Madhav Institute of Technology & Science, Gwalior – 474005

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Department of Civil Engineering

Name of Department	Civil Engineering
Name of Dedicated Research Centre	**Water & Waste Water**
Objectives of Dedicated Research Centre	To carry out research work in the field of water & waste water analysis
In-charge of Dedicated Research Centre	Prof. A. K. Saxena
Core Team of the Centre	Dr. M. K. Trivedi, Prof. A. K. Saxena, Prof. A. K. Agarwal, Dr. Prachi Singh
Year of Establishment	2005
Number of UG, PG & PhD scholars working In the centre	PG: 03, PhD: 02
Major Facilities Available	Atomic Absorption Spectroscopy UV-VIS Spectrophotometer Digital Colony counter Digital flame photometer
Activities conducted during the year (2017-2022) pertaining to research	1. Work on research project entitled "Development of rationalized water quality index" was carried out. 2. Research work on "Determination of heavy metals in particulate matter" is carried out.
Activities conducted during the year (2017-2022) pertaining to entrepreneurship	Nil
Activities conducted during the year (2017-2022) pertaining to community orientation	1. Testing of water quality in Gwalior Chambal region. 2. Testing of waste water quality in Gwalior Chambal region. 3. Consultancy services on various environmental related issues.
Activities conducted during the year (2017-2021) pertaining to incubation	Nil
Any other activities conducted during the year (2017-2022)	Conduction of virtual lab.
Outcomes in terms of innovations, creation and transfer of knowledge through dedicated centre during the year (2017-2022)	Quality research papers have been published in reputed international journals and conferences.
Any other achievement during the year (2017-2022)	One International workshop was organized in association with IWWA, Gwalior center.
Overall outcomes of dedicated centre for (i) research, (ii) entrepreneurship, (iii) community orientation and (iv) incubation etc.	**Research:** Publication of quality research paper in various reputed journal. Conduction of M. Tech research works. **Community orientation:** Providing solutions to environmental problem in Gwalior Chambal region. Generation of revenue

Dr. M. K. Trivedi

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Madhav Institute of Technology & Science, Gwalior – 474005

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Department of Civil Engineering

Name of Department	Civil Engineering
Name of Dedicated Research Centre	**Material Diagnostic**
Objectives of Dedicated Research Centre	To carry out research work in the field of advanced material.
In-charge of Dedicated Research Centre	Dr. Abhilash Shukla
Core Team of the Centre	Dr. Abhilash Shukla, Dr. Jayvant Chaudhary
Year of Establishment	2020
Number of UG, PG & PhD scholars working In the centre	PG: 02, PhD: 01
Major Facilities Available	1. Creep rig machine 2. Ultra-sonic pulse velocity analyzer 3. Concrete resistivity meter 4. Digital Rebound Hammer 5. Rebar locater 6. Crack width microscope
Activities conducted during the year (2020-2022) pertaining to research	1. Work on non-destructive testing of C&D waste concrete.
Activities conducted during the year (2020-2022) pertaining to entrepreneurship	Nil
Activities conducted during the year (2020-2022) pertaining to community orientation	1. Testing of seven vehicular underpasses of Raipur express way constructed by Raipur express way ltd. 2. Testing of KV No. 2 and KV No. 3 buildings for the assessment of structure current condition. 3. Testing of overhead tanks of Issagarh, Shadora, Gwalior, Sheopur and many other locations.
Activities conducted during the year (2020-2022) pertaining to incubation	Nil
Any other activities conducted during the year (2020-2022)	Demonstration of all the equipment available to the fellow faculty members of the department.
Outcomes in terms of innovations, creation and transfer of knowledge through dedicated centre during the year (2020-2022)	Quality research papers have been published in reputed international journals and conferences.
Any other achievement during the year (2020-2022)	Nil
Overall outcomes of dedicated centre for (i) research, (ii) entrepreneurship, (iii) community orientation and (iv) incubation etc.	**Research:** Publication of quality research paper in various reputed journal. Conduction of M. Tech research works. **Community orientation:** Providing solutions on the structural conditions of various structures like vehicular underpass, school buildings and overhead water tanks.

Dr. M. K. Trivedi

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Department of Electrical Engineering

Name of Department	Electrical Engineering Department
Ecosystem for innovations, creation and transfer of knowledge [description (in maximum of 100 words)]	Research publication is use for the transfer of knowledge
Name of Dedicated Research Centre	**Centre for Renewable Energy:** Renewable Energy Lab
Objectives of Dedicated Research Centre	1. To provide quality education through regular educational programs (such as M.Tech., Ph.D.) and short term programs (with duration 1 week, 2 week), for providing trained manpower in the area of green energy and energy efficiency 2. To develop sustainable infrastructure by providing solutions to energy problems. 3. To promote awareness related to energy and sustainable solutions.
In-charge of Dedicated Research Centre	Prof. Vishal Chaudhary
Core Team of the Centre	Dr. Vikram, Prof. Bhavana Rathore Prof. Saurabh K Rajput, Prof. Rahul Sagwal Prof. Manoj Kumar, Prof. Nipun Gupta
Year of Establishment	2021 (February)
Number of UG, PG & PhD scholars working In the Centre	05 – UG; 02 – PG; 04 - PhD (Annexure-1)
Major Facilities Available	1. Smart Grid simulator with Real Time Data Acquisition system and power measurement unit hardware. 2. Renewable energy & Smart Grid Hardware Simulator setup.
Activities conducted during the year (2017- 2022) pertaining to research	02 International conference paper published (Annexure-2)
Activities conducted during the year (2017- 2022) pertaining to community orientation	Nil
Any other activities conducted during the year (2017-2022)	Nil

Outcomes in terms of innovations, creation and transfer of knowledge through dedicated center during the year (2017-2022)	Nil
Any other achievement during the year (2017- 2022)	Presentation of Lab during NBA visit.
Overall outcomes of dedicated center during the year (2017- 2022) for (i) research, (ii) entrepreneurship, (iii) community orientation and (iv) incubation etc.	01 B.Tech. Lab will run in the upcoming semester. (Annexure-3)

Dr. Sulochana Wadhwani

Prof. & Head, EED

Electrical Engineering Department (Annexure-1)

1. **UG Students**
    a. Reena Sharma
    b. Kritika Kohli
2. **PG Students**
    a. Subhi Jain
    b. Soma Das Pachori
3. **PhD. Students**
    a. Poonam Singh
    b. Sunita Shukla
    c. Vimal Tiwari
    d. Vishal Chaudhary

Electrical Engineering Department (Annexure-2)

List of Publications

1. Vishal Chaudhary, Reena Sharma, Punjan Dohare, "Overview of Integrated Renewable Energy System" in the International conference on Ecosystem Restoration for Resilience and Sustainability: Living with nature (2021) organized by Indian Institute of Technology Indore and National Institute of Disaster Management, New Delhi during June 5th- June 7th, 2021.
2. Saurabh Kumar Rajput, Kritika Kohli, Sulochana Wadhwani, "Detailed Economic Analysis of Solar Roof-Top Photovoltaic System: Case study of institutional building" ICSTACE 2021 organized by Electrical Engineering Department, SVNIT Surat, India during November (11-12)' 2021.

Electrical Engineering Department (Annexure-3)

130415: Renewable Energy Lab

List of Experiments

1. To set up a Solar PV standalone system and calculate power in different branches of the system.
2. To set up a Solar PV Grid Connected system and calculate power in different branches of the system.
3. To set up a Solar PV Power plant with the help of a Hybrid inverter.
4. To set up a Wind Energy standalone system and calculate power in different branches of the system.
5. To set up a Solar PV- Wind Energy Hybrid standalone system and calculate power in different branches of the system.
6. Utilizing smart houses as a load and analyzing load waveforms.
7. Utilizing Load analysis kit and understanding about loads connected in series.
8. Observing different weather parameters using a weather station.
9. Comparing the different types of grid connected systems and analyzing their waveforms with the help of linear loads.
10. Comparing the different types of grid connected systems and analyzing their waveforms with the help of nonlinear loads.

Course Outcomes:

On the successful completion of the lab experiments students will be able to:

CO 1. **Develop** the understanding of renewable energy sources.

CO 2. **Investigate** the solar PV & wind energy operation and find their performance curves.

CO 3. **Examine** smart house & load analysis kit.

CO 4. **Develop** teamwork skills for working effectively in groups.

CO 5. **Prepare** a technical report on experiments conducted in the lab.

Madhav Institute of Technology & Science, Gwalior – 474005

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Department of Mechanical Engineering

Name of Department	Mechanical Engineering
Ecosystem for innovations, creation and transfer of knowledge [description (in maximum of 100 words)]	Department is continuously doing research work in Solar. Many Ph.D. s are going on and completed in this laboratory. Many research papers got published. Research projects also are going on in these areas.
Name of Dedicated Research Centre	**Solar Energy Lab**
Objectives of Dedicated Research Centre	● To impart knowledge of various solar energy systems to UG, PG & PhD Students ● To make the students understand the basic concepts involved in solar thermal systems like flat plate collector, concentrator and solar PV systems. ● To evaluate the performance of a Solar System under different atmospheric conditions like temperature, pressure, wind, radiation etc.
In-charge of Dedicated Research Centre	Dr. M.K. Gaur
Core Team of the Centre	Dr. M.K. Gaur Dr. C.S. Malvi Mr. Pushpendra Singh Mr. Vikas Kumar Thakur Ms. Rishika Shah Mr. Amit Shrivastava
Year of Establishment	2018
Number of UG, PG & PhD scholars working In the Centre	UG – 18 PG – 2 PhD – 10 (Annexure-1)
Major Facilities Available	● Evan Span hybrid active greenhouse solar dryer ● Parabolic hybrid greenhouse solar dryer ● Solar Still at three different tilt angles ● PV panels ● Evacuated tube solar collectors ● Flat plate solar collectors ● Solar Cookers ● Parabolic solar concentrator ● Weather Station ● Data logger ● Thermocouples (k-type)

	• Portable hand held Solarimeters • Pyranometer • Hygrometer • Anemometer • Thermal Image Camera • Single User Ansys CFD
Activities conducted during the year (2017- 2022) pertaining to research	Two FDP programs • Renewable Energy sources and Future Energy Needs (Feb. 15-19, 2021) • Building Science and Energy Conservation (Sept. 22-26, 2021)
Activities conducted during the year (2017- 2022) pertaining to community orientation	Nil
Any other activities conducted during the year (2017-2022)	Nil
Outcomes in terms of innovations, creation and transfer of knowledge through dedicated centre during the year (2017-2022)	37 Publications in reputed International Journals. (Annexure-2)
Any other achievement during the year (2017- 2022)	Nil
Overall outcomes of dedicated centre during the year (2017- 2022) for (i) research, (ii) entrepreneurship, (iii) community orientation and (iv) incubation etc.	• One GIAN Course • One Patent Filed on the developed greenhouse dryer • One PhD completed and six PhD ongoing • 30 Publications in Reputed International Journals

Dr. M.K. Gaur

Professor & Head, MED

Mechanical Engineering Department (Annexure-1)

1. Gaurav Saxena (PhD)
2. Pushpendra Singh (PhD)
3. Vikas Kumar Thakur (PhD)
4. Rishika Shah (PhD)
5. Chandra Shekhar Koli (PhD)
6. Vedansh Chaturvedi (PhD)
7. Amit Shrivastava (PhD)
8. Deepak Pippal (PhD)
9. Anand Kushwah (PhD)
10. Nagendra Sharma (PhD)
11. Aman Singh Parihar (UG)
12. Chandra Mohan Yadav (UG)
13. Amrit Kumar Pandey (UG)
14. Ananya Anup Jain (UG)
15. Ravi Kushwah (UG)
16. Prateek Arora (UG)
17. Ranjeet Rajput (UG)
18. Bhavya Surana (UG)
19. Akash Kumar (UG)
20. Anil Kumar Choudhary (UG)
21. Hrithik Sharma (UG)
22. Rishabh Prajapati (UG)
23. Shivam Baisandar (UG)
24. Ritik Sharma (UG)
25. Tathagat Muktesh Bohare (UG)
26. Naman Singh (UG)
27. Shivam Verma (UG)
28. Pallav Bhatia (UG)

Mechanical Engineering Department (Annexure-2)

1. Shah R., Pandit R.K., Gaur M.K. (2022) Urban physics and outdoor thermal comfort for sustainable street canyons using ANN models for composite climate, Alexandria Engineering Journal, 61(12), 10871-10896. https://doi.org/10.1016/j.aej.2022.04.024.

2. Singh P., Gaur M.K, Malvi C.S. (2022) Effect of Drying Area on Heat Transfer Coefficient and Drying Kinetics of High Moisture Crop Dried in Hybrid Active Greenhouse Solar Dryer, Heat Transfer Research, 53(11), 79–97. https://doi.org/10.1615/HeatTransRes.2022040797

3. Shrivastava A, Gaur M.K., Singh P. (2022), Mango leather (Aam Papad) drying in hybrid greenhouse solar dryer with evacuated tube collector and finned drying tray: drying behavior and economic analysis, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects. https://doi.org/10.1080/15567036.2022.2029974

4. Kushwah A., Kumar A., and Gaur M.K. (2022), Drying kinetics, performance, and quality assessment for banana slices using heat pump–assisted drying system (HPADS), Journal of Food Process Engineering, 1-10. https://doi.org/10.1111/jfpe.13964

5. Kushwah A, Gaur M.K., Kumar A., Singh P., (2022) Application of ANN and prediction of drying behavior of Mushroom drying in side hybrid greenhouse solar dryer: An experimental validation, Journal of Thermal Engineering, 8(2), 221-234. https://doi.org/10.14744/jten.2021.0006
6. Singh P., Gaur M.K, (2022) A Review on thermal analysis of hybrid greenhouse solar dryer (HGSD). Journal of Thermal Engineering, 8(1), 103-119. https://doi.org/10.18186/thermal.1067047.
7. Thakur V.K., Gaur M.K., Dhamneya A.K. (2021) Validation of Thermal Models to Predict the Productivity and Heat Transfer Coefficients for Passive Solar Still with different Nanoparticles, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, 1-21. https://doi.org/10.1080/15567036.2021.1971338
8. Thakur V.K., Gaur M.K., (2021) Heat and Mass Transfer Analysis of Passive Solar Still with Nanoparticles, Operating at Different Water Depth and Various Slope of Glass Cover, Desalination and Water Treatment, 1-25. doi:10.5004/dwt.2021.27627
9. Singh P., Gaur M.K, (2021) Sustainability Assessment of Hybrid Active Greenhouse Solar Dryer integrated with Evacuated Solar Collector, Current Research in Food Science, 4, 684-691. https://doi.org/10.1016/j.crfs.2021.09.011
10. Singh P., Gaur M.K, (2021) Environmental and economic analysis of novel hybrid active greenhouse solar dryer with evacuated tube solar collector, Sustainable Energy Technologies and Assessments, 47 (2021), 101428. https://doi.org/10.1016/j.seta.2021.101428
11. Singh P., Gaur M.K, (2021), Heat Transfer analysis of Hybrid active Greenhouse Solar dryer attached with evacuated tube solar collector. Solar Energy, 224, August 2021, 1178-1192. https://doi.org/10.1016/j.solener.2021.06.050
12. Kushwah A., Kumar A., Gaur M.K., and Pal A. (2021) Garlic dehydration inside heat exchanger-evacuated tube assisted drying system: Thermal performance, drying kinetic and color index. Journal of Stored Products Research, 93, September 2021, 101852. https://doi.org/10.1016/j.jspr.2021.101852
13. Singh P., Pandey B.K., Gaur M.K, (2021) Performance evaluation of evacuated solar collector assisted hybrid greenhouse solar dryer under active and passive mode, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2021.10.461
14. Thakur V.K., Gaur M.K, (2021) Study the effect of CuO nanoparticles on the performance of passive solar still in winter and summer season, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2021.11.119
15. Shah R., Pandit R.K., Gaur M.K, (2021) Thermal comfort analysis through development of artificial neuralnetwork models: An experimental study in Cwa climate, Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2021.11.139
16. Sharma N.K., Gaur M.K. and Malvi C.S. (2021) Application of phase change materials for cooling of solar photovoltaic panels: A review. Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2021.05.127
17. Thakur V.K., Gaur M.K., Dhamneya A.K. and Sagar M.K. (2021) Performance Analysis of Passive Solar Still with and without nanoparticle. Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2021.05.539

18. Kushwah A., Kumar A., Pal A., and Gaur M.K. (2021) Experimental analysis and thermal performance of evacuated tube solar collector assisted solar dryer. Materials Today: Proceedings, https://doi.org/10.1016/j.matpr.2021.04.243

19. Singh P, Gaur M.K. (2020). Review on development, recent advancement and applications of various types of solar dryers, Energy Sources, Part A: Recovery, Utilization, and Environmental Effects, pp. 1–21, 2020. doi.org/10.1080/15567036.2020.1806951

20. Thakur V.K, Gaur M.K, Sagar M.K, Tiwari G.N. (2021) A Study on Heat and Mass Transfer Analysis of Solar Distillation Systems. Journal of Thermal Engineering, Vol. 7, No. 5. pp. 1184–1205.

21. Gaur M. K., Tiwari G.N., Singh P., Kushwah A (2021), Heat Transfer Analysis of Hybrid Active Solar Still with Water Flowing over Glass Cover, Journal of Thermal Engineering, 7(6), 1329-1343.

22. Saxena G., Gaur M.K. (2020) Performance Evaluation and Drying Kinetics for Solar Drying of Hygroscopic Crops in Vacuum Tube Assisted Hybrid Dryer, Journal of Solar Energy Engineering, 2020, 142(5):1-21.

23. Saxena G., Gaur M.K.(2020) Energy, exergy and economic analysis of evacuated tube solar water heating system integrated with heat exchanger, Materials today: proceedings. doi:10.1016/j.matpr.2020.04.793.

24. Kushwah A., Gaur M.K., Pandit R.K., Singh P. (2020) Material Thermal Performance Comparison Between The Tomb Of Mohammad Ghaus Heritage Building And A Modern Style Dwelling In Madhya Pradesh, International Journal of Built Environment and Sustainability. Vol. 7(2), 33-44.

25. Kushwah A., Gaur M.K., Pandit R.K. (2020) The Role of Phase Change Materials for Lifetime Heating of Buildings in Cold Climatic Conditions. International Journal of Built Environment and Sustainability. Vol. 7(33), 81-96.

26. Singh P. and Gaur M.K. (2019) Progress in hybrid greenhouse solar dryer (HGSD): A review, Advances in Energy Research, Vol. 6(2), 145-160, http://doi.org/10.12989/eri.2019.6.2.000

27. Gaur, M.K., Tiwari, G.N., Singh. P., Kushwah, A. (2019) Development of Empirical Relations to Compute the Heat Transfer Coefficients for Distiller Operating in Different Operating Modes, Desalination and Water Treatment, Vol 158, 1-10.

28. Pandit R.K., Gaur M.K., Kushwah A., Singh P., (2019) Comparing the thermal performance of ancient buildings and modern style housing constructed from local and modern construction materials, Nanotechnology Perceptions, 15, 174-182. doi: 10.4024/N12PA19L.ntp.15.02.

29. Saxena G. and Gaur M.K. (2018) Exergy analysis of evacuated tube solar collectors: a review, International Journal of Exergy, Vol. 25 (1), pp.54-74.

30. Malvi C.S. , Gupta A. , Gaur M.K., Crook R. and Dixon-Hardy D.W. (2017) Experimental investigation of heat removal factor in solar flat plate collector for various flow configurations, International Journal of Green Energy, Vol. 14 (4), 442-448.

31. Singh P., Gaur M.K. Environmental and Economic analysis of hybrid greenhouse solar dryer: A Review, International Journal of energy Technology, 2(1), 55-69.

32. Thakur V.K., Gaur M.K. A study on passive solar still with nanoparticles, International Journal of energy Technology, 2(1), 26-38.

33. Gaur M.K., Tiwari G.N., Kushwah A, Kumar A. and Saxena G. Integrated PVT Hybrid Active

Solar Still (HASS) with an optimized Number of Collectors. Solar Desalination Technology, Green Energy Technology, Springer, PP. 219. https://doi.org/10.10O7/978-981-13-6887-5

34. Singh P., Gaur M.K, (2021) Enviro-Economic Analysis of Ginger Drying in Hybrid Active Greenhouse Solar Dryer, Springer Nature Singapore, Artificial Intelligence and Sustainable Computing, Algorithms for Intelligent Systems, 117-128, https://doi.org/10.1007/978-981-16-1220-6_11

35. Thakur V.K., Gaur M.K, Sagar M.K. (2021) Performance analysis of different tilt angles based solar still, Springer Nature Singapore, Artificial Intelligence and Sustainable Computing, Algorithms for Intelligent Systems, 189-200, https://doi.org/10.1007/978-981-16-1220-6_17

36. Saxena G., Gaur M.K, Kushwah A. (2021) Performance analysis and ANN Modelling of Apple drying in ETSC-Assisted Hybrid Active Dryer, Springer Nature Singapore, Artificial Intelligence and Sustainable Computing, Algorithms for Intelligent Systems, 275-294, https://doi.org/10.1007/978-981-16-1220-6_24

37. Shah R., Pandit R.K., Gaur M.K., (2021) Artificial Neural Networks as a Tool for Thermal Comfort Prediction in Built Environment, Springer Nature Singapore, Artificial Intelligence and Sustainable Computing, Algorithms for Intelligent Systems, 155-165, https://doi.org/10.1007/978-981-16-1220-6_14

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Department of Electronics Engineering

Name of Department	**Electronics Engineering**
Ecosystem for innovations, creation and transfer of knowledge [description (in maximum of 100 words)]	Department is continuously doing research work in Communication and Microwave Engineering. Department is having one dedicated laboratory for this work. Many M.Tech. dissertations and Ph.D.s are completed in this laboratory. 03 MoUs with industries are signed for research and knowledge exchange. Industrial visits, training, expert talks were conducted in collaboration with these industries. Many research papers got published and 02 patents were filled and granted. Research projects also are going on in different areas.
Name of Dedicated Research Centre	**Communication Lab**
Objectives of Dedicated Research Centre	Design and Development of Microstrip Patch Antenna
In-charge of Dedicated Research Centre	Dr. Sandeep Sharma and Dr. Dinesh Rano
Core Team of the Centre	Dr. P.K. Singhal Dr. Laxmi Shrivastava Dr. Vandana Vikas Thakare Prof. Deep Kishore Parsedia Dr. Dinesh Rano
Year of Establishment	1987
Number of UG, PG & PhD scholars working in the Centre	UG- 360 PG- 05 Ph.D. Scholar- 13
Major Facilities Available	**Hardware:** Spectrum Analyzer, RF signal generator, Antenna Measurement Setup (Antenna turn table), Keysight Model V200A Microwave (Power sensor), Microwave waveguide bench, Circulators, Attenuator, Power meter, Phased Array Antenna, L.P.F., H.P.F., B.P.F., phase shifter, VSWR meter, Balanced modulator, Fiber Optics trainer, Satellite trainer, Digital comm. Trainer, Transmission line, FM transmitter, EV transmission line and antenna trainer, Function generator. **Software:** IE3D, CST
Activities conducted during the year (2017-2022) pertaining to research	**M.Tech. Dissertations completed:** 1. Bit Error rate Analysis of Different Digital Modulation Schemes in OFDM System 2. BER Improvement by modified Interleaver using Random and QPP Interleaver 3. Enhanced Method of the Shortest Path using Adaptive

	Multiclustering with Fuzzy Logic in Wireless Sensor Networks 4. Performance Analysis of Kaiser-Hanning Window for FIR Digital Filter Design 5. Analysis of BER Performance for DCO-OFDM in VLC System 6. Design of Wideband MIMO Antenna with Neutral Line Structure for 5G Frequency Applications. 7. Patch Antenna by Using Tunable Metamaterial. 8. Shorted Microstrip Patch Antenna for RF Energy Harvesting at 2200 – 2400 MHz Band. 9. Design and Analysis of Multiband Microstrip Patch Antenna for RF Energy Harvesting Applications 10. Size reduction of Microstrip Patch Antenna by using interconnected framework of double negative metamaterial. 11. Analysis to Increase the Channel Capacity of MIMO System over Nakagami -m Fading by Proposed Concept of Antenna Selection 12. Fast convolution technique for CDMA Transmitter and Receiver 13. Design of Microstrip patch antenna with ring shaped DGS for GSM and WLAN applications 14. Design of an effective finite impulse response filter using combination of Gaussian and Kaiser window function 15. Effective FIR Filter Design Using Hybrid Blackman Window and Cosine Series Window 16. Effective Fir Filter Design Using Hybrid Blackman Window and Cosine Series Window 17. Design of Dipole Antenna for Gsm & Lower-Band Applications 18. K Medoid Clustering and Gaussian Mixture Model in Wireless Sensor Network Using A Constant Threshold 19. Performance Analysis of Flying Ad-Hoc Network (Fanet) Using Ricean Fading Model. 20. Energy Management in Wireless Network Using Energy Scavenging and Enhancement Techniques 21. Design of Slotted Wideband and Dual Band Microstrip Patch Antenna for Energy Harvesting 22. Design of Truncated Square Patch Array for Energy Harvesting 23. Microstrip based wideband antenna design for GSM and S-band applications 24. Routing and Spectrum Allocation with Class of Service in Elastic Optical Network 25. Design of an Effective Finite Impulse Response Filter Using Two Variable Adaptable Window Function 26. An IoT based Wireless Sensor Network for Air Pollution Monitoring **Ph.D.s completed:** 1. Design of Broadband Antennas for Wireless Communication 2. Design and development of Microstrip Filters using Metamaterials

	3. Patch Antenna comfortable to Planar and non-Planar Surface 4. Planar Microstrip Patch Antenna with Fractal Geometry 5. Performance Improvement of Computer Aided Diagnosis System for Biomedical Images 6. Feature Extraction of Environmental Images 7. Spectrum sensing Techniques using Energy and Eigen value based algorithm 8. Performance improvement of resource allocation schemes for cognitive radio networks
Activities conducted during the year (2017-2022) pertaining to community orientation	● Workshop on "Design of Microwave Circuits" during 28-29 September, 2018. ● Workshop on "Optical Fiber Communication and its Applications" on September 7, 2019 under TEQIP III. ● Workshop on "Robotics and Control" during 16-17, May, 2020. ● Online National Conference on "Role of Electronics Engineering in Current Societal Changes" during 20-21 June, 2020. ● Expert Lecture by Dr. K. V. Arya, Professor IIITM Gwalior, on Recent Developments In Wireless Technology on October 14, 2019. ● Workshop on "Next Generation Communication System-Challenges and Opportunities" under TEQIP III on July 25, 2020. ● In-house workshop on "Smart Wireless Communication Technologies" during 28-30 June, 2021. ● Expert Lecture by Dr. R P S Gangwar, Director, WIT, Dehradun, on "5G Technology- Evolution, advancement & Challenges" on December 21, 2020. ● Expert Lecture by Dr. Amritanshu Pandey, Associate Professor, IIT BHU, on "Optical Networking for Computing applications" on February 26, 2021. ● Short Term Course (QIP) on "RF and Microwave Antennas" during 5-9 January, 2019. ● TEQIP-III Sponsored Online One Week FDP on "5G: devices & Key Enable Technology" during 19 – 23 September 2020. ● ATAL Faculty Development Program on "Modern Techniques for Wireless Communication" during 17 - 21May, 2021.
Any other activities conducted during the year(2017-2022)	**MoU** signed with following industries for 03 years: ● **Ace Antenna India Private Limited, Hyderabad** on 11.09.2018 and again renewed for next 03 years for Research and Development in the areas of Antenna and Microwave Circuits, Training. Expert talk was conducted. Many research paper published in collaboration with industry. 02 patents got published and granted. ● **Smart Controls India Pvt. Ltd, Gwalior** on 14.11.2017 and again renewed for next 03 years' faculty for Research and Development in the Areas of Communication Engineering and IOT. 02 industrial visits, expert talk and webinar were conducted for students. ● **Hitsvai pvt. ltd. Noida** 01.03.2021for 03 years for knowledge enhancement, training, Internship and Industrial visit. Interaction session and training were conducted for students.
Outcomes in terms of innovations, creation and transfer of knowledge through	● 26 M.Tech. dissertations and 08 Ph.D. thesis work completed utilizing this laboratory. ● Many Microstrip Patch Antenna have been designed and

dedicated centre during the year (2017-2022)	developed. ● Many Research papers published. ● 02 Patents published and granted.
Any other achievement during the year (2017-2022)	**Research Projects completed:** ● Design and Analysis of High Gain Dual-Polarized Base Station Antenna Array for 4G/5G Applications, of amount Rs. 1,95,970/- IRS-2020 under TEQIP-III. ● IoT Based Wireless Sensor Network For Air Monitoring of amount Rs. 1,47,500/- IRS-2020 under TEQIP-III.
Overall outcomes of dedicated centre during the year (2017-2022)for (i)research, (ii) entrepreneurship, (iii) community orientation and (iv)incubation etc.	26 M.Tech. dissertations and 08 Ph.D. thesis work completed utilizing this laboratory. Many Research papers published. 02 Patents published and granted. Many Faculty Development Programs, Workshops, Conferences and expert talks were conducted. 02 research projects completed. Many Microstrip Patch Antenna have been designed and developed.

Dr. Laxmi Shrivastava

Head, Electronics Engineering Department

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Department of Architecture and Planning

Name of Department	Architecture and Planning
Name of Dedicated Research Centre	**Centre for Urban Research and Design Development**
Ecosystem for innovations, creation and transfer of knowledge	MITS has created a vibrant environment of interdisciplinary collaboration and innovation focused on issues concerning human habitats. The Institute has actively engaged in research projects, advisory assignments and capacity building initiatives aimed at solving critical problems in the built environment and improving the quality of life in India's towns and cities. Through such research and consulting pursuits over the past few decades, our faculty members have made available their academic knowledge and expertise to external stakeholders including the government public sector bodies, communities and businesses. Traditionally individual faculty members led these research endeavors directly under the Institute administration. However, considering the growth of research engagements and the need for transparent and effective management of resources and knowledge-base, the Institute needed a robust and independent entity to manage its research activities.
Objectives of Dedicated Research Centre	To carry out research work in the field of sustainability in development for better public domain for the city through organization and policies for governance
In-charge of Dedicated Research Centre	Dr. Anjali S Patil, Ar Satyam Shukla
Core Team of the Center	Dr. Anjali S Patil, Dr. S.S Jadon, Prof. Richa Mishra, Prof. Pranshi Jain, Prof. Ankit Kumar
Year of Establishment	2016
Number of UG, PG & PhD scholars working in the centre	UG: 05; PG: 03; PhD: 04
Major Facilities Available	GIS Specialized Lab Documentation Tools for survey 3D printer Digital Software required for urban analysis

Activities conducted during the year (2017-2022) pertaining to research	1. Work on a research project entitled "Development of city morphology" was carried out. 2. Research work on "Development of Local Area Plan for Maharaj Bada".
Activities conducted during the year (2017-2022) pertaining to entrepreneurship	
Activities conducted during the year (2017-2022) pertaining to community orientation	1. Analyzing the Scope of cycling tack within the city 2. Documenting the urban morphology of Maharaj Bada, Gwalior 3. Consultancy services on various urban planning and Design Projects.
Activities conducted during the year (2017-2021) pertaining to incubation	Nil
Any other activities conducted during the year (2017-2022)	Conduction of TPS and LAP surveys within the city
Outcomes in terms of innovations, creation and transfer of knowledge through dedicated centre during the year (2017-2022)	Quality research papers have been published in reputed international journals and conferences.
Any other achievement during the year (2017-2022)	One faculty development program was organized in association with AICTE on Intellectual Property in Architecture & Planning.
Overall outcomes of dedicated centre for (i) research, (ii) entrepreneurship, (iii) community orientation and (iv) incubation etc.	**Research:** Publication of quality research paper in various reputed journal. Conduction of M.Plan research works. **Community orientation:** Providing solutions to urban issues in Gwalior Designing better public spaces for the city

Dr Anjali S Patil
Asso Professor & Head