

# COER R&D E-NEWS LETTER

## COLLEGE OF ENGINEERING ROORKEE

Volume 2

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Process parameter optimization of biodiesel production from algal oil by response surface methodology and artificial neural networks

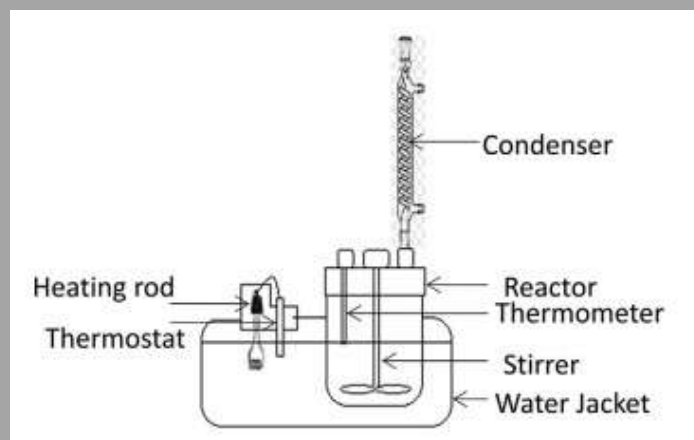
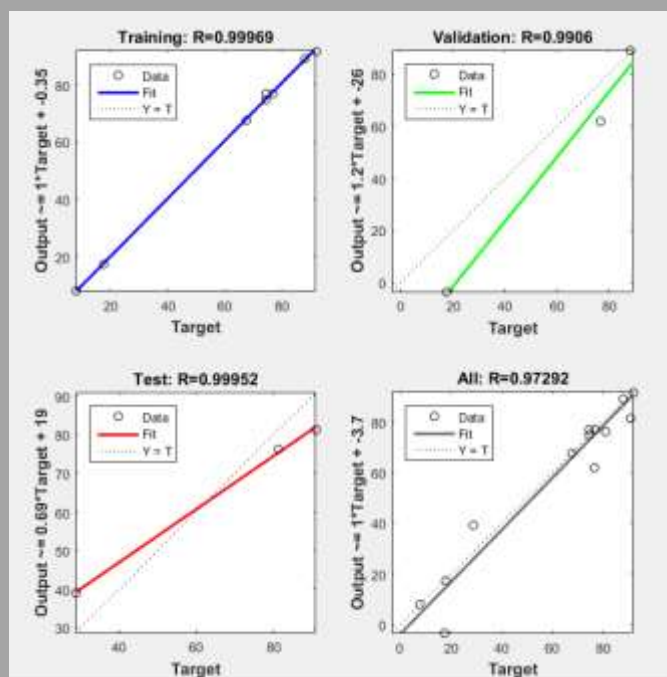
Fuel

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### Highlights

- Comparative study of RSM and ANN for modeling of biodiesel production is studied
- Catalyst, Reaction time and Methanol amount were used for modeling
- ANN has been found to have good predictability as compared to RSM

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**MESSAGE: Er. J.C. JAIN,  
CHAIRMAN**



*I am delighted to know that the Research efforts of the College of Engineering Roorkee and COER School of Management are presented in this R & D e-News Letter. Research is prime mover for the growth of academic excellence in an institution of higher learning. This effort of presenting the achievement of faculty members will encourage our students to carryout research oriented assignments and projects and will showcase our expertise to industries and research organizations. I compliment the Editorial team at the launching of the second issue of this e-News Letter and convey my best wishes for its success*

Er. J. C. Jain



## Editorial

Dear Readers

Greetings from COER.

In spite of the multiple changes brought by the COVID-19 pandemic, College of Engineering Roorkee research achievements continues to grow stronger with national and international recognitions in terms of publications, patents, international lectures etc. We could not accomplish any of these remarkable achievements without our faculty members' and students' diligence and creativity. I would like to say thanks to all for their dedication, hard work and resilience during this uncertain time.

Despite the challenges and uncertainties caused by the global pandemic, this is also a very exciting time for us. In the period of May to Oct 2020, twelve webinars were conducted by various experts including three international webinars. Faculty members have published 23 papers in international journals of repute along with 6 patents in Indian patent journal. Not only this, COER faculty members have also participated and successfully completed 77 online self learning certification courses by NPTEL and Coursera.

As a catalyst in academic learning, first time COER would like to expose our students to the world of Project Based Learning (PBL). PBL is a teaching method in which student gains knowledge and skills by working for an extended period of time on a project to investigate and respond to an authentic, engaging, and complex question, problem, or challenge. It will take coordinated teamwork to achieve this ambitious goal.

Thank you all for your interest in our research enterprise. We are looking forward to working on industrial research problems. In order to become productive and innovative researchers, it will take all of us working together.

Stay safe and stay agile.

Dr Siddharth Jain



## INSIDE

■ International Journal Publications.....	1
■ Conference Publications.....	3
■ Patents.....	4
■ Webinars/ FDPs conducted.....	5
■ Online Self Learning Courses Completed by faculty members.....	6
■ Honors and Awards.....	8
■ Major Research facilities .....	9

## RESEARCH HIGHLIGHTS (MAY 2020 - OCT 2020)





## International Journal Publications

S. No.	Author name	Paper	Year of publication	Journal Name	Impact Factor
1.	Deepak Verma & Siddharth Jain	A prospective utilization of the biomass for the production of the biodiesel	2020	Mini-Reviews in Organic Chemistry,	1.12
2.	Kapil Dev & Siddharth Jain	Municipal solid waste generation, composition, and management: the global scenario	2020	Social Responsibility Journal	1.84
3.	Akshay Garg & Siddharth Jain	Process parameter optimization of biodiesel production from algal oil by response surface methodology and artificial neural networks	2020	Fuel	5.128
4.	Mohd Fazil Khan, Aksay Garg, Siddharth Jain, Gaurav Dwivedi & Tikendra Nat Verma	Optimization of low-temperature transesterification of low FFA blend of sunflower oil and algae oil	2020	Fuel	5.128
5.	Sunil Kumar, Siddharth Jain and Harmesh Kumar	Experimental study on biodiesel production parameters optimization of Jatropha-Algae oil mixture and diesel engine coupled with generator performance and emission analysis fuelled with diesel/biodiesel blends	2020	ACS Omega	2.58
6.	Anoop Kumar Sukla, Gaurav Dwivedi, Siddharth Jain	Advances of Carbon Capture and Storage in Coal-Based Power Generating Units in an Indian Context	2020	Energies	2.702
7.	Ankit Kumar Singhal	Design and fabrication of cost efficient photographometry 3-D scanner	2020	Journal of Xidian University	-
8.	Aksha Garg, Gaurav Dwivedi, Siddharth Jain	Production and optimization of biodiesel from rubber seed using BBD technique	2020	Materials today proceedings	-
9.	Prabhat Kumar, Amardeep Sharma, Avadhesh Chamoli, Swati Arya	Site specific study of dehradun site using nga models	2020	Alochana Chakra Journal	-
10.	Prabhat Kumar, Avadhesh Chamoli, Amardeep Sharma	Influence of rooftop-tower on step back – set back building	2020	Alochana Chakra Journal	-
11.	Nitin Tomar, Amardeep Sharma, Prabhat Kumar	Concrete strength using mild steel scrap fiber of lathe machine	2020	Alochana Chakra Journal	-
12.	Prashant Kumar, Nishant Kumar, Sunil Saharan	Analysis & design of cut & cover tunnel in high seismic zone	2020	Alochana Chakra Journal	-
13.	Nishant Kumar, Sunil Saharan, Prashant Kumar	Time history analysis of prestressed concrete	2020	Alochana Chakra Journal	-
14.	Neelam Sharma, Brij Mohan Singh & Karan Singh	QoS-Based Energy-Efficient Protocols for Wireless Sensor Network	2020	Sustainable Computing: Informatics and Systems, Elsevier	2.798
15.	Kamal Kant Verma, Brij Mohan Singh,	Two-Stage Human Activity Recognition using 2D-ConvNet	2020	International Journal of	2.56



S. No.	Author name	Paper	Year of publication	Journal Name	Impact Factor
	H.L. Mandoria & Prachi Chauhan			Interactive Multimedia and Artificial Intelligence, Spain	
16.	Deepak Painuli, Divya Mishra, Suyash Bhardwaj & Maank Aggarwal	Fuzzy Rule Based System to predict COVID19 - A Deadly Virus	2020	International Journal of Management and Humanities	-
17.	Deepak Painuli, Divya Mishra, Suyash Bhardwaj & Maank Aggarwal	Machine Learning based Model to combat Covid19	2020	International Journal of Information Technology and Electrical Engineering	-
18.	Manish Kumar, Diwakar & Bhupal Arya	Predictive And Responsive Mobile Detection Tool For Infected Covid-19 Symptomatic Carrier	2020	Journal of Natural Remedies	-
19.	Ravi Kumar, Praveen Kmar Verma & Maneesh Pant	Enhancement in the security of RSA algorithm Using Subset Sum Cryptography	2020	Alochana Chakra Journal	-
20.	Sharad Kumar Singh & Punit Sharma	Towards a Green Storage Solution for Cloud Computing	2020	Mukt Shabd Journal	-
21.	Supriya & Ashutosh Shukla	Machine Learning Approach for Classifying Paddy Crop Diseases	2020	Mukt Shabd Journal	-
22.	AbhishekVerma, AshutoshShukla, Ashwani Kumar	Heart disease prediction using machine learning Techniques & artificial intelligence	2020	International Journal of Scientific Research in Engineering and Management (JSREM)	-
23.	AbhishekVerma, AshutoshShukla, Ashwani Kumar, Amit Kumar	Analysis of Transient Stability for Multi-machine Power System	2020	International Journal for Research in Engineering Application & Management (IJREAM)	-
24.	Deep Gupta	Sustainable Method of Waste Water Treatment Using Micro-Algae.	2020	International Journal of Advance Research, Int. J. Adv. Res	7.08
25.	Sudhir Kumar Gaur, and Deep Gupta	The Difference of Ethical Values in between Management and Engineering Students.	2020.	International Journal of Research	3.541
26.	Deep Gupta, Sudhir Kumar Gaur and Siddharth Jain	Article "Nature's Purifiers"	2020	Down to Earth Magazine	-



## Conference papers

S.No	Name	Title of Paper	Name of Conference	Date
1	Kapil Dev and Siddharth Jain	A Detailed Analysis of Municipal Solid Waste Generation and Composition for Haridwar City, Uttarakhand, India)	International Conference On Innovations in Clean Energy Technology	27-28 Aug 2020
2	Bharat Prajapati, Maniraj M and Siddharth Jain	Effectiveness of homogeneous and heterogeneous catalyst on biodiesel yield: A review	International Conference On Innovations in Clean Energy Technology	27-28 Aug 2020
3	Anna Raj and Siddharth Jain	Classification and synthesis of nano particles: A review	International Conference On Innovations in Clean Energy Technology	27-28 Aug 2020
4	Uddeshya Kumar, Sam Joseph Paul and Siddharth Jain	Biodiesel production from algae using biochar as catalyst	International Conference On Innovations in Clean Energy Technology	27-28 Aug 2020
5	Sam Joseph Paul, Uddeshya Kumar and Siddharth Jain	Photovoltaic cells cooling techniques for energy efficiency optimization	International Conference On Innovations in Clean Energy Technology	27-28 Aug 2020
6	Gunjan Agarwal and M.K. Khare	Multiobjective optimization of cutting parameters in machining- A sustainable approach	International Conference On Innovations in Clean Energy Technology	27-28 Aug 2020
7	Himanshu Gupta	Scope of AI in medical field	International Conference on Advances in Engineering Science and Technology	23-24 July 2020
8	Himanshu Gupta	Comparative Analysis of Internet Threats	International Conference on Advances in Engineering Science and Technology	23-24 July 2020



## Patent Publication

S.No.	Name of Faculty member	Title of patent published	Patent Journal	Patent Application Number
1	Dr Siddharth Jain Mr Varun Pratap	Foldable Bridge Assembly	Official Journal of the Patent office	202011029142A
2	Dr.Rajesh Kumar Dr.NiteshDutt	An improved system and method of dish-disinfecting after dish washing	Official Journal of the Patent office	202011030752A
3	Dr Mridula Mr Aman Kumar Mishra Dr Harvendra Singh Bhadauria Dr Annapurna Singh	A method for preparation of binder for interlocking paver blocks by utilization of polyethylene terephthalate and composition thereof	Official Journal of the Patent office	202011032211A
4	Dr Brij Mohan Singh Dr Harvendra Singh Bhadauria Mr Rohit Kannoja Mr Kamal Kant Verma Dr Mridula Dr Annapurna Singh	A system of vision based deep multi-model using evolutionary algorithm for hearing impaired persons	Official Journal of the Patent office	202011032210A
5	Dr Mridula Dr Brij Mohan Singh Dr Annapurna Singh Mr Kamal Kant Verma Mr Rohit Kannoja Dr Harvendra Singh Bhadauria	A Sign Language Recognition System for hearing impaired in variable resolution lighting and background conditions	Official Journal of the Patent office	202011032208A
6	Neelam Sharma Dr Brij Mohan Singh Dr Karan Singh	ITCP- wireless sensor network: intelligent transmission control protocol for wireless sensor network	Official Journal of the Patent office	202011024973A





## List of Seminars/ Webinars/ FDPs Organized

Sr. No.	Date	Name of Activity	Speaker
1	1 May 2020	Webinar on Challenges of Power Generation of Conventional and Renewable Energy Sources	Prof. Ramesh Bansal University of Sharjah, United Arab Emirates
2	2 May 2020	Webinar on Clean Energy	Dr. Aruna Kumar, VIT Vellore Dr. Puneet Verma, ASK Consulting Engineers, Australia
3	7 May 2020	Webinar on Energy & Environmental Problems Facing The Third World And Their Probable Solutions For Sustainable Development	Prof. D.P. Kothari Former Director (I/C), IIT Delhi, Former Principal, VRCE, Nagpur
4	23 May 2020	Webinar On Fight Covid-19 Using Robotics & IT	Mr. Ajay Godara Founder & Director, Enovate Skill Innovator & Mentor of Change NITI Aayog, Govt of India
5	May 30 2020	Webinar on Career after Degree / Diploma in Civil Engineering	Mr. Ajay Tiwari
6	5 June 2020	Webinar on Environment and health During Covid-19	Dr Deepak Kumar
7	5 June 2020	Webinar on Climate change and its impact on planet	Dr Deep Gupta
8	5 June 2020	Climate Change & its Mitigation	By Mr Ashish Garg
9	16-20 June 2020	Five Days Online FDP on Power Electronics Applications in Smart Grid Technologies- Recent Advances	1. Dr. Premalata Jena, Associate Professor, IIT Roorkee 2. Dr. Ashwani Kumar, Professor, NIT Kurukshetra 3. Dr. Mukesh Pathak, Professor, IIT Roorkee 4. Dr. S. K. Jain, Professor, Thapar Institute of Engineering & Technology, Patiala 5. Dr. K. K Gupta, Assistant Professor, Thapar Institute of Engineering & Technology Patiala 6. Dr. Mukhtiar Singh, Professor, DTU, New Delhi 7. Dr. Y. P Verma, Associate Professor, UIET Chandigarh
10	24 Aug 2020	Smart Inverters for Increasing Connectivity of Photovoltaic Power Systems	Dr. Rajiv Varma, Professor, University of Western Ontario, Canada
11	2 Sep 2020	Machine Learning and its Applications	Dr. Partha Pratim Roy, Associate Professor, IIT Roorkee
12	26 Sep 2020	Online Teaching through Microsoft Teams	Dr. Uttam K. Roy, Associate Professor, IIT Roorkee



### Online Self Learning Certification Courses Completed by Faculty Members

S. No.	Name of Faculty Member	Title of course completed	Date of Award of Certificate	Name of Online Course Portal (NPTEL etc)
1.	Mr Bhagwandas Patel	Medical Image Analysis	June 2020	NPTEL
		Machine Learning	June 2020	NPTEL
		Manufacturing Automation	Sep2019	NPTEL
		Digital Image Processing	Nov 2019	NPTEL
2.	Mr Rishabh Yadav	Evolution Of Air Interface towards 5G	June 2020	NPTEL
3.	Mr Akhil Dangwal	Digital Electronics Circuits	June 2020	NPTEL
4.	Ms Anuradha	Introduction to Research	June 2020	NPTEL
		Electric Vehicle –I	June 2020	NPTEL
5.	Mr Ashutosh Shukla	Fuzzy logic & neural networks	June 2020	NPTEL
6.	Mr Nitin Chand	Electric Vehicle –I	June 2020	NPTEL
		Power System Engineering	June 2020	NPTEL
7.	Mr Abhishek Verma	DC Power Transmission Systems	June 2020	NPTEL
		Recent Advances In Transmission Insulator	June 2020	NPTEL
8.	Mr Sandeep Singh	Electric Vehicle –I	June 2020	NPTEL
9.	Mr Amit Kumar	DC Power Transmission Systems	June 2020	NPTEL
		Introduction to IoT	June 2020	NPTEL
		Recent Advances In Transmission Insulator	June 2020	NPTEL
10.	Dr. Aadesh Arya	Introduction to internet of things	June 2020	NPTEL
11.	Ms Isha Bharadwaj	The Joy of Computing Using Python	June 2020	NPTEL
		Programming for Everybody (Getting started with Python)	June, 2020	Coursera
		Python Basics	August, 2020	Coursera
12.	Mr Himanshu Gupta	The Joy of Computing Using Python	June 2020	NPTEL
13.	Ms Swati Arya	Data Analytics with Python	June 2020	NPTEL
14.	Mr Maneesh Pant	Programming for Everybody (Getting started with Python)	June 2020	Coursera
15.	Ms Divya Mishra	Big Data-AI and Ethics	May 2020	Coursera
		Network Security and Database Vulnerability	June 2020	Coursera
		Machine Learning Foundation: A Case Study Approach	June 2020	Coursera
		Cyber Security Roles, Processes and Operating System Security	June 2020	Coursera
		AI for Everyone	July 2020	Coursera
		Cybersecurity compliance Framework & System	Aug. 2020	Coursera



S. No.	Name of Faculty Member	Title of course completed	Date of Award of Certificate	Name of Online Course Portal (NPTEL etc)
16.	Ms Nilima Patel	Administration		
		Introduction to Cybersecurity Tools & Cyber Attacks	June 2020	Coursera
		Introduction to Machine Learning	April 2020	NPTEL
17.	Mr Sharad Kr Singh	Introduction to Machine Learning	June 2020	NPTEL
		Computer Architecture	June 2020	NPTEL
18.	Mr Priyabrat	Introduction to research	June 2020	NPTEL
		Introduction to internet of things	June 2020	NPTEL
19.	Dr. Gunjan Agarwal	Computer Networks and Internet Protocol	June 2020	NPTEL
20.	Dr. Siddhartha Jain	Introduction to research	June 2020	NPTEL
21.	Dr. Nitesh Dutt	Patent drafting for beginners	June 2020	NPTEL
22.	Mr. Ravi Prakash	Introduction to research	June 2020	NPTEL
		Introduction to research	June 2020	NPTEL
23.	Mr. Varun Pratap Singh	Kinematics of mechanism and machine	June 2020	NPTEL
		Laws of Thermodynamics	June 2020	NPTEL
		Patent drafting for beginners	June 2020	NPTEL
24.	Mr. Ankit Kumar Singhal	Introduction to research	June 2020	NPTEL
		Introduction to research	June 2020	NPTEL
		Power Plant Engineering	June 2020	NPTEL
25.	Dr Mridula	Introduction to Operation Research	June 2020	NPTEL
		Introduction to research	June 2020	NPTEL
		Concepts of Thermodynamics	June 2020	NPTEL
		Manufacturing Automation	June 2020	NPTEL
26.	Mr Virender Kumar	Product Design Using Value Engineering	June 2020	NPTEL
		Introduction to Geographic Information System	June 2020	NPTEL
27.	Ms Akansha	Processing of Polymers and Polymer Composites	June 2020	NPTEL
		Processing of Polymers and Polymer Composites	June 2020	NPTEL
28.	Dr Veeralakshmi	Introduction to research	June 2020	NPTEL
		Basic Statistics	June 2020	Coursera
29.	Mr Amit kumar	Managing the Company of the Future	June 2020	Coursera
		Marketing Management	June 2020	NPTEL
		Cost Accounting	June 2020	NPTEL
30.	Dr Ashima Garg	Working Capital Management	June 2020	NPTEL
		Basic Statistics	June 2020	Coursera
		Managing the Company of the	June 2020	Coursera

S. No.	Name of Faculty Member	Title of course completed	Date of Award of Certificate	Name of Online Course Portal (NPTEL etc)
		Future		
31.	Mr. KR Ansari	Successful Negotiations: Essential Strategies and Skills	June 2020	Coursera
		Basic Statistics	June 2020	Coursera
32.	Ms Chhavi Krishna	Preparing to Manage Human Resource	June 2020	Coursera
		A Language and Tool for Financial Analysis	June 2020	Coursera
33.	Ms Renu Jakhar	Basic Statistics	June 2020	DataCamp
		Managing the Company of Future	June 2020	Coursera
		Successful Negotiation: Essential Strategies and Skills	June 2020	Coursera
34.	Mr Ravi Kumar	Programming in java	June 2020	NPTEL
35.	Dr Anju Malik	Programming in java	June 2020	NPTEL
36.	Dr. Rashmi Gupta	Effective Writing	June 2020	NPTEL
		Introduction to Research	June 2020	NPTEL
37.	Dr . Pinki Chugh	Enhancing Soft Skills and Personality	June 2020	NPTEL
38.	Dr. Kamal Kapoor	Fiber Optics	June 2020	NPTEL
39.	Ms Sweta Gaur	Managing the Company of the Future	June 2020	Coursera
		BehavioralFinance	June 2020	Coursera
		The Language and Tools of Financial Analysis	June 2020	Coursera

### Honors /Awards/ Appointments

- Dr. SP Gupta, Director General was nominated as a member of the Academic Council of the Uttarakhand Technical University on 20<sup>th</sup> July, 2020.
- Dr. BM Singh, Director, has been appointed member of a sub-committee of the Academic Council of UTU to prepare guidelines for opting Computer Science related subjects as Minor Electives by students of other branches.
- Dr. BM Singh was appointed Director and Dr. Siddharth Jain as Dean Research of COER on 27<sup>th</sup> July 2020.
- Dr. Amit Bhatt appointed Dean, Medical Sciences on 18<sup>th</sup> May, 2020 and promoted as Director Administration, Ayurvedic and Paramedical Sciences on 2<sup>nd</sup> December 2020. Dr. Pankaj Chaudhary as Associate Dean, Academics on 25<sup>th</sup> May, 2020 and promoted as Dean Academics on 2<sup>nd</sup> December 2020. Dr. Chaudhary was also appointed Director, COER School of Management on 1<sup>st</sup> July, 2020.
- Dr. Devendra Kumar was appointed Dean Admissions of COER on 23<sup>rd</sup> September 2020 and Dr. Himanshu Chauhan as Dean IT-Infrastructure on 25<sup>th</sup> November, 2020.
- Dr Ravi Joshi joined as Principal of COER Medical College of Ayurveda and Hospital on 15<sup>th</sup> October 2020.
- College of Engineering Roorkee has been placed in Band B (rank 26-50) in the category of Private Colleges across the country for its performance in Atal Ranking of Institutions on Innovation Achievements (ARIIA). COER is the only Institute from Uttarakhand to get this honor.

## Major research facilities at COER

<b>Mechanical Engineering</b>	
<b>Strength of Material and Material science lab</b>	<b>Mechanical Workshop and Manufacturing Science Lab</b>
<ol style="list-style-type: none"> <li>1. Muffle furnace</li> <li>2. Briquetting machine</li> <li>3. Emery belt machine</li> <li>4. Dish polishing Machine</li> <li>5. Microscope(up right)</li> <li>6. Microscope(inverted)</li> <li>7. Torsion testing machine</li> <li>8. Vickers hardness machine</li> <li>9. Profile projector</li> <li>10. Impact testing machine</li> <li>11. Universal Testing .Machine ( 80 Ton)</li> </ol>	<ol style="list-style-type: none"> <li>1. Centre lathe( 61/2')</li> <li>2. Horizontal Milling machine</li> <li>3. Drilling machine pillar type 12mm</li> <li>4. TIG Welding machine</li> <li>5. Universal sand strength machine</li> <li>6. Sand rammer</li> <li>7. Flowability meter</li> <li>8. Permeability meter</li> <li>9. Lift type crucible furnace</li> <li>10. Sieve shaker(rotap) and gyratory</li> <li>11. Mould hardness tester</li> <li>12. Core hardness tester</li> <li>13. Screw thread micrometer 25-50mm</li> <li>14. Gear tooth Vernier 50mm</li> <li>15. Dial gauge 0-25mm</li> <li>16. Inside micrometer 50-63mm</li> <li>17. Depth micrometer0-50mm</li> <li>18. Combination set300mm</li> <li>19. Vernier height 300mm</li> <li>20. Wire gauge</li> <li>21. Radius gauge 1-7mm</li> <li>22. Surface plate 2*2 feet</li> </ol>
<b>CAD/CAM lab</b>	
<ol style="list-style-type: none"> <li>1. 60 Computers (Monitor + CPU+ Keyboard+ Mouse) ,i3, 500GB hard disc , 4 GB</li> <li>2. XL Mill CNC machine with computer &amp; CVT, MTAB-XL MILL(non ATC), 3 axis</li> <li>3. 3D printer, Prusaplus,210mmx210x310mm resolution 100 to 400micron</li> </ol>	
<b>Fluid Mechanics and machinery lab</b>	<b>Heat &amp;Mass Transfer and Refrigeration &amp;Air Conditioning lab</b>
<ol style="list-style-type: none"> <li>1. Pelton wheel</li> <li>2. Pitot tube</li> <li>3. wind tunnel</li> <li>4. Francis turbine</li> </ol>	<ol style="list-style-type: none"> <li>1. Thermal Conductivity Of Insulation Power(Critical Thickness) measuring instrument</li> <li>2. Thermal Conductivity Of Fluid /Gases/power measuring instrument</li> </ol>
<b>Thermal Science and Automobile lab</b>	<b>Biofuel Lab</b>
<ol style="list-style-type: none"> <li>1. Flash Point apparatus</li> <li>2. Bomb Calorie Meter</li> <li>3. Red wood viscometer</li> <li>4. Computerized 4S4C Diesel Engine with hydraulic dynamometer</li> <li>5. 4stroke 4cylinder Petrol Engine Test Rig</li> <li>6. Computerized ,Single cylinder diesel engine test ring with dynamometer</li> </ol>	<ol style="list-style-type: none"> <li>1. Flash Point apparatus</li> <li>2. Bomb Calorie Meter</li> <li>3. Red wood viscometer</li> <li>4. Emission meter Biodiesel reactor</li> </ol>



<b>Electrical &amp; Electronics Engineering</b>	
<b>Control System lab</b>	<b>Electric Drives Lab</b>
<ol style="list-style-type: none"> <li>1. PID control system</li> <li>2. For Temperature control of oven</li> <li>3. Synchro transformer</li> <li>4. For angular displacement control of object</li> <li>5. LVDT system</li> <li>6. For linear Displacement control</li> <li>7. RTD system</li> <li>8. For precise temperature measurement</li> <li>9. MATLAB software (Non licenced)to covers various works</li> <li>10. Simulation of various virtual system</li> <li>11. Programming of various optimization algorithms.</li> <li>12. Creating customize GUI model of various systems</li> </ol>	<ol style="list-style-type: none"> <li>1. Single Phase Dual Converter VDL</li> <li>2. Speed Control of Mosfet Chopper VDL=103</li> <li>3. Study Closed Loop Control Dc Motor VDL-105</li> <li>4. Speed Control of 3-Phase Induction with Motor VDL-106</li> <li>5. CSI Fed 3- Phase Induction Motor Drive VDL-110</li> <li>6. Speed Control of Slip Ring Induction Motor By Static Rotor Resistance Using Rectifier and Chopper</li> <li>7. Speed Control of 3-Phase Slipring Induction Motor VDL-109</li> <li>8. Oscilloscope Channel 50 Mhz 16 Kmemory Model Edux-1002 (DSO) VSI Fed 3-Phase Induction Motor Drive VDL-111</li> </ol>
<b>Power System Lab</b>	<b>Power Electronics Lab</b>
<ol style="list-style-type: none"> <li>1. Various fault detection relay Kits</li> <li>2. Dielectric Strength of Transformer oil Tester</li> <li>3. ABCD, Hybrid and image parameter Kit</li> <li>4. Transmission line training kit</li> <li>5. Feeder and generator protection kits</li> </ol>	<ol style="list-style-type: none"> <li>1. SCR kits to study characteristics , triggering and controlling</li> <li>2. SCR parallel inverter</li> <li>3. DC Motor and Induction motor for speed control Rectifier kits</li> </ol>
<b>Electrical Machine Lab</b>	<b>Electric Machine Lab</b>
<ol style="list-style-type: none"> <li>1. DC shunt motor generator set</li> <li>2. DC Compound motor generator set</li> <li>3. 3-phase squirrel cage induction motor</li> <li>4. Single phase induction motor</li> <li>5. Synchronous motor</li> <li>6. Alternator motor set</li> <li>7. 1 phase transformer</li> </ol>	<ol style="list-style-type: none"> <li>1. DC shunt motor generator set</li> <li>2. DC Compound motor generator set</li> <li>3. 3-phase squirrel cage induction motor</li> <li>4. Single phase induction motor</li> <li>5. Synchronous motor</li> <li>6. Alternator motor set (Parallel operation) 1 phase transformer</li> </ol>
<b>Network Lab</b>	<b>Electrical Measurement and Measuring Instruments Lab</b>
Various kits for solving Circuits using circuit solving methods	Various set ups to measure different physical quantities



<b>Electronics and Telecommunication Engineering</b>	
<b>PCB LAB</b>	<b>Basic Electronics Lab</b>
<ol style="list-style-type: none"> <li>1. Facility to design and fabricate single side PCB IS Available by using various softwares viz Express PCB, Eagle, Easy EDA Equipments available are as follows:</li> <li>1. Proto- Contact- PCB Artwork Film Maker</li> <li>2. Ultra-Violet Exposure System (Single Sided)</li> <li>3. Photo Resist DIP Coating Machine</li> <li>4. Proto-ETCH Etching Machine</li> <li>5. PCB Drilling Machine ( Protodrill-3000)</li> <li>6. PCB Shearing Machine-Slash-300</li> <li>7. Chemicals For The Above Machine</li> <li>8. Open source software Scilab is available for Image processing and signal processing.</li> <li>9. Tanner tool is available for VLSI design</li> </ol>	<ol style="list-style-type: none"> <li>1. C.RO (20MHZ)</li> <li>2. P. N. Junction Diode Kit</li> <li>3. Half-Full wave Bridge Rectifier</li> <li>4. Zener Diode Kit</li> <li>5. FET Kit</li> <li>6. Project Board with power supply</li> <li>7. Function Generator</li> <li>8. Digital Multimeter</li> <li>9. Sampling &amp; Reconstruction Trainer Kit</li> </ol>
	<b>Microwave Engineering Lab</b>
	<ol style="list-style-type: none"> <li>1. Klystron Source Kit</li> <li>2. Gunn Diode Source Kit</li> <li>3. Klystron Bench Kit</li> <li>4. Gunn Bench Kit</li> <li>5. Antenna Based Test Bench Power Meter</li> </ol>
<b>Electronic Circuit Lab</b>	<b>Digital Electronics Lab</b>
<ol style="list-style-type: none"> <li>1. Colpitt Oscillator</li> <li>2. Wein Bridge Oscillator</li> <li>3. Study of Basic OP-AMP</li> <li>4. Feedback Amplifier</li> <li>5. Transformer coupled amplifier</li> <li>6. Single Stage Transistor Amplifier</li> <li>7. Differential Amplifier</li> <li>8. D/A Converter</li> </ol>	<ol style="list-style-type: none"> <li>1. 8-Bit DAC OP-AMP</li> <li>2. PLL Kit</li> <li>3. IC Regulator-723</li> <li>4. Timmer-555 Kit</li> <li>5. Voltage to Frequency Converter</li> <li>6. Voltage to Current Converter</li> <li>7. Active Filter</li> </ol>
<b>Microprocessors Lab</b>	<b>Communication Engineering Lab</b>
<ol style="list-style-type: none"> <li>1. 8085Microprocessor Kit</li> <li>2. 8502Microprocessor Kit</li> <li>3. 8086Microprocessor Kit</li> <li>4. 8031Microprocessor Kit</li> <li>5. ADC-0809 Card</li> <li>6. DAC-0800</li> <li>7. Stepper Motor Card</li> <li>8. Key Board Card</li> <li>9. 8255 PPI Card</li> <li>10. 8253 Study Card</li> <li>11. IC Tester Card</li> </ol>	<ol style="list-style-type: none"> <li>1. Optical Power Meter</li> <li>2. DSP Starter Kit Texas</li> <li>3. Transmission Line Trainer</li> <li>4. Antenna Trainer</li> <li>5. Double Sided Band – Single Sided Band Transmitter and Receiver</li> <li>6. pulse code modulation transmitter and receiver</li> <li>7. Pulse Generation</li> <li>8. Amplitude Shift keying Modulation (Trinity)</li> <li>9. Pulse Shift keying Modulation (Trinity)</li> <li>10. Frequency Shift keying Modulation (Trinity)</li> </ol>

<b>Computer Science &amp; Information Technology</b>	
<b>High Performance Computing (HPC) Lab</b>	
1.	20 computer systems configuration: i7, 16 GB RAM, 1 TB hardisk.
2.	Machine learning (10 systems are allotted) with following software: <ul style="list-style-type: none"> <li>• Keras Deep Learning Library/Sciket Learn</li> <li>• Other Supporting library like Numpy/Scipy/Sklearn</li> <li>• Support Cluster Computer</li> </ul>
3.	Cloud Computing (5 systems are allotted) with following software: <ul style="list-style-type: none"> <li>• Cloud Simulator</li> <li>• Amazon Web Service</li> <li>• High speed Internet connection</li> </ul>
4.	Big Data (5 systems are allotted) with following software: <ul style="list-style-type: none"> <li>• Cassandra</li> <li>• MongoDB</li> <li>• Apache Hadoop</li> </ul>

<b>Civil Engineering</b>	
<b>Advanced Surveying</b>	
1.	Equipment: Differential Global
2.	Positioning System (DGPS)
<b>Transportation Engineering</b>	
1.	Plastic melting Machine
2.	Tile Abrasion Testing Machine
<b>NABL Accredited Material Testing Lab</b>	
Universal Testing Machine (UTM)	

<b>Plastic and Polymer Engineering</b>	
<b>NABL Accredited Plastics &amp; Polymer Testing Laboratory</b>	
Testing Facilities : Mechanical testing: 1. Tensile strength 2. Compressive strength 3. Flexural strength 4. Impact test (Izod/ Charpy/ Dart/ Falling weight Impact) 5. Co-efficient of friction 6. Tear Strength 7. Hydrostatic Pressure 8. Brust test 9. Density  Thermal Testing 1. Heat Distortion Temperature	Equipments available are as follows: 1. Environmental Chamber 2. Hot Air Oven 3. Haze Meter 4. Digital Gloss Meter 5. Opacity Tester 6. Electronic Weighing balance 7. Dhona Weighing Balance 8. Specific Gravity 9. Melt Flow Index 10. Carbon black dispersion 11. Melting Point 12. Slip tester 13. Humidifier 14. Water Bath



<ul style="list-style-type: none"> <li>2. Vicate Softening Point</li> <li>3. Reversion Test</li> <li>4. Melt flow Index</li> </ul> <p>Chemical Testing</p> <ul style="list-style-type: none"> <li>1. Atomic Absorption Spectrometer</li> <li>2. Carbon Black Content</li> <li>3. Carbon Black dispersion</li> <li>4. Ash content/ Sulphated ash Content</li> <li>5. Resistance to Sulphuric acid</li> <li>6. Resistance to Dichloromethane</li> <li>7. Identification</li> <li>8. Water absorption</li> <li>9. Moisture content ho</li> <li>10. Overall Migration</li> </ul> <p>Optical Testing</p> <ul style="list-style-type: none"> <li>1. Gloss</li> <li>2. Transparency</li> <li>3. Haze</li> <li>4. Opacity</li> </ul> <p>Flammability</p> <ul style="list-style-type: none"> <li>1. Limiting Oxygen Index</li> <li>2. Smoke Density</li> <li>3. Smoke visibility</li> <li>4. Burning Rate</li> <li>5. Flame Resistance</li> </ul> <p>Accelerated weathering test:</p> <ul style="list-style-type: none"> <li>1. UV resistance</li> <li>2. Environmental Stress cracking Resistance</li> </ul> <p>Electrical Testing</p> <ul style="list-style-type: none"> <li>1. Arc resistance</li> </ul>	<ul style="list-style-type: none"> <li>15. Vicat Softening Temperature</li> <li>16. Heat Deflection Temperature</li> <li>17. Universal Testing Machine (50 KN)</li> <li>18. Universal Testing Machine (10 KN)</li> <li>19. IZOD / Charpy Impact Tester</li> <li>20. Film Dart Impact Tester</li> <li>21. Impact Testing Machine</li> <li>22. Deep Freezer</li> <li>23. Temperature &amp; Humidity Chamber</li> <li>24. Tearing Strength Tester</li> <li>25. UV Resistance Tester</li> <li>26. Environmental Stress Cracking Resistance</li> <li>27. Carbon Black Content</li> <li>28. Limiting Oxygen Index</li> <li>29. Smoke Density Tester</li> <li>30. Smoke Visibility Tester</li> <li>31. Toxicity chamber</li> <li>32. Fire Resistance Tester</li> <li>33. Dichloromethane Bath</li> <li>34. Muffle Furnace</li> <li>35. Hot oil Bath</li> <li>36. Hydrostatic Pressure Testing Machine with Burst Tester</li> <li>37. Acceptance Test water Bath</li> <li>38. Type Test water Bath</li> <li>39. Dry Arc Resistance</li> <li>40. Atomic Absorption Spectrometer (AAS)</li> <li>41. Digital Thickness Gauge</li> <li>42. Digital Vernier Calliper</li> <li>43. Digital Micrometer</li> <li>44. Water Flow Meter</li> <li>45. Hydrometer</li> </ul>
<b>Synthesis &amp; Polymerization Lab</b>	
<p>Equipments available are as follow:</p> <ul style="list-style-type: none"> <li>1. Conditioning Chamber</li> <li>2. Flow Cup Viscometer</li> <li>3. Heating Mantle (500ml)</li> <li>4. Hot Plate (with stirrer)</li> <li>5. Insulation Testing m/c</li> <li>6. Izod Impact m/c</li> <li>7. Laboratory Balance with Density Measurement Kit</li> <li>8. Melting Point Apparatus.</li> <li>9. MFI Tester</li> <li>10. pH Meter Digital</li> <li>11. Shore-A Durometer Hardner</li> <li>12. Abbe Refractometer Model RSRT-1.</li> </ul>	<p>Facilities</p> <ul style="list-style-type: none"> <li>1. Develop new polymers and chemically modify the existing polymers based on specific property requirements.</li> <li>2. Synthesize desired thermoplastics and thermosetting polymers</li> </ul>

## Glimpse of Research Facilities



**Heat Deflection Temperature Tester**



**Universal Testing Machine**



**Melt Flow Index Machine**



**Carbon Black Dispersion Machine**



**Microstructure analysis**



**CBR Machine**



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