Approved by All India Council for Technical Education, New Delhi
Affiliated to Anna University, Chennai
NAAC Accredited Institution & NBA Accredited Courses (Mech. Engg., ECE, CSE, IT)
"Nizara Educational Campus" Muthapudupet, Avadi-IAF, Chennai - 55.

6.5.2 Quality assurance initiatives of the institution:

DVV Clarifications	Response	Page No.
HEI to provide NIRF certificate mentioning the Band, Rank of HEI along with NIRF submission form; HEI to provide follow-up action taken on AAA report in the form of minutes of meeting with signatures of all the committee members; HEI to provide Collaborative quality initiatives with other institution and also provide the other quality audit/accreditation recognized by state, national or international agencies such as NAAC, NBA etc	Collaborative Quality Initiatives with other Institution	
	Margdarshan- MoU between Rajalakshmi Engineering College & Aalim Muhammed Salegh College of Engineering	1-10
	MoU between K.J. Research Foundation & Aalim Muhammed Salegh College of Engineering	11-15
	Collaborative Research with SRM Medical College Hospital & Research Centre	16-17
	Collaborative Research work with other Institutions	18-25

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING

SHARE & MENTOR INSTITUTIONS

MARGDARSHAN

Exchange of MoU between

RAJALAKSHMI
ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

&

AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

Rajalakshmi Institutions

தமிழ்நாடு तमिलनाडु TAMIL NADU 74AB 661897

Rajalakshmi Engg. College
Thandalam.

4.12.2019

G.S. சரஸ்வதி (S.V.)
ஸ்ரீபெரும்பூதூர் தமிழ்நாடு
உ எண் : 24/CGL/08

MEMORANDUM OF UNDERSTANDING (MoU)

Between

Rajalakshmi Engineering College

And

Aalim Muhammed Salegh College Of Engineering

This MoU is entered into on the 30th November 2019 by and between Rajalakshmi Engineering College (hereinafter called REC) located at Thandalam, Chennai - 602 105 and Aalim Muhammed Salegh College Of Engineering (hereinafter called AMSCE) at IAF-Avadi, Chennai - 600 055

1. **PREAMBLE**

AICTE has initiated a Scheme called 'Margdarshan' (Share and Mentor Institutions) envisaging that a Hub and Spoke system is to be established by an institute of repute as a Mentor within an existing facility to serve as the hub to guide ten technical institutions in Outcome Based Education and NBA Accreditation Process.

In this regard, Rajalakshmi Engineering College (REC) is selected by AICTE to serve as a Mentor institute in the region.

9/12/19

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

9/12/19

2. OBJECTIVES OF THE MOU

The aim of this MoU is to stimulate and facilitate AMSCE to guide itself in Outcome Based Education and thereby guide for the process of NBA Accreditation.

Objectives are :

a. Mentor institute(REC) will design the activities that will explain the requirements and parameters of NBA Accreditation
b. Mentor Institute(REC) will conduct Faculty Development Programmes concentrating in each of the parameters and Process of NBA Accreditation
c. Mentor Institute(REC) will conduct Workshops/Seminars for the benefit of faculty and students of Mentee Institution(AMSCE).
d. Mentor Institute(REC) will guide and help in preparation of SAR (Self Assessment Report) for NBA.
e. Mentor Institute(REC) will build a strong linkage with Mentee Institution (AMSCE) in relation to NBA Accreditation.

3. DURATION

This MoU shall remain effective from the date of execution until the end of the term of three years (2019-20 to 2022-23)

4. TERMS AND CONDITIONS

- All costs for conducting Faculty Development Programmes and Seminars will be managed through the funding received from AICTE for Margdarshan Project
- Faculty Development Programmes shall be conducted at Rajalakshmi Engineering College and faculty members from Mentee Institution (AMSCE) may avail hostel facility if required.
- There will be NO COST involved from Mentee Institution(AMSCE) in this project
- Mentee Institute (AMSCE) agrees to depute faculty members to attend the programmes conducted under this project.

5. 'MARGDARSHAN' COORDINATOR

Mentee Institute (AMSCE) agrees to designate a faculty member who will be responsible to co-ordinate and implement activities undertaken under this MoU.

On Behalf of REC

Dr.S.N.Murugesan 9/12/19
Principal, REC

RAJALAKSHMI ENGINEERING COLLEGE THANDALAM CHENNAI 602 105

On Behalf of AMSCE

Dr.M. Afzal Ali Baig 9/12/19
Principal, AMSCE

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING

AALIM MUHAMMED SALEGH COLLEGE OF ENGINEERING CHENNAI 600 055

9.12.19
Dr.V.Prasannakumari
Professor - REC
Margdarshan Chief Coordinator

9/12/19
Er.S. Ramkumar
Asst Professor - AMSCE
Margdarshan Coordinator

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHA... POST
CHE...

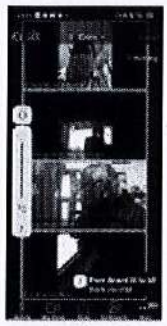
Aalim Muhammed Salegh College of Engineering <principal@aalimec.ac.in>

Fwd: Attendance Proof

Aalim Muhammed Salegh College of Engineering <principal@aalimec.ac.in> Thu, Jun 4, 2020 at 12:00 PM
To: Margdarshan REC <margdarshan@rajalakshmi.edu.in>

Good Morning Margdarshan Team
Thanks a lot for a beautiful presentation and throwing light on minute inputs for effective preparation of the course file content for the NBA process. Regards
[Quoted text hidden]

4 attachments



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PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

The Management, Principal, Staff and Students of

RAJALAKSHMI
ENGINEERING COLLEGE
An AUTONOMOUS Institution
Affiliated to ANNA UNIVERSITY, Chennai

Rajalakshmi Nagar, Thandalam, Chennai - 602 105

cordially invite you for the
inauguration & exchange of MoUs for

SHARE AND MENTOR INSTITUTIONS (MARGDARSHAN)

under the guidance of

MHRD | Government of India
Ministry of Human Resource Development &
AICTE

on 30th November 2019 in the Main Seminar Hall at 11:00 a.m.

Dr. M.P. POONIA
Vice Chairman, AICTE
has kindly consented to be the Chief Guest
and inaugurate the AICTE MARGDARSHAN scheme

Dr. (Mrs.) THANGAM MEGANATHAN
Chairperson, Rajalakshmi Institutions
presides

Dr. C.R. MUTHUKRISHNAN
Advisor, Rajalakshmi Institutions
felicitates

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

Dr. (Mrs.) Thangam Meganathan	Mr. M. Abhay Shankar	Dr. S.N. Murugesan
Chairperson	Vice Chairman	Principal

RAJALAKSHMI ENGINEERING COLLEGE
Rajalakshmi Nagar, Thandalam, Chennai - 602 105
Ph.: 044-37181111, 37181112
Email: admin@rajalakshmi.edu.in
www.rajalakshmi.org

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Labels

AICTE
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AMSCE_MCA_HOD 4
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CSE_FACULTY_LOG_SH...
ED CELL

Margdarshan FDP - Group Photo and PPTs

External Inbox ×

Margdarshan REC <margdarshan@rajalakshmi.edu.in> Jan 2,
to skarthikeyan.s26, rajasekarbe, deva101maths, rhh.mssm, arularasiarulmani, bindhumilton9, sureshvelu95, chandrangeee, sh

Dear Friends

Wishing you all a **VERY HAPPY NEW YEAR !**

PFA the PPTs used in the FDP and also the group photo.

Thanks for your participation. Hope you had useful sessions.

I request you all to fill up the FDP Feedback form through below link without fail.

https://forms.gle/Ttz9uxdtUd6aCQoD6

With Best Regards,

Dr. V. Prasannakumari,
Professor IT,
Chief Co-ordinator, AICTE Margdarshan
Rajalakshmi Engineering College.

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
4VADI - IAF, MUTHAPUDUPE
CHENNAI 600 055

Margdarshan FDP Feedback

The form Margdarshan FDP Feedback is no longer accepting responses.
Try contacting the owner of the form if you think this is a mistake.

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

Margadarshan Lecture-NBA

Content beyond Syllabus

Dr.S.Rajkumar
Professor & Head,
Department of Biomedical Engineering,
Rajalakshmi Engineering College.

Criteria 2 : Program Curriculum and Teaching – Learning Processes

Program Curriculum (20)

2.1.1. State the process used to identify extent of compliance of the University curriculum for attaining the Program Outcomes and Program Specific Outcomes as mentioned in Annexure I. Also mention the identified curricular gaps, if any (10)

(State the process details; also mention identified curricular gaps).

Note: In case all POs are being demonstrably met through University Curriculum then 2.1.2 will not be applicable and the weightage of 2.1.1 will be 20.

- Effective Process Implementation (6)
- Curricular Gaps (4)

Process used to identify extent of compliance of University curriculum for attaining POs & PSOs

1. Each faculty determine the level of their courses studying the elements of POs & PSOs. Further, the Bloom's level of cognitive domain was adopted to determine the level of expected attainment.
   - The introductory topics were termed as level I covering Bloom's levels 1 & 2, where students were exposed to the topic
   - The competency topics were termed as level II covering Blooms levels 3 & 4, where students gain competency in the topic
   - The expertization topics termed as level III covering Bloom's levels 5 & 6, where students gained mastery in the topic.
2. The 'COs with POs & PSOs mapping' was performed, the weak areas were pointed out and probable gaps were identified. The Table thus prepared was reviewed by faculty members to determine which components of PO & PSO were either not met or met to level I only. Discussions focused on whether level I of introductory nature was adequate or does the institute need to develop more beyond syllabus topics, introduce additional electives, laboratory experiments, etc. to improve the level.
3. For developing content beyond the syllabus, the feedback from alumni, Employer, and industry (T&P department) were discussed thoroughly and analyzed. Also, the internet searching was done to assess the demand of the industries.
4. Meeting with Academic committee and subject experts had been conducted to review the syllabus provided by other universities and to detect gap.
5. Finally, the content beyond syllabus which is to be imparted to make corrective actions for bridging the gap were thoroughly discussed and finalized.

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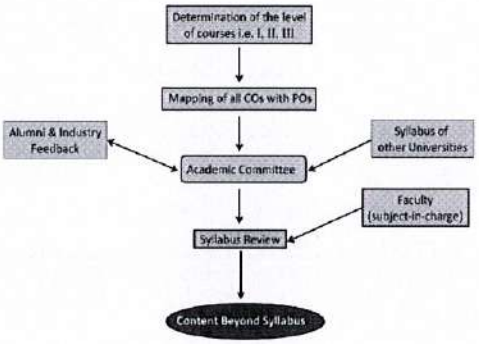
CHENNAI 600 055



Identified Gaps

- Students lag in relating theoretical aspects in Practical terms
- Students lag in communication-skills and Lack of Reasoning Aptitude
- Students are not rich in their soft-skills and they are also not motivated
- Low percentage of selections in PSUs and GATE
- Students lack in creating a linkage between social and professional aspects
- Poor interest and involvement in R & D works

2.1.2. State the delivery details of the content beyond the syllabus for the attainment of POs and PSOs (10)

Intimation to the University (2)+Delivery details (5)+Mapping (3)

(Provide details of the additional course/ learning material / laboratory experiments/ projects etc., arising from the gaps identified in 2.1.1 in a tabular form in the format given below)

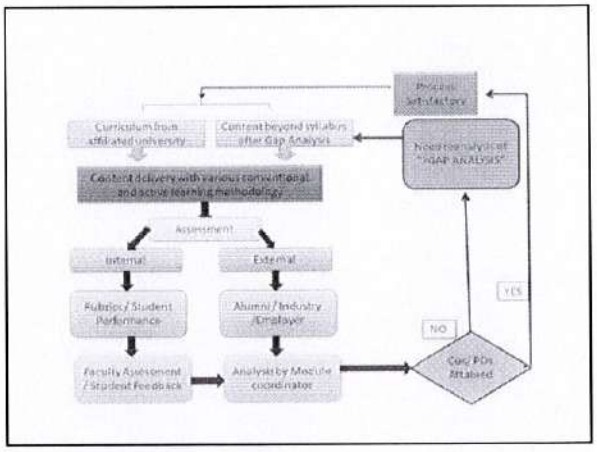
Different Modalities

- Lectures (Chalk and Talk)
- External/ Internal Special Lecture
- Technical Seminars
- Projects
- Industrial Visits and Technical Trainings
- Workshops
- Technical Activities
- E-Books, GATE/PSU Notes/Classes
- Placement Oriented Activities
- Personality Enhancement Activities
- Conferences
- Govt. Initiatives for E-Resources (Virtual lab, NPTEL, Moodles etc)
- Internshala
- ICT based Learning
- Social Activities etc

CAY, CAYm1, CAYm2

S.No.	Gap	Action taken	Date-Month-Year	Resource Person with designation	No. of students present	Relevance to POs, PSOs

- Documentary evidence
- Availability & Appropriateness of Mapping



Thank you

PRINCIPAL
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COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPE
CHENNAI 600 055

தமிழ்நாடு तमिलनाडु TAMILNADU

BM 607085

AALIM MUHAMMED SALEGH COLLEGE OF ENGINEERING

T. SELVARAJ,
STAMP VENDOR
L.NO. 1172/E/91,
NO.9, KARUMARIAMMAN KOIL STREET,
VILINGIYAPAKKAM,
AVADI, CHENNAI - 600 07

MEMORANDUM OF UNDERSTANDING

BETWEEN

K.J.RESEARCH FOUNDATION, K.J.HOSPITAL RESEARCH AND POSTGRADUATE CENTER

182 Poonamallee High Road, Chennai-600084, Tamil Nadu

AND

AALIM MUHAMMED SALEGH COLLEGE OF ENGINEERING

Avadi IAF, Chennai 600055, Tamil Nadu

1. AALIM MUHAMMED SALEGH COLLEGE OF ENGINEERING

Aalim Muhammed Salegh College of Engineering is a self-financing Minority Institution, is approved by AICTE, New Delhi, and Affiliated to Anna University, Chennai. This College is offering 6 UG Programs – CIVIL, CSE,EEE, ECE, MECHANICAL and IT and one PG program – MCA. The vision of the Institution is to impart value oriented technical education and to infuse a sense of discipline and humanitarian culture to mould the youth as an Intellect Citizen.

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI - 600 055

K.J. RESEARCH FOUNDATION 241, (New 182) Poonamallee High Road Chennai-600 084 INDIA

Secretary & Correspondent
Aalim Muhammed Salegh
College of Engineering

2. **K.J.Research Foundation, K.J.Hospital Research And Postgraduate Center**

K J Hospital, Research and Post-graduate Centre, Chennai (herein after referred to as KJH) is the first corporate hospital in the country for which the founder is awarded the National B.C.Roy Award. It is one among the top- ranking hospitals in the country and it delivers multi speciality clinics under one roof and with the latest medical equipments. KJH has initiated research activities in basic and applied medical sciences right from its inception in the year 1969, although the **K.J.Research Foundation** (herein after referred as KJRF), an independent research unit of KJH was formally registered in the year 1983 under the Tamil Nadu Society Registration Act 1975. KJRF has been recognized by the Department of Scientific & Industrial Research (DSIR), Ministry of Science and Technology, Government of India for conducting research programmes. The Ministry of Finance, Government of India has issued exemption certificate under notification 35(1)(ii) (For the donated sum Income Tax exemption of 100% for any individual donor and 175% exemption for any corporate body).

KJH/KJRF is recognized by Indira Gandhi Centre for Atomic Research (IGCAR), Anna University,Chennai, IIT Madras, Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), University of Madras, Pharmacy Department of Pittsburgh University, U.S.A, Tamil Nadu Dr.M.G.R.Medical University, for conducting Ph.D., Degree programmes. National Board of Examination, New Delhi had recognized KJRF/KJH for conducting Diploma course in National Board (DNB) in the following disciplines i) General Medicine ii) General Surgery iii) Radiology and iv) Dermatology. KJRF/KJH is accredited to the Royal College of Physicians and Surgeons Glasgow, U.K.

Three of our candidates were awarded Ph.D. Degree by Anna University, Chennai, one candidate from Andhra University and one candidate from Tamil Nadu Dr.M.G.R.Medical University. Now two candidates are registered with Anna University, Chennai (they are in the final phase of Ph.D) and another candidate is registered with IIT Madras.

Major objective of KJRF as follows:

To carry out the Scientific Research in basic Medical Health and allied fields of modern medicine and in indigenous medical systems, thus to co-ordinate both systems.

The research activities of the KJRF are grouped under the following broad headings:

i) Fundamental Research
ii) Applied Research
iii) Scientific Studies
iv) Polymerase chain Reaction (PCR) based studies and Molecular Research
v) Drug trials in animal models

K. Jagadeesan

S. Sagu Sankar

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

KJRF/KJH has already signed MOU with Indira Gandhi Centre for Atomic Research (IGCAR) Kalpakkam in the year 2000. It is to the credit of this Institution that it went ahead with joint projects in Thermography and in Micro Detector developed for assessing Lymphatic flow assessment. Also a joint field project namely "Development of portable Lymphoscintigraphy for early assessment of Filarial Lymphatic Disease in South Indian scenario based on Radioactive Tracer Transport" has been accepted by the Board of Research in nuclear Sciences (BRNS) Department of Atomic Energy,Government of India in November 2006 Another on going project by KJRF/KJH is funded by Indian Council of Medical Research (ICMR) New Delhi. The project is "Low cost and sensitive mass screening for prediction of future Osteoporotic Fracture Risk in woman and men".

3. The two pioneer institutions, **KJRF/KJH** and **Aalim Muhammed Salegh College Of Engineering** have recognized and offer excellent opportunities for constructive collaboration for sharing the reservoir of knowledge available at both the ends, in order to contribute to mutual benefit in the fields of education and research programmes in selected disciplines. Interest in this regard has been discussed between the two institutions at various forums and levels. Accordingly, a team of senior medical Doctors and Research Scientists from the KJRF/KJH and Senior Academic Faculty Members from **Aalim Muhammed Salegh College Of Engineering** have exchanged visits in order to identify the possible areas of collaboration that will promote the effective linkages between the two institutions. The consensus will provide a suitable framework and platform for establishing the linkages and also pave the way for conducting collaborative Research and Education in various field of interest for overall National benefits ultimately.

4. The Memorandum of Understanding (MoU) between **KJRF/KJH and Aalim Muhammed Salegh College Of Engineering** in the first instance is aimed at conducting collaborative programmes in Education, Research and Development encompassing the following broad common areas of mutual interest and benefit:

   1. Cancer Vaccine: Personalized cancer vaccine by growing the cancer cells and preparing vaccine from the same and it is used to build up antibodies against the specific cancer. This technology has proved effective in sarcomas and certain carcinomas. Our publications on the same has been well received and recently in USA, Prof.Richard Barth of "Dartmouth-Hitchcock Medical Center, U.S.A" has also brought out the similar vaccine but we were the first to introduce the concept.

   2. Auto Immune Disorder: Auto immune diseases in human beings are incurable. With the advent of an enzyme preparation and immune modulator developed from a herbal preparation has proved to cure auto immune diseases like systemic lupus erythematosus (SLE) and Psoriasis.

K. Jagadeesan

S. Sagu Sankar

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

Secretary & Correspondent
Aalim Muhammed Salegh
College of Engineering

3. Application of Nano Technology on prosthetic heart valve material to prevent clot formation and infection:

- In collaboration with Material science Group IGCAR
- Project funded by UGC-DAE-CSR

4. Transplantation immunology and immune modulation.

5. Molecular mechanisms and identification of active principles of herbal preparations used for treatment and or prevention of diabetes.

6. Electron microscopic studies on pancreas and salivary glands with particular reference to diabetes.

7. Stem Cell Research.

8. Rheumatoid Arthritis.

9. Osteoporosis.

10. Taking up collaborative research projects.

11. Organizing Faculty Development Programs.

12. Conducting training programs for students.

13. Establishing Research and Development Centre.

In addition, the MoU also provides a space for inclusion of other areas of R and D not mentioned above which is of interest to both the Institutions at a later date.

5. The details of the various schemes and other arrangements in respect of the above will be worked out and finalized through mutual discussions for effective implementation of the programmes.

6. (a) The results / procedures / products / publications and patents that are produced by the collaboration with KJRF/KJH and Aalim Muhammed Salegh College Of Engineering will be the joint property of the institutions mentioned above.

   (b) Any proprietary information, specifications, designs, experimental data, test Results and conclusions of a study or studies made jointly by the two institutions shall not be divulged to any third party without mutual consent.

7. The progress of various schemes / programmes will be reviewed jointly and improvements may be incorporated periodically during the process of implementation in order to meet the aims and objectives of the MoU.

K. Jagadeesh

K J RESEARCH FOUNDATION, 941, (New 152) Poonamallee High Road, Chennai-600 084, INDIA, Reg. No. 120 of 1993

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

S. Syed Jasmudeen
Secretary & Correspondent
Aalim Muhammed Salegh
College of Engineering

8. Duration of the MoU: The duration of the MoU shall be **five years** from the date of signing. The MoU may be renewed for further period if desired by either party.

9. Any disagreement / difference of opinion / dispute regarding the interpretation of the provisions of this MoU shall be resolved by mutual consultation by the signatories.

Chairman / Director

K.J.Research Foundation,
K.J.Hospital Research & PG centre,
182, Poonamalle High Road,
Chennai-600084. Tamil Nadu

Secretary & Correspondent

Aalim Muhammed Salegh
College Of Engineering
Muthapudupet, Avadi IAF,
Chennai- 600055, Tamil Nadu

Secretary & Correspondent
Aalim Muhammed Salegh
College of Engineering

Date:

Place:

Witness:

1) (Prof. Dr. N.R. SHANKER)

2) Dr. Y. PAUL KORATH

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING
AVADI - IAF, MUTHAPUDUPET
CHENNAI 600 055

COLLABORATIVE RESEARCH

SRM MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE

SRM

ETHICS CLEARANCE NUMBER: 2963 */IEC/2021*

Proceeding of Institutional Ethics Committee

The Institutional Ethics Committee Discussed "Human fatty liver measurement through Nano graphene polyvinyl sensor signal based instantaneous frequency and Gaussian regression"- by Mrs. M.K. Srilekha, Assistant Professor, Guided by- Dr. N.R. Shanker Director, Chase Research and Development Solutions, Dept. of ECE, SRM IST on 25.11.2021 at 10.30 AM. The Ethics Committee approved the project and the progress will be reviewed periodically.

Jamuna Rani
Member Secretary
Institutional Ethics Committee

Copy to :
Mrs. M.K. Srilekha

IEC NO: 2963
Date: 25.11.21

SRM Nagar, Potheri, Kattankulathur-603203, Chengalpattu District, Tamilnadu, India.
Phone - Hospital off.: 044 - 47432333, 47432307, 47432367, College: 47432502
Fax: 27455106, Web: www.srmist.edu.in

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING

SRM MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE

SRM
INSTITUTE OF SCIENCE & TECHNOLOGY

ETHICS CLEARANCE NUMBER: 2964/IEC/2021

Proceeding of Institutional Ethics Committee

The Institutional Ethics Committee Discussed "Detecting the Breast cancer (stage T1) of size below two centimeter using thermogenesis with nano iron oxide and thermal imaging"- by Mrs. Geetha P, Research Schloar, Dept. of EIE - Guided by Dr.S.Umamaheswari, Assistant Professor, Dept. of ECE, SRM IST & Co-investigator : Dr.N.R.Shanker, Director, Chase Research and Development Solutions, Avadi on 25.11.2021 at 10.30 AM. The Ethics Committee approved the project and the progress will be reviewed periodically.

Jamuna Rani
Member Secretary
Institutional Ethics Committee

Copy to :
Mrs. Geetha P

SRM MEDICAL COLLEGE HOSPITAL & RESEARCH CENTRE
IEC 2964
Date 25-11-2021

SRM Nagar, Potheri, Kattankulathur-603203, Chengalpattu District, Tamilnadu, India.
Phone - Hospital off.: 044 - 47432333, 47432307, 47432367, College: 47432502
Fax: 27455106, Web: www.srmist.edu.in

PRINCIPAL
AALIM MUHAMMED SALEGH
COLLEGE OF ENGINEERING

IEEE Access
Multidisciplinary | Rapid Review | Open Access Journal

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Digital Object Identifier 10.1109/ACCESS.2022.3151697

Comprehensive Review of KY Converter Topologies, Modulation and Control Approaches With Their Applications

K. RAMASH KUMAR[1], K. RAMEEZ RAJA[2], SANJEEVIKUMAR PADMANABAN[3], (Senior Member, IEEE), S. M. MUYEEN[4], (Senior Member, IEEE), AND BASEEM KHAN[5], (Senior Member, IEEE)

[1]Department of Electrical and Electronics Engineering, Dr. N. G. P. Institute of Technology, Coimbatore, Tamilnadu 641048, India
[2]Research Scholar, Department of Electrical and Electronics Engineering, Aalim Muhammed Salegh College of Engineering, Muthapudupet, Chennai, Tamilnadu 600055, India
[3]CTiF Global Capsule, Department of Business Development and Technology, Aarhus University, Herning 7400, Denmark
[4]Department of Electrical Engineering, Qatar University, Doha, Qatar
[5]Department of Electrical and Computer Engineering, Hawassa University, Hawassa 05, Ethiopia

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ABSTRACT In current scenario, the challenging task in designing a DC-DC converter has high voltage gain and small output ripple waves, which researchers deal with highly complicated. Because of its topological and Continuous Conduction Mode (CCM), the KY converters have developed a better converter than all the traditional DC-DC converters to overcome this intricacy of voltage transfer gain and output ripple waves. The KY converters had comparative and various qualities when compared with the boost converter with Synchronous Rectifier (SR). The KY converter is used in photovoltaic and sustainable power applications, which are examined in this study. KY converter incorporates mode-1 and mode-2 operation and its types, for example, one plus D and one plus 2D where the KY can deliver the N^{th} type of KY converters. This article provides a comprehensive review and investigation of the KY converters, which incorporates their topology with control methodologies, Pulse Width Modulation (PWM) techniques, working activity of KY converters, and types for mode-1 and -2; it interprets the few strategies the KY converter is executed and its applications.

INDEX TERMS KY converters, boost converter, Cuk converter, DC to DC converter, control methodology, digital implementation.

I. INTRODUCTION

DC–DC power converters are not only becoming more popular, but they are also being respected in the current market. It's better for invariable power sources in LCDs, Ipads, MP3 players, battery-powered industrial equipment, automobile stereos, communications equipment, fuel cells, electric vehicles, and solar cell modules tec.,. Good output voltage regulation, circuit layout with fewer components, good voltage transfer gain, and reduced output ripple voltage/current are all required for these applications. Based on their structure, concept, performance, and application, many topology DC–DC converters have been constructed and classified into six generations. In Continuous Conduction Mode (CCM), typical non-isolated DC–DC converters/Luo converters with/without linked inductance have resulted in pulsating output current, higher output voltage ripples, a greater number of components, diodes, and a right half pole zero (RHPZ) structure [1]–[3]. Many KY topologies have been created to address these cries. KY family converters are recently derived DC-DC converters. Fuzzy Logic Controller (FLC) plus Sliding Mode Controller (SMC) for KY boost converter has been reported [4]. From this article, it is found that authors were designed FLC plus SMC

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ORIGINAL ARTICLE

Experimental Investigation of the Effect of Independent Parameters in the Face Milling of Aluminum 6082 Alloy

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Abstract Face milling is the vital process, which takes away the material from the top surface. This work comprehends the selection of desirable milling parameters like spindle speed (SS), feed rate (FR) and depth of cut (DoC) over machining time, material removal rate and surface roughness. The complex technical reasons like shearing action, dribbling, furrowing, churning and piling were identified concerning the parameter considered. The SS is associated with shearing action or incisaling with plowing, FR causes furrowing and DoC concerns the piling action over the material, affecting the responses. The mathematical model was developed through response surface methodology (RSM). Later, an assessment was made between the predicted and experimental data so as to perceive the consistency of the developed model. The surface plot of RSM has greater concurrence with the white light interferometer images, which is evident for the technical reason. The maximized productivity and better part quality are decided based on the appropriate machining parameter selection. Therefore, optimization is carried out through the genetic algorithm to obtain the desired input parameters. The optimal values of SS, FR and DoC for minimizing the responses are found to be 4978.51 rpm, 598.242 mm/min. and 1.499 mm, respectively.

Keywords Characterization · Material processing · Empirical modeling · Aluminum 6082 · Face milling · Machining time · Surface roughness · Material removal rate

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1 Introduction

Components from manufacturing processes have different stages; these are preliminary production processes such as casting, rolling, forging, welding, etc. However, the manufactured components from preliminary operations are not suitable for working conditions, because they do not have any close tolerance values. A lot of secondary operations are available for making the components to close tolerances by using machining operations [1]. Studies in production processes and mechanisms are largely examining processes to enhance their quality and productivity. The quality of goods is characterized by how precisely the finished products complies with requirements, including measurements and consistency of the surface. Surface quality is described and established by parameters like surface texture, SR, surface finish, etc. [2]. Recent years have seen a large ascend in the usage of Aluminium (Al) alloys in the automotive sector due to the combination of superior strength and lightness [3]. Özel et al. [4] studied the micro-milling operation to enhance the productivity, reliability and quality in Al 2024-T6 and AISI 4340. Larger instability due to process dynamics and uninterrupted shift, among shearing dominated cutting and plowing was observed during micro-milling. The machine tool vibration and SR were studied in milling of Al 6082. The tangential,

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Properties of Plasma Sprayed Al_2O_3-13TiO_2 and ZrO_2 Blended Coatings on Biomedical Alloy

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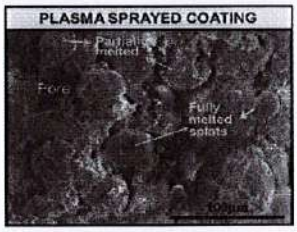
ABSTRACT

Plasma spray grade Al_2O_3-13TiO_2 and ZrO_2 powders were blended physically in different proportions (80 wt% Al_2O_3-13TiO_2 + 20 wt% ZrO_2, 20 wt% Al_2O_3-13TiO_2 + 80 wt% ZrO_2 and 50 wt% Al_2O_3-13TiO_2 + 50 wt% ZrO_2) and plasma sprayed on biomedical Ti-13Nb-13Zr alloy using identical plasma spray parameters. Microstructural and phase analyses of the as-sprayed coatings were carried out using scanning electron microscopy and X-ray diffractometry. Results showed that the 80% Al_2O_3-13TiO_2 + 20% ZrO_2 coating had enhanced corrosion and wear resistance compared to the other two compositions and appeared to be a propitious coating for biomedical application.

[Keywords: Plasma spray, Hardness, Corrosion, Wear, Microstructure]



Introduction

Ti-13Nb-13Zr alloy is considered to be a potent candidate for biomedical applications, especially in hip and knee joint prosthesis due to its low modulus, high strength to weight ratio, excellent biocompatibility and high corrosion resistance.[1–5] However, this alloy undergoes higher wear due to its higher coefficient of friction.[6] To overcome the above drawback, several surface modification techniques, such as plasma ion immersion implantation, laser nitriding, atmospheric plasma spraying and physical vapour deposition, have been used for surface modification or developing coatings on biomedical titanium alloys.[7–10] Laser nitriding on commercially pure (CP) titanium and Ti-13Nb-13Zr alloy has led to substantial enhancement in their corrosion and wear resistance.[7] However, it has resulted in the formation of minute cracks. This problem can be effectively circumvented by depositing ceramic coatings on biomedical Ti-13Nb-13Zr alloy by using atmospheric plasma spraying, sol-gel, electrophoretic deposition and sputtering techniques.[9–18] Among the aforementioned coating techniques, atmospheric plasma spraying (APS) technique is the most well established technique to deposit various ceramic coatings.[19, 20] In recent years, ceramics are considered a better alternative for metallic-based implants, as they offer several advantages over metals and alloys. Besides being bio-inert, ceramics produce little wear debris and further the compositions and the microstructures can be tailored to match the material properties to those of natural bone. Articulating surfaces on hip, knee and shoulder implants are currently being fabricated using either alumina or zirconia, which are scratch resistant and significantly harder than the metal combination.[21] These two ceramic materials can also be used on both the ball and the socket components of implants. One of the limitations of using ceramics as implants is their brittleness which may result in catastrophic failure. Hence, in order to effectively circumvent the above issue, bio-inert ceramics, such as zirconia and alumina can be coated on metallic substrates which will be more suitable for the manufacturing of new and high wear-resistant implants.[22, 23]

Kabacoff[24] and Gell *et al.*[25] have shown that the nanostructured Al_2O_3-13TiO_2 coatings fabricated on some of the mechanical parts, such as periscope piston rod used in navy and submarine, resulted in better indentation crack resistance, adhesion strength, spallation and wear resistance. It is important to note that Al_2O_3-13TiO_2 has the same effect in the field of bioimplants and both alumina and titania are biocompatible. Lee *et al.*[26] in their work clearly demonstrated enhanced mechanical properties such as hardness, fracture toughness and wear resistance of Al_2O_3-13TiO_2 coating deposited on femoral head.

Though exhaustive work has been carried out on alumina-titania composite coatings for other applications,

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Acoustic Emission Based Deep Learning Technique to Predict Adhesive Bond Strength of Laser Processed CFRP Composites

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The high degree of inhomogeneity in material and intricacies created by machining of carbon fiber reinforced plastic (CFRP) composites hinder the accurate prediction of residual strength of the adhesive bond joint using analytical models. Recently, artificial intelligence techniques are effectively utilized as an alternative method for predicting the results of complex phenomena. In this paper, attempts were made to predict the bond strength of laser surface treated and adhesively bonded CFRP composite specimens using the artificial neural network (ANN) from the acoustic emission (AE) parameter recorded during the shear test. Twelve adhesively bonded specimens whose surfaces were pre-processed with 3W Nd:YAG laser at different processing parameters. ANN was trained using segregated AE data according to the failure mechanism and the percentage of failure load (5 to 100%). Predicted values were compared with experimental values and the results were analysed for the suitability of ANN with AE in the application.

Keywords: *Acoustic emission, NDT, neural network, prediction, failure characterization.*

1. INTRODUCTION

Aviation and space industries were always in thirst of reliable and sustainable material for the better performance of their products [1]. CFRP composites are the ideal choice due to their superior mechanical properties like high tensile strength, good strength to weight ratio, radar absorption, water resistance and better impact resistance [2]. CFRP composites are widely utilised in critical components of advanced aerospace applications like helicopter rotor blades, fighter jet nose cone, wind turbine blades and robotic manipulators [3,4,5]. Due to its macroscopic inhomogeneity, it creates unique technological challenges while joining.

Adhesive bonding is preferred for a composite because of its distinct advantages like high fatigue strength and the lowest possible addition of weight [6]. In order to realise a good adhesive bond, the impregnated fibers should be made to expose out from bulk material prior to bonding. Because the outer matrix (epoxy) layer, being a binding element, will not bear any load and inherit the impurities from its manufacturing processes like grease, release agent and atmospheric dust and moisture. These difficulties nessaciate surface preparation prior to bonding and it will also improve the adhesive bonding strength by inducing roughness and wettability [7]. Laser surface processing being a non-contact type and ability to precisely adjust the process parameter makes it a distinct candidate for the pre-treatment of CFRP composite [8]. Because of its high power density, matrix element will be evaporated and leaving the fibers unaffected by selecting appropriate processing parameters. Oliveria et al.[9] results depicted that the change in surface morphology of fibers by laser radiation can affect the bond strength. Recently, Sathiyamurthy et al. [10] experimentally proved that even a micron level change in the surface characteristic of laser processed specimens can deteriorate the bond strength of CFRP composite to a higher extent.

The interaction of laser energy on CFRP composite is a complex phenomenon that makes it difficult to predict the surface morphology [11,12]. Predicting the final bond strength from the failure mechanism will pave the way to monitor a product in service and exploit it with confidence. Finite element analysis (FEA) was performed by Garinis et al. [13] for dynamic analysis of composite rotor blade and Dinulovic et al. [14] developed a novel Pan's theory based FEA model to predict mechanical properties of composite structures. Due to the complex failure behaviour of the composites, mathematically calculating the final bond strength is a challenging task and needs extensive computational infrastructure. These reasons necessitate the need for a simple and reliable expert system.

In recent times, deep learning, due to its simple mathematical operation and ability to fit the complex model, plays a vital role in various engineering domains, by learning the given problem and stating a more generalized result with acceptable error margin [15]. Simplest ANN will comprise three layers, namely input layer, hidden layer and output layer. Each neuron in a layer will be associated with every neuron in the succeeding layer through a communication link. The signal processed in a neuron will be transmitted to the adjacent

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Selective laser ablation of CFRP composite to enhance adhesion bonding

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ABSTRACT

In this work, the effect of picosecond laser radiation on ablating carbon fiber-reinforced polymer (CFRP) composite surface to increase the adhesive bond strength was analyzed. The experiment was conducted using a picosecond laser of 3 W average power with 532 nm wavelength, working at the 20kHz frequency. Effect of process parameters (scanning speed, beam overlap, and number of passes) on surface treatment of CFRP was analyzed and optimized for maximum shear strength using response surface methodology (RSM). Single lap shear test was performed on adhesively bonded laser-treated specimens using the optimized process parameter (for maximum shear strength) and maximum roughness. Acoustic emission data was collected during the shear test to investigate and characterize the failure mechanism. The morphology of laser-treated surface and shear tested surface was explored using scanning electron microscopy (SEM) and white light interferometer (WLI).

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KEYWORDS
Adhesion; laser; NDT; CFRP; RSM

Introduction

In the recent past, polymer composites reinforced with carbon fiber[1] and carbon nanotubes[2] have fascinated much scientific attraction due to their inherent properties like high strength to weight ratio, large working temperature range, lower thermal expansion, biocompatibility, and chemical inertness. Because of these properties, CFRP composites are used in spacecrafts, defense equipment, advanced surface vehicles[3–8], and biomedical sector.[9] These composites are very versatile due to the fact that it will produce different materials with different properties, which will allow the manufacturer to tailor material for specific applications.[1]

Due to machine capacity, the complexity of the part, resin polymerization time and difficulty in handling large raw materials will place limitations in the size of the component to be manufactured. With these constraints, several elements have to be merged to realize large structures. Joining of CFRP composite always a major concern in its utilization for the intended application.[10] The most preferred technique to join CFRP composite parts is adhesive bonding. Adhesive bonding provides distinctive advantages like better static and fatigue strength, stiffness, least increase in weight and lower cost. Adherent surface preparation is the most critical process to achieve better adhesive bond strength.[11] The surface preparation technique deployed should maximize adhesive wettability by increasing surface energy.[11,12] Surface energy can be increased by roughening the adherent surface. Surface roughness has a vital role in controlling adhesive interaction with the adherent surface, wettability and spreading of adhesives on the surface.[11]

In addition, roughening enhances the adhesive bond strength by providing some amount of mechanical interlocking between adhesive and adherent surface.[12,13] There exists a complex relationship among roughness, wetting, and adhesive strength which is very difficult to predict but studying the interaction is essential to design a better adhesive joint. The literature revealed that roughness pattern of various degrees will affect the adhesive bond strength by altering the fracture energy and mechanical interlocking. Another compulsory surface preparation for adhesive bonding is the elimination of excess resin layer to expose the underlying fibers which are the sole load-bearing element and surface contaminants due to the manufacturing process (florin-based release sprays or release wax) which will reduce the wettability. Low-cost mechanical surface preparation techniques like grit blasting and sanding will permanently spoil the composite by creating irreversible damages like fiber fracture, delamination and unwanted inclusions.[11] These inclusions will negatively affect the bond strength by acting as stress concentration points, which leads to the need for secondary cleaning methods.[13] Due to the inhomogeneous characteristic of CFRP, it is very difficult to prepare the surface by mechanical means, which leads to delamination.[14]

Laser-based surface preparation provided district advantage over all mechanical techniques by being the non-contact type and also offer no tool wear and eliminating the necessity of secondary cleaning method. Because of available and low cost of operation, CO_2 lasers were the first to be used for polymer composite processing.[15] But due to the thermal energy of radiation thermomechanical degradation will occur in the material[3,16,17] In CFRP, due to the huge difference in thermal properties of carbon fibers and resin matrix, a large heat-affected zone (HAZ) will form due to which the integrity of the composite will be compromised by degrading carbon

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(57) Abstract :
Utilization of automation is demonstrated in this invention which conveys the parts of the ferromagnetic materials. In conjunction usage of conveyor belts is conventional along with the robotic arms which runs on the pneumatic power for achieving the functionality of picking and placing the object. Pneumatic cylinders are used in the system for its development with valves in the tubing and electromagnet. The system also consists of frame for supporting purpose, shafts and rods. Controlling of the arm is done pneumatically for the motion of to and fro. Materials such as metals are detected by the sensors whose signals are sent to the microcontroller. The circuit is simple used for switching which helps the mechanism of pick and place of the piece of metal to be carried out efficiently and a faster manner. These pneumatic arms are used widely in the industries of automation which consist of conveyor belts along with it for meeting the needs of the automation.

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COMPLETE SPECIFICATION

(See Section 10; rule 13)
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NOVEL DESIGN OF PNEUMATIC PICK AND PLACE ROBOTIC ARM FOR MANUFACTURING APPLICATION

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Article type : Article

Drilling performances and wear characteristics of coated drill bits during drilling reinforced concrete

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Abstract:

This paper deals with the investigation on the microstructure and wear behavior of uncoated, Al_2O_3-13 wt% TiO_2 and WC-12 wt% Co coated drill bits intended for drilling reinforced concrete. Atmospheric plasma spraying technique was employed to fabricate the above coatings on High speed steel drill bits. The circularity measurements of the drilled holes were carried out using MATLAB. The holes drilled using WC-12 wt% Co coated drill bit showed a better circularity depicting enhanced wear resistance as compared to that of the uncoated and Al_2O_3-13wt% TiO_2 drill bits. The improvement in the wear resistance of WC-12 wt% Co coated drill bit is attributed to its higher hardness and lower porosity. Thrust force was observed to be lower for WC-12 wt% Co coated drill bit depicting less amount of wear. This study suggests that WC-12 wt% Co coated drill bits can be a potential candidate for drilling reinforced concrete.

Keywords:Atmospheric plasma spraying, Microstructure, Drilling, MATLAB, Thrust force

1. Introduction

Reinforced concrete has been widely employed for construction as it is economical and highly durable with little maintenance required over its life time. Besides, it is possible to