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The Institute of Integrative Biosciences is a cross-disciplinary life sciences institution that offers world-class degree programmes and undertakes cutting-edge research in different areas and at the interfaces of biological sciences.

The IIB is a constituent institute of CECOS University of IT and Emerging Sciences, a leading player in engineering education for over 28 years.

IIB has a holistic approach towards education with not only stronger computer sciences and mathematics modules but also a renewed emphasis on humanities, arts and the social sciences.

IIB highly values creativity, independent critical thought, along with strong entrepreneurial flair. We aim to nurture these foundational attributes within each graduate to make them the fittest in the job market.
WHY IIB?

CROSS-DISCIPLINARY

Cross disciplinary – At CECOS University, IIB leverages its 28 years of leadership in engineering education, including computer sciences and informatics. Our curriculum and research both have a strong cross-disciplinary focus.

ENTREPRENEURIAL

Teaching and training at IIB have strong entrepreneurial components, which aims to cultivate innovators and our leaders of tomorrow in the biotech sector.

FLEXIBLE AND INDEPENDENT

We aspire not just to make our curriculum flexible, but also to foster a healthy environment for stimulating discussions and independent academic research.

TRANSLATIONAL

The curriculum and research at IIB has a strong applied and translational focus, with a mission to tackle real-world problems of direct local and national relevance in energy, medicine, agriculture, livestock and the chemical industry.
Thank you for considering the Institute of Integrative Biosciences as the next step of your academic career! Our degree programmes in Biotechnology and Bioinformatics promise to be exciting, stimulating and at the same time intellectually challenging journeys. You will be studying different subjects, which have been pulled together into the most flexible and up-to-date curriculum around. Starting from foundational courses in molecular biology, biochemistry and microbiology, you will progress into more advanced modules that touch upon some exciting new technologies in your senior years. Our curriculum also learns from the needs of the job market, both in academia and the industry, and places an additional focus on areas like mathematics and computer sciences. This will make sure that you can easily meet the skill demands in the market and excel in whichever career you choose after graduation. We also bring in a renewed emphasis on subjects in the social sciences, right in line with the ‘holistic’ approach we have towards your education.

Boundaries between different fields are blurring as science is progressing and the interfaces between different fields are some of the hottest areas of research. This is where IIB leverages 28 years of quality engineering education at CECOS. We intend to collaborate both in taught modules and research projects with the engineering, computer science, mathematics, statistics and even the management science departments, both at CECOS and leading Universities abroad. This makes sure that your dissertation project in your final year, is not only original & independant but also an innovative & cross-disciplinary piece of work.
Finally, we aspire not just to produce graduates with strong foundations in their fields of choice, but beyond that, who are problem solvers, innovators and entrepreneurs, ready to take on the most pressing challenges we are facing as Pakistanis and as Human beings. I truly hope you have similar ambitions!

Faisal F. Khan, *MSc (Oxon), DPhil (Oxon)*, 
Director,  
Institute of Integrative Biosciences  
faisal@cecos.edu.pk | @esepzai
Dr Faisal F. Khan is a graduate of the University of Oxford, where he successfully completed his doctoral studies at the intersection of Cell Biology and Systems Biology as a member of the Oxford Protein Informatics Group. His thesis was titled the ‘Design, implementation and experimental validation of network-based model for predicting mitotic microtubule regulating proteins’. His project involved integrating biological data and using machine-learning techniques to predict genes which function in specific biological processes. This was followed by experimental validation using genetics, molecular biology, biochemistry and proteomics with a focus on cell division in the popular model organism, Drosophila melanogaster.

Prior to IIB, Faisal taught Bioinformatics, Industrial Biotechnology and Human Molecular Genetics and a newly developed course on Systems Biology at the University of Peshawar. He has also held different positions at the University of Exeter (UK), NUST (Pakistan) and LUMS (Pakistan).

During the course of his DPhil, Faisal was also a SIP scholar at the Saïd Business School where he read Strategy and Innovation. Faisal also has an MSc in Integrative Bioscience from the University of Oxford with two dissertations in Cell Biology and Structural Bioinformatics, and a BS in Biotechnology from the University of Peshawar.

Throughout his career Faisal has won numerous awards and scholarships including the HEC overseas scholarship, the Oxford-Noon Award and the St. Anne’s College Domus Award. As an entrepreneur, Faisal was selected amongst Europe’s 40 Biotech Leaders of the Future by Novartis in 2009 and his startup won his team the CUE Grand Finale, the largest business plan competition at the University of Cambridge, in 2011.
Biotechnology is one of Biology's fastest growing areas, which has revolutionized a broad range of industries – from the food and chemicals sector to agriculture and medicine. The degree programme in this area includes courses that deliver in-depth and comprehensive training to students at different levels of the subject matter – from the intricate molecular biology of cells to the industrial production of valuable chemicals and bio-products. Core subjects include biochemistry, molecular biology, microbiology and genetics. The programme also includes courses on cutting-edge areas like next-generation sequencing, systems biology and synthetic biology.

The Biotechnology degree programmes have a relatively larger breadth of subjects, which corresponds to the diversity of applications within the field. For example, technologies like genetic engineering, metabolic engineering, stem cells technology, personalized medicine, bio-nanotechnology and synthetic biology, to name a few, have directly affected a variety of sectors and continue to do so. These include medicine, agriculture, energy, livestock, manufacturing, food, and the pharmaceutical & chemical industries.

If you enjoy observing and studying life and nature and are interested in undertaking rigorous training in how you could use biological systems to engineer valuable products and develop solutions to tackle the most pressing problems we face in the world, this could be your best choice.
BS AND MS DEGREES IN BIOINFORMATICS

The field of biology in general is undergoing a major shift, thanks to some major technological advances. Instead of single ‘reductionist’ experiments by biologists, where they focus on individual molecules and their reactions, the trend is moving towards high-throughput experiments, which generate massive amounts of data. This phenomenon has enabled scientists to draw a more holistic ‘systems’ level understanding of biological processes. A simple analogy could be looking at an image or a map at a very high zoom-in level, compared to a zoomed out view of an entire space, which can be much more comprehensive and complete.

The surge in data over the past couple of decade has also brought in new problems into the field, which had to be solved. For example, the storage and analysis of this amount of data has not been possible without the help of computers. These computational needs along with other applications, which developed with time, like data visualization, statistical predictions, mathematical modelling and molecular dynamics simulations paved the way for a new area of specialization, which is broadly termed as bioinformatics. With a very high demand for computer science and engineering experts, the field has drawn lots of experts from fields outside biology.

Bioinformatics can be a breathtaking course for the ‘inter-disciplinarians’ out there. Students from biology (pre-medical) backgrounds who have knack for computer science, mathematics or statistics or students from physics and mathematics (pre-engineering) backgrounds who wish to apply their skills in biology and medicine, can find this a rewarding experience that unifies their college experience with their current interests.
No matter which career path a graduate chooses at the end, after a journey of intense intellectual training and self-discovery, it is our responsibility to make sure they have all the necessary skillsets considering the present and more importantly the future trends in research and business. At IIB we are on a mission to train the next generation of scientists, innovators and entrepreneurs who are ready to take on the biggest challenges of the global and the Pakistani biotech sectors. Existing areas where life sciences graduates have traditionally been absorbed are as follows.

- Research and Teaching at Universities in the country and abroad. Many Pakistani graduates have made their way to the top as post-graduates, post-doctorates and faculty members in top-ranking universities around the world.
- Research in government research institutes like the PARC, VRI, NIFA, PCSIR, IRNUM, NIBGE, NIAB, etc.
- Research and Laboratory specialists in Hospitals – both government and private ones like the Agha Khan University Hospital, Shaukat Khanum Memorial Hospital and Research Centre and Shifa International.
- Government departments like livestock, fisheries, food, energy, agriculture and health.
- Multinational companies and private sector companies and industries in areas like pharmaceuticals, food, energy, chemicals, livestock and agriculture.
- Development Agencies and NGOs, including the United Nations, MercyCorps, Merlin, World Bank, etc.
- Business and Consultancy
- Policy institutes.
- Science Communication and Journalism
- Intellectual property Rights and Law firms
At IIB, we have a strong cross-disciplinary team of researchers and academics. The diversity of their backgrounds and current research interests allow us to work at different interfaces of biological sciences.

**IIB FACULTY TEAM**

**Prof. Naseer Ahmad**  
PhD, Loughborough University (UK)

**Prof. Azzam ul Asar**  
Post Doctorate, New Jersey Institute of Technology (US)

**Prof. Salah ud Din**  
PhD, University of Wales (UK)

**Dr. Nasir Karim**  
PhD, Qurtuba University (Pakistan)

**Dr. Faisal F. Khan**  
DPhil, University of Oxford (UK)

**Dr. Riaz Muhammad**  
PhD, Loughborough University (UK)

**Dr. Najeeb Ullah**  
PhD, Politecnico di Torino (Italy)

**Dr. Raza Ullah**  
PhD, Institute of Management Sciences (Pakistan)
ADMISSIONS

The admission decisions are based on all three components of the eligibility criteria: FSc marks/A-level grades (or equivalent certificates), IIB entrance test and the admissions interview.

Subject-wise eligibility criteria is as follows:

- **BS Biotechnology** - FSc Pre-Medical or A-levels with Biology and Chemistry.
- **BS Bioinformatics** - FSc Pre-Medical, Pre-engineering or Computer Science or A-levels with any combination of Biology, Physics, Mathematics, Computer Science and Chemistry.
- **MS Biotechnology** - BS Degree (16 years of education) in relevant fields of Biology, Medicine and Agriculture.
- **MS Bioinformatics** - BS Degree (16 years of education) in relevant fields of Biology, Engineering and Computer Science.

For more details call the Admissions Office at 091-5860291 or visit the Admissions Office at our Main Campus.
“If he [Bill Gates] were a teenager today, he says, he'd be hacking biology. “Creating artificial life with DNA synthesis. That's sort of the equivalent of machine-language programming,” says Gates. “If you want to change the world in some big way, that's where you should start - biological molecules.”

Wired Magazine, April 2010