



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

**APPLICATION FOR ADMISSION TO Ph.D. PROGRAMMES**

Date of Application:30-12-2020

Department	MECHANICAL ENGINEERING	Application No.	202020219
Area of Research	TWO PHASE FLOW	Research Mode	PART TIME

**Name** :SAJITH KRISHNAN R  
**Date of Birth / Age** :18-05-1990 / 30 Years  
**Gender** :MALE  
**Category** :OBC  
**e-Mail ID** :sajithkrishnanr@gmail.com  
**Mobile** :8281648056



*Sajith*

<b>Father's/Husband's Name</b>	A RAMAKRISHNAN	<b>Father's/Husband's Occupation</b>	RETD GOVERNMENT SERVANT
<b>Family Income</b>	240000	<b>Residential Type</b>	RURAL
<b>Birth Place</b>	THIRUVANANTHAPURAM	<b>Mother Tongue</b>	MALAYALAM
<b>Religion</b>	HINDU	<b>Martial Status</b>	SINGLE
<b>Aadhaar No.</b>	880694012284	<b>PAN No.</b>	CDPPR9968C
<b>Physically Challenged</b>	NO	<b>Type of Disability</b>	-
<b>Address for Communication:</b> RAGAM EDAVANMUKAL ARUVIKKARA P.O THIRUVANANTHAPURAM DISTRICT KERALA` INDIA Pin-695564		<b>Permenant Address:</b> RAGAM EDAVANMUKAL ARUVIKKARA P.O THIRUVANANTHAPURAM DISTRICT KERALA` INDIA Pin-695564	

Qualification						
Degree	Discipline	College/university	Year Passed	AVG/CGPA	Class	Mode
MTECH	ENERGY SYSTEMS ANALYSIS AND DESIGN	GOVERNMENT ENGINEERING COLLEGE KOZHIKODE	2015	8.37	FIRST CLASS WITH DISTINCTION	REGULAR
BTECH	MECHANICAL ENGINEERING	MARIAN ENGINEERING COLLEGE	2012	7.5	FIRST CLASS	REGULAR
HSE	SCIENCE	RKDNSSHSS	2008	85.33	DISTINCTION	REGULAR
SSLC		CHRIST NAGAR EHSS	2006	84.86	DISTINCTION	REGULAR

Experience				
Organization	Designation	Experience From	Experience TO	Work Nature
LOURDES MATHA COLLEGE OF SCIENCE AND TECHNOLOGY	ASSISTANT PROFESSOR	2016-01-04	2020-12-30	TEACHING

Payment Details				
Transaction ID	Reference	Date of transaction	Amount	Status

202020219_201231183602	VIDD9613298549	31-12-2020	600	SUCCESS
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# Research Proposal

1. **Title of the Research Proposal:** Fluid and thermal analysis on flow boiling in micro channel coated with diamond micro particle.
2. **Broad Subject area/field of classification:** Flow Boiling in micro channels
3. **Broad objectives of the project:** Develop an experimental setup capable of estimating the heat transfer coefficient and flow visualization in a micro channel coated with diamond micro particles.
4. **Applications/Socioeconomic importance:** There is an ever-growing need for high heat flux removal for thermal management of electronic devices or chips. Flow boiling in micro channels is one of the promising liquid cooling technique for high heat flux removal

## 5. Abstract

In electronics industry due to miniaturization of the components with faster processing there is a need to design heat transfer equipments which can transfer large amount of heat within small area. In such situations micro heat exchangers comes into play. In this field micro channels are gaining popularity due to its high convective heat transfer coefficient (Typical values ranges from 5000 to 20000 W/m<sup>2</sup>k) without using much amount of space. In this Phd project work I am planning to manufacture a micro channel which is coated diamond micro particles and its performance is compared with that of ordinary micro heat exchanger. Diamond micro particles has high thermal conductivity and increased area for heat transfer which helps to increase the net heat transfer rate when compared to that of ordinary micro channel.

## 6. Literature Review

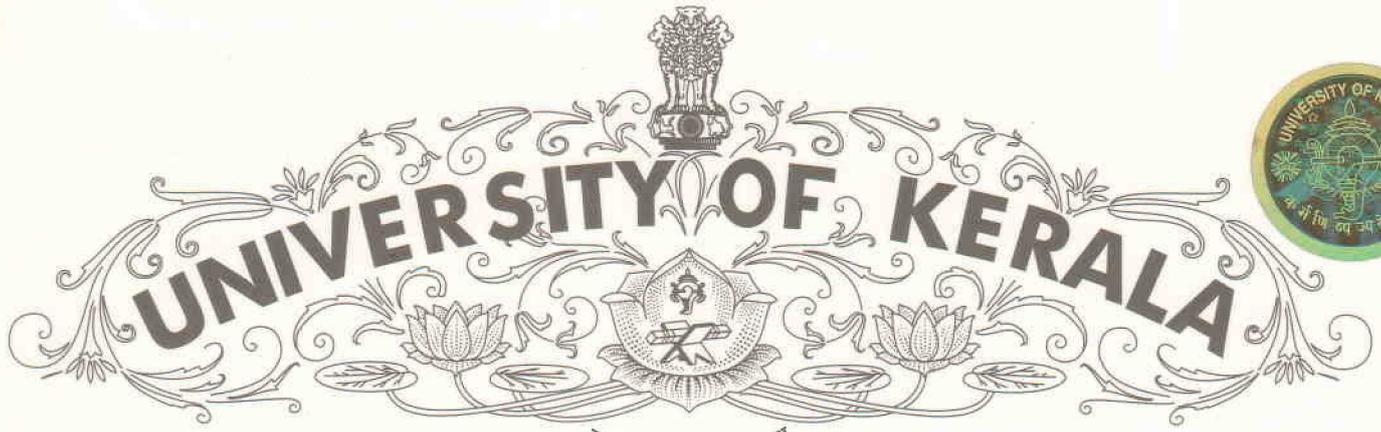
Although the heat transfer coefficients are quite high in single phase flow with small diameter channels, flow boiling yields much higher values. For example, the single-phase heat transfer coefficient under laminar flow of water in a 200 $\mu$ m square channel is around 10,000 W/m<sup>2</sup>°c, whereas the flow boiling heat transfer coefficients can exceed 100,000 W/m<sup>2</sup>°c (Steinke and Kandlikar, 2004) [1]. In other words, larger channel diameters can be implemented with flow boiling at comparable or even higher heat transfer coefficients than single-phase systems. This feature becomes especially important in view of the filtration requirements to keep the channels clean. Qu and Mudawar showed that by using two phase flow mechanism for cooling purpose it is able to maintain uniform temperature throughout the surface and also enhances the heat transfer rate [2]. Vikash Khanikar et al. coated carbon nano tubes on the micro channel surface due to its high thermal conductivity and its ability to initiate and maintain the nucleate boiling process [3]. They also observed a higher heat transfer coefficient and reduction in incipient of boiling superheat temperature.

## References

1. *Mudawar and D. E. Maddox, Critical heat flux in subcooled flow boiling of fluorocarbon liquid on a simulated electronic chip in a vertical rectangular channel, hl. 1. Heal MQSS Transfer, Vol. 32, No. 2, pp. 379-394, 1989*
2. *W. Qu, I. Mudawar, Measurement and correlation of critical heat flux in twophase micro-channel heat sinks, Int. J. Heat Mass Transfer 47 (2004) 2045–2059.*
3. *Vikash Khanikar, Issam Mudawar , Timothy Fisher, Effects of carbon nanotube coating on flow boiling in a micro-channel, International Journal of Heat and Mass Transfer 52 (2009) 3805–3817.*

## 12. Particulars of equipment required

SL NO	FACILITY	REMARKS
1	Pressure sensor	2.set (inlet and outlet)
2	Micro channel test cell (with and without diamond micro particle coating) , Glass cover slip, piping, pump, thermocouples & insulation	Test cell to be fabricated according to required dimension
3	Water Bath	1.nos
4	Cartridge heater	3 Nos
5	Thermocouple	10 Nos
6	Flow meter	1 Nos
7	Digital wattmeter, voltmeter, ammeter	1no (1 each)



कर्मणि व्यज्यते प्रज्ञा  
കേരള സർവകലാശാല

## FACULTY OF ENGINEERING AND TECHNOLOGY

*The Senate of the University of Kerala hereby makes known that **Sajith Krishnan, R.** has been admitted to the Degree of Bachelor of Technology under **Mechanical Engineering** Branch, he having been certified by duly appointed examiners to be qualified to receive the same and having been by them placed in the **First Class** at the examination held in **April 2012** .*

*Given under the seal of the University*

University Buildings

Thiruvananthapuram July 26, 2013



*Amthant*

Vice Chancellor



**FACULTY OF ENGINEERING**

Whereas it has been certified by duly appointed Examiners that

**Sajith Krishnan.R.**

is qualified to receive

the Degree of Master of Technology (M.Tech.)

in Branch *Energy Systems Analysis & Design*

he having been placed in **First Class with Distinction** with

Cumulative Grade Point Average (CGPA) **8.37**

at the Examination held in **June 2015** (Reg.No. **GCANCEA011**)

The Senate of the University of Calicut hereby confers on him

the Degree of

*Master of Technology*

with all the Rights, Privileges and Honours thereunto appertaining.

Given under the seal of the University



**Vice - Chancellor**



CALICUT UNIVERSITY P.O.  
Kerala, INDIA  
PIN - 673 635  
16/09/2017  
Date .....

**No. 0696475**

# UNIVERSITY OF KERALA

Serial No : 12 03 5872  
 Ref. No. EG : 12 32 0455 O



Thiruvananthapuram  
 Date : 03/08/2012

Name of Programme : B.Tech. Mechanical Engineering  
 Semester : 8  
 Month & Year of Exam : Apr 2012  
 Name of Student : **SAJITH KRISHNAN R**

ExamCode : **403 08801**  
 Candidate Code : **08 407 050**

## Statement of Grades

Subject Code	Subjects	Credits	Letter Grade
08801	Energy Management	3	<b>C Plus</b>
08802	Industrial Engineering	3	<b>C Plus</b>
08803	Automobile Engineering	4	<b>D</b>
08804	Computer Integrated Manufacturing	4	<b>C</b>
08805	Facilities Planning	4	<b>B</b>
08806	Propulsion Engineering	4	<b>B Plus</b>
08807	Industrial Seminar	2	<b>A Plus</b>
08808	Project & Viva voce	5	<b>S</b>
			
Semester - 1 & 2			<b>7.7</b>
Semester - 3			<b>7.17</b>
Semester - 4			<b>7.03</b>
Semester - 5			<b>7.51</b>
Semester - 6			<b>7.55</b>
Semester - 7			<b>7.68</b>
Semester - 8			<b>7.65</b>

Result : **Passed**

CGPA : **7.5**  
 (Seven \* Five)

Prepared By : Ajitha

Checked By : Biji

Section Officer : Sujeetha

  
 Controller of Examinations

\* Pass requirements & papers to be cleared if any shown overleaf



## UNIVERSITY OF CALICUT

## POST GRADUATION PROGRAMME UNDER CREDIT SEMESTER SYSTEM

## FINAL GRADE SHEET

Date : 19.11.2015

NAME OF PROGRAMME: MASTER OF TECHNOLOGY IN ENERGY  
SYSTEMS ANALYSIS AND DESIGN

NAME OF CANDIDATE: SAJITH KRISHNAN.R

REGISTER NO. : GCANCEA011

MONTH&amp;YEAR : JUNE, 2015

The following is the cumulative grades awarded to the candidate at the Final Semester Degree Examination(CUCSS) , JUNE 2015

Course Code	Course Title	Credits	Letter Grade	Credit Point	Date Of Exam
<b>SEMESTER I</b>					
MEA 10 101	ADVANCED ENGINEERING MATHEMATICS	4	C	28.00	1/2014
MEA 10 102	ENERGY CONVERSION SYSTEMS	4	C	28.00	1/2014
MEA 10 103	ADVANCED FLUID MECHANICS AND HEAT TRANSFER	4	A	36.00	1/2014
MEA 10 104	TURBO MACHINERY	4	C	28.00	1/2014
MEA 10 105A	COMPUTATIONAL METHODS	4	C	28.00	1/2014
MEA 10 106P	THERMAL SYSTEMS LAB/MINI PROJECT	2	A	18.00	1/2014
MEA 10 107P	SEMINAR	2	A	18.00	1/2014
Semester-I		SGPA-I : 7.67			
<b>SEMESTER II</b>					
MEA10 201	DESIGN OF EQUIPMENTS FOR ENERGY CONVERSION SYSTEMS	4	B	32.00	7/2014
MEA10 202	MATERIALS ENGINEERING AND TRIBOLOGY FOR ENERGY CONVERSION SYSTEMS	4	C	28.00	7/2014
MEA10 203	ADVANCED INSTRUMENTATION SYSTEMS	4	B	32.00	7/2014
MEA10 204B	ADVANCED THERMODYNAMICS AND COMBUSTION	4	A	36.00	7/2014
MEA10 205A	SOLAR ENGINEERING	4	B	32.00	7/2014
MEA10 206P	SEMINAR	2	B	16.00	7/2014
MEA10 207P	MECHANICAL ENGINEERING DESIGN LAB/ MINI PROJECT	2	A	18.00	7/2014
Semester-II		SGPA-II : 8.08			
<b>SEMESTER III</b>					
MEA10 301D	RELIABILITY ENGINEERING	4	B	32.00	12/2014
MEA10 302D	ENERGY CONSERVATION AND HEAT RECOVERY SYSTEM	4	A	36.00	12/2014
MEA10 303P	INDUSTRIAL TRAINING	1	B	8.00	12/2014
MEA10 304P	MASTER RESEARCH PROJECT (PHASE-1)	6	A	54.00	12/2014
Semester-III		SGPA-III : 8.67			
<b>SEMESTER IV</b>					
MEA10 401 P	MASTERS RESEARCH PROJECT (PHASE -II)	12	S	120.00	6/2015
Semester-IV		SGPA-IV : 10.0			
Programme Total Credits Acquired : 75 (Core: 53, Elective: 16, Dissertation: 6) CGPA : 8.37					



Controller of Examinations

Prepared by

Checked by

Section Officer

AR/DR/JR (Exams)



GOVERNMENT OF KERALA  
DEPARTMENT OF TECHNICAL EDUCATION  
GOVERNMENT ENGINEERING COLLEGE, KOZHICODE

TRANSFER CERTIFICATE

TC No. : C1/92/2015/162

Date : 01-01-2016

Name of Student : SAJITH KRISHNAN R  
Admission No. / Year : 162/2013  
Gender : Male  
Date of Birth (in figures and words ) : 18-05-1990  
Eighteenth May Nineteen Ninety  
Religion & Caste : Hindu-Nadar  
Whether the student belongs to Scheduled Caste/ Scheduled Tribe : No  
Date of Admission : 19-11-2013  
Course : M.Tech  
Branch : Energy Systems Analysis and Design  
Semester : Combined S1S2  
Regular or Part Time : Regular  
Date of Leaving : 06-10-2015  
Semester from which relieved : Fourth Semester  
Reason for leaving : Course Completed  
Whether the student has paid all the fees due to the institution : Yes  
Whether the student was in receipt of fee concession : No-  
Date of Application of TC : 01-01-2016  
Institution to which the student intends to join :

PRINCIPAL

Prepared by:   
(Dated Initials)



Verified By:   
(Dated Initials)

Govt. Engg. College  
Kozhikode - 673 005  
Kerala



**LMCST**

**LOURDES MATHA COLLEGE OF SCIENCE & TECHNOLOGY**

(Approved by AICTE and Affiliated to the University of Kerala  
and APJ AbdulKalam Technological University)

An ISO 9001 : 2008 Certified Institution

Lourdes Hills, Kuttichal, Thiruvananthapuram - 695 574

Ph : 0472 - 2853550  
2853682  
2853546  
Fax : 0472 - 2853846

Ref. No.....

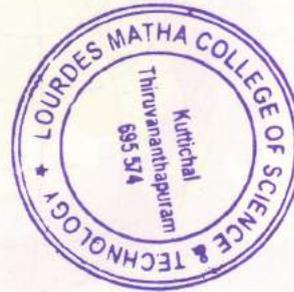
Date.....

LMCST/2019/16

11.01.2019

**EXPERIENCE CERTIFICATE**

This is to certify that Mr. Sajith Krishnan R is working as Assistant Professor in the Department of Mechanical Engineering of this Institution from 4<sup>th</sup> January 2016 onwards. His character and conduct are good.



Principal

**PRINCIPAL**

**LOURDES MATHA COLLEGE OF  
SCIENCE & TECHNOLOGY  
Lourde Hills, Kuttichal P.O,  
Thiruvananthapuram Dist. 695 574**

आयकर विभाग

INCOME TAX DEPARTMENT

SAJITH KRISHNAN R

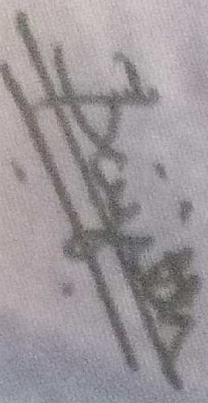
RAMAKRISHNAN

18/05/1990

Permanent Account Number

CDPPR9968C

Signature



भारत सरकार

GOVT. OF INDIA





**INDIAN UNION**  
**KERALA STATE**  
**DRIVING LICENCE FORM 7**



No.: 21/3257/2008      Date: 31/12/2019

Name : SAJITH KRISHNAN R

S/W/D of : Ramakrishnan

Address : Ragam

Edavanmugal  
Aruvikkara

Date of Birth : 18/05/1990

Temp. Address

Category

Valid from

Valid To

K R MDS

Non-Transport

11/07/2008

10/07/2028

Jagathy

Transport

20/12/2019

19/12/2024



Authorisation to drive the following vehicle class throughout India

Class of Vehicle	With effect from	Testing Authority
M/C with gr	11/07/2008	ALA,NDD
LMV	11/07/2008	ALA,NDD
HPMV	31/12/2019	LA,TVPM
HGMV	31/12/2019	LA,TVPM



C 5525159

Date of First Issue : 11/07/2008

Badge No. & Date : 1/ 251/ 2019 20/12/2019

Signature of Holder

Sudeep. B. K.

ALA TRIVANDRUM

B<sub>2</sub> 56/2019

APPENDIX VII

FORM OF CERTIFICATE TO BE PRODUCED BY OTHER BACKWARD CLASSES APPLYING FOR APPOINTMENT TO POSTS UNDER THE GOVERNMENT OF INDIA

This is to certify that SAJITH KRISHNAN R son / daughter of A. Ramakrishnan Ragam Edavamkul, Aruvikara P.O. of Aruvikara Village Kerala State belongs to the MINDU NADAR Community which is recognized as a backward class under.

- i) Resolution No. 12011 / 68 / 93 - BCC (C), dated the 10th September 1993 published in the Gazette of India Extraordinary Part I, Section 1, No. 188 dated the 13th September, 1993.
ii) Resolution No. 12011 / 9 / 94 - BCC, dated the 19th October 1994 published in the Gazette of India Extraordinary Part I, Section I, No. 163 dated the 20th October, 1994.
iii) Resolution No. 12011 / 7 / 95 - BCC, dated the 24th May 1995 published in the Gazette of India Extraordinary Part I, Section I, No. 88 dated the 25th May 1995.
iv) Resolution No. 12011 / 44 / 96 - BCC, dated the 6th December 1996 published in the Gazette of India Extraordinary Part I, Section I, No. 210 dated the 11th December 1996.
v) Resolution No. 12011 / 68 / 93 - BCC published in Gazette of India - Extraordinary - No. 129, dated the 8th July, 1997.
vi) Resolution No 12011 / 12 / 96 - BCC published in Gazette of India - Extraordinary - No. 164, dated the 1st Sept. 1997.
vii) Resolution No 12011 / 99 / 94 - BCC published in Gazette of India - Extraordinary - No. 236, dated the 11th Dec. 1997.
viii) Resolution No 12011 / 13 / 97 - BCC published in Gazette of India - Extraordinary - No. 239, dated the 3rd Dec. 1997.
ix) Resolution No 12011 / 12 / 96 - BCC published in Gazette of India - Extraordinary - No. 166, dated the 3rd Aug. 1998.
x) Resolution No 12011 / 68 / 93 - BCC published in Gazette of India - Extraordinary - No. 171, dated the 6th Aug. 1998.
xi) Resolution No 12011 / 68 / 98 - BCC published in Gazette of India - Extraordinary - No. 241, dated the 27th Oct. 1999.
xii) Resolution No. 12011 / 88 / 98 - BCC published in Gazette of India - Extraordinary - No. 270, dated the 6th Dec. 1999.
xiii) Resolution No. 12011 / 36 / 99 - BCC published in Gazette of India - Extraordinary - No. 71, dated the 4th April 2000.
xiv) Resolution No. 36033 / 3 / 2004 - Estt. Govt. of India, Ministry of Personnel, Public grievances and pensions Dept. of Personnel and Training, North Block, New Delhi dated 9th March 2004.

Sri Sajith Krishnan R and /or his family ordinarily reside(s) in the MINDU NADAR District / Division of the Kerala State. This is also to certify that he / she does not belong to the persons / section ( Creamy Layer ) mentioned in Column 3 of the Schedule to the Government of India, Department of Personnel and Training O. M. No. 36012 / 22 / 93 - Estt ( SCT ) dated 8-9-1993.

Dated: 7.1.19



District Magistrate Deputy Commissioner etc. ANILKUMAR TAHSILDAR & EXECUTIVE MAGISTRATE NEDUMANGAD

- Note: a) The term 'ordinarily' used here will have the same meaning as in Section 20 of the Representation of the People Act, 1950.
b) The authorities competent to issue caste certificates are indicated below.
i) District Magistrate / Additional District Magistrate / Collector / Deputy Commissioner / Additional Deputy Commissioner / Deputy Collector / 1st Class Stipendiary Magistrate / Sub-Divisional Magistrate / Taluka Magistrate / Executive Magistrate / Extra Assistant Commissioner (not below the rank of I Class Stipendiary Magistrate)
ii) Chief Presidency Magistrate / Additional Chief Presidency Magistrate / Presidency Magistrate.
iii) Revenue Officer not below the rank of Tahsildar and
iv) Sub-Divisional Officer of the area where the candidate and / or his family normally resides.

ANNEXURE-I

CERTIFICATE FROM THE ORGANISATION WHERE THE CANDIDATE IS EMPLOYED

Certified that Mr./Ms./Mrs. Sajith Krishnan R is employed as (Designation) Asst. Professor in the (Department/Division Name) Mechanical Engineering of (Institution/Industry Name) Lourdes Matha College of Science and Technology.

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

FOR FULL TIME : NA

The candidate will be sanctioned leave for the duration of the research programme and will be relieved from duty from \_\_\_\_\_ to \_\_\_\_\_ to undertake the full time research work in the University.

FOR PART TIME :

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.

Date : 31/12/2020

Signature of the Head of organization with office seal

