



Anand Nagar, Krishnankoil - 626126, Srivilliputtur (via), Virudhunagar District, Tamilnadu.

APPLICATION FOR ADMISSION TO Ph.D. PROGRAMMES

Date of Application:05-11-2024

Department	MECHANICAL ENGINEERING	Application No.	20240149
Area of Research	PRODUCTION ENGINEERING	Research Mode	PART TIME

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Qualification						
Degree	Discipline	College/university	Year Passed	AVG/CGPA	Class	Mode
M.TECH	MECHANICL ENGINEERING	GOVERNMENT ENGINEERING COLLEGE THRISSUR	2008	73 %	FIRST	REGULAR
B.TECH	MECHANICAL ENGINEERING	GOVERNMENT COLLEGE OF ENGINEERING,KANNUR	2002	61.40 %	FIRST	REGULAR

Experience				
Organization	Designation	Experience From	Experience TO	Work Nature

UNIVERSITY OF TECHNOLOGY AND APPLIED SCIENCES, OMAN	LECTURER	2011-12-07	2024-05-11	RESPONSIBILITIES INCLUDE DELIVERING LECTURES, CONDUCTING SEMINARS, SUPERVISING AND GUIDING PROJECT STUDENTS, PROVIDING ACADEMIC ADVISING, AND OFFERING COUNSELING SUPPORT TO STUDENTS
SREE NARAYANA GURU COLLEGE OF ENGINEERING AND TECHNOLOGY	ASSISTANT PROFESSOR	2006-09-29	2011-11-30	RESPONSIBILITIES INCLUDE DELIVERING LECTURES, CONDUCTING SEMINARS, SUPERVISING AND GUIDING PROJECT STUDENTS, PROVIDING ACADEMIC ADVISING, AND OFFERING COUNSELING SUPPORT TO STUDENTS
SPACE PRO ,COIMBATORE	ENGINEER	2003-04-15	2004-12-24	PLANNING AND SCHEDULING RESPONSIBILITIES INCLUDE DELIVERING LECTURES, CONDUCTING SEMINARS, SUPERVISING AND GUIDING PROJECT STUDENTS, PROVIDING ACADEMIC ADVISING, AND OFFERING COUNSELING SUPPORT TO STUDENTS

Payment Details				
Transaction ID	Reference	Date of transaction	Amount	Status
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20240149_241105205838	ZHD5NA304CNWHM	05-11-2024	600	SUCCESS

RESEARCH PROPOSAL

Submitted by Sumesh M

RESEARCH TITLE

Development of an Adaptive In-Pipe Inspection Robot for Real-Time Pipeline Integrity Monitoring system and its effects and impact on small scale industrial sector.

1. Introduction

Pipelines serve as one of the most essential and economical methods for transporting fluids, such as gas, oil, water, and sewage, over long distances. However, pipelines are prone to aging, corrosion, and damage, which can compromise their functionality and safety. Such issues can lead to leaks, environmental damage, costly repairs, and even safety hazards for communities. Regular and thorough inspection of pipelines is therefore essential to ensure operational integrity and prevent failures. Traditional inspection methods can be costly, labor-intensive, and inefficient in detecting early signs of wear or damage, particularly in pipelines with confined spaces, variable diameters, and long distances.

In small-scale industries, pipeline infrastructure is crucial for transporting essential resources such as gas, oil, water, and chemicals. Due to budgetary constraints, frequent manual inspections are often impractical, leaving pipelines vulnerable to wear, corrosion, and other forms of damage over time. Small-scale industries face unique challenges, as they often lack the sophisticated monitoring systems utilized by larger corporations to ensure pipeline integrity, yet failures in these pipelines can cause substantial operational disruptions, safety risks, and environmental damage.

This research proposes the design and development of an adaptive in-pipe robot equipped with an adjustable mechanism that allows it to navigate through pipelines of varying diameters. The robot will be able to autonomously perform inspections, gather data, and provide real-time information about the structural condition of pipelines. The design includes a unique scissor-like mechanism that enables adaptation to pipe diameters, making it highly versatile for use in various types of pipeline infrastructure. This interdisciplinary research integrates robotics, mechanical engineering, and automation to develop an effective tool for pipeline inspection and maintenance.

2. Research Objectives

The primary objectives of this research are:

1. To **design an adaptive in-pipe robot** that can navigate pipelines with varying diameters while remaining stable and operational in confined spaces.
2. To **develop a scissor-like, pantograph-based mechanism** that allows the robot to adjust its size as needed, enabling efficient movement and inspection in pipelines of different sizes.
3. To **implement an inspection and data-gathering system** for real-time analysis of pipeline conditions, focusing on identifying wear, corrosion, and potential leak sites.
4. To **evaluate the robot's performance and adaptability** in simulated and real pipeline environments, ensuring robustness, efficiency, and reliability in varied conditions.
5. **Evaluate the robot's impact on small-scale industries** by analyzing improvements in inspection frequency, maintenance costs, and overall operational efficiency.

3. Background and Rationale

In-pipe robots are increasingly utilized in industries that rely on extensive pipeline networks. Various in-pipe robotic designs have been developed, but they often face challenges such as limited adaptability to changing pipe diameters, difficulties in maneuvering around bends or obstacles, and restricted ability to operate autonomously for extended periods. Most existing robots are designed for pipelines with specific diameters and may require frequent recalibration or structural modifications to function effectively in pipes of different sizes.

The proposed in-pipe robot addresses these limitations by incorporating a scissor-like pantograph mechanism with adjustable links, sleeves, and an elastic band system. This setup allows the robot to expand or contract its arms according to the pipe's diameter, ensuring consistent contact and stability. Furthermore, the adaptive mechanism reduces the need for recalibration, making the robot more efficient and versatile. By combining mechanical adaptability with autonomous navigation, this project aims to develop a robust solution to improve pipeline inspection practices and reduce operational costs associated with manual inspections and maintenance.

4. Literature Review

The field of pipeline inspection robotics has evolved considerably, with research highlighting various in-pipe robot designs, navigation mechanisms, and control systems. Key areas of exploration include:

- **Mechanical Adaptability:** Many current robotic designs incorporate spring-loaded or adjustable wheels for maneuvering. However, these approaches often face challenges in maintaining stability and uniform contact in pipes of varying diameters. Scissor-based mechanisms, such as pantograph designs, show potential for providing flexible and consistent adaptability without complex recalibration requirements.
- **Autonomous Navigation:** Advances in autonomous systems have enabled robots to navigate intricate networks with minimal human intervention. Robots with embedded sensors, cameras, and machine learning algorithms can identify obstacles and adapt navigation paths. However, successful deployment in confined and varying-diameter pipelines remains challenging.
- **Pipeline Condition Assessment:** Inspection robots typically rely on sensors for damage detection, corrosion analysis, and leak identification. Ultrasonic sensors, infrared cameras, and image processing algorithms are commonly used for condition assessment. Incorporating these technologies in adaptable robots is essential for comprehensive pipeline inspection solutions.
- **Sensor Integration for Integrity Monitoring:** Studies show that sensors like ultrasonic, infrared, and acoustic sensors are highly effective for pipeline integrity inspection. However, the integration of these sensors into compact, autonomous robots remains challenging due to size, power, and data processing limitations.
- **Cost-Effectiveness in Small-Scale Settings:** Small industries require tools that balance functionality and affordability. Research on low-cost, efficient robotics systems points to ESP32 microcontrollers as viable options due to their compact size, wireless capabilities, and compatibility with diverse sensors.

This research builds on existing work by focusing on adaptive mechanisms and improved stability to enable versatile use across pipelines of various sizes, combined with a data acquisition system for condition assessment.

5. Methodology

This research will adopt a multi-phase methodology, combining design, simulation, prototyping, and testing to develop and evaluate the proposed in-pipe robot.

Phase 1: Conceptual Design and CAD Modeling

- **Design Framework:** Develop a CAD model of the in-pipe robot, focusing on the scissor-like pantograph mechanism, link assembly, and elastic band system. The robot will be structured with a cylindrical body and an adjustable arm mechanism to maintain adaptability to different pipe diameters.
- **Material Selection:** Select materials that are lightweight, durable, and corrosion-resistant, ensuring the robot's suitability for varied environments (e.g., oil, gas, water, sewage).

Phase 2: Mechanical Simulation and Analysis

1. **Structural Analysis:** Perform finite element analysis (FEA) on the robot's frame and adjustable components to assess stress distribution, elasticity, and durability under various pipe diameters and conditions.
2. **Kinematic and Dynamic Simulation:** Use simulation software to evaluate the robot's movement dynamics within pipelines. Analyze the scissor mechanism's extension and retraction, verifying its ability to adapt to different diameters without compromising movement efficiency.
3. **Optimization:** Fine-tune the design based on simulation results to minimize power consumption, maximize speed, and enhance structural integrity.

Phase 3: Prototype Development and Testing

1. **Prototype Assembly:** Construct a physical prototype using 3D-printed components and off-the-shelf parts. Assemble the pantograph-based scissor mechanism, motorized wheels, and inspection sensors.
2. **Laboratory Testing:** Test the robot in a controlled pipeline environment with variable diameters to assess performance, adaptability, and data collection capabilities.

3. **Data Collection System:** Integrate ultrasonic sensors, infrared cameras, or other inspection tools to capture real-time data on pipeline conditions. The robot will use wireless data transmission to relay information to a central monitoring system.

Phase 4: Field Testing and Evaluation

1. **Controlled Environment Testing:** Conduct testing in field-like conditions to evaluate the robot's adaptability, efficiency, and inspection accuracy in pipelines with typical obstacles, curves, and varying diameters.
2. **Data Analysis:** Analyze collected data to assess the robot's accuracy in detecting damages, corrosion, and potential leaks.
3. **Performance Metrics:** Measure key performance indicators, such as movement speed, adaptability, stability, data accuracy, and battery life, to determine the robot's viability for large-scale deployment.

6. Scope of the Study

The research will focus on:

- **Pipeline Types:** Testing will be limited to cylindrical pipelines commonly used for transporting fluids, particularly water, oil, and gas.
- **Diameter Range:** The robot will be designed to accommodate pipes within a specified diameter range, covering most standard pipelines in the industry.
- **Inspection Types:** The study will cover structural integrity inspections, including corrosion, wear, and crack detection, using non-destructive testing methods.

This scope ensures a manageable yet comprehensive examination of the robot's capabilities within the most common pipeline types and sizes.

7. Expected Outcomes

The anticipated outcomes of this research are:

1. **Versatile In-Pipe Robot:** A functional robot with an adaptive scissor-based mechanism capable of navigating pipes of varying diameters while maintaining consistent contact and stability.
2. **Enhanced Inspection Efficiency:** Improved data collection and real-time transmission capabilities for effective pipeline condition monitoring.
3. **Scalability and Practicality:** A scalable design suitable for industrial deployment across multiple sectors, including water, oil, and gas industries.
4. **Operational Cost Savings:** Reduced need for manual inspections, lowering inspection costs and downtime while enhancing safety.

8. Significance of the Study

This research contributes to the fields of robotics, pipeline maintenance, and industrial automation by providing an adaptable, efficient, and economically viable solution for pipeline inspection. By reducing the reliance on manual inspections and improving early detection capabilities, this project will have far-reaching implications for the safety, sustainability, and efficiency of pipeline infrastructure across industries.

10. Timeline

The proposed project timeline is structured to proceed through six main phases over an 18-month period. In the initial **Conceptual Design** phase, spanning the first three months, the focus will be on defining the design parameters and developing a robust conceptual framework for the in-pipe inspection robot. Following this, the project will enter the **Simulation and Optimization** phase, from months 4 to 6, where various design aspects will be digitally modeled and optimized for performance within simulated environments.

Once the design is refined, the **Prototype Development** phase will take place during months 7 to 9, in which the physical robot model will be assembled based on the optimized design specifications. This prototype will then undergo rigorous **Laboratory Testing** from months 10 to

12, where its functionality and adaptability will be evaluated in controlled conditions to ensure it meets project objectives.

The next stage, **Field Testing**, will be conducted over months 13 to 15. Here, the robot will be deployed in real-world pipeline environments to assess its performance under actual operating conditions. Finally, the **Data Analysis & Reporting** phase will take place from months 16 to 18, focusing on analyzing the collected data, drawing conclusions, and preparing comprehensive reports on the project's findings and potential implications for small-scale industries. This structured approach ensures a thorough development, testing, and evaluation process to maximize the effectiveness of the adaptive in-pipe robot.

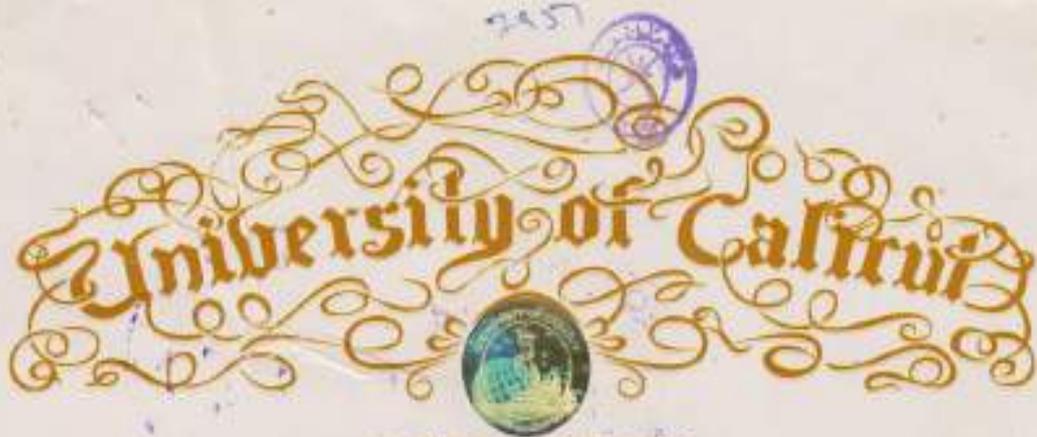
11. Conclusion

This proposal outlines the design and development of an adaptive in-pipe robot for efficient pipeline inspection. With a unique scissor-based mechanism, this robot aims to overcome existing limitations, offering a robust and versatile solution for industries dependent on pipeline infrastructure. Through comprehensive testing and evaluation, this project will provide a significant advancement in pipeline inspection technology, with implications for sustainability, safety, and operational efficiency.

12. REFERENCES

1. Wu, Q.; Lee, C.M. A Modified Leakage Localization Method Using Multilayer Perceptron Neural Networks in a Pressurized Gas Pipe. *Appl. Sci.* 2019
2. Yan Zhao, Lixin Zhang, Xin Zha, Jin Liu, Ming Gao, "Research on Descaling Characteristics and Simulation Calculation of a Coaxial High-Frequency Electronic Descaling Device", *Water* 2021, 13, 789. <https://doi.org/10.3390/w13060789> , <https://www.mdpi.com/journal/water>
3. Zhu, W.-F.; Chen, X.-J.; Li, Z.-W.; Meng, X.-Z.; Fan, G.; Shao, W.; Zhang, H.-Y. A SAFT Method for the Detection of Void Defect inside a Ballastless Track Structure Using Ultrasonic Array Sensors. *Sensors* 2019, 19, 4677.
4. Nishihara, T., Osuka, K., & Tamura, I. (2010, August). Development of a simulation model for inner-gas-pipe inspection robot: SPRING. In *Proceedings of SICE Annual Conference 2010* (pp. 902-904). IEEE. Patent number: 978 (2010).

5. Kurata, M., Takayama, T., & Omata, T. (2010, September). Helical rotation in-pipe mobile robot. In 2010 3rd IEEE RAS & EMBS International Conference on Biomedical Robotics and Biomechanics (pp. 313-318). IEEE. (2010).
6. Lim, J., Park, H., Moon, S & Kim, B. (2007, December). Pneumatic robot based on inch worm motion for small diameter pipe inspection. In 2007 IEEE International Conference on Robotics and Biomimetics (ROBIO) (pp. 330-335). IEEE. (2007).
7. Suzumori, K., Miyagawa, T., Kimura, M., & Hasegawa, Y. Micro inspection for 1-in-pipes. IEEE/ASME transactions on mechatronics, 4(3),286-292. (1999)
8. Montero, R., Victores, J.G., Martínez, S., Jardon, A. and Balaguer, C. (2015), “Past, present and future of robotic tunnel inspection”, Automation in Construction, Vol. 59, pp. 99-112.
9. Lin, L.; Jiang, W.B.; Xu, X.S.; Xu, P. A critical review of the application of electromagnetic fields for scaling control in water systems: Mechanisms, characterization, and operation. NPJ Clean Water 2020, 3, 25.
10. Wentao Zhao, Liang Zhang, Jongwon Kim, “Design and Analysis of Independently Adjustable Large In-Pipe Robot for Long-Distance Pipeline”, Appl. Sci. 2020, 10, 3637; doi:10.3390/app10103637
11. R. K. Jain, Abhijit Das, A. Mukherjee, Santosha Goudar, Ankita Mistri, A. Mondal, “Design Analysis of Novel Scissor Mechanism for Pipeline Inspection Robot (PIR)”, Proceedings of the Advances in Robotics 2019 July 2019 Article No.: 61 Pages 1–6 <https://doi.org/10.1145/3352593.3352671>
12. Qu, Y.; Durdevic, P.; Yang, Z. Smart-Spider: Autonomous Self-driven In-line Robot for Versatile Pipeline Inspection. The authors would like to the support from Danish Hydrocarbon Research and Technology Centre (DHRTC) through DHRTC Radical Project Program. IFAC Papers on Line 2018, 51, 251–256.
13. Kim, H.M.; Yoo, H.R.; Park, G.S. Analysis of the Magnetic Characteristics in MFL Type NDT System for Inspecting Gas Pipelines. In Lecture Notes in Electrical Engineering; Springer Science and Business Media LLC: Berlin, Germany, 2016; Volume 415, pp. 319–324.
14. Chang, F.S.; Hwang, L.T.; Liu, C.F.; Wang, W.S.; Lee, J.N.; Wang, S.M.; Cho, K.Y. Design of a Pipeline Inspection Robot with Belt Driven Ridged Cone Shaped Skate Model. In Proceedings of the 2015 IEEE International Conference on Robotics and Biomimetics (ROBIO), Zhuhai, China, 6–9 December 2015; IEEE: New York, NY, USA, 2015; pp. 787–792.



FACULTY OF ENGINEERING

Whereas it has been certified by duly appointed Examiners that
Sumesh. M.
is qualified to receive the Degree of
Master of Technology in Engineering (M. Tech.)
in Branch **M. Mechanical**
(**Production Engineering**)
he having been placed in **First Class**
at the Examination held in
October 2008 (Reg. No. 121)

The Senate of the University of Calicut hereby confers on him
the Degree of
Master of Technology in Engineering

with all the Rights, Privileges and Honours thereunto appertaining.
Given under the seal of the University

CALICUT UNIVERSITY

Pin-673 635

Date 15/05/2009

[Signature]

VICE CHANCELLOR



Nº 175636



ATTESTED BY MR

S. M. H. ZAIDI
S. M. H. ZAIDI
NOTARY

Government of India
Mumbai & Thane District

19 OCT 2011



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D.M. MOHAMAD SHAREEF
Joint Secretary to
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General Education Department
Certificate Authentication Centre
Kozhikode

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13 OCT 2011
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The Signature of Smt. *S.M. H. ZAIDI*
Mrs. S. M. H. ZAIDI
Secretary
Higher Departments
Government of Maharashtra
Maharashtra, Mumbai

19 OCT 2011

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KANNUR UNIVERSITY

FACULTY OF ENGINEERING

Whereas it has been certified by duly appointed examiners that

Sumesh M.

is qualified to receive the Degree of Bachelor of Technology in Engineering (B.Tech)
in Branch.....*Mechanical Engineering*.....

he/she having been placed in.....*First Class*..... at the

Examination held in*June 2001*..... (Reg. No.*7108 - VIII Sr.*.)

August 2002 (Reg. No.*5585 - VI Sr.*)

The Syndicate of Kannur University hereby confers on him / her the Degree of

Bachelor of Technology in Engineering

with all the Rights, Privileges and Honours thereunto appertaining.

Given under the seal of the University



Kannur University

Date *11.06.04*

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D.M. MOHAMAD SHAREEF
 Joint Secretary to
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INDIA

This public document of the type
DEGREE

is issued to **SUMESH M**

has been signed by **D M MOHAMAD SHAFEEF**

with the seal / stamp of **JT. SECRETARY, GED, GOVT. OF KERALA**

Certified by
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 Asst. Registrar : *[Signature]*

**CAC
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सीनियर स्कूल सर्टिफिकेट परीक्षा, १९९६
ALL INDIA SENIOR SCHOOL CERTIFICATE EXAMINATION, 1996

यह प्रमाणित किया जाता है कि
This is to certify that **SUMESH M**

अनुक्रमिक आत्मज/आत्मजा श्री
Roll No. 4207673 Son/Daughter of Shri **CHANDU M**

ने बोर्ड द्वारा मार्च १९९६ में आयोजित सीनियर स्कूल सर्टिफिकेट परीक्षा
passed the Senior School Certificate Examination of the Board held in March, 1996
विद्यालय से **J N VIDYALAYA BHAGAVATPADAPURI CANNANORE KL**
from

निम्न विषयों में उत्तीर्ण की :-
In the following subjects :

ENGLISH CORE	MATHEMATICS	PHYSICS
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Dated **20-09-1996**

K. Sharma
परीक्षा नियंत्रक
Controller of Examinations
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Central Board of Secondary Education

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* against a subject indicates that the candidate passed in the subject at the Compartmental Examination.

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(P.T.O.)

नोट परीक्षार्थी को निर्गत करने के पूर्व विद्यालय के प्रधानाचार्य द्वारा यह प्रमाणपत्र विम्नवत प्रतिहस्ताक्षरित किया जाएगा।

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Signature of Principal :

तिथि

Date

विद्यालय की मुहर

Stamp of the School :

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PRINCIPAL
JAWAHAR NAVODAYA VIDYALAY#
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Central Board of Secondary Education

ALL INDIA

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SECONDARY SCHOOL EXAMINATION, 1994

यह प्रमाणित किया जाता है कि

This is to certify that **SUMESH M**

संयुक्त संख्या
Roll No. **5131039**

पिता/माता का नाम
Son/Daughter of Shri **CHANDU M**

जन्म की तारीख
born on

SIXTH MAY NINETEEN HUNDRED AND SEVENTY NINE

हे, ने बीईएसए 1994 में आयोजित द्वैकणुदरी स्कूल परीक्षा

passed the Secondary School Examination of the Board held in March, 1994

विद्यालय से
from

J N VIDYALAYA MARIAHU JAUNPUR UP

निम्न विषयों में उत्तीर्ण की:-

In the following subjects:

- | | | |
|----------------------|--------------------|-------------------|
| 1 MALAYALAM | 2 ENGLISH COURSE-B | 3 MATHEMATICS |
| 4 SCIENCE WITH PRAC | 5 SOCIAL SCIENCE | 6 WORK EXPERIENCE |
| 7 PHY & HEALTH EDUCA | 8 ART EDUCATION | |

नियुक्त
Delhi

दिनांक
Dated **29-07-1994**



K. Sharma

नियंत्रक
Controller of Examinations
केन्द्रीय माध्यमिक शिक्षा बोर्ड
Central Board of Secondary Education

* इस प्रमाणित किया विषय के अगुने लख है, यह विषय परीक्षा में उत्तीर्ण किया है।

* against a subject indicates that the candidate passed in this subject at the Compartmental examination.

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D.M. MOHAMAD SHAREEF
Joint Secretary to
Government of Kerala
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**EMPLOYMENT INFORMATION & ASSISTANCE BUREAU
PATTANMUL**

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Branch: II—Mechanical

Specialisation: Production Engineering

UNIVERSITY OF CALICUT



Calicut University P. O. 673 635

Date: 16.01.2009

Folio No. 004

M. Tech. DEGREE MARKLIST

*FIRST SEMESTER Reg. No. 121/December 2005

SECOND SEMESTER Reg. No. 121/feb 2006

Subject Code	Subjects	Marks Awarded		Total	Aggregate marks for 1st Sc. (in words) Max. 800	Subject Code	Subjects	Marks Awarded		Total	Aggregate marks for 1st Sc. (in words) Max. 800	Aggregate marks for 1 & II Sc. (in words) Max. 1600
		Written Max. 100	Sessional Max. 50					Written Max. 100	Sessional Max. 50			
MPE 2 K 901	Computer Oriented Statistical Techniques	56	40	96	(Five, Four, Six)	MPE 2 K 1001	Metal Forming Processes	72	42	114	(Six, Two, Two)	(One, One, Six, Eight)
MPE 2 K 902	Production and Materials Management	58	45	103		MPE 2 K 1002	Advanced Manufacturing Processes	83	48	131		
MPE 2K 903	Plant Maintenance	68	39	107		MPE 2K 1003	Machine Tool engineering	66	47	113		
MPE 2 K 904	Computer Integrated Manufacturing	65	45	110		MPE 2 K 1004	Operations Research	56	40	96		
MPE 2 K 905...	Financial Management.	48	42	90		MPE 2K 1005...	Management Information Systems.	73	48	121		
MPE 2 K 906(P)	Seminar /Lab/ Mini Project	-	40			MPE 2 K 1006 (P)	Mini Project	-	47			
	Total	295	251	546			Total	350	232	622		

Pass minimum in a Subject is 50% marks in the Written Exam, or minimum of 40% marks in the Written Exam, and not less than 50% of the total marks of written and sessional.

THIRD SEMESTER & FOURTH SEMESTER Reg. No. 121 Date of Viva-Voce. 07.10.2008



Subject	Grading of accepted thesis (Satisfactory/ Good/Very Good/Excellent)	TITLE OF THESIS
Thesis/Dissertation and Viva-Voce	Excellent	Application of value Engineering Methodology for Energy Conservation (Gas Stove)

Admitted on (Month & Year)..... College G. F. C Thriassur

Prepared by St Compared by W

CONTROLLER OF EXAMINATIONS

CLIP608908/100Fx1

S. O.

A. R. J. R. (Exams.)

UNIVERSITY OF CALICUT



Calicut University P. O.
673 635

Folio No. 45
No. ~~EB-XI~~ EPR-VI

Dated 21.08.2006

MEMORANDUM

The following marks were awarded to him/her at the First Semester M. Tech. Degree Examination of December 2005.....
(Register No. 121.....)

BRANCH: II MECHANICAL — PRODUCTION ENGINEERING

Subject Code	Subjects	Credit	Marks awarded		Total
			Written Max. 100	Sessional Max. 50	
MPE 2K 901	Computer Oriented Statistical Techniques	3	56	40	96
MPE 2K 902	Production and Materials Management	3	58	45	103
MPE 2K 903	Plant Maintenance	3	68	39	107
MPE 2K 904	Computer Integrated Manufacturing	3	65	45	110
MPE 2K 905	Financial Management	3	48	42	90
MPE 2K 906 P	Seminar/Lab./Mini Project	1	—	40	40
Total		16	295	251	546

Pass minimum in a subject is 50% marks in the Written Exam. or Minimum of 40% marks in the Written Exam. and not less than 50% of the total marks of Written and Sessional.

To
Sri/Smt. SUMESH.M
Compared by [Signature]
Prepared by [Signature]

[Signature]
CONTROLLER OF EXAMINATIONS

[Signature]
S.O.

[Signature]
A.R./D.R. (Exams)

UNIVERSITY OF CALICUT



Folio No. 35

No. EB-XI EPR VI

Calicut University P.O.
673 635

Dated 18.10.2006

MEMORANDUM

The following marks were awarded to him/her at the Second Semester M. Tech. Degree Examination of February 2006.

(Register No. 121.....)

BRANCH : II MECHANICAL—PRODUCTION ENGINEERING

Subject Code	Subjects	Credit	Marks awarded		Total
			Written Max. 100	Sessional Max. 50	
MPE 2K 1001	Metal Forming Processes	3	72	42	114
MPE 2K 1002	Advanced Manufacturing Process	3	83	48	131
MPE 2K 1003	Machine Tool Engineering	3	66	47	113
MPE 2K 1004	Operations Research	3	56	40	96
MPE 2K 1005	Management Information Systems	3	73	48	121
MPE 2K 1006 P	Mini Project	1	—	47	47
Total		16	350	272	622

Pass minimum in a subject is 50% marks in the Written Exam. or Minimum of 40% marks in the Written Exam. and not less than 50% of the total marks of Written and Sessional.

To
Siv/Smt. SUMESH. M

Prepared by [Signature]

Compared by [Signature]

[Signature]

CONTROLLER OF EXAMINATIONS

[Signature]
S. O.

[Signature]
A.R./D.R. (Exams)

CUP/879/01/50Px1

KANNUR UNIVERSITY



Folio No. 0329

Kannur 670 002
Dated **15 MAR 2003**

MEMORANDUM

The following marks are awarded to him/her at the Eighth Semester Examination in B.Tech (Engineering) Degree Course.

Branch - MECHANICAL ENGINEERING

Reg. No. Month & Year	Group	Subject	Marks awarded		Maximum Marks		Result
			Written	Sessional	Written	Sessional	
7108	ME 801	Compressible Fluid Flow	53	38	100	50	
June 2001	ME 802	Operations Research	40	36	100	50	
	ME 803	Thermal Engineering III	42	39	100	50	
	ME 804	Modern Manufacturing Systems	40	42	100	50	
	ME 805	MATERIALS MANAGEMENT	59	35	100	50	
Practicals							
	ME 806	Project	-	76	-	100	
	ME 807	Seminar	-	39	-	50	
	ME 808	Viva-Voce	59	-	100	-	
		Total of VIII Semester	293	305	600	400	
Carry over Marks							passed
Total of I and II Semester			584	533	1100	650	
Total of III Semester			347	265	700	350	
		IV	391	289	700	350	
		V	358	265	700	350	
Reg. No. 5585 August 2002		VI	351	301	700	350	
Reg. No. 12159 Dec. 2001 ME 705 Elective		VII	301	243	600	300	
STATISTICAL QUALITY CONTROL							
Grand Total			2625	2201	5100	2750	



Pass Minimum in a subject is 50% of marks at the University Examination or 40% marks at the University Examination and an aggregate minimum of 50% in the University Examination marks plus sessional

Name of College :

To
Sri/Smt. Sumesh. M

[Signature]
Controller of Examinations

Marks entered by cb

Marks checked by [Signature]

Section Officer

[Signature]
A.R./D.R. (Exams.)

क्रमांक
S. No. 96

0007554

केन्द्रीय माध्यमिक शिक्षा बोर्ड
CENTRAL BOARD OF SECONDARY EDUCATION

अंक विवरणिका MARKS STATEMENT

संविपर स्कूल सर्टिफिकेट परीक्षा, 1996
ALL INDIA SENIOR SCHOOL CERTIFICATE EXAMINATION, 1996 SCH-6579

नाम
NAME SUMESH M

अनुक्रमिक
ROLL NO. 4207673

कोड CODE	विषय SUBJECT	प्राप्त अंक MARKS OBTAINED				स्थिति में POSITIONAL GRADE
		सि. TH	प्र. PR	कुल TOTAL	शब्दों में TOTAL IN WORDS	
301	ENGLISH CORE	XX	XX	61	SIXTY ONE	B2
041	MATHEMATICS	XX	XX	51	FIFTY ONE	C2
042	PHYSICS	38	29	67	SIXTY SEVEN	B2
043	CHEMISTRY	33	29	62	SIXTY TWO	C1
044	BIOLOGY	32	28	60	SIXTY	C1
500	WORK EXPERIENCE					B1
502	PHY & HEALTH EDUCA					B1
503	GENERAL STUDIES					C2

PASS

परिणाम Results

Abbreviations: अक्षरों का अर्थ

AB: Absent in the Subject विषय में अनुपस्थित

PP: Part of Practical प्रयोगों में भाग लेना

PT: Part in Theory विद्यार्थी में शामिल

* Appeared in compartmental examination: पूरक परीक्षा में बैठे

अंकों वाली विषयों में विषयों को परिष्कार नहीं की है

Only for Subject involving practical work

पूरक परीक्षा में बैठे

दिनांक Date

23.05.96

दिनांक Date

K. Sharma

परीक्षा नियंत्रक
Controller of Examinations

क्रमांक
No. 94

0156012

केन्द्रीय माध्यमिक शिक्षा बोर्ड
CENTRAL BOARD OF SECONDARY EDUCATION

अंक विवरणिका MARKS STATEMENT

सेकण्डरी स्कूल परीक्षा 1994

SECONDARY SCHOOL EXAMINATION, 1994

ALL INDIA

SCH 8722

नाम
NAME SUMESH M

अनुक्रमिक
ROLL NO. 5131039

जन्म तिथि
DATE OF BIRTH 6TH MAY

NINETEEN HUNDRED SEVENTY NINE

कोड CODE	विषय SUBJECT	प्राप्त अंक MARKS OBTAINED				स्थिति में POSITIONAL GRADE
		सि. TH	प्र. PR	कुल TOTAL	शब्दों में TOTAL IN WORDS	
712	MALAYALAM	080	XXX	080	EIGHTY	B2
384	ENGLISH COURSE B	051	XXX	051	FIFTY ONE	B2
741	MATHEMATICS	055	XXX	055	FIFTY FIVE	B2
386	SCIENCE WITH PRAC	041	024	065	SIXTY FIVE	B2
787	SOCIAL SCIENCE	044	XXX	044	FORTY FOUR	C2
500	WORK EXPERIENCE					A1
502	PHY & HEALTH EDUCA					A2
506	ART EDUCATION					A2

परिणाम Result

PASS

Abbreviations: अक्षरों का अर्थ

AB: Absent in the Subject विषय में अनुपस्थित

Ex: Exempted छूट-आव

* : Appeared in Compartmental Examination पूरक परीक्षा में बैठे

दिनांक Delhi

दिनांक Dated

03/06/1994

परीक्षा नियंत्रक

Controller of Examinations

K. Sharma

GOVERNMENT OF KERALA
GOVERNMENT ENGINEERING COLLEGE, TRISSUR

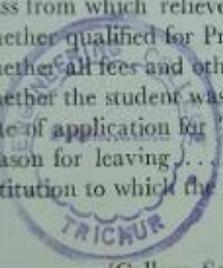
No. 503/08

Date 21-10-08.....



TRANSFER CERTIFICATE

1. Name of Student..... SUMESH M.
2. Date of birth (in words and in figures)..... 6:5:1979. 9th May. Hinduker. Serenky
3. Caste and religion..... Hindu, Malayan. (SC)..... Nice
4. Admission No..... 7/04
5. Date of admission..... 17-12-04
6. Class to which admitted..... First year. Mech. in Mechanical Engg.
7. Date of leaving..... 20-12-06
8. Class from which relieved..... Final. 10-tdh in Mechanical Engg.
9. Whether qualified for Promotion to a higher class..... course completed
10. Whether all fees and other dues have been paid..... yes
11. Whether the student was in receipt of fee concession..... yes
12. Date of application for T. C..... 21-10-08
13. Reason for leaving..... Completed
14. Institution to which the student intends proceeding..... —



(College Seal)

Paul Raja
Principal
GOVERNMENT ENGINEERING COLLEGE
TRISSUR



To Whom It May Concern

This is to certify that Mr. Sumesh Malayan has been working as a lecturer in the Department of Engineering at our institution since December 7th, 2011.

Mr. Sumesh Malayan has served as a full-time lecturer since his initial appointment and has consistently demonstrated dedication and competence in his role.

His primary responsibilities include delivering lectures, conducting seminars, supervising and guiding project students, providing academic advising, and offering counseling support to students. Throughout his tenure, Mr. Sumesh Malayan has demonstrated a strong commitment to academic excellence, and his conduct and performance have consistently been found to be good.

We recognize his contributions to our institution and are confident that he will continue to succeed in all his professional endeavors.

Dr. Naser Hamood Hamed Al Haddabi

Head of Engineering Department

University of Technology and Applied Sciences-Al Mussanah

Sultanate of Oman



Broad Horizons أفاق واسعة

Sultanate of Oman

University of Technology and Applied Sciences Al Musannah



سُلْطَنَةُ عُضْمَانِ
جامعة التقنية والعلوم التطبيقية بالمنصنة

Muladdah, Mussanah, Sultanate of Oman
(0968) 26871 – 350 | act.info@act.edu.om
P.O. Box: 191 | Postal Code: 314



To Whom It May Concern

This is to certify that Mr. Sumesh Malayan, is working as Lecturer in Department of Engineering since 7th December, 2011. He is working as a full time lecturer in the institution since beginning.

His role and responsibilities includes,

- Delivering lectures and seminars for under graduate students,
- Conducting practical classes for under graduate students,
- Supervise and guide student projects,
- Academic advising and counselling for the students,
- Administration duties as assigned by the department.

His conduct and performance are found to be good.


Mr. AbdulHamid Alhinai
Head of the Department,
Department of Engineering,
UTAS-Al Musannah,
alhinai@act.edu.om



Office Seal



Sree Narayana Guru College of Engineering & Technology

P.O: Chalakode, Payyanur - 670 307, Kannur Dist., Kerala State.

(Approved By AICTE New Delhi And Affiliated To Kannur University)

Managed by: Sree Bhakthi Samvardhini Yogam, Kannur-2.

Ph: 04985-201987, 201988, 201989 EPABX: 201702, 703, 709 Fax: 04985-201988

Email: sngcet@bnl.in Website: sngcet.org



SNGCET/E/2011

30-11-2011

EXPERIENCE CERTIFICATE

This is to certify that **Mr. SUMESH.M**, S/o. Late. Shri. Chandu.M, Kaleeswaram, Kankol.P.O, Kannur - 670337 has worked here as Lecturer in Mechanical Engineering department of this institution from 29-06-2006 to 31-12-2010 and as Assistant Professor from 01-01-2011 to 30-11-2011

His character and conduct were.....*GOOD*.....

D.M.S.
30-11-2011

PRINCIPAL

PRINCIPAL
SREE NARAYANA GURU COLLEGE OF
ENGINEERING & TECHNOLOGY, PAYYANUR
KANNUR





SPACE PRO

91, V.K.R Street, Venkitapuram, Coimbatore - 641013.

TNGST No.2001467 Dt.25.11.98

CST No. 640597

1	0	5
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Date: 17th January 2005

CERTIFICATE

This is to certify that **Mr. SUMESH. M, Kaleeswaram, Kankol P.O, Kannur** has worked as an **Engineer** in this organization for period of Twenty months from 15th April 2003 to 23rd December 2004.

During this period, he has had exposure to the various manufacturing processes, planning and scheduling methods and quality assurance techniques of various assemblies produced within the firm.

He has shown good communication skills. His conduct and character are found to be good


Senior Manager

SPACE PRO
91, V. K. R. STREET
VENKITAPURAM
COIMBATORE - 641 013
TNGST. N. 200467
CST. No. 640597-98
Area Code: 105

आयकर विभाग
INCOME TAX DEPARTMENT

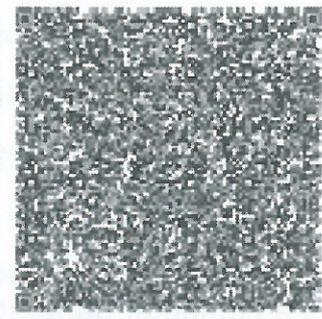


भारत सरकार
GOVT. OF INDIA



ई-स्थायी लेखा संख्या कार्ड
e - Permanent Account Number Card

CJEPS4959M

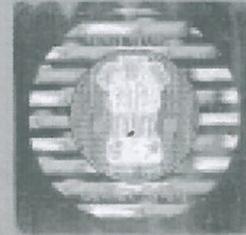


नाम / Name
SUMESH M

पिता का नाम / Father's Name
CHANDU MALAYAN

जन्म की तारीख /
Date of Birth
06/05/1979

हस्ताक्षर / Signature



In case this card is lost / found, kindly inform / return to :
Income Tax PAN Services Unit, UTTITSL
Plot No. 3, Sector 11, CBD Belapur,
Navi Mumbai - 400 614.

इस कार्ड के खोने/पाने पर कृपया सूचित करें/लौटाएं :
आयकर पैन सेवा यूनिट, UTTITSL
प्लॉट नं: ३, सेक्टर ११, सी.बी.डी.बेलापुर,
नवी मुंबई-४०० ६१४.

Self Attested Sumesh . M .

24/3/24



भारत सरकार
Government of India



Issue Date: 16/02/2013



Sumesh M
Date of Birth/DOB: 06/05/1979
Maly/ MALE

2560 9416 5218

VID : 9112 7593 6581 9941

मेरा आधार. मेरी पहचान

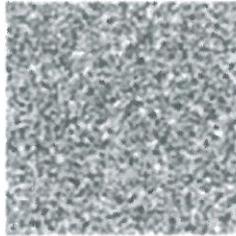


भारतीय विशिष्ट पहचान प्राधिकरण
Unique Identification Authority of India



Address:

S/O: Omana P P, Malayan House,
Kaleeswaran, Karkkole, Karmur,
Kerala - 670307



UID/VID/UIDAI

2560 9416 5218

VID : 9112 7593 6581 9941



1947



uidai@uidai.gov.in



www.uidai.gov.in

*Self Attested
Sumesh. M.
[Signature]*

GOVERNMENT OF KERALA
GOVERNMENT ENGINEERING COLLEGE, TRISSUR

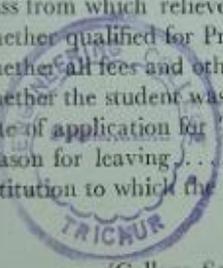
No. 503/08

Date 21-10-08.....



TRANSFER CERTIFICATE

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3. Caste and religion..... Hindu, Malayan (SC)..... Nice
4. Admission No..... 7/04
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6. Class to which admitted..... First year Mech. in Mechanical Engg...
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8. Class from which relieved..... Final 10-tdh in Mechanical Engg
9. Whether qualified for Promotion to a higher class..... course completed
10. Whether all fees and other dues have been paid..... yes
11. Whether the student was in receipt of fee concession..... yes
12. Date of application for T. C..... 21-10-08
13. Reason for leaving..... Completed
14. Institution to which the student intends proceeding..... —



(College Seal)

Paul Raja
Principal
GOVERNMENT ENGINEERING COLLEGE
TRISSUR

ANNEXURE-I

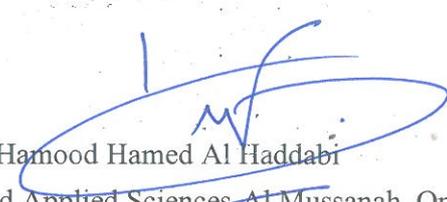
CERTIFICATE FROM THE ORGANISATION WHERE THE CANDIDATE IS EMPLOYED

Certified that **Mr. SUMESH MALAYAN** is employed as **lecturer** (Designation) in the **Engineering Department**, (Department/Division Name) of **university of technology and applied science, Al musannah**.

(Institution/Industry Name).

We have no objection in forwarding his/her application for the Ph.D. Research Programme.

The candidate will be permitted to undertake part time study in the University/College and will be allowed to be present for discussions with the supervisor, attending course works, conduct of experiments and participations in seminars and related presentations. Further the required facilities at our organization will also be provided to the candidate for doing research.


Dr. Naser Hamood Hamed Al Haddabi

University of Technology and Applied Sciences - Al-Mussanah, Oman

Date: **5/11/2024**

Signature of the Head of Organization with office seal

