Biotech – Industrial Training Program (BITP)

- Neena and Bibil

On behalf of Department of Biotechnology (DBT), Ministry of Science and Technology, Government of India, Biotech Consortium India Limited (BCIL) is implementing a scheme of practical industrial training for M.Sc./M.Tech./B.E./B.Tech Biotechnology students. BCIL, a company promoted by the Department of Biotechnology, Government of India and all the Indian Financial Institutions concentrates on the commercialization of Biotechnology. The aim of this programme is to provide industry-specific training to Biotech students for skill development and to expand their job opportunities in biotech industry. This programme provides an opportunity to Biotech Industry for training and selecting skilled labour and utilise the technical expertise to the fullest. The training period is for six months during which the trainee is paid a stipend of Rs.8000/- per month and the trainer company is paid a bench fee to cover the expenses for providing training. The advertisement for the programme is published in national newspapers once in every year in the month of June and online application forms for students and requisition forms for companies are accessible on website for submission. The final placement for training is done in October

"It is not the strongest of species that survives. Nor the most intelligent that survives. It is the one that is most adaptable to change."

- *Charles Darwin*

bio360 Life Sciences Park

three sixty degrees of innovation

- Kavitha and Neena

Bio360 – Life Science Park is Kerala's first of its kind park which intends to facilitate the Bio-IT and Nanotechnology sectors in India. Situated at Veiloor village in Thiruvananthapuram, the Life Sciences Park will be a geographic assemblage of industry (Biotechnology, Nanotechnology & Life Sciences), research institutions and sci-tech academia. Its purpose is to address the needs of the rapidly emerging life sciences industry and is expected to attract investments; both domestic and foreign in the related areas.

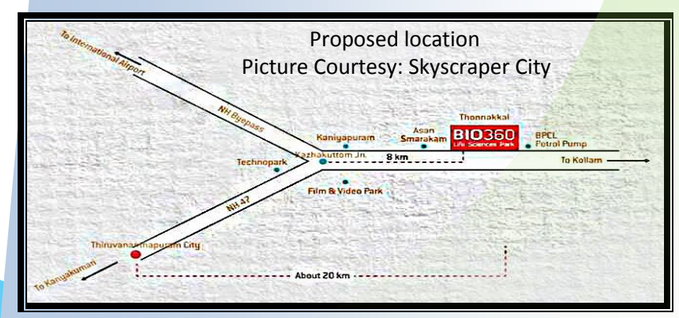
The park will accommodate large and integrated Bio-IT companies to set up their companies and ready to occupy built-up modules and IT companies with focus on human healthcare sector. The forte of this knowledge centre will be the Incubation Centre and the Technology Development Centre.

The Incubation Centre (IC) will provide critical enabling infrastructure and support to start-up Bio-IT companies and also assist them in the initial years (incubation period 2 -3 years) to acquire a critical mass and become self sustainable. Once profitable the company will move out and venture on its own. Technology Development Centre (TDC) will focus on the small and medium size IT players, inventors and entrepreneurs in the State, to start, expand or make their business more competitive in the marketplace.

> The park will accommodate large and integrated Bio-IT companies

A state-of-the-art, new generation biotechnology incubation centre is being promoted by KSIDC and Tropical Botanic Garden and Research Institute (TBGRI) in the Life Sciences Park. Nationally and internationally renowned R&D institutions in Life Sciences / Biotechnology sector including Sree Chitra Tirunal Institute for Medical Sciences and Research & Technology (SCTIMST), Regional Cancer Centre (RCC), Rajiv Gandhi Institute For Biotechnology (RGCB), and National Institute for Interdisciplinary Science and Technology (NIIST) are also part of this joint venture with KSIDC and TGBRI.

The first phase of development of this park will be in 75 acres of land. The project cost of the Incubation Centre, excluding the land, is estimated to be Rs. 300 million (Rs. 180 million for the first phase).



Biotechnika...

- Biotechnology & Biochemical Engineering – Emerging trends, challenges and prospects in the Indian context

Editorial

At the outset, let me extend my warm greetings to all my colleagues and students in the Department of Biotechnology and Biochemical Engineering, on the eve of the twelfth anniversary of inception of our department at SCTCE. This newsletter, commemorating a decade of excellence in Biotechnology and Biochemical Engineering is primarily aimed at throwing light on the trends, challenges and prospects of BT & BCE in the Indian context. It shall hence serve the purpose of guiding fresh graduates of Biotechnology in their quest for career, academic, research and entrepreneurship opportunities in BT & BCE.

The Department of BT & BCE, which was established at SCTCE in the year 2002, has been successfully able to deliver its objectives and commitments in an exemplary manner. The contributions made by my pre-incumbents, particularly, **Prof. C.K. Baby**, **Prof. G. Subramanian** and **Prof. S. Balachandran** have to be remembered at this juncture, with utmost gratitude. The support and encouragement offered to us by the present Principal, **Prof. (Dr.) Shaji Senadhipan** is also worth mentioning. **Prof. P.M. Hormese**, Emeritus Professor of Mechanical Engineering, was one of the founding faculty members of this department. His contributions to the infrastructure development of the department should never be left unnoticed. I am also indebted to my team of vibrant colleagues, whose enthusiasm and sincerity are driving the department ahead in the progress path. I sincerely hope that this department shall march ahead with increasing vigor, towards attainment of broader objectives in the areas of research and consultancy, which are vital to ensuring societal acceptance of this discipline in the days to come.

On this twelfth year, I dedicate this Newsletter to all the Biotech students of today and the Bioprocess Engineers of tomorrow, with sincere prayers for a golden future which Biotechnology is holding for them.

Warm regards,

Prof. (Dr.) P.P. Thomas
Professor and Head
Department of BT & BCE (SCTCE)
Formerly Deputy Director &
Head of Process Engineering and Environmental Technology (CSIR- NIIST, Thiruvananthapuram)

Scope of Biotechnology...

-Grace

They say, "BIOTECHNOLOGY has no scope... you will end up hopeless in future"... but they don't understand that WE ARE the future!!

The field of biotechnology is considered to be of no scope mainly because the number of companies employing biotechnology students is less in comparison with IT or finance.

On one hand, it caters to the industrial sector such as food and beverages industry, textiles industry, biological products, medicines and pharmaceuticals while on the other hand this branch of science caters to the requirements of agriculture, animal husbandry, nutrition and environmental conservation.

Research is carried out in more than 25 diverse areas. The concepts derived from diverse subjects of sciences are applied to biological matter, generally living cells, for developing new and improved biological and industrial products.

The primary reason behind the interest emerges from the fact that the technical and procedural application of biotechnology touches a vast array of disciplines.

- It makes use of replenishable natural resources.
- Production of bioethanol, biodiesel, biohydrogen enables energy conservation.
- The cost of production via biotechnological process is usually less in comparison with chemical synthetic route

According to a recent survey, India is stated to become an international focal point for development of biotechnology. Primarily, India being an agrarian economy requires professionals who can improve agrarian practices and optimise agricultural output.

India offers the large-scale practice of biotechnology. We have one of the largest biodiversity, one of the largest coastlines in the world, at least seven distinct climatic zones and one of the largest and most varied sets of marine organisms. There are places on the Indian coast where there is uninterrupted sunshine for some 340 days in the year so that marine organisms are grown in open raceways.

We have an enviable infrastructure and a large pool of experienced manpower. Large tracts of land available for growing the desired plants required for agricultural biotechnology. We have experience of building world-class institutions in virtually every sector of human endeavor.

Do you still think that biotechnology have no scope? After all, biotechnology sector ranks second among growing sectors with a tremendous employment potential and is least affected by economic recession.

A more affordable option to fight breast cancer...

Priyadarsini & Manasa

Biotech major Biocon'sCANMab (biosimilarTrastuzumab) for treating metastatic breast cancer entered the market in the first week of February. The product, CANMAb, the world's first 'biosimilar' or remake of Swiss multinational Roche's original drug trastuzumab, costs about 25 per cent less than the original. It will make breast cancer treatment more affordable and accessible to many Indian patients who test positive for the cancer-indicating HER2 (short for human epidermal growth factor). Patients need to take at least three intravenous drug cycles lasting around three months before any change in tumour can be noticed. In India, breast cancer is the No. 2 cancer striking women and roughly 1.5 lakh new cases are detected each year. At least a quarter of them or nearly 40,000 test positive for the HER2 and can benefit from CANMAb. Biocon co-developed the new product with U.S. pharma major Mylan. Roche sells the drug in India as Herceptin, which generated 2012 sales worth around Rs.130 crore. The local version costs Rs.19,500 for a 50 mg budget vial and around Rs.57,000 for 400 mg. The original rival comes in a single 400 mg offer and costs around Rs.75,000-80,000. Product offers the same level of safety and efficacy as the reference product Herceptin. The Biocon-Mylan joint development programmes are on target. The two companies are working on eight molecules at present in the auto-immune and oncology space. Few molecules are in global clinical development, which is under way at multiple sites across the globe.

Career Opportunities and Entrepreneurship in Biotechnology And Biochemical Engineering

-Agnes and Niyas

One can choose a suitable career path according to individual interests in any of these fields- research and development, analysis or production area. The long – term career potential is in fact boundless, with the growing fields of biomedicine, genetic engineering production of various bio-processed materials, marketing of biotechnology products and processes in various areas, research and bioinformatics application of information technology to the management of biological information and so on.

The long – term career potential is in fact boundless...

As a biochemical engineer, job responsibilities exist for the design and scale-up of processes, instruments and equipments from the laboratory through the pilot plant and manufacturing process. A biochemical development engineer is involved in new product scale-up, process improvement and technology transfer and process validation activities. He or she works with various departments to ensure that processes and designs are compatible for new product technology transfer and to establish future process and equipment automation technology.

The various career opportunities available are:

Entry-level jobs: are the first of several tiers within the same general areas of responsibility in various sectors viz. Research & Development, Quality Control, Clinical Research, Manufacturing & Production, Regulatory Affairs, Information Systems and Administration etc.

Government Jobs: A Biotechnologist may work in government institutes and organizations, such as CSIR, ICMR, ICAR Labs, Regional Research Labs, FCI, IDPL, national institutes, centres of excellence, DBT institutes and other academic science and technology institutes through sponsored projects. A post-doctoral fellowship in specialized disciplines of biotechnology is also being supported through DBT.

Private Sector Jobs: Large number of leading biotech companies exist in India. Many jobs are currently available in the private sector for research & development, marketing, sales/business development and customer support profiles.

Some of the leading private industries in India are as follows: Imperial Life Sciences, Lifecell International etc.

Entrepreneurship: B.Tech Biotechnology and Biochemical graduates can also opt for higher studies or become excellent entrepreneurs by starting their own ventures like Mitra Biotech, Amnion and various other emerging companies. Biotech Incubator and Park offers wet/dry lab, office space and all the other basic facilities needed to start/run any biotech business successfully. One can start business from here, as all the facilities concerned with Production and R&D activities like Road and Transportation, 24 hr water supply, power supply, Telecom services.

Following are the list of such biotech parks and incubators of India.

- **Agri-Science Park@ICRISAT, Patancheru, Hyderabad, Andhra Pradesh.**
- **Bangalore Helix and Biotech Park, Bangalore, Karnataka**
- **Biotech Incubator, Hyderabad, Andhra Pradesh**.

Bachelor and after….

Grace and Veena

What after B.Tech Biotechnology?..What's your next career option?..

You could be in a turning point or would be thinking about the same....what next? You could either choose to work or opt for higher studies.

Masters are the next step. A post-graduate degree will improve your job prospects further. Field of specialization solely depends on your taste. It will help you gain in-depth knowledge of the subject and provide the confidence required to face the job market. After completing B.Tech in Biotechnology, you can pursue M.Tech, M.Sc & Ph.D or MBA .MBA provides broad introduction to Biotechnology and focuses on imparting management skills, required in chemical, pharmaceutical or allied industries
Courses offered are listed below:

- Integrated PhD courses
- PhD in biological sciences
- Ph.D. Biotechnology
- Post Graduate Diploma in Biotechnology
- Post graduation in Genomic/Genetic or Nano-Technology

The candidates can do their post graduate degree in India as well as in foreign countries. MS is a good choice for people who are interested in the field of research. For ME/M.Tech, the candidate should appear for the GATE exam. For MBA, high scores in CAT/MAT entrance examination are mandatory to get a seat in top B-Schools of India.
There many institutes which offers masters degree in Biotechnology. Some of them are:

- IIT's
- India Institute of Medical Sciences
- Jawaharlal Nehru University

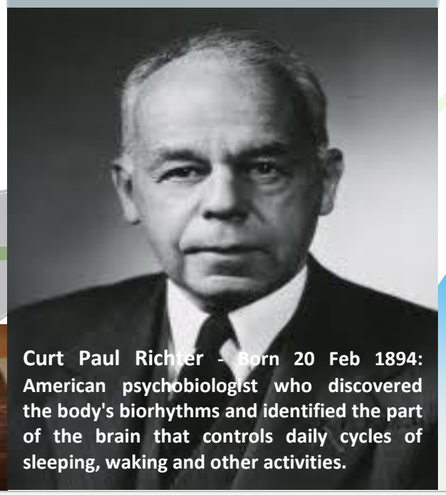
After completing the MBA, the aspirants can join any Drug manufacturing or marketing company. To study in foreign countries GRE, TOEFL examinations are to be taken. Only B.Tech and M.Tech or science graduates are eligible for JRF.

To do PhD, the B.Tech graduates must have a valid GATE score and the M.Tech graduates can apply without the GATE score. Ph.D. Research can be done at Jawaharlal Nehru Technological University, Hyderabad; Jawaharlal Nehru University, New Delhi; Rajiv Gandhi Centre for Biotechnology, Thiruvananthapuram; the Cochin University of Science and Technology, Kochi, and so on.

Bangalore INDIA BIO 2014 gives Indian biotech industries renewed hope

- Kavitha

Bangalore India Bio reiterated its stature as the India' s Biggest and most important Biotech Event through the intensity of the conference sessions & quality of business meetings, the sheer number of participation, the presence of a Nobel Laureate Professor John Gurdon, ,a World Food Prize Laureate Em. Prof. Dr. Marc Van Montagu and other eminent personalities. Organised by the Department of Information Technology, Biotechnology and Science & Technology, Government of Karnataka and the Vision Group on Biotechnology - Bangalore INDIA BIO' s success showcases the commitment by the Government of Karnataka to promote Biotechnology in the state. Inspirational talks by the eminent personalities, panel discussions, powerful presentations captured the audiences' imagination. Contemporary topics of interest to the biotech sector including stem cells and regenerative medicine, personalised medicine, .biomedical devices and digital health, clinical trials etc were keenly deliberated upon. The event had an International participation from nearly 20 countries, including UK, USA, Malaysia, Australia, Germany, Canada and others.



Curt Paul Richter - Born 20 Feb 1894: American psychobiologist who discovered the body's biorhythms and identified the part of the brain that controls daily cycles of sleeping, waking and other activities.