DMI
College of Engineering

Department of Mechanical Engineering

MEVOLUTION 23-2

(Aug 2023-Jan 2024)

Editors

Mr. E M Pradeep
Assistant Professor

Mr. Thomas Alva Edison V
IV Mech Student

News Letter

STUDENTS ACHIEVEMENTS

NPTEL COURSES

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

MANOJ KUMAR V

for successfully completing the course

Laser Based Manufacturing

with a consolidated score of 66 %

Online Assignments	19.13/25	Proctored Exam	46.5/75

Total number of candidates certified in this course: 626

Aug-Oct 2023

(8 week course)

Prof. T. V. Bharat

Head, Centre for Educational Technology

NPTEL Coordinator, IIT Guwahati

Indian Institute of Technology Guwahati

swayam

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

NARENDRAN A

for successfully completing the course

Laser Based Manufacturing

with a consolidated score of 48 %

Online Assignments	14.54/25	Proctored Exam	33/75

Total number of candidates certified in this course: 626

Aug-Oct 2023

(8 week course)

Prof. T. V. Bharat

Head, Centre for Educational Technology

NPTEL Coordinator, IIT Guwahati

Indian Institute of Technology Guwahati

swayam

Roll No: NPTEL23ME108S83411370 To verify the certificate No. of credits recommended: 2 or 3

Our second-year Mechanical Engineering students have successfully completed the NPTEL online certification course on **Laser Based Manufacturing**, an advanced subject that focuses on the application of laser technology in modern manufacturing processes. This 8-week program, conducted under the guidance of IIT Guwahati through the SWAYAM platform, provided an in-depth understanding of the fundamental principles, working mechanisms, and practical applications of laser systems in manufacturing. The course covered key aspects such as laser-material interaction, laser types, laser cutting, welding, drilling, and surface treatment techniques, highlighting their advantages in terms of precision, efficiency, and adaptability compared to conventional methods. It also emphasized the role of lasers in advanced manufacturing domains, including micro-machining and additive manufacturing, which are crucial in industries like aerospace, automotive, electronics, and biomedical engineering. By engaging in both online assignments and a proctored examination, our students not only strengthened their theoretical knowledge but also developed analytical skills to solve real-world manufacturing challenges. Their achievement reflects their commitment to continuous learning and adaptability to emerging technologies in the mechanical domain. Such certifications not only enhance technical competency but also prepare our students for future research and industrial applications where advanced manufacturing processes are increasingly in demand. As an institution, we take pride in nurturing young talents with exposure to cutting-edge technologies, ensuring they are well-equipped to contribute effectively to the evolving needs of modern engineering industries. This accomplishment showcases their dedication and the institution’s focus on academic excellence and practical relevance.

TECHNICAL SYMPOSIUM

Our Mechanical Engineering students actively participated in a **National Level Technical Symposium** organized by Alpha College of Engineering, under the banner of IEEE. This event served as a vibrant platform for students to showcase their technical knowledge, innovative ideas, and problem-solving skills in various competitive events. Our students displayed exceptional enthusiasm and involvement by taking part in multiple technical and non-technical competitions, where they demonstrated creativity, teamwork, and strong subject knowledge. Their consistent efforts and dedication led to remarkable achievements, as they secured prizes and recognition, bringing laurels to our institution. Such participation not only strengthens their academic learning but also enhances their confidence, communication, and leadership abilities, which are essential for their overall professional growth. The exposure to external platforms and interaction with peers from different institutions has widened their perspective and inspired them to pursue excellence in both academics and extracurricular activities. The institution extends its heartfelt appreciation to the students for their achievements and expresses sincere gratitude to the faculty members and management for their continuous guidance, encouragement, and support in nurturing young talents. This success highlights the commitment of our institution to providing holistic education that balances technical expertise with personal development, ensuring our students are well-prepared to face future challenges in the engineering field with competence and confidence.

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STAFFS ACHIEVEMENTS

PROFESSIONAL DEVELOPMENT

No: 11/2023/1/MB/68627

अखिल भारतीय तकनीकी शिक्षा परिषद्

प्रमाणपत्र

प्रमाणित किया जाता है कि

एनआईटीटीटी पंजीयन क्रमांक :20222119564

ने

राष्ट्रीय तकनीकी शिक्षक प्रशिक्षण पहल

के अंतर्गत

मॉड्यूल 8 : संस्थागत प्रबंधन और प्रशासनिक कार्यविधि

को सफलता पूर्वक पूर्ण किया।

All India Council for Technical Education (AICTE)

Certificate

This is to certify that

AMALA MITHIN MINTHER SINGH A

NITTT Registration No: 20222119564

has successfully completed

Module 8 : Institutional Management and Administrative Procedures

of

National Initiative for Technical Teachers Training

Director NITTTR, Bhopal | Director NITTTR, Chandigarh | Member Secretary AICTE | Director NITTTR, Chennai | Director NITTTR, Kolkata

FEBRUARY 2023

No: 11/2023/1/M1-M8/43128

अखिल भारतीय तकनीकी शिक्षा परिषद्

प्रमाणपत्र

प्रमाणित किया जाता है कि

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ने

राष्ट्रीय तकनीकी शिक्षक प्रशिक्षण पहल के अंतर्गत

को सफलता पूर्वक पूर्ण किया।

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AMALA MITHIN MINTHER SINGH A

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Director NITTTR, Bhopal | Director NITTTR, Chandigarh | Member Secretary AICTE | Director NITTTR, Chennai | Director NITTTR, Kolkata

SEPTEMBER 2023

The Department of Mechanical Engineering is pleased to announce a significant professional accomplishment by Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research). Dr. Singh has successfully completed an extensive eight-module course offered by the National Initiative for Technical Teachers Training (NITTR), an initiative of the All India Council for Technical Education (AICTE).This comprehensive training program, which includes a critical module on "Institutional Management and Administrative Procedures," is designed to equip technical educators with advanced skills in academic leadership, governance, and contemporary educational administration. The successful completion of this rigorous course underscores Dr. Singh's deep commitment to continuous professional growth and excellence in academic leadership.This achievement is not only a personal milestone but also a significant asset to the institution. The enhanced expertise in institutional management and administrative protocols directly contributes to the effective leadership and strategic development of the department and the college as a whole. It reinforces our institution's commitment to maintaining high standards of academic administration and governance, aligning with the best practices advocated by AICTE.Dr. Singh's dedication to professional development sets a commendable example for the faculty and strengthens the department's leadership capabilities. This accomplishment enhances our capacity for innovative institutional management and furthers our mission of delivering high-quality technical education.

NATIONAL RECOGNITION FOR FACULTY ACHIEVEMENT IN NPTEL

HIGHEST NUMBER OF NPTEL COURSE TAKERS - JAN 2022- JULY 2023 (4 SEMS)

Name	Role	College Name	City	State	No. of courses
Chidananda G	Faculty	Bapuji Institute Of Engineering & Technology	Davanagere	Karnataka	23
Chemmanur Frince Thomas	Faculty	Dharmsinh Desai University,nadiad	Anand	Gujarat	22
Koneru Gopala Krishna	Faculty	Bits-pilani, Wilp Division	Hyderabad	Telangana	22
Dr S Henry Kishore	Faculty	Sri Krishna Arts And Science College	Coimbatore	Tamil Nadu	21
Mathias Yaw Kamperi Geyer	Other	Other	Chennai	Tamil Nadu	21
N C Balaji	Faculty	The National Institute Of Engineering	Mysore	Karnataka	20
Satyanarayana B	Faculty	Institute Of Aeronautical Engineering	Hyderabad	Telangana	20
Aswini B	Faculty	Bhaktavatsalam Memorial College For Women, Chennai	Tiruvallur	Tamil Nadu	19
Kuljeet Singh Kohli	Employed	Bt Global Services India Pvt. Ltd.	Chandigarh	Punjab	19
Asheesh Kumar	Faculty	Mahatma Gandhi Institute Of Technology	Hyderabad	Telangana	18
Nithyananda Sastry Darbha	Faculty	Kle College Of Pharmacy, Belagavi	Belgaum	Karnataka	18
Dr Prashant B Daigavane	Faculty	Government College of Engineering,nagpur	Nagpur	Maharashtra	18
Balachandra Kumaraswamy	Faculty	Bms College Of Engineering	Bengaluru	Karnataka	17
Dr A K Subramani	Faculty	Saveetha School Of Management	Chennai	Tamil Nadu	17
S Lakshmana Kumar	Faculty	Sona College Of Technology	Salem	Tamil Nadu	17
Dr Jayashree Agarkhed	Faculty	Poojya Doddappa Appa College Of Engineering	Gulbarga	Karnataka	17
Shaik Jakeer Hussain	Faculty	Vignans Foundation For Science,technology And Research	Guntur	Andhra Pradesh	17
Dr A Amala Mithin Minther Singh	Faculty	Dmi College Of Engineering	Chennai	Tamil Nadu	17
Santosh Kumar Mohapatra	Employed	Water Resources Department	Berhampur	Odisha	17
Dr Nalini A	Faculty	All India Institute Of Medical Sciences	Hamirpur	HP	17

There are learners taking 5 or 6 courses in every semester for the last 2 years.

The Department of Mechanical Engineering takes great pride in announcing that Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), has been nationally recognized for exceptional performance in continuous professional development. Dr. Singh has secured the **7th position at the national level** for the highest number of NPTEL courses completed between January 2022 and July 2023, a period spanning four semesters.This remarkable achievement, with a total of 17 NPTEL courses successfully completed, places Dr. Singh among the top faculty members in India recognized by the NPTEL program. The accomplishment highlights an extraordinary commitment to self-directed learning and academic excellence, demonstrating consistent engagement with advanced educational content over an extended period.This national ranking reflects not only individual dedication but also brings significant prestige to the institution. It underscores the faculty's active pursuit of knowledge and alignment with national educational standards. Dr. Singh's accomplishment serves as an inspiration to both colleagues and students, embodying the institution's core values of lifelong learning and academic rigor.The department celebrates this outstanding achievement, which reinforces our commitment to fostering a culture of continuous improvement and academic excellence. Such recognition at the national level enhances the institution's reputation and motivates other faculty members to engage in similar professional development initiatives. This accomplishment stands as a testament to the high-quality academic leadership within the Department of Mechanical Engineering.

RECOGNITION AS NPTEL ACTIVE SINGLE POINT OF CONTACT (SPOC)

The Department of Mechanical Engineering is pleased to announce that Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), has been honored with a Certificate of Appreciation as an Active Single Point of Contact (SPOC) for the SWAYAM-NPTEL Local Chapter by IIT Madras. This prestigious recognition is for his instrumental role and outstanding performance during the July - December 2023 semester.As the SPOC, Dr. Singh served as the key liaison between the institution and the NPTEL program, acting as a brand ambassador and effectively promoting the initiative among students and faculty. The award specifically acknowledges his exceptional efforts in driving candidate participation and ensuring the successful engagement of the college with the national online learning platform.This accolade, conferred by Prof. Andrew Thangaraj, NPTEL Coordinator at IIT Madras, highlights the significant contribution made by Dr. Singh in fostering a culture of continuous learning and academic excellence within the institution. His dedicated leadership has been crucial in encouraging widespread enrollment and successful completion of NPTEL courses, thereby enhancing the skills and knowledge base of the academic community.This national recognition not only celebrates Dr. Singh's individual commitment but also brings considerable prestige to the institution, underscoring our active participation in high-quality, technology-enabled education initiatives.

PRESTIGIOUS NPTEL STAR AWARDS ACHIEVEMENT

The Department of Mechanical Engineering takes immense pride in announcing that Dr. A. Amala Mithin Minther Singh, Head of Department and Dean (Research), has achieved exceptional recognition from the National Programme on Technology Enhanced Learning (NPTEL) by securing three distinct Star Awards in recognition of outstanding contributions to technology-enhanced learning. This remarkable accomplishment demonstrates extraordinary commitment to academic excellence and professional development.

Dr. Singh has been honored with the following prestigious awards:

1. NPTEL Believer Award for consistent completion of 5 NPTEL courses

2. NPTEL Discipline Star Award for dedicated engagement spanning 132 weeks of course participation

3. NPTEL Evangelist Award for remarkable achievement in completing 25 NPTEL courses

These awards represent a comprehensive acknowledgment of Dr. Singh's sustained dedication to continuous learning, depth of knowledge acquisition across disciplines, and exceptional contribution to promoting the NPTEL initiative. The Discipline Star Award, in particular, highlights an extended commitment to learning spanning multiple academic years, while the Evangelist Award recognizes the role as a champion of online education.This triple recognition places Dr. Singh among an elite group of academic professionals nationwide who have demonstrated such comprehensive excellence in professional development. The achievement not only brings honor to the individual but also significantly enhances the institution's reputation as a center for academic excellence and innovative learning practices.The department celebrates this extraordinary accomplishment, which serves as an inspiration to both faculty and students, reinforcing our commitment to fostering a culture of continuous learning and academic excellence.

FACULTY ACHIEVEMENT IN PROFESSIONAL CERTIFICATION

Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Automation in Manufacturing

with a consolidated score of 67 %

Online Assignments	20.6/25	Proctored Exam	46.5/75

Total number of candidates certified in this course: 1610

Jul-Oct 2023

(12 week course)

Prof. T. V. Bharat
Head, Centre for Educational Technolog
NPTEL Coordinator, IIT Guwahati

Indian Institute of Technology Guwahati

swayam

Roll No: NPTEL23ME105S103346607 To verify the certificate No. of credits recommended: 3 or 4

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Fundamentals of Manufacturing Processes

with a consolidated score of 53 %

Online Assignments	16.56/25	Proctored Exam	36/75

Total number of candidates certified in this course: 520

Prof. Kaushik Ghosh,
Professor(Chemistry)
Coordinator CEC

Jul-Oct 2023

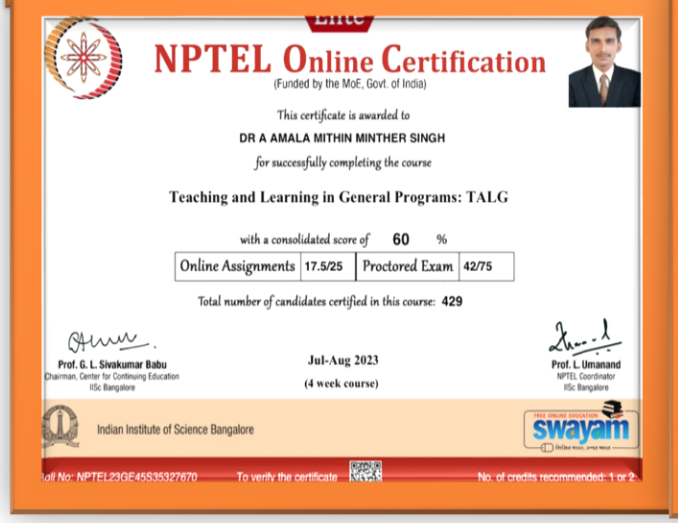
(12 week course)

Prof. Ranjana Pathania,
Professor (BSBE)
Coordinator (NPTEL)

Indian Institute of Technology Roorkee

swayam

Roll No: NPTEL23ME131S83410717 To verify the certificate No. of credits recommended: 3 or 4



Elite

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Teaching and Learning in General Programs: TALG

with a consolidated score of 60 %

Online Assignments	17.5/25	Proctored Exam	42/75

Total number of candidates certified in this course: 429

Prof. G. L. Sivakumar Babu
Chairman, Center for Continuing Education
IISc Bangalore

Jul-Aug 2023

(4 week course)

Prof. L. Umanand
NPTEL Coordinator
IISc Bangalore

Indian Institute of Science Bangalore

swayam

Roll No: NPTEL23GE45S35327670 To verify the certificate No. of credits recommended: 1 or 2

NPTEL Online Certification

(Funded by the MoE, Govt. of India)

This certificate is awarded to

DR A AMALA MITHIN MINTHER SINGH

for successfully completing the course

Manufacturing Systems Technology I & II

with a consolidated score of 56 %

Online Assignments	17.5/25	Proctored Exam	38.45/75

Total number of candidates certified in this course: 135

Prof. B. V. Ratish Kumar
Chairman, Centre for Continuing Education
IIT Kanpur

Jul-Oct 2023

(12 week course)

Prof. Satyaki Roy
NPTEL Coordinator
IIT Kanpur

Indian Institute of Technology Kanpur

swayam

Roll No: NPTEL23ME86S53408800 To verify the certificate No. of credits recommended: 3 or 4

The Department of Mechanical Engineering takes great pride in announcing a significant professional accomplishment by Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research). Dr. Singh has successfully completed a demanding 12-week advanced certification program offered through the NPTEL platform, an initiative funded by the Ministry of Education, Government of India.This certification, administered by the prestigious Indian Institutes of Technology (IITs), signifies a deep commitment to continuous learning and mastery of contemporary technological domains. Dr. Singh achieved a commendable consolidated score, demonstrating a strong grasp of the course material through rigorous online assignments and a proctored examination. The certification places Dr. Singh among a selective group of professionals nationwide who have undergone this specialized training.This accomplishment underscores the faculty's dedication to staying abreast of current industry trends and enhancing their expertise beyond the conventional curriculum. It directly contributes to enriching the academic delivery within the department, ensuring that students receive education aligned with cutting-edge technological advancements. The successful completion of this program not only enhances Dr. Singh's professional profile but also brings considerable prestige to the institution, reflecting our commitment to fostering a culture of academic excellence and continuous improvement. This achievement strengthens our department's capability to provide high-quality, industry-relevant education.

FACULTY PARTICIPATION IN NATIONAL IP AWARENESS

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS | GEOGRAPHICAL INDICATIONS

सत्यमेव जयते

NIPAM
NATIONAL IP AWARENESS MISSION

Government of India
Ministry of Commerce and Industry
Department for Promotion of Industry and Internal Trade
Office of the Controller General of Patents, Designs and Trade Marks

CERTIFICATE

This is to certify that, **DR. AMALA MITHIN MINTHER SINGH , FACULTY** of **DMI COLLEGE OF ENGINEERING** has successfully participated in IP Awareness/Training program under

NATIONAL INTELLECTUAL PROPERTY AWARENESS MISSION

on October 16,2023

Azadi Ka Amrit Mahotsav

Organized by
Intellectual Property Office, India

Date:October 19,2023

(Prof. (Dr) Unnat P. Pandit)
CONTROLLER GENERAL OF
PATENTS, DESIGNS & TRADE MARKS

The Department of Mechanical Engineering is pleased to acknowledge the active participation of Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), in the National Intellectual Property Awareness Mission (NIPAM) organized by the Intellectual Property Office, India. This program was conducted under the auspices of the Ministry of Commerce and Industry, Government of India, on October 16, 2023.The National IP Awareness Mission is a significant initiative aimed at enhancing knowledge and understanding of intellectual property rights among academicians, researchers, and students across the country. Dr. Singh's successful participation in this program underscores a commitment to staying updated with national policies and frameworks related to IPR, which are crucial for fostering innovation and research within the institution.This training has equipped Dr. Singh with valuable insights into the processes of patent filing, design registration, and trademark protection, thereby strengthening the ability to guide and mentor students and fellow faculty members in protecting their inventions and creative works. The certification, issued by the Office of the Controller General of Patents, Designs, and Trade Marks, adds considerable credibility to the department's efforts in promoting a robust innovation ecosystem.Such initiatives align with the institution's goal of integrating IP awareness into the academic curriculum and research activities, ultimately contributing to the creation of valuable intellectual assets and supporting the nation's broader objectives of becoming a global innovation hub.

PUBLICATION IN A PRESTIGIOUS JOURNAL

Renewable and Sustainable Energy Reviews 197 (2024) 114372

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Renewable and Sustainable Energy Reviews

journal homepage: www.elsevier.com/locate/rser

Solar photovoltaic cooling using Paraffin phase change material: Comprehensive assessment

Prabhu B [a,*], Valan Arasu A [b], Gurusamy P [c], Amala Mithin Minther Singh A [d], Arunkumar T [a]

[a] Centre for Additive Manufacturing, Chennai Institute of Technology, Chennai, India
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ARTICLE INFO

Keywords:
Photovoltaics
Paraffin
Cooling
Performance
Efficiency
Solar energy

ABSTRACT

Cooling with phase change material has been identified as one of the most promising cooling approaches for lowering solar photovoltaic module temperature and enhancing system performance. To the best of the authors' knowledge, the specific contribution of Paraffin based phase change material with its prospective thermal enhancement strategies in solar photovoltaic cooling systems has not been reported. This study comprising four phases aims to provide a comprehensive assessment of the use of Paraffin-based phase change materials, an active cooling approach and metal oxide-based nanoparticles in solar photovoltaic cooling systems through the use of recent and relevant research studies. The comprehensive and comparative discussions, in contrast to former reviews, are provided at the end of each phase to summarize their technical considerations. Furthermore, for each examined study, limitations and implications are discussed in order to identify research gaps for further improvements. This comprehensive assessment findings show that a Paraffin-based phase change material cooling approach can cope with a greater drop in solar photovoltaic module temperature ranging from 3 to 26.6 °C, which stimulates an increase in module electrical efficiency ranging from 1 to 56 %. Challenges and environment impact of the existing systems are summarized. Opportunities and future perspective in this field pave the way for utilizing the possibilities for developing more thermal efficient and economic viable solar photovoltaic cooling systems for a sustainable environment.

1. Introduction

Since they have been acknowledged as the most effective and efficient solutions for reducing greenhouse emissions, the utilization of renewable energy resources worldwide and their long-term planning on sustainability have grown significantly [1–5]. Solar energy is the most abundant, and environmentally beneficial source of energy because it is 1000 times more abundant than the entire quantity of energy used by all sources (about 1.8×10^{11} MW) [6–8]. Solar thermal collectors can be used to use solar energy for thermal uses, while SPV systems can be used to generate electricity [9–11]. The IEA analysis estimates that, SPV module installations will account for 16% of the world's electricity generation in near future. Fig. 1 depicts the great potential of SPV systems utility in electricity capacity additions among various renewables [12]. As a result, photovoltaic energy will be a demandable, sustainable, and clean mode of generating electricity [13]. Irradiance, operating temperature, dust, humidity and others variables affect the electrical conversion efficiency of a SPV module [14,15]. Among the various factors affect the performance of a SPV module, higher operating temperature of module will be a threat for electricity generation. The fill factor and open circuit voltage of a SPV module decreased as the temperature of the module increased, resulting in a drop in $\eta_{electrical}$ [16–18]. A SPV module's efficiency is decreased by 0.3–0.65 % per K [19]. For better performance of a SPV module, its surface temperature needs to be maintained about 25 °C [20].

This factor has motivated researchers to develop an efficient and effective thermal management solution for SPVS. PCM-based SPVS are very appealing and advantageous in terms of techno-economic considerations. These systems are used to observe and store the waste heat exhausted by a SPV module in a thermal storage medium for better thermal management in electricity generation. The various thermal management systems of PCM based SPVS are shown in Fig. 2.

In general, LHESS is the most promising system for storing thermal

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Available online 22 March 2024

The Department of Mechanical Engineering is pleased to announce a significant research publication by Dr. A. Amala Mithin Minther Singh, Head of the Department and Dean (Research), in collaboration with fellow researchers. Their paper, titled "Solar Photovoltaic Cooling Using Paraffin Phase Change Material: Comprehensive Assessment," has been published in the esteemed journal Renewable and Sustainable Energy Reviews (March 2024), a high-impact SCI journal.This comprehensive review paper addresses the critical challenge of temperature management in solar photovoltaic (PV) systems, where elevated operating temperatures significantly reduce electrical efficiency. The research provides a detailed assessment of using paraffin-based phase change materials (PCMs) as a passive cooling mechanism for solar PV modules. The study systematically analyzes how this approach can lower module temperatures by 3°C to 26.6°C, subsequently increasing electrical efficiency by 1% to 56%.The publication consolidates existing research, identifies technical considerations, and discusses limitations and future perspectives for developing more efficient and economically viable solar PV cooling systems. This contribution is highly relevant to the global pursuit of sustainable energy solutions and enhances the renewable energy research profile of the institution.This achievement underscores the department's commitment to advancing knowledge in sustainable technologies and contributes significantly to the institution's research output. It also reinforces the department's expertise in thermal management and renewable energy applications, providing valuable insights for academics and industry professionals working on enhancing solar energy system performance.