About Aligarh Muslim University

Aligarh Muslim university occupies a unique position amongst universities and institutes of higher learning in the country. It was established in 1920 by the efforts of great visionary and social reformer Sir Syed Ahmad Khan. Since inception, it has opened doors to the members of all communities and from all corners of the world.

Spread over 467.6 hectares in the city of Aligarh, Uttar Pradesh, Aligarh Muslim University offers more than 300 courses in traditional and modern branches of education. It ranks eight among top twenty research universities in India.

The university has 13 faculties comprising 117 teaching departments, 3 academies and 21 centres and institutes. It has more than 37327 students and 1686 teachers on its rolls. There are nineteen halls of residence with eighty hostels for students.

About the Department

Department of Civil Engineering was established in 1942. Since then it has been contributing to engineering education by offering one B.Tech.and five M. Tech. programs in different specializations of civil engineering. The department has thirty Professors, four Associate Professors and five Assistant Professors covering different specializations. The areas of specializations include Structural Engineering, Hydraulics and Water Resources, Environmental Engineering, Geotechnical Engineering and Earthquake and Disaster Mitigation. There are 52 research scholars working in different fields and 35 Doctoral degrees have been awarded till date. The faculty members have to their credit Multinational Research Projects and individual research grants from different funding agencies.

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{GLOBAL INITIATIVE OF ACADEMIC NETWORK}

QUANTITATIVE TOOLS IN ENVIRONMENTAL BIOTECHNOLOGY AND MOLECULAR BIOLOGY FOR ENGINEERS

DECEMBER 19 – 23 , 2022

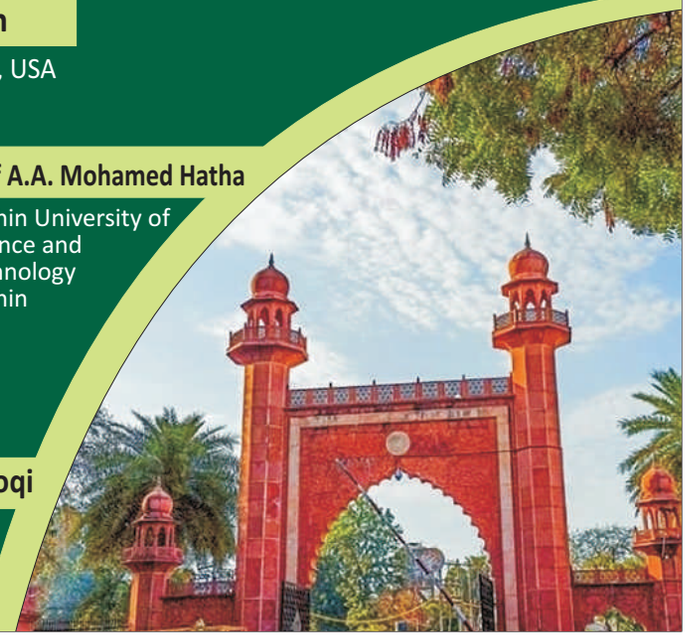
Organized by

Environmental Engineering Section
Department of Civil Engineering
Z.H.College of Engineering and Technology
Aligarh Muslim University, Aligarh

Prof. Syed Hashsham
Michigan State University, USA

Prof A.A. Mohamed Hatha
Cochin University of Science and Technology Cochin

Course Coordinator
Prof. Izharul Haq Farooqi



Quantitative Tools in Environmental

Biotechnology and Molecular Biology for Engineers

Overview

Engineers and scientists increasingly employ natural microbial processes to address environmental and human health issues. Management and control of such processes involve fundamental understanding of the theoretical bases on which microbes work and the mathematical models that govern them. This short course sponsored by the MHRD Scheme on Global Initiative on Academic Network (GIAN) titled "Quantitative Tools in Environmental Biotechnology and Molecular Biology" is designed for engineers and scientists engaged on biological processes. The course content emphasizes quantitation of various entities (bacteria, molecules, rates, processes) and offers them a unique perspective on life on earth at the molecular level.

It will connect concept such as flow of electrons in bacteria, how the rate of electron flow determines the doubling time, why some bacteria double within half an hour and others may take years, importance of these two extremes in controlling various processes, effect of toxicant and how it impacts the microbial processes both in the environment and inside the gut of higher organisms.

The course will also introduce microbial ecology (how combination of very different microbial populations work together to carry out a process), and the molecular tools that are increasingly being employed by engineers and scientists to manage and track the performance of processes that employ microbial communities. Case studies and hands-on examples will be used to provide practical knowledge of this exciting field.

Objectives: The broad objectives of the course includ

- Exposing participants to the fundamentals of environmental biotechnology and molecular biology,
- Introducing the quantitative approach to managing microbial systems and molecular tools for the protection of the environment and health,
- Providing exposure to practical problems and their solutions, through case studies and projects in environmental biotechnology and molecular biology,
- Enhancing the capability of the participants to identify new issues related to environmental biotechnology and molecular biology and design approaches to solve them.

Who Can Attend:

- Faculty from Reputed Academic, Research and Technical institutions.
- Practicing Engineers and Professionals from Govt. and other Institutions
- Students at all levels (BTech/MTech/PhD)

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Technical Program

Date	Lecture	Topic	Faculty
19-12-22	**Lecture 1**	Microbial systems in the context of energy and electron flow	Prof. Syed Hashsham
19-12-22	**Lecture 2**	Energetics and stoichiometry of biological reactions	Prof. Syed Hashsham
19-12-22	Tutorial 1	Problem solving session with examples from published literature and case studies pertinent to energy and health	Prof. Syed Hashsham and Prof. I.H.Farooqi
20-12-22	**Lecture 3**	Fundamentals of Environmental Biotechnology	Prof A.A. Mohamed Hatha
20-12-22	**Lecture 4**	Molecular tools relevant to environmental engineers and scientists in environmental biotechnology and human health: Module I	Prof. Syed Hashsham
20-12-22	Tutorial 2	Problem Solving Session with examples	Prof A.A. Mohamed Hatha and Prof. I.H.Farooqi
21-12-22	**Lecture 5**	Molecular tools relevant to environmental engineers and scientists in environmental biotechnology and human health: Module II	Prof. Syed Hashsham
21-12-22	**Lecture 6**	Residue Curve Theory, Separation Scheme Synthesis and Other Uses for Residue Curves, Opportunistic Separation Scheme Synthesis,	Prof A.A. Mohamed Hatha
21-12-22	Tutorial 3	Experimental session with examples: Primer/probe design, experimental approach for making use of molecular tools for a given objective	Prof. Syed Hashshamand Prof. I.H.Farooqi
22-12-22	**Lecture 7**	Case study - Environmental biotechnology	Prof. Syed Hashsham
22-12-22	**Lecture 8**	bioremediation of polluted soil and water ecosystems	Prof A.A. Mohamed Hatha
22-12-22	Tutorial 4	Case study – Human health (gut microbiome)	Prof. Syed Hashshamand Prof. I.H.Farooqi
23-12-22	**Lecture 9**	Emerging concepts in environmental Biotechnology (Nutrient recovery vs. waste treatment, Energy harvesting using microbial systems and the role of molecular tools)	Prof. Syed Hashsham
23-12-22	**Lecture 10**	Principles and applications of genetic engineering - II	Prof A.A. Mohamed Hatha
23-12-22	Tutorial 5	Problem Solving Session	Prof A.A. Mohamed Hathaand Prof. I.H.Farooqi

Registration Fee

Participants from Academic Institutes	Rs. 2000/-
Participants from Industry and Non Academic Organizations	Rs. 3000/-
Research Scholars M. Tech Students	Rs. 1500/-

Mode of Payment In the form of Demand Draft drawn in favour of "Quantitative Tools in Environmental Biotechnology and Molecular Biology for Engineers"

Bank Transfer : The details shall be posted later

Quantitative Tools in Environmental

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International Faculty

Dr. Syed A Hashsham has been working as a Professor in Michigan State University for the last twenty-three years. He did Bachelor's in Engineering from AMU Aligarh, Master's from I.I.T. Bombay, Ph.D from University of Illinois at Urbana-Champaign and Post Doc from Stanford university.His research interest lies in microbial genomics, beneficial and harmful effects of nanomaterials, and developing affordable platforms for decentralized point of care genetic testing. He is also interested in developing molecular tools and mathematical models relevant to microbial ecology, biotechnology and environmental genomics

He has published 96 peer-reviewed journal articles, 11 peer-reviewed book chapters/reports, 11 peer-reviewed conference proceedings, more than 100 peer-reviewed abstracts with poster presentations, ~78 platform presentations, 10 letters of disclosures, and 3 patent applications that have resulted from his research mostly at Michigan State University. The annual rate of peer-reviewed journal publications is between 4 and 5 with a Web of Science H-index at 24 with more than 2,544 citations (2,367 without self-citations; January 25, 2018 data as per the Web of Science), Google H-index of 27, i10-index of 42, and Research-Gate Score of 36.94. He is involved as Lead Investigator in

National Faculty

Dr Mohamed A A Hatha. has obtained in B.Sc. inZoology from Kerala University in 1985, M.Sc. in Marine Biology from School of Marine Sciences, Cochin University of Science and Technology, Cochin in 1988 and Doctorate from Department of Environmental Sciences, Bharathiar University, Coimbatore, in 1995. He is serving as a Professor in the Dept. of Marine Biology, Microbiology and Biochemistry, School of Marine Sciences, Cochin University of Science and Technology, Cochin from 2012 onwards.He has been in teaching profession since 1996 and has served at various organizations. He has supervised 73 M.Sc. thesis, 24 M. Phil and 17 Ph. D thesis. He was conferred with numerous awards including Fulbright fellowship. He has published 83 research papers in International journals, 42 in national Journals, 10 book chapters and made more than 110 presentations in conferences. He has published five books. Prof. Hatha has has undertaken a number of international and National research projects worth millions. Besides he has aslo worked as Consultants in different fields. His research area is Environmental microbiology and Food microbiology.

Course Coordinator

Prof. Izharul Haq Farooqi has been working in the environmental engineering field for the last thirty two years. The areas of specialization are water and wastewater treatment including Biological treatment, Biodegradation of toxic wastes, corrosion control. Teaching interests include Biological treatment of wastewaters, environmental chemistry and microbiology, Industrial water treatment. Dr.Farooqi has published more than one hundred research papers in refereed journals and conferences abroad. Dr.Farooqi has supervised seven Ph.D thesis and 73 M. Tech. Dissertations. Dr. Farooq has organized three international conferences and a number of National and International workshops on different topics of environmental engineering. Dr. Farooqi has undertaken research projects from different agencies like Ministry of Environment and Forest, UGC, UPCST, UNICEF and DST. Besides he was awarded with Young Scientist Award by UP Council of Science and Technology. Part from research projects Dr. Farooqi has taken a number of consultancy assignments from different govt. and private organizations.

Local Coordinator, GIAN at AMU

M. J. Warsi is the Professor and Chairperson, Department of Linguistics, Aligarh Muslim University (AMU), Aligarh. Prior to AMU he taught at University of Michigan, Ann Arbor, USA, University of California at Berkeley, USA, and Washington University in St. Louis, USA. Professor Warsi, is the recipient of the James E. McLeod Faculty Award for the year 2012 at Washington University in St. Louis, USA. He is a gold medalist from Aligarh Muslim University and a West Bengal Urdu Academy award holder. In the year 2005 Prof. Warsi was named an "unsung hero" by the Chancellor of the University of California at Berkeley, USA. He has published numerous books, research papers and in the area of applied linguistics. His academic findings help to understand the efficacy of the common contact in languages, culture and identity. He is also serving as the Editor-in-Chief, Aligarh Journal of Linguistics (AJL), a UGC-Care-listed journal. He has delivered invited lectures, talks and keynote addresses at many Universities in India and abroad. He has been the recipient of several grants including a $25000 grant by South Asia Language Resource Centre, University of Chicago, USA. Freeman Foundation Grant by University of Michigan, Ann Arbor, USA, and Mini Professional Development grant by University of California at Berkeley, USA.Professor Warsi is currently serving as Local Coordinator, GIAN at Aligarh Muslim University, Aligarh.