

The Foundation Course in Research Methods - 2021

IUCEE is pleased to offer ‘The Foundation Course in Research Methods’ a comprehensive 5-month program that aims to provide participants with the fundamental knowledge of conceptualization and operationalization of the key principles of research design. The topics to be covered will include reviewing of literature, choosing a research problem, designing a research project and the research framework required to conduct systematic research based on ethical principles.

The presenters, Dr. Prathiba Nagabhushan and Dr John Tharakan will hold two webinars with the participants each month for five months. The webinars will include guest speakers who are internationally recognized in the area of engineering research. The speakers will discuss their own approach related to the topic of discussion, and will engage with the audience through chat sessions facilitated by the presenters. The program will be carried out entirely online. Canvas will be used for communication, collaboration and coordination.

Program Goals:

This course is designed to accomplish the following goals by the end of the course:

- To familiarize the faculty from any domain of teaching in the engineering colleges the steps involved in taking up a research project.
- To enable the participants to have an overview of the necessary knowledge and understanding of research methods to confidently address a research problem

Instructors:

Dr. Prathiba Nagabhushan, Australian Catholic University, Canberra, Australia
Dr. John Tharakan, Howard University, Washington, USA

To Apply by August 1st 2021: If interested, please send your expression of interest to the following email address:

Krishna_Vedula@uml.edu

Fees: Rs. 6,000.00 per participant of an IUCEE consortium member. Rs. 7,500.00 per participant from non-consortium members.

Start date: August 15th, 2021 Sunday @ 7 am IST.

Please contact Dr. Krishna Vedula for more details: Krishna_Vedula@uml.edu

Course Details

This course will enable the participants to:

- Identify different research designs and methods and their theoretical underpinnings
- Demonstrate an understanding of the range of tasks necessary to completing a research project
- Understand the ethical principles to be observed in the conduct of a research project.

Expected Deliverable: Each participant will attend all the online sessions, participate in discussions and submit all assignments designed for the course.

Pedagogy

This course is delivered entirely online through CANVAS and Zoom webinars and the teaching methods include readings, lectures, power-point presentations, discussions, exercises and ongoing assignments that would facilitate the participants to gain knowledge and understanding of the systematic approach to conducting research.

Evaluation Methods

- Assignments
- Participation in discussion forums

Assessment Criteria

- Demonstration of detailed, accurate knowledge and understanding of scientific research design
- Active engagement in the course and its content through consistent participation in the discussion and webinars

Course & Assessment Outline

Module	When	Topics	Assignment	Assessment Weighting
1	15/8/2021	Introduction to research: <ul style="list-style-type: none"> • What is research? • Why do research? • Steps involved in conducting scientific research • Ethical Principles in Research 	1. Identification and explanation of the ethical issue in a given scenario Due on 5/9/2021	20%
2	22/8/2021	Identifying the research topic: <ul style="list-style-type: none"> • Literature review • Need for research • Identifying a research problem 	2. Analysis of a sample paper for clarity of approach to literature review and research question using a graphic organiser Due on 26/9/2021	35%
3.	29/8/2021	Guest Speaker from IUCEE & Chat session		

			Topic: Significance of Literature Review leading to a research question	
4	5/9/2021	Research Design 1: <ul style="list-style-type: none"> • qualitative, • quantitative, • mixed-methods designs • Their advantages and disadvantages 		
5	12/9/2021	Research Design 2: Experimental design <ul style="list-style-type: none"> • Its advantages and disadvantages 		
6	19/9/2021	Research Design 3: <ul style="list-style-type: none"> • Cross-sectional design • Longitudinal design • Case studies • Observational studies • Self-reports 		
7	26/9/2021	Guest Speaker from IUCEE & Chat session	Topic: Significance of alignment of research design to research questions	
8	3/10/2021	Research Methods: <ul style="list-style-type: none"> • Sample & Population • Methods of sampling, • Development of materials for data collection • Primary and secondary data • Qualitative and quantitative data • Procedural requirements 	3. An evaluation of research design and method in a sample research article using an infographic Due on 17/10/2021	45%
9	10/10/2021	Data Management <ul style="list-style-type: none"> • Descriptive statistics • Inferential statistics • Conclusions and generalisations 		
10	17/10/2021	Guest Speaker from IUCEE & Chat session	Topic: Challenges in designing an effective research project and suggestions to overcome them	

Course Instructors



Dr. Prathiba Nagabhushan is an educational psychologist who has a PhD from the Australian National University, Canberra, Master of English from Madras University and Master of Education from Bangalore University. She is currently teaching Psychology to senior secondary students and Methods of Teaching English and Humanities to Master of Teaching students at the Australian Catholic University, Canberra. With over 25 years of teaching experience at different levels

of educational system in India, Mexico and Australia, she has also taught in a variety of educational settings, with diverse students and across a wide range of cultural contexts.

A Gold-Medallist from Madras and Bangalore Universities, Prathiba has won the National Award for 'Innovations in Teaching' from the NCERT, New Delhi and recently received an International Award for the Best Research Paper at the International Conference on Cognitive & Behavioural Psychology, Singapore. She is a member of Global Science & Technology Forum, Singapore. Prathiba was the Cultural Ambassador of India to Mexico, sponsored by the Rotary International, Evanston, Illinois, USA. She is the recipient of the prestigious "Achievement Award - 2019 for the Outstanding Services to the ACT Community" by Mr Andrew Barr, the Chief Minister of the Australian Capital Territory.

Prathiba's publications include research articles on student motivation and engagement in learning, global trends in education and pre-service teachers' emotional well-being. Her current research interests include self-efficacy in students, ICT in education and educational practices and research in engineering education. Her book "Engaging Adolescent Students in Contemporary Classrooms: Emerging Research and Opportunities" is a compendium of her valuable research on adolescents' motivation towards and engagement in their learning.

Prathiba lives with her husband Nagabhushan, a mechanical engineer, working for the Federal Government of Australia, in Canberra. They have a daughter, Samyuktha, who also lives in Canberra with her husband and children.



Dr. John Tharakan is a Professor at Howard University in the College of Engineering, Architecture and Computer Sciences, where he also directs the Graduate Studies program in the Department of Chemical Engineering. Before joining the faculty at Howard, he worked as a research scientist at the American Red Cross. His research interests and experience are in environmental engineering and biotechnology, appropriate technology development and

education, and sustainable development. His bioenvironmental engineering research has focused on the use of biological technologies for the remediation of contaminated environmental media. As a Fulbright Senior Research Scholar to India in 2006-07, he organized and conducted a Symposium on Biological Methods of Waste Treatment in South India, the proceedings of which were published as an edited book. His appropriate technology research has had specific focus on technologies for water treatment and conservation, renewable energy production using solar and biomass resources, and waste management and resource recovery. Professor Tharakan's scholarly work has also focused on the ethics and philosophy of technology, with particular emphasis on the role of the research university in sustainable development. As Faculty Adviser to Howard University's Engineers Without Borders student

chapter, he has worked on appropriate water, sanitation and energy technology implementation in developing communities in Senegal and Kenya (<http://www.howard.edu/Kenya>). He has also served as Chair or Co-Chair of an on-going series of biennial International Conferences on Appropriate Technology (2004 – 2018) that have been held across Africa bringing together academics, researchers, practitioners and community groups to facilitate knowledge and technology transfer for social justice (<http://www.appropiatech.net>), and he has served as the editor for the published proceedings of these conferences. From 2015 – 2016, he served as Fulbright-Nehru Senior Research Scholar, resident at the Cochin University of Science and Technology, where his research focused on the social impact assessment of innovative and appropriate technologies in the areas of water, energy and the environment. Prof. Tharakan has been an activist engineering educator, incorporating project based learning, open-ended design, service learning and ethics in engineering into his core pedagogical approach to educating the engineers of tomorrow. Dr. Tharakan received his undergraduate education from the Indian Institute of Technology, Madras, graduating with a BTech in Chemical Engineering in 1982. He continued his graduate education at the University of California, San Diego, where he completed his MS in Fluid Mechanics in 1983, and defended his doctoral dissertation in July 1986 to receive his PhD (1986, Engineering Science, Biochemical Engineering) degree. His research has been published in the Journal of Biotechnology and Bioengineering, the Journal of the Life Sciences, the Journal of Chromatography, the Journal of Immunological Methods, the Journal of Environmental Science and Engineering, the Journal of Engineering Education, the International Journal of Service Learning in Engineering, Journal of Science and Engineering Ethics, the African Journal of Science, Technology, Innovation and Development, and the Journal of Engineering Education Transformation, in addition to his numerous peer reviewed conference proceedings, review articles and research letters and notes.