:** The term angel investing refers to the process where investors provide financial backing to startups in return for shares in the business. In addition to the capital, they also provide their knowledge and expertise in helping the company to grow and achieve success. The capital (angle capital) can be one time investment of seed money or continuous support to weather through difficult times. Unlike venture capitalists angel investors are not averse to take on the risk of a brand new entity.

**Crowdfunding:** Crowdfunding is a relatively new phenomenon where startups raise capital from a relatively large number of people by asking for small amounts. This new platform has given entrepreneur founders of startups a unique chance to sell their idea directly to the public.

**What is seed funding?**

Seed funding is a term that can be applied to any finance received at the outset of a new venture to begin operations. Usually it comes through family, friends or even through the personal assets of the investors.

**What is incubator?**

Incubator refers to a facility designed to nurture entrepreneurship and assist startup companies to grow by making use of shared resources, management and technical expertise and intellectual capital.

**What is an accelerator?**

Accelerators as the name sounds are institutions which “accelerate” growth of new ventures. Acceleration programs are usually time-limited and provide specific services, resources and contacts with the precondition that the startups must provide a working prototype as well as initial traction on the market. The start-ups 'graduate' at the end of the accelerator program.
**What is a spin-off?**

Spin-offs are companies created from a bigger organization such as university, corporation to act as independent entities. However from a legal perspective a spin-off is like an ordinary business enterprise.

**How to register a start up in India?**

One can choose from the following kind of business structures in India depending upon the nature of work, size of business, requirements and demands of the start-up.

- Sole Proprietorship
- Partnership Firm
- Limited Liability Partnership
- Company

**What is mentoring?**

To help the first time entrepreneur’s stride ahead with confidence, mentors by way of mentoring assist the start up teams to structure their business and business models to have a firm foothold in the market. Generally it’s a repetitive process.

**What is equity?**

Equity refers to the capital invested in a firm by its owner(s) or holder(s) of common stock (ordinary shares). In the normal course of the business, this is returned only when the owners sell their shareholdings to others.

**What is loan?**

In financial parlance, a loan is an arrangement where debt is provided by one entity which can be an organization or individual to a borrower generally with the consideration that it must be returned with an interest.

*Courtesy: DeitY, Ministry of Communication & IT, GoI*
New Horizon College of Engineering

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Former Vice-Chancellor of Anna University and Dr.MGR University

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National President,
The Institution of Engineers (India)

Dr. K. Ramachandra
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Director, National Design and Research Foundation

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Scientist-G, Head, Ocean Observation Systems, National Institute of Ocean Technology,
Visiting Professor, IIT-Madras & IIT-Kharagpur

Dr. Wooday P Krishna
National President, Indian Institution of Production Engineers

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Editor-In-Chief
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