MECHVERSE

The Mechanical Pulse of Innovation

EDITION 1

DEPARTMENT OF MECHANICAL ENGINEERING

GOVERNMENT POLYTECHNIC COLLEGE SHAJAPUR

About College

Government Polytechnic College, Shajapur established in 2010. It is an affiliated college situated at vijay nagar, Shajapur (M.P.). This technical institution approved from the All India Council for Technical Education (AICTE) provides diploma programs in engineering field. The Institution at present has two departments Electrical and Mechanical Engineering.

Government Polytechnic College offers Diploma programs in Engineering and Technology to cater the needs of Industries, Business, and the Service sectors.

Vision

Government Polytechnic College, Shajapur is committed to become a premier institute in the field of Technical Education in rural suburb by offering innovative and skill based diploma programmes as per the requirement of its stakeholders.

Mission

Government Polytechnic College, Shajapur aims to: -

1. Supply competent human resources for middle level technical positions.

2. Strive for excellence in all the program offerings.

3. Provide student support services, such as guidance, counseling and placement services to individual students.

4. Have strong linkages with industry for mutual benefits.

5. Make the Institution learning Organization for staff and students.

About Department

The Mechanical Engineering Department at Government Polytechnic College, Shajapur, is a cornerstone of technical education in the region. Established to provide quality education and practical skills, the department offers a *Diploma in Mechanical Engineering*, a three-year program designed to prepare students for the technical workforce or higher studies.

The department is equipped with modern laboratories and facilities that support hands-on learning, which is essential for vocational education. Students gain exposure to subjects like thermodynamics, manufacturing processes, and machine design, ensuring a strong foundation in mechanical engineering principles.

The department also emphasizes co-curricular activities, encouraging students to participate in sports, teamwork, and other skill-enhancing events. This holistic approach ensures that graduates are not only technically proficient but also well-rounded individuals.

Vision

The vision of the department is to become a center of excellence in mechanical engineering education, producing skilled professionals who can lead advancements in technology and sustainable development. It aims to inspire creativity, critical thinking, and lifelong learning among students, ensuring they remain adaptable in a rapidly evolving technological landscape.

Mision

To provide quality education in mechanical engineering.

To develop mechanical engineering knowledge and skills.

To increase employability and sustainability.

To impart social and professional ethics.

MESSAGE FROM CHAIRPERSON

ऋजु बाफना
आई.ए.एस.
कलेक्टर एवं जिला दण्डाधिकारी
जिला-शाजापुर (म.प्र.)

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-शुभकामना संदेश-

यह अत्यंत हर्ष और गर्व का विषय है कि शासकीय पॉलिटेक्निक कॉलेज, शाजापुर अपनी प्रथम तकनीकी पत्रिका " MECHVERSE " का प्रकाशन करने जा रहा है। यह प्रयास विद्यार्थियों की अकादमिक प्रतिभा, नवाचार की भावना एवं तकनीकी कौशल को बढ़ावा देने की दिशा में एक सराहनीय कदम है।आज के तेजी से बदलते तकनीकी युग में यह अत्यावश्यक है कि हमारे युवा केवल सैद्धांतिक ज्ञान तक सीमित न रहें, बल्कि व्यावहारिक ज्ञान और समस्याओं के समाधान में भी दक्ष हों। इस पत्रिका का प्रकाशन कॉलेज की शैक्षणिक गुणवत्ता और विद्यार्थियों की रचनात्मकता का परिचायक है।

यह पत्रिका विद्यार्थियों को अपनी तकनीकी समझ, अनुसंधान, नवाचार और रचनात्मकता को अभिव्यक्त करने का एक उत्कृष्ट मंच प्रदान करेगी। यह उनके अनुभवों और उपलब्धियों को साझा करने का माध्यम बनेगी, जिससे अन्य विद्यार्थियों को भी प्रेरणा मिलेगी। साथ ही यह पत्रिका संस्थान के प्रयासों को प्रदर्शित करेगी जो एक समर्पित और जागरूक पीढ़ी के निर्माण में निरंतर योगदान दे रही है।

मुझे पूर्ण विश्वास है कि यह पत्रिका न केवल संस्थान की बौद्धिक वातावरण को समृद्ध करेगी, बल्कि शाजापुर जिले के तकनीकी विकास एवं सामाजिक-आर्थिक उन्नति में भी महत्वपूर्ण भूमिका निभाएगी। मैं सभी विद्यार्थियों को इस नवाचार में सक्रिय रूप से भाग लेने हेतु प्रोत्साहित करती हूँ और इस प्रयास की सफलता हेतु हार्दिक शुभकामनाएं प्रेषित करती हूँ।

(ऋजु बाफना)

"बेटी पढ़ाओ-आगे बढ़ाओ"

MESSAGE FROM VICE CHAIRPERSON

अरुण भीमावद
विधायक
विधानसभा क्षेत्र 167 शाजापुर (म.प्र.)

क्र / 2025 / शुभकामना / 208

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शाजापुर दिनांक– 9 / 04 / 2025

!! शुभकामना संदेश !!

यह जानकर अत्यंत हर्ष हो रहा है कि हमारे शासकीय पॉलिटेक्निक कॉलेज शाजापुर की पहली तकनीकि पत्रिका के शुभारंभ की घोषणा करते हुए बहुत खुशी हो रही है। यह मील का पत्थर प्रकाशन तकनीकी शिक्षा को बढ़ावा देने और हमारे छात्रों एवं शिक्षकों की उल्लेखनीय उपलब्धियों को प्रदर्शित करने की हमारी निरंतर प्रतिबद्धता में एक महत्वपूर्ण कदम है। कई वर्षो से शासकीय पॉलिटेक्निक कॉलेज शाजापुर हमारे जिले में तकनीकी प्रशिक्षण का आधार रहा है। हमने अपने छात्रों को औद्योगिक और तकनीकी परिदृश्य में सार्थक योगदान देने के लिए आवश्यक कौशल और ज्ञान से परिपूर्ण करने का प्रयास किया है। यह पत्रिका हमारे संस्थान को नवाचार और उत्कृष्टता का केन्द्र बनाने में समर्पण और कडी मेहनत का प्रमाण है।

इसके पन्नों में आपको अत्याधुनिक परियोजनाओं शोध पहलों, तकनीकी लेखों और व्यावहारिक अनुप्रयोगों की झलक मिलेगी जो हमारे शैक्षणिक वातावरण को परिभाषित करते हैं। आप हमारे छात्रों के जीवन और विस्तार में जिले की प्रगति पर हमारे प्रशिक्षण के ठोस प्रभाव को देखेगे। हमारा उदेश्य यह उजागर करना है कि हमारे स्थानीय उद्योगो में कैसे योगदान दे रहे है और शाजापुर के अन्दर तकनीकि प्रगति को आगे बढ़ा रहे है। हमारा मानना है कि शासकीय पॉलिटेक्निक कॉलेज शाजापुर हमारे जिले के युवाओं को सशक्त बनाने और आर्थिक विकास को आगे बढाने में महत्वपूर्ण भूमिका निभाता हैं यह पत्रिका समुदाय की सेवा करने और शाजापुर के लिए एक उज्जवल भविष्य बनाने की हमारी प्रतिबद्धता का प्रतिबिब है। मै आप सभी को इस पत्रिका को पढने और हमारे संस्थान के भीतर पनपने वाली प्रतिभा ओर समपर्ण को देखने के लिए आमंत्रित करता हूँ। हमें शाजापुर समुदाय का हिस्सा होनेपर गर्व है और हम उत्कृष्टता की अपनी यात्रा रखने के लिए तत्पर है।

इन्ही मंगल कामनाओं के साथ, मेरी हार्दिक शुभकामनाएँ।

(अरुण भीमावद)
विधायक,
विधानसभा क्षेत्र शाजापुर

From Principal's Desk

Mr. Vipul Parmarthi Principal
M.Phil English
Contact: vipul.parmarthi@mp.gov.in

Dear Faculty and Students of Mechanical Engineering Department,

I am thrilled to address you all on this momentous occasion, as we celebrate the launch of our department's first-ever magazine. This achievement is a testament to your hard work, dedication, and passion for mechanical engineering. As we gather here today, I would like to take a moment to reflect on the significance of mechanical engineering in our modern world. Mechanical engineering is the backbone of our technological advancements, playing a vital role in shaping our daily lives. From the simplest household appliances to the most complex industrial machinery, mechanical engineers have been instrumental in designing, developing, and innovating solutions that have transformed our world. As students and faculty of the Mechanical Engineering Department, you are part of a proud tradition of innovation and excellence. Your work has the potential to impact millions of lives, to shape the future of our planet, and to inspire future generations of engineers and innovators which brings me to the magazine that you have worked tirelessly to create. This magazine is a testament to your creativity, your passion, and your commitment to sharing your knowledge and ideas with the world. It is a platform for you to showcase your talents, to share your experiences, and to inspire your peers. I would like to extend my heartfelt congratulations to each and every one of you who has contributed to this magazine. Your hard work, dedication, and teamwork have paid off, and I am thrilled to see the fruits of your labor.

From HOD's Desk

Er. Jogendra Bharti
Lecturer, Inch. HOD
ME - Manufacturing Technology
Contact: jogendra.bharti@mp.gov.in

Dear Students, Faculty and Staff,

It is with immense pleasure and a sense of accomplishment that I address you on the auspicious occasion of the launch of our very first departmental magazine, a landmark moment for the Mechanical Engineering Department at Government Polytechnic College, Shajapur. This magazine is a testament to the collective efforts, creativity, and dedication of our students and faculty. It serves as a platform to showcase the diverse talents, innovative ideas, and technical prowess that thrive within our department. This publication is not just a collection of articles and projects; it is a reflection of our commitment to fostering a vibrant and intellectually stimulating environment. The journey to bring this magazine to fruition has been a collaborative one. I extend my heartfelt gratitude to the editorial team, the student contributors, and the faculty members who have tirelessly worked to ensure its success. Their passion and enthusiasm have been the driving force behind this achievement.

Departmental academic staff details:

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Department Meritorious students (2023-2024):

Name		Semester	CGPA
	Yash Chouhan	6th	8.62
	Ajay Saroliya	6th	7.62
	Harshit Rathore	4th	7.65
	Abhilove vishwakarma	2nd	7.16

Placement details of 2024 pass-out students:

S.No.	Name	Company	Package
1	Ajay Gorasiya	VE Commercial Dewas	1.56 LPA
2	Ajay Saroliya	John Deere Dewas	1.56 LPA
3	Aman Ansari	John Deere Dewas	1.56 LPA
4	Aman Ansari	VE Commercial Dewas	1.56 LPA
5	Aman Khan	John Deere Dewas	1.56 LPA
6	Aman Khan	VE Commercial Dewas	1.56 LPA
7	Aman Khan	Mita India Dewas	2.16 LPA
8	Chetan Parihar	VE Commercial Dewas	1.56 LPA
9	Dilip Sindal	John Deere Dewas	1.56 LPA
10	Hashim Mev	VE Commercial Dewas	1.56 LPA
11	Jojan Bhatoniya	VE Commercial Dewas	1.56 LPA
12	Jojan Bhatoniya	John Deere Dewas	1.56 LPA
13	Jojan Bhatoniya	Mita India Dewas	2.16 LPA
14	Kalash Saxena	Wind World India Limited	2.16 LPA
15	Krishnapal Singh	John Deere Dewas	1.56 LPA
16	Pankaj Sourashtriya	VE Commercial Dewas	1.56 LPA
17	Phool Singh Gurjar	VE Commercial Dewas	1.56 LPA
18	Phoolsingh Gurjar	John Deere Dewas	1.56 LPA
19	ram charan gurjar	VE Commercial Dewas	1.56 LPA
20	Ramcharan Gurjar	John Deere Dewas	1.56 LPA
21	Rohit	John Deere Dewas	1.56 LPA
22	sameer ansari	VE Commercial Dewas	1.56 LPA
23	Sonu Sourashtriya	John Deere Dewas	1.56 LPA
24	Sonu Sourashtriya	Mita India Dewas	2.16 LPA
25	sonu sourashtriya	VE Commercial Dewas	1.56 LPA
26	yash chouhan	VE Commercial Dewas	1.56 LPA
27	Yuvraj Singh Rathod	John Deere Dewas	1.56 LPA

Industrial visit:

To bridge the gap between theoretical knowledge and practical application, the Mechanical Engineering Department aims to organize at least one industrial visit per semester for students throughout their course. These visits will expose students to real-world industrial environments, processes, and technologies, fostering a deeper understanding of their field. In session 2024-2025 industrial visits organized in Maksi industrial area namely shreedhee industries, Jangid Agro ltd., Bansal Pipes and Gentari Finsurya pvt. Ltd.

Events organized:

To create a vibrant and engaging learning environment, the Mechanical Engineering Department will organize a diverse range of annual events throughout the students' course. These events will complement academic learning, promote creativity, teamwork, and professional development. In session 2024-2025 various events including expert lectures, technical workshops and cultural activities were organized by the department.










Departmental laboratories

1.	**Engineering workshop** **Polytechnic college shajapur's workshop is well equipped for all the repair and manufacturing task. It features bench for holding work piece, a drilling machine for hole creation, and different type of welding machine such as MIG, T IG, Spot welding machine, DC and AC arc welding machine.**		
			
2.	**Fluid mechanics and hydraulic machines lab** **Fluid mechanics lab provides hands on experience to students. It features test RIG of Pelton, Kaplan and Francis turbine allowing students to measure different parameters such as Discharge, Brake power and indicated power.**		
			
3.	**Thermal Engineering lab** Thermal engineering lab has different types of boilers model eg. Cochran boiler, locomotive boiler, Benson Boiler, Babcox and Wilcox boiler and IC Engine models.		
			
4.	**Measurement and metrology lab** **Measurement and metrology lab features tool for dimensional accuracy. This lab has Vernier caliper, Screw gauge and sine bar and other related instruments for accuracy measurement.**		
			
5.	**Material Testing lab** **Material testing lab examines material properties through various test like hardness test and tensile test. Labs have different equipment such as microscope, hardness test machine**		
6.	**CAD Lab** **CAD lab provides digital environment to the students so they can enhance their skill in designing according to industry demand.**		

Articles

Solar Energy

Harshit Rathore

6th Sem, Mechanical Engineering

Solar energy is defined as the transformation of energy that is present in the sun and is one of the renewable energies. Once the sunlight passes through the earth's atmosphere, most of it is in the form of visible light and infrared radiation. Plants use it to convert into sugar and starches; this conversion process is known as photosynthesis. Solar cell panels are used to convert this energy into electricity.

Solar energy, radiation from the Sun capable of producing heat, causing chemical reactions, or generating electricity. The total amount of solar energy incident on Earth is vastly in excess of the world's current and anticipated energy requirements. If suitably harnessed, this highly diffused source has the potential to satisfy all future energy needs. In the 21st century solar energy has become increasingly attractive as a renewable energy source because of its inexhaustible supply and its nonpolluting character, in stark contrast to the finite fossil fuels coal, petroleum, and natural gas.

Solar power is a renewable and infinite energy source that creates no harmful greenhouse gas emissions – as long as the sun continues to shine, energy will be released. The carbon footprint of solar panels is already quite small, as they last for over 25 years. Plus, the materials used in the panels are increasingly recycled, so the carbon footprint will continue to shrink.

Solar energy discovered

Solar energy was used by humans as early as the 7th century B.C. when humans used sunlight to light fires by reflecting the sun's rays onto shiny objects. Later, in 3rd century B.C., the Greeks and Romans harnessed solar power with mirrors to light torches for religious ceremonies.

In 1839 and at the age of just 19, French physicist Edmond Becquerel discovered the photovoltaic (PV) effect while experimenting with a cell made of metal electrodes in a conducting solution. He noted that the cell produced more electricity when it was exposed to light – it was a photovoltaic cell.

In 1954 PV technology was born when Daryl Chapin, Calvin Fuller and Gerald Pearson developed the silicon PV cell at Bell Labs in 1954 – the first solar cell capable of absorbing and converting enough of the sun's energy into power to run everyday electrical equipment.

Future of solar energy

The Future of Solar Energy considers only the two widely recognized classes of technologies for converting solar energy into electricity photovoltaic's (PV) and concentrated solar power (CSP), sometimes called solar thermal) in their current and plausible future forms. Because energy supply facilities typically last several decades, technologies in these classes will dominate solar-powered generation between now and 2050, and we do not attempt to look beyond that date. In contrast to some earlier Future of studies, we also present no forecasts for two reasons. First, expanding the solar industry dramatically from its relatively tiny current scale may produce changes we do not pretend to be able to foresee today. Second, we recognize that future solar deployment will depend heavily on uncertain future market conditions and public policies including but not limited to policies aimed at mitigating global climate change. As in other studies in this series, our primary aim is to inform decision-makers in the developed world, particularly the United States. We concentrate on the use of grid-connected solar-powered generators to replace conventional sources of electricity. For the more than one billion people in the developing world who lack access to a reliable electric grid, the cost of small-scale PV generation is often outweighed by the very high value of access to electricity for lighting and charging mobile telephone and radio batteries. In addition, in some developing nations it may be economic to use solar generation to reduce reliance on imported oil, particularly if that oil must be moved by truck to remote generator sites. A companion working paper discusses both these valuable roles for solar energy in the developing world.

Windmill Energy

Yuvraj Singh

6th Sem, Mechanical Engineering

Windmill Energy has been a rapidly growing sector in recent years. As of 2020, hundreds of thousands of large turbines were generating over 650 gig watts of power, with 60 GW added each year.

Key Developments in 2024 and 2025:

The market for small-scale wind turbines is expected to rise by more than 9% between 2022 and 2030, driven by increasing awareness about greenhouse gas emissions and climate change. Europe is anticipated to hold its leading position for small-scale wind turbine utilization due to shifting attitudes about renewable energy. The cost of wind turbines depends on their size, tower type, and associated equipment, with a typical residential wind turbine costing between USD 15,000 and USD 75,000.

Advantages of Windmill Energy:

Renewable and Sustainable: Wind energy is a renewable and sustainable source of power, reducing reliance on fossil fuels and mitigating climate change.

Low Operating Costs: Wind turbines have low operating costs, as there are no fuel costs and maintenance is minimal.

Energy Independence: Wind energy can provide energy independence, especially for remote or off-grid locations.

Challenges and Limitations:

Intermittent Power Generation: Wind energy generation is intermittent, dependent on wind speeds and weather conditions.

Noise and Visual Impact: Wind turbines can generate noise and have a visual impact on the surrounding landscape.

High Upfront Costs: While wind turbines have low operating costs, the upfront costs of purchasing and installing a turbine can be high Here's an article on windmills, covering their history, benefits, and modern applications.

Geothermal energy

Vijay Singh Rajput

6th Sem, Mechanical Engineering

Geothermal energy is a renewable energy source derived from the heat stored beneath the Earth's surface. This heat originates from the Earth's core and is continuously replenished by natural processes such as radioactive decay and the movement of magma. Geothermal energy is harnessed using geothermal power plants, which extract hot water or steam from underground reservoirs. This steam is used to turn turbines connected to generators, producing electricity. Additionally, geothermal heat can be used directly for heating buildings, greenhouses, and industrial processes. It is an eco-friendly, sustainable, and reliable energy source, offering a cleaner alternative to fossil fuels with minimal environmental impact.

Applications of Geothermal Energy:

Geothermal energy has various applications in different industries and everyday life. Some of its key uses include:

1. *Electricity Generation* – Geothermal power plants convert underground heat into electricity using steam turbines. Countries like Iceland, the U.S., and the Philippines use geothermal energy for large-scale power production.

2. *Direct Heating* – Hot water from geothermal reservoirs is used for heating buildings, greenhouses, and even roads to prevent ice formation in cold regions.

3. *Geothermal Heat Pumps (GHPs)* – These systems use the Earth's stable underground temperature to provide heating and cooling for homes and commercial buildings.

4. *Industrial Applications* – Geothermal heat is used in various industries for drying crops, pasteurizing milk, and processing food products.

5. *Spa and Recreational Uses* – Natural hot springs heated by geothermal energy are popular for relaxation and therapeutic treatments.

6. *Desalination* – Geothermal heat can be used in desalination plants to produce fresh drinking water from seawater.

Advantages of Geothermal Energy:

1. *Renewable and Sustainable* – Geothermal energy is continuously replenished by the Earth's internal heat, making it a long-term energy source.

2. *Eco-Friendly* – It produces very low greenhouse gas emissions compared to fossil fuels, reducing environmental pollution.

3. *Reliable and Consistent* – Unlike solar and wind energy, geothermal energy is available 24/7, providing a stable power supply.

4. *Low Operating Costs* – Once a geothermal plant is set up, maintenance and operational costs are relatively low.

5. *Efficient Heating and Cooling* – Geothermal heat pumps provide energy-efficient heating and cooling for homes and buildings.

6. *Reduces Dependence on Fossil Fuels* – It helps decrease reliance on coal, oil, and gas, contributing to energy security.

7. *Small Land Footprint* – Geothermal power plants require less land compared to wind or solar farms.

Disadvantages of Geothermal Energy:

1. *High Initial Costs* – Drilling wells and setting up geothermal plants require significant investment.

2. *Location-Specific* – Geothermal energy is only available in certain regions with underground heat reservoirs.

3. *Possible Environmental Impact* – Drilling can release harmful gases and cause land instability in some cases.

4. *Resource Depletion in Some Areas* – Overuse of a geothermal reservoir may lead to reduced efficiency over time.

5. *Difficulty in Transporting Energy* – Unlike fossil fuels, geothermal energy cannot be easily transported over long distance

Artificial Intelligence

Mohammad Hamzah Khan

4th Sem, Mechanical Engineering

The simulation of human intelligence in machines that are designed to think and behave like people is known as artificial intelligence (AI). It includes a broad range of technologies, such as robotics, computer vision, natural language processing, and machine learning. Without explicit programming for every activity, AI systems are made to evaluate data, see patterns, make decisions, and get better over time.

The ability of machines to learn from data and make predictions or decisions based on that information makes machine learning, a subset of artificial intelligence, very significant. AI can now perform jobs like image analysis, speech recognition, and autonomous driving thanks to deep learning, a more sophisticated type of machine learning that simulates how the human brain processes information. AI is transforming a number of industries, including manufacturing, healthcare, banking, and entertainment. It optimizes supply chains, enhances customer service via chatbots, and assists physicians with medical diagnosis. But there are also worries about the ethical ramifications of AI technology, privacy problems, and employment displacement. AI will become more and more important in determining how civilization develops in the future.

AI in Today's World

Healthcare

By increasing diagnostic precision, forecasting disease outbreaks, and offering individualized treatment regimens, artificial intelligence is revolutionizing healthcare. Based on a person's genetic profile, machine learning algorithms can recommend treatments, assess medical imaging, and identify early indicators of conditions like cancer. By resolving medical questions and setting up appointments, chatbots and virtual assistants driven by AI are also improving patient involvement.

Finance

AI is used in the financial industry for algorithmic trading, risk management, fraud detection, and customer support. Large datasets can be analyzed by machine learning algorithms to find patterns and forecast market trends. AI-powered robo-advisors are also assisting people in choosing investments according to their risk tolerance and financial objectives.

Transportation

Through route optimization, traffic control, and driverless cars, artificial intelligence is transforming the transportation sector. AI-powered self-driving cars navigate and make choices on the road using sensors and machine learning algorithms. By streamlining delivery routes and increasing fuel economy, AI is also improving logistics.

The Ethical Dilemmas of AI

While the potential benefits of AI are immense, it also raises ethical and societal concerns. Some of the key issues include:

Job Displacement

Numerous tasks could be automated by AI, which would result in job displacement in industries including customer service, manufacturing, and transportation. Making sure that employees are retrained and that new employment possibilities are generated in AI-driven businesses is the problem.

Privacy and Security

Large-scale data collection by AI systems has raised privacy and data security issues. It is crucial to consider how data is utilized, stored, and safeguarded, especially when it comes to private data such as medical records or personal preferences.

धातु संधिकरण

Manoj Ahirwar
4th Sem, Mechanical Engineering

धार सन्धिकरण या समायोजन एक ऐसी प्रक्रिया है जिसके द्वारा दो अलग-अलग धातुओं को जोडा जाता है। धातु संयोजन प्राचीन तरीको जैसे फोर्ज वेल्डिंग और रिवेटिन से विकसित होकर आधुनिक तकनीको जैसे घर्षण वेल्डिंग (FSW) तक (एफएस.डब्लू! और चुंबकीय पल्स वेल्डिंग (MP W) तक पहुच गया है, जिससे दक्षता बहुमुखी प्रतिभा में वृध्दि हुई है।

पुरानी विधियाँ

फोर्ज वेल्डिंग: यह सबसे में से एक पुरानी वेल्डिग तकनिकों मे से एक है जिसका उपयोग असर लोहार लोहे और स्टील, को जोड़ने के लिए करते है।

रिवेटिंग: एक यांत्रिक बन्धन तकनीक जिसमें एक दूसरे पर चढि चादरों के बीच रिवीट एक स्थायी जोड बनाया जाता है।

सोल्डरिंग: एक प्रक्रिया जिसमें दो धातुओ को कम गलतांक धातुओं वाले मिश्र धातु (सोल्डर) का उपयोग करके जोडा जाता है।

टाकना: यह जोड़ने की विधि सोल्डरिंग के समान है, लेकिन इसमें उच्च तापमान और अधिक मजबूत भराव धातु का उपयोग किया जाता है।

चाप वैल्डिंग: एक प्राचीन निधि जिसमें इलेक्ट्रोड धातु के बीच विद्युत चाप उत्पन्न की जाती है।

गैस वैल्डिंग: इसमें एसीटिलीन या गैसोलीन जैसे ईंधन गैसों को ऑक्सी जन के साथ जलाकर ऊष्मा उत्पन्न की जाती जो धातुओं के सिरो को पिघलाकर उन्हें पिघला देती है।आधुनिक तकनीके धातु सधिकरण

घर्षण वेल्डिंग: एक ठोस अवस्था संयोजन प्रक्रिया जिसमें घर्षण द्वारा वेल्ड बनाने के लिए एक घूर्णन उपकरण का उपयोग किया जाता है। जिसका व्यापक रूप से उच्च शक्ति वाले एल्यूमीनियम मिश्रधातुओं को जोड़ने के उपयोग किया जाता है।

चुम्बकीय पल्स वेल्डिंग (MPW): एक तीव वैडिंग विधि जो धातुओं जोडने के लिए विद्युत चम्बकिय स्पंदो का उपयोग करती है जो असमान धातु जोड के लिए विशेष प्रभावी है।

लेज़ेर वेल्डिंग: धातुओं को पिघलाने और जोड़ने के लिए एफ केंद्रित लेजर बीम का उपयोग करता है जो सटीकता और गति प्रदान करता है

इलेक्ट्रॉन बीम वैल्डिंगं: एक उच्च-वैक्यूम प्रक्रिया जो गहरी और सनकीर्ण वेल्ड बनाने के लिए इलेक्ट्रॉनों की एक केंद्रित किरण उपयोग करती है।

शीट वैडिंग: एक वेलडिंग प्रक्रिया जिसमे धातु के दो टुकडों को पर्याप्त दबाव लगाकर बिना पिघलाए या किसी उष्मा की आवश्यकता नही होती है।

प्रतिरोध वैल्डिग: एक संयोजन विधि जिसमें दो धातु शीटो को एक साथ जोड़ने के लिए विद्युत प्रतिरोध धारा उत्पन्न उष्मा का उपयोग किया जाता है।

चिपकने वाला संबंध: धातु के भागों को एक साथ जोड़ने के लिए चिपकाने वाले पदार्थ का उपयोग करना जो एक गैर ताप विधि है जो ताप संवेदनशील सामग्रियों लिए अच्छी है।

निर्णायकः शीट धातु घट्कों के बिन्दु संयोजन के लिए एक उच्च गति यांत्रिक बन्धन तकनीक है।

Pyroelectric Materials and Their Future Applications

Er. Mohit Singhal

Sr. Lecturer, Mechanical Engineering

Pyroelectric materials are a unique class of materials that generate an electrical charge in response to temperature fluctuations. Unlike thermoelectric materials, which require a temperature gradient to produce electricity, pyroelectric materials operate based on time-dependent temperature changes. These materials belong to a special subclass of piezoelectric materials, requiring a non-centrosymmetric and polar structure. Pyroelectric materials like *Single Crystals* (e.g., Triglycine Sulfate, Lithium Niobate), *Ceramics* (e.g., Lead Zirconate Titanate, Barium Titanate), *Thin Films* (e.g., Hafnium Oxide, Lead Titanate), *Polymers and Composites* (e.g., Polyvinylidene Fluoride (PVDF), PVDF/ZnO composites). For example, single crystals and ceramics exhibit strong pyroelectric responses, whereas thin films and polymers offer flexibility and ease of integration into wearable electronics.

Future applications of pyroelectric materials: With advancements in material design and synthesis, pyroelectric materials are poised for diverse applications across multiple sectors. For example, thermal energy harvesting, infrared and ultraviolet detection, self-powered sensors, biomedical applications, hydrogen generation and environmental applications.

Challenges and future prospects: While promising, the practical deployment of pyroelectric materials faces challenges such as: material stability, scaling up production, integration with existing technologies.

Nevertheless, ongoing research in nanostructuring, doping, and composite materials is expected to overcome these limitations, driving the future adoption of pyroelectric materials in next-generation energy and sensor applications.

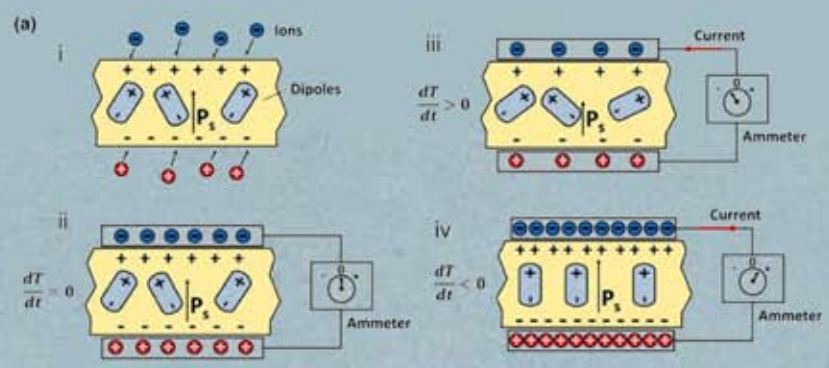


Figure (a): schematic diagram of working mechanism of a pyroelectric generator

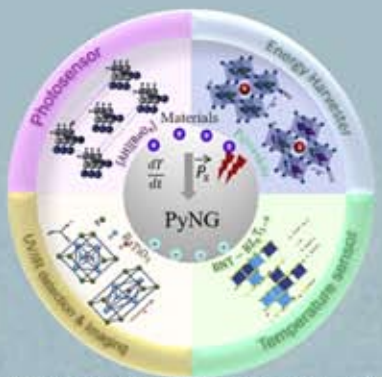
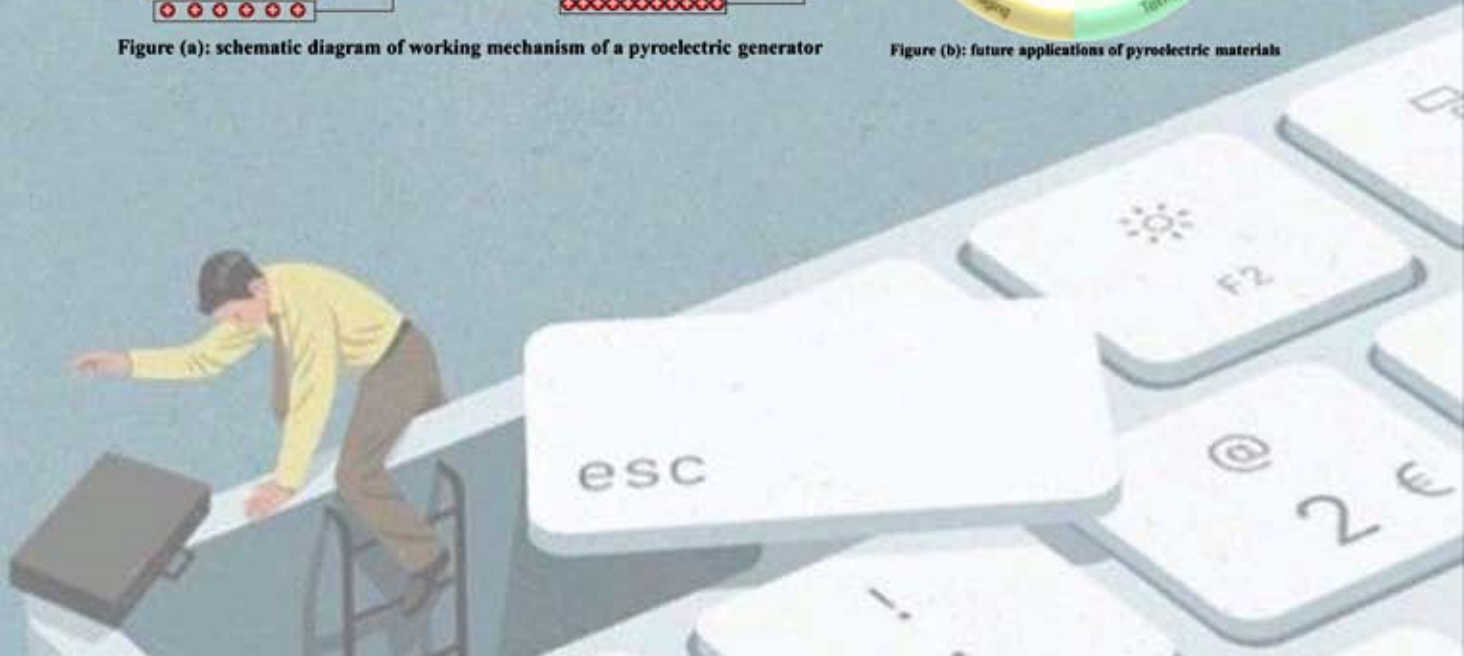


Figure (b): future applications of pyroelectric materials



3D Printing

Er. Jogendra Bharti

Lecturer, Mechanical Engineering

3D printing represents state of the art additive manufacturing process in which material is added layer by layer till desired product is fabricated. 3D printing technology is mainly classified according to the type of input raw material form used namely solid, semi-solid (powder) and liquid. For solid input material which is mainly in the form of wire 3D printing technologies include Fused Deposition Modeling (FDM). Powdered based 3D printing technology includes Selective Laser Sintering (SLS) and Selective Laser Melting (SLM). Liquid based 3D printing fabrication methods comprises of stereolithography (SLA), digital light processing (DLP), direct ink writing (DIW), and inkjet.

Steps involved in 3D printing process:

Design: Creating a 3D model of the object using CAD software.

Prepare: Convert the 3D model to a file format like STL and slice the model i.e. set the thickness of each layer.

Set up: Prepare the 3D printer as per input raw material used.

Print: Use the 3D printer to create the object layer by layer

Finish: Make any final touches on the object.

Application:

3D printing technology finds its wide application in many fields due to its capability to fabricate customized parts in less time. Some of the major application of this technology is in medical field by creating models of body parts for learning purpose. Apart from creating models this technology is used to create wide range biomedical implants of different materials in short period of time. Another application can be find in Aerospace Engineering where 3D printing technology is used to fabricate complicated parts and in Military and Defense services by fabricating arms and weaponry parts.

Renewable Energy – Powering a Safer Future

Er. Shalini Singh

Sr. Lecturer, Mechanical Engineering

Renewable energy is energy derived from natural sources that can be replenished over time. Renewable energy sources and technologies have potential to provide solutions to the Long standing problems being faced by the developing countries. The renewable energy sources like wind energy, solar energy, geothermal energy, biomass energy and fuel cell technology can be used to overcame the shortage in India. An fossil fuel-based energy sources are Causing detrimental environmental issues such as global warming and climate change. Therefore, Renewable energy technologies have introduced to overcome Current environmental Crisis Renewable energy is getting more and more attention due to its increasing awareness of clean environment among the society. To meet the energy requirement for such a fast growing economy, India will require an supply of 3-4 times more energy than the total energy consumed today.

The removable energy is one of the best options Consumed today to meet this requirement. India is increasingly adopting responsible renewable energy techniques and taking positive steps towards Carbon emissions, cleaning the air and ensuring a more sustainable future. Governments and nongovernmental organizations also need to play important role in these aspects.

The Rise of Autonomous Vehicles: A Revolutionary Shift in Transportation

Er. Ankur Sahu

Lecturer, Mechanical Engineering

Autonomous vehicles, often referred to as self-driving cars, are transforming the landscape of transportation. These vehicles, designed to operate with minimal or no human intervention, rely on cutting-edge technologies such as sensors, machine learning, and artificial intelligence. With six levels of automation defined by the Society of Automotive Engineers (SAE)—ranging from Level 0 (manual driving) to Level 5 (full automation)—these vehicles are poised to revolutionize how we travel.

How Autonomous Vehicles Work

Autonomous vehicles are equipped with an array of remote-sensing technologies, including radar, lidar, GPS, and cameras. These devices collectively create a 3D map of the vehicle's surroundings, identifying road signs, traffic lights, pedestrians, and other vehicles. Advanced computer systems process this data in real-time, allowing the car to make decisions about steering, speed, and braking. Machine learning algorithms enhance the vehicle's ability to navigate by learning from data, while artificial intelligence allows for decision-making in complex, dynamic scenarios. Connected vehicle technology also plays a critical role, enabling cars to communicate with one another and with smart infrastructure to ensure a safer driving environment.

Benefits of Autonomous Vehicles

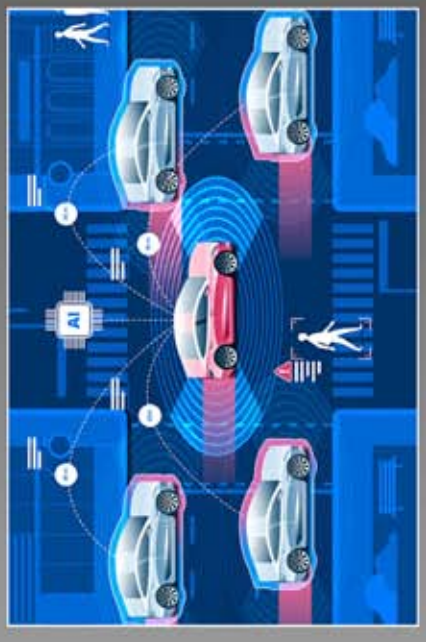
Advocates of self-driving technology highlight several potential benefits:

1. Improved Safety: By eliminating human error—the leading cause of road accidents—autonomous vehicles could significantly reduce traffic fatalities.

2. Increased Efficiency: Automated driving can optimize traffic flow, reducing congestion and fuel consumption.

3. Enhanced Mobility: These vehicles could expand transportation access for individuals who are unable to drive, such as the elderly or those with physical disabilities.

4. Environmental Impact: By integrating electric propulsion systems, autonomous vehicles could contribute to a reduction in greenhouse gas emissions.



Challenges and Criticism

Despite their promise, autonomous vehicles face several hurdles:

1. Infrastructure Requirements: The widespread adoption of self-driving cars requires smart roads and robust communication networks.

2. Regulatory and Ethical Concerns: Policymakers must address liability issues and ethical dilemmas in scenarios where accidents are unavoidable.

3. Environmental Concerns: Critics warn that increased convenience could lead to more vehicle miles traveled, exacerbating congestion and pollution.

The Road Ahead

Though vehicles with partial automation such as lane-keeping assist and adaptive cruise control are already on the market, fully autonomous cars are still in development. Experts predict that Level 4 automation could become commercially viable by 2030–2035. As research and innovation continue, the potential for reshaping urban landscapes, transportation systems, and mobility as we know it remains vast. Autonomous vehicles stand at the intersection of technology and transportation, offering exciting possibilities for the future. As the world adapts to this new era, the balance between innovation, regulation, and societal needs will determine the trajectory of this transformative technology.

Advances in automotive technology

Er. Afaque Ahmed Qureshi
Guest Lecturer Mechanical Engineering

The automotive industry is shown significant growth in rapid technological advancement. Gone are the days of purely mechanical machines today's cars are sophisticated system constantly evolving to be safer, reliable and more efficient as compare to previous. Due to rapid growth in automation such as self driving, ABS (Anti-lock Braking System) and sensor system which enhance comfort while driving. Let's examine some of the most exciting developments.

Autonomous Driving:

There is notable progress for autonomous vehicle such as advance driver – assistance system (ADAS). Feature like adaptive cruise control, lane departure warning, automatic emergency braking and blind spot monitoring are becoming increasingly common. These systems rely on a combination of sensors, including cameras and radar to perceive vehicles surrounding.

Connectivity and the Connected Car:

Modern cars are becoming increasingly connected, both to the internet and to other devices. This connectivity enables a range of features, including:

Over-the-air (OTA) updates: Allowing for software updates and feature enhancements without visiting a dealership.

Real-time traffic and navigation: Providing up-to-date information for optimized routing.

Entertainment systems: Offering integration with smart phones and other devices.

The Electric Revolution:

The most prominent change is undoubtedly the rise of electric vehicles (EVs). Battery technology is rapidly improving, leading to longer ranges, faster charging times, and lower costs. Advancements in solid-state batteries promise even greater energy density and safety. Beyond the batteries, electric power trains are becoming more efficient, and regenerative braking systems are optimizing energy recovery.

Advanced Materials and Manufacturing:

The automotive industry using lightweight materials like high-strength steel, aluminum, and carbon fiber to improve fuel efficiency and performance. 3D printing is also being used for prototyping and even manufacturing certain components.

Enhanced Safety Features:

Beyond ADAS, other safety technologies are also improving. Airbag systems are becoming more sophisticated, and active safety features like electronic stability control and traction control are constantly being refined. The development of pedestrian detection systems and automatic emergency braking for cyclists is also improving road safety for all.

As we move forward, we can expect to see even greater improvement of artificial intelligence, advancements in autonomous driving, and a continued focus on sustainability. The future of driving promises to be safer, cleaner, and more connected than ever before.

Climate Change

Er. Darpan Choudhary

Guest Lecturer, Mechanical Engineering

Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large volcanic eruptions. But since the 1800s, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas. Burning fossil fuels generates greenhouse gas emissions that act like a blanket wrapped around the earth, trapping the sun's heat and raising temperatures.

The main greenhouse gases that are causing climate change include carbon dioxide and methane. These come from using gasoline for driving a car or coal for heating a building, for example. Clearing land and cutting down forests can also release carbon dioxide. Agriculture, oil and gas operations are major sources of methane emissions. Energy, industry, transport, buildings, agriculture and land use are among the main sectors causing greenhouse gases.

Humans are responsible for global warming

Climate scientists have showed that humans are responsible for virtually all global heating over the last 200 years. Human activities like the ones mentioned above are causing greenhouse gases that are warming the world faster than at any time in at least the last two thousand years.

Many people think climate change mainly means warmer temperatures. But temperature rise is only the beginning of the story. Because the earth is a system, where everything is connected, changes in one area can influence changes in all others.The consequences of climate change now include, among others, intense droughts, water scarcity, severe fires, rising sea levels, flooding, melting polar ice, catastrophic storms and declining biodiversity.

Climate emergency: 2025 declared international year of glaciers

As glaciers disappear at an alarming rate due to climate change, the UN general assembly has declared 2025 the international year of glaciers' preservation (IYGP).

A complex issue

Climate change impacts our society in many different ways. Drought can harm food production and human health. Flooding can lead to spread of disease, death, and damage ecosystems and infrastructure. Human health issues that result from drought, flooding, and other weather conditions increase the death rate, change food availability, and limit how much a worker can get done, and ultimately the productivity of our economy.

Hope for the future

There is still time to lessen the impacts and severity of climate change. We already know many of the problems and solutions, and researchers continue to find new ones. Experts believe we can avoid the worst outcomes by reducing emissions to zero as quickly as possible, which will limit warming. To meet this goal, we will have to invest in new technology and infrastructure, which will spur job growth. For example, we will need to continue improving technology and facilities that capture and process renewable energy. Lowering emissions will also benefit human health, saving countless lives and billions of rupees in expenses related to health.

Powder Metallurgy Technologies

Er. Sachin Patidar

Guest Lecturer, Mechanical Engineering

In reality, powder metallurgy comprises several different technologies for fabricating semi-dense and fully dense components. The conventional powder metallurgy process, referred to as press-and-sinter, was used to produce the planetary carrier shown here. The surgical scissor parts were formed through the metal injection molding (MIM) process, the manifold was manufactured through hot isostatic pressing (HIP), while the connecting rod was produced using powder forging (PF). Meanwhile, new to the scene, metal additive manufacturing (AM) is gaining popularity.

Using many of these PM processing techniques, as well as other processes such as spray forming, roll compaction, rapid solidification, and others, components are also produced today from particulate materials other than metal powders. Today's advanced materials are seldom made of metals and metallic alloys alone, often incorporating ceramics, ceramic fibers, and intermetallic compounds. These include:

- Cermets
- Intermetallic compounds
- Metal matrix composites
- Nanostructured materials
- High-speed steels.

International Women's Day Special

Er. Shalini Singh

Sr. Lecturer, Mechanical Engineering

"The beauty of women
is not in her clothes
is not how she dress
is not how she comb her hair
is not how she talk
is not how she sit
Is not how fair is she
The real beauty of women
is reflected is her soul
that's in the eye of the beholder."

"She breathes life into you and she breathes life into life.
She is a mother and a sister,
A wife, friend, a daughter!
To make a place for her, on her own
Not always does she want to prove something or her worth
But because she simply wants to do what she loves.
And the beauty of a woman
If you ask me, what to gift her today
on her special day,
Is the freedom to make her choices
Is the freedom to make her live
Conventional or not
And to look at her beyond the vision of gender.
As a fellow human being
Not as a privilege she is bestowed upon.

"वो मान है सम्मान है तुम्हारा,
वो माँ है वो एक नारी है।

वो एक माँ है,
जब ठंड लगे उसे,
चादर उठाती है तुम्हें,
जब भूख लगे उसे,
खाना खिलाती है तुम्हें,
वो एक माँ है,
वो एक नारी है।

वो एक बेटी है,
जो माँ का सहारा,
पिता का हौसला है,
वो एक बेटी है,
वो एक नारी है।

वो एक अर्धांगिनी है,
अपना आँगन छोड़,
तुम्हें अपनाती है,
साहस और समर्पण से,
परिपूर्ण है जो,
वो एक नारी है।

वो दुर्गा, लक्ष्मी, काली है,
जो इस धरती की, हरियाली है।
वो एक नारी है,
जो सब रिश्तों पर भारी है।"

Short term course/FDP/Industrial training attended			
S.No.	**Faculty Name**	**Title**	**Organizer**
1.	Er. Mohit Singhal	• FDP on Cloud Infrastructure (AWS). • FDP on Implementing Experiential Learning. • Industrial training on Mechanical Engineering Application In Gear Manufacturing Department.	• GPC Sironj • NITTTR Kolkata • VE Commercial Dewas
2.	Er. Shalini Singh	• FDP on Cloud Infrastructure (AWS). • FDP on Implementing Experiential Learning.	• GPC Sironj • NITTTR Kolkata
3.	Er. Jogendra Bharti	• FDP on Advanced Machining Processes. • Industrial training on Mechanical Engineering Application in Gear Manufacturing Department.	• NITTTR Chandigarh • VE Commercial Dewas
Publications:			
S.No.	**Faculty Name**	**Title**	**Publisher/journa**
1.	Er. Jogendra Bharti	Research paper on "Mechanical behavior of reconstructed defected skull with custom PEEK implant and titanium fixture plates under dynamic loading conditions using FEM".	Journal of The Mechanical Behavior of Biomedical Materials. (2023)
2.	Er. Mohit Singhal	• Research paper on "Taguchi Optimization of AISI D-2 die steel using graphite based Electrical Discharge Coating (EDC)". • Book on "Theory of Machines".	• ICAMM 2023, IIT Indore. • University Book House Pvt. Ltd. (2023)
3.	Er. Shalini Singh	• Book on "Engineering Mechanics". • Book on "Theory of Machines".	• Sanjay Publication(2023). • University Book House Pvt. Ltd. (2023).

OUR ALUMNI

Rishab Saxena

Reflections of My Journey at Government Polytechnic College, Shajapur.

Joining Government Polytechnic College, Shajapur, during the COVID-19 lockdown was a unique experience. The usual excitement of college life was replaced by online classes, and extracurricular activities were put on hold. However, once things resumed, the last two years turned out to be some of the most memorable ones of my life

Mornings were spent attending lectures, but the real fun began after classes. Volleyball and cricket became a daily routine, with faculty members often joining us, making the experience even more enjoyable. We formed a volleyball team and represented our college in intercollege competitions. Though we didn't win, bringing back sports after two years of inactivity due to COVID was a proud achievement.

The final year was filled with internships and projects, providing valuable hands-on experience. Our professors Mohit Sir, Darpan Sir, Sachin Sir, Shalini Ma'am, and Ankur Sir were more than just teachers; they were mentors who guided us in academics, career planning, and even personal growth. Their support made every challenge easier to overcome.

As our time at college came to an end, we were excited for the future yet nostalgic about parting ways. Many of us secured jobs, while others pursued further studies. Though we moved in different directions, the friendships, late-night discussions, and shared experiences remain unforgettable.

Looking back, my journey at Government Polytechnic College was truly enriching. To the current students cherish every moment, participate in every opportunity, and make the most of your time. These years will always be a treasured chapter in your life.

Fahim Khan

My Journey at Govt. Polytechnic College Shajapur: A Chapter to Remember

As I near the end of my journey at Govt. Polytechnic College Shajapur, I find myself reflecting onthe incredible experiences, friendships, and lessons that have shaped me over the years Walking through these corridors for the first time, I was filled with excitement and nervousness, not knowing that this place would soon become my second home.

From engaging lectures to sleepless nights before exams, from thrilling college fests to quiet moments of self-discovery, every moment here has been special. The faculty's guidance, the camaraderie of friends, and the opportunities for growth have played a vital role in shaping my confidence and aspirations.

One of the highlights of my college life was invited as a motivational speaker by Respected Mohit Singhal Sir and Shalini Ma'am at that time I am glad to share my experience and knowledge to new students, a part from that winning an inter-college competition in volleyball by Mechanical branch. All the faculty's are top notch and helped a lot so grateful to have such faculty's Jogendra Bharti Sir a man I have never seen anyone like Sir in any College, and yes there's Ankur Sahu Sir who always guided me for better career.

These experiences taught me teamwork, leadership, and resilience skills that I will carry forward in my journey ahead. As I step into the next phase of my life, I do so with gratitude and a heart full of memories.
To my juniors, I would say cherish every moment, take risks, and embrace every opportunity that comes your way. College is not just about academics it's about growth, friendships, and finding yourself and yes it's a second home for me.

Thank you, Govt. Polytechnic College Shajapur and All the wonderful faculty's, for giving me some of the best years of my life!

Samarth Jaiswal

गवर्नमेंट पॉलिटेक्निक कॉलेज शाजापुर का हृदय से धन्यवाद!

मैंने 2020 में कोरोना के दौरान कॉलेज में प्रवेश लिया, और मुझे उम्मीद नहीं थी कि हमारी पढ़ाई संभव होगी। लेकिन कॉलेज की फैकल्टी ने ऑनलाइन माध्यम से हमें पढ़ाया, जिसे हमने अच्छी तरह से समझा।

कोरोना के दौरान मैंने अपने तीन सेमेस्टर घर से पूरे किए, और उसके बाद मैंने कॉलेज ज्वाइन किया।

कॉलेज का वातावरण, फैकल्टी, क्लासेस - सब कुछ वाकई में लाजवाब थाकॉलेज में हर महीने खेल प्रतियोगिताएं, वार्षिक उत्सव, और धार्मिक-सांस्कृतिक उत्सव जैसे गणेश उत्सव, नवरात्रि आयोजित किए जाते हैं, जिसमें सभी विद्यार्थी बढ़-चढ़कर भाग लेते हैं।

कॉलेज में स्मार्ट क्लासेस, कंप्यूटर लैब, लाइब्रेरी ने मेरे डिप्लोमा को और भी आसान बनाया।5वें और 6ठें सेमेस्टर के दौरान कॉलेज में कैंपस इंटरव्यू भी आयोजित किए गए, जिसमें कई बड़ी बड़ी कंपनियों आयी और हमने उनमे भाग लिया और मेरा चयन भी हुआ।

इन सबके पीछे मेरे कॉलेज के शिक्षकों का सहयोग रहा, जो हमेशा एक सकारात्मक सोच के साथ बच्चों को आगे बढ़ने की राह दिखाते हैं।अंतिम सेमेस्टर में हमने एक प्रोजेक्ट पर काम किया, जिसमें हमने एक एयर प्यूरीफायर बनाया, जिसमें सभी शिक्षकों ने सपोर्ट किया।

डिप्लोमा पूरा होने के बाद मेरा प्लेसमेंट हाइयर एप्लायंसेज इंडिया प्राइवेट लिमिटेड में हुआ, जिसका स्टार्टिंग पैकेज 3.5 लाख थामैं इस जॉब के लिए अपनी पूरी जीपीसी फैकल्टी को धन्यवाद देना चाहता हूं।

Special thank you to Mohit sir ♥.

Sheikh Rashid

"From Student to Entrepreneur: My Journey at Govt. Polytechnic College"

Being a diploma graduate in Mechanical Engineering from **Govt. Polytechnic College, Shajapur**, turned my passion into a successful business.

Shekh Rashid Batch:2017-20

During my college years, I gained hands-on experience in repairing two-wheelers using advanced machines.

Through technical education, hands-on training, and mentorship, they provide me the foundation for practical skills and business understanding.

Today, I'm the proud owner of **R.K. Auto Garage & Workshop**, a **multispecialist** two-wheeler service center in **Hatmaidan, Shajapur (M.P.)**. My expertise includes **BS6 scanner-based repairs**, ensuring modern and high-quality vehicle servicing. My journey is a true testament to the impact of technical education and entrepreneurial spirit