

UNIVERSITY OF CALCUTTA
INSTRUMENTATION ENGINEERING, DEPT. OF APPLIED PHYSICS
FACULTY ACADEMIC PROFILE/ CV



Full name of the faculty member: Ujjwal Mondal

Designation: Associate Professor

Specialisation : Real Time Control Systems, Repetitive Control Systems

Contact information :

Res: A26 Diamond Park, D/3 Jogomaya Apartment, Joka, Kolkata 700104

Office: Dept. of Applied Physics, 92 A.P.C. Road, Kolkata 700009

e-mail: ujjwalmondal@rediffmail.com; umaphy@caluniv.ac.in

Academic qualifications:

Degrees (graduation onward):

| College/ University from which the degree obtained | Abbreviation of the degree |
|-----------------------------------------------------------|-----------------------------------|
| University of Kalyani, W.B. | B.Tech. |
| Jadavpur University, Kolkata | M.E. |
| IEST, Shibpur, Howrah | PhD |

Positions held/ holding:

Associate Professor (from 25th October 2017)

Assistant Professor (up to October 2017)

Subject undertakes:

Undergraduate level: B.Tech in Instrumentation Engineering

1. Sensors and Transducers
2. Circuit theory and Networks
3. Control Systems
4. Analog Electronics Laboratory
5. Network Theory Laboratory
6. Control Systems Laboratory
7. Microprocessor Laboratory
8. Design Laboratory

Post Graduate Level: M.Tech in Instrumentation and Control Engineering

1. Modern Control Systems
2. Advanced Control Systems
3. Measurements and Instrumentation Techniques
4. Communication Laboratory

Research interests:

Areas of research interests

- Development and deployment of Real Time Control Systems
- Design and Implementation of Repetitive Control Systems
- Application of Wavelet Transform in Control Systems
- Fractional Order Modeling and Control
- Modified Adaptive Control
- Dynamic inversion
- Image processing (Haze and rain removal)
- Assistive technology

Research guidance:

PhD Guidance as Supervisor / Joint Supervisor:

Degree awarded:

1. Dr. Hiranmoy Mandal, Assistant Professor & HOD, Electrical and Electronics Engineering Department, Academy of Technology, West Bengal

Title of thesis: Some Modified Techniques of Measurement in Process Industry (Role: Joint supervisor)

Candidates successfully completed pre-submission seminar:

1. Naiwrita Dey

Title of thesis: “Design and Implementation of Robust Repetitive Controller : Some Advanced Approaches”.

(Role: Supervisor)

2. Pampa Debnath

Title of thesis: “Modeling and design of mm-wave devices for communication system applications”.

(Role: Supervisor)

Name of registered candidates for PhD:

1. Santanu Mallick
2. Manas Sarkar

List of publications:

Journals:

- Naiwrita Dey, Ujjwal Mondal, Anindita Sengupta, “Periodic Disturbance Compensation of Peristaltic Pump: A State Feedback Repetitive Controller-Based Approach”, J. Inst. Eng. India Ser. B (06 June 2022, Springer). <https://doi.org/10.1007/s40031-022-00751-5>
- S. Mallick, U. Mondal, “Inter-relationship between approximate dynamic inversion and MRAC augmented with proportional-integral controller”, Journal of Control and Decision, (19 May 2022, Taylor & Francis), <https://doi.org/10.1080/23307706.2022.2076162>

- S. Mallick, U Mondal, "U-Model-Based Dynamic Inversion Control for a Class of Nonlinear Dynamical Systems", Iranian Journal of Science and Technology, Transactions A: Science, 46, 475–490 (25 January 2022, Springer). <https://doi.org/10.1007/s40995-022-01261-1>
- Pampa Debnath, Arpan Deyasi, Ujjwal Mondal, Angsuman Sarkar, "Analytical investigation of double negative material based photonic filter performance at 1550 nm", Journal of Optoelectronics and Advanced Materials Vol. 23, Iss. 7-8, pp. 319-326 (Aug. 16, 2021, INOE, Romania)
- Mandal, H., Mondal, U., Bera, S.C., "Study of a modified obstruction free pressure sensor based flow transducer using hall sensors", Instrumentation Measure Métrologie, Vol. 20, No. 3, pp. 143-151. (30 June 2021, IIETA). <https://doi.org/10.18280/i2m.200304>
- Debnath, Pampa; Mondal, Ujjwal; Deyasi, Arpan, "Optimization of Scattering Parameters Through Numerical Investigation of One-Bit RF MEMS Switch Over Ku, K and Ka Band", Micro and Nanosystems, Volume 13, Number 3, 2021, pp. 353-359(7), (September 1, 2021, Bentham Science) <https://doi.org/10.2174/1876402912999201102200350>
- Manas Sarkar, Priyanka Rakshit Sarkar, Ujjwal Mondal and Debashis Nandi, "Empirical Wavelet Transform Based Fog Removal via Dark Channel Prior", IET Image Processing, Volume14, Issue 6, Pages 1170-1179, 11 April 2020, DOI: 10.1049/iet-ipr.2019.0496
- S.Islam, A. Choudhary and Ujjwal Mondal "Finite Dimensional Repetitive Controller For Single Phase PWM Inverter" International Journal on Computer Science and Engineering, Vol. 7, Issue 18, pp 251-256, E-ISSN 2347-2693, May 2019.
- "Tracking of periodic reference signal: A parameterized finite dimensional repetitive control approach" Ujjwal Mondal, Anindita Sengupta, Naiwrita Dey; Transactions of the Institute of Measurement and Control (SAGE), Vol. 40, issue. 13. Pp- 3640-3650, Sept, 2018

- “Sustainable and Equitable Global Society: Technological Paradigm Shift, Ujjwal Mondal, Combating Environmental Hazards and Disasters: Issues and Approaches, UGC-HRDC, University of Calcutta, ISBN: 978-93-5268-753-4, June 2017
- “Servomechanism for periodic reference input: Discrete wavelet transform-based repetitive controller”, Ujjwal Mondal, Anindita Sengupta and Rajeev R. Pathak; Transactions of the Institute of Measurement and Control (SAGE), Vol. 38, Issue. 1, pp-14-22, January, 2016.
- “Repetitive controller: an advanced Servomechanism for periodic reference input”, Ujjwal Mondal, Anindita Sengupta & Ananya Roy; International Journal of Dynamics and Control (SPRINGER), Vol. 4, Issue 4, pp- 428–437, January , 2015
- “Real-Time Speed Control of a DC Motor using Open Source Code Tools”, Ujjwal Mondal, Parthasarathi Satvaya, Sourav Kumar Das; International Journal of Soft Computing and Engineering (IJSCE), ISSN: 2231-2307, Volume-2, Issue-6, January, 2013.
- “Real Time System Development & Speed Control of a stepper motor Using Commercial Soft Tools & Open Source Codes.”, Ujjwal Mondal and Anindita Sengupta; International Journal of Electronics & Communication Technology (IJECT), vol.2, issue 1, pp.96-102, 2011.

Books/ book chapters:

- Title: Control Systems;
 Publisher: McGraw Hill Education (India);
 - ISBN-13: 978-1259097522 (2013)
 - ISBN-13: 978-0071329101 (2011)
 - ISBN-13: 978-0070671300 (2009)
- Book Series Title: Advances in Communication, Devices and Networking (Lecture Notes in Electrical Engineering)
 Publisher: Springer Nature Singapore Pte Ltd
 - Book Series No: LNEE, volume 662, Page 199-206, July 2020.

Paper / Chapter: Guided Filter Based Colour Image Rain Streaks Removal Using L_0 Gradient Minimization Method.

ii. Book Series No: LNEE, volume 537, Page 239-246, Feb. 2019

Paper/ Chapter: A Novel Wavelet-Based Image Defogging Using Dark Channel Prior and Guided Filter.

- Title: Photonics, Plasmonics and Information Optics;

Edition: 1st Edition

First Published: 2021

Imprint: CRC Press

Pages16

eBook ISBN: 9781003047193

Conference/ seminar volumes:

- Sarkar, S., Mukherjee, A., Mondal, U., Sengupta, A. (2022). Modified Multiloop Finite Dimensional Robust Repetitive Controller for Supply Air Pressure Loop of a Heating, Ventilation, and Air Conditioning System, Proceedings of International Conference on Industrial Instrumentation and Control. Lecture Notes in Electrical Engineering, vol 815. Springer, Singapore. https://doi.org/10.1007/978-981-16-7011-4_5
- Pradhan, S.K., Das, D., Mondal, U. (2022). Classification and Area Computation Modelling of Remote Sensing Images Using Histogram and Convolutional Neural Network, Topical Drifts in Intelligent Computing. ICCTA 2021. Lecture Notes in Networks and Systems, vol 426. Springer, Singapore. https://doi.org/10.1007/978-981-19-0745-6_63
- Das, A., Mondal, U. (2022). A Study on the Development and Deployment of IoT Based Remote Health Monitoring System Utilizing ECG Signal. Proceedings of International Conference on Industrial Instrumentation and Control. Lecture Notes in Electrical Engineering, vol 815. Springer, Singapore. https://doi.org/10.1007/978-981-16-7011-4_59
- Mukherjee, A., Sarkar, S., Mondal, U., Sengupta, A. (2022). Modified Multiloop Finite Dimensional Robust Repetitive Control for 7 Degrees-of-Freedom Robot Arm. , Proceedings of International Conference on Industrial Instrumentation and Control.

Lecture Notes in Electrical Engineering, vol 815. Springer, Singapore.
https://doi.org/10.1007/978-981-16-7011-4_6

- Dey, R., Mondal, U., Dhar, R.S. (2022). Application of Internal Model Principle Based Plug-in Repetitive Controller in Artificial Cardiovascular System, *Advanced Computational Paradigms and Hybrid Intelligent Computing . Advances in Intelligent Systems and Computing*, vol 1373. Springer, Singapore. https://doi.org/10.1007/978-981-16-4369-9_36
- Sarkar, M., Sarkar, P.R., Mondal, U., Nandi, D. (2020). Guided Filter Based Colour Image Rain Streaks Removal Using LL0 Gradient Minimization Method, *Advances in Communication, Devices and Networking. ICCDN 2019. Lecture Notes in Electrical Engineering*, vol 662. Springer, Singapore. https://doi.org/10.1007/978-981-15-4932-8_22
- Pampa Debnath, Arpan Deyasi, Ujjwal Mondal, “Design of Inline Coaxial Probe to RGW Transition in Ku and K Band” *IEEE VLSI Device Circuit and System (VLSI DCS) 2020*, Kolkata, India, July 18-19,2020.
- Pampa Debnath, Arpan Deyasi, Ujjwal Mondal, Angsuman Sarkar, “Improved Loss Characteristic in 1-bit RF MEMS Switch Owing to Lower Dielectric Constant” *IEEE VLSI Device Circuit and System (VLSI DCS) 2020*, Kolkata, India, July 18-19, 2020.
- Naiwrita Dey, Ujjwal Mondal, Anindita Sengupta, “Robust Higher Order Repetitive Controller for Disturbance Rejection and Multiplicative Uncertainty”, *2nd International Conference on Innovative Mechanisms for Industry Applications (ICIMIA)*, Bangalore, India, March 5-7, 2020.
- S. Mallick, U. Mondal, “Design of Lyapunov based Model Reference Adaptive Controller for First Order plus Delay Time Liquid Level System,” *International Conference on Intelligent Computing and Remote Sensing*, Bhubaneswar, July 6-7, 2019.
- Pampa Debnath, Arpan Deyasi, Ujjwal Mondal, “Bandwidth Enhancement of Ridge Gap Waveguide with Inline Coaxial Probe Transition” *6th International Conference on Microelectronics, Circuits & Systems*, Kolkata, India, July 6-7, 2019
- Naiwrita Dey, Ujjwal Mondal, Anindita Sengupta, “A Novel Robust Repetitive Controller for Tracking of Periodic Commands in the Presence of Internal Uncertainties”, *6th International Conference on Microelectronics, Circuits & Systems*, Kolkata, India, July 6-7, 2019

- Santanu Mallick and Ujjwal Mondal, “Performance Analysis of a Conical Tank System using Lyapunov based MRAC Technique”, IEEE Region 10 Symposium 2019 Theme: Technological Innovation for Humanity (TENSYP 2019), Kolkata, India, June 7-9, 2019
- S.Islam, A. Choudhary and Ujjwal Mondal "Finite Dimensional Repetitive Controller For Single Phase PWM Inverter" International Conference on EECCE 2019, Pailan Technical Campus, Kolkata, April 26-27, 2019
- Santanu Mallick and Ujjwal Mondal, “Performance Study of different Model Reference Adaptive Control Techniques applied to a DC Motor for Speed Control”, IEEE 3rd International Conference on Trends in Electronics and Informatics (ICOEI 2019), Tirunelveli, India, April 23-24, 2019
- Satyaki Sen, Chanchal Dey, Ujjwal Mondal “IMC based Fractional-order Controller for a Level Process”, IEEE 5th International Conference on Opto-Electronics and Applied Optics (OPTRONIX-2019), UEM, Kolkata, March 17-18, 2019
- Naiwrita Dey, Ujjwal Mondal, “Modified Repetitive Controller for Disturbance Rejection of Peristaltic Pump”, IEEE 5th International Conference on Opto-Electronics and Applied Optics (OPTRONIX-2019), UEM, Kolkata, March 17-18, 2019
- S. Mallick, U. Mondal, “Comparative Performance Study of Lyapunov Based MRAC Technique and MRAC Augmented with PID Controller for Speed Control of a DC motor,” IEEE 2nd International Conference on Advanced Computational and Communication Paradigms, Sikkim, February 25-28, 2019
- Ujjwal Mondal Ramasish Bnajerjee, Naiwrita Dey, “ MRAC Based Approach for Stabilization of Single Link Inverted Pendulum” International Conference on Current Trends towards Converging Technologies SVS College of Engineering, Coimbatore, India (IEEE ICCTCT 2018), 1-3 March, 2018.
- Bonhihotri Hazra, Ramashis Banerjee, Naiwrita Dey, UjjwalMondal, “Stabilization Of Double Link Inverted Pendulum Using LQR”, International Conference on Current Trends towards Converging Technologies, SVS College of Engineering, Coimbatore, India (IEEE ICCTCT 2018), 1-3 March, 2018.

- Naiwrita Dey, Ujjwal Mondal, Debasish Mondal, “Design of a H-infinity robust controller for a DC servo motor system” IEEE International Conference on Intelligent Control Power and Instrumentation (ICICPI), RCCIIT, Kolkata, 21-22 October, 2016
- Siladitya Khan, Avishek Paul, Tanmoy Sil, Ujjwal Mondal, “Position control of a DC motor system for tracking periodic reference inputs in a data driven paradigm” IEEE International Conference on Intelligent Control Power and Instrumentation (ICICPI), RCCIIT, Kolkata, 21-22 October, 2016
- Ujjwal Mondal, Abhirup Basu, Sangeeta Bose, Upananda Saha, “Finite Dimensional Robust Repetitive Controller for Tracking Periodic Reference Input”, IEEE International Conference on Electrical, Computer and Communication Technologies, SVS College of Engineering, Coimbatore, India, 05 Mar - 07 Mar 2015.
- Ujjwal Mondal, Anindita Sengupta, “Robust Servo Performance of Repetitive Controller for Periodic Reference Signals”, 6th IEEE POWER INDIA International Conference, Delhi Technological University, Delhi, 5-7 December 2014.
- Ujjwal Mondal, Anindita Sengupta, Rajeev R. Pathak, “DWT based Repetitive Controller for tracking of Periodic Reference Signal”, International Conference on Control, Instrumentation, Energy and Communication 2014, IEEE Xplorer , Technology Campus, University of Calcutta, Kolkata, 31 Jan - 02 Feb 2014.
- Ujjwal Mondal, Anindita Sengupta, Shanti Mohan Sinha, Bhaskar Das, Pradipta Ghosh, “Finite Dimensional Repetitive Controller for Identified Model of a DC Servo System”, IEEE International Conference on Power and Energy in NERIST, Arunachal Pradesh, December 28-29, 2012.
- Ujjwal Mondal, Parthasarathi Satvaya, Sourav Kumar Das, “Real-time control of a DC Motor using Open Source Code Tools”, National Conference on Advanced Communication Systems and Design Techniques, Haldia Institute of Technology, Haldia, September 29-30, 2012.
- Ujjwal Mondal, Rajeev R. Pathak, Anindita Sengupta, Ashok Sutradhar, “Repetitive Controller in Liquid Level System: A Discrete Wavelet Transform Based Approach”, IEEE National Conference on Electrical, Electronics and Computer Engineering, Jadavpur University, Kolkata, West Bengal, 4th - 5th November, 2011.

- Ujjwal Mondal, Partha Sarathi Satvaya, “Real Time Speed Control of a Stepper Motor”, International conference on Emerging Trends in Engineering & Technology (IETET-2010), Geeta Institute of Management and Technology, Kurukshetra, Haryana, 14 – 16 October, 2010.
- Ujjwal Mondal, Sankar Mahanta, “Real Time System Development using Open Source Codes”, Mobile and Pervasive Computing (CoMPC-2010),TIFAC-CORE, Velammal Engineering College, Chennai, January 28-29, 2010.

Invited lectures delivered:

- Lecture on “Recent Trends of Control Systems and Automation” is delivered through online platform in the 5 Days Faculty Development Program (19-23 Sept., 2022), organized by Dept. of Electrical and Electronics Engineering, RTC Institute of Technology, Ranchi, Jharkhand, September 19, 2022.
- Lecture on “An overview of Control Systems” is delivered through online platform at Gargi Memorial Institute of Technology, Baruipur, West Bengal, Sept. 12, 2020.
- Lecture on "Internal Model Principle: Servomechanism for Periodic Reference Signal" is delivered through online platform in the National level Faculty Development Program organized by Global Institute of Science and Technology, Haldia, West Bengal, July 24, 2020.
- Lecture on “Control Systems” is delivered through online platform at the Webinar organized by Pailan College of Management and Technology, Pailan, West Bengal, June 15, 2020.
- Lecture on “Emerging Trends on Instrumentation & Control Engineering” at RCC IIT, Kolkata, 24th July, 2019.
- Lecture on “Emerging Trends on Instrumentation & Control Engineering” at RCCIIT, Kolkata, 25th June, 2018.
- Lecture on “Transistor” at Pailan College of Management and Technology, Pailan, West Bengal, 3rd April, 2018.
- Lecture on “Control Systems” at Pailan Technical Campus, Pailan, West Bengal, 23rd March, 2018.
- Lecture on “Control Systems” at Pailan Technical Campus, Pailan, West Bengal, 22nd April, 2017.
- Lecture on “Control Systems” at Pailan Technical Campus, Pailan, West Bengal, 12th March, 2016.

- Lecture on “Introduction to MATLAB & its Application” at RCCIIT, Kolkata, 24th February, 2016.
- Lectures on “Sensors” at IEST, Shibpur, West Bengal, 31st July, 2015.
- Lecture on “Application of MATLAB in Control Systems” in MATLAB Workshop, organized by IEEE HIT Student branch at Haldia Institute of Technology, Haldia, West Bengal, 4th July, 2010.

Other notable activities:

- External question setter of RK Mission VCC, Rahara, Kolkata
- External expert for Project fellow selection in the Jadavpur University, Kolkata, West Bengal.
- External question moderator in the Dept. of Electrical Engineering, Aliah University, Kolkata, West Bengal.
- External expert in M.Tech. Project presentation and viva-voce examination in the Dept. of Electrical Engineering, Aliah University, Kolkata, West Bengal.
- External expert in M.Tech. project presentation and viva-voce examination in the Dept. of Electrical Engineering, IEST, Shibpur, West Bengal.
- External expert in M.E. project presentation and viva-voce examination in the School of Illumination Engineering, Jadavpur University, Kolkata, West Bengal.
- Expert in Faculty Selection in CIPET, Haldia, West Bengal.
- Reviewer for papers for several International Conferences and Journals.

Membership of professional societies:

- Life Member of Instrument Society of India (2405)
- Member of The Institute of Electrical and Electronics Engineers (93021489)
- Member of International Society of Automation (000033684898)
- Life Member of The Robotic Society (R180852)