M.E.S.College of Engineering

Department of Computer Engineering

National conference on

“Recent Advances in Computer Engineering”

Brochure for the Year 2022

9th National Conference on

"RECENT ADVANCES IN COMPUTER ENGINEERING"

[RACE 2022]

In Association with

"CSI Pune Chapter"

on

April 21-22, 2022

Organized by

Department of Computer Engineering,
Modern Education Society's College of Engineering, Pune
(Wadia College Campus)Accredited by NBA & NAAC with an 'A' Grade
www.mescoepune.org, 02026163831
Email ID: race@mescoepune.org

Important Dates

Deadline of Paper Submission:	April 01, 2022
Intimation of Acceptance:	April 07, 2022
Submission of CRC Paper:	April 14, 2022
Last Date of Registration:	April 14, 2022

Registration Fees

No registration charges for participants

Mode of Conference

Online Platform (Microsoft Teams)

Registration Link :

Participants should register on the link: https://forms.gle/DGSVU9xCxtRUTASg7

Chief Patrons

Dr. A. J. Hake
(Management Trustee, ME Society, Pune.)
Dr. A. S. Chandak
(Management Trustee, ME Society, Pune.)
Dr. M. K. Sanap
(Management Trustee, ME Society, Pune.)

Patron

Dr. S. S. Sarawade
(Principal, MES College of Engg., Pune.)
Dr. (Ms). M. P. Dale
(Vice-Principal, MES College of Engg., Pune.)

Convener

Dr. (Mrs.) Nuzhat F. Shaikh
(Head, Department. of Computer Engg.)

Organizing Secretary

Dr. (Mrs.) Shalaka P. Deore
(9923239509)

Coordinator

Prof. Amol S. Kamble
(8623832226)

Steering Committee

Dr.(Mrs.) R. A. Khan
Dr.(Mrs.) S. K.Wagh
Dr.(Mrs.) J. R. Pansare
Dr.(Miss.) R. M. Wahul

Advisory Board

Dr. V. H. Patil (Chairperson, BOS Comp. Engg., SPPU)
Dr. P. N. Mahalle(Professor&Head of AI&DS, VIIT, Pune)
Dr. P. D. Patil (Member BOS Computer Engg, SPPU)
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Dr. J. S. Chitole (Professor, VIT, Pune)
Dr. V. Vlagamutalvi (Professor, Satyabhama University)
Dr. A. Pravin (Professor, Satyabhama University)
Dr. A. Canessane (Professor, Sathyabama University)

Organizing Committee

Mrs. S. R. Khonde
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Mr. G. S. Pole
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Ms.R.H.Shende

Technical Support Staff

Mr. P. V. Raut
Mrs. V. H. Kamble
Mr. L. J. Parande
Mr. H. G. Muknak
Mr. N. L. Raut

About the College

Modern Education Society is established in 1932 with the motto “For the Spread of Light”. M.E.S. College of Engineering established in 1999 and situated in the heart of Pune city, offers engineering degree courses in Mechanical, E&TC and Computer Engineering and is affiliated to Savitribai Phule Pune University, accredited by NBA and NAAC with ‘A’ Grade. The college is developing fast with the vision “To Develop Motivated, Environment friendly, Self esteemed, Creative and Oriented Engineers” and the mission “To develop industry oriented manpower to accept the challenges of globalization by promoting value Education through motivated trained faculty by maintaining conducive environment for affordable cost by promoting industry institute interaction by involving Alumni”.

About the Department

The Department of Computer Engineering has been taking consistent efforts since its inception in 1999 with highly qualified and energetic faculty for all round development of budding engineers for tomorrow's nation building. Department is accredited by N.B.A. for three years (2019-2022). The department has intake of 180 UG and 24 PG students. This is an exciting place to study and grow where thinkers become leaders and where there is thirst of knowledge. The interaction between the students and professors profusely enriches the educational experience. The department is well equipped with state-of-the-art infrastructure & advance laboratories. Many staff members have completed Ph. D. and a few are pursuing Ph.D. in various streams of Computer Engineering to strengthen Research & Development & to leverage research aptitude of students.

Best Paper Award

For each track best paper will be selected from the presented papers.

Call for Paper

The 9th National Conference on “Recent Advances in Computer Engineering” [RACE-2022] is the premier forum for presentation of new advances and research results in the field of Computer Engineering. The conference will bring together researchers, engineers and scientists in the domain of interest from variety of disciplines such as Computer, Information Technology and Electronics & Telecommunication.

Topics of interest include but not limited to

- Data Science & Big Data
- Internet of Things
- Software Engineering
- Networking & Cloud Computing
- Artificial Intelligence & Machine Learning
- Data Mining and Information Retrieval
- GPS & Applications
- Computer Networks
- Cyber Security & Network Security
- Information and Coding Techniques
- Biomedical Signal/Image Processing
- Image and Pattern Recognition
- Computer Vision, Biometrics
- Cryptography and Network Security
- Graphics, Animation & Virtual Reality
- Cloud Computing
- Fuzzy Systems/Neural Network

Paper Submission

Full Length Papers should be sent on:
race@mescoepune.org

Paper Format

All manuscripts should be strictly in MS-word/latex and limited to 6 pages.
For template, visit
http://mescoepune.org/race/

Paper Publication

All papers will be published in RACE 2022 Conference proceedings bearing ISSN:2347-3649.

Modern Education Society's College Of Engineering, Pune - 1.

Department : Computer

Submitted :

Date : 10-03-2022

Activity Details : Sanctioning budget of RACE 2022 No.: 578

Respected Sir,

National Conference "RACE-2022" of Computer Dept is organised on 21st & 22nd 2022. Kindly sanction mentioned budget for RACE 2022 (Online / Offline mode). Online Budget :- 70,000/- Offline Budget :- 1,10,000/-

(Dr. S. P. Pore) (A. S. Kamble)

Remarks :

Head of Department

Registrar

Principal

C.F.O.

M.E.S. College of Engineering Pune

Department of Computer Engineering

Budget:RACE-2022

Registration Fees(in Rs)

Sr.No.	Category	Budget of RACE-2022 (Online/ Offline Mode)	
		Amount (Online Mode)	Amount (Offline Mode)
1	Industry Delegate	0	1000/-
2	Academic Person	0	800/-
3	Research Scholars & PG Students	0	800/-
4	UG Students	0	800/-
5	Attendee	0	500/-

Budget(in Rs)

Year		2022	2022
Sr.No.		Expected	Expected
1	No of Delegates	70	70
2	Conference kit	0	20,000
3	Printing of Journals/Proceedings	10,000	40,000
4	Certificates,Sovinear and Banners	5,000	
5	Honorarium for chief guest	3,000	3,000
6	Honorarium for Keynote speaker	3,000	3,000
7	Honorarium for session chairs	20,000	20,000
8	Lunch & Refreshment for 2 days	15,000	60,000
9	Mementos	5,000	10,000
10	Transportation/Lodging/Boarding	4,000	5,000
11	Miscelineous	5000	5,000
12	**Total Expenditure**	**70,000**	**1,66,000**
13	**Registration fess collection**	**0**	**56,000**
14	**Funds from college**	**70,000**	**1,10,000**

Coordinator	HOD	Registrar	Vice-Principal	Principal
Dr. S. P. Deore	Dr. N. F. Shaikh	Mr. S. S. Ingole	Dr. M. P. Dale	Dr. S. S. Sarwade

List of Best Papers

Paper ID	All Author Names of Best Paper	Title of Best Paper
RACE056	Mayur Mhetre, Atharva Khardekar ,Dhanashree Khutwad, Prof. Sagar Shinde	Human Fall Detection System Using Internet of Things and Machine learning
Race003	Gautami Kumbhar, Priyadarshini Gopal,Sphoorti Kadapa, Tanya Raina, Dr. N. F. Shaikh	Super Resolution of Satellite Imagery
Race020	Kaif Tamboli, Anurag Patil, Pratima Lonkar, Samiran Kodgire, Dr. N. F. Shaikh	GEOGRAPHIC INFORMATION SYSTEM(GIS) FOR GEOSPATIAL DATA MANAGEMENT AND ANALYSIS BASED ON OPEN-SOURCE TECHNOLOGIES
Race012	Vaishnavi Ubale, Tritiksha Wagh, Bhagyashree Mohite, Sarah Kazi, Dr. R. M. Wahul	Realtime Road Lane Detection using AI
Race042	Sagar Kedari, Saurav Gangurde, Gayatri Dev, Prof. Sagar Shinde	Driver Drowsiness Detection System
Race025	Ashwini Koshta, Asma Bekinalkar, Diksha Tickoo, Liza Souza, Prof. S. S. Raskar	Review of Air Pollution Hotspots Detection and Identifying the Source Trajectories using ML techniques
Race012	Revati M Wahul	Realtime Road Lane Detection using AI

M. E. S. College of Engineering, Pune – 01

Department of Computer Engineering

National Conference on

‘Recent Advances in Computer Engineering’

RACE-2022

[April 21 - 22, 2022]

Convener
Dr. N. F. Shaikh

Organizing Secretary
Dr. S. P. Deore

Organizing Committee
Prof. A. S. Kamble

RACE - 2022 Committee Members

Sr. No	Committees	Staff-in-charge	Roles and Responsibility	Sign
1	**Delegate Relations**	Dr. N. F. Shaikh Dr. R. A. Khan Dr. S. K. Wagh Dr. R. M. Wahul Dr. S. P. Deore	Receive mails from participants, acknowledge with thanks by mail, attend to delegate's queries	
2	**Session Coordination**	Prof. S. R. Khonde Prof. S. P. Khedkar Dr. A. P. Kale Prof. D. D. Ahir Prof. S. R. Khade Ms. S. A. Sapkal	Smooth coordination of sessions and follow up. Prepare session list and attend session chair. Collect feedback from Session chair.	
3	**Proceeding Printing**	Prof. G. S. Pole Prof. G. B. Aochar Prof. M. S. Shinde Prof. B. F. More Prof. S. S. Mane Prof. Rupali Shende	Organization of Papers, Prepare list of paper, indexing and front page. Printing related task of proceeding.	
4	**Conference Certificate**	Prof. J. S. Mane Prof. Y. S. Ingle	Printing of leaflets, Brochure, feedback forms, etc.	
5	**Felicitation, Inaugural , Valedictory, Banners and Photography, Microsoft teams**	Prof. B. K. Bodkhe Prof. S. S. Raskar Mrs. V. H. Kamble Mr. N. R. Raut	To facilitate during sessions on two days, Management of Microsoft teams, computer, etc. Program schedule on table and other necessary accessories, Photo, felicitation of guests etc.	
6	**Accounts**	Prof. A. D. Dhawale Prof. A. Nagare Mr. H. G. Muknak	To take the advance from the office. To distribute the fund as required by the individual committees, documentation and settle the account etc.	
7	**Conference Registration**	Prof. G. B. Deshmukh Ms. S. E. Ingale Mr. L. J. Parande	Registration of participants , feedback form	
8	**Publicity (Brochure and Website)**	Prof. S. B. Shinde Prof. N. M. haske Mr. P. V. Raut	Publicity of conference (ISSN) by sending brochure and conveying to the principal, Head for encouraging students for publication.	
9	**Review and Acceptance**	Dr. R. A. Khan Dr. S. K. Wagh Dr. J. R. Pansare Dr. R. M. Wahul	Review the papers and send ACCEPTANCE to "Delegate Relations" committee.	

10	**Coordinator**	Dr. S. P. Deore	Coordinating all activities of conference.	
11	**Co-coordinator**	Prof. A. S. Kamble	Coordinating all activities related to conference.	

Coordinator
Dr. (Mrs.) S. P. Deore

HOD
Dr. (Mrs.) N. F. Shaikh

Vice-Principal
Dr. (Mrs.) M. P. Dale

Principal
Dr. S. S. Sarawade

Scanned with CamScanner

About the Event

The 7 National Conference on "Recent Advances in Computer Engineering" [RACE-2019] is the premier forum for presentation of new advances and research results in the field of Computer Engineering. The conference will bring together researchers, engineers and sciencetists in the domain of interest from variety of disciplines such as Computer, Informa on Technology, and Electronics & Telecommunication Engineering.

Topics of interest include but not limited to :

- Data Science & Big Data
- Internet of Things
- Software Engineering
- Networking & Cloud Computing
- Artificial Intelligence & Machine Learning
- Data Mining and Information Retrieval
- GPS & Applications
- Computer Networks
- Cyber Security & Network Security
- Information and Coding Techniques
- Biomedical Signal/Image Processing
- Image and Pattern Recognition
- Computer Vision, Biometrics
- Cryptography and Network Security
- Graphics, Animation & Virtual Reality
- Cloud Computing
- Fuzzy Systems/Neural Network

Outcomes of RACE 2019

Student will be able

1. To write technical article.
2. To provide an excellent opportunity to the students to showcase their talent, research orientation and untapped potential.
3. To develop presentation and communication skills and to work in teams.

RACE Organizing Team

Convenors: Dr. N. F. Shaikh (HoD, Comp)

Organizing Secretory: Dr. S. P. Deore

Photos:


Is it Brand New ?
Neural Nets
McCulloch & Pitt 1943
Perception
Rosenblatt 1958
RNN
Grossberg 1973
CNN
Fukushima 1979
RBM
Hinton 1999
DBN
Hinton 2006
D-AE
Vincent 2008
AlexNet
Alex 2012
GoogLeNet
Szegedy 2015
Introduction to Deep Learning

RACE 2022 Organizing Committee

Dr. S.P. Doore.
(RACE-22 Co-ordinator)

M.E.S.College of Engineering

Department of E&TC Engineering

National conference on

“Advancements in Communication, computing and ElectronicsTechnology”

Brochure for the Year 2022

Modern Education Society's Wadia College of Engineering, Pune -01

Dept. of Electronics and Telecommunication Engineering IEEE Signal Processing Society

Sponsored

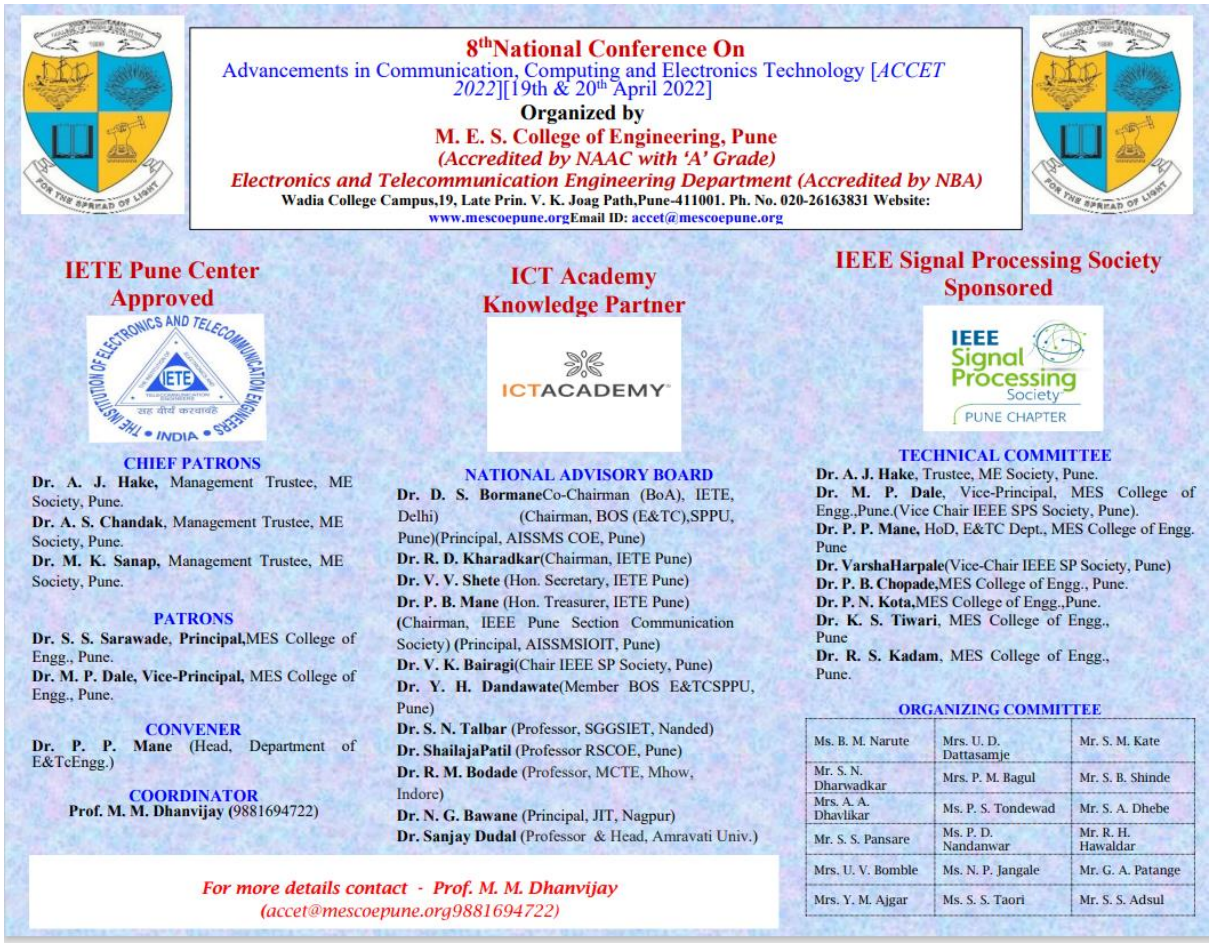
IETE Pune Centre Approved

8th National Conference on

Advancements in Communication, Computing and Electronics Technology [ACCET]

[19th & 20th April 2022]

BROCHURE



ABOUT THE COLLEGE

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M.E.S. College of Engineering established in 1999 and situated in the heart of Pune city, offers engineering degree courses in Mechanical, E&TC and Computer Engineering and is affiliated to SavitribaiPhule Pune University, accredited by NBA and NAAC with 'A' Grade. The college is developing fast with the vision ***"To Develop Motivated, Environment friendly, Self esteemed, Creative and Oriented Engineers"*** and the mission *"To develop industry oriented manpower to accept the challenges of globalization by promoting value Education through motivated trained faculty by maintaining conducive environment for affordable cost by promoting industry institute interaction by involving Alumni"*.

ABOUT THE DEPARTMENT

The Department of Electronics and Telecommunication Engineering is established in 1999 and emerged as a leading source for providing up-to-date knowledge and technological developments in Electronics and Telecommunication Engineering. The department has technically rich and industry experienced faculty providing sound foundation of knowledge in Electronics and related areas. The Department has 19 dedicated faculty members including seven doctorate professors and ten perusing their PhD degree. State of the art computational and experimental facilities enable the department to undertake basic and applied research and provide support to R&D organizations. Department offers sponsorship for BE in-house projects. Various programs and activities like Roboclub, ETSA etc. are conducted for uplifting students continuously throughout the year. The department organizes several FDPsand workshops for technical upgradation of faculties. The graduating students are well placed in leading academic institutes, research organizations and industries.

The department has started **M.E.(Signal Processing)** course from2013. To make students ready for industry requirements the department have started offering **3 Honors Program** from AY 2020-21 as follows **Artificial Intelligence and Machine Learning, Data Science and Internet of Things.**

CALL FOR PAPER

The National Conference on Advancements in Communication, Computing and Electronics Technology provides a platform that can facilitate researchers, academicians and students to discuss recent advances and trends in the fields of theoretical, experimental, applied Communication, Computing and Electronics Technology. The conference will also spark innovative ideas, foster research relations or partnerships between the various institutions and build strong research and developmentcommunity.

Paper Format :
All manuscripts should be strictly in MS-word / LaTeX IEEE format and limited to 6 pages.

Paper Publication :
All papers will be published in ACCET 2022 conference proceedings. Selected quality papers will be published in following **UGC care listed Journals**with further review:

- **ICTACT Journal on Microelectronics**
- **ICTACT Journal on Soft Computing**
- **ICTACT Journal on Image and Video Processing**
- **ICTACT Journal on Communication Technology**

Best Paper Award:
For each track best paper will be selected out of presented papers.

Mode of conference execution: Online (MS Teams Platform)

Conference Page : www.mescoepune.org/accet

REGISTRATION FEES

•**No registration charges for participants.**
• At the end of the workshop all participants have to fill the feedback form.

REGISTRATION FORM AND PAPER SUBMISSION LINK

https://forms.gle/q1sYqyNYUMbxFmdz9

Topics of interest for paper submission includes but not limited to:

- ✓ Embedded systems and VLSI
- ✓ Software Defined Network (SDN) and Internet of Things
- ✓ Wireless Communication and Antennas
- ✓ Wireless Sensor Network
- ✓ Biomedical signal processing and signal processing
- ✓ Human Bond Communication
- ✓ Image Processing and Pattern Recognition
- ✓ Robotics, Mechatronics, PLC's & Automation
- ✓ AI, Machine Learning and Deep Learning
- ✓ 5G networks and Mobile Communication
- ✓ Soft Computing and Cloud Computing
- ✓ Computer Vision
- ✓ Nano Technology and Nano Materials
- ✓ Renewable Energy Sources
- ✓ Mathematical Modeling and Optimization Techniques
- ✓ Augmented Reality
- ✓ Power Electronics
- ✓ Semiconductor Material

IMPORTANT DATES

- ✓ Paper Submission deadline(Soft copy): ~~06/04/2022~~**10/04/2022**
- ✓ Intimation of Review and Acceptance: ~~09/04/2022~~ 13/04/2022
- ✓ Final submission of full length paper (Soft copy): ~~11/04/2022~~ 14/04/2022
- ✓ Dates of Conference: 19/04/2022 & 20/04/2022
- ✓ Participants should fill the online registration form before ~~06/04/2022~~ 10/04/2022
- ✓ Candidates will be confirmed only after the receipt of registration form. Confirmation will be communicated on ~~11/04/2022~~ 14/04/2022 via email and phone.

PERMISSION AND BUDGET DOC

Modern Education Society's College Of Engineering, Pune - 1.

Department : E&Tc

Submitted : Bharath Naruto

Date : 28/03/2021

Activity Details : ACCET 2022

No.: 1323

Kindly sanction budget for ACCET 2022 as follows

1. Printing proceedings Rs. 10000/-
2. Banners Rs. 5000/-
3. Honorarium for Guest Rs. 30000/- (12 tracks × 2000/- + 2 speakers × 3000/-)
4. Journal publication Rs. 20000/- (Plagiarism)
5. Miscellaneous Rs. 5000/-

Total Rs. 70000/-

Remarks :

Approval

Head of Department | Registrar | Principal | C.F.O.

Portfolios of Organizing Committee

M.E.S. College of Engineering Pune-411001
8th National Conference on
Advancements in Communication, Computing and Electronics Technology
ACCET on 19th -20th April 2022 (2021-22)
Portfolios of Organizing Committee **(tentative)**

Dated: 11/03/2022

Sr. No	Portfolio/ Activity	Details		Committee members 2022
1.	Delegate Relation	1. Finalizing advisory Committee.	PNK	1. Dr. M. P. Dale 2. Dr. P. B. Chopade 3. Dr. P. P. Mane 4. Dr. P. N. Kota
		2. Suggesting Reviewers & session chairs.		
		3. Communication with delegates, online felicitation of session chair on the day of Conference.		
		4. Report generation	PNK	
2.	Reprography	1.Proceedings soft and hard copy	PMB	1. Dr. P. N. Kota 2. Prof. P. M. Bagul 3. Prof. U. V. Bomble 4. Prof. P. S. Tondewad 5. Students
		2.Brochures	PST	
		3. Flyers, Banner Report generation	UVB	
		4. Online 'Unveiling of Proceeding' facilitation	PNK	
3.	Webpage Monitoring & Conference Alert	1.ACCET portal monitoring		1. Dr. K. S. Tiwari 2. Prof. M. M. Dhanvijay
		2.Easy chair & Conference alert		
		3.Email Account management		
		4. Report generation	MMD	
4.	Conference Paper management	1.Downloading received papers, checking their registration & paper coding.		1. Dr. K. S. Tiwari 2. Dr. R. S. Kadam
		2. Plagiarism checking		
		3. Sending Plagiarism report and collecting Copyright forms from authors.		
		4. Reviewer panel finalization and confirmation		
		5. Sending papers for reviewing		

		6. Collecting reviewers' reports.		
		7. List of papers selected for presentations and publications		
		8. Creating finalized paper folders.		
		9. Report generation		
5.	Publications	1. Searching good Journals.		1. Dr. Rekha Kadam 2. Prof. M. M. Dhanvijay
		2. Communication with Journal editors.		
		3.Publication of selected papers		
		4. Report generation	RSK	
6.	Keynote Speakers, Invited Speakers, Tutorial Speakers	1. Communication with speakers		1. Dr. P. P. Mane 2. Dr. P. B. Chopade 3. Dr. P. N. Kota 4. Prof. M. M. Dhanvijay
		2. Selecting cutting edge technology / E&TC topics		
		3. Facilitating speakers		
		4. Report generation	MMD	
7.	Inaugural / Valedictory, Vote of Thanks	1.Inauguration	PMB	1. Prof. P. M. Bagul 2. Prof. M. M. Dhanvijay
		2. Vote of thanks	MMD	
		3. Report generation	PMB	
8.	Sponsorship	IETE etc, communication with sponsorers And Report generation	PNK	1. Dr. P. N. Kota
9.a	Certificates / Invitation Cards	Invitation and thanks giving cards 1. Advisory Committee. 2. Keynote Speakers 3. Reviewers & session chairs.	ASK, PDN	1. Prof. A. S. Kulkarni 2. Prof. Y. M. Ajgar 3. Prof. P. D. Nandanwar
		Certificates finalization, generation, and distribution of certificates i. Paper presenters ii. Reviewers iii. Guest speakers iii. Session chairs. iv. best papers	ASK, PDN	
9.b	Feedback Forms	To prepare the feedback forms, i. distribution of feedback forms to paper presenters ii. distribution of feedback forms to all reviewers, session chairs. iii. distribution of feedback	YMA, PDN	

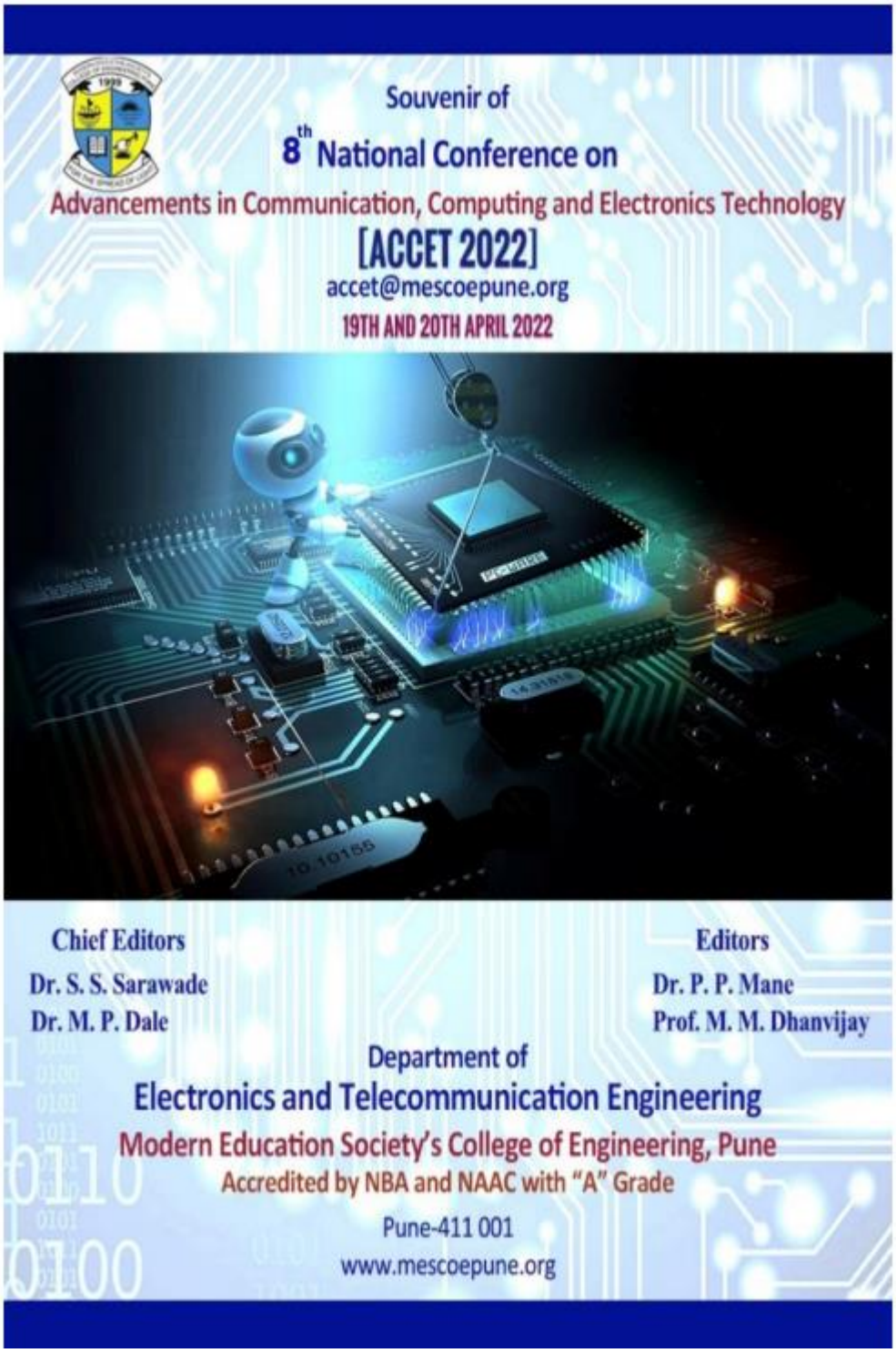
		forms to all participants and collection of same.		
		Report generation	PDN	
10.	Invitation And publicity	Collection of addresses of colleges across the country, prepare the list, Send mails regarding call for papers, post the leaflets along with covering letter. Keep the record. Report generation	UDD	Prof. U. D. Dattasamjhe
11.	Accounts	To take the advance from the office. To distribute the funds as required by the individual committees, documentation and settle the account etc. Report generation		1.Prof. B. M. Narute 2.Mr. Dhebe
12.	Registration	1.Registration of participants, and 2. Registration Link Formation 3. WhatsAPP group formation 4. Report generation		Prof.S. S. Pansare
13.	Session Co-ordination	Allotment of papers as per areas	SND	1.Prof. S. N. Dharwadkar 2.Prof.U. V. Bomble 3.Prof. N. P. Jangale 4.Mr. Sanjay Dhebe Students Volunteer
		Schedule preparation of tracks and dissemination	UVB	
		Smooth coordination of sessions,	SND, UVB	
		Attendance of paper presenters with all details to be given to certificate committee	SND, NPJ	
		Teams creation and channel creation as per tracks	SND,Sanjay Dhebe	
		Panel finalization (Session chairs both internal and External)	SND	
		Panel allocation and follow up.	SND, Internal session chairs of respective tracks	
		Photographs of session	UVB,	

		collection	Students	
		Feedback form circulation	UVB, Students	
		Result i.e. best paper declaration with all the details of each track.	UVB, SND	
		Report generation	UVB	
14.	Student Research Forum (SRF)	To organize research paper writing guidance session for students. Report generation		1. Dr. M. P. Dale 2. Dr. K. S. Tiwari 3. Dr. P. P. Mane 4. Dr. P. N. Kota 5. Dr. P. B. Chopade 6. Dr. R. S. Kadam All guides
15.	Contact Person	To attend the queries of participants and provide information regarding the conference.		1. Prof.M. M. Dhanvijay 2. Pratiksha Nandanwar
16.	Report generation	Collection of all the reports and final report		1 Prof. M. M. Dhanvijay 2. Prof. S. S. Taori

Co-ordinator
Prof. Mrinai M. Dhanvijay

HOD
Dr. Prof. P. P. Mane

Souvenir


Souvenir of
8th National Conference on
Advancements in Communication, Computing and Electronics Technology
[ACCET 2022]
accet@mescoepune.org
19TH AND 20TH APRIL 2022
Chief Editors
Dr. S. S. Sarawade
Dr. M. P. Dale
Editors
Dr. P. P. Mane
Prof. M. M. Dhanvijay
Department of
Electronics and Telecommunication Engineering
Modern Education Society's College of Engineering, Pune
Accredited by NBA and NAAC with "A" Grade
Pune-411 001
www.mescoepune.org

Department of
Electronics and Telecommunication Engineering

Modern Education Society's
COLLEGE OF ENGINEERING

19, Late Prin. V. K. Joag Path,
Wadia College Campus,Pune-411001.
www.mescoepune.org
Ph. No. 020-26163831

Report

Modern Education Society's College of Engineering, Pune -01

Dept. of Electronics and Telecommunication Engineering

IEEE Signal Processing Society Technical Sponsored,
IETE Pune Centre Approved and
"Knowledge Partner" ICT Academy sponsored
8th National Conference on
Advancements in Communication, Computing and Electronics Technology
[ACCET] [19th & 20th April 2022]

Date: 20 / 04 / 2022

Conference Report

Name of the Activity: ACCET- National Conference
Date of Activity: 19/04/2022 to 20/04/2022
Venue: Online on Microsoft Teams Platform.

Objective:

- To aware research scholars, students and faculty members about the recent developments in the field of Electronics Engineering, Communication Systems, Power System, Control Engineering, Machine vision etc.
- To meet with the personnel who have specialized in their respective fields so that both the students and the faculty members can gain knowledge from the research work carried out by them.

Target:
Faculty members, Research Scholars, Post-Graduate and Under-Graduate students.

8thNational Conference On

Advancements in Communication, Computing and Electronics Technology
[ACCET 2022][19th & 20th April 2022]
Organized by
Modern Education Society's College of Engineering, Pune
(Accredited by NAAC with 'A' Grade)
Electronics and Telecommunication Engineering Department (Accredited by NBA)
Wadia College Campus,19, Late Prin. V. K. Joag Path,Pune-411001. Ph. No. 020-26163831
Website: www.mescoepune.org Email ID: accet@mescoepune.org

IETE Pune Center Approved	ICT Academy Knowledge Partner	IEEE Signal Processing Society Sponsored

Banner of ACCET-2022

About the conference:

IEEE Signal Processing Society Pune chapter Sponsored and in association with **IETE Pune Centre and "Knowledge Partner" ICT Academy,** 8th National Conference on **'Advancements in Communication, Computing and Electronics Technology' [ACCET-2022]** was organized by the Department of E&TC Engineering on 19th & 20th April 2022. It is expected that researchers will bring new prospects for collaboration across disciplines and gain ideas facilitating novel concepts. The theme of this conference will motivate the researchers to adopt the outcome for implementation. The national Conference on 'Advancements in Communication, Computing and Electronics Technology' [ACCET-2022] aims to bring together the researchers, scientists, engineers, and research scholar in areas of Engineering and Technology, and it provides them an international forum for the dissemination of original research, new ideas and practical development experiences. The conference has the focus on the prime issues in the field of engineering and science.

There has got a good response to the call-for-papers for the Conference ACCET-2022.

Around 56 numbers of full length papers have been received from the researchers, academicians and industry persons of the leading organizations, institutes and industries from Maharashtra like Nashik, Mumbai, Amravati, Aurangabad, Chalisgaon and Pune region.

A committee of 21 reviewers put in their efforts to filter 59 good quality technical papers out of approximately 60 received ones. Total 41 Paper were presented on the day of conference. The observations and suggestions by the reviewers were helpful to the authors for further improvements in their papers.

ACCET National Conference Group Photograph

Reviewers list for ACCET 2022

Sr. No.	Reviewer Name	Mail ID	Institute
1.	Dr. M. P. Dale	mpdale@mescoepune.org	MESCOE, Pune
2.	Dr. P. P. Mane	pranoti.mane@mescoepune.org	MESCOE, Pune
3.	Dr. K. S. Tiwari	kanchan.tiwari@mescoepune.org	MESCOE, Pune
4	Dr. P. N. Kota	prabhakar.kota@mescoepune.org	MESCOE, Pune
5	Prof. S. N. Dharwadkar	sndharwadkar@mescoepune.org	MESCOE, Pune
6	Prof. N. Masood	nabegha.masood@mescoepune.org	MESCOE, Pune
7	Prof. Shailendra Badwaik	scbadwaik.scoe@sinhgad.edu	SCOE, Pune
8	Dr. Rubeena Khan	rakhan@mescoepune.org	MESCOE, Pune
9	Dr. Y. H. Dandwate	yogesh.dandawate@viit.ac.in	VIIT, Pune
10	Dr. R. M. Bodade	rajeshbodade@gmail.com	MCET, Mhow, Indore
11	Dr. Vinayak Bairagi	bairagi1@gmail.com	AISSMS, IOIT, Pune
12	Dr. S. K. Wagh	skwagh@mescoepune.org	MESCOE, Pune
13	Dr. Mithra	mithra.v@dypvp.edu.in	DY Patil , Pimpri
14	Dr. Tushar Jadhav,	tushar.jadhav@viit.ac.in	VIIT, Pune
15	Dr. Vrushali G Raut,	vgraut.scoe@sinhgad.edu	SCOE
16	Dr. Prachi R.	prrajarapollu@entc.maepune.ac.in	MAE , Alandi
17	Dr. Jayshree Pansare	jayshree.pansare@mescoepune.org	MESCOE Pune
18	Dr. Varsha Harpale	varshaks3@gmail.com	PCCOE, Pune
19	Prof. Anagha Kunte	anaghakunte@mmcoe.edu.in	MMCOE, Pune
20	Dr. D. K. Shedge	shedgedk@gmail.com	AISSMS IOIT
21	Dr. B. D. Jadhav	bdjadhav1979@gmail.com	JSPM, Tathawade

The conference was approved by IETE Pune centre and Sponsored by IEEE, Pune division. Selected Papers will be published in Scopus / UGC listed Journal and author will bear the cost of publication.

In order to motivate the participants, we have announced the 'Best Paper Award' for the papers from each category. By and large these technical papers added a true value in current research and development trends in the field of Communication, Computing and Electronics Engineering.

ACCET-2021 Schedule

Day 1: 19th April 2022 Tuesday,

08:45 – 10:00 Opening Ceremony
10:00 – 11:00 Keynote Session (Mr. Navalmal Bhandari)
11:00 – 11:15 Short Break
11:15 – 14:30 Online Paper Presentations
Sessions: S1, S2, S3, S4, S5, S6, S7, S8, S9, S10
14:30 – Lunch

Day 2: 20th April 2022 Wednesday,

09:30 – 11:30 Guest Lecture (Mr. Abhijeet Deogirikar)
11:30 – 12:00 Valedictory

Day1:

On the day of the conference, i.e. on Tuesday 19th April 2022, the Inaugural Function was arranged in online mode on Microsoft Teams at 9 am. Prof. M. M. Dhanvijay, the conference coordinator, gave the introductory speech and greeted the dignitaries and the participants. The inaugural function was hosted by Prof. P. M. Bagul. The function was started with 'Saraswati Poojan' by playing audio tune in the presence of the dignitaries.

Dr. P. P. Mane, HoD E&TC Department and conference Convener, highlighted about the department and presented the key points about the conference in her welcome address. She encouraged the participants with her motivating speech.

Dr. M. P. Dale, Vice Principal highlighted the important activities of the college and gave her best wishes to ACCET-2022.

Dr. A. J. Hake, Trustee, M. E. Society highlighted on the latest technologies and research areas. He has graced the occasion with his encouraging words. He elaborated the significance of paper presentation and publication.

Principal Dr. S. S. Sarawade mentioned the importance of the conference and how the research can be done with the use of the latest technologies.

Later the unveiling of the conference Souvenir was taken place.

The function was also graced by the Guest of honor and the key-note speaker Mr. Navalmal Bhandari, Delivery Lead at Honeywell Automation India Ltd, Pune.

The audiences were addressed by Chief Guest, Prof. Dr. D. S. Bormane, Co-Chairman (BoA), IETE, Chairman, BOS (E&TC), SPPU, Pune, Principal, AISSMS COE, Pune

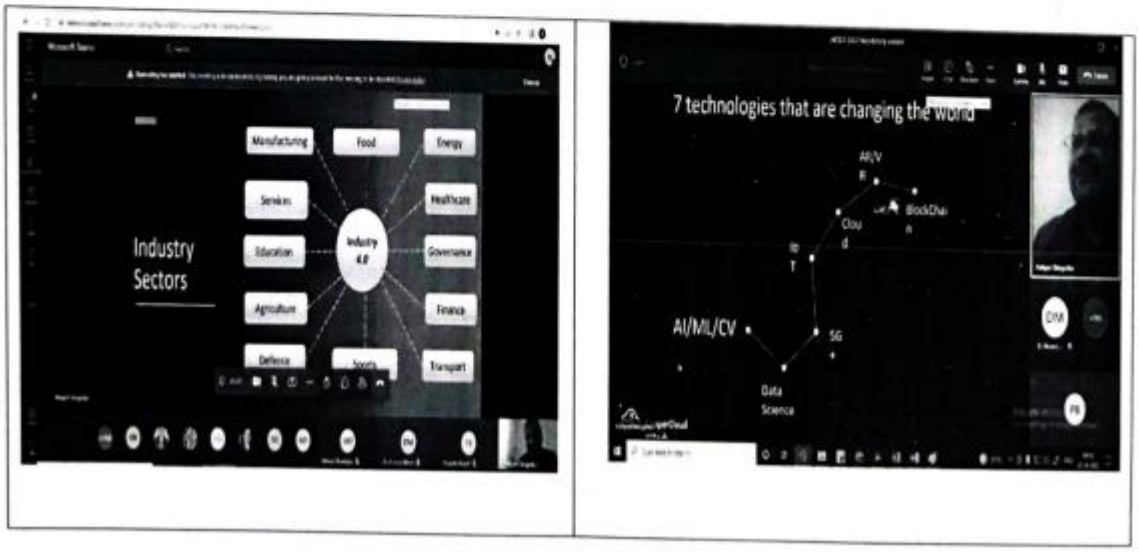
The function was concluded with the vote of thanks by Prof. M. M. Dhanvijay.

In second half, the paper presentation sessions were started in online mode on Microsoft Teams. Ten parallel sessions of paper presentation were conducted. The papers were evaluated by following session chairs.

Session	Internal session chair	External session chair
S1	Dr. P. P. Mane and Prof. S. S. Taori	Dr. S. P. Metkar
S2	Dr. P. B. Chopade and Prof. N. P. Jangale	Dr. Mithra Venkatesan
S3	Dr. P. N. Kota and Prof. P. D. Nandanvar	Dr. B. D. Jadhav
S4	Prof. B. M. Narute and Prof. P. S. Tondewad	Dr. Avinash Patil, AIT
S5	Prof. S. N. Dharwadkar and Prof. Dr. M. P. Dale	Dr. Vrushali Raut
S6	Dr. K. S. Tiwari and Prof. M. M. Dhanvijay	Dr. D. K. Shedge
S7	Prof. A. S. Kulkarni and Prof. Y. M. Ajgar	Dr. Vinayak Bairagi
S8	Dr. R. S. Kadam and Prof. U. D. Dattasamje	Dr. Sushma Wadar
S9	Prof. S. S. Pansare and Prof. P. M. Bagul	Dr. R. S. Kamthe
S10	Prof. U. V. Bomble	Dr. Varsha Harpale

Day2:

Keynote session started at 9:30 am with Welcome of the guest speaker by Prof. P. M. Bagul. The key note session on Topic: "Computer Vision - Introduction & Applications in Industry4.0" About the Speaker : Mr. Abhijeet Deogirikar Founder & CEO of CopperCloud IOTech Pvt Ltd, a Company that builds Industry4.0 and Internet of Things (IoT) solutions.



Keynote Speech by Mr.Abhijeet Deogirikar

After keynote Best Paper Awards based on technical contents and presentation skills, are given to the presenters from each session.

ACCET 2022 Session-wise Best Paper

Session No.	Paper Id	Paper Title	Author Name
1	AI_4	Smart Surveillance System	Dr. V.G. Raut, Renuka Joshi, Rushikesh Patil,Vedashree Dandavate
2	AI_7	Predictive model for prediction of bitcoin prices using recurrent neural network	Shreya Kashid, Harshika Mishra, Stephani Kedari, Tejas Majkar, Dr. Archana Kale
3	IoT_3	Iot in Hydroponics: A Review	Vivek D. Ugale,Swati S.Pawar,Aniket Kumavat, Krushna Dhale
4	IoT_6	Real time stand alone system to detect driver drowsiness	Anashwara Pillai, Tadhaksha Mahesh, Joezer Ebenezer, Ayush Morya
5	IP_5	Fall Detection for elderly people using image processing	Rohit Sharad Shinde, Sahil Pawar, Om Khedkar, Prof. U. V. Bomble
6	ES_1	Automated Pill Dispenser System	Kedar Kulkarni, Mkarand Birajdar, Arsh Phirphire, KVL Tanuj
7	Rob_1	RBSR : Rocker Bogie Surveillance Robot	Kunal Kishor Desarda, Yash Oza,Shibiludeen, Prof. Priyanka Bagul
8	AI_14	House Price Prediction Model using Machine Learning	Aishwarya Shetiya, Neha Panmad,Ruchika, Dr.Rekha Kadam
10	AI_16	ITSM based virtual agent using Service Now	Shubham Iyer, Sonali Ranmale, Zeba Sameen, Prof.Aparna Kulkarni

Participants were given certificates for presenting their paper and 9 best paper awards and certificates were also given. It gives us an immense pleasure to share with you that the papers of the conference ACCET 2022 will be considered for Publication in ICTACT Journals – International Publications of ICT Academy: The best papers selected in the Conference by the Conference Judges/Reviewers will be recommended for possible publication in the respective scopes of ICTACT Journals. These papers would be selected for publication after the peer review process by ICT Academy.

Outcome:

- Students and research scholars were made aware about the recent trends in the field of electronics and electrical engineering.
- Students knew about the benefits of such conferences so that they may get an insight into the field of research which is an essential factor for the advancement of their career.

Scope for Improvement:

- Internationally renowned speakers may be call as resource persons.
- Paper presentation can be initiated through Web conferencing.

ACCET-2022 Team

ACCET-2022 Team

Prof. M. M. Dhanvijay
Coordinator
National Conference (ACCET-2022)

Dr. P. P. Mane (Head, Department of E&Tc Engg.)
Convener
National Conference (ACCET-2022)

M.E.S.College of Engineering

Department of Mechanical Engineering

National conference on

"Recent Developments in Mechanical Engineering"

Brochure for the Year 2022

Souvenir of

9th National Conference on

Recent Developments in Mechanical Engineering, (RDME-2021)

August 18, 2021

in Association with

AIP Publishing, USA

Editors

Dr. V. N. Chougule, Dr. A. R. Patil, Dr. B. D. Nandre

Message from Trustee, M. E. Society, Pune

I am very happy to note that the Department of Mechanical Engineering, M. E. Society's College of Engineering, Pune is organizing an **9th National Conference on 'Recent Development in Mechanical Engineering' [Virtual] on** 18th August 2021. Since its inception in 1999, M. E. S. College of Engineering, Pune has risen to be a well-known, renowned Engineering College in Pune and India. With more than two thousand students on its rolls, M.E. Society's College of Engineering, Pune is known for imparting its unique blend of liberal education, combining sound basic knowledge of Engineering techniques, together with its enviable culture of modernism, cosmopolitanism, and secularism.

The Wadia Colleges tradition on the beautiful campus here has been to ensure that our students assimilate the best of knowledge from the formal system of education and to imbibe the right mix of culture, personality, attitudinal development, and life skills, thereby building a foundation for a lifetime of leadership and hard work.

It is in this context that I especially welcome the initiative of the Department of Mechanical Engineering, M.E.S. College of Engineering to organize the **9th National Conference on Recent Development in Mechanical Engineering (RDME 2021).** The ideas and thought processes that will be exchanged during the conference will, I am sure, educate, inform, and provoke our teachers and students and also immensely benefit all the participants.

I sincerely appreciate the efforts taken by the staff and students of the Department of Mechanical Engineering, M. E. S. College of Engineering in this maiden initiative of theirs and take this opportunity to compliment all the staff for their exemplary work, devotion and sincerity of purpose which today has made MESCOE one of the most sought-after engineering schools in the University of Pune.

Dr. A. J. Hake

Trustee, M. E. Society, Pune

Message from Principal

"Innovation Distinguishes Between A Leader And A Follower". - Steve Jobs

"Education is the most powerful weapon which you can use to change the world" – Nelson Mandela

Education is the first step for people to gain the knowledge, critical thinking, empowerment, and skills they need to make this world a better place.

The world is facing an unprecedented crisis where almost all countries are struggling. Such crises often push for revisiting existing norms and notions, and sometimes even provoking thought process for changing knowledge and power centres. The current pandemic situation has initiated changes in thinking patterns of various countries in terms of their power, resources, and innovation status. India too has shown up as one amongst a new world's leaders at various fronts while many developed countries have failed to manage the worst pandemic situation. India has always been a land of sages, Gurus, skills, art and culture. It has a proud history where the royal courts have included skilled artisans proudly calling them as Jewels or Navratnas. This was the era of Glorious India. With time passing, this centre of knowledge, skills and innovations shifted to western part of the world. Our indigenous skills got replaced by machines which were entirely of foreign origin. Eventually, the tag of Glorious India started fading and got lost and somehow, we also undermined our own skills and rich cultural heritage. At this juncture, the way of doing Business is changing around the globe. In this changing situation we are evaluating the status whether India is ready and aimed at regaining and reclaiming the image of glorious India and leading the world ecosystem.

We believe that education and industry are mutually dependent and always go hand in hand. Current market scenario demands highly skilled engineering professionals. To become employable, Engineers must develop Professional attitude. Professional attitude means a combination of qualities such as technical ability, presentation skills, working in a team, effective communication, taking initiatives, decision-making and many more. Technical education is changing its phase in the era of information explosion. It has created new challenges and opportunities for intellectuals to direct their efforts to develop technology for the social and economic growth of country.

Message from Principal (cont.)

The *9th National Conference on Recent Developments in Engineering (RDME-2021)* aims to provide an outstanding opportunity for both academic and industrial communities alike to address new trends, challenges, and emerging technologies on topics relevant to today's technological advancements in the wide variety areas of Mechanical Engineering to foster communication among researchers and practitioners working in these areas with a common interest.

Industrialists are rethinking competitive advantage for the post-pandemic landscape, apply technology to predict demand patterns, customize orders and leverage asset availability. Looking forward to welcoming you to the first ever virtual conference *RDME-21*. While we regret that the COVID pandemic prevented us from holding the conference offline, we are excited about the opportunities of holding an innovative virtual conference

The success of this conference is a result of efforts of contributors and presenters who have shared with us the latest developments in their respective fields. Such an event is not possible without the hard work of the reviewers to whom I am deeply indebted for taking out time to provide professional opinions on the submissions.

I highly appreciate the efforts of the DR. Prof. V. N. Chougule, HoD, Mechanical Engineering, Coordinator Dr. B. D. Nandre and Dr. A. R. Patil & the conference organizing team who have coordinated and linked with the contributors, reviewers and many other concerned. The non-teaching staff cannot be forgotten, their dedicated support ensures that the conference is of high quality and makes the conference a thoroughly enjoyable gathering.

I wish 'RDME-2021' all the success!

Dr. S. S. Sarawade

Principal

Message from Vice Principal

Knowledge is not power; it is only potential. Applying that knowledge is power. Understanding why and when to apply that knowledge is wisdom!

\- Takeda Shingen

It is undeniably a pleasure and proud privilege for me to know that the Department of Mechanical Engineering is organizing 9th National Conference on **'Recent Developments in Mechanical Engineering' [RDME-2021]** on 18th August 2021. This conference aims to provide a platform to researchers, professionals, academicians and above all to the students who have aptitude and attitude and can dream to make it big in their professional carrier in near future.

As I look forward, I can visualize that our college will grow in pursuit of higher standards of teaching & research. Already we have achieved academic excellence by obtaining accreditation certificate from NAAC with 'A' grade and NBA for all three department. I am sure that it will continue to maintain its excellence and character with great distinction.

I am sure the delegates will gain insight into why research is more important in the organization. They will be highly motivated to do what they do best. It will create a potential and research attitude in the minds of participants.

The success of this Conference is solely on the dedication and efforts of conference organizing team to make this a reality. I congratulate organizing team of RDME 2021 and eventually I express my special thanks and appreciation to all.

I wish 'RDME-2021' all the success!

Dr. Manisha P. Dale

Vice Principal

Message from Head of Department (Mechanical)

Welcome one and all to the 9th National conference on "Recent Developments in Mechanical Engineering" (RDME-2021). This time it was altogether a different exciting difference with hard working organizing committee members and our UG & PG students working with enthusiasm with had never seen before.

We are overwhelmed by marvelous response from UG and PG students from MESCoE as well as reputed organizations. All the published papers had gone through strict scrutiny for plagiarism as well as review from experienced reviewers from both teaching and industrial community.

We are extremely thankful to the Hon. Prof. Dr. A. J. Hake, Trustee, M. E. Society, and Principal Dr. S. S. Sarawade for giving an opportunity and guidance on regular basis. A special thanks to conference publication partner American Institute of Physics (AIP), USA for agreeing to publish our conference paper in their proceedings.

I am thankful and grateful to review committee, the authors and student volunteers for their timely support. Hope this will give chance to see the reflection of our progress and achievements.

Finally, I must personally congratulate and appreciate efforts from Dr. B. D. Nandre and Dr. A. R. Patil, coordinators of RDME 2021 and contributions from all teaching and non-teaching faculty members from Mechanical Engineering department.

We hope to meet many of you personally throughout the conference. Please take the time to enjoy both the conference and great heritage of Pune.

Dr. V. N. Chougule

Head of Department (Mechanical)

Message from Coordinators

It gives me an immense pleasure and satisfaction to write a preface to the souvenir for the 9th National Conference on 'Recent Developments in Mechanical Engineering' (RDME-2021). This aim of this conference is to provide common platform to bring students, researcher, faculty and industry person from every corner of India and create medium for exchange of knowledge. Participant through this conference can share their work with experts and I am sure will get valuable feedback on their work to produce quality outcome. The organizing committee members are working with enthusiastic and hardworking as never before to make sure that participant will enjoy their time and have quality interaction with other participants.

This 9th conference is unique in many aspects as compared to other conference. First this time, we have received total 127 registration with 120 full length paper from every corner of India. We have received registration from both private universities as well as central universities like IIT, NIT etc. This overwhelming participation has made this conference a vivid group of UG, PG, Research student, Faculties, and Industry persons. Another uniqueness of the conference is that it is being organized in association with American Institute of Physics, USA as publishing partner. The selected quality papers will be published in AIP Conference Proceeding with indexing and abstracting in Google Scholar, Scopus, and Web of science (CPCI).

We are deeply indebted to Trustee, M. E. Society and Hon. Principal for their constant support and encouragement throughout the bringing out this Souvenir and making this conference a big success. We are grateful to Head of Mechanical department for his continuous guidance during organization of this conference. We must thank to peer review committee members for their painstaking effort in rigorous review work and shaping the contents of the journal and souvenir. Finally, we are also thankful and grateful to the authors, organizing committee members, advisory board, and student volunteers for their kind cooperation.

Dr. B. D. Nandre, Dr. A. R. Patil
Coordinators, RDME 2021

Advisory Board

Dr. B. B. Ahuja

(Director, COE, Pune)

Dr. S. S. Pardeshi

(BoS Chairman, Mechanical Engineering, SPPU, Pune)

Dr. A. V. Waghmare

(BoS Member, Mechanical Engineering, SPPU, Pune)

Dr. P. A. Patil

(BoS Member, Mechanical Engineering, SPPU, Pune)

Dr. P. J. Awasare

(Former, BoS Chairman, Mechanical Engineering, SPPU, Pune)

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(Principal, Trinity College of Engineering, Pune)

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(Prin. Scientist, NCL, Pune)

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(Professor, NIT, Warangal, Karnataka)

Dr. A. A. Thakare

(Professor, VNIT, Nagpur)

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(Management Trustee, ME Society, Pune.)

Dr. A. S. Chandak

(Management Trustee, ME Society, Pune.)

Dr. M. K. Sanap

(Management Trustee, ME Society, Pune.)

Patrons

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(Principal, MES College of Engineering, Pune.)

Dr. M. P. Dale

(Vice-Principal, MES College of Engineering, Pune.)

Convener

Dr. V. N. Chougule

(Head, Department of Mechanical Engineering)

Steering Committee

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Dr. S. H. Gawande

Dr. A. C. Mitra

Mrs. V. J. Sonawane

Coordinators

Dr. B. D. Nandre (9422369859)

Dr. A. R. Patil (9326273960)

Organizing Committee Members

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Mr. S. D. Wankhede
Mr. S. S. Jadhav
Mr. K. A. Mahajan
Dr. R. N. Yerrawar
Mr. H. S. Salave
Mr. S. S. Jadhav
Mr. B. R. Pujari
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Mr. V. R. Varude
Mr. V. S. Mane
Mr. A. A. Chaugule
Mr. A. A. Patil
Mrs. P. R. Magdum
Mr. C. B. Meshram

About Us

About the Institute

Modern Education Society is established in 1932 with the motto "For the Spread of Light". M.E.S. College of Engineering established in 1999 and situated in the heart of Pune city, offers engineering degree courses in Mechanical, E&TC and Computer Engineering and is affiliated to Savitribai Phule Pune University, accredited by NBA and NAAC with 'A' Grade.

UG COURSES:

Computer Engineering Intake - 180

Electronics & Telecommunication Engineering Intake - 120

Mechanical Engineering Intake – 120

PG COURSES:

ME in Mechanical Engineering Design Intake - 24

ME in Signal Processing Intake - 12

ME in Computer Engineering Intake – 24

Vision of Institute:

To Groom - Motivated, Environment friendly, Self-esteemed, Creative and Oriented Engineers.

Mission of Institute:

To Develop Industry Oriented Manpower to accept the challenges of Globalization by,

- Promoting Value Education through motivated trained faculty
- Maintaining conducive environment for education at affordable cost,
- Promoting Industry Institute interaction,
- Involving alumni.

About the Department:

The Department of Mechanical Engineering is striving hard since its inception in 1999 with highly qualified and energetic faculties for the all-round development of the budding engineers for the tomorrow's nation building. The department is accredited by NBA for three years (2018-2021). The department is well equipped with state-of-the-art facility in CAD/CAM, I C engine, Heat Transfer, Refrigeration and Air Conditioning, Fluid Mechanics and Fluid Machineries etc. We have center of excellence in emerging areas of mechanical engineering like 3D Printing lab (Under MODROB), NI Lab, Industrial Tribology Lab, Robotics Lab and Baker's MQC Lab which help student from institute and outside institute to conduct their research work. The leadership and team building qualities, environmental consciousness of our students are nurtured through membership and participation in various events organized by SAE India, Renewable Energy Club and MESA.

Vision of Department:

To groom Motivated, Environmentally friendly, Self-esteemed, Creative and Oriented Mechanical Engineers

Mission of Department:

- To Develop Industry Oriented Manpower to accept the challenges of Globalization by,
- Imparting mechanical engineering knowledge through trained faculty in conducive environment,
- Creating awareness about the needs of mechanical industries through alumni and industry-institute interactions
- Encouraging them to think innovatively and introduce them to various research activities
- Supporting them to groom in all aspects like communication, interpersonal skills.

Program Outcomes (PO)

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage**: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society**: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability**: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and teamwork**: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication**: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and

write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. **Project management and finance**: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning**: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
13. **PSO I:** Apply principles of machine design, manufacturing, thermal engineering and management to identify, formulate and solve real life problems in various fields of engineering
14. **PSO II:** Use modern modeling, simulation techniques and computational tools.
15. **PSO III:** Develop practical solutions for mechanical engineering problems/processes under professional and ethical constraints.

Peer Review Committee

Dr. G. R. Desale	Sr. Principal Scientist, CSIR-National Chemical Laboratory, Pune
Dr. V. M. Phalle	HoD, Mechanical Engineering Dept., VJTI, Mumbai.
Dr. P Nagashwara Reddy	Dean, Gudlavalleru Engineering College, Krishna District, Andhra Pradesh, 521356
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Dr. Sandeep Kumar	HoD, Mechanical Engineering Dept., Bengal College of Engineering, Kolkata
Dr. S. N. Sapali	Professor, Mechanical Engineering Dept., College of Engineering, Pune
Dr. A. D. Desai	Principal, SRES's Ramchandra College of Engineering Pune
Dr. L. G. Navale	Professor emeritus, Dr. D. Y. Patil Institute of Technology, Pimpri, Pune
Dr. A. V. Waghmare	HoD, Mechanical Engineering Dept., AISSMS College of Engineering, Pune
Dr. R. R. Arakkerimath	HoD, Mechanical Engineering Dept., G. H. Raisoni College of Engineering & Management, Pune, India.
Dr. R. S. Bindu	Professor, Mechanical Engineering Dept., Dr. D. Y. Patil Institute of Technology, Pimpri, Pune
Dr. K. B. Waghulde	Professor, Mechanical Engineering Dept., Dr. D. Y. Patil Institute of Technology, Pimpri, Pune
Dr. A. A. Patil	Professor, Mechanical Engineering Dept., Dr. D. Y. Patil Institute of Technology, Pimpri, Pune
Dr. R. K. Kavade	Asso. Professor, Mechanical Engineering Dept., Dr. D. Y. Patil Institute of Technology, Pimpri, Pune
Dr. A. M. Pawar	Asso Professor, Bharati Vidyapeeth's Women's college of Engineering, Pune
Dr. H. K. Wagh	Assistant Professor, Mechanical Engineering Dept., R C Patel Institute of Technology, Shirpur
Dr. Vipin Gawande	Assistant Professor, Mechanical Engineering Dept., VP's Kamalnayan Bajaj Institute of Engineering and Technology, Baramati
Dr. N. D. Pagar	Assistant Professor, Mechanical Engineering Department, MIT-ADT University, Pune
Dr. S. S. Sarawade	Principal and Professor, MED, M.E.S. College of Engineering, Pune
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RDME 2021

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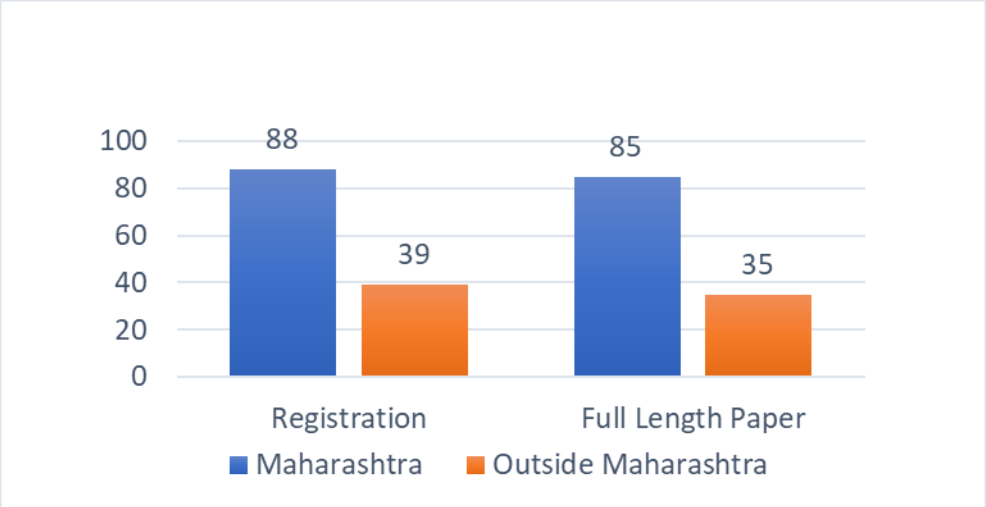

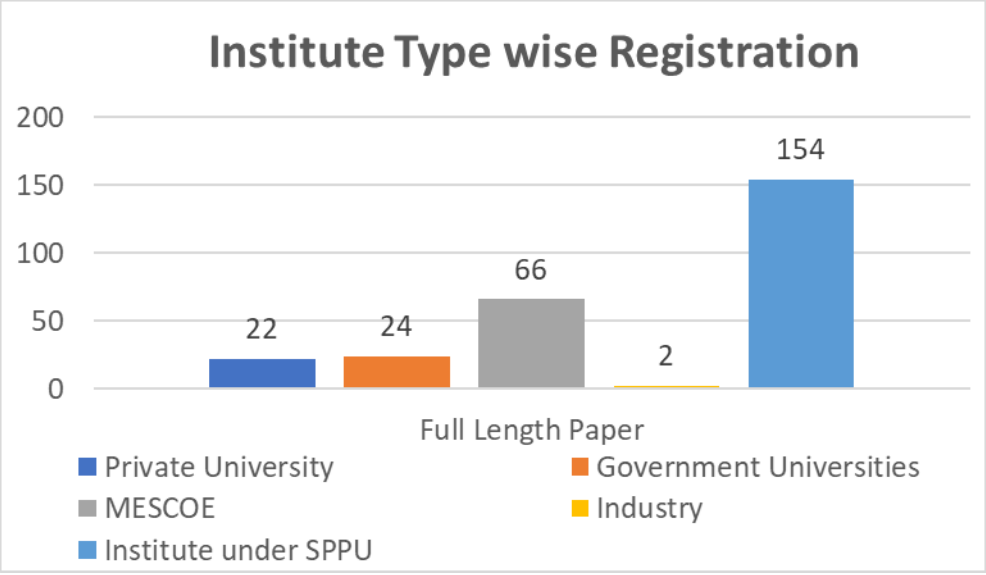

INDEX

A-01: Electromagnetic Braking System

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Abstract: In this paper we had develop the electromagnetic braking system. Braking System should ensure the safety and comfort of the passenger, driver and other road user. The brake must be strong enough to stop the vehicle during emergency within shortest distance. The conventional braking system is bulky and power to weight ratio is low. Electromagnetic braking system is high-tech braking system find its use in small & heavy vehicle like car, jeep, truck, busses etc. This paper represents about minimizing the brake failure in order to avoid the accident. It also reduces the upkeep of braking system. The effectiveness of brake should remain constant. The proper cooling of brake gives anti fade character and efficient operation of brake. Proper lubrication and maintenance must be done to operate brake safe, effective and progressive with minimum fatigue to driver. This system provides better response time for emergency situations and in general keeps the friction brake working longer and safer.

Keywords: *Brake, Electromagnetism, Brake power, Torque.*
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A-02: Mechanical testing methods for Spark Plasma Sintered Materials

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Abstract: Sintering is the process of heating and condensing metal particles at temperatures below their melting point. Microwave sintering, hot isostatic pressing, conventional sintering, and spark plasma sintering are all examples of sintering processes. Spark plasma sintering is a new powder consolidating method, particularly for processing nanomaterials, among all these methods. Pressure and electric current are utilized simultaneously in this technique to compact the densified powder. Pulsed direct current is passed through the conductive die and the powder sample in this technique. The current delivered creates an electric field, which heats the powder sample from the inside out. For spark plasma sintered materials, this study provides several mechanical testing methods such as compact tensile test, compression test, micro hardness test, nanoindentation test, density measurements, corrosion studies, and wear behavior. This publication also includes details on the specimen dimensions used in the preparation of spark plasma sintered compacts.

Keywords: *Spark Plasma Sintering (SPS), Nano Materials, Mechanical Testing, Specimen Dimensions, Industrial issues.*

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A-03: Fumigation Methods of Ethanol in Dual Fuel CI Engine- A Literature Review

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Abstract: Ethanol is one of the potential alternative fuel to conventional engine-fuels. I can be used in CI engine with dual fuel operation. There are two methods to use ethanol in CI engine namely 'blending' with diesel fuel and 'fumigation' with intake airstream. It is noted in the literature, the diesel fuel can be replaced up to 50% by fumigating ethanol with the intake airstream. This paper provides a comprehensive review of different methods used by the researchers to fumigate the ethanol in dual fuel CI engine.
Advantages and limitations of all methods are also discussed critically. It is observed that many authors have used advanced technologies to fumigate the ethanol however few authors have fumigated ethanol in a simple way with almost zero modification of existing engine system.

Keywords: *Fumigation Characteristics, Dual Fuel Engine, Ethanol, Fumigation Methods.*
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A-04: The Use of Phase Change Material in Thermal Energy storage systems for heating Applications- A review

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Abstract: In the paper various research work related to thermal energy storage (TES) are reviewed. Now days, more research is concentrated towards use of the nonconventional energy. The use of TES helps to reduce load fluctuations of the system. One of the materials used in the TES is phase change material (PCM). During daytime solar energy could be stored and utilized as required. There are lot of possible ways of using PCM like honeycomb structure, fins, encapsulated systems etc. The way of using TES is for three types like sensible heat, latent heat, chemical heat systems. The more useful energy is latent heat.

Keywords: *Thermal energy storage, phase change material, heat exchanger, heat transfer fluid.*
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A-05: Cementing of an Oil Well using VBA

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Abstract: Well cementing is the process of pumping cement slurries to the annular space between the wellbore and the casing and the annular space between the two consecutive casing strings. Cementing is the foremost footsteps in making a well ready for production. Oil well cementing is the procedure of pumping slurry down the casing and up the annulus in the middle of the casing and the enclosure of the well, where the slurry is permitted to settle, then attaching the casing to the shaping. Evaluative frameworks affecting the triumph of a cementing operation are the concentration and the varieties of additives present in a blended fluid to develop the cement slurry. The paper describes the macro for the whole process of well cementing using Microsoft excel's inbuilt VBA. This will speed up the whole process, reduce the time for calculations and reduce any human error. This study takes six types of additives each for lead slurry and tail slurry. Based on input parameters provided, output such as slurry yield, slurry density, slurry volume, and no. of sacks of cement can be found.

Keywords: *Cementing, Pumping, slurry, cement, volume.*

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A-06: Development of Economical Selective Laser Sintering Setup for Metal Additive Manufacturing

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Abstract: Selective Laser Sintering (SLS) is one of the additive manufacturing technologies in the industry but the cost for these machines is very high. This paper is directed towards developing and creating a relatively low-cost Metal 3D printer using SLS technology which will comprise of all the basic components required in the high-cost printers, while also giving decent output. Various parameters and conditions to be considered during the design and applications are discussed. The research conducted on these parameters will give a crisp idea on how to setup a basic SLS system. The design phase is mainly divided into 3 sections: (1) Feeder mechanism, (2) Laser Gantry, (3) Enclosed inert gas chamber. Electronics is also a major aspect of this project which includes (1) Selection of motors (2) Selection of Interfacing board MACH-3 (3) Inert gas chamber temperature control system. Proposed system can be substantiated by conducting numerous experiments. After examining the results of various experiments, different process parameters as LASER properties (such as Laser power, Scanning Speed, hatching patterns etc.), and material properties (as powder grain size) will be optimized. This is an attempt to create a low cost SLS setup which is suitable for academic and research purposes.

Keywords*: SLS, Feeder Mechanism, Laser Gantry, Stepper Motors, Electronic Control system.*

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A-07: A study and analysis of Multiple Ribs for efficiency enhancement of a Solar Air Heater System (An Ansys Fluent Analysis)

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Abstract: Solar energy is the most extensively used renewable energy resource due to its high quantitative intensity factor. Solar air heaters are inexpensive, have a basic construction, and may be used for a variety of purposes. It's a rectangular duct with an absorber plate on top, and heat only falls on the absorber plate's top. Because the heat transfer coefficient between the coated absorber plate and the carrier fluid is lower in a modest solar air heater, it has a lower heat transfer and thermal performance. The thermal performance of air moving through the rectangular duct is significantly altered when ribs/baffles are inserted just beneath the absorber plate. In the present study, a comparison was made between the results of in three patterns, namely, equilateral triangular ribs, semi-circular ribs and rectangular ribs to select the most effective absorber plate roughness. The Nusselt number variation was tested at fixed rib pitch (p) and height (e) values with Reynolds numbers ranging from 5000 to 15000. The widely accessible software ANSYS FLUENT v18.1 was used to run computational fluid dynamics (CFD) simulations. The SST-k-omega model was utilized for flow analysis, with a constant heat flux of 1000 W/m2. The results revealed that the equilateral triangular ribs yielded better performance than the semi-circular and rectangular ribs. Out of the three arrangements, the best thermal performance was given by Equilateral triangular ribs whose convective heat transfer coefficient was 1.204 times smooth duct's convective heat transfer coefficient. Turbulence kinetic energy, temperature, heat transfer coefficient and Nusselt number were all evaluated and discussed in relation to Reynolds number.

Keyword: *Solar air heater, turbulent flow, Nusselt number, ribs, Reynolds number.*
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A-08: Life estimation of taper roller bearing used in a decanter gearbox using Python 3.8

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Abstract: Now a day, wastewater treatment is the new area of application focused to recycle the wastewater. Wastewater generated by urban areas creating environmental pollution and creating unhealthy to living organism. Decanter plays major role to recycle needs of water for avoiding pollutions. Hence gearboxes used for decanter application

shall have adequate life of operation without any premature failure. The life of gearbox majorly governed by the bearings which maintain dynamic supports to the gears performing transmission of power. Today Python an intelligent programming language becoming popular in area of machine learning, data analytics, artificial intelligence and design. This paper presents the methodology for estimation of life of taper roller bearing used decanter gearbox using python language. The results obtained will be validated using analytical method.

Keyword: *Life Estimation, Python, Bearings, Gearbox.*

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A-09: Design and Development of 360 degree welding turn table with scissor height adjustor

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Abstract: Most of the things we use in our daily life is welded or made by equipment that is welded. That is why Welding is the two most prominent operation in the fabrication industry. Welding operation usually require 2 or more people to perform them with speed. One or two people to hold the work and the other person to perform welding on the work. Sometimes it is also required to turn the work continuously in case of cylindrical component. To make this task easier we here design a rotary welding turn table with chuck arrangement to allow for easy welding operation using a single operator. The tabletop welding turntable uses a worm and worm gear arrangement with a firm design to rotate the top. This paper deals with the construction and working of all components required for 360degree welding turn table with scissor height adjustor. With an increase in size and complexity of today's welding requirements, new techniques must be developed so as to ease the operator's burden and ensure uniform and efficient circular welding. In this paper the various components of the circular welding positioner are critically designed, that is why, there was a clear need to develop techniques to unburden the welder and bring the welding process back out on top. Our way of doing this, was by designing a rotary welding turn table with a scissor height adjustor, allowing quick and efficient welding by a single operator. This project involves the process of designing the table by considering the shape, functionality, portability and the manufacturing costs for people to use it.

Keywords: *Rotary welding turn table, Scissor mechanisms, Welding, Fabrication.*

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A-10: Latent Heat Thermal Energy Storage using Phase Changing Material in Two different Orientations

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Abstract: This current study signifies the importance of Phase Changing Material (PCM) in two different orientations, viz; circular and cross. The PCM used is n-tetracosane with the melting point of 40°C trials for charging and discharging were carried out, where PCM was encapsulated inside Spherical Balls. A heater was used to charge the PCM inside Spherical Balls with the aid of water (selected as heat Transfer Fluid), thereby liquefying the PCM proficiently from ambient temperature to 85°C. For the discharging process, solidification of PCM was imposed from 85°C to 55°C (selected for use at medium temperature application) while trying to unalter the temperature of the water. Experiments were conducted throughout the day and readings were recorded by data logger without causing any physical intervene. Recordings revealed that 4.5 hours were taken to charge PCM and 20 hours were taken to discharge it in circular orientation. Whereas; 3.16 hours were taken to charge PCM and 19.5 hours to discharge it in cross orientation. Hence, PCM charges superficially due to heater provided externally and discharges leisurely giving out the energy stored within. To validate the results, CFD analysis was carried out and a rational concurrence is accomplished.

Keywords: *Phase Changing Material, Circular orientation, cross orientation, Latent Heat Thermal Energy Storage, Charging, Discharging*
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A-11: Numerical Analysis of Enriched Biogas Used as a Fuel in Single Cylinder Stationary Diesel Engine Using Tagauchi Approach

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Abstract: The present economics and community development along with petrol and diesel oil consumption and oil decreasing crises, substitute fuel plays an important role for the next electricity generation. Currently, conventional gasoline fuel like diesel is used in transportation, electricity generation, and commercial applications. Instead of diesel, we can use enriched biogas as a substitute fuel of conventional C. I engine. This paper focused on the investigation of enriched biogas used as a fuel in a single cylinder stationary diesel engine using Tagauchi approach which is used for collecting data of different compression ratios, crank angle, and exhaust emission for various loads compared with the performance parameter. In further we can take an observation for different loads, due to this we can get the various reading performance parameters like brake power, indicated power, brake specific fuel consumption, brake thermal efficiency, and mechanical efficiency. In this study, the experimental investigation is focused on Taguchi method to analyze the optimum input parameters to obtain the improved engine

performance characteristics of C. I engine fueled with enriched biogas (CH4- 94.69 %, CO2- 3.05 %, H2S-87 ppm, O2-1.07 %, Moisture-1.07 %, Calorific Value-48,488 kJ/kg). The Compression ratio, injection angle, and operating load were considered as input parameters and each parameter at three levels. The Brake Power, Indicated Power, Mechanical Efficiency, Brake Thermal Efficiency and Brake Specific Fuel Consumption were selected as performance parameters. The experimentation depends on Taguchi L-9 orthogonal array and the engine to put the test at different compression ratios, injection angles, and operating loads. The data were analysed using S/N (Signal-Noise) ratio for each factor. The optimum combination of the performed parameters are obtained in a single cylinder four-stroke diesel engine operated on enriched biogas for better output compression ratio 16:1, injection angle 230 bTDC with maximum load 9 to 12 kg. This result shows that BP is 8.641 %, IP is 12.1684 %, BSFC is 13.33 %, BTE is 3.48 %, and Mechanical efficiency 3.63 % improved compared to other combination.

Keywords: *Enriched biogas, Signal-Noise (S/N) ratio, orthogonal array, Injection angle, Compression ratio (CR), Operating Load etc.*
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A-12: Design and Development of Biogas Venturi mixture for Stationary Diesel Engine using Analytical and CFD approach

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Abstract: The major problem to use biogas as an alternative fuel in diesel engines is the modification needed for converting the current diesel engine into an enriched biogas engine. The fuel intake system is one of the major modifications required for the diesel engine. To overcome this problem, a new biogas venturi mixture has been designed by using an analytical and Computational Fluid Dynamics (CFD) approach. With the new fuel intake system, the engine runs effectively and properly using enriched biogas as an alternative fuel. It has been observed that simple modifications are required in the fuel intake system such that convergent divergent angle, throat diameter, etc. for uniform mixing of enriched biogas and air for complete combustion of fuel for improving engine performance and efficiency. This paper focuses on the design and development of a biogas venturi mixture with different convergent angles (200, 240 & 280, etc.) and different throat diameters (22 mm, 21mm, 20mm, 18mm & 16 mm etc.) used in a 3.5 kW, 661CC, 4-stroke stationary diesel engines using an analytical and CFD approach. This paper concludes that 16 mm throat diameter and 240convergent angle, the maximum pressure

drop and maximum velocity observed in a uniform and homogenous mixture. Better mixing can affect combustion, which leads to improved volumetric efficiency, brake thermal efficiency with reduced emission.

Keywords: *Alternative fuel, Enriched biogas, Combustion, Analytical method, CFD method.*
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A-13: Radiator and evaporator leak testing machine

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Abstract: This machine is manufactured as per the customer's requirement and specific testing need. As the component is some form of a casting tube like structure which is leak tested. For this specific purpose and requirement of Leak Testing Machine the industry will train in terms of design and manufacturing of whole machine. Testing method was the most important consideration. For which Testing method is selected according to the applications of component. According to the first meeting with the customer the specified the component details that the component is an aluminum casting and should be leak tested. As it is a casting component not a machined component, if a crack is detected on a casting component, then it is of no use as casted component cannot be welded or machined to fill the crack. For this purpose, dry leak test method is appropriate. As customer just needs to notify that the component has a crack. So, dry testing method is appropriate. When company needs to detect the location of the leakage of the component then use the wet leakage testing method. Whenever need to check leakage of radiator it's possible to anywhere. When engine is overheated then radiator will be used for cooling the engine but the radiator not ok so its possibility of engine block.

Keywords: *Casting component, Crack, Dry leak test, Location of leakage, Overheated.*
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A-14: DESIGN ANALYSIS & PERFORMANCE EVALUATION OF MECHANICAL TORQUE BOOSTER WITH COTTON ROPE

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Abstract: In many mechanical systems it is required to amplify the torque to operate the devices, especially in cases where the control input is in the form of hand wheel that is operated manually to either lift or lower heavy loads as in application of hoists , non-linear broaching, load positioning application, remote metering and counting. In all above

systems the control force which is supplied as input is not sufficient to operate the control the mechanism and hence a torque booster is needed.

The proposed mechanical torque booster applies the principle of capstan. Mechanical torque booster uses a capstan is simple mechanical amplifier-rope wound on motor driven drum slips until slack is taken up on the free end. Force needed on free end to lift the load depends on the coefficient of friction and number of turns of rope. The kinetic energy of the drum is transferred via the rope to the output shaft and thus amplified power and torque is obtained at the output shaft. The project aims at the concept development of the torque booster system, the gear train to obtain the desired motion of the drums spinning in opposite direction is attained through the system design. The components of the system will be designed using theoretical methods and the strength of the components will be validated using analysis. The components of the system will be modelled using Unigraphix Nx-8 and the analysis of the components will be carried out using Ansys workbench 16.0. The system will be manufactured, and testing will be carried out to derive the performance characteristics of the torque booster. Two different materials of rope namely cotton, and leather will be tested and the comparative performance evaluation will be presented in the report.

Keywords: *Torque booster, Gear train, Kinetic energy, Leather , cotton rope.*
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A-15: DESIGN OF HYBRID MOTORCYLE SUBSTITUTING ACETYLENE GAS AS ALTENATIVE FUEL AND REGENERATING POWER

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Abstract: In the present scenario there is a continuous improvement in automobile industry for satisfying the prerequisite individuals needs of change, in the hunt of advancement in hybrid vehicle we accompanied thought of elective powers acetylene gas for economic improvement of energy protection productivity the executives climate safeguarding consequently study uncovers that acetylene gas delivered from water and calcium carbide is sustainable in nature and show like those hydrogen gas. From detail study it has been concluded that combination of electric and acetylene gas powered motorcycle gives less emission than petrol and diesel. In this manner lessening the running expense and least toxin emanation. This makes it fit for the use on economic and environmental standard. It more effective and eco-friendly alternative fuel option. Thus, this project is an attempt for the use of acetylene gas in hybrid motorcycle in such that it can prove to be useful for the peoples in the future.

Keywords: *motorcycle, acetylene, energy, calcium carbide.*
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A-16: Modelling & Analysis of Cooling of Electronic Packaging Using Synthetic Jet Impingement

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Abstract: Recently, the cooling process for electronics components has attracted many researchers and several techniques for improving the cooling efficiency and heat transfer rate have been demonstrated. One of the best efficient techniques is the introduction of a synthetic jet. The synthetic jet releases air by collecting from surrounding. It has a hollow cylindrical body with single port as orifice which works as an input and output also. Opposite end to the orifice actuator has fitted. Actuators fluctuate its piston or diaphragm and this action cause air jet. When actuators move towards orifice it imparts air towards specimen and actuators move far from the orifice it produces vacuum and surrounding air is fill inside due to pressure goes decreasing below atmospheric pressure. In the present study, the mathematical calculation for cooling effect is done and practically readings are taken for cooling effect. The mathematical calculation is then experimentally validated by taking the readings. Further the experimental values then validated by using Computational fluid dynamics in Ansys software. In CFD velocity and distance between surface to be cooled and orifice are change according to practical readings and the results are validated.

Keywords: Synthetic Jet, CFD, Cooling effect etc.
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A-17: Vortex bladeless wind electricity generation

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Abstract: Vortex-Bladeless is a Spanish SME whose objective is to develop a new concept of wind turbine without blades called Vortex or vorticity wind turbine. This design represents a new paradigm in wind energy and aims to eliminate or reduce many of the existing problems in conventional generators. Due to the significant difference in the project concept, its scope is different from conventional wind turbines. It is particularly suitable for offshore configuration, and it could be exploited in wind farms and in

environments usually closed to existing ones due to the presence of high intensity winds. The device is composed of a single structural component, and given its morphological simplicity, its manufacturing, transport, storage and installation has clear advantages. Thus, the objective of this SHAPE project is to develop the needed tools to simulate Fluid-Structure Interaction (FSI) problems and to reproduce the experimental results for scaled models of the Vortex-Bladeless device. In order to do so the Alya code, developed at the Barcelona Supercomputing Center, is adapted to perform the Fluid-Structure Interaction (FSI) problem simulation. The obtained numerical results match satisfactorily with the experimental results reported today. India is stepping towards becoming a global superpower. This implies that, it is leading the list of developing countries in terms of economic development.

Keywords: *Rack and pinion, Dynamo turbine, GF sheet, flexible rod.*
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A-18: Coating Process: An Overview of Research Work

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Abstract: A coating is a covering that is applied to the surface of an object, usually referred to as the substrate. The purpose of applying the coating may be decorative, functional, or both. Paints and lacquers are coatings that mostly have dual uses of protecting the substrate and being decorative, although some artist's paints are only for decoration, and the paint on large industrial pipes is presumably only for the function of preventing corrosion. Functional coatings may be applied to change the surface properties of the substrate, such as adhesion, wet ability, corrosion resistance, or wear resistance. In other cases, e.g., semiconductor device fabrication (where the substrate is a wafer), the coating adds a completely new property, such as a magnetic response or electrical conductivity, and forms an essential part of the finished product. A major consideration for most coating processes is that the coating is to be applied at a controlled thickness, and a number of different processes are in use to achieve this control, ranging from a simple brush for painting a wall, to some very expensive machinery applying coatings in the electronics industry. A further consideration for 'non-all-over' coatings is that control is needed as to where the coating is to be applied. A number of these non-all-over coating processes are printing processes. Many industrial coating processes involve the application of a thin film of functional material to a substrate, such as paper, fabric, film, foil, or sheet stock.

Keywords: *Wear, Resistance, Surface coatings, etc.*
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A-19: Design and impact study of a composite material front bumper for an automobile

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Abstract: It is vital to consider the influence of the bumper inside the car at some point during the collision when constructing it. The bumper is the first part of the vehicle to be damaged in a collision. The bumper's layout must be adjusted so that extra strength is absorbed, reducing the impact on the vehicle and its occupants. Because materials play such an important role in a bumper's resistance, the fabric used for it must be carefully chosen. The car industry's current challenge is a disregard for weight and safety. Furthermore, it is difficult in mass manufacturing, which involves a high level of value, as well as maintaining its quality. Another important aspect of bumper design is the percentage it adds to the overall weight of the vehicle. The use of composite fabric can meet both the weight loss and overall performance requirements of current bumper materials such as ABS (metal reinforced) and other metallic bumpers.

Keywords: *Automotive Car, Bumper, Composite material, FEA, CATIA V5, Hyper mesh*.
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A-20: Experimental Analysis of Multi lobe Hydrodynamic Journal Bearing by using CFD

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Abstract: Hydrodynamic journal bearings are widely used due to their high load carrying capacity and good damping properties. Journal bearings have been widely used in rotating machinery. The bearing carries higher loads which reduces film thickness and also increase temperature of bearing due to fluid film temperature increment. The pressure distribution is important in both load capacity estimations (static performance) and dynamic analysis. We can analyze the pressure of fluid film and total deformation of hydrodynamic journal bearing by Fluid Structure Interaction technique. This paper describes FSI technique with optimization.

Keywords: *static performance, fluid interaction technique.*
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A-21: Design and Study of Unmanned Arial Vehicles (Drone) For Reforestation with Seed Dispenser

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Abstract: It is vital to consider the influence of the bumper inside the car at some point during the collision when constructing it. The bumper is the first part of the vehicle to be damaged in a collision. The bumper's layout must be adjusted so that extra strength is absorbed, reducing the

impact on the vehicle and its occupants. Because materials play such an important role in a bumper's resistance, the fabric used for it must be carefully chosen. The car industry's current challenge is a disregard for weight and safety. Furthermore, it is difficult in mass manufacturing, which involves a high level of value, as well as maintaining its quality. Another important aspect of bumper design is the percentage it adds to the overall weight of the vehicle. The use of composite fabric can meet both the weight loss and overall performance requirements of current bumper materials such as ABS (metal reinforced) and other metallic bumpers.

Keywords: *Deforestation, Seedballs, Arial seeding, Quadcopter, Unmanned Aerial Vehicle (UAV), Reforestation.*
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A-22: Numerical Investigation on the Performance and Emission Characteristics of CI Engine using Blends of Diesel and Different Biodiesels

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Abstract: In this paper, an attempt has been made to simulate a compression ignition engine using pure diesel, pure soybean methyl ester (SME100), rapeseed oil methyl ester (RME100), jatropha methyl ester (JME100) biodiesels, as well as their 10% and 20% blends with diesel as fuels. The engine considered for the simulation is a single cylinder, naturally aspirated, water cooled, direct injection, four stroke diesel engine. The engine speed, injection timing, and compression ratio were all held constant for this simulation at 1500 rpm, 23°bTDC, and 17.5:1, respectively. The commercial software named Diesel-RK used for this work is capable of predicting the engine performance metrics such as brake thermal efficiency (BTE), brake specific fuel consumption (BSFC), exhaust gas temperature, and environmental parameters such as NOx, CO2, PM, and smoke emissions. The predicted results shows that BSFC increases and brake thermal efficiency decrease with the use of biodiesels compared to neat diesel. It was observed that RME 100 has higher thermal efficiency among pure biodiesels. In respect of emission characteristics, NOx and CO2 emissions were found to increase, where smoke and PM emissions decreases with the use of biodiesels. RME10 and RME20 shows lowest exhaust emission compared to other biodiesel blends. Thus, it could be concluded that that using biodiesel-diesel blends containing 10-20% biodiesel will be useful and beneficial, with little loss in engine performance.
Keywords: *Simulation, Performance, Emission, Soybean biodiesel, Rapeseed biodiesel, Jatropha biodiesel.*
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A-23: A Comparative Study in an Unbalanced Rotor Mounted on Rolling Element Bearings and Bump Foil Bearings

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Abstract: This paper intensively focusses on a comparison between dynamic vibrational analyses of an unbalanced Jeffcott rotor with a disc at middle supported on foil bearings and conventional

bearings. For the execution of this purpose, the analysis has been done considering two cases. The first case is to support or levitate the rotor by foil bearings and the second case is to support the rotor on conventional bearings. Dynamic equations of motion of the rotor-bearing system including the unbalance force, inertia force and force due to bearings, for both cases have been derived. The solution of the equations has been obtained by building a SIMULINK™ model, which are the displacement response of the system for both the cases. It is found that the displacement response due to the unbalance fault in the first case is less than the second case. The wear and life aspect of the rotor-bearing system may also improve in the first case.

Keywords: *Rolling element bearing; Jeffcott rotor; Unbalance; Foil bearing.*
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A-24: IMPROVISED SOLUTION FOR BUSINESS EXPANSSION USING MACHINE LEARNING

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Abstract: In today's competitive world, growth within the business is incredibly necessary. Each company desires to enhance their facilities and operational methods. Each amendment of trend within the market presents a good chance yet as a risk for investors. The demand for a selected product or service is usually related to completely different uncertainties that may create them volatile and difficult to predict. Demand unpredictability is one amongst the managers' considerations within the offer chain that may cause giant statement errors, problems within the upstream offer chain and impose unessential prices. Managing offer chain risks has received raised attention in recent years, attending to protect offer chains from disruptions by predicting their incidence and mitigating their adverse effects. At constant time. However, most works target prediction performance and neglect the importance of interpretability so results may be understood by offer chain practitioners, serving to them create selections that may mitigate or stop risks from occurring. This work deals with the merchandise Management for offer chain and production division of Gilbarco veeder root. Specifically, the study meant to forecast demand and cut back the assembly time (lead time) that touching the structure performance. Research may be a method of evaluating the feasibleness of a replacement product or service, through analysis conducted directly with potential customers. This methodology permits organizations or businesses to get their target market, collect and document opinions and create up on selections. Presently the policies that square measure followed by the organization has to be in a very well-structured manner to get high client satisfaction in terms of quality, and most significantly in on time delivery

Keywords: *Product Management, Demand forecast, Supply chain, Target market.*
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A-25: Exergetic Analysis of Plate Heat Exchanger for Boiler in Rectified Spirit Plant

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Abstract: In this paper energy and exergy analysis on components of working rectified sprite plant of capacity 11 TPH coal and the gas-fired boiler is carried out. Most of the system Is design on energetic performance criterion and is not sufficient for finding system imperfections. Hence exergy analysis is necessary to improve. It has been observed that Energetic and Exergetic performance of Plate Heat Exchanger use for heating the feed water for the boiler can be optimized. Heat carried away by Spent wash which is waste product of the plant and used as hot fluid in PHE can be utilized more effectively. Analytical calculation is carryout in Excel program to study the change in mass flow effect and by graph it has been observed that by increasing the flow rate of spent wash or decreasing the flow rate of feed water there is an increase in energetic efficiency, exergetic efficiency, and feed water temperature. Also, the effect of adding a gasketed plate has been observed, temperature increase by adding plate but there is also a pressure drop. The experimental is carried out based on analytical result there is an increase in exergetic efficiency of PHE by 6 to 7 % and increases in temperature of feed water 0.90-degree c by increasing the mass flow by 900 kg/hr. Also, other components of the boiler were observed before and after experimentation and found to be increased in performance. The thermal performance of PHE is optimized by adjusting the mass flow rate.

Keywords: *Plate Heat Exchanger, Analysis, Energy, Exergy, Mass Flow rate.*
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A-26: DESIGN AND VIBRATIONAL CHARACTERISTIC ANALYSIS OF EXHAUST MANIFOLD WITH EXPERIMENTAL VALIDATION USING FFT ANALYZER

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Abstract: The vibrations created in four-wheeler engines transfer to the silencer manifold, these frequent vibrations cause breakage in silencer manifold. Two sorts of vibration can affect the exhaust: the sonic pressure waves coming from the exhaust ports, and therefore the vibration of the engine itself due to torquing. Pressure wave vibrations are usually transparent, travelling through the exhaust to either absorb into or wipe out within the muffler. These waves are harmonic, just like the vibration of a speaker, but they're usually too minute to cause noise through component movement. Engine vibrations, on the opposite hand, can easily shake your exhaust pipes enough to cause component rattling or impact. This project deals with the damping of such later mentioned vibration problems with an idea of CAE (Computer Aided Engineering). during this project we are analyzing the exhaust under various conditions for modal (natural vibrations). static and modal analysis of manifold are going to be perform using ANSYS 19 software. Experimental validation of manifold is going to be completed using FFT and impact

hammer test.

Keywords: *ANSYS, manifold, FFT and impact hammer test.*
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A-27: A Review paper on identification and selection of parameters in friction drilling and form threading process on various materials

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Abstract: Thermal drilling and form drilling for sheet metals and hollow tubes are now widely used in the manufacturing and automotive industries. Thermal drilling and form drilling are currently most extensively used in mass production areas. This is a review study on the design and manufacture of a form threading tool for friction drilled holes, with the goal of investigating the comparative analysis of friction drilled hole form threading on various materials using a thermal drilling tool. Friction drilling is done on a variety of materials, such as square and circular tubes, using a thermal drilling process that uses heat generated between the tungsten carbide tool and the work piece material to soften the work piece, which is then extruded to form bosses and bushes, which are commonly used in sheet metal operations in industry. For the form threading operation, the bushing depth is used. In the industry, naturally formed bush is becoming more popular. The thickness to diameter ratio of thermal drilled holes and spindle speed are the two important key elements that influence the process.

Keywords: *Thermal drilling, bush length, hardness, material type, temperature, Speed, Feed.*
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A-29: Portable Oxygen Extractor Machine

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Abstract: Oxygen concentrators are electrically powered devices which are designed to provide oxygen for patients who require long-term domiciliary oxygen. The machines have been available for the last 10 to 15 years, but it is only recently that improvements in design have led to them being generally accepted as a reliable and economical means of supplying long-term oxygen therapy. There are two basic types of concentrator currently available: the molecular sieve (MS) concentrator, and the membrane oxygen enricher. In this article the characteristics and principles of operation of these machines are reviewed, together with the development and present state of MS concentrator technology. A summary of a comparative evaluation of seven MS concentrators is presented and the results discussed. Relevant safety standards and current trends in concentrator design are then reviewed.

Keywords: *portable, concentrator, membrane*
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A-30: Computational Study of MHD Double Diffusive Upper Convected Maxwell Nanofluid Flow induced by Non-linear Stretching Sheet

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Abstract: The present study explores the double-diffusive MHD flow of Maxwell nanofluid past a non-linear stretching sheet in presence of non-Newtonian Casson fluid. Brownian motion and thermophoresis effects are taken into the account. The similarity solutions based on the Runge-Kutta-Fehlberg scheme with shooting method are used to solve the non-linear coupled differential equations by using MATLAB programming following shooting technique. The graphs are plotted to discuss the velocity, temperature and nanoparticle concentration fields. Further, numerical results are obtained for skin friction coefficient, local Nusselt number and local Sherwood number for precise entries of pertinent fluid parameters especially magnetic parameter, Brownian motion parameter, thermophoresis parameter, Casson fluid parameter, Maxwell parameter and discussed through tables and graphs. In a limiting case, obtained results are compared with previously published results and found to be in very good agreement.

Keywords: *Casson fluid, Magnetohydrodynamic flow, Brownian motion, Thermophoresis, Upper Convective Maxwell Model.*
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A-31: A Neural Network Based Approach to Solve Problems of Newton-Euler Mechanics

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Abstract: A feed-forward back-propagation neural network approach is used to solve a three-dimensional Newton-Euler mechanics problem. The aim is to find the angular acceleration of a system of cylinders subjected to external forces given the system parameters like mass, length, radii, configuration, velocity and forces. The predicted output is compared with the simulated output and it is seen that the approximate solution is within an acceptable tolerance value.

Keywords: *Neural Network, Learning Algorithm, Mechanics.*
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A-32: Joint Integrity and Strength CAE Simulation Methodology for PHEV Vehicle Skid Plate Assembly

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Abstract: Battery unit skid plate Joint integrity and Strength are key design attributes to ensure Functionality of vehicle. This paper provides an overview of simulation methodology to predict joint integrity and Strength of Battery unit skid plate. Bolt Joint integrity checked against the maximum vertical each wheel spindle loads, which captures maximum bending and twisting. This is the condition in which bolts can experience high load and bolt slippage should check against this load. Skid plate experiences different loading based on drivability and road profile. To simulate severe off road event condition, Maximum load which skid plate experience, applied, as Point load on skid plate at various critical locations to find the deflection and to make sure skid plate is strong enough to protect underneath battery unit.

Keywords: *Joint Integrity, Strength of Skid Plate, CAE.*
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A-33: Comparative Study on Weld Quality Characteristics of SS 316L and IS 2062 E250A Dissimilar Materials in TIG Welding

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Abstract: The successful joining of two dissimilar materials has a wide range of applications like in the nuclear sector, oil refinery plants, heat exchangers, and chemical processing equipment's. Effective welding of dissimilar material is need of the hour in recent times because of its unique mechanical properties. In this work, mechanical properties of SS 316L and IS 2062 E250A dissimilar materials welded by Tungsten inert gas welding is studied. Also, the relationship between the welding parameter and the mechanical properties is achieved by correlating the results of experiment and finite element analysis. Specimens were prepared using Taguchi L9 orthogonal array and thereafter finite element analysis, tensile and hardness test is carried out. The results obtained from these methods almost go hand in hand thereby giving out the parameters responsible for superior tensile strength and hardness. Apart from that the correlation gives an idea about the parameter relation to obtain good weld.

Keywords: *SS 316L, IS 2062 E250A, Dissimilar Materials, Taguchi L9 Array, Tungsten Inert Gas Welding, Finite Element Analysis, Tensile Test, Micro Vickers Hardness Test, Weld Quality.*

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A-34: Design and Dynamic Analysis of Radome

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Abstract: Radomes (Radar Domes) are characterized as electromagnetic windows, comprising of spreads or lodgings that serve to shield electronic hardware from effects of environment influences such as dust, wind, and rain. The selection of materials and shape depend upon the radome application. In this paper, zirconia based ceramic material and silicone resin were used for the study. The design of radome depends on the several mechanical factors such as unpredictable outline, non-uniform pressure, non-isotropic materials, impact loads and thermal loads. In this study, a sandwich shaped multi-layered wall structure was modelled using CATIA V5. Further, static and dynamic analysis of radome was carried out under varying boundary conditions. In addition, thermal analysis of radome was analysed using Fluent. The results of the study are shows that zirconia based radomes have good performance over other materials.

Keywords: *Radome, Zirconia, Dynamic Analysis, Thermal Stress Distribution.*

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A-35: Development of Virtual Laboratories – An Evolution of Traditional Laboratories

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Abstract: Industrial sector is now evolving to match the requirements of the Industry 4.0; the educational field is also trying to match this advancement. The various trends in the educational field are coming up as an opportunity. Numerous institutes are grabbing these opportunities and shifting towards the virtual laboratories for improving students' practical based knowledge. Virtual labs can be accessed from remote locations and thus they are useful in distance learning. This paper discusses the paradigm shift of traditional labs towards virtual labs in the field of mechanical engineering. It also includes the design and development of MESCOE MECH SM VLab, a Virtual lab for Solid mechanics. Results were compared for various experiments acquired through different models developed in the VLab. Potency of this lab is validated by taking survey from subject experts and students.

Keywords: *Virtual Laboratories, Stress, IoT, Evolution in Educational Sector, LabVIEW.*

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A-36: Investigational Study on Swarm of Nano Solar Sail

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Abstract: Interstellar propulsion is still a nightmare in Aerospace Industry. Threshold of world aerospace development lasts only up to the distance at which the voyager is

floating. Mass of fuel is the major constraint in development of space thrusters. Solar Sails are a breakthrough in the history of fuel less non electric propulsion came by means of Sailing in space by using the momentum produced by light photons. They utilize light momentum to propel in space. The challenge in implementing Solar sails is its larger surface area usually in square kilometer with a thickness ranging from 10nm to 100nm. So far it is considered, the feasible option is folding the sail to make it accommodatable for launch vehicles. But deployment of such a large sail demands a critical mechanism to unfold the sail in space. This paper discusses a competitive method to launch the sails by creating a swarm of smaller sails and arranging them in space using swarm particle optimization. The solar sail swarm is simulated in MATLAB-Simulink environment and compared with the experimental results obtained from Solar-Sail Ground testing Set Up in Space Combustion Laboratory, MIT Chennai. The results indicate, simulated and experimental values of sail velocities ware 0.41 mm/s and 0.47 mm/s simulated and experimental thrust values are 0.00046 N and 0.0005 N respectively. These data are 93.8 percent nominal and exhibits the efficacy of swarm compared to conventional sail deployment techniques.

Keywords*: Solar Sails, Radiation Pressure, Sail Deployment Techniques, Space Combustion, Electric Thrusters, Di-Electric Film.*
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A-37: Design and Analysis of Knuckle Joint Assembly under Tensile Loading Condition

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Abstract: Better fuel efficiency, emissions issues, and weight reduction have all become major concerns in the vehicle industry these days. Weight reduction can be achieved in this case by using superior materials, optimizing a suitable design, and ensuring high-quality manufacturing. In the automobile industry, leaf springs are employed as suspension in the majority of vehicles. As a result, lowering the weight of leaf spring is advantageous and can assist in achieving the desired goal. Composites are getting closer to achieving weight reduction without sacrificing load carrying capacity or stiffness properties Composite materials have a higher elastomeric strain energy than steel leaf springs, have a higher strength-to-weight ratio, and are lighter. The design and analysis of a cast knuckle joint assembly under tensile load is the subject of this work.

Keywords: *Knuckle Joint, Tensile Load, FEA, CATIA V5, Boundary Conditions.*
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A-38: Numerical Investigations on the Mixing Characteristics of Cold Coaxial Jets in a Dual Combustion Ramjet Engine

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Abstract: In non-reacting flow conditions, the mixing characteristics of the transverse injection in a Dual Combustion Ramjet engine are investigated using both experimental and numerical analysis. The study focuses on the assessment of the supersonic flow characteristics in the vicinity of the gas generator's injection location and downstream. At two positions with varying injection pressure ratios, ranging from 1.875 to 2.125, the fuel is injected. The numerical simulations have been performed by using the Reynolds Averaged Navier Stokes equation with the SST k-ω turbulence model. The computational studies are carried out using commercial software Ansys Fluent. The computational results have been validated with the experimental results and are in good agreement with them in terms of wall pressures. The results reveal that the transverse injection at the inlet of the supersonic combustor enhances the mixing of the coaxial jets with less stagnation pressure loss due to the counter-rotating vortices generated at the nozzle rim of the gas generator. In contrast, these inherent advantages could not be noticed with isolator injection methods.

Keywords: *Dual Combustion Ramjet, Coaxial Jets, Supersonic Combustor, Static Wall Pressure, Stagnation Pressure Loss.*
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A-39: Investigational Study of Phase Evolving Material (PEM) for the Hot Food

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Abstract: The aim of the investigation is to dissect the thermodynamic conduct of the Phase Evolving Material (PEM) and apply the idea of PEM into the hot food stockpiling reason. An exploratory investigation is completed in a food stockpiling vessel; Paraffin wax is utilized as PEM. From exploratory investigation, PEM is a substance with a high warmth of combination where dissolving and cementing at a specific temperature, is fit for putting away and delivering enormous measure of energy. The outcomes affirm that, the proposed idea of hot food stockpiling framework is modest and powerful. This application can be utilized in lodgings, home, and where there is a need to keep food warm.

Keywords: *Paraffin Wax Characterization, Phase Evolving Materials, Latent Heat of Fusion, Thermal Conductivity Properties, Natural Convection Behaviour.*

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A-40: Design Analysis and Manufacturing of Electric Vehicle with Adaptive Headlight

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Abstract: The aim is to design and develop a control system based an intelligent electronically controlled automotive bumper activation system called "IR Sensor PVC Go-Kart for Accident Prevention with Pneumatic Bumper& Braking System". This system consists of IR transmitter and Receiver circuit, Control Unit, Pneumatic bumper system and braking unit. This output is given to logic circuit to indicate the final output i.e. alarm and the control signal is given to the bumper activation system braking unit. The pneumatic bumper system is used to provide safety to the man and vehicle.

Keywords: *Adaptive Headlight, Steering, Ackerman System, Design, Analysis.*
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A-41: Assessment on Effect of Pore Size and Porosity on Strength of Bone Scaffolds through Finite Element Analysis

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Abstract: A key component in tissue engineering for bone regeneration is the scaffold that serves as a template for cell interactions and the formation of bone extra cellular matrix to provide structural support to the newly formed tissue. This paper presents the effect of pore size and porosity of bone scaffold architecture considering load bearing capacity. Tetrakaidecahedron structure is used in kelvin cell for modelling bone scaffold architecture. Various bone scaffold architectures are modelled in Autodesk Inventor 2020 and comparison of various bone scaffold architectures is done using ANSYS software. Analysis revealed that, bone scaffold with kelvin cellular architecture shows significant improvement in stiffness of scaffold than square, circular and triangular architecture.

Keywords: *Tetrakaidecahedron, Scaffold Architecture, Bone, Tissue Engineering, FEA.*
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A-42: Static Analysis and Optimization of Connecting Rod

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Abstract: Connecting rod is one of the most important parts of any internal combustion engine which interfaces the piston to the crankshaft and converts the reciprocating motion of piston into rotary motion of crankshaft and vice versa. Hence connecting rod must be strong enough to bear the various types of thrusts coming from the different parts in contact during the entire combustion process. Due to various types of loads acting on the connecting rod different failure phenomenon occurs during its life cycle. The objective of the present work is to design and optimize connecting rod for its weight and cost. In first part of the work various dimensions of the connecting rod for study purpose were determined and static analysis was performed considering the different materials of the connecting rod. In the second part optimization was carried out for these different materials and compared the results and selected the best suitable material. Optimization gives the best loading conditions and magnitudes with sufficient strength as required. Model of the connecting rod is designed with the help of INVENTOR and further analysis was performed by ANSYS.

Keywords: *Connecting Rod, FEM, ANSYS, Simulation, Static Analysis.*
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A-43: Automation in Fixture Design and ERP Based Manufacturing: A Review

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Abstract: To avoid errors and bring accuracy and speed, automation of the fixture design process is nescessary. Over the last few years extensive research has been done to automate the design process for fixtures its manufacturing and .Computer aided fixture design is used over the years via which the design of fixtures takes place efficiently. The CAD /CAM packages help us in designing, analyzing the fixture in virtual environment. CAE analysis helps us finding the region of high stress, high elastic deflection and regions of possible failure. Thus we can optimize the fixture design and manufacturing in virtual environment, eliminate all the flaws and then manufacture the fixture and continue the manufacturing process. The Statistical Process Control helps in the real time data tracking which reduce error in the manufacturing of the fixtures and during manufacturing of the part. It helps the operators detect the faults in the process and thus prevents accident. The real time data gets stored in the database memory of the SPC software. The software then uses the data for manufacturing purposes in the future. The ERP based manufacturing also is used to centralize the full product lifecycle management of the fixture. Thus, automation of the design of fixture, its manufacturing and centralization with the help of ERP helps us achieve errorless and smooth process.

Keywords-Automation, CAD, Customization, Cloud, ERP
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A-44: Advancement in Agriculture Drone

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Abstract: Agriculture is backbone for Indian economy. So, as it need to be update time to time as other field. In recent years we are introduce to new technology in agriculture field is agriculture drone. For better income needs better production on field. But the crop production is directly or indirectly depending over varies parameters like temperature, humidity, rain, soil moisture, etc. Which are not in the hand of farmers. It also depends on disease, pests, fertilizers etc. Like parameters which can be control by good treatment. Pesticides can increase production, but while spraying pesticides it can affect human health along with pest, disease, etc. The main objective of this product is to protect human health with the increase productivity of field. The main motto of the paper is to introduce recent technology. In this paper we are going to discuss on this technology. This paper is trying to place detail about different types of hardware use to create prototype for agriculture drone.

Keywords: *Agriculture Drone, Pesticides, Crop Production.*
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A-45: Laser Hardening Process Simulation for Cast Iron

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Abstract: Laser hardening is one of the most sought after and innovative method used for surface hardening and can be applied to a vast range of metallic materials. This process enables high quality and accurate results due to the controllability of input parameters. The laser beam is focused on a localized region for hardening that region. High intensity laser beam is used to heat up the surface to the austenitic region. There are steep temperature gradients that arise because of heat changes that ultimately result in cooling through conduction. The hardened martensitic region is determined by the heat distribution caused by the intensity profile of the laser beam. Simulations are very important aspect of laser hardening as it gives us optimal conditions to use and provide us with results after varying parameters. After analyzing simulation results, we can select appropriate conditions to carry out our hardening process. This paper is a review of the fundamentals of laser hardening process. The aim of this research work is to find an average of the case depth of the materials Cast Iron, and then further find the optimum conditions for both the materials under which laser hardening should be performed

ideally.

Keywords: *Laser Hardening, Cast Iron, Heat Distribution.*
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A-46: A Review on Polymer Gear Applicability for Power Transmission

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Abstract: Gears are one of the most vital components in the mechanical power system and are also used in most industrial machinery. Metallic gears have high noise, more wear, and friction during its operation and such types of gears have more cost. To avoid such difficulties associated with metallic gears, they are replaced by plastic gears. Composite polymer gears are used in various engineering applications due to their properties like self-lubricating, better wear resistance, low cost, and mass production possibility. This paper reviews the different design and testing procedures for performing plastic gears under various load applications.

Keywords: *Polymer Gears, Failure, Material, Wear.*
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A-47: Design and Development of Electromagnetic Braking System for Automobiles SUV type Vehicles

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Abstract: Electromagnetic brake is currently under process for future use. It needs to be more reliable and more efficient in working. In this project we are working to analyse the parameter and their affectivity on the working of the system. This brake has better response at higher range of speed and also higher life span due to frictionless working of the system. There is need for better heat abstraction for higher life range, reliability and lower the failure chances.

Keywords: *Electromagnetic, Braking System, Electromagnetic Brake.*
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A-48: Comparative Analysis of Passive and Semi-Active Suspension System for Different Road Profiles by Using Matlab/Simulink

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Abstract: The objective of this work is to examine optimum performance evaluation between passive and semi active suspension system by doing comparative analysis subjected to different road profile with the help of MATLAB Simulink. Basically, we know that semi active suspension

system has been used as a mediator methodology between passive and semi active suspension system but for understanding of why it is ideal over passive suspension, we have performed this study to analyse it on performance basis. We have selected 6 road profiles named as Full sinusoidal road profile, Step wave road profile, square road profile, triangular road profile, Trapezoidal Road profile and Double bump or pulse road profile. Based on the equation of motion we have generated two different MATLAB Simulink program for passive suspension system and for semi active suspension system respectively. To compare both, one separate program has built to call individual prior model as a subsystem and make conclusive results. *For semi active suspension system, we have used PID controller to get optimized results and we provide road input to them. Above mentioned road input generates disturbances as per their functionality and fed it to the system, then suspension systems objective comes into the picture that is reduce instability by reduction in vibration and provide ride comfort by nullifying the shocks considerably. Their individual performance is compared in graphical form along with the nature of input i. e. road profile and amplitude of it. Finally, we concluded that semi active suspension system is more suitable to get optimized results to fulfil suspension functionality.*

Keywords: *Passive, Semi-Active, PID Controller.*
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A-49: Effect of Dynamic Digestion and Static Digestion on Biogas Production Rate Using Multi Phase Flow Digester

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Abstract: Long cycle digestion and low gas production rate all these are disadvantages of traditional anaerobic digestion technique. To improve or to increase the rate of production of biogas and to maintain constant temperature during winter season a 4 m^3 capacity a multiphase flow digester is developed in this study. Experiments were conducted on this system and at different temperature 50 days trials are taken. These 50 days trials shows that dynamic digestion has more rate of production of biogas as compared to static digestion. It is also noted that the heat transfer rate increases and slurry temperature increases due to this technique. The optimization of the system is depending on the slurry temperature and biogas production rate. The optimum digestion temperature is proposed and find in this study. There is effect on digestion temperature due to insulation thickness. It is calculated in this study.

Keywords: *Multiphase Flow Digester, Biogas, Slurry Temperature, Dynamic Digestion.*
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A-50: Design Optimization of Motorcycle Mirror to Reduce Vibration for Clearer Image of Rear View

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Abstract: The side mirror is an important device for observing objects both from sides and behind. All motorbikes, cars and other vehicles have side mirrors. They are very crucial for smooth driving. Drivers can judge both side traffic coming from behind in these mirrors. As per traffic annual data, many accidents happen due to malfunctioning and not observing mirrors at the proper time. "Mirror" vibrates too much during vehicle running condition on the road. Hence this research paper/project mainly focuses on the design optimization Motorcycle "Mirror" to reduce vibration for better rear-view image.

Keywords: *2W Mirror, Mirror Design, Regulation, Safety, Design & Development.*
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A-51: Performance Investigation of an Automotive Car Radiator Operated with Nano Fluids Based Coolant

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Abstract: In this paper, we will do a performance investigation of an automotive car radiator by using Nano fluids-based coolant. This work will investigate the use of aluminium oxide (Al2O3) and copper nanoparticle (CU) nanoparticles. There will be two occurrences happening in a heat exchanger: fluid flow in channels and heat transfer between fluids and channel walls. Thus, an enhancement to heat exchangers can be achieved by improving the processes occurring during those process. Nano fluids, display much higher heat transfer characteristics compared to traditional heat transfer fluids. The investigation is planned to be conducted for broad ranges of the Peclet numbers, and volume concentrations of suspended nanoparticles. The outcome expectation is to measure the importance of Peclet number on the heat transfer characteristics. This experiment is to investigate the concept of using Nano fluid in heat exchangers. The optimal volume concentrations in which the heat transfer characteristics become the highest enhancement is also conveyed. Finally, the structure of different Nano fluids will be compared.

Keywords: *Nano fluid, Automotive Car Radiator, Heat Transfer Enhancement, Aluminium Oxide Copper Particles.*
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A-52: Blockchain for Intelligent Manufacturing: Impact, Application & Challenges

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Abstract: The fourth Industrial Revolution has started to change the factories of the new world and is now moving towards becoming an integral part of the manufacturing system. Through the Industrial Internet, organisations with a particular level of communication technology adoption will be able to interact and collaborate with virtually any other enterprise. Every second, an enormous amount of data and information is produced, stored and analysed. All the strategic decisions of a company will be based on this data. Incorrect judgments can be made as a result of inaccurate, illegitimate, or manipulated data, posing a major risk to the future of an organisation. To overcome this problem a DLT (Distributed Ledger Technology) called Blockchain is introduced. Blockchain enables real-time transparency and traceability, which aids an organization's transition to sustainability. The manufacturing industry's main challenges, such as transparency in logistics, large scale collaborative production, and security, are all inherently compatible with the Blockchain technology's basic characteristics. The purpose of this study is to examine the impact of Blockchain technology in the manufacturing industry, as well as existing risks that may be mitigated via its use. The challenges that arise in real time as a result of Blockchain adoption and the areas for improvement. It is discovered that simulation techniques must be considered, and a first step toward implementation is provided. This paper describes the implication of Blockchain Technology and suggests the rising disruptive technology solutions.

Keywords: *Distributed Ledger Technology (DLT), Blockchain Technology, Intelligent Manufacturing, Industrial Internet.*
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A-53: Development and Analysis of Passive Suspension Model with Half Sine Wave Road Bump for Different Suspension Parameters

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Abstract: In this paper, an actual road bump profile has been developed for the passive suspension system by tracing mathematically and MATLAB^{r20} coding. The profile is generally in the shape of a half sine wave. The passive suspension system in a quarter car is been analyzed for the actual road bump with the effective changes of input. In the vehicle suspension, the optimal suspension should fulfil the following basic requirements: ride comfort, reduction of dynamic road-tire forces, and reduction of relative motions between the vehicle bodies. The output parameter is ride comfort which is nothing but the root mean square of acceleration of vehicle displacement concerning time. As rider comfort is a significant factor for freshly designed modern automobiles like electric and

hybrid vehicles, the automobile industries are working to improve the design and provide passenger comfort in high-speed automobiles. The car dynamics are being studied using a quarter-car model. This project's goal is to look at vehicle economy in terms of ride comfort and road holding. A two-degree-of-freedom framework quarter-car model is used to analyse the dynamic response of ride efficiency and road keep. In the MATLAB/SIMULINK™ setting, a mathematical model of the road profile to a quarter car with sprung and unsprung masses is built and simulated. The system's equations are solved using MATLAB SIMULINK, which is then used to evaluate the system's behavior and determine the impact of damping coefficient, stiffness, sprung mass, and velocity on ride comfort and ride keeping.

Keywords*: Passive Suspension, Ride Comfort, Robustness, SIMULINK Block Model Design, Newton's Law of Motion, Scope Graph, MATLAB, SIMULINK.*
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A-54: Simulation of Laser Hardening Process of EN8 and EN24 Steel

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Abstract: Laser surface hardening is an efficient method used to enhance the tribological properties and increase the product life of mechanical components used in various engineering industries. This project report comprises the laser hardening simulation of materials EN8 and EN24 Steel using ANSYS 2020 R2 ACADEMIC simulation software. This study aims to determine the optimum scanning speeds required for martensitic transformation to occur in the materials EN8 and EN24 at varying power levels. As the power intensity of the laser increases the surface temperature, the surface of the material reaches its austenitic state and is cooled rapidly causing the material to harden. The martensite formation is observed by studying the temperature profile corresponding to the surface temperatures of the material at each iteration of the simulation. Each iteration was simulated by varying the laser scanning speed and the laser power and by keeping the laser beam diameter constant. The results were further analysed and the iteration corresponding to the desired output were selected.

Keywords: *Laser Hardening, EN8 & EN24 Steel, Tribological Properties, ANSYS.*
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A-55: Optimization and Performance Analysis of Heat Pump Air Conditioning System using Alternative Refrigerant

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Abstract: According to the F-Gas guidelines, a dangerous atmospheric deviation has arrived at basic levels, impediments have been set on the utilization of certain fluoride-containing refrigerants. The EU F-Gas Regulation has presented amounts for the utilization of refrigerants with an unnatural weather change potential (GWP) more prominent than 150. In the current work, the effect of different refrigerants on the proficiency of the warmth siphon activity is explored. Fitting working scope of five HFC refrigerants, for example, R-600, R-290, R-407c, R-410a, R-404a, for utilizing a warmth siphon is studied. Various Refrigerants like R-600, R-290, R-407c, R-410a, R-404a are broadly utilized in heat siphon frameworks. Thinking about the ecological effect of these refrigerants, search for long haul choices to conform to F-gas guidelines. In the wake of looking at the over five distinctive Hydrocarbon (HC) refrigerants dependent on their warm and actual properties like Critical Pressure (Bar), Heat of Vaporization Kj/Kg at 25˚C Vapour Density kg/m3, Boiling Point, Critical Temperature ˚Cost, Freezing Point ˚C, Specific Heat of Vapour CP 25˚C (Kj/Kg.k) are displayed as appropriate choices for heat siphon applications. Subsequent to utilizing the Vikor Optimization strategy R290 as HC refrigerant is a potential refrigerant appropriate for existing HFCs frameworks because of zero ODP and low GWP. The presentation of warmth siphon was dissected and contrasted and usually utilized refrigerants including R-600, R-290,R-407c,R-410a,R-404a as far as warming coefficient of execution (COPh), pressure proportion (CR) and releasing temperature (DTIt is vital to realize what these components mean for the buildup execution in various plan circumstances. The results accomplished in present examination may give the directions to the plan and advancement of productive heat pump frameworks. The Thermal and Physical Properties of various Refrigerants are additionally researched in the Coolpack Software.

Keywords: *R-290, HFC, COP, GWP, ODP.*
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A-56: Use of Ethanol as an Alternative Fuel for IC Engine – A Review

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Abstract: In this era of technological advancement in modern vehicle technology the Hunting for more cleaner and efficient fuel had become the hot topic as it is believed that the main cause of climate change is taking place due to usage of fossil fuels. The research on lots of alternative fuels is taking place but the most viable option for adoption seems to be Ethanol as it has higher octane number as compared to gasoline and environment friendly. This review paper aims to study different percentage of blending of gasoline and ethanol by observing different performance parameter of IC engine. And tries to answer certain questions related to ethanol percentage and adaptability of current vehicle design in Indian market.

Keywords: *Ethanol, Blending, Emission, Fuel Consumption.*
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A-57: Experimental Analysis of Riveted and Hybrid Joints for Composite Structures using Finite Element Analysis

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Abstract: Composites are used extensively in numerous engineering applications as well as automotive, aerospace, and building industries. Increasing use of secured structures is envisaged for reducing fastener count and riveted joints and there by drastically reducing assembly price. Adhesive bonding has been applied with success in several technologies. Modelling, static analysis of 3D models and production of the composite joints (bonded, riveted and hybrid) were performed using FEA computer code. The results were understood in terms of Von Mises stress. To utilize the total potential of composite materials like optical fibre - epoxy as structural parts, the strength and stress distribution of those joints particularly, bonded, riveted and hybrid joints should be understood while conducting experimental works. Numerous joints like secured, riveted and hybrid joints were ready by optical fibre epoxy composite laminates. Then endure for tensile take a look at by universal testing machine with information acquisition system. The results can then be compared with the joints. The simplest Joint is identified by their load Bearing capacity. Hybrid composites made of 2 or additional completely different reinforcements show increased mechanical properties needed for advanced engineering applications. Many problems in composites were resolved throughout the previous few years through the event of recent materials, new ways and models for hybrid joints.

Keywords: *Hybrid Composites, Glass Fibre, FEA, Static Analysis.*
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A-58: Sugarcane Cultivator Vehicle

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Abstract: In traditional process the plantation of sugarcane is done through manpower that is very complicated and time consuming, it requires human workforce for various unit operations like planting, weeding, earthing up, fertilizer application, and harvesting. In early modern era agriculture is also developed .Now days lots of Mechanization takes place in various process of sugar cane farming. Our project is based on design and development of semi-automated sugar cane planting machine for farmers. After development of product no need of labours needed for plantation process, farmer itself can done his job. The sugarcanes fill in that furrows with the help of mechanism. The covering plates provided at the back of the vehicle then pushes the soil back on the seeds . It is a multifunctional machine we can spray fertilizer, fungicide and insecticide by

incorporating a tank as well. In traditional method of plantation purpose more labours required, more time required thus cost increases thus we will be able to provide economical product which reduces labours, time and cost involves in it.

Key words: sugarcane, economical, multifunctional
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A-59: Experimental Investigation on the Effect of Optimized Dimethyl Carbonate on CI Engine Performance and Emissions at various Engine Operating Parameters using Taguchi Method

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Abstract: The reduction of emissions from diesel engines has been one of the primary elements in obtaining improvement in air quality. In the present work we analyse effect of Dimethyl carbonate (DMC) as fuel additive on CI engine on reduction in Smoke and NOx emissions and try to optimise the percentage of Dimethyl carbonate (DMC) and operating parameter to achieve better fuel efficiency and emissions using Taguchi method. Our study evaluated the impacts of 5%, 10%, 15% and 20% blends of DMC in diesel fuel. This DMC blends are tested with three significant parameters as compression ratio (CR), fuel injection pressure (FIP), fuel injection timing (FIT) has been taken. In this test, the input parameters are taken as 200, 220, 240, 260, 280 bar for FIP and 15:1, 16:1, 17:1, 18:1, 19:1 for C.R. and 21º, 22º, 23º, 24º, 25º before Top Dead Centre (bTDC) for FIT. Furthermore, the best solution based on Taguchi method, decreases both NO_X and Smoke emission.

Keywords: *Dimethyl Carbonate, CI Engine, Compression Ratio, Fuel Injection Pressure, Fuel Injection Timing, Taguchi Method.*
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A-60: A Review on Optimization of Injection Techniques in Naturally Aspirated, Turbocharged Hydrogen Fuelled Spark Ignition Engine

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Abstract: In the present paper, literature has been reviewed on variable injection duration of hydrogen fuel for different combustion pressure in the SI engine. The optimization of a hydrogen-operated engine with a variable manifold injection system began with a technical assessment that included an extensive literature review of the past literature. The researchers have determined the effect of performance parameters on various blend percentages of hydrogen accompanying conventional fuels such as alcoholic fuels, gasoline, diesel, and CNG. The increasing proportion of hydrogen content with other alternative fuels has a divisive positive impact on engine performance and exhaust emissions. The combustion reaction gets affected in heavy-duty engines

at a lower speed range with medium load is investigated numerically by Ahmadi (2018) et al. With the increasing percentage of hydrogen gas, a rise in ignition delay transpires as the combustion pressure increases. These factors influence the chamber temperature so that a considerable change in emissions is observed. Hydrogen is a magnificent constituent of a combustion mixture to achieve satisfactory results in low-speed engine applications. The hydrogen combustion operations are carried out by researchers within the thermal limits of the existing base engine hardware to avoid its metallurgical eradication. Investigators have contributed to improving the performance of engine and for reducing the emissions in hydrogen-fueled engines. The researchers have reshaped the functional features of the spark-ignition engines by making hydrogen operations compatible with the existing infrastructure. The researchers have modified the test engine to an electronically operated, timed injection system for effective control of engine input parameters. The trial results show the reduction tendency in maximum brake power but increasing brake thermal efficiency in hydrogen operation. Reduction in NOx is detected at higher speed operations for hydrogen fuel. The past results show that combustion heat release rate and maximum cylinder pressure increase with increasing speed for hydrogen as compared to other base fuels.

Keywords: *Turbocharged, Hydrogen, Lean Burn, Engine Optimization, Port Injection, NOx, Manifold Injection, Injection Pressure.*
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A-61 Investigation of tensile strength of notched fiber-reinforced composite specimen for various layup pattern

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Abstract: For a variety of reasons, high-performance composite systems are often designed with different shapes and size discontinuities. Under different working loads, the areas near these notches become vital regions. The double-edge-notched Carbon fiber Specimen is investigated using a combination of analytical well as finite element (FE) simulation techniques to check the Tensile strength Stress concentration factor and delamination in this research study. In notched composites, the occurrence of subcritical damage has a considerable impact on the overall strength of the component. This experiment is a thorough investigation of three separate carbon fiber layups, which were examined in tension using a triangular, rectangular, and circular double-edge-notched specimen. Static analysis of carbon fiber plate having triangular and circular double-edge-notched specimen will be performed using ANSYS19 software. Comparative analysis will be done with FEA Experimental results using MCDM Techniques. Conclusion and future scope will be suggested.

Keywords: *Composite; Carbon Fiber; Failure mode; FEA; MCDM Techniques.*
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A-62 Wear analysis performance and simulation of External Gear Pump

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Abstract: As a kind of hydraulic power component, the external gear pump determines the performance of the entire hydraulic system. Gear pumps are subjected to various degradation such as wear which deteriorate the performance of the gear pump. The purpose of this research is to analyse the wear degradation of external gear pump under various operating conditions like speed, pressure and radial gap between gear tooth and casing. As wear affect the performance of gear pump, optimization of operating conditions on the performance of gear pump was studied. External gear pump is modelled in Fusion 360, and ANSYS CFD analysis was used for the simulation of volumetric efficiency under various operating conditions, which was later finalised by DOE. The pump was simulated at different operating speeds like 900RPM, 1800RPM and 3000RPM as well as different radial wear gaps.

Keywords: *Gear pump, wear particle analysis, spectrometry, condition monitoring.*
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A-63 Review on solar powered cooling system integrated with PCM

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Abstract: India is a country producing varieties of fruits and vegetable every year, but per year availability of fruits and vegetables is very less because of post-harvest losses. So, there is a need to develop more and more cold storage system to reduce post-harvest losses. The initial cost and running cost of cold storage systems is very. Number of researchers used renewable energy as key source to produce power. Solar energy is freely available energy which can be used to generate power. Also, some researchers used Phase change material to save energy. This paper discusses about technologies developed by researchers to save energy for cold storages.

Keywords: *Solar PV panels , Solar collectors, PCM.*
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A-64 The simulation of laser surface hardening process for ck45 steel using FEA

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Abstract: LASER hardening is the process in which surface hardening of complex parts can be done efficiently than other processes. LASER can be utilized for hardening remote areas of parts where other processes cannot be utilized. Also helps in control of various parameters like hardening depth, temperature etc. In this present work we find out

temperature distribution over a workpiece using FEA software. Laser hardening is exercised to enhance surface mechanical and wear resistance of target materials. This process is easy to use for enhancing surface properties of intricate shape components with minimal time requirement. The benefit of this process is that it is possible to improve only selective surface properties without changing the remaining surface properties of bulk material. Cast iron ck45 steel has numerous important properties like hardness, superior wear resistance and frictional performance etc.

These properties are useful in various industrial applications. The temperature distribution over a workpiece directly co-relates with the laser beam power and from the laser beam power we achieved depth of hardness of selected material. The laser beam power, velocity, beam dimeter and melting temperature of given material are the most important parameters used in the FEA analysis. We consider 400 W optic fiber laser for the simulation process and varying the laser beam power within this range.

Keywords: *LASER, Hardening, Ck45 Steel, FEA etc.*
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A-65 Biogas production and its cost analysis in all aspects

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Abstract: Energy which is produced from biodegradable organic waste is biogas. It is a green and cost-effective replacement of water. Potential to meet the energy requirement in rural areas and counter the effect of reckless burning of biomass resources. This waste can be utilized for both centralized small scale biogas production and bottling. One of the major concerns of biogas plants can't be operated economical and environmentally sustainable manner. In order to produce biogas in rural areas, using anaerobic systems with high organic content of farm wastes can be able to remove these concerns. The production of biogas can then be used for cooking, lighting and heating.

Keywords: *Biogas, Cost-effective, Rural areas, Anaerobic systems.*
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A-66 Car detection using Python

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Abstract: In transportation, vehicle detection system may be defined as a system which can detect vehicles and measure traffic parameters such as count, speed, incidents etc. Also, vehicle detection can be used for various transportation applications like autonomous vehicle guidance, vehicle safety, etc. Vehicle detection by video cameras is one of the most promising non-intrusive technologies for large scale data collection and

implementation of advanced traffic control and management schemes. It is also the basis for vehicle tracking.
Video based vehicle detection technology is an integral part of Intelligence Transportation System (ITS), due to its comprehensive vehicle behavior data collection capabilities. The goals of ITS are to enhance public safety, reduce congestion, improved travel and transit information. ITS technologies assist states, cities, and towns nationwide to meet the increasing demands on surface transportation system.
This repo illustrates the detection and tracking of multiple vehicles using a camera mounted inside a self-driving car. The aim here is to provide developers, researchers, and engineers a simple framework to quickly iterate different detectors and tracking algorithms. In the process, I focus on simplicity and readability of the code. The detection and tracking pipeline is relatively straight forward. It first initializes a detector and a tracker. Next, detector localizes the vehicles in each video frame. The tracker is then updated with the detection results. Finally, the tracking results are annotated and displayed in a video frame.

Keywords*: Car detection, Python, Intelligence Transportation System.*
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A-67 Development of Electrically Operated Tiller Machine for cultivation of crops

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Abstract: Earlier Farmers were using Traditional farming methods which is time consuming and hardworking hence we introduce new technology called tractors which can be used as cultivator to plow/cultivate land. Generally, these machines are costlier, polluting our environment and not affordable to our Indian farmers, hence we decided to research and make compact portable electrically operated cultivator (Tiller) machine at affordable rate. Working of this machine is based on battery and motor mechanism which can be capable to move cutter or tiller. Rather than developing IC engine-based mechanism we prefer to work on electrically operated mechanism as it is clean source of energy and don't pollute environment as well. Majority of our Indian farmers adopt subsistence farming in which they follow traditional farming methods. Such farming is very hardworking and not more efficient, so our basic aim of project is to develop small portable cultivator machine which turn them towards modern farming methods. This article describes design, manufacturing, fabrication analysis of proposed model. Our project aims to achieve high safety, reduces human effort, increases the efficiency of tiller machine, reduces the workload, and reduces maintenance cost.

Keywords: *BLDC motor, Battery, controller, wheels, tiller, differential.*
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A-68 Design and fabrication of Surface Water Cleaning Machine

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Abstract: Earlier for cleaning water sources we were using Traditional cleaning methods which is time consuming and hardworking hence we introduce new technology called cleaning machine which can be used as cleaning device Generally, these machines are costlier, heavy and require manual operating and not affordable to our Indian water body, hence we decided to make compact portable surface water cleaning machine at affordable rate. Working of this machine is based on battery and motor mechanism which can be capable to move cutter or tiller. Rather than developing IC engine-based mechanism we prefer to work on electrically operated mechanism as it is clean source of energy and don't pollute environment as well. Majority of the waste that are accumulated on Indian water bodies are solid in nature like plant decay polythene farming methods. Cleaning of this water bodies are very hardworking and in turn require large time and human labor and not prove efficient so our basic aim of this project is to develop small portable cleaning machine which turn them towards modern which can be made to operate on river front and small water body. This report describes design, manufacturing, fabrication analysis of proposed model. Our project aims to achieve high safety, reduces human effort, increases the efficiency of the soil tiller, reduces the workload, reduces the fatigue of workers, and reduces maintenance cost.

Keywords: *od 555motor, Battery, teeth , anchor, chain drive.*
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A-69 Design, development and analysis of Onion Cold Storage System

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Abstract: India is the second largest producer of onion. In India, onions are cultivated under the tropical areas, where nearly about half of cultivated onions damage out of their total production because of certain losses which can be avoided by temperature and humidity control. Thus, our aim is to design proper and adequate storage, which will bring relief to the farmer. Refrigeration is important technique by which, we can store fresh food and vegetables to maintain their freshness for long life. This study includes various aspects of design, analysis and modification of storage, which also contain all standard refrigeration principle and heat load factor, which are generally considered for design of cold storage. The capacity of cold storage is fifty Tones and heat load obtained for the same is 26.11 TR. The CFD analysis was done to obtain velocity flow pattern

inside the storage along with the analysis of heat flow to the surroundings.

Keywords: *cold storage, refrigeration system, automation, controlled atmosphere.*
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A-70 Pressure Characteristics of Oil-water Flow in Microchannel

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Abstract: Herein, we present the study of evolution of local pressure characteristics of oil-water flow in a T-junction microchannel. In order to capture the interfacial phenomenon, we employ the volume of fluid model that is available in the commercial software, Ansys Fluent 2021 R1. The formation of flow morphology at various flow ratios (oil/water) and their corresponding pressure characteristics were analyze. It was observed to display a repetitive pressure profile during each stage of the droplet formation. The simulations showed that the local pressure reaches its peak before ejecting out the droplet. This is followed by a decrease in local pressure due to the retraction of the interface along its inlet. The peak pressure was found to vary with velocity ratio. The droplet size was found to decrease with the increase in velocity ratio. The results in the present work can be of significance for understanding the mechanism of droplet formation and its inter-competing forces.

Keywords: *microchannel, two-phase, pressure characteristics, volume of fluid, and droplet Introduction.*
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A-71 Modified Frequency Response Curve Test Rig

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Abstract: Design and development of frequency response curve test-rig for estimating the vibration characteristics of various materials. The salient features of the test rig, which makes it possible to conduct a set of experimental cases to determine the nature of vibration under different variations and the test. Using the test-rig developed, the main objective is to analyse the transverse vibrations of various materials and to study the effect of excitation on vibration response. A comparative study is performed on the effect of variations in the characteristics of the material and system parameters on frequency and amplitude of vibration for different conditions.

Keywords: *Vibration, Frequency response curve, Test rig.*
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A-72 Review on use of various blends of soya bean oil-based biodiesel in CI engine

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Abstract: Biodiesel is an alternative diesel fuel that can be produced from renewable feedstocks such as vegetable oils, waste frying oils, and animal fats. It is an oxygenated, non-toxic, Sulphur-free, biodegradable, and renewable fuel. Many engine manufacturers have included this fuel in their warranties since it can be used in diesel engines without significant modification. The present study deals with details of methodology for production of biodiesel such as from soybean oil and cotton-seed oil to investigate its characteristics. Soybean and cotton-seed oil-based bio diesel properties are observed and tested in the fuel testing laboratory with standard procedures. It was found that soybean oil-based biodiesel has closer properties with diesel fuel. Then an experimental set-up was used by researcher in the study to analyze the performance, combustion and emission of soybean and cotton-seed oil biodiesel with respect to normal diesel by using different blends such as (B20, B40, B60, B80 and B100) for soybean and (B5, B10, B15, and B20) for cottonseed. It was observed that there is no difficulty found in running the engine, but the performance of the bio-diesel blends is quite deviated from the normal diesel. The combustion characteristics of the tested blends agreed with the normal diesel. The carbon emissions were much lower for soybean oil bio-diesel blends than diesel.

Keywords: *Biodiesel, Combustion, cotton seed oil, Diesel Engine, Emissions, soyabean oil.*
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A-73 Failure analysis of a clutch release bearing and way forward to resolve issues

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Abstract: The study aims to perform the fault analysis of Clutch Release Bearing and study its patterns when it goes under failure. The Clutch functions the transmission of engine power to the wheel. The clutch release bearing helps make this disengagement possible and allows the clutch plate to rotate freely between them. The common phrase for improper functioning of vehicle clutch we experience is that 'The bearing failed' and with the question we must understand that along with bearing geometry and design and theoretical design life of the bearing, it fails prematurely because of the following causes: Fatigue, Poor lubrication, contamination. Along with these failures, the study highlights the failure modes of improper fitment and the functioning condition viz noise, overheating, burning due to bearing seizure. The purpose of study is to help us understand the causes of failure and possible improvements to avoid failures, increasing the life of bearing. The study and data collected helps to understand and identify the failure mode in the system hence proving it to be easy for the manufacturers to solve the problem. Bearings are initially physically examined. For further failure mode testing and analysis ANSYS and

SOLIDWORKS is used. 3D modelling of the clutch release bearing has been done using Siemens NX. A Failure analysis report is generated stating the probable reasons, statistics of the tests and functioning of the bearing. The paper also includes the necessary corrective preventive actions to be made and the way forward to continue the production efficiently

Keywords: *Fault analysis, clutch release bearings, failure mode, ANSYS, Siemens NX, Solid works.*
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A-74 Design and development of automated manual transmission working prototype on two-wheeler

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Abstract: Moped and motorcycles are widely used in India. Present motor-cycle gear shifting mechanism is manual. AMT and AT are gaining popularity in passenger cars due to user friendly operation, and better traction control. This paper cover development of an automatic gear shifting system for a popular Indian motorcycle. The system the manual mechanical gear shifting remains unchanged, because an additional electromechanical system is placed on the top for clutch & gear shift operation. The objective is to automate the gear transmission in a gear featured bike for ease of driving. A simple algorithm based on speed of vehicle is proposed, which perform clutch operation and gear shift without manual intervention. This is achieved by embedded system as it can reduce the number of electrical components, easy interface and low probability of failure. Microcontroller Arduino UNO is used in this work. Embedded 'C++' Language code is written and stored in the ROM of the microcontroller.

By implementing this system into a clutch feature bike, automatic transmission of gears while driving the motor bike can be achieved. The components used in this proposed 2-wheeler AMT systems are Arduino UNO , Stepper Motor NEMA 23 , Stepper Motor NEMA 34 LCD Display, Hall Effect Sensor.

Keywords: *AMT, Gear Shifting Strategy.*
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A-75 Study of various forecasting models for time series data, using stochastic processes

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Abstract: The data which is in time stamped format is called as time series data. The time

series data is everywhere for example Weather data, Stock market data, health care data, Sensor data, network data, sales data and many more .Time series have various components due to which the time series data became complex. Trend, Seasonality, Cyclical, and irregularities, these are different components. As everyone interested to know about future. That's why Forecasting using time series data is important point of consideration. This research paper focuses on components of time series data simultaneously study of different time series modelling and forecasting techniques which are based on stochastic processes. Mainly all the models discussed here focus on use of past time series data for forecasting future values. The Research paper covers AR, MA, Random Walk, ARMA, ARIMA, SARIMA, and Exponential Smoothing processes (single, double and triple) which are used for forecasting time series data.

***Keywords**: Time Series data; ARMA; ARIMA; SARIMA; Exponential Smoothing; Stochastic processes for forecasting.*
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A-76 Design and analysis of roll cage for SAE Baja vehicle

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Abstract: This project deals with the Design and Analysis of Roll Cage for SAE Baja Vehicle. In a Baja vehicle the roll cage is one of the main components. It is the main subsystem of ATV on which the other subsystems such as Engine, Steering and Transmission are mounted. It also surrounds and protects the occupant in case of impact and roll over incidents and gives the aesthetics to the vehicle. The forces acting on vehicles from various directions are responsible for crack initiation and deformation in the vehicle as a result stress are generated. In this paper an attempt is made to find out these areas by carrying out FEA of the roll cage. The design procedure follows all the rules laid down by SAE rule book for m-Baja cars. We have carried out crash analysis (front, rear, side impact, rollover) and torsional analysis, and based on the results of a comparative study was done before finalizing the design. All computational analysis was performed using ANSYS, SOLIDWORKS, and SIMSCALE.

***Keywords:** Roll cage, Baja vehicle, ATV, FEA.*
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A-77 The effects of hardness of different impacting particles and target materials on slurry erosion wear

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Abstract: The effects of target material and erodent's hardness on erosion wear rate of different ductile materials systematically examined in present study. Accordingly, four

different grades of S.S. spherical particles (CrNi, CrLn, CrS and Cr) with similar density (7860 kg/m^3) having different hardness (300-500 Hv) were used to impact on four different target materials (AA6063, SS304L, Copper and Brass) at two different orientation angles (i.e., 30° and 90°). The particles of size 362.5 μm with 10% wt. solid concentration are used to impact at 4 m/s velocity on target surface at 30°impact angle for 1 hour test duration. The kinetic energy of impacting particles was kept constant during all experiments by varying test durations for 30° and 90° orientation angles. The maximum erosion wear was observed from all four target materials due to impact of higher hardness of Cr grade S.S. particles as compared to other three grades of S.S. erodent (i.e., CrNi, CrLn, and Crs) at both 30° and 90° impact angles. On the other side the higher hardness of SS304L target material having more resisting effect on erosion wear as compared to other three target materials. This shows that the hardness of striking particles and target material having adverse effect on erosion wear from target surface. However, the hardness ratio represents the erosion wear of different possible combinations of erodent and target surfaces. The average mass loss from target surface increases with increasing the hardness ratio of erodent and target material. This reveals the material loss from target surface is a strong function of hardness ratio and could be used for developing the empirical relation. Scanning electron microscopic images also shows the difference in craters geometries formed on different hardness of target materials.

Keywords: *Erosion wear; Hardness; spherical stainless-steel particles; SS304L; AA 6063;Brass; Copper.*
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A-78 Numerical analysis of gas turbine blades through different geometric configurations of cooling holes

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Abstract: Gas turbines have an important role in electric power generation. Turbine rotor blades are most important components in a gas turbine power plant. Turbine blades are mainly affected due to static loads and temperature. The specification data for gas turbine is obtained from 'Ahlone Power Station', in Myanmar. Materials of the gas turbine rotor blade are chosen as Nickel alloy, Titanium. The gas turbine rotor blade height is 0.0826 m, rotor blade chord is 0.0645 m and rotor blade thickness are 0.0129 m. The gas turbine rotor blade inlet temperature is 1622°C and rotor blade outlet temperature is 1478°C Gas turbine blades need cooling to keep the metal temperature at safe level to ensure a long creep life and low oxidation rates. The solid model of the blade profile is generated in CATIA V5 as per standard dimensions. CAD geometry is then imported to ANSYS workbench to perform thermal analysis on the rotor blade. A thermal analysis has been carried out to investigate the direction of temperature flow, total heat flux, directional

heat flux. To optimize the cooling rate of the blade, method of cooling holes is used. Different grids of cooling holes are used for this purpose. Further Modal Analysis is carried out. An attempt to suggest the best material along with the best cooling hole geometric configuration for a turbine blade is made in this paper.

Keywords: *Gas turbines, Turbine blades, Cooling holes, Numerical analysis, Thermal analysis.*
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A-79 Mechanical, tribological, thermal properties of Aluminum – 7075 reinforced with red mud/fly ash metal matrix composite

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Abstract: The term Metal Matrix Composite (MMC) refers to composites with metallic matrix having reinforcing constituent mostly in the form of ceramic. Reinforcement is normally nonmetallic. Composites with aluminum alloy matrix (AMCs) and ceramic reinforcements are popular candidates in automotive, aerospace and defense fields because of their high strength-to-weight ratio, stiffness, impact strength, wear resistance, etc in comparison with their iron-based counterparts. The major problem associated with reinforcement of MMC is the cost of reinforcement. Fly ash can be explored as reinforcement due to its low density, good physical properties and is significantly cheaper than other reinforcements. Incorporating fly ash into aluminum alloys will not only reduce the environmental pollution but one can develop value added products at low cost. Red mud, another cheap reinforcement is the waste material during the production of alumina from bauxite in Bayer's process. The red color is caused by the oxidized iron present, which can make up to 60% of the mass of the red mud. Red mud contains oxides of iron, titanium, aluminum, and silica. It also contains other minor constituents. In order to improve the Mechanical, tribological and thermal properties of Aluminum – 7075 reinforced with red mud/fly ash metal matrix composite a detailed review is presented in this paper.

Keywords: *Metal matrix composite; reinforcement; red mud/fly ash.*
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A-80 Design and manufacturing of light weight crash protection attachments curated for sports bikes

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Abstract: For the street, track or trail, investing in motorcycle crash protection pays off in dividends the first time you drop your bike. One serious road accident in the country occurs every minute and 16 people die on Indian roads every hour. Our project is based on the design and manufacturing of bike crash accessories. The ends of the Fork Sliders will be made up of Black Delrin, which has the added advantage of being highly abrasive. Thus, if you fall while riding, it sacrifices itself to some extent and absorbs some crash energy. The core inserts and the rod of the Fork Sliders will be made from Aircraft Billet Aluminium, thus being sturdy and lightweight at the same time. Bolts are made up of Stainless Steel, to provide a rust proof experience. The Frame Sliders (also known as Frame Protectors, Crash Protectors and Crash Bobbins) on the other hand are a means to reduce the damage to the frame (around the engine) and fairing of the bike. In normal circumstances, even a simple standstill falls damages the fairing. The bike's stock leg guard is made up of hollow steel, hence is not very strong. Replacing the fibre (or plastic) parts is expensive, in case of sport bikes. Fitting the bike with Frame Sliders results in reducing these costs. Hence, these are meant to be cost effective way of keeping your bike in good condition.

Keywords: *Crash, Safety, Bike crash guards, Frame Sliders, Fork Sliders.*
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A-81 Evaluation of mechanical properties of Banyan/Glass fibre reinforced epoxy composites

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Abstract: In this work, we prepared a fiber reinforced composite made of banyan fiber, glass fiber, and epoxy resin (LY 556). Hand layup technique is opted for the fabrication of composites. First, pure epoxy composites were tested, and then banyan and glass fiber reinforcement were done in proportions of 10%, 20%, and 30%. Banyan fiber and glass fiber are mixed in a 1:1 ratio, that is if 10% fiber is added, 5% of banyan and 5% of glass fiber, similar for 20% and 30%. Fibers are placed in a longitudinal direction, and epoxy is cured with a hardener (HY 951). Tensile and flexural tests were performed using a standard tensiometer. Impact tester made from international equipment; Mumbai was used for impact testing. To ensure accurate results, we made 15 samples of each composition, five for tensile, five for flexural and five for impact. The testing resulted in good and productive results.

Keywords: *Banyan fiber, Epoxy resin, Glass fiber, Hand layup, Hardener.*
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A-82 Analysis of Camshaft Used in Two Cylinder Engine

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Abstract: Camshaft is that the most vital components within the engines of automobiles. Camshafts are liable for accurately timed fuel injections required by IC engines. Camshafts have multiple cams on them, and these are used to open valves through either direct contact or push rod the goal of the project is to model the camshaft and perform analysis under finite element method. Initially, the model is made by the essential needs of an engine with the available background data like as power to be transmitted, forces acting over the camshaft by means of valve train while running at maximum speed. One of the objectives of this project is to select and optimize material for camshaft from structural steel and gray cast iron.

Keywords: *Modal Analysis, Optimization, Camshaft, structural analysis.*
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A-83 Transient Structural Analysis of Knuckle Joint

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Abstract: A knuckle joint is a mechanical joint used to connect two rods which are under a tensile load, when there is a requirement of small amount of flexibility, or angular moment is necessary. It has a range of applications such as in robotics, reciprocating engine valve tie rod, and suspension bridge Tractor trolly joint. Various cases of failures are reported in a Knuckle joint because of poor design and strenuous loading condition. For a guaranteed safety of the structure, analysis and optimization of a knuckle joint are required. A cheaper and qualitative production of the knuckle joint are often achieved in a short period through optimization. In this paper, Finite Element Method (FEM) using ANSYS workbench was used to carry out static structural and transient analysis of a knuckle joint where its dynamic response is observed The Analysis results obtained such as shear stress, equivalent stress and the deformation was found within the acceptable range for given loading condition and the design of Knuckle joint is found safe.

Keywords: *Transient Analysis, Optimization, Life, Damage.*
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A-84 Development of an Electric Scooter for Power Regeneration and Biometric Safety

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Abstract: Basically, transportation or mobility is a human need. Mobility provides us to take benefits of life and its possibilities. However, mobility does have its drawbacks, particularly in urban environments, where many people use mobility options

simultaneously. Since the introduction of the internal combustion engine (ICE), recent technology in vehicles has fundamentally changed. In recent years, electric low-powered PTWs, also called e-Mopeds, becomes into trend. It operates with no emissions and no excessive noise pollution, as well as convenient designs. Recorded with travel pre-post-survey, usage and attitudes were evaluated. Results show that most daily trips of e-scooters and charging infrastructure is insufficient for this type of vehicle, while considerable safety, atmospheric conditions, and weight capacity are restricting attributes.

Keywords*: Mobility, e-Mopeds ,e-Scooters, emissions.*
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A-85 Comparative study and CFD simulation of existing automotive muffler with different perforation

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Abstract: These paintings ambition to examine the exhaust glide sample of one of the 3-Wheeler Exhaust systems to apprehend the exhaust traits, float tendencies, and exhaust dispersion at the outlet. This painting makes use of Finite volume Computational Fluid Dynamics (CFD) evaluation that's executed using stable Works glide Simulation tool to examine three-wheeler Exhaust system version developed the usage of CAD. The version is created by measuring the actual dimensions of the Exhaust gadget components.

Keyword: *CFD, Muffler, CAD.*
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A-86 Use of Electronic Viscous Drive to optimize Fan duty cycle

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Abstract: The Electronic Viscous Fan Drive Clutch is one of the key components of cooling system in automotive sectors. It is more efficient than the current traditional bimetal operated Mechanical Viscous Fan Drive Clutch in terms of fan power consumption. The comparative change in fan power with both fan drives is studied and it is observed that with electronic fan clutch 86% reduction in fan power is achieved. In the current study an attempt is made to demonstrate the improvement in the cooling system in terms of ambient temperature of air and the coolant temperature. This is achieved through the complete driving cycles by maintaining unvarying temperature. Standard rise over ambient vehicle test with support of Vector CANapeis utilised for testing and data recording. With use of electronic viscous fan drive there is direct proportional relation between coolant temperature and fan rpm. It also indicates that the system level

temperatures are optimized to achieve higher efficiency in terms of thermal and fuel economy.

Keywords: *Fan Duty Cycle, Electronic Viscous Fan Drive, Fan Power, Coolant Temperature, Automotive Cooling System.*
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A-87 Smart Automated Wardrobe

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Abstract: The purpose of the research is to develop an automated system for keeping track and handing garments using a simple application that can help people to a great extent in this regard. The idea of smart automated wardrobe has been proposed to cut short the time one often spends deciding what to wear and what not to wear for any occasion. The user will interact with the system via digital screen. This mechanism will also provide statistics to show the clothes that are being worn frequently and those that haven't been touched for a long time. The learning-based personalization feature allows the system to assist new users as well as adapt to users whose preferences change over time. The proposed system for smart wardrobe can be used effectively by fashion bloggers, organization etc. Not only an organizer but a normal person can use the system as it is simple to understand. As is, the system may require quite some changes to realize a user experience that would be acceptable but at least we have provided a basis for future research. One has identified challenges and future enhancement. The prerequisites require the learning and basic understanding of various engineering concepts from different fields. The core operation is solely dependent upon linear actuators, electronic motors, and basic Arduino programming. Each hanger carriage will be allotted with unique identification tag. Each tag will represent a cloth from a particular set viz (formal, casual, sports). These hangers will be placed at a fixed distance from some reference in hanger carriage in a slotted tray arrangement. In the slotted tray the hanger will be free to travel in one direction (towards user). A pull-push type linear actuator will be placed on a main carriage operated by servo motor attached to a lead screw, will push and retract the hanger in the slots. The user can operate the process through a digital interface that will be placed on one of the door panels. In a nutshell this system aka. Smart wardrobe will hand out the hanger consisting of the desired attire that the user wants to wear for the day, based on his selection that he makes through the digital screen. There's a lot of upgradations possible in future with the help of technologies like machine learning and Artificial Intelligence. Use of voice commands and clothes recommendation based on the outside weather are also some of the possible customizations.

Keywords: *Garments, Automated system, Smart Wardrobe, Artificial intelligence.*
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A-88 A Review of Study of Energy Recovery from Air Conditioning System

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Abstract: Waste heat from Air Conditioning (AC) system has for quite some time been disregarded as a heat source for power generation. With the expanding AC request around the world, important innovation advancement is desperately required. In this examination, joined system have been proposed for AC waste heat conversion. Power generation modules depend on organic Rankine cycle (ORC). Above system is coordinated with a basic AC cycle to set up a joined system. Study has been carried out to evaluate the performance of the systems and it results in an overall COP enhancement.

Keywords: *Energy Recovery, Organic Rankine Cycle (ORC).*
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A-89 Pre-Stressed Modal Analysis of the Elastic Rail Clip

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Abstract: In the Industry, the Modal Analysis or Natural Frequency Analysis or Eigenvalue Solution of the Structures is most widely accepted to avoid the resonance of the Structure (Component / Assembly). Finding the Mode Shapes of the Structure is also a prime importance. When the Structure is excited with the Frequencies which are very close to the Natural Frequencies may lead to catastrophic failure of the structure. Apart from this, many structures are designed to work under Stress. When performing the Modal Analysis on such Structures, the Pre-Stressed Effect must be considered, because the Stress State Changes the Natural Frequency of the Structure. The Response of the Structure without the Pre-Stress Effect may be very different from the Response of the Structure with the Pre-Stress Effect. The Differential Stiffness [adding a Stress Stiffness Matrix – may be due to Linear or Non-Linear] is considered while finding out the Eigenvalue Solution. Both pre-stress and non-pre-stress modal results are natural frequencies but under different conditions. If pre-stress modal results differ appreciably from design intent, one must understand which parameters are causing this change in modal results and must be optimized accordingly. The Elastic Rail Clip (ERC – MARK-III – T3701) is studied for the Pre-Stressed Effect and the Natural Frequencies are computed. The Natural Frequencies are identical pre-stress effect is negligible in ERC in situ.

Keywords: *Pre-stress modal analysis, Rail Fastening System, Elastic Rail Clip.*
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A-90 Topology optimization using generative design and analysis for weight reduction of airfoil

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Abstract: It has been observed that with sizing and weight deduction being of utmost importance in the designing of an aircraft and its components various rapid and powerful designing methodologies have been developed. These include topology optimization and finite element method applications on the aircraft component design structure. The topology is optimized by using conventional methods of removing materials and creating holes as far as the rim of an aircraft airfoil is considered. This method ensures that the material which is experiencing minimum stress in the structure is removed and thereby reducing weight keeping the strength, rigidity, and toughness the same. Moreover, generative design with the help of its effective machine learning algorithms has always come to the aid when it comes to designing, developing complex manufacturing structures and with its unique designing flow, the optimal design output is achieved. In the past few years, generative design has been one of the most advanced and helpful methods of designing objects. Furthermore, to achieve topology optimization and to create a generative structure design, a third important application is finite element analysis. By meshing the component, a static and dynamic acting load can be calculated, and further analysis is done. These three together, that is, generative shape design powered topology optimization with finite element analysis FEA will be helpful in this paper. If the integrated working of generative design, topology optimization, surface analysis, or FEA Aids to the reduction of weight of a wing rib of an aircraft not only the strength of the Design would remain intact but also an optimized topology will help in making the final product and more efficient.

Keywords: *Designing methodologies, Weight reduction, Generative design, FEA, Efficient design.*
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A-91 Manufacturing from the future: 4D Printing

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Abstract: 3-D printing technology is a bottom-up approach to manufacturing in which three-dimensional and geometrically fixed structures are created by adding material layer by layer. This scenario changed when smart materials came into the picture and revolutionized the field of additive manufacturing paving way for 4D printing technology. 4D printing stands out for introducing the fourth dimension 'TIME'. Ambient conditions like temperature, pH, and humidity are responsible for stimulating the smart materials to activate 3D printed objects with any external aid. This paper explores and reviews this technology in terms of activation stimuli. 4D printing has the potential to create parts that adapt themselves according to the surrounding condition. 4D printing technology is highly flexible with its applications in a wide spectrum of fields making it the 'manufacturing from the future'.

Keywords: *4D Printing; activation; smart materials; stimuli.*
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A-92 A Review on Human Robot Interaction, Detection of Robot Collision and Safety Methods

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Abstract: In the context of the residential and industrial application of robot assistants to professional employees, for a robot to share its workspace with manpower and to have physical interaction with them requires the implementation of fully controlled strategies, which is becoming a big challenge nowadays. However, robot assistants for professional employees are becoming a commodity, but practically, developing an efficient and easy control of possible collisions on the entire robot structure is hard to achieve. For this human robot interaction framework, various problem-solving techniques and tests have been reported so far for detection and response to robot collisions with human beings. In this review, the author included a study of robotic automation's history, a detailed overview of model-based techniques for collision detection, their comparison and evaluation, and various methods for safety control. For these analyses, publications from the Scopus and SCI libraries are selected after a rigorous screening process. The detailed overview presented in this article would be of interest to the scientific groups working in the area of automated detection and control of robotic collisions with safety.

Keywords: *Robotic, human robot interaction, collisions detection and control etc.*
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A-93 Characterization of DLP based Stereolithography System

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Abstract: The DLP based stereolithography (SLA) system is developed to fabricate 3D components from the liquid photopolymer or resin. The light beam from the DLP projector is focused on the platform containing a layer of liquid photopolymer through the objective lens. The photo – polymerization of the liquid resin takes place due to the focusing of a light beam of specific wavelength (300 – 700 nm). Thus a liquid resin layer is solidified by photo-polymerization and 3D object is fabricated by layered manufacturing technique. The photopolymer used in this SLA system is polyethylene glycol di-acrylate and Irgacure 784 as a photo-initiator. The 3D objects with different geometries are

successfully fabricated by using the developed SLA system. The different SLA process parameters like layer thickness, exposure time, settling period and number of layers are varied to obtain the low curing period of the layer, high build speed and accuracy of the fabricated component. It is necessary to characterize the developed SLA process parameters so that the experimental results can be validated. The developed SLA process parameters are characterized by using the method of least square inbuilt function in the MATLAB software. A special MATLAB code is developed to characterize the SLA process parameters. A good correlation is observed between the experimental and numerical results. The minimum and maximum percentage difference between the experimental and numerical methods is 0.48 and 14.06 respectively.

Keywords: *DLP projector, stereolithography (SLA), photopolymer, characterization.*
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A-94 Computation Fluid Dynamics investigation and experimental validation of an orifice meter

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Abstract: This paper discusses the analysis of an orifice meter using Computational Fluid Dynamics and the experimental confirmation of CFD results. The experimental setup is offered in the fluid mechanics laboratory as an experiment. Fluent is a computational fluid dynamics (CFD) instrument. Gambit has been used to generate the CAD models for the experimental setup. CFD analysis is carried out using the Segregated Solver and the Spalart-Allmaras Model, which have shown the best results in earlier trials by other researchers. The comparison of CFD Analysis and practical results demonstrates the versatility and accuracy of CFD Analysis. The decimal disparity may occur as a result of human mistake in manual experimental rigorous screening process. The detailed overview presented in this article would be of interest to the scientific groups working in automated detection and control of robotic collisions with safety.

Keywords: *Orifice, Orifice meter, Spalart - Allmaras Model*
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A-95 Experimental studies of Preheating Effect on Vapour Compression Refrigeration System

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Abstract: Refrigeration is the process of removing heat from the enclosed body or space so that the temperature of the enclosed body is first lowered and then maintained at the required temperature below the surrounding temperature. There are many types in refrigeration systems, among which the vapour compression cycle is used in the case

study, because the vapour compression refrigeration (VCR) system has the maximum possible coefficient of performance and is widely used in refrigeration for both industrial and domestic applications. In the VCR system, the refrigerant evaporates and condenses depending on the pressure and temperature during the refrigeration cycle, so that the refrigerant changes from the liquid to the vapour phase to the liquid phase without leaving the system. It is found that this may have been due to an increase in the convection coefficient, an increase in the heat transfer in the evaporator and the condenser with the surroundings.The refrigerant at the suction is in saturated vapour phase this will increase work done by compressor due to which coefficient of performance of the system will decrease. In this paper reduce the compressor work by using preheater. The preheater is installed in between evaporator and compressor. Prehearer is designed in such a way that the fins of the conductor getting heated and transfers the heat to the refrigerant. Thus the temperature of refrigerant increases from saturated to superheated condition that was handled by compressor efficiently due to which coefficient of performance will be increased as well as compressor work decreases. The experiment is carried out with 134a refrigerant. The 134a is Non CFC refrigerant does not deflect to ozone layer

Keywords: *VCR System, Preheating, COP.*
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A-96 Computer Aided Engineering investigation of a fastner to enhanced design insights

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Abstract: Pretension load plays very important role in industrial assemblies in order to avoid accident by loosening of assemblies. The aim is to determine maximum limit of pretension load without thread failure using universal testing machine. The vibration test rig is developed for measuring the loosening performance of nut bolt assemblies. The samples of ISO Metric bolts of different size such as M8, M10, M12, M16 and M20 bolt having 1.25, 1.5, 1.75, 2 and 2.5mm pitches respectively are used for testing. The maximum stresses developed, and deformations occur due to pretension load applied on nut bolt assembly are obtained by finite element method using ANSYS Workbench version 14. The validations of results are carried out by using experimental method.

Keywords: *Bolted joint, Stress analysis, loosening performance, Pretension Introduction*
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A-97: CFD Analysis and Experimental Investigation of CPU heat sink with Miniature Vapour Compression Refrigeration System for CPU Cooling

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Abstract: The refrigeration industry and the academy have recently come up with many innovative refrigeration concepts for both conventional and non-conventional applications. This article explores how the conventional vapor compression refrigeration concept combined with innovative engineering approaches can break down barriers to provide very compact and energy efficient refrigeration systems. These compact systems are suited for low cooling capacities. Among various new active cooling techniques, the Vapor Compression Refrigeration (VCR) system is the leading technology. This paper presents a miniature VCR system for CPU cooling. It includes a commercial miniature compressor, a capillary tube, a custom-made condenser and a evaporator. The system is tested systematically by experiments. The results indicate that the temperature of the evaporator can be maintained at about 10˚C for hours as required in CPU cooling. For that A small refrigeration system for cooling of computer system components is evaluated. A thermodynamic model describing the performance of the cycle along with a CFD (computer) simulation program is carried out to evaluate its performance. The results of analysis show that the new technology not only overcomes many shortcomings of the traditional fan-cooled systems, but also has the capacity of increasing the cooling system coefficient of performance.

Keywords: *Compressor, capillary tube, condenser, evaporator, VCR system, MSRS, CPU cooling.*
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A-98 Facial Recognition using an unmanned aerial vehicle

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Abstract: Drones, as known as unmanned aerial vehicles (UAV), are aircrafts which can perform autonomous pilot. They can easily reach locations which are too difficult to reach or dangerous for human beings and collect images from bird's-eye view through aerial photography. Enabling drones to identify people on the ground is important for a variety of applications, such as surveillance, people search, and remote monitoring. Since faces are part of inherent identities of people, how well face recognition technologies can be used by drones becomes essential for future development. Terrorism represents an ever-growing danger these days. Regretfully, acts of terrorism have been recurring in an ever-growing number. Due to the rapid development of computer science in the 21st century, it is necessary to find a technical solution enabling the pretermission or prevention of the acts of terror. The unmanned aerial vehicles (UAVs) capable of biometric facial recognition may have a great contribution to the prevention of an eventual act of

terror committed by suspicious persons, who jeopardize or end lives of innocent people. In large cities or during mass happenings, timely identification of the suspicious person represents a key question of national security. As an image taken by a drone is only relevant when it can be rapidly compared with the images of suspicious people in the database on hand, the drone should be able to detect faces in record time for faster and efficient threat detection system.

Keywords: *facial recognition, drones, surveillance, facial.*
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A-99 Electrolyzed Micro-Cleaning Machine

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Abstract: What is the problem with Pollution? This question makes one to think about pollutions effect on health and environment in all aspects. As in today's time pollution is due to increase in usage percentage of Vehicles, Agriculture machine and also cleaning Machine. While using these machines if we have look at micro polluting elements released in environment by these machines which can adversely affect your health in many direct ways by entering body during inhaling, Eyes irritations, Lungs failure, Respiratory problems and many more. "Health Is Wealth" as this phrase keeps our health at upper most level to think about. Maintaining cleanliness in your environment is the first thing to avoid any health issues. In today's world many machines are available to maintain clean and tidy environment around once. But these machines consume much more power which indirectly makes pollution and effect outer environment. As world is moving toward greener & environmentally friendly product which cause minimal damage to the environment. In our product we innovated the process of cleaning which directly save the amount of power required for cleaning process. This product works on motor and battery but the main innovative thing is we have eliminated the usage of vacuum to save power with same cleaning output and also develop a new 99.9% germ killing process. Also, the battery can be charged by solar charging process. Therefore, we can reduce the pollution & in this, we try to reduce the cost of equipment. Developing and designing an authentic product consider various factors like new-age design, feasibility in design, cost effectiveness considering rural areas, so that non-skilled person can also handle it easily.

Keywords: *Micro Cleaning, 99% germ Cleaning, Electric Scrubbing, mopping and sweeping, Electrolyzed Water, Micro-Fiber, COVID-19 pandemic.*
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A-100 Design Optimization of Wheel Chair Ramp for Low Floor Bus

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Abstract: Use of public transport has been in focus for very long time owing to its obvious

benefits. Still around the globe, a large share of urban and inter-urban transport system is out of reach for person with disabilities. Wheelchair users find it difficult to use buses, even low-floor ones. Wheel chair ramps deliver a decorous, identical approach to entering a low-floor bus. Wheel chair ramps are a platform generally constructed in aluminium that can be deployed manually or automatically for wheelchair passenger for on boarding. It is necessary for it to be lightweight yet highly durable ensuring the fuel efficiency for automobile operators. This study discusses a conceptual manually operated foldable design for wheel chair ramp. For this design, a sandwich structure is designed along with use of composite for a designated loading requirement. This will be done to convert the conventional design for light weighting yet durable design. Design evaluation is done using FEA for static structural analysis. Physical testing will be conducted to investigate strength requirement and mechanical behaviour using UTM. FEA results are compared to physical test results under this study

Keywords: *Wheel chair ramps, low floor bus, light weight designs with composites, sandwich panel structures.*
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A-101 Collaborative and Diversified Approaches for Industrial Component Detection in Real time

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Abstract: Identifying industrial components as per their part family is very much required for production planning and sequencing. In this research work a visual identification system is proposed for identifying the engineering works or parts or components based on their part families in group technology, computer vision and artificial intelligence techniques. The computer vision system is responsible for extracting the features of the component. The developed software provides the part family classification code using group technology method of that component from the data obtained from vision system. The classification code can be used for further processing. The algorithms and the design details are deliberated. In this work, identification of part families by categorization with vision system is discussed and has been used to identify the part families with 100% accuracy. In our work, interdisciplinary approach based on Mechanical Engineering and Computer Science & Engineering is presented. This collaborative approach is applied for classification and recognition of mechanical components. These mechanical components are based on part families used for designing and manufacturing in medium scale industries. The major objective of work is to recognize and classify the components such as bolts, nuts, and washers and to evaluate design and manufacturing attributes in real-time. The proposed real-time Industrial Component Detector (ICD) system is developed to process the input component using methodologies based on template matching, clustering techniques, and region extraction technique. Aforesaid methodologies are applied for designing and implementing three algorithms using C# & .NET namely, Comp-Temp-

Match, K-Cluster-Comp-Match and biggest BLOB algorithm respectively. The experimental results in the system for recognition rate is achieved using techniques is 97%. in addition, we propose a system which outperforms using referencing model, since the model doesn't require to be calibrated again and again, and also performs auto calibration. Moreover, to design and develop a "Reference Based Dimension Prediction (RDP) System" for recognition and classification of part families in various industrial components along with determination of dimensions effectively. RDP system works in sequential phases namely; a). Capturing the image of component b). Converting the image into gray scale followed by smoothing of image by using Gaussian filter c). Transforming the blurred gray image into 'Canny' image d). Noise removal of 'Canny' image by applying threshold to it e). Dilation and erosion operation on resultant image f). Resultant image act as input to RDP system and g). Creation of reference Object. Further, Dimensions are predicted by RDP system by facilitating Euclidean Distance and Manhattan Distance Method along with Reference object which included as a part of input image. Reference Based Dimension Prediction System employs methodology related to dimensions of design and manufacturing attributes which predicts in referencing the dimensions of other reference object. In this framework, the pixel density of the reference object is used to compute prediction for determining the dimensions of unknown object. The experimental results obtained using proposed referencing dimension prediction model achieves 99% precision in predicting dimensions which is further used to identify and classify the part family.

Keywords: *artificial intelligence, industry, vision system, image.*
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A-102 A Contemporary Review of Eco Friendly Alternatives in Brake Materials

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Abstract: Brake pads are considered as crucial part of braking systems for all vehicles which are equipped with disc brakes. Traditional brake pad material contains ingredients which are hazardous for environment. This work will review research done to find eco friendly alternative in brake materials.

Keywords: *Eco friendly brake materials, brake pad composition.*
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A-103 Experimental based evaluation of Ph changing water and effect on specific heat of Water.

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Abstract: Electric energy mostly in our life so demand of electric energy increase. By survey maximum electric energy in domestic purpose which is 60 percentage uses for heating water so to reduction electric energy for heating water this experiment study. In This experiment pH of water changes and observe it at effect on water when water pH changes. pH is depended on H and OH molecules. If increases Hydrogen molecules pH of water will reduce water terns in to acidic and if hydroxide molecules increase pH of water increases and water turns in alkaline. In this experiment we observe specific heat of water and compared with treated water and normal water. In this experiment we use pH reduce material which reduce pH of water and which is available in naturally. Basically four material which are use for reducing pH of water driftwood, almond leaves, peat moss etc. we know that for production of electricity we use coal, petrol , diesel or other fuel which will vanish in one day so there is need to save fuel for future use for our children's, children So it s very important to Save electric energy. In this experiment constant parameter is volume of water and changing parameter is percentages natural resources. After treated water observe thermal properties of water and evaluate best method which reduce pH of water effectively. Water having cohesion force because water molecules stick each other. This is due to hydrogen bond among molecules. In pH lowering process we increases percentages of hydrogen by reducing ph of water so increases stickiness and due to that we know that heat transfer rate is more when molecules distance is low. Hence in this experiment we reduce molecules distance by reducing pH of water and increase heat transfer rate. Specific heat of water is more than other liquid.

Keywords: *pH of Water, Almond Leaves, Peat Moss, Driftwood, Thermal, Natural Resources. Temperature Difference.*
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A-104 Design And optimization of Solar Panel Tracking using Arduino

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Abstract: Of all the renewable energies, solar energy is the only energy gained its popularity and importance quickly. Through the solar tracking system, we can produce an abundant amount of energy which makes the solar panel's workability much more efficient. Perpendicular proportionality of the solar panel with the sun rays is the reason lying behind its efficiency. This project is discussed all about the design and construction mechanism of the prototype for the solar tracking system having a single axis of freedom. The main control circuit is based upon Arduino. Programming of this device is done in the manner that the LDR sensor, in accordance with the detection of the sun rays, will provide direction to the DC Motor that in which way the solar panel is going to revolve. Through this, the solar panel is positioned in such a manner that the maximum amount of sun rays could be received. In comparison with the other motors, DC motor is the simplest and the suave one, the torque of which is high and speed of which is slow enough. We can program it for changing the direction notwithstanding the fact that it rotates only in one direction

subject to exception as far as programming is concerned. 1985, first time ever it was witnessed for production of the silicon solar cells with an efficiency of 20%. Though a hike in the efficiency of the solar panel had a handsome increase still perfection was a far-fetched goal for it. Below 40%, most of the panels still hover to operate. Availability of the solar cells types with higher efficiencies is on provided they are too costly to purchase

Keywords: *Solar panel, programming, Arduino, energy conservation, solar cells.*
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A-105 Investigation of Heat Transfer Analysis of Rhombus Shaped Pin Fins Array of Heat Sink.

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Abstract: The proper dissipation of heat from the source has always been a need for improving the heat sink's thermal performance. They are widely used to cool heat sources in a variety of applications, including electronics and vehicle components. The heat transfer characteristics of a vertical heat sink embedded with rhombus shaped pin fins were examined numerically and experimentally in this study. To conduct the research, the experimental test setup was planned and created. The actual results obtained with a flat plate type heat sink were compared to theoretical results obtained from the literature and found to be in good agreement with a minimum error. The rhombus-shaped fins are staggered and have uniform fin spacing over the rectangular base. The analysis uses four distinct heat inputs (50, 100, 150, and 200 W). For various instances, the convective heat transfer coefficient (h) and Nusselt number (Nu) are calculated. An ANSYS based on finite volume The numerical model is solved using Fluent software. To imitate the natural flow characteristics of air, a laminar model was used. The rhombus has a smaller surface area than the circular fins, which lowers the material cost. The heat transfer efficiency of rhombus shaped fins was found to be 11.65 percent higher than that of circular shaped fins.

Keywords: *Natural convection; Heat transfer coefficient; Pin fin heat sink; Rhombus pin fin: CFD*
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A-106 Performance analysis of Diesel Engine Fuelled with Preheated Pongamia using waste heat of exhaust gas

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Abstract: The paper presents the performance analysis of a diesel engine operated with preheated Pongamia oil as a fuel. Pure biodiesel produced from Pongamia oil is heated directly by utilizing exhaust gas heat and used as a fuel in a diesel engine. The shell and tube heat exchanger as a heat recovery system is designed and fabricated as per ASME standards. The diesel engine test setup is

installed with a heat recovery system and tested at different loading conditions. The test results are encouraging and show a significant improvement in the performance engine operated with preheated Biodiesel. It is observed that the effectiveness of the heat exchanger is in the range of 65 to 75 %. The results have shown the activist effects on brake power and viscosity of the oil at 70˚C preheating. The average amount of heat utilized from the exhaust gas is 6 to 7% for preheating biodiesel. The preheated Pongamia can be used as a substitute for diesel fuel without modification.

Keywords: *Heat exchanger, Heat recovery, Pongamia oil, Diesel engine*
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A-107 Design and fabrication of waste segregator

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Abstract: Waste management has been remained a pervasive problem since always and it's continuing to grow with the urbanization which directly impacts the ecology of our surroundings. In every process the first step is to segregate waste but our traditional methods of waste segregation are very time consuming and to tackle that we'd like a cutting-edge technology this technique uses inductive sensor and capacitive sensor to detect metallic waste and plastic waste respectively where servomotors provide other required movements within the system. Our waste segregation system is merely a prototype. With required modifications and enhancements, this idea is often implemented in house hold, offices and industrial applications.

Keywords: *Automatic, Waste segregation, Inductive sensor, Capacitive sensor, IoT*
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A-108 Production technique of biodiesel from algae plants to control the energy crisis

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Abstract: In the current decade, the energy crisis of fossil fuel is the biggest problem, so because of fossil fuel the world is unsafe. The available resources of fossil fuels in the universe are rapidly decreasing and one day they will vanish, so we need to concentrate on biofuels as a possible replacement for conventional fossil fuel. For biodiesel production we need animals as well as plant resources. The use of crops for food production will never be a suitable source for biofuel production, because it will definitely destroy the demand for food. The biofuel production from algae plants is economical and easy. According to lipid content ability different types of algae are available in nature. Chlorella algae have the highest lipid content. Generally, the lipid content of algae is between 20% and 50%, which can be converted into various types of biofuels, such as biodiesel and kerosene oil. Sohxlet extraction apparatus used for lipid extract from algae biomass also trans-esterification methodology used for biodiesel production. In this present research

article focused on the part of algae biodiesel as a possible alternative to traditional fossil fuels.

Keywords: *Crisis, Algae, Biodiesel, Trans-esterification, Lipid, Biofuel, Fossil*
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A-109 Design and Development of Portable Ventilator System

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Abstract: The developing countries like India, providing intensive care health services is always an issue, when the situation arises during pandemics. This issue becomes more challengeable in regular ICU, critical situations such as COVID-19 world is suffering. In these kind of situations, regular ICU ventilators are not adequate to address the increasing demand. Also, when the patient has to transfer through ambulance or patient has to wait for regular ICU ventilator. During this kind of situations, there is a need of bridge ventilation. This manuscript describes design and development of an artificial respiration system, which, during acute shortages and supply chain disruptions or in some critical conditions, at emergency application, at remote location health care centers can serve as a compact portable mechanical ventilator. This is the component-based structure. which will make it affordable for health care centers. The device will provide a controlled breathing mode. The system is designing for reliability and scalability of measurement circuits through the use of the serial peripheral interface and has the ability to connect additional hardware due to the object-oriented algorithmic approach. The attempt has made in this work to design and develop portable ventilator working prototype, so as to deliver controllable volume of air with required pressure.

Keywords: *Artificial ventilation, Portable, Respiration, Peep.*
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A-110 Efficient approach for lung cancer detection in early stage using learning technics.

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Abstract: Pulmonary nodules detection has played an important role in lung cancer analysis because nodules are the first doubtful symptoms for the possibility of cancer. Margin features of the pulmonary nodules offer crucial radiological features to determine the likelihood of malignancy. Overall, benign nodules are having smooth margins whereas malignant nodules are having irregular margins. The main objective of this research is to design a suitable intelligent learning algorithm for pulmonary nodule detection in the lung CT and to extract relevant features for classification of margin types of pulmonary nodules by observing the 3D structure. 3D image of nodule candidate is formed from 2D lung CT slices. Geometric features of the 3D nodule are taken

out and given as input to classifier to classify the margin types. Finally, from margin type, detect TNM stage and estimate life of patient

Keywords: *Pulmonary nodule; detection; learning technics.*
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A-111 Influence of stepped pin tool profile on Mechanical properties of Underwater Friction Stir Welding of AA 6061-T6 Alloy.

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Abstract: In this research, Aluminium alloy AA6061-T6 of 6mm thickness fabricated with butt type weld configuration with newly developed conical stepped pin profile tool. Water as a cooling medium used during welding process. Mathematical model for heat generation for new stepped pin tools has been developed to decide tool dimensions by considering shoulder diameter to pin diameter ratio (D/d) 3 by comparing with conventional conical tool. Result shows that conical stepped tool shows significant mechanical properties as compared with conventional conical tool. Significant grain refinement, higher value of microhardness in LHDZ zone and effective interaction between contacting surfaces of tool and base material were responsible for effective microstructural and mechanical properties of Stepped tool as compared with conventional conical tool.

Keywords: *Underwater friction stir welding, AA6061-T6, Tool Pin Profile, Conical tool, conical stepped pin tool profile*

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A-112 Advisory System for Biodiesel Production

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Abstract: Advisory system is the decision-maker for many problems. That will help to frame the solutions for themselves. Transesterification is one of the best methods for biodiesel synthesis from vegetable oils. Here the study of optimization of Transesterification is done by using three different heterogeneous catalysts separately from Karanja oil. Results are analyzed by the Taguchi method for input parametric optimization for Karanja biodiesel production using three different heterogeneous catalysts. Three different mathematical models are obtained by using the Taguchi method. These mathematical models are used for the development of the advisory system. The advisory system is developed by using Visual Basic software. Only by putting the input parameters, one can obtain output parameters without any experimentation work.

Keywords: *Biodiesel, Transesterification heterogeneous, catalyst, Optimization*
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A-113 Design and Analysis of a Flywheel-Based Kinetic Energy Recovery System

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Abstract: This paper is based on the experimentation of kinetic energy recovery systems in order to determine its efficiency and power storage capacity. KERS can be used in any system which uses brakes in order to stop a moving body in rotation. The Paper involves the use of the Half Toroidal CVT assembly for the assessment of the efficiency of the whole setup. Releasing of the stored energy in the flywheel is again sent back to the primary flywheel in form of boost or acceleration.

Keywords: *Kinetic energy recovery; flywheel; stored energy; half toroidal CVT.*
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A-114 Survey for Efficient Utilization of Domestic LPG by Improving Burner Pot Interaction

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Abstract: There is high demand for Liquefied Petroleum Gas (LPG) for domestic purposes and in industries too. It is a more economical and clean burning domestic cooking fuel across the world. The use of clean fuels such as liquefied petroleum gas (LPG) is beneficial in several ways. However, only about 33.6 million or 17.5% of all Indian homes use LPG as their primary cooking fuel. In urban areas almost all the families are using LPG stove gas but to increase the use of LPG gas stove in rural areas, more study has to be performed for making it more economical by increasing its efficiency and lowering carbon emissions. So, in this study an effort has been directed towards increasing the overall efficiency of LPG gas stove by setting out the optimum distance between burner head and pot/vessel bottom while using other combinations of different types of burners. The optimum distance between burner head and pot/vessel bottom can be set by increasing and decreasing the distance and then observing the various parameters. Those parameters will be used in the formulas for getting the maximum efficiency of a LPG gas stove. Hence this paper considers the possibility of enhancing the household use of LPG. From an overview of the cooking fuels used in India, it focuses on LPG, analyzing the factors affecting the efficiency and projecting future scenarios. Salient features of the LPG usage in households are also discussed. On the basis of the existing situation, barriers to increasing LPG use -- in particular, the problems regarding affordability, pricing and reliable distribution -- have been identified.

Keywords: *LPG, efficiency, carbon emissions, fuel.*
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A-115 Survey for analysing the use of Biomass cook stove for cooking purpose in rural areas

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Abstract: Biomass has been used as a cooking fuel for past few centuries though after all these technological advancement in the field of cooking, billions of people in developing countries are still lacking access to clean cooking fuels and modern technologies and hence they rely on using inefficient cook stoves along with burning of low calorific value fuels like animal dung, wood, crop residue etc. The aim of this survey is to find out the reasons why people in rural areas are not shifting to clean cooking fuels such as LPG despite of all the schemes and subsidies provided by the government. Further the outcomes of the survey will be considered to develop a biomass cook stove by taking factors like efficiency, cost, and smog into consideration

Keywords: *Biomass, clean fuel, residues, subsidies.*
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A-116 Normal and shear stress distributed points on thin walled corrugated tubes by conformal transformation technique.

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Abstract: The mapping between the two symmetrical unusual complex geometries is used to correlate the parameters by conformal transformation technique. To locate the actual localized stress points (normal and shear) in the thin-walled corrugated tubes (U-shape bellows convolution) geometry, physical correspondence and relationship is compared to orthotropic plate. The transformation of the associated components of membrane stress moment's components between plate and bellows is discussed. The distributed stress-points on the top, center, and bottom parts of the convolution are technically defined and associated nature of the stresses has been confirmed by correlation. The positioning of the stress-points on the convolution geometry surfaces at the top, middle and bottom parts correspondingly in comparison with plate signifies the pressure-based meridional stresses, circumferential membrane stress, and deflection-based meridional stresses. The stress defined analytically by Expansion joints manufacturing association are well verified by FEA simulation and experiments and confirms the location with type of the stresses. The result obtained by both the methodologies found in close match and well verifies the identification and nature of the associated stresses.

Keywords: *Conformal transformation technique, normal stress, shear stress, corrugated tubes, bellows, orthotropic plate.*
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A-117 Internet of vehicle based load balancing Technique in SDN using Integrated Whale Optimization Algorithm

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Abstract: In large networks, a single server is often unable to handle client requests with the fast growth of internet users and applications. Increased computational latency, user mobility, and location - based services are still issues with the Internet of Vehicles (IoV). Our network should be able to cope with large volume of traffic without introducing unnecessary delay. One solution to this problem is load balancing for network scalability and service availability. Load Balancer is a device that distributes the traffic among number of servers. But traditional vendor specific Load Balancer is a device that is much more expensive. Internet user cannot change the functionality of that device i.e. Traditional Load Balancer are non-programmable. In a network single Load Balancer becomes a single point of failure or sometimes in large network it becomes bottleneck. Software defined networking is a promising solution to all these disadvantages. SDN improve the performance of transmission using six features like bandwidth ratio, hop count, latency, packet overhead, and packet loss. Find load on each node using this feature. Select least loaded path for transmission as a new incoming data flow in a real time. Further, this paper aims to incorporate a new optimization strategy to address the "Load balancing" problem in terms of latency minimization. This paper proposes a novel nature-inspired meta-heuristic optimization algorithm, called as hybrid Whale Optimization Algorithm (H-WOA). Finally, the performance of proposed model is compared over other conventional models with respect to latency. Experimental analysis shows that the load balancing using SDN based hybrid Whale Optimization Algorithm strategy works better than the other load balancing. Also, it efficiently minimizes the latency and improves the Quality of Service (QoS) in Software Defined architecture. Fog computing transfers computation and storage to the network's edge, lowering latency and enabling mobility and position awareness.

Keywords: *Software Defined Network (SDN), Load balancer, Whale optimization, Latency.*
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A-118 Green Engine

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Abstract: Innovative thinking leads to the development of new technologies. Today, the world is facing a serious pollution crisis due to the exhaust gases from vehicles using petroleum-based fuel. The pollutants like HC, NOx occurs due to the incomplete combustion of fuel. These pollutants are very harmful to human beings causing various diseases. Also, the fuel recourses are depleting rapidly. This report includes an introduction to Green Engine, technical features, working and comparison with the conventional internal combustion engine, also its pros and cons with future applications.

Keywords: *green engine, future engine, piston-less, green technology.*
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A-119 Review of application of design for manufacturing technique

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Abstract: Design for manufacturing is a technique whose focus is to reduce the manufacturing time & cost. In this technique, design changes are made in the product which facilitates manufacturing of the product. Various means are used for this purpose. Examples of these are minimizing total number of parts, variety of parts, using standard parts, shaping the parts. In this paper review of the research in this area is taken. At the end, the problem identified for applying Design for Manufacturing is discussed.

Keywords: *Design for manufacturing, design for assembly, DFMA, ease of assembly.*
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A-120 Review of application of design for manufacturing technique

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Abstract: Railway braking has become important because it directly relates to the train's running safety. Air Brake system has been introduced for LHB (Linke Hofmann Busch) type coaches in the railways. LHB coaching stocks with brake system in Indian Railway are working with twin pipe graduated release air brake system. The core component of Air Brake System is the A9 Air Distributor Valve, it is a compact self-lapping, pressure maintaining brake valve which is capable of graduating the application or release of locomotive and train brakes and solely controls the entire braking operation of a coaching as well as the entire train in case of emergency. The maintenance and functional details of A9 Air Distributor Valve for coaching stocks is thoroughly represented. The latching mechanism in A9 Distributor valve has a traditional sliding motion of Cam and Latch plate, which resulted in early wear out of the respective components which then needed to be maintained and replaced regularly. The new design has a better life span and easy availability of the material along with saving the expenditure of maintenance and replacement.

Keywords: : LHB, Distributor Valve, Maintenance, Replacement, Air braking

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