10 YEARS OF UNIVERSITY RECOGNITION
20 YEARS OF ACADEMIC EXCELLENCE

REVA UNIVERSITY
Bengaluru, India

Vision for Research and Development

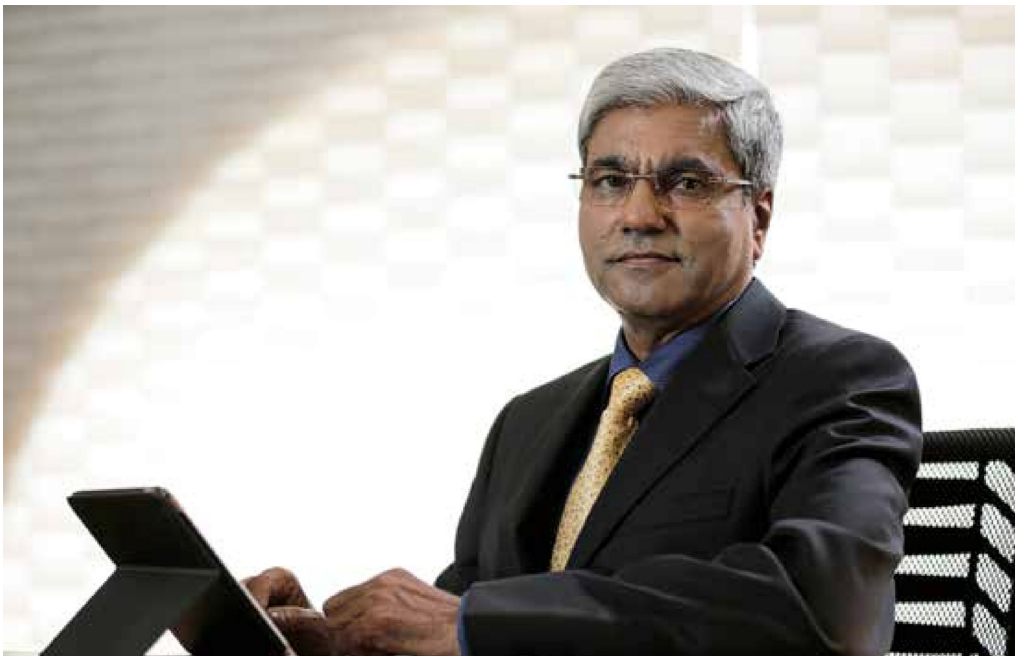
2016

Rukmini Knowledge Park,
Kattigenahalli, Yelahanka, Bengaluru - 560 064
www.reva.edu.in

"Success in life depends on action,
that is, on what you do and not what
you feel or think and the price of
success is hard work. To work,
to initiate, to get results and get
results quickly is the keynote of the
modern age. Industry,
Concentration, Self-reliance,
a resolute will, added to
integrity of character are the
chief passports to success
and these are within
the reach of every active brain."

- Sir M. Visvesvaraya

Chancellor's Message



Information revolution has enabled researchers all over the globe to enhance the research productivity in all areas of knowledge. The world has witnessed a revolutionary innovations during recent past. The research has become an integral part of higher learning institutions.

REVA University has been established with a vision of developing into an innovative centre of higher learning and research. The well experienced and committed faculty members, dynamic research scholars and young & talented students community with an urge to learn and innovate, state-of-the-art research facility for cutting-edge research are the strength of REVA.

I am happy that our faculty members have worked diligently to bring this VISION document for Research and Development. I wish this will be guiding light to see through a path breaking research in REVA that will contribute richly for the societal development and national progress, and hence place REVA University on the research map of the country in coming years.

I deem it a great pleasure that this very Vision Document is being released by none other than the eminent scientist of the country Bharat Ratna Professor C.N.R Rao.

I assure full support to realize this vision and wish a great success

Dr. P. Shyama Raju
Chancellor

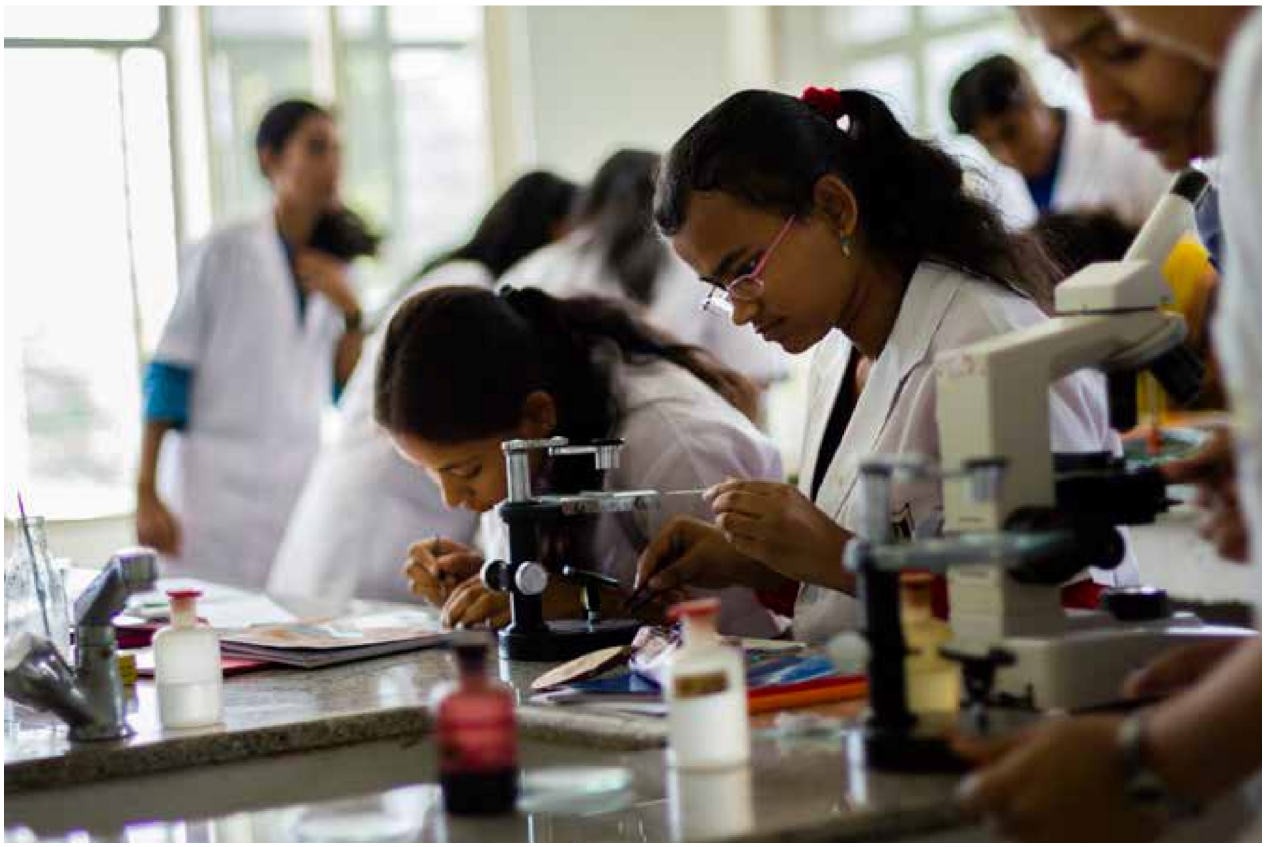
PREAMBLE

Research at REVA University has been recognized as the primary activity to enhance teaching-learning process, and also to develop a unique identity as a university that commits itself to address societal issues through application of Science and Technology. The Research and Innovation Council headed by an experienced senior professor aims to continuously liaise with various funding agencies, R&D institutions, industries and faculty members of REVA University to facilitate for undertaking innovative cutting-edge research.

REVA strives to create an ambience for research culture among faculty members, research scholars and the student community. Majority of Faculty members have been engaged in sharing research related experiences, interdisciplinary / multidisciplinary collaborative work, appreciating research contributions of fellow colleagues thereby making the campus vibrant and conducive for research and research related activities. The university encourages establishment of research facilities in the campus and provides top-up grants as and when required.

REVA has made a modest beginning in research with the support of dedicated faculty members and research scholars, and has set an ambitious vision of becoming one among the best of universities which cater to societal needs. It has initiated research in 18 disciplines under Engineering, Science & Technology, Commerce, Management Studies, Education and Arts & Humanities. It has also facilitated an INSA Senior Scientist Prof. H Junjappa to set up a synthetic organic chemistry lab to carry out core research activities in Heterocyclic and Aromatics.

RESEARCH STRENGTH



HUMAN RESOURCES

The university has over 350 faculty members engaged in active research in varied areas of specializations. The majority of these researchers are young and enthusiastic in pursuing research in cutting-edge technologies of social relevance.

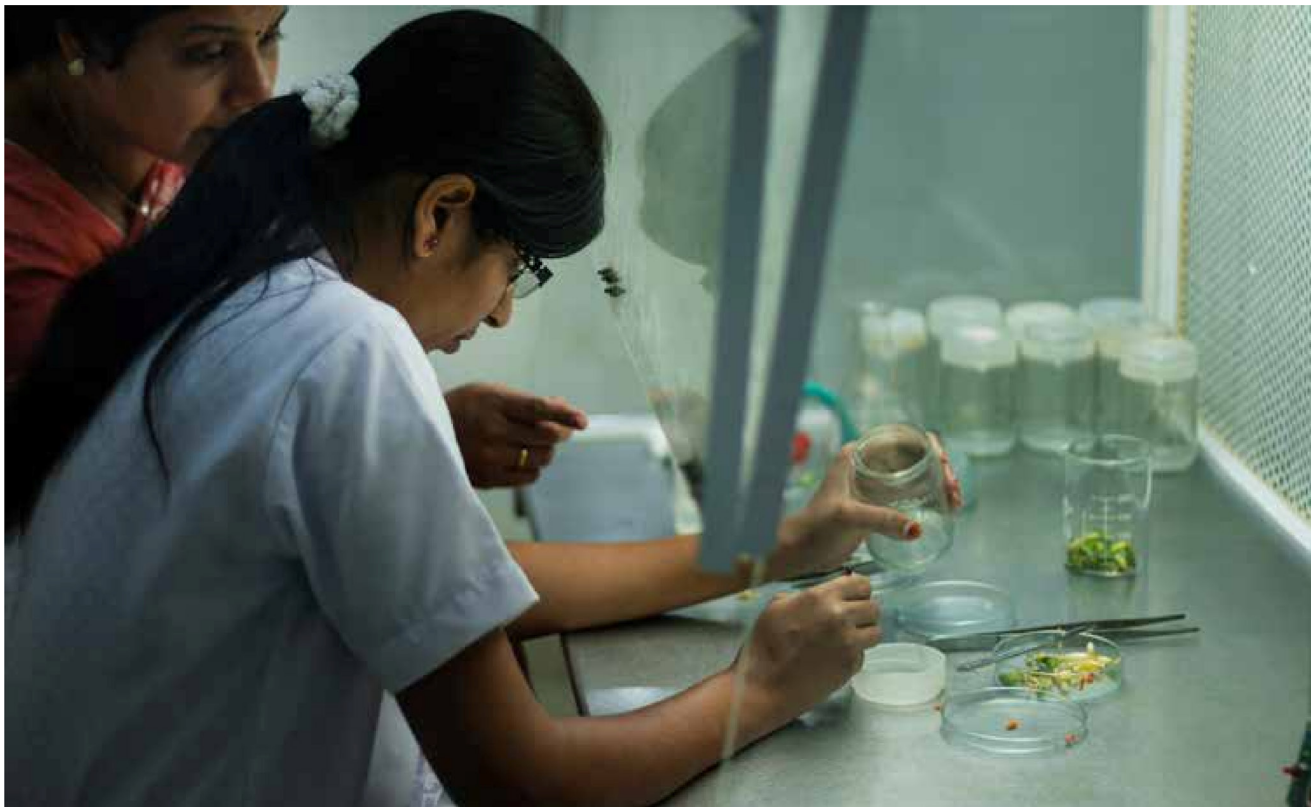
As a new university intending to orient itself towards research, it has research programs leading to PhD degree in various disciplines. Presently, there are nearly 170 registered PhD scholars working on various problems relating to Engineering, Architecture, Science & Technology, Commerce, Management Studies, Legal Studies, Education, Arts & Humanities.

The university having committed to promote research and learning together provides an opportunity for a large band of students to work on research oriented projects under the guidance of faculty members. This is achieved through the formation of research circles involving students from different disciplines to develop teams of inter disciplinary studies and research.

FACILITIES

The university has moderate laboratory facilities, equipment and computing infrastructure required for research. These include:

- Low temperature research (Cryogenic)
- Conducting polymers
- Electrochemical Work Station
- Signal Processing
- Data Mining and Cloud Computing
- VLSI and Embedded Systems
- Communication and Networking
- Transportation Engineering
- Structural Engineering
- Rapid prototyping
- Power Electronics and Power System component modeling and analysis
- Bio-Fuels
- Vibration Analysis, and so on.



ON-GOING PROJECTS

Following are the major areas in which projects are being executed by the faculty members and students across various disciplines.

- Heterocyclic, Aromatics and Hetero-aromatics
- Photo-electrode materials photo-electrochemical Hydrogen evolution
- Spectroscopic properties of rare earth ions doped phosphors for W-LED applications
- PSOC applications
- MSP 430 applications
- Cognitive agent based resource estimation & routing management in mobile AdHoc networks
- VLSI, Embedded Systems and Communication
- Application of Cloud Computing for Image Processing and Multimedia Data Security
- Studies on Rapid Fabrication of Metal coated Stereo lithography (SLA) Components for Enhanced surface Integrity and functional compliance.
- Design optimization of Gating /Riser system in casting with the aid of CAD and simulation technology.
- Battery Management System for Electric Vehicles
- Spectroscopic properties of rare earth ions doped phosphors for W-LED applications
- Underwater sensors applications
- Iterative MIMO OFDM receiver for underwater communication

PROJECTS EXECUTED

Some of the research projects which have been successfully executed during the recent past are:

- Cognitive agent based information fusion in Wireless Sensor Networks (WSN)
- Health care system, location based service, e-service & security
- Migration of business logic to database
- Tele-mammography services for rural Indian women
- Studies on process parameters optimization of rapid prototype parts for the betterment of part quality.
- Studies on the Ultrasonic Impact Technique for relieving residual stress of Engine components.
- Design and Development of medical equipment trolley
- Bio-monitoring of lake waters using Daphnia acute toxicity test

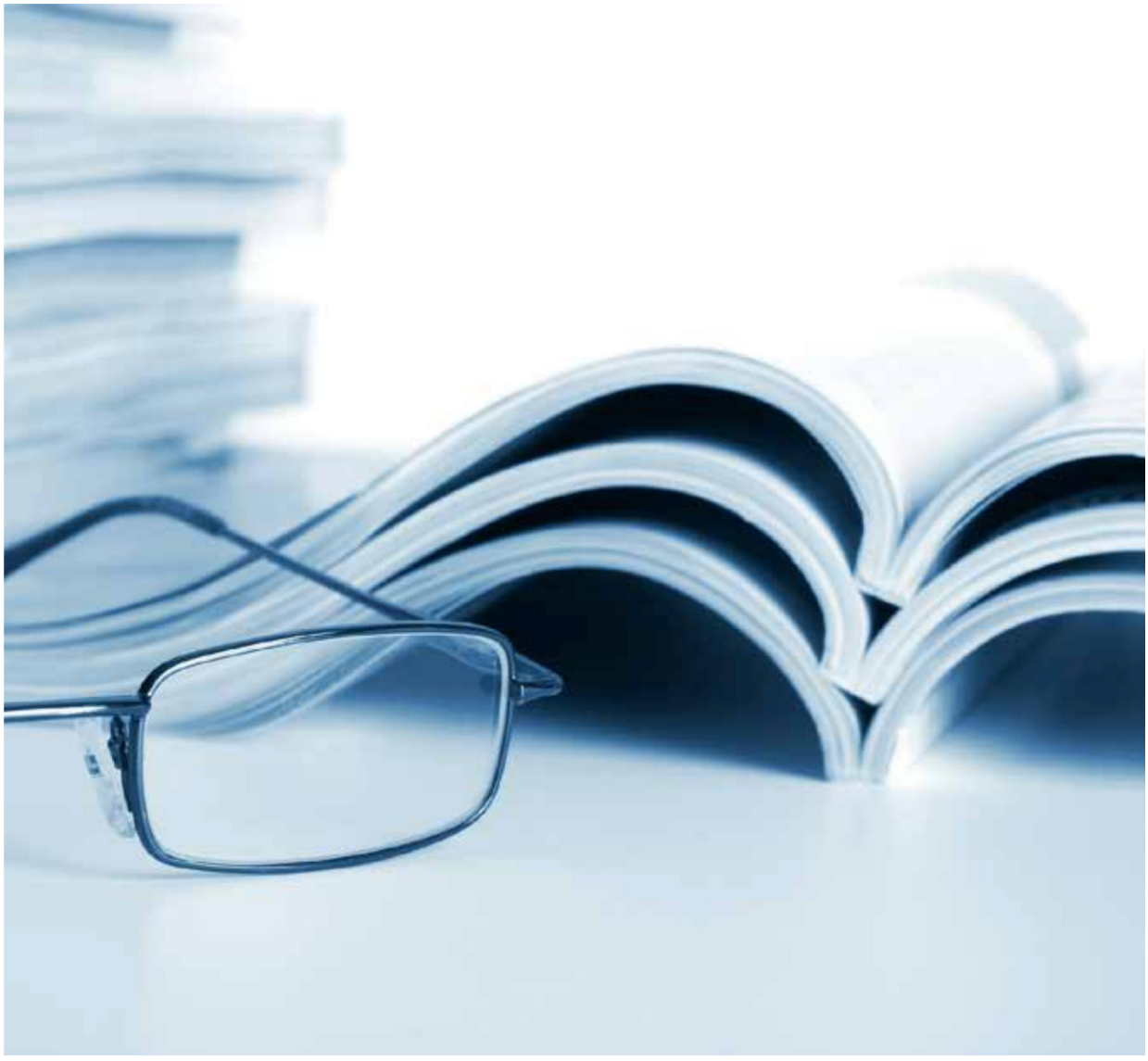
PUBLICATIONS & GRANTS

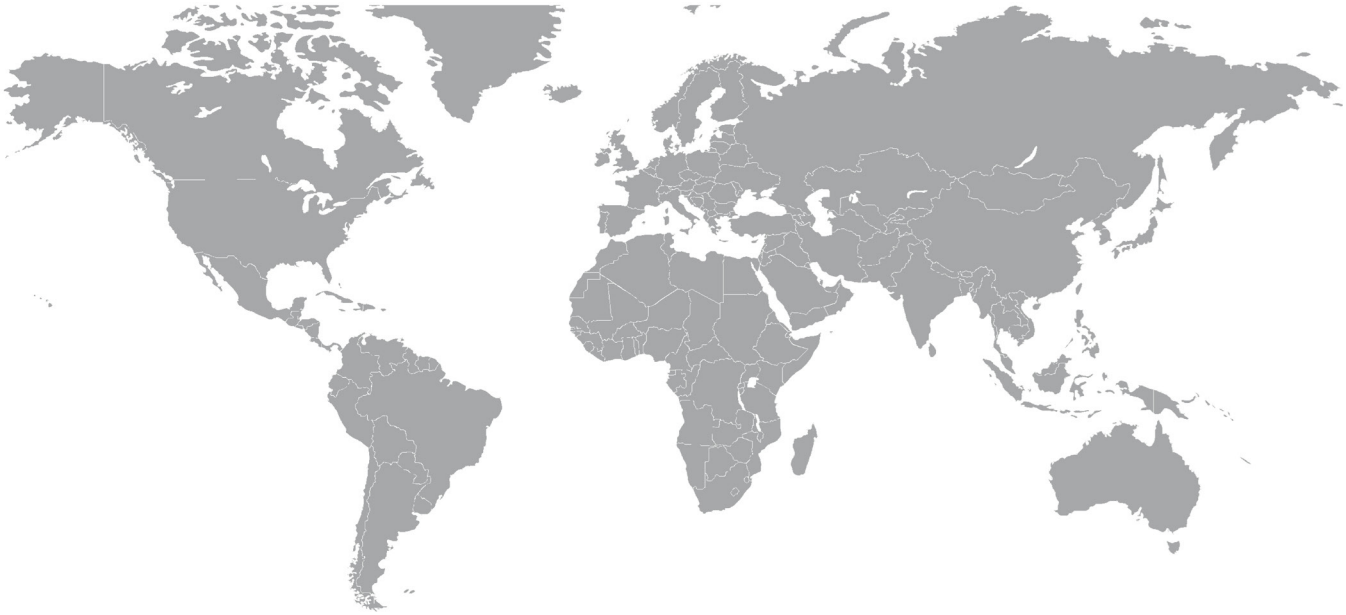
The university has always encouraged faculty members, research scholars and students by providing financial assistance to travel and participate in various academic and research oriented events. This has resulted in publishing over 300 articles in reputed journals and about 725 research papers in National and International conferences / seminars. The faculty members are also active in funded research and have succeeded in mobilizing sufficient resources within a short span.

RESEARCH SCHOLARS

In order to promote research leading to PhD degree in various disciplines, the university has started research programs in 18 disciplines from the beginning and there are over 170 scholars registered and pursuing research.

Further over 110 faculty members are also pursuing research leading to PhD in different disciplines with other universities.





COLLABORATIONS

Interdisciplinary/multidisciplinary, collaborative research is the order of the day to transform basic research into applied and socially relevant areas. In view of this, the university from the beginning has ventured into collaboration with industries, premier institutions and R&D organizations. Through this, young faculty members, students and research scholars are being exposed to new environments, advanced research methodologies, tools and techniques. They also have an opportunity for interaction with experienced scholars and practitioners. Some of the important collaborations are:

- Oklahoma State University, Stillwater
- The Hong Kong Polytechnic University
- Seneca College of Applied Arts and Sciences, Canada
- University of Alabama, Huntsville
- Imperial College, London
- Swiss Business School, Zurich
- Florida International University, Florida
- Winnoa University, Winnoa
- University of Texas, Arlington
- University of New Jersey, USA
- University of Perdue, USA
- Intel
- Microsoft (earlier NOKIA)
- EMC2
- VMWARE
- Toyota Kirloskar
- Arthvidhya
- SAP

ENDOWMENTS FOR ADVANCED RESEARCH

The university intends to attract endowments, scholarships, fellowships to promote research. Under this endowment the university aspires to explore funded projects, undertake innovative research, develop prototypes in areas of social relevance, design and develop models to address specific problems in society. To promote such activities by inspiring students, faculty members and others to inculcate research temperament, the university has initiated many incentive schemes. In this endeavor, the first endowment instituted is Shri Narayana Raju Centre for Advanced Research in Life Sciences. The university further intends to attract many more endowments to take research as its primary concern.

SHRI NARAYANA RAJU CENTRE FOR ADVANCED RESEARCH IN LIFE SCIENCES

This is one of the very ambitious initiatives by the university with financial assistance from the endowment fund instituted by Rukmini Educational Charitable Trust in the name of Late Prof. Narayana Raju who had dedicated himself to the development of science and scientific research, particularly in the area of life sciences. Under this endowment the university aims to set up an advanced research center with the state-of-the-art research facilities in the area of Life Sciences. The advanced research center undertakes innovative research projects in biological sciences, molecular biology, biotechnology, and bio-chemistry and so on. It organizes conferences, seminars, workshops, training programs, exhibitions and such other events to provide a forum for students, researchers, faculty members, industrialists, doctors and even public to participate and share their experiences and explore new vistas of scientific developments.

" India is a nation of a billion people.
A nation's progress depends upon how its people think.
It is thoughts which are transformed into actions.
India has to think as a nation of a billion people.
Let the young minds blossom -
full of thoughts, the thoughts of prosperity."

- Dr. A.P.J. Abdul Kalam

RESEARCH STRATEGY

The research strategy of the university has been very diligently grafted with the support of experts in the areas

THRUST AREAS

- **Chemical Sciences :** Heterocyclic, Aromatics and Hetero-aromatics, Electrochemical Synthesis, Energy Conversion Devices, Nano-structured Materials, Photo-electrochemical Hydrogen generation, Bio-fuel, Nano-catalysis in organic synthesis, pesticide residue analysis in food.

- **Physical Sciences :** Study on super conductors, Nano materials, Photonics.

- **Mathematics :** Nano Tribology, Heat and Mass Transfer, Fluid Mechanics, Domination Numbers and Operation Research, Graph theory.a

- **Electronics and Communications :** MEMS; Nano Electronics, Cognitive Radio, Underwater Wireless Communications, Aviation Electronics, VLSI.

- **Computing and Information Technology :** Cloud Computing, Data Mining, Software Engineering, Wireless Sensor Networks, Computer Networks, Data Analysis, Healthcare, Wearable Wireless Sensor Networks, VLSI & Embedded Systems, IOT.

- **Mechanical Engineering :** Bio-fuels, emission study of engines, Nano technology for coatings, composites, vibration analysis, and virtual lab.

- **Civil Engineering:** Innovative Concretes Reinforced Earth, Special Foundations, and Liquefaction Resistance of Soils.

- **Electrical and Electronics Engineering:** Electric Vehicle, ultra capacitor applications in EV, Multilevel inverter applications, Battery Management system, Micro Grid, LED lightings, Renewable Energy Sources and active filter.

- **Management Studies:** Strategic leadership and innovative entrepreneurship, Functional development management, Managing technology and innovation, Resources management and sustainable development, corporate responsibilities, Ethics and accountability.

- **Legal Studies:** Cyber Security, Juvenile justice, Medicinal law, Human rights, IPR.

- **Arts & Humanities:** Gender Studies, Diaspora Studies, Feminism, English Language Teaching (ELT), Computer Assisted Language Learning (CALL) and Culture Studies.

CENTERS FOR INTERDISCIPLINARY RESEARCH

The university has formed research circles consisting of faculty members, research scholars and students from different disciplines with an objective of establishing interdisciplinary research centers. These research circles would be evolved into interdisciplinary research centers and centers of excellence in coming years. These circles are working on scientific, technological and social problems. The primary aim of these circles is to provide a common platform for young and enthusiastic researchers to be creative, enterprising and to cultivate spirit of working together as a multidisciplinary team for a specific output, apart from venturing into bringing innovative projects and solutions. They also initiate collaborations, undertake research projects, conduct training and exchange programs. Some of the research circles presently working on various projects include Energy Circle, IOT Circle, Simulation Circle, Robotics Circle etc.

SCHEMES FOR RESEARCH PROMOTION

The university is committed to excel in research and stand as a unique and potential innovative and research center in coming years. Therefore the university aims to promote, to inspire and to inculcate research culture among faculty members, research scholars and students. The university believes in a blend of young and old and therefore creates an environment of exchanging expertise within the university as well as between universities, institutions and organizations. It promotes young faculty members, researchers and students to share their ideas with peer group in their respective areas. To harness this, following are the schemes introduced by the university:

- Seed money
- Travel grant

- Research award
- Research fellowships
- Exchange programs
- Contingency grants
- Teaching research associate-ship
- Establishment of chairs and endowments
- Joint research projects
- Establishment of specific research facilities

MENTORING YOUNG FACULTY MEMBERS FOR RESEARCH

Faculty mentoring initiative has begun wherein senior faculty mentors within respective schools guide young faculty in research and enable them to identify research topics for their Ph.D. The timetable has been formulated to accommodate such interactions among the mentor and the faculty members. Every school conducts a weekly meeting after school hours and continuously monitors the progress of such interactions.

EXPLORING RESEARCH FUNDS

The university is striving to mobilize funding from various funding agencies, industries and such others to excel and thrive in accomplishing quality research and make its mark in the research map of the country. Efforts are being made to explore funding from VGST, DST, CSIR, DBT, UGC, DRDO, ICSSR, UNESCO, UNIDO, IDBI etc. The faculty members also explore funded projects from ISRO, NAL, BEL, HAL, Microsoft and such other organizations, institutions and industries. Schools are advised to look for funding options through the alumni group. Further many students undertake funded research projects from the above organizations. To create awareness among the faculty members, research scholars and students about funding, awareness programs on various funding options are being regularly carried out by inviting experts from above organizations/institutions/ agencies. The experts and peer researchers having rich experience in funded research are invited to address the faculty members and share their experiences in mobilizing successful funding. The university also conducts in-house training programs for faculty members and research scholars on writing research proposals and also on defending research proposals. They are also given training programs on writing research papers for publications in reputed journals.

SHORT TERM EXPECTED OUTCOMES

- Research papers/articles in journals - 500
- Research papers presented and published in conferences - 1500
- Text books - 25
- Funded projects - 25
  (Worth of Rs.10 cr.)
- Multidisciplinary research centers - 05
- Award of PhD degrees - 200
- Patents registered - 10
- Patents awarded - 05
- Collaborations - 25

LONG TERM EXPECTED OUTCOMES

- Research papers/articles in journals - 1500
- Research papers presented and published in conferences - 4000
- Text books - 50
- Funded projects - 125
  (worth of Rs.50 cr.)
- Multidisciplinary research centers - 05
- Centers of excellence - 03
- Award of PhD degrees - 500
- Patents registered - 40
- Patents awarded - 30
- Collaborations - 60

"A scientific truth does not triumph by convincing its opponents and making them see the light, but rather because its opponents eventually die and a new generation grows up that is familiar with it."

- Max Planck

RESEARCH INCENTIVES

The university has initiated the following incentive schemes to motivate the faculty members, research scholars and students of the university to undertake quality research, consultancy and

such other research related activities.

The scheme envisages the following

- Motivate our faculty members to concentrate on research related activities, in addition to teaching, so as to publish research articles in reputed refereed international and national journals with impact factor.

- Pursue efforts to write books, monographs for publication by International and National publishers of repute.

- Create interest among the members of faculty so that they take efforts to establish collaborative research projects with their counterparts in reputed foreign Universities.

- Encourage faculty members to submit proposals and secure funded research projects from various funding agencies in India and abroad.

- Undertake consultancy projects sponsored by both Government and Private Sectors.

- E ncourage creativity among faculty members, so that they make original contributions by way of products, concepts etc. and obtain patents.

" "The important thing is to not stop questioning. Curiosity has its own reason for existence. One cannot help but be in awe when he contemplates the mysteries of eternity, of life, of the marvelous structure of reality. It is enough if one tries merely to comprehend a little of this mystery each day."

- Albert Einstein

Research Publications

When a research paper is published based on his/her work in hard copy or in electronic form in a refereed journal, he / she will earn credit as indicated below:

- Publications in Journals with Impact factor/SNIP above 2.00 - 6.0 credit
- Publications in Journals with Impact factor/SNIP > 1.00 < 2.00 - 4.0 credit
- Publications in Journals with Impact factor/SNIP < 1.00 - 3.0 credit
- Publication in reputed journals without impact factor - 1.0 credit
- Publication in reputed conferences - 2.0 credit
- Publication in other conferences - 1.0 credit
- Chapter Publication in edited book - 1.0 credit

The publications will be considered only if they are indexed in Journals / conference proceedings. Journal publications with good impact factors are given adequate weightage.

If the paper is contributed by more than one author, the credit points will be shared by all the authors equally. Faculty members are encouraged to publish papers only in reputed journals and avoid publications in paid journals. Faculty members should also submit a "Self Declaration" stating that publication fee was not paid to the Journal.

Publication of Book

Faculty members who have taken efforts to write and publish books or monographs are entitled to earn credits as indicated below.

SI No	Description	Published by	Credits
1	Full book with ISBN	International publisher	10.0
2	Full book with ISBN	National publisher	4.0
3	Editor of the book with ISBN	International Publisher	2.0
4	Editor of the book with ISBN	International Publisher	1.0

Collaborative Research Project with Foreign Universities/ Agencies

- Any collaborative research project undertaken by faculty members with a foreign University with tangible outcome, the faculty member is eligible to earn a credit of 10.00 per project. The tangible outcome shall be endorsed by the Research committee of the institution.

- Incasetheprojectinvolvesmorethanonefacultymemberfromtheinstitution,thetotalcreditswillbe shared among the participating faculty members.

- The year in which the collaborative project commenced is the criteria for including this into the scheme. A project cannot be included more than once in the scheme.

- Any publication arising out of this collaborative research will also be eligible for credits as per the norms of the publication.

Generation of Research Grants

Faculty members are expected to submit proposals for research grants from funding agencies. It is quite likely, that these projects may involve modernization of laboratories, acquiring of equipment required specific to the research study or conducting of surveys etc. The number of credits earned will be linked to the total amount of research grant sanctioned by the sponsoring agency.

Description	Published by
Upto Rs. 2.0	5.0
Rs.2.01 to Rs 5.00	6.0
Rs. 5.01 to Rs. 20.00	8.0
Rs.20.01 to Rs. 30.00	8.0
Rs.30.01 to Rs. 40.00	10.0
Rs.40.01 to Rs. 75.00	14.0
Rs.75.01 to Rs.100.00	18.0
Beyond Rs. 100	20.0

The amount being released in phases, the incentive(s) paid is also proportional to the amount received by the university.

Credit points for the year under consideration = (amount received in the year/ Total amount sanctioned) x (credits for the total amount sanctioned)

Patents Obtained

Faculty members may obtain patents for their original contribution in the form of product or innovation from international and national agencies. These faculty members will earn credits as indicated below. If more than one faculty member is involved in this, they will share the credits in a mutually agreed way.

International agencies	15.0 Credits per patent
National agencies	10.0 Credits per patent

Undertaking Consultancy Projects

When there is a contribution by the faculty member and the staff in consultancy projects without using the resources of REVA University, the sharing of the revenue between members involved in the consultancy project and REVA University shall be in the ratio of 60:40. In case the university resources are used the sharing shall be in the ratio 40:60 respectively.

PERIOD OF RECKONING

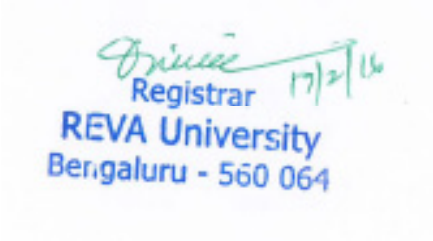
The Academic year is the period for calculating the credits earned by a faculty member that is, from 1st July of the previous year to 30th June of the current year.

PAYMENT OF INCENTIVE

At the end of every academic year, the total credits earned by a faculty member will be calculated based upon the evidence produced and the incentive payable to the faculty member will be arrived at and disbursed. For each credit earned a sum of Rs.3000/- will be paid. For fractional credits, the amount of Rs.3000/- will be proportionately paid.

CONCLUSION

This research and development vision visualized in line with the vision of the university, aspires to provide an enriching research environment to faculty members, research scholars and students to endeavor towards undertaking innovative and leading-edge research that contribute significantly to the needs of society. It promotes and motivates young scientists to undertake projects to find solutions to complex societal and industrial problems. The initiatives described in this vision document shall help in transforming actions into achievements. The document also intends to facilitate blending of teaching, learning, research and knowledge transfer. The incentive scheme shall inspire and motivate young scientists to contribute their best through collaborative research. The Research and Innovation Council established exclusively shall drive the huge human resource to take forward the university to greater heights in the global research map in coming years.




VLSI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