THE MET LEAGUE OF COLLEGES
MET
AS SHARP AS YOU CAN GET
Bhujbal Knowledge City

MET's Institute of Engineering

Department of Mechanical Engineering

NEWS LETTER

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ISO: 9001 – 2008 certified MET is an NGO in Special Consultative Status with United Nations (ECOSOC)

FROM THE EDITOR’S DESK

We are delighted to present the Department of Mechanical Engineering, MET Bhujbal Knowledge City Institute of Engineering Yearly Newsletter (Academic year 2021-22) for your perusal. In this rapidly evolving era, e-learning has proven to be the most effective method of knowledge dissemination. The present newsletter showcases the endeavors of our students and the accomplishments of the faculty over the preceding year.

We trust that you will find this edition enjoyable, and we invite your suggestions and feedback to assist us in making further improvements.

Stay healthy, stay fit!

News Letter Core Committee

Editor	Head, Department of Mechanical Engineering
Faculty In charge	Prof. A. B. Varandal
Edited By	Deshmukh Vikrant Abhay (BE)
Design By	Kamble Shubham Sunil (TE)

News Letter Students Committee Members

Year	Name of Students
BE	Deore Devendra Suresh
BE	Aherkar Rushikesh Nandkisahor
TE	Chaudhari Darshan Madhukar
TE	Abid Liyakat Magdum
SE	Bomble Shivam Arun
SE	Hale Akanksha Dinesh

Academic Year: 2021_22

Content

Departmental Vision and Mission

Vision

To become the center of excellence in Mechanical Engineering discipline with strong research and application based teaching beneficial to contribute well being of industry and society.

Mission

- To provide quality education and generate future leaders in the field of Mechanical Engineering through a rigorous curriculum.
- To promote teaching and learning process resulting in research that is distinguished by its impact on academia, industry & society.

Admitted Students

UG	**443**
PG	**05**
PhD	**19**

Total no of Faculties : 25

MECH-PRO 22

Technical Event

On the occasion of “**Science Day**” MET Bhujbal Knowledge City's Institute of Engineering, Department of Mechanical Engineering organized Technical event MECH-PRO’ 22 on 27th April 2022.

For this event 132 students were participated. The winners were appreciated by trophy, certificates.

Dr. V. P. Wani (Principal), Mr. Khairnar (Registrar), Dr. M. P. Ray (HOD) and all staff members & students were present for this event.

Project competition and project exhibition Glimpse

List of Students completed NPTEL course

Sr. No	Name of candidate	Name of Course	No of Weeks	Year	Score
1	Kunal Tajane	Entrepreneurship & IP strategy	8	Jul Sept 2021	77.00%
2	Sakshi Shinde	Entrepreneurship & IP strategy	8	Jul Sept 2021	86.00%


Elite

NPTEL Online Certification

(Funded by the Ministry of HRD, Govt. of India)

This certificate is awarded to

KUNAL ANIL TAJANE

for successfully completing the course

Entrepreneurship and IP strategy

with a consolidated score of 77 %

Online Assignments	24.58/25	Proctored Exam	52.5/75

Total number of candidates certified in this course: 794

Prof. G P Raja Sekhar
Dean, Continuing Education
IIT Kharagpur

Jul-Sep 2021
(8 week course)

Prof. Debjani Chakraborty
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam

Roll No:NPTEL21HS102514020295

To validate and check scores: https://nptel.ac.in/noc


Elite

NPTEL Online Certification

(Funded by the Ministry of HRD, Govt. of India)

TOPPER

This certificate is awarded to

SAKSHI ROHIDAS SHINDE

for successfully completing the course

Entrepreneurship and IP strategy

with a consolidated score of 86 %

Online Assignments	24.58/25	Proctored Exam	61.5/75

Total number of candidates certified in this course: 794

Prof. G P Raja Sekhar
Dean, Continuing Education
IIT Kharagpur

Jul-Sep 2021
(8 week course)

Prof. Debjani Chakraborty
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam

Roll No:NPTEL21HS102524020484

To validate and check scores: https://nptel.ac.in/noc

List of Faculties completed NPTEL course

Sr. No	Name of candidate	Name of Course	No of Weeks	Year	Score
1	Anil Patil	Heat transfer	12	Jul Oct 2021	54.00%
2	Anil Patil	Applied thermodynamics for Engineers	12	Jul Oct 2021	55.00%


NPTEL Online Certification
(Funded by the Ministry of HRD, Govt. of India)

This certificate is awarded to
ANIL GOPAL PATIL
for successfully completing the course
Heat Transfer

with a consolidated score of 54 %

Online Assignments	22.5/25	Proctored Exam	31.5/75

Total number of candidates certified in this course: 104

Prof. G P Raja Sekhar
Dean, Continuing Education
IIT Kharagpur

Jul-Oct 2021
(12 week course)

Prof. Debjani Chakraborty
Coordinator, NPTEL
IIT Kharagpur

Indian Institute of Technology Kharagpur

swayam

Roll No:NPTEL21CH31514100243

To validate and check scores: https://nptel.ac.in/noc


NPTEL Online Certification
(Funded by the Ministry of HRD, Govt. of India)

This certificate is awarded to
ANIL GOPAL PATIL
for successfully completing the course
Applied Thermodynamics for Engineers

with a consolidated score of 55 %

Online Assignments	25/25	Proctored Exam	30/75

Total number of candidates certified in this course: 29

Jul-Oct 2021
(12 week course)

Prof. Hemant B Kaushik
Head, Center for Educational Technology
NPTEL Coordinator, IIT Guwahati

Indian Institute of Technology Guwahati

swayam

Roll No:NPTEL21ME92524100515

To validate and check scores: https://nptel.ac.in/noc

List of Students completed IIT-Bombay spoken tutorial Python course

Sr no	Name of Students
1	ATUL RAJAN
2	SHUBHAM SHINDE
3	RUSHIKESH AHERKAR
4	MOHAMMED YUSUF
5	VISHAL PAWAR
6	MANISH PAWAR
7	NADIM SHAH
8	ATISH GHODE
9	NINAD HANMANTE
10	JAYESH PATIL
11	JAYESH PAGAR
12	SNEHA MOHITE
13	JAYESH GAWALI
14	SWAPNIL SONAR
15	ARJUN MULANE
16	GAURAV JONDHALE
17	RUSHIKESH TAYADE
18	DINESH PAWAR
19	NANDKISHOR PATIL
20	RAHUL BACHHAV
21	ABHIMANYU SINGH
22	AJAY MALI
23	AKSHAY PATIL
24	ANIKET GADEKAR
25	SHANTANU MAHALE
26	PRIYANKA UGALE
27	AVINASH GORE
28	SAGAR BHADANE
29	YASH PAGAR

List of Students completed IIT-Bombay spoken tutorial Arduino course

Sr no	Name of Students
1	KUNAL TAJANE
2	SAKSHI SHINDE
3	PRADYUMNA KATE

ACHIEVEMENT

Sports

Sr. No.	Student Name (AY)	Year	Award	Event / Sports / Topics	Organized By
1	Ahiray Kalpesh Deepak	TE	Zonal Level	Squash Racket	Arts, Commerce and Science college Satpur,
2	Nahire Abhishek Pravin	BE	Zonal Level	Cricket(Boys)	Arts, Commerce and Science college Karanjali.


SAVITRIBAI PHULE PUNE UNIVERSITY
NASHIK DISTRICT ZONAL SPORTS COMMITTEE
Certificate of Participation
(Inter - Zonal Sports)
No.: 000810
This is to certify that Mr./ Ms. Kalpesh Deepak Ahiray
Student of MET Bhujbal Knowledge City College
has represented the Nashik District Zone in the Inter Zonal Squash Competition
held at Mrs. Hadtya College, Pune during the year 2021 - 2022
Prof. Dr. Deepak Jundre
Secretary,
Nashik District Zonal Sports Committee
Prof. Dr. M. S. Shinde
President
Nashik District Zonal Sports Committee


SAVITRIBAI PHULE PUNE UNIVERSITY
NASHIK DISTRICT ZONAL SPORTS COMMITTEE
Certificate of Participation
(Inter - Zonal Sports)
No.: 000525
This is to certify that Mr./ Ms. Abhishek Nahire
Student of MET College
has represented the Nashik District Zone in the Inter Zonal Cricket Competition
held at during the year 2021 - 2022
Prof. Dr. Deepak Jundre
Prof. Dr. M. S. Shinde

Zonal Sports Certificate

PAPERS PUBLISHED BY STAFF

Sr. No	Name of Author	Title of Paper	Organizer Conference/ journal	Link
1	T. Y. Badgujar, V. P. Wani	Wavelet transform and mel-frequency cepstral coefficient-based feature extraction of the sheet metal trimming process to study burr formation	International Journal of Mechatronics and Manufacturing Systems	https://doi.org/10.1504/IJMMS.2022.122906
2	H A Chavan & D. D. Deshmukh	Productivity Improvement of Automotive Rod Forming Process by Simultaneous Operation Using FE Simulation	International Journal of Modern Manufacturing Technologies	https://ijmmt.ro/vol13no12021
3	Dipak Kisan Dond, Nitin Parashram Gulhane	Optimization of Injection System Parameter for CRDI Small Cylinder Diesel Engine by using Response Surface Method	Journal of The Institution of Engineers (India): Series C volume	https://link.springer.com/article/10.1007/s40032-021-00688-6
4	Dipak Kisan Dond, Nitin Parashram Gulhane	Effect of Injection System Parameters on Performance and Emission Characteristics of a Small Single Cylinder Diesel Engine	International Journal of Automotive and Mechanical Engineering	https://journal.ump.edu.my/ijame/article/view/4451
5	Dipak Kisan Dond, Nitin Parashram Gulhane	Effect of a turbocharger and EGR on the performance and emission characteristics of a CRDI small diesel engine	Heat Transfer	https://onlinelibrary.wiley.com/doi/abs/10.1002/htj.22350
6	Dipak Kisan Dond, Nitin Parashram Gulhane	Optimization of combustion parameters for CRDI small single cylinder diesel engine by using response surface method	Journal of Mechanical Engineering and Sciences	https://journal.ump.edu.my/jmes/article/view/5436
7	S. P. Kakade, A.G. Thakur	Comparative analysis and investigations of welding processes applied for hardfacing using AHP	International Journal of Modern Manufacturing Technologies	https://ijmmt.ro/vol13no12021/06
8	D.D. Deshmukh, V. D. Kalyankar	Metallurgical characterisation of multi-track Stellite 6 coating on SS316L substrate	The Canadian Journal of Metallurgy and Materials Science	https://www.tandfonline.com/doi/abs/10.1080/00084433.2022.2149009

9	Dhiraj Deshmukh, Vivek Kalyankar, Avishkar Bhoskar,	On the performance of metallurgical behaviour of Stellite 6 cladding deposited on SS316L substrate with PTAW process	The Canadian Journal of Metallurgy and Materials Science	https://www.tandfonline.com/doi/abs/10.1080/00084433.2022.2031681
10	S.P. Kakade, AG Thakur, DD Deshmukh, SB Patil	Experimental investigations and optimisation of Ni-Cr-B-Si hardfacing characteristics deposited by PTAW process on SS 410 using response surface	Advances in Materials and Processing Technologies	https://www.tandfonline.com/journals/tmpt20
11	Amit S. Patil, V. K. Sunnapwar, K. S. Bhole, M. P. Ray & Y. S. More	Effective cooling methods for Ti6Al4V CNC milling: a review	Advances in Materials and Processing Technologies	https://doi.org/10.1080/2374068X.2022.2094073
12	Amit S. Patil, V. K. Sunnapwar, Kiran S. Bhole, Ankit D. Oza, S. M. Shinde, R. Ramesh	Effective machining parameter selection through fuzzy AHP-TOPSIS for 3D finish milling of Ti6Al4V	International Journal on Interactive Design and Manufacturing (IJIDeM)	https://doi.org/10.1007/s12008-022-00993-z
13	Amit S Patil, Sachin M Shinde, Ramesh R Lekurwale, Kiran S Bhole, Ankit D Oza,R Ramesh	On efficient electrode design and manufacturing techniques for hot die steel inserts	International Journal on Interactive Design and Manufacturing (IJIDeM)	https://link.springer.com/article/10.1007/s12008-022-00994-y
14	Amit S Patil, Sachin M Shinde, Ramesh R Lekurwale, Kiran S Bhole, Ankit D Oza,R Ramesh	5-axis virtual machine tool centre building in PLM environment	International Journal on Interactive Design and Manufacturing (IJIDeM)	https://link.springer.com/article/10.1007/s12008-022-00974-2

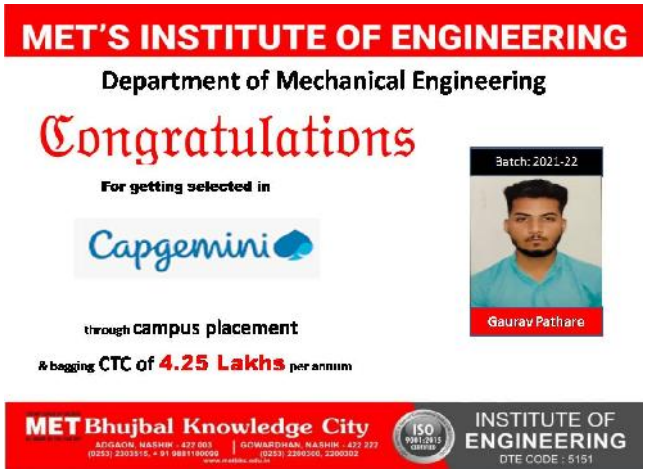
GATE exam appeared student list

Academic Year 2021-22 (BE)	
Sr. No.	**Student Name**
1	Abhishek Nahire **(Qualified)**
2	Kiran Gosavi
3	Vishal Rajpurohit
4	Yogita Ingale
5	Prasad Dhikle
6	Ankita Hire
7	Sharad Mahajan
8	Vaishnav Barve

PLACEMENT

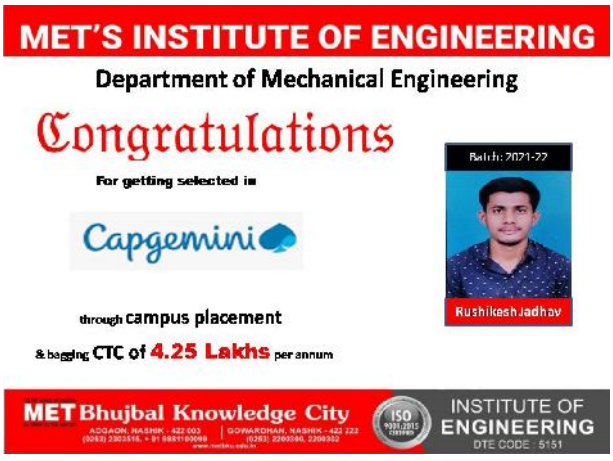

MET
Bhujbal Knowledge City
Department of Mechanical Engineering
Congratulations
Ankita Hire
For being placed in
CEAT
Through campus placement 2021-22
Package: 2.5 LPA
+91 98811 00099
metbhujbalknowledgecity.ac.in

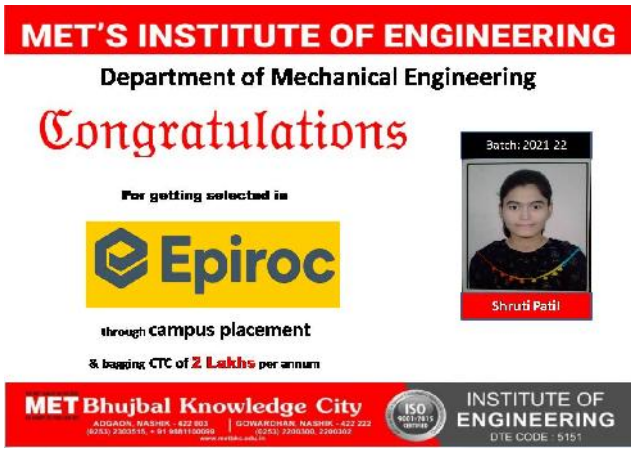

MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
Capgemini
through campus placement
& bagging CTC of 4.25 Lakhs per annum
Batch: 2021-22
Chirag Dhangar
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
Capgemini
through campus placement
& bagging CTC of 4.25 Lakhs per annum
Batch: 2021-22
Gaurav Pathare
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
Capgemini
through campus placement
& bagging CTC of 4.25 Lakhs per annum
Batch: 2021-22
Lalit Ahire
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
Capgemini
through campus placement
& bagging CTC of 4.25 Lakhs per annum
Batch: 2021-22
Pratik Veole
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
Capgemini
through campus placement
& bagging CTC of 4.25 Lakhs per annum
Batch: 2021-22
Rushikesh Jadhav
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
Epiroc
through campus placement
& bagging CTC of 2 Lakhs per annum
Batch: 2021 22
Shruti Patil
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
Epiroc
through campus placement
& bagging CTC of 2 Lakhs per annum
Batch: 2021-22
Diya Jain
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
wipro
through campus placement
& bagging CTC of 3.5 Lakhs per annum
Batch: 2021-22
Nayan Nikam
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151


MET'S INSTITUTE OF ENGINEERING
Department of Mechanical Engineering
Congratulations
For getting selected in
wipro
through campus placement
& bagging CTC of 3.5 Lakhs per annum
Batch: 2021-22
Dnyaneshwar Pavale
MET Bhujbal Knowledge City
INSTITUTE OF ENGINEERING
DTE CODE : 5151

MET's INSTITUTE OF ENGINEERING

Department of Mechanical Engineering

Placed Students 2021-22

Congratulations

Abhishek Joshi
BYJU'S
10 LPA

Abhishek Nahire
BYJU'S
10 LPA

Dnyaneshwar Pawale
wipro
3.5LPA

Sharad Mahajan
wipro
3.5LPA

Durgesh Yeole
Infosys
3.6LPA

Vikrant Deshmukh
Infosys
3.6LPA

Shubham Ahire
Infosys
3.6LPA

Vaibhav Deore
Infosys
3.6LPA

Divesh Deore
Infosys
3.6LPA

Sandip Misal
TATA CONSULTANCY S
3.6LPA

Mahesh Pelmahale
TATA CONSULTANCY S
3.6LPA

Rushikesh Andhale
TATA CONSULTANCY S
3.6LPA

Manas Sandanshiv
wipro
3.5LPA

Kiran Gosavi
wipro
3.5LPA

Ujjwal Patil
Infosys
3.6LPA

MET's INSTITUTE OF ENGINEERING

Department of Mechanical Engineering

Placed Students 2021-22

Congratulations

wipro **6 LPA**

Abhishek Wadile

Capgemini **4 LPA**

Chirag Dhangar

Capgemini **4 LPA**

Lalit Ahire

Capgemini **4 LPA**

Gaurav Pathare

Capgemini **4 LPA**

Pratik Yeole

Capgemini **4 LPA**

Rushikesh Jadhav

Infosys **3.6LPA**

Prerana Malve

Infosys **3.6LPA**

Priyanka Badgujar

Infosys **3.6LPA**

Divesh Jadhav

RDC Concrete **3.6LPA**

Rohit Mogal

RDC Concrete **3.6LPA**

Rohit Saindane

RDC Concrete **3.6LPA**

Manaswi Chavanke

wipro **3.5LPA**

Rupesh Borse

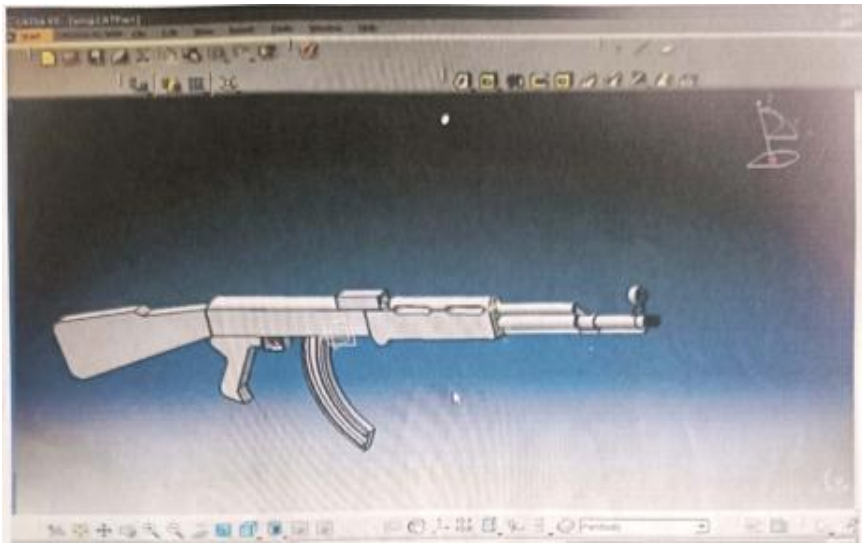
wipro **3.5LPA**

Shreyas Bhalde

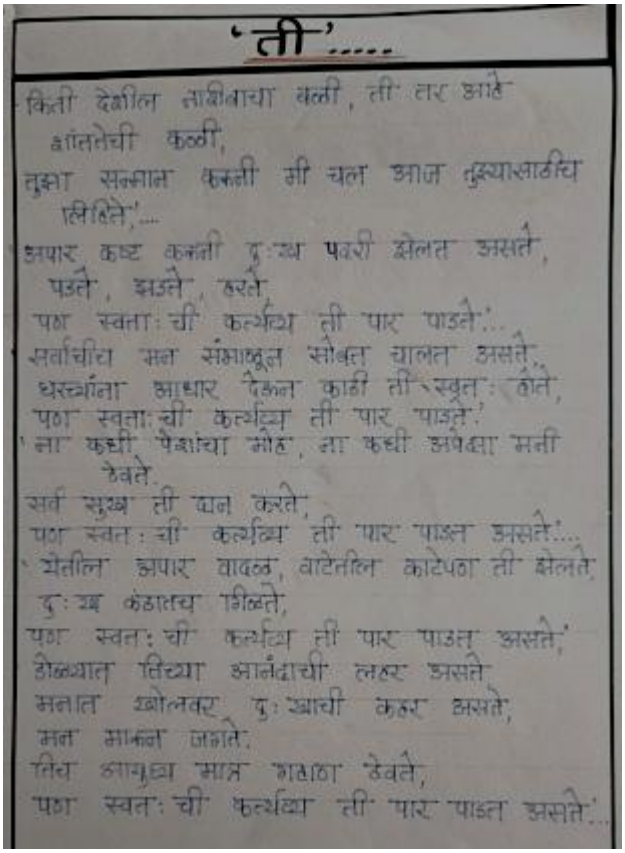
wipro **3.5LPA**

Abhijit Khaire

EXTRA CURRICULUM



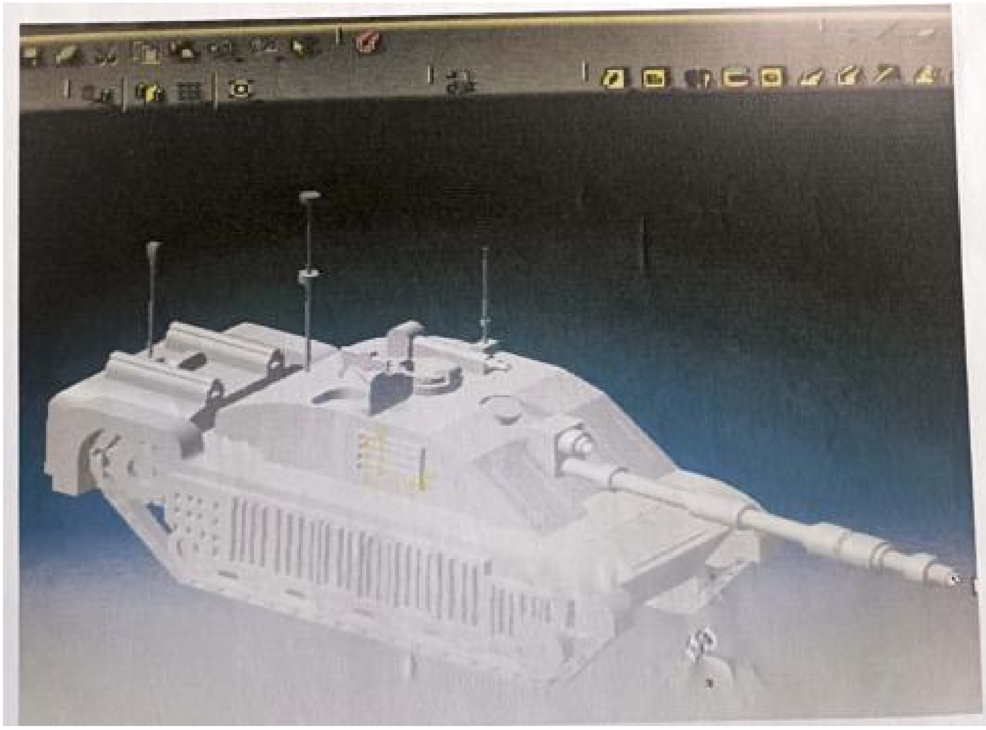
Model developed in CATIA by PAGAR YOGESH KAILAS (TE)



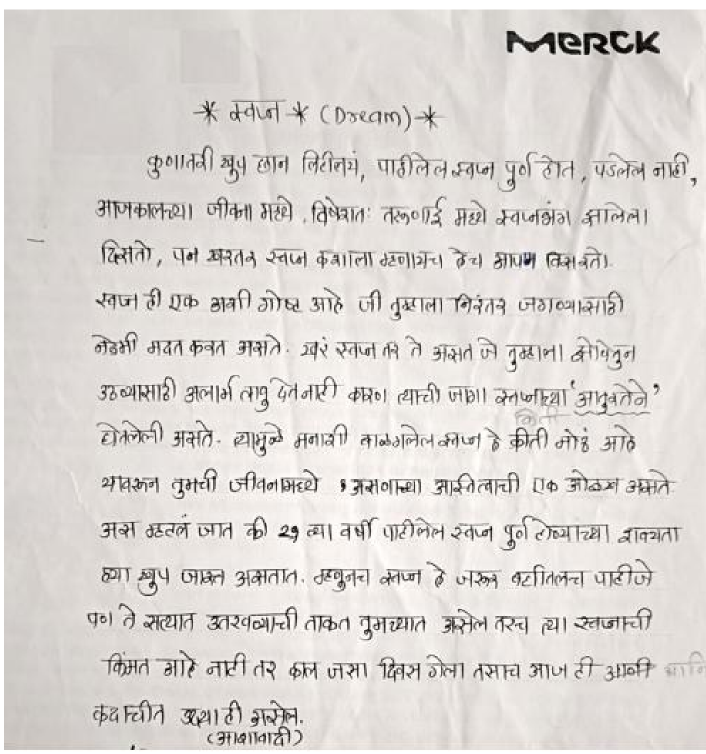
‘ती’.....

किती देखील नाशिबाचा वली, ती तर आहे
ज्वालतेची कळी,
तुझा सन्मान करती मी चल आज तुझ्यासाठीच
लिहिते,...
अपार कष्ट करती दुःख पदरी झेलत असते,
पडते, झडते, झुरते,
पण स्वतःची कर्त्यव्य ती पार पाडते...
सर्वांचीच मन संभाळून सोबत चालत असते,
थरथरांना आधार देऊन काठी ती स्वतः होते,
पण स्वतःची कर्त्यव्य ती पार पाडते.
ना कधी पैशांचा मोह, ना कधी अपेक्षा मनी
ठेवते.
सर्व सुख ती दान करते,
पण स्वतःची कर्त्यव्य ती पार पाडत असते...
येतील अपार वादळ, वाटेतील काटेपण ती झेलते,
दुःख कंठातच गिळते,
पण स्वतःची कर्त्यव्य ती पार पाडत असते,
डोळ्यात तिच्या आनंदाची लहर असते,
मनात ओलावर दुःखाची कहर असते,
मन मारुन जगते,
तिच आयुष्य मात्र गहाण ठेवते,
पण स्वतःची कर्त्यव्य ती पार पाडत असते...

Nikam Nayan Vijay (BE)



DESHMUKH PRASAD MANGESH (TE)



Merck

* स्वप्न * (Dream) *

कुणीतरी खुप छान लिहीलयं, पाहीलेलं स्वप्न पुर्ण होतं, पडलेलं नाही, आजकालच्या जीवना मध्ये, विशेषतः तरूणाई मध्ये स्वप्नभंग झालेला दिसतो, पण खरंतर स्वप्न कशाला म्हणायचं हेच आपण विसरतो. स्वप्न ही एक अशी गोष्ट आहे जी तुम्हाला निरंतर जगण्यासाठी नेहमी मदत करत असते. खरं स्वप्न तर ते असतं जे तुम्हाला झोपेतुन उठण्यासाठी अलार्म लावु देत नाही कारण त्याची जागा स्वप्नाच्या 'आतुरतेने' घेतलेली असते. त्यामुळे मनाशी बाळगलेलं स्वप्न हे किती मोठं आहे यावरुन तुमची जीवनामध्ये असणाऱ्या अस्तित्वाची एक ओळख असते. असं म्हटलं जातं की २१ व्या वर्षी पाहीलेलं स्वप्न पुर्ण होण्याच्या शक्यता त्या खुप जास्त असतात. म्हणुनच स्वप्न हे जरूर बघीतलंच पाहीजे पण ते सत्यात उतरवण्याची ताकत तुमच्यात असेल तरच त्या स्वप्नाची किंमत आहे नाही तर काल जसा दिवस गेला तसाच आज ही आणि कदाचित उद्या ही असेल.

(आशावादी)

GAIKWAD MADAN DEVIDAS (TE)

Technical Articles

Title: Application of AHP for solving industrial problem

The Analytic Hierarchy Process (AHP) is a decision-making technique developed by Thomas Saaty in the 1970s. It provides a structured method for dealing with complex decisions by breaking them down into smaller, more manageable components. This is typically done using pairwise comparisons. A key feature of AHP is its ability to accommodate both quantitative and qualitative factors in decision making. Application of Analytic Hierarchy Process (AHP) in solving industrial problems involves utilizing a structured decision-making framework to arrange and make informed choices among various alternatives.

In an industrial setting, AHP can be applied to address a wide range of issues such as:

1. **Vendor Selection**: AHP can help in selecting the most suitable vendor by evaluating criteria like cost, quality, reliability, and delivery time.
2. **Process Optimization**: AHP aids in optimizing industrial processes by identifying and prioritizing factors such as efficiency, safety, cost-effectiveness, and environmental impact.
3. **Resource Allocation**: AHP assists in allocating resources effectively by considering factors like manpower, equipment utilization, budget constraints, and project deadlines.
4. **Product Design**: AHP can be used to prioritize design features and requirements based on factors such as functionality, user preferences, cost, and market demand.
5. **Risk Management**: AHP helps in assessing and prioritizing risks associated with various industrial activities, allowing for informed decision-making to mitigate potential negative impacts.
6. **Asset Management**: AHP facilitates decision-making related to the maintenance, replacement, or upgrade of industrial assets by considering factors such as asset condition, performance, and lifecycle costs.
7. **Supply Chain Management**: AHP assists in optimizing supply chain operations by evaluating factors like supplier reliability, transportation costs, inventory management, and customer satisfaction.

8. **Market Expansion**: AHP supports decision-making related to market expansion strategies by considering factors such as market size, growth potential, competition, and regulatory environment.

Overall, AHP provides a systematic approach to decision-making that helps decision-makers make more informed and consistent choices, particularly in situations where multiple criteria and alternatives need to be considered. By applying AHP in these areas, industrial organizations can make more informed decisions, improve efficiency, reduce costs, and enhance overall competitiveness.

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Title: Role on Tribology in Industry

Introduction of Tribology:

Tribology is the interdisciplinary field of science and engineering that focuses on understanding the interaction of surfaces in relative motion. It encompasses the study of friction, wear, and lubrication and plays a crucial role in numerous industrial applications and everyday life. Friction is the resistance to motion that occurs when two surfaces contact each other. Understanding friction is essential for optimizing the performance of mechanical systems, as it affects traction, control, and Tribology. Wear refers to the gradual removal of material from surfaces in contact, typically due to mechanical, chemical, or thermal interactions. Wear can occur through various mechanisms, including abrasion (mechanical removal), adhesion (material transfer), and fatigue (repeated loading). Lubrication involves the application of a lubricant, such as oil, grease, or solid film, to reduce friction and wear between interacting surfaces. Proper lubrication selection and maintenance are essential for optimizing efficiency, reliability, and durability in mechanical and tribological systems.

In the automotive sector, tribological principles are crucial for engine performance, fuel efficiency, and component longevity. In aerospace, tribology contributes to the reliability and safety of aircraft by ensuring smooth operation and minimizing wear in critical components. In manufacturing, tribology influences the design and performance of machinery, such as bearings, gears, and cutting tools, impacting productivity and product quality. Additionally, tribology plays a vital role in medical devices and implants, where minimizing friction and wear are essential for patient safety and device longevity.

Advancements in tribology are driven by innovations in materials science, surface engineering, and lubrication technologies. By fostering interdisciplinary collaboration and investing in tribology research and education, we can unlock new opportunities for improving performance, efficiency, and sustainability across industries. Tribology continues to be a dynamic and evolving field, addressing the challenges of today and shaping the technologies of tomorrow.

Application of Tribology:

Tribology finds applications across various industries, including automotive, aerospace, manufacturing, and biomedical.

1. Automotive Industry:

Tribology is essential for optimizing the performance and durability of engine components such as pistons, cylinders, and crankshafts. Proper lubrication and surface treatments reduce friction and wear, improving fuel efficiency and extending engine life. Tribological principles are critical in designing brake pads, discs, and calipers to ensure efficient energy conversion and reliable stopping power. Understanding frictional behavior helps engineers develop brake materials with the right balance of friction, wear resistance, and thermal stability. Tribology plays a vital role in the design of gears, bearings, and transmission fluids to minimize friction losses and enhance power transfer efficiency. Lubrication strategies optimize gear meshing and reduce wear in high-stress components.

2. Aerospace Industry:

Tribology is crucial for the performance and reliability of aircraft engines, where components operate in extreme conditions of temperature, pressure, and speed. Advanced coatings and lubricants are developed to withstand high loads and temperatures, reducing friction and wear in critical engine parts. In Landing Gear Systems, Tribological considerations are essential in designing landing gear systems to ensure smooth operation during takeoff, landing, and taxiing. Lubrication and surface treatments mitigate wear and corrosion, enhancing the longevity and safety of landing gear components. Also, tribology plays a key role in the design and maintenance of aircraft bearings, which support rotating components such as turbines and propellers. Lubricants and bearing materials are selected to withstand high speeds and loads while minimizing friction and heat generation.

3. Manufacturing Industry:

Machine Tools: Tribology influences the design and performance of machine tools, such as lathes, mills, and grinders, used in manufacturing processes. Bearings, slides, and cutting tools are engineered to minimize friction and wear, improving machine accuracy and surface finish. Metal Forming Processes: Tribology plays a crucial role in metal forming processes such as forging, stamping, and extrusion, where surfaces undergo deformation under high pressure. Lubricants and coatings reduce friction and wear between tooling and workpiece, enhancing productivity and product quality.

Future Perspectives:

In the realm of tribology, the future holds promise for exciting advancements driven by ongoing research and technological innovation. One key area of focus is the development of advanced materials with tailored surface properties to minimize friction and wear, thus improving efficiency and durability in mechanical systems. Nanotechnology offers opportunities for creating nanoscale lubricants and coatings with superior performance and environmental sustainability. Additionally, advancements in computational modeling and simulation techniques enable researchers to gain deeper insights into tribological phenomena at the molecular level, facilitating the design of novel lubricants and surface treatments. As industries strive for greater energy efficiency and sustainability, tribology will continue to play a vital role in optimizing the performance of machinery and reducing environmental impact.

Conclusion:

In conclusion, tribology stands as a cornerstone of modern engineering, influencing the design, performance, and longevity of mechanical systems across diverse industries. By delving into the intricate interactions of surfaces in motion, tribologists unlock insights that drive innovation and improvement in efficiency, reliability, and sustainability. From optimizing automotive engines and aerospace components to enhancing manufacturing processes and biomedical devices, tribology touches virtually every aspect of our lives. As we look to the future, the continued advancement of tribological research and technology promises to usher in a new era of engineering excellence, where friction is minimized, wear is mitigated, and lubrication is optimized. Through interdisciplinary collaboration and a commitment to innovation, tribology will remain at the forefront of shaping a world where machines run smoother, last longer, and leave a lighter footprint on the planet.

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Title: Challenges in CNC Manufacturing

For CNC machining enterprises, the cost of equipment and software can be a substantial barrier to advancement. This is particularly relevant for newer or smaller businesses. Using computer numerical control (CNC) machining demands specific hardware and software that can be costly to obtain and maintain.

Yet, this is not the only disadvantage CNC manufacturing companies face due to this widespread constraint. Instead, this constraint and expense issue brings up other concerns for the organization, including the following ones:

- **The initial investment**: CNC machines and other related equipment can be expensive, making it challenging for smaller enterprises to enter the field. Because of the high equipment cost, a corporation may be unable to provide all the services it would like to its customers since certain devices are simply out of its price range.
- **Expenses Related to Software**: CNC machines require specialized software to function properly, which may be expensive to purchase and maintain. Costs may be driven further by the requirement to continually update software to remain competitive with industry standards and keep pace with technological advances.
- **Expenses Related to Training**: CNC machines require qualified operators and programmers, which can be a substantial expense for the organization regarding training and education expenses.
- **Competition**: New companies trying to enter the CNC machining industry may face a hurdle due to the high cost of equipment and software needed to operate the machines. This can impede the overall growth and progression of the industry.

The Necessity for Skilled Labour

Using a computer-aided design (CAD) model and computer-aided manufacturing (CAM) software to generate the necessary code and instructions for the CNC machine is at the heart of the **CNC manufacturing** process.

As a result, workers need to have a solid understanding of intricate and precise programming and simulation to operate the CNC machine and its motions. If done without it, programming and

simulation can be time-consuming, expensive, and prone to errors or inconsistencies. This issue is especially true for complicated or unique designs with several axes, tools, or procedures.

Before beginning the CNC machining process, designers and programmers should use sophisticated and dependable CAD/CAM software, verify and validate the code, and run simulations. This issue is the most effective method for overcoming this obstacle.

Machining Difficulties Associated With Certain Materials

The difficulty in machining particular materials with CNC machines can be attributed to various factors, such as the material's inherent physical properties, the equipment utilized during the machining process, and the cutting conditions.

The hardness or the toughness of particular materials presents a common difficulty in the machining process. Titanium, hardened steel, and high-strength alloys are materials that can be challenging to mill because of their extreme hardness and ability to rapidly wear out cutting tools. This can result in greater tooling costs as well as longer machining times.

The tendency of the material, when subjected to cutting pressures, to distort or deflect presents another issue. This can lead to problems such as imperfect surface polish, inaccurate dimensions, and broken tools.

In addition, the machining process can cause certain materials to undergo thermal expansion or contraction, which can lead to the component being machined being distorted or warped. This can be avoided by selecting thermally stable materials. Machining some materials can be challenging, which is a rather typical problem, especially in high-performance applications that demand materials with precise physical qualities.

However, developments in cutting tool technology and machining methods have helped to minimize some of these obstacles, making it feasible to manufacture a larger range of materials with higher precision and efficiency. This is one of the many benefits of technological advancements.

The Complexity of Designs and Its Restrictions

Machining with computer numerical control (CNC) has several obstacles, one of the most significant of which is its several design limits that may restrict the parts' size, form, and

geometry. For instance, CNC machining cannot produce parts with undercuts, internal corners, or hollow features unless supplementary tools or processes are employed.

Hence, complex or unique designs may require additional setups, tool changes, or secondary operations. This complexity can increase the production process's time, cost, and difficulty level. The designers should consider the capabilities and constraints of CNC machining and optimize their designs in accordance with those considerations to avoid these limitations.

Expenses Associated With Maintenance and Repairs

Another typical obstacle that CNC manufacturing companies have to overcome is the requirement for routine tool maintenance to address wear and tear. Maintenance performed regularly helps to ensure the quality and uniformity of the parts. Because of their high-speed and high-pressure contact with the material, the tools used in CNC machining are susceptible to wear and tear.

This can harm the tools' performance, precision, and lifespan and result from errors, failures, or faults in the parts. As a result, operators of CNC machining equipment are required to monitor and measure the wear and condition of the tools and replace or repair the tools as required. In addition, they are responsible for performing routine maintenance on the CNC machine and its components, such as the spindle, coolant, and lubricant, to avoid any breakdowns or malfunctions.

Choosing Materials

Machining with computer numerical control (CNC) presents several challenges, including the requirement of meticulous material selection for the parts. Cutting, drilling, or milling the material with high-speed tools is required for CNC machining. This process can cause heat, friction, and stress on the material being worked on.

Hence, the material must be suitable for CNC machining and have the attributes sought, such as strength, durability, machining capacity, and aesthetics. For CNC machining, certain materials, such as plastics, composites, or metals with high hardness or flexibility, might provide challenges or hazards, including melting, chipping, cracking, or warping. However, selecting the appropriate cutting parameters can mitigate these challenges and risks. To solve this problem,

designers should select the material that optimally satisfies the design requirements and the CNC machining settings.

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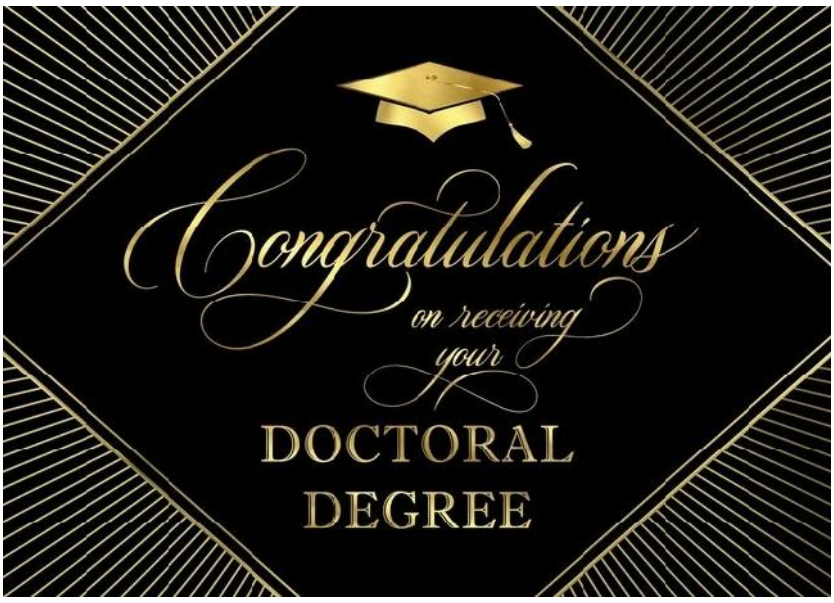
APPRECIATION

List of staff completed PhD

Sr. No	Name of Staff	Date of Viva-Voce	University
1	Dipak K. Dond	11/04/2022	V.J. T. I., Mumbai



Covid 19 Instructions and Precautions

- Stay at home as much as possible.
- Avoid physical contact like handshakes, hand holding or hugs.
- Avoid touching surface such as table tops, chairs, door handles etc.
- Wear mask.
- Wash your hand regularly.