# 3. Academic Schools

3.1 School of Computing and Electrical Engineering (SCEE)

The School of Computing and Electrical Engineering (SCEE) of IIT Mandi aims to maintain excellence in teaching and research in technologies related to Computing, Communication, Electronics and Electrical Engineering.

The School of Computing and Electrical Engineering has 33 Faculty members, 5 Staff Members, 69 Ph. D Students, 22 Masters students and 385 B.Tech Students. It has five broad areas namely Power Electronics & Drives, Controls & Sensors, VLSI, Signal Processing and Communications, Computer Science & Engineering.

The School offered two UG degrees namely B.Tech. in Computer Science & Engineering and Electrical Engineering. The School has three M.Tech. program namely in Power Electronics and Drives, Signal Processing & Communications, and VLSI in addition to regular Ph.D and MS by Research programs.
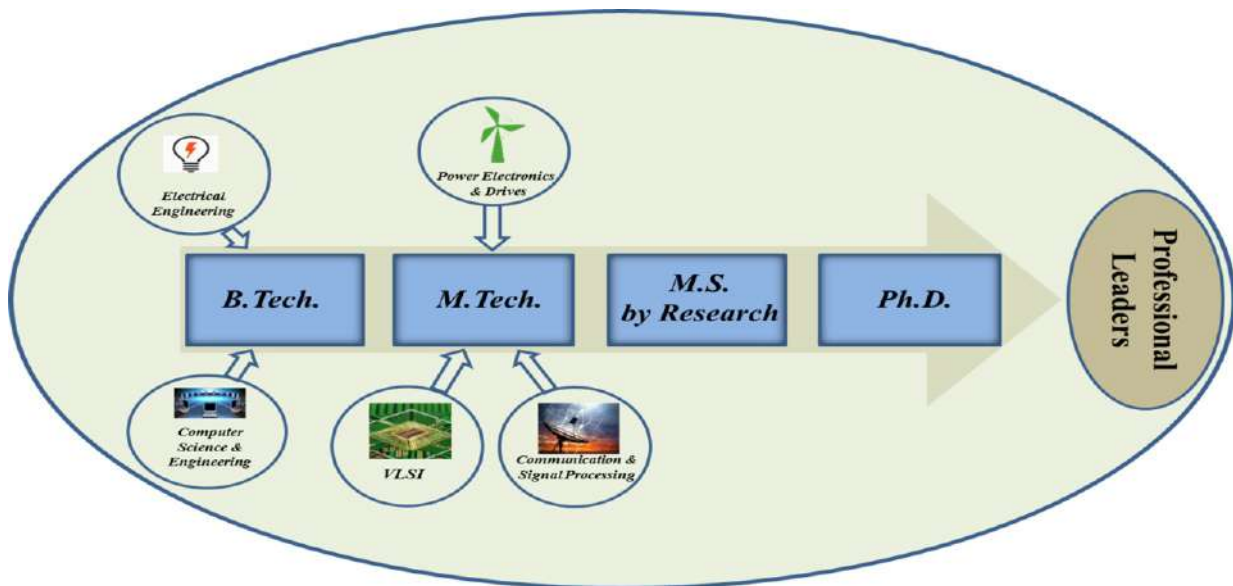
Degree programs offered by SCEE, IIT Mandi

Various programs in SCEE with their intake capacity and start of year

Program	Year of start	Intake Capacity
B. Tech. (Computer Science & Engineering)	2009	58
B. Tech. (Electrical Engineering)	2009	55
M. Tech. (VLSI)	2016	30
M.Tech. (Communication & Signal Processing)	2017	30
M. Tech. (Power Electronics & Drives)	2017	30
M.S. by Research	2010	As per the requirements
Ph.D.	2010	

The area of research covers a broad spectrum of theoretical and application-based topics such as: smart grid, renewable energy, materials for efficient semiconductor devices, next generation communication and efficient human-computer interaction etc.

At the undergraduate level, we emphasize the hands-on learning approach by providing students with a firm foundation of both the theory and practice of Computer Science and Electrical Engineering. We also have joint faculty positions with the School of Basic Sciences and School of Humanities to expose students to the social, ethical, and liberal education to make significant contributions to the society.

At the post-graduate level our faculty provide a deeper mastery of the basics and opportunities for research and professional development for students in the field of Computer Science and Electrical Engineering.

Our faculty members are engaged in both practical and theoretical research, often in partnership with government agencies, private industry and non-governmental organizations. National and international collaborations are one of the prime focus of the faculty. This aims towards advancement of knowledge within our disciplines and also to contribute to society.

School received Rs. 3,08,56,344/- worth of External Funding in the year 2018-19. There were around 70 Journal Papers, 91 Peer Reviewed Conference Papers, 11 book/book chapters and 4 patents filed from the School in the year 2018-19

For more information
Website: http://iitmandi.ac.in/Schools/SCEE/index.php

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Research Projects

Externally Sponsored Research Projects

S. No.	Project Title	Sponsoring Agency	Investigator	Amount Sanctioned (In Rs.)	Duration of Project
1	Development of low cost accelerated water purification systems with added mineralisation for himalayan region Date of Sanction: 01.04.2018 Date of Completion: 27.09.2021	NMHS	Dr. Jaspreet Kaur Randhawa (PI) Dr. Bharat Singh Rajpurohit, Dr. Samar Agnihotri (Co-PI's)	40,66,000	3 Years
2	High Energy and power density hybrid density hybrid supercapacitors for Grid scale energy storage Date of Sanction: 01.05.2018 Date of Completion: 30.04.2020	SERB	Dr. Rudra Kumar (PI) Dr. Satinder Kumar Sharma (Mentor)	19,20,000	2 Years
3	Deployment of sensors for landslide monitoring and early warning Date of Sanction: 15.06.2018 Date of Completion: 14.06.2019	Deputy Commissioner Mandi (H.P.)	Dr. Varun Dutt (PI) Dr. Venkata Uday Kala (Co-PI)	2,99,750	1 Year
4	Design and implementation of a cyber-physical system for high through put phenotyping & real time management of crops in the himalayan region Date of Sanction: 01.04.2018 Date of Completion: 31.03.2023	DBT	Dr. Srikant Srinivasan	32,50,000	5 Years
5	Design and fabrication of an interface ASIC for a vibratory gyroscope sensor application Date of Sanction: 22.11.2018 Date of Completion: 21.11.2020	ISRO	Dr. Satinder Kumar Sharma (PI)	45,76,000	2 Years
6	Water and energy efficient reliable irrigation system (watEr-ERIS): Solar energy and cloud-based decision support systems for automated irrigation system Date of Sanction: 15.01.2019 Date of Completion: 14.01.2022	SERB (IMPRINT-2)	Dr. Kasiviswanathan KS (PI) Dr. Subhamoy Sen, Dr. Tummuru Narsa Reddy (Co-PI's)	74,54,071	3 Years
7	Point of care monitoring of neuro-vascular interaction (Especially inverse neurovascular coupling) during spreading depolarization's in brain trauma using simultaneous recording of EEG & NIRS Date of Sanction: 14.09.2018 Date of Completion: 13.09.2019	DST	Dr. Shubhajit Roy Chowdhury (PI) Dr. Dheeraj Khurana (Co-PI) PGI Chandigarh	24,68,732	1 Year

8	Development and deployment of low-cost lanslide monitoring & waring system in District - Sirmour (H.P.) Date of Sanction: 17.01.2019 Date of Completion: 16.01.2020	DC office Sirmour(H.P.)	Dr. Varun Dutt (PI) Dr. K.V. Uday (Co-PI)	4,01,500	1 Year
9	Development of high accuracy of high machine learning diagnostics for pest and disease management for agricultural crops Date of Sanction: 25.03.2019 Date of Completion: 24.09.2022	Arnetta Technologies Pvt. Ltd	Dr. Srikant Srinivasan (PI), Dr. Anil Kumar Sao (Co-PI), Dr. Dileep A.D (Co-PI)	3,00,000	6 Months
10	POWER: Platform for open WLAN experimentation and research Date of Sanction: 28.03.2019 Date of Completion: 27.03.22	SERB (IMPRINT-2)	Dr. Samar Agnihotri (PI) from IIT Mandi and Dr. Mukulika Maity from IIIT Delhi, Dr. Venkatesh Ramaiyan from IIT Chennai, Prof. Joy Kuri from IISc Bangalore as (Co-PI's)	92,35,600	3 Years

Seed Grant Projects

S. No.	Projects Title	File No.	Investigator	Amount Sanctioned (In Rs.)	Duration of Project
1	ASIC implementation of hardware-efficient & low-power spectrum sensor based on cyclosationary feature detection for congnitive radio mobile-broadband system Date of Sanction: 12.04.2018 Date of Completion: 11.04.2021	IITM/SG/RSh/64	Dr. Rahul Shrestha	10,00,000	3 years

Sponsored Consultancy Research Projects

S.No.	Proposal Title	Faculty name	Agreement signed with	Amount Sanctioned (In Rs.)	Duration of Project
1	Turbo encoder/decoder IP core for OFDM transceiver Signing Date: 21.12.2018 Completion Date: 20.04.2019	Dr. Rahul Shrestha	Mr. Vijay Ananth K. Data Patterns (India) Pvt. Ltd., Chennai	9,51,080	4 Months

Dr. Shubhajit Roy Chaudhury

Product: Non invasive glucometer in the process of technology transfer.

Dr. Arti Kashyap

Eco- friendly Utilization of hazardous Pine Needles for social benefits through making briquettes:

Description: Pine needles cause a major threat to the environment, biodiversity and local economy in the entire Himalayan region due to their non-bio-degradability and highly-inflammable nature. In this project, utilization of pine needles by the pellatization/ briquetting in conjunction with various biomasses is the central focus for social benefit.

UHL has already been successful in preparing the briquettes as well as pellets of dry pine needle and its various forms by mixing other constituents. The center has its own set up in IIT Mandi campus. The briquetting unit set up in our campus has the capacity of 150kg/hour with a connected load of 12 HP. The cost of the unit is around six lacks.

We had proposed our technology to HP forest department and now forest department is providing 50% subsidy to the local entrepreneur for setting up briquettes unit.

Dr. Gopi Shrikanth Reddy

Design of Dual band microwave absorber with incident angle independence of more than 45°.

Publications

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2. P. Kumar, S. Thakor, "Performance of OFDM-FSO link with Analog Network Coding," in Photonic Network Communications, Journal Photonic Network Communications, vol. 35, no. 2, pp. 210-224, 2018.

3. Rahul Shrestha and Abhijit Sahoo, "High-Speed and Hardware-Efficient Successive Cancellation Polar-Decoder," IEEE Transactions on Circuits and Systems II: Express Briefs, Early Access (D.O.I:10.1109/ TCSII.2018.2877140), October-2018.

4. Mahesh S. Murty and Rahul Shrestha, "Reconfigurable & Memory-Efficient Cyclostationary Spectrum Sensor for Cognitive-Radio Wireless Networks," IEEE Transactions on Circuits and

Systems II:Express Briefs, Volume: 65, Issue: 8, pp. 1039-1043, August-2018.

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6. Kumar, M., & Dutt, V. (2019). Alleviating misconceptions about Earth's climate: evidence of behavioral learning in stock-and-flow simulations. System Dynamics Review.

7. Sangar, S., Dutt, V., & Thakur, R. (2019). Comparative Assessment of Economic Burden of Disease in Relation to Out of Pocket Expenditure. Frontiers in public health, 7.

8. Sangar, S., Dutt, V., & Thakur, R. (2019). Coping with Out-of-Pocket Health Expenditure in India: Evidence from NSS 71st Round. Global Social Welfare, 1-10.

9. Sangar, S., Dutt, V., & Thakur, R. (2019). Distress financing of out-of-pocket health expenditure in India. Review of Development Economics, 23(1), 314-330.

10. Aggarwal, P., Moisan, F., Gonzalez, C., & Dutt, V. (2018). Understanding Cyber Situational Awareness in a Cyber Security Game Involving Recommendations. International Journal of Cyber Situational Awareness. 3(1), 1-29.

11. Choudhury, A., Kaushik, S., & Dutt, V. (2018). Social-network analysis in healthcare: analysing the effect of weighted influence in physician networks. Network Modeling Analysis in Health Informatics and Bioinformatics, 7(1), 17.

12. Chaturvedi, P, Arora, A., & Dutt, V. (2018). Learning in an interactive simulation tool against landslide risks: the role of strength and availability of experiential feedback. Natural Hazards and Earth System Sciences, 18(6), 1599-1616.

13. Sangar, S., Dutt, V., & Thakur, R. (2018). Economic burden, impoverishment and coping mechanisms associated with out -of-pocket health expenditure: analysis of rural-urban differentials in India. Journal of Public Health, 1-10.

14. Sangar, S., Dutt, V., & Thakur, R. (2018). Rural–urban differentials in out-of-pocket health expenditure and resultant impoverishment in India: evidence from NSSO 71st Round. Asia-Pacific Journal of Regional Science, 1-19.

15. Sharma, N., Debnath, S., & Dutt, V. (2018). Influence of an intermediate option on the ascription experience gap and information search. Frontiers in Psychology, 9, 364.

16. Kumar, M., & Dutt, V. (2018). Experience in a Climate Microworld: Influence of Surface and Structure Learning, Problem Difficulty, and Decision Aids in Reducing Stock-Flow Misconceptions. Frontiers in Psychology, 9, 299.

17. Ashish Kumar, and Ankush Bag, "High Responsivity of Quasi-2D Electrospun ß-Ga2O3 based Deep-UV Photodetectors", IEEE Photonics Technology Letters (accepted).

18. Ankush Bag, Subhashis Das, Rahul Kumar, and Dhrubes Biswas, "Evolution of Lateral V-defects on InGaN/GaN on Si(111) during PAMBE: A Role of Strain on Defect Kinetics ", CrystEngComm, 20 (2018) 4151-4163.

19. Ankush Bag, Subhashis Das, Partha Mukhopadhyay, and Dhrubes Biswas, "Observation and analysis of kink effect during drain current inception of GaN HEMT", Superlattices and Microstructures, 120 (2018)101-107.

20. Saptarsi Ghosh, Subhashis Das, Syed Mukulika Dinara, Ankush Bag, Apurba Chakraborty, Partha Mukhopadhyay, Sanjay Kumar Jana , and Dhrubes Biswas, "OFF-state Leakage and Current Collapse in AlGaN/GaN HEMTs: a Virtual Gate Induced by Dislocations", IEEE Transactions on Electron Devices, 65 (2018) 1333-1339.

21. S. Ghosh, P.K. Sonker, S. Roy Chowdhury, "Modeling and Simulation of Low-Cost and Low Magnetic Field Magnetic Resonance Imaging", Sensors and Transducers, Accepted for publication, 2019.

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23. G. Sharma, S. Roy Chowdhury, "Design of NIRS probe based on computational model to find out the optimal location for Non-Invasive Brain Stimulation", Journal of Medical Systems, Accepted for publication, 2018.

24. Y. Arora, S. Ramasahayam, S. Roy Chowdhury, "An Optimal Reflection Photoplethysmographic Sensor System based on Skin Optics", IEEE Sensors Journal, Vol. 18, No. 17, pp. 7233-7241, 2018.

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32. S. Sharma, S. Das, H. Shrimali and S. K. Sharma, "High-Performance CSA-PANI based Organic Phototransistor by Elastomer Gratings" in Elsevier Journal of Organic Electronics, Vol. 57, pp. 14-20, Jun. 2018.

33. I. Yadav, H. Shrimali , A.Andreazza, V. Liberali, "Analytical Expressions for Noise and Crosstalk Voltages of the High Energy Silicon Particle Detector", Journal of Instrumentation, Institute of Physics (IOP) science, vol. 13, Jan. 2018, pp. C01019.

34. Bring your own hand: how a single sensor is bringing multiple biometrics together: Gaurav Jaswal, Aditya Nigam, Amit Kaul and Ravinder Nath, in the Journal of Soft Computing in 2019.

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Outreach/Continuing Education Activities Organized: (Workshops/ Conferences etc.)

1. Expert sessions delivered: "Introduction to Hadoop ecosystem and MapReduce programming model for Data Processing" and "Introduction to Apache Spark for stream / batch processing with case study / demo" as part of DST Sponsored Training Programme on "Big Data Management & Comprehensive Analysis" under the Scheme "NATIONAL PROGRAMME FOR TRAINING OF SCIENTISTS & TECHNOLOGISTS WORKING IN GOVERNMENT SECTOR" at C-DAC Mohali on Feb 14, 2019.

7. Venue: Government Engineering College Jhalawar, Rajasthan Date: 17-21 Dec, 2018.

8. Organizing Committee members of Interspeech 2018 Program Interspeech 2018, Hyderabad, 2-6 September 2018 Responsibility: Registration and Finance.

9. Invited Speaker Topic: AI and Machine learning in Agriculture Venue: Central Potato Research Institute, Shimla Date: 26 July 2018.

2. Innovation Hackathon organized during the period April 07-15, 2018.

3. Xilinx workshop on FPGA based system synthesis during October 13-15, 2018.

4. NMHS workshop on Water Filtration Techniques Based on Solar Energy from 11th to 13th February 2019.

5. Workshop Speaker Topic: Machine learning and deep learning, Venue: International Conference on Computational Intelligence in Data Science, SSN College of Engineering, Chennai Date: 21 Feb 2019.

6. Faculty Development Program (FDP) Resource Persons FDP on Machine Learning

10. Organizer and Workshop Speaker Workshop: International Workshop on Applied Deep Learning, SCEE, IIT Mandi Date: 16-20 July 2018.

11. Invited Speaker Venue: National Conference on Emerging Trends in Science and Engineering (NCETSE 2018), Shri Madhwa Vadiraja Institute of Technology & Management, Bantakal, Udupi, Karnataka Date: 28 April 2018.

12. Faculty Development Program (FDP) Speaker Program: FDP on Machine Learning and Applications Venue: ABV – Indian Institute of Information Technology and Management Gwalior Date: 29 March 2018.

13. Himachal Pradesh Science Congress Panelist on "Rural Upliftment through science and technology interventions" and conducted workshop on Precision Agriculture at IIT Mandi.

14. Organized the AI in Agriculture session at the Pan-IIT conclave held on January 2019 in IIT Delhi.

Winter School on Cognitive Modelling from 4th February to 10th February

The event was attended by national and international researchers and professionals who trained students and professors on the best practices in the area of cognitive modelling. Cognitive Models are essentially theories of how people think and make decisions, implemented through computer simulations. Integrating Artificial Intelligence (AI) and Machine Learning, cognitive modeling studies human cognition by creating models of behavior in both basic and applied domains. Cognitive models can aid researchers to understand how people make decisions in novel situations such as driving a car or trading in a stock market. These decisions are often based on prior experiences and emotions. Cognitive models can also be used to explain how people make errors while performing in a number of decision tasks. Some of these tasks may involve allocation of resources, control of quantities to goals, negotiations among several individuals, and making choices in real-world situations involving risk. "The AI and Cognitive Modeling fields will see rapid growth in a world where computing technology is growing exponentially due to Moore's Law," said Timothy A. Gonsalves, director, IIT Mandi. Low-cost landslide monitoring technology and the Farmer Zone project are among two of several examples of how IIT Mandi is leading AI initiatives for the benefit of the Himachal Pradesh and India. The Cognitive Modelling Winter School at IIT Mandi is based on pedagogic models established in the US (Carnegie Mellon University's yearly ACT-R Summer School) and the Netherlands (University of Groningen's yearly Cognitive Modelling Spring School). Seventy-five applicants have been shortlisted for this year's Winter School at IIT Mandi.

- A two day workshop on Deep Learning, at Amrita Viswavidyapeetham, Kollam, Kerala, January 2019. A talk on Deep Learning, at School of Engineering, Cochin University of Science and Technology, January 2019 A talk on bioacoustics, IISER Mohali, November 2018.

- A talk on bioacoustics, IISER Tirupati, March 2019 A talk on dictionary learning, Naval Physical and Oceanographic Lab, DRDO, Kochi, August 2018.

- Program co-chair for Medimage 2018 workshop, held in conjunction with ICVGIP 2018.

- Invited speaker at workshop for machine learning for medical image analysis (WMLMIA) at IIT Kharagpur.

- Invited speaker at workshop on deep learning for signal processing at Amrita Vishwa Vidyapeetham.

- Invited speaker at workshop on New Trends in Signal Proc., at SCET, Surat, Gujarat.

- Conducted a 5 day International Workshop on Applied Deep Learning at IIT Mandi from 16 to 20 July 2018.

- Conducted a 5 day Workshop on Deep Learning at Aligarh Muslim University from 30th Jan to 3rd Feb 2019.

Training Workshop on the Use of Briquette Machine for DPN Briquetting

One-day training workshop was organized for entrepreneurs on 26th December 2018 in the topic "the use of briquette machine for dry pine needle briquetting". A total of 35 entrepreneurs from different parts of Himachal Pradesh participated in the workshop. The main goal of the training workshop was to motivate entrepreneurs to set up pine needle based industry. We explained the procedure involves and technicality in dry pine needle briquetting and briquette machine. We also organized a hands-on training session for participants in the briquette machine setup.

Workshop on "Eco friendly utilization of Dry Pine Needles for social benefits:

We organized a workshop recently at IIT Mandi along with forest department officials to work together on the issue. The main aim was to aware people about the use of dry pine needles and encouraged them to set up pine needle based industry. We told them that by setting up this industry they will earn handsome income and additionally contribute to saving our forest from fire.

Vigyan Jyoti Workshop 9 To 23rd Sept, 2018 (A DST initiative for young girls)

15 Days workshop on Vigyan Jyoti has been successfully completed at IIT Mandi. The purpose of this workshop was to motivate 30 young girls of Govt. schools of Himachal Pradesh to join the field of Science and Technology.

- Program Chair, International Conference on Differential Equations and Control Problems: Modeling, Analysis and Computations (ICDECP19), IIT Mandi.

- EEE PES-IAS and PELS-IES conducted an "FEM Electromagnetics Training Workshop" on 27th December.

A hands-on training was given to the students willing to work in the area of 'Electrical Machine Design and Analysis'. There were many systems in PC laboratory in which the software has been installed and the students worked individually or in a group accordingly.

IEEE Session Name: Ansys Electromagnetics Training Workshop
Date: 27th December 2018
Venue: PC laboratory (A-5 building)
Time: 2:00 PM to 5:00 PM

- An illuminating talk was given by Prof. M. Balakrishnan, Department of Computer Science and Engineering, IIT Delhi on Monday, November 05, 2018 at 1730 hrs in room no. A1-NKN.

   Title of the talk: ASSISTECH: Assistive Technology Solutions for Mobility & Education of Visually Impaired

Expert Talks by Prof. K Gopakumar, IISc, Banglore held on 3rd Nov'18 at EED, DTU under the aegis of IEEE PELS-IES and PES-IAS Delhi Chapters, NVVN ,etc.

Title: High resolution multilevel voltage space vector structure generation for variable   speed drives and grid-tied applications

- An IEEE PES-IAS Tutorial jointly organized with PELS-IES by as per the following schedule:

Title: Manufacturing, Nanotechnology, Recent Development in Materials for Sustainability, Machine Learning to Deep Learning, High Tech Agriculture for Indian Farms, Electric Vehicle, Characterisation and Modelling of Solar Photovoltaic Panels.

Speakers:
- Dr.Satvasheel Powar, IIT Mandi
- Dr. Sunny Zafar, IIT Mandi
- Dr.Sumit Sinha Ray, IIT Mandi
- Dr. Ajay Soni , IIT Mandi
- Dr. Satinder Kumar Sharma, IIT Mandi .
- Dr. Pradeep Kumar, IIT Mandi
- Dr. Prem Felix Siril, IIT Mandi
- Dr. Rahul Vaish, IIT Mandi
- Dr. Atul Dhar, IIT Mandi
- Prof. Ujjwal Maulik, Jadavpur University.
- Dr. Aditya Nigam, IIT Mandi.
- Dr. Shyam Kumar Masakapalli, IIT Mandi.
- Dr. Srikant Srinivasan, IIT Mandi
- Dr. Rajan Kapur, Dr. Aditi Halder, IIT Mandi
- Dr. Narsa Reddy,IIT Mandi
- Dr. Shyamasree Dasgupta, IIT Mandi
- Ms. Pallavi Bharadwaj, Research Scholar, IISc Bangalore
- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry offered a series of lectures as below:

Medium and large Synchronous generators for Turbo and hydro power plants for Industries and Mini hydel power projects.

- One day IEEE workshop on Finite Element Modeling Applications to Engineering Problems using ANSYS software at IIT Mandi campus on 23rd August, 2018.

- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry will be offered a lecture on Large MV and HV Synchronous and Induction Motors for River lift irrigation systems and River linked irrigation schemes – Mega projects in India (22nd Aug, 2018).

- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry offered a lecture on Science–Technology–Application – Industry Interface. Learning and progressive role for would be Engineers (21/08/2018).

- Er. Sabyasachi Roy who has a long experience of working with Electrical Power Industry offered a lecture on Large MV and HV Induction Motors for Thermal Power Plant application with emphasis on present day super critical ultra mega power plants – 660/800/1000 MW. (20th Aug, 2018).

- **Title of Talk:** Smart Distribution Grid – Towards Efficient Electricity Management
Speaker: Dr. Naran Pindoriya, Associate Professor, IIT Gandhinagar.
Date/Time: June 7th, 2018 at 12:15 PM
Venue: SC-NKN, IIT Mandi

Talks outline:

Access to affordable, reliable and low-carbon electricity plays a critical role for sustainable economies and social development. The transition to a decarbonized economy involves (1) optimal utilization of distributed renewable energy resources (2) developing smart grid technologies and (3) promoting energy efficiency in electricity value chain. This talk would cover the discussion on enabling technologies for smart grid – advanced sensing/measurement, integrated communications, advanced components/subsystems and improved interface/decision support. Some research scope in the smart grid domain would also be highlighted.

Brief Profile:

Dr. Naran M. Pindoriya is an Associate Professor in Electrical Engineering at Indian Institute of Technology Gandhinagar, India. Before he joined IIT Gandhinagar, he was a research fellow in the Department of Electrical and Computer Engineering at the National University of Singapore, Singapore in 2010. He received Ph.D. in Electrical

Engineering from Indian Institute of Technology Kanpur, India in 2009. His research interests include active distribution grid, microgrid, load forecasting, and demand side energy management. He has developed the Power Systems and Smart Grid (PS & SG) research laboratory at IIT Gandhinagar. The PS&SG research group has published the research findings in scholarly research journals and peer-reviewed conferences.

Conference/Workshops/Other Institute/Industry Visited (India or Abroad) or Invited Lectures Delivered

1. Dr. Varun Dutt presented his work on cybersecurity: Influence of patching vulnerabilities on the decision making of hackers and analysts at International Conference on Cyber Situational Awareness, Data Analytics and Assessment (Cyber SA 2018), At Glasgow UK.

2. Dr. Varun Dutt's team presented his work on Landslide monitoring system in a workshop conducted by district authority ant Keylong district of Lahaul Spiti on August 11th, 2018.

3. Dr. Varun Dutt's team presented a lecture on landslide monitoring and warning system, in International workshop on "Extreme Severe Storms and Disaster Mitigation Strategy" 24-26 December, 2018 at Central University, Rajasthan.

4. Dr. Varun Dutt's team presented a lecture on their startup iIoTs in product development and people leadership workshop, by IIT Mandi Catalyst at Leh dated on 15-17 November, 2018.

Eminent Guest/Scholars/Students/Interns Hosted: (With details of activities/talks etc.)

1. Hosted Prof. Kanchi Gopinath from IISc Bangalore on Sept 27-28, 2018 at IIT Mandi

2. Sept 27: Talk 1: "Managing Systems Memory" targetted towards 3rd year B.Tech. Computer Science Students doing CDP (Introduction to Communicating Distributed Processes) course and Research Scholars working in the area of Operating Systems, Big Data computing.

3. Talk 2: "Adhaar Privacy Models" open research talk Sept 28: Meeting with NMSWorks-project under UAY scheme at Director's Conference Room.

4. Prof. Meenakshi Balakrishnan, from IIT Delhi was hosted on November 05, 2018. He delivered a talk on Smart assistive technologies for the blind people.

5. Prof. Hiranmay Saha from IIEST Shibpur was hosted on August 17-18, 2018. He delivered a talk on Innovation on Power Generation using Solar and Bio-waste. Both the talks were supported by IEEE PES.

6. Hosted Prof Ajish Abraham, All India Institute for Speech and Hearing, Mysore, January 2019 (photo attached).

7. Dr. Ashutosh Gupta (IIT Bombay) Instructor of CS591_7: SAT and SMT solvers (even semester, AY 2018/2019, 1 credit).

8. Ms. Kavita Singh Kale and Santosh Kale Instructors of HS592: Multi Media Film Making (odd semester AY 2018/2019, 1 credit).

9. Prof. Paritosh Pandya (TIFR) Instructor of EE591_1: Verification in VLSI Design (even semester, AY 2017/2018, 1 credit).

10. Prof. Saurabh Lodha, IIT Bombay Title of talk: Electronic and optoelectronic devices using 2D van der Waals materials, 25th May, 2018.
Dr. Marieke van Vugt (University of Groningen) (Guest Speaker)
Dr. Terrance C. Stewart (University of Waterloo) (Guest Speaker)

Professional Achievements, Honors and Awards/ Membership of Professional Societies

Dr. Shubhajit Roy Chowdhury

- Outstanding Reviewer Award by the Journal of Neuroscience Methods (Elsevier) in 2018.

Dr. Gopi Shrikanth Reddy

- URSI- APRASC International Union of Radio Science "Young Scientist Award - 2019".

Dr. Hitesh Shrimali

- Fellowship Chair: IEEE VDAT conference 2019.

- Organising committee member: IEEE EDAPS conference 2018.

- Young Faculty Research Fellowship, Meity, GoI.

Dr. Anil Sao

Young Faculty Research Fellowship, Meity, GoI.

Dr. Varun Dutt

- Member of Editorial Board of Management and Business Review (MBR) journal.

- Special topics editor on "Applications of Cognitive Approaches to Cyber Security" in Frontiers in Cognitive Science journal.

- Lead Author for Chapter 2 on "Integrated Risk and Uncertainty Assessment of Climate Change Response Policies" in Intergovernmental Panel on Climate Change (IPCC)'s 5th Assessment Report (AR5): http://mitigation2014.org/contributor/chapter-2.

- Knowledge Editor, English Financial Daily, Financial Chronicle: http://www.mydigitalfc.com

- Associate Editor, Frontiers in Cognitive Science journal, http://loop.frontiersin.org/people/48650/overview

- Review Editor, Frontiers in Neuroscience journal, http://loop.frontiersin.org/people/48650/overview

Dr. Tushar Jain

Tushar Jain has been elevated to the grade of IEEE Senior Member, 2018.

Dr. Siddhartha Sarma

- Awarded fellowship under Indo-Japanese Establishment of Young Researcher Fellowship Programmer 2018-2019. I visited University of Electro-Communications, Chofu, Tokyo, Japan. Funding agencies: INSA (India) and JSPS (Japan).

Dr. Bharat Singh Rajpurohit

- IEEE Industry Application Society (IAS) Outstanding Chapter Chair Award 2018.

- Chairperson, PES-IAS Society, IEEE Delhi Section, 2018.

New Initiatives / New Research Facilities Created / Equipment Installed / Laboratory Established

Dr. Shubhajit Roy Chowdhury

- Developed Embedded Systems Laboratory equipped with ARM Cortex boards, Xilinx Ultrazync ZCU 102 boards. Currently the testing and measuring equipments of the lab is under process.

- Installed electrometer in Biomedical Systems Lab capable of measuring current in nanoamperes.

Dr. Gopi Shrikanth Reddy

- Initiated creation of VLSI- testing facility which will cater testing facility of RF and VLSI circuits, active and passive devices.

- Current Equipment's in testing lab: P Network analyser, test antennas, Variac, DSO.

Dr. Bharat Singh Rajpurohit

- Hydropanel.

Dr. Ankush Bag

- Growth setup for ultra-wide Bandgap Semiconductors has been developed.

Dr. Varun Dutt

- Installed a 3D printer in lab.
- Installed a portable engraving machine in lab.

Dr. Tushar Jain

- As a new initiative in control systems lab, we have introduced rigorous Arduino-based control experiments which are more inclined towards imparting an in-depth working knowledge of controlled physical systems and helps in bridging the well-known gap between control theory and its practical implementation. The lab is designed in such a way that the students get complete hands-on practical knowledge of control systems which will prepare them for their MTP projects.
- Installation of TDCS (Transcranial Direct Current Stimulation) system at Biomedical Systems Laboratory, MANAS Group, IIT Mandi for performing experiments related to brain research**.**

Student Activities/Achievements

1. The former Ph.D student, Dr. Pravindra Kumar, has joined Thapar Institute of Engineering and Technology as an Assistant Professor in July 2018.

2. The former Ph.D student, Dr. Sanjay Rathee got Post Doctoral Fellow position at Oxford University, London in April 2018.

3. Mr. Gaurav Sharma and Ms. Yashika Arora received IBRO Fellowship from International Brain Research Organization for attending IBRO APRC School in the year 2019.

4. Best Poster Award, IEEE ICEE 2018, IISc Bangalore, (Mr. Manoj Yadav).

5. Ms. Vibha Gupta: Best paper award at workshop on Computer Vision for Microscopy Imaging (CVMI 2018) held with CVPR 2018.

6. Ms. Vibha Gupta received MSR travel grant to travel to MICCAI 2018.

7. Ms. Yashika Arora received the SERB Overseas Visiting Doctoral Fellowship (OVDF) in the year 2019.

8. Ms. Yashika Arora :"GSM based SMS alert system: Light, Fire, Gas and Intruder Detector" got 1st position in Innovation Hackathon 2018 held during April 7 to April 15, 2018 organized by Design & Innovation Centre, Indian Institute of Technology Mandi.

9. Ms. Palvi Aggarwal, got her Ph.D. and joined postdoctoral at Carnegie Mellon University, USA.

10. Ms. Neha Sharma got her Ph.D. and joined as an assistant professor in IIIT Una, Himachal Pradesh.

11. Mr. Shivendra Sangar submitted his synopsis and currently working as assistant professor for department of education in Mandi district.

12. Mona, Vyoma and Avinash attended the EECI (European Embedded Control Institute)- IGSC (International Graduate School on Control) Module-08 on "Nonlinear Model Predictive Control" held at IIT Madras in March, 2018. Each of them also received the financial support from EECI to attend the lectures held in the module.

13. Mona received student support from IEEE Control System Society (IEEE-CSS) to present his paper in 2nd IEEE Conference on Control Technology and Applications, August 21-24, Copenhagen, Denmark, 2018.

14. Mona received student support from IEEE Control Systems Society (IEEE-CSS) through organizers of the Indian Control Conference (ICC) 2019, to attend the conference hosted at IIT Delhi.

15. Vyoma Singh did internship from Robert Bosch, Bangalore on topic "Parameter estimation of Mean Value Spark Ignition Engine" from 5th November, 2018 to 11th January, 2019.

16. Avinash received student support from IEEE Control Systems Society (IEEE-CSS) through organizers of the Indian Control Conference (ICC) 2019, to present his papers in the conference at IIT Delhi in January, 2019.

17. Vyoma, Bindu and Avinash attended the EECI (European Embedded Control Institute)- IGSC (International Graduate School on Control) Module-02 on "Practical Adaptive Control" held at IIT Madras in January, 2019. Each of them also received the financial support from EECI to attend the lectures held in the module.

18. Mona has presented his research paper in IFAC SafeProcess Symposium in Warsaw, Poland 2018 with the help of the financial support received from Deity.

19. Bindu has presented her papers in ICARCV 2018 in Singapore with the help of the financial support from the School.

Students Attended: Continuing Education Activities / Conference Attended

1. Four days CBME MedTech Workshop (March 2019) at Indian Institute of Technology, Ropar, Punjab.

2. 1st Biomedical Instruments and Devices Hub Workshop on Strategy and Solutions for Better Health Care (February, 13 2019) at Postgraduate Institute of Medical Education & Research, Chandigarh.

3. Three days Workshop on Brain Connectivity Analysis and Conference on Brain Computer Interfaces (December 2018) at Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerala.

4. Three days International Workshop on Nano/Micro 2D-3D Fabrication, Manufacturing of Electronic- Biomedical Devices & Applications (November 2018) at Indian Institute of Technology, Mandi.

5. Research Evaluation Workshop of Visvesvaraya Ph.D Scheme for Electronics & IT/ITES (September, 2018) at Malaviya National Institute of Technology, Jaipur.

6. Field visit to ±800kVHVDC Converter Station, Kurukshetra, Haryana during 24-26 April, 2018.

Outreach Activity: Laboratory Visits of School/Diploma/ITI Students

"We need diversity of thoughts in the world to face new challenges." "Together we can do great things". With this spirit in mind SCEE and IEEE PES-IAS Society organize a lab visit of the post graduate students (Master of Arts, Economics specialization) of Vallabh Government College, Mandi and several schools at IIT Mandi campus.

Students has visited IIT Mandi Campus at Kamand. Firstly the volunteers of this event had organized an interaction session for these college students and further directed them into respective labs. Interaction session included some interesting topics on introduction of IEEE, PES Society, IAS Society, IIT Mandi and other studies related discussions which were diversified. Volunteers also briefed students about the procedures and preparation for admission to technical institutions at India. A brief discussion on the Masters plan in IIT Mandi was also discussed as it was relevant to these Master in Economics students since they can apply for the Ph.D Research Program after their post graduate degree in the School of Humanities and Social Sciences at IIT Mandi.

The students showed keen interest in knowing the procedure and criteria for getting into IIT and the zeal and enthusiasm within them have further made the event more successful. Volunteers took students to different labs like; Advanced Material Research Center (AMRC) Mechanical Workshop, Electrical lab, Electronics lab and Language lab which was of their interest in area of Economics and Language. In Language lab an activity was been organized and the students were given the task to perform. Not only the students but the staff who accompanied them took active part in various activities and found relevant to their course and area. Some experiments were performed in Electrical and Mechanical labs which were explained in details to the students. An introduction and training to IT/ multimedia and these labs were given by the volunteers to the students.

Students came to know about the research work going on at IIT Mandi and also came to know about the working of different instruments in the laboratory. Students were very enthusiastic to know more and more about different technical activities undertaken at IIT Mandi while showing more interest in the Language lab.

1. **Publications:** There has been a celebration of the IEEE PES Day which was organized by the IEEE IAS SB Chapter and supported by IEEE PES-IAS Chapter of Delhi Section. This event was covered in the *PES Newsletter (eNewsUpdate)*. The same has been attached below:

Team member installing system on a landslide

Team getting award for disaster risk reduction by SDMA.