Sree Chitra Thirunal
College of Engineering

Email: principal@sctce.ac.in
Website: www.sctce.ac.in
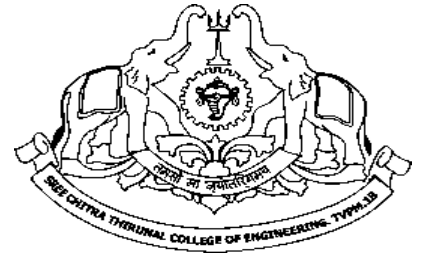
ATAL FDP 2024 Report

Low-emission fuels: Policies, Technologies, Prospects and Challenges

15th-20th January 2024

CONTENTS

Sanction Letter

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION
(Statutory body under Ministry of Education, Govt. of India)
Nelson Mandela Marg, Vasant Kunj, New Delhi 110 070
Website link: https://www.aicte-india.org/atal

ATAL

TRAINING AND LEARNING BUREAU
Sanction Letter

F. No. 1690952727/AICTE /ATAL/2023-24   Date-06/12/2023

To
The Drawing and Disbursing Officer,
All India Council for Technical Education
Nelson Mandela Marg, Vasant Kunj,
New Delhi-110070

Sub: Release of a sum of Rs. 2,50,000/- (Rupee two lakh fifty thousand only) being the first instalment of the Grant-in-Aid under AICTE Training And Learning (ATAL) Academy Programme for the Academic year 2023-24 reg.

Sir/Madam,

This is to convey the sanction of the Competent Authority of the Council for payment of Rs. 3,50,000/- (Rupees Three Lakhs fifty thousand Only) as Grant- In -Aid for conducting of **Face to Face** Faculty Development Programme under AICTE Training and Learning (ATAL) Academy Programme and to make payment of **Rs 2,50,000/- (Rupee two lakh fifty thousand only)** as first instalment of Grant-in-Aid as per details given below:

1	Name of the Beneficiary Institute (University/College/Institute	SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING
2	Address	PAPPANAMCODE THIRUVANANTHAPURAM,695018
3	Name of the Coordinator	Dr. K B Radhakrishnan
4	Permanent ID of Institute	1-4217615
5	Title	Low-emission fuels: Policies, technologies, prospects and challenges
6	Dates of FDP	15/01/2024 to 20/01/2024
7	FDP Type	Technical
8	Total Amount Sanctioned	Rs.3,50,000/-
9	Amount to be released as 1st Instalment	Rs.2,50,000/-
10	Amount to be released as 2nd Instalment (Case to case basis upon submission of Statement of Expenditure)	Rs.1,00,000/- (Cap Limit)

2. Maintenance of Account by the Institute/University

(a) The University/College/ Institute shall maintain proper accounts of the expenditure out of the grants, which shall be utilized only for approved items of expenditure as given above.

(b) Funds covered by this grant shall be kept separately and would not be mixed up with other funds, so as to know the amount of interest accrued on the grant from AICTE.

(c) The Council or its nominee shall have the right to check/ verify the account to satisfy that the fund has been utilised for the purpose for which it was sanctioned.

(d) The Institute shall send a confirmation to AICTE within 15 days of receipt of grant on the receipt of the same.

(e) All mandatory documents **in original, in hardcopy** be submitted to The Director, Training & Learning Bureau, All India Council for Technical Education, Nelson Mandela Marg, Vasant Kunj, New Delhi - 110070 within fifteen days of completion of the FDP.

II. Distribution of funds to institutions.

Amount of the grant sanctioned will be released in two instalments, first as advance of Rs. 2,50,000/- and then as reimbursement against the utilization Certificate and Statement of Expenditure, limited to Rs. 1,00,000/- to the University/Institute through electronic transfer in the account of the University/Institute after submission of mandate form.

III. Refund of Grant by the way of RTGS in favour of Member Secretary, AICTE, New Delhi

The unutilised Grant-in-Aid should be refunded to the Council within fifteen days of conduct of the FDP. If the university/institute does not conduct FDP on the prescribed dates, or fails to follow directions in regard to conduct of FDPs as laid out in the scheme document, or falls under 10(i), the entire amount will be liable to be refunded along **with interest @, of 10% per annum** within 07 days. The amount has to be refunded to AICTE through RTGS as per details given below:

Account Number	89113200222
Name of the Account Holder	Member Secretary, AICTE, New Delhi
Bank Name	State Bank of India
Branch Name	Shastri Bhawan, New Delhi
IFSC Code	SBIN0002205

IV. Submission of documents by University / Institution

(a) The following mandatory relevant documents are required to be submitted by the University / Institution within fifteen days of the completion of the programme.

(i) List of candidates who have successfully completed the programme on the basis of the test conducted by the prog. co-ordinator

(ii) Completion report along with photographs and media reports

(iii) Originals of Utilization Certificate, Statement of Expenditure and bills etc., duly audited by a chartered Accountant and countersigned by the Head of the Institution within one month of conduct of FDPs. In case of the institute being a Government institute/University the documents are to be certified by the Accounts Officer/ Controller of Accounts as deemed and counter signed by the head of the Institution.

The instructions/guidelines to be followed by University/Institution

I. Release of funds

a. The maximum cost for conducting per programme will be of **Rs. 3,50,000/-** as per detail given as under:

Sr. No.	Particulars	Sanctioned amount for 2023-24 for Face to Face FDPs
1.	Honorarium to Co-ordinator	Rs. 8,000/-
2.	Honorarium to Co-Co-ordinator	Rs. 5,000/
3.	Honorarium for computer operators/lab-Technicians	Rs. 5,000/-(in total)
4.	Honorarium for experts	Rs. 50,000/- (Rs. 5,000 per session)
5.	TA to External experts engaging session	Rs. 1,00,000/-
6.	Refreshment & Lunch	Rs. 60,000/-
7.	Hands on training material, consumable items, and Miscellaneous Charges etc. reimbursed on actual basis	Rs. 22,000/-
8.	TA to Participants (excluding in-house participants)	Rs. 1,50,000/- (Rs. 2,000 (lump sum) per External Participant payable only for those with >=90% attendance and travelling beyond 20 KM one side)
	TOTAL	**Rs. 3,50,000/-**

Maximum amount mentioned against each head will not be released and expenditures are to be restricted to head wise maximum limits

(b) The grant is subject to the adjustment on the basis of Utilisation Certificate in the prescribed proforma to be submitted by the University/College/Institution. Further, the accounts of the Institute will be open for test check by the Council or Controller & Auditor-General of India or any other officer designated by them.

(c) The amount of the Grant-in-Aid bill shall be disbursed and credited to the account of SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING through RTGS.

(d) This Grant-in-Aid is being released in conformity with the terms & conditions as well as norms of the scheme as already communicated vide the scheme document.

(e) The sanctioned grant-in-aid is debitable to the ATAL's FDP scheme and is valid for payment during the **financial year 2023-24** only.

(f) Funds once released for organising the approved topic/area of FDP cannot be utilised for any other programme.

(g) In case the event is cancelled/not conducted/could not conduct due to lack of required participants on the first day first session, the Grant- In-Aid shall be **refunded to AICTE within 07 days.**

(h) In case it is revealed that any vigilance case/ grievance is pending against the institute or punitive action has been initiated against the institute for violation of AICTE norms, the Grant-In-Aid released to the institute will be liable to be refunded along **with interest @, of 10% per annum.**

(h) The amount of the grant shall be adjusted on submission of utilization certificate and detailed expenditure statement by university / institution. On receipt of these documents the total amount of financial assistance, admissible as per the norms, shall be worked out and Grant is aid shall be adjusted.

V. General Instructions

(a) Maximum 50 and minimum 30 minimum number of participants released to 20 for North Eastern states Jammu, Kashmir, Ladakh and Andaman & Nicobar Islands.

(b) A test has to be conducted on the last day accordingly. Scheme document 2023-2024 and those who score more than 70% will be termed as successful candidates. Those who have attendance 80% or more and also score more than 70% in the test will be issued a digital certificate.

(c) Eligibility for institutes and participants are as laid out in the scheme guidelines

(d) No fees shall be charged from any participant for attending ATAL FDP.

(e) The institute should bear the expenses incurred in addition to the fund granted by AICTE from their own resources.

(f) Terms and conditions laid out in the Scheme Guideline for ATAL FDPS 2023-24 will be final and binding.

This Sanction Order may be treated as Offer Letter for all purposes.

Yours Sincerely,

Dr. Sunil Luthra,
Director
Training and Learning Bureau, AICTE

Copy forwarded for information and necessary action to :-

1. Dr. K B Radhakrishnan, Email: hod[bt]@sctce.ac.in

2. Dr. C Satish kumar,
   PAPPANAMCODE THIRUVANANTHAPURAM

3. Guard File

Programme Schedule

ATAL Faculty Development Programme on

Low-emission Fuels: Policies, Technologies, Prospects and Challenges

Sree Chitra Thirunal College of Engineering, Thiruvananthapuram
15th – 20th January 2024

Date	Day	10.00 am-11.00 am	11.15 pm-12.45 pm	LUNCH BREAK	1.15 pm-2.45 pm	2.45 pm- 4.15 pm	Tea Break	4.30 pm-6.00 pm
15/01/24	Monday	Inaugural session & Key note address Guest of honour: Dr. R. Harikumar (Director, Energy Management Centre, Kerala)	Lecture-1 Carbon capture technologies Speaker: Dr. Hareesh U.S (NIIST)		Lecture-2 Health and environmental aspects of fuel emissions Speaker: Dr. Ajit Haridas (NIIST Retd.)	Lecture-3 Achieving carbon neutrality: The way to go Speaker: Dr. Partha Kundu (NIIST)		Lab session

Date	Day	9.00 am-10.30 am	10.45 am-12.15 pm	LUNCH BREAK	1.15 pm-2.30 pm	2.30 pm-3.45 pm	Tea Break	4.00 pm-5.30 pm
16/01/24	Tuesday	Lecture-4 Low-carbon energy Speaker: Dr. G.Madhu (CUSAT Retd.)	Lecture-5 Emerging green fuel technologies Speaker: Dr. G. Madhu (CUSAT Retd.)		Lecture-6 Current trends in fuel hydrogen research Speaker: Dr. G. Mohan (SCTCE)			Lecture-7 Bio-hydrogen Speaker: Prof. V. Gayathri (SCTCE)
17/01/24	Wednesday	Lecture-8 Hybrid and electric vehicles Speaker: Dr. V.K. Chithrakumar (SCTCE)	Lecture-9 Biomass to Biofuels Speaker: Dr. Binod Parameswaran (NIIST)		Article discussion	Article Discussion		Lab session
18/01/24	Thursday	Lecture-10 Fuel cell technology Speaker: Dr. M. Shameeth (VSSC)	Lecture-10 (contd.) Fuel cell technology Speaker: Dr. M. Shameeth (VSSC)		Article Discussion	Lecture-11 Lignocellulosic ethanol and biorefineries Speaker: Dr. Rajeev. K. Sukumaran (NIIST)		Lab session
19/01/24	Friday	Lecture-12 Biorefinery approach to low-emission fuels production Speaker: Dr. Pinaki Dey (NIIST)	Lecture-13 Alternative fuels- Safety norms and legislations Speaker: Dr. R. Venugopal (PESO) (11.15 am to 1.30 pm)		Lecture-14 Biofuels Speaker: Dr. Krishnakumar. B (NIIST) (2 pm to 3.15 pm)	Yoga session Dr. Salini P.S (Samyoga Foundation) (3.30 pm -5.00 pm)		
20/01/24	Saturday	Industrial Visit CSIR- National Institute for Interdisciplinary Science and Technology, Pappanamcode, Thiruvananthapuram			Article discussion	Reflective journal & MCQ test		Feedback & Valedictory session

Participants list

LIST OF PARTICIPANTS

Sl.No.	Name	Email	Phone	Institute Name	Designation	Specialisation	Experience(years)
1	Mr. Manikandan P M	pm.manikandan@tkmce.ac.in	8086120130	TKM College of Engineering	Assistant Professor	Chemical Engineering	7
2	Mrs. Indu S	indus.bt@mcet.ac.in	7356955181	MOHANDAS COLLEGE OF ENGINEERING AND TECHNOLOGY	Assistant Professor	BIOTECHNOLOGY	6 Year(s) 4 Month(s)
3	Dr. Anoop. M. S	anoopms@sctce.ac.in	9496814506	Sree Chitra Thirunal College of Engineering	Assistant Professor	Mechanical Engineering	10 Year(s) 8 Month(s)
4	Dr. Abhilash S S	abhilash@sctce.ac.in	9447537887	Sree Chitra Thirunal College of Engineering	Assistant Professor	Manufacturing Technology	13 Year(s) 3 Month(s)
5	Dr. Dileeplal J	dileeplalagape@gmail.com	9400037080	College of Engineering Muttathara	Associate Professor	Mechanical Engineering	19 Year(s) 6 Month(s)
6	Mr. AFSAL K F	kfafsal@gmail.com	9447321008	ACE COLLEGE OF ENGINEERING	Assistant Professor	MACHINE DESIGN	10 Year(s) 1 Month(s)
7	Dr. RINU SATHYAN	rinu@sctce.ac.in	9495392468	Sree Chitra Thirunal College of Engineering	Faculty members of the AICTE approved institutions	Mechanical Engineering	12 Year(s) 2 Month(s)
8	Dr. Rajasree Retnamma	rajasree.r@saintgits.org	9497668933	Saintgits College of Engineering, Kottayam, Kerala	Associate Professor	Chemical Engineering	6 Year(s) 7 Month(s)
9	Dr. Praseetha P Nair	praseetha@gectcr.ac.in	9656221371	Government Engineering College, Thrissur	Associate Professor	Chemical Engineering	20 Year(s) 6 Month(s)
10	Mrs. Saritha M.	sarithashm@gmail.com	9526018778	Colllege of Engineering Muttathara	Faculty members of the AICTE approved institutions	Power Systems	17 Year(s) 2 Month(s)
11	Mrs. Gayathri V	gay_vij@yahoo.com	9446483056	SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING, TRIVANDRUM	Assistant Professor	BIOTECHNOLOGY	17 Year(s) 7 Month(s)
12	Mrs. Susmitha Kumari S	susmithasashi@sctce.ac.in	9495392710	Sree Chitra Thirunal College of Engineering	Assistant Professor	Chemical Engineering	18 Year(s) 11 Month(s)
13	Dr. Johnson Y	johnson.y@lmcst.ac.in	9847590214	Dept of Futures Studies, University of Kerala	Research scholars	Control Systems	15 Year(s) 11 Month(s)
14	Dr. Saibi R	saibi@tkmce.ac.in	9995718134	TKM College of Engineering	Assistant Professor	chemical Engineering	13 Year(s) 5 Month(s)
15	Dr. Nisha Jose K	nisha@sctce.ac.in	9446149873	SCT College of Engineering	Associate Professor	Electronics and Communication	22 Year(s) 2 Month(s)

Participants List

#	Name	Email	Phone	Institution	Category	Department	Experience
16	Mr. SREEJITH S J	sreejith.sj@lmcst.ac.in	9995464121	Lourdes matha college of science and technolgy	Faculty members of the AICTE approved institutions	MECHANICAL ENGINEERING	3 Year(s) 1 Month(s)
17	Mr. AEBYSH ABRAHAM	aebysh.abraham@lmcst.ac.in	7356122753	LOURDES MATHA COLLEGE OF SCIENCE AND TECHNOLOGY	Faculty members of the AICTE approved institutions	MECHANICAL ENGINEERING	8 Year(s) 0 Month(s)
18	Mr. Rohith S P	20mm1729@lmcst.ac.in	9497353980	Lourdes matha college of science and technolgy	Faculty members of the AICTE approved institutions	Mechanical Engineering	1 Year(s) 0 Month(s)
19	Mrs. DEEJA MILNER L	deejamilner@gmail.com	9345819234	Lourdes matha college of science and technolgy	Faculty members of the AICTE approved institutions	Mechanical engineering	13 Year(s) 3 Month(s)
20	Mrs. RUBEENA S	bt13001@sctce.ac.in	9526874847	SCT College of Engineering	Assistant Professor	Industrial Biotechnology	10 Year(s) 6 Month(s)
21	Mrs. ANCIYA S S	anciya.ss@acetvm.com	9061105622	ACE COLLEGE OF ENGINEERING	Faculty members of the AICTE approved institutions	POWER SYSTEM AND CONTROL	0 Year(s) 6 Month(s)
22	Mr. Sivaprasad HT	sivaprasad.ht@vkcet.com	9496811823	Valia Koonambaikulathamma College of Engineering and Technology	Faculty members of the AICTE approved institutions	Department of Mechanical Engineering	10 Year(s) 4 Month(s)
23	Dr. K S Uma Suganya	suganyakuttalam@gmail.com	9952092407	Sree Chitra Thirunal College of Engineering	Faculty members of the AICTE approved institutions	Biotechnology	2 Year(s) 11 Month(s)
24	Dr. Prince George	princegeorge119@gmail.com	917816472	Saintgits College of Engineering	Assistant Professor	Chemical Engineering	2 Year(s) 5 Month(s)
25	Dr. Fazil. A	fazil@tkmce.ac.in	9326113840	TKM College of Engineering	Faculty members of the AICTE approved institutions	Chemical Engineering	18 Year(s) 8 Month(s)
26	Miss PARVATHY P	parvathyprakasan9dk@gmail.com	8943196480	BIOVENT INNOVATIONS PVT LIMITED	Industry Bureaucrats/Technicians / Professionals	BIOTECHNOLOGY	0 Year(s) 0 Month(s)
27	Mrs. ARYA R P	aryarp1994rajan@gmail.com	8281444967	SCT College of Engineering	Lab Instructor	Biotechnology and Biochemical Engineering	0 Year(s) 0 Month(s)
28	Mr. Achu R	achu.kply@hotmail.com	9809654804	CSIR NIIST	Research scholars	Materials Science	2 Year(s) 0 Month(s)

Participants List

No.	Name	Email	Phone	Institution	Designation	Field	Experience
29	Mrs. KAVITHA K V	kavitha@sctce.ac.in	9447965262	Sree Chitra Thirunal College of Engineering	Faculty members of the AICTE approved institutions	Computer Science & Engineering	20 Year(s) 11 Month(s)
30	Dr. RAJESH S P	rajeshsp@sctce.ac.in	8848746755	S C T College of Engineering	Assistant Professor	Mechatronics	12
31	Dr. ANI LAWRANCE	aniesaju@gmail.com	9447700378	Sree ChitraThirunal College of Engineering	Faculty members of the AICTE approved institutions	Chemical Engineering	19 Year(s) 0 Month(s)
32	Dr. SUMESH C K	sumeshck@sctce.ac.in	8848021969	Sree Chitra Thirunal College of Engineering	Faculty members of the AICTE approved institutions	Mechanical Engineering	15 Year(s) 6 Month(s)
33	Dr. Shalini A Nair	pillaisamrudhi@gmail.com	9495642976	Mohandas	Faculty members of the AICTE approved institutions	Biochemistry	20 Year(s) 1 Month(s)
34	Mrs. ANJU A V	anjuavnair@gmail.com	9446993196	CSIR- NIIST	PROJECT ASSOCIATE	ENVIRONIMENTAL TECHNOLOGY	0 Year(s) 0 Month(s)
35	Mr. ATLY PAULY	atleepauly8040@gmail.com	9496319975	CSIR-NIIST	Research scholars	CO2 Capture	0 Year(s) 0 Month(s)
36	Mr. ANANTHU V R	ananthuraghulal@gmail.com	9526582710	CSIR - NIIST	project associate	environmental technology	0 Year(s) 0 Month(s)
37	Miss Athira A	athiraani1952@gmail.com	7356761282	CSIR NIIST THIRUVANANTHAPURAM	Research scholars	Microbiology	0 Year(s) 0 Month(s)
38	Miss AKHINA M K	mkakhina1@gmail.com	8086371233	CSIR-NIIST	Research scholars	zoology	0 Year(s) 3 Month(s)
39	Miss HARITHA K	harithakolleri96@gmail.com	9495868332	CSIR NIIST	Research scholars	environmental technology	0 Year(s) 0 Month(s)
40	Mr. Biju Jacob	bijujacob@sctce.ac.in	9447212420	Sree Chitra Thirunal College of Engineering	Assistant Professor	Biotechnology	13
41	Miss PUNNIA PRASAD	punniakesav@gmail.com	9746334903	Mohandas College of Engineering and Technology	Faculty members of the AICTE approved institutions	Bioprocess Engineering	13 Year(s) 11 Month(s)
42	Miss SAFNA SIRAJ T.S	safnasiraj333@gmail.com	6238928097	CSIR NIIST	Industry Bureaucrats/Technicians / Professionals	biotechnology	0 Year(s) 0 Month(s)
43	Dr. Radhakrishnan K B	drkbrnair20@gmail.com	9447205767	SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING	Professor	CHEMICAL ENGINEERING	34

Resource Persons

R Harikumar

Director
Energy Management Centre (EMC)
Government of Kerala

R Harikumar, Director of Energy Management Centre (EMC), Government of Kerala is a Graduate in Mechanical Engineering; Post Graduate in Energy Conservation and holds a Ph.D in Energy Management. EMC is the State Designated Agency (SDA of BEE, Govt of India) in Kerala for implementation of the provisions of the Energy Conservation Act 2001, which includes inter alia, Energy Conservation Building Code (ECBC), Perform-Achieve-Trade (PAT) scheme for energy intensive industries, Municipal & Agricultural DSM, Standards & Labelling for selected equipment, etc. He was on deputation from EMC to Agency of Non-conventional Energy & Rural Technology (ANERT) as its Director from September 2016 till December 2018. ANERT is the Kerala State Nodal Agency (SNA of MNRE, Govt of India) for promoting renewable energy. He was instrumental in launching the "Soura" - joint program of KSEBL & ANERT, targeting 1000 MW of solar by 2022. Got more than 28 years of experience in the fields of energy efficiency and renewable energy. Trained at National Productivity Council during 1992, he worked for a national energy consultancy organization in North India. Harikumar had a brief stint in a chemical processing industry and then worked for more than 2 years in the first Energy Services Company (ESCO) in Asia, at Bangalore, before joining EMC in 1997. From Sept 2006-Sept 2009, he was on deputation to ANERT as its Project Director, leading its district operations. A Certified Energy Auditor of Bureau of Energy Efficiency, he is the Honorary Founder General Secretary of the Society of Energy Engineers and Managers (SEEM), the professional body of Certified Energy Managers and Auditors in the country, established in 2005. Harikumar has travelled widely within the country for energy efficiency capacity-building programs as a faculty member of the Federation of Indian Chambers of Commerce and Industry (FICCI) and the United Nations Industrial Development Organization (UNIDO). On various energy-related missions, he has also travelled abroad to Bangladesh, France, Japan, Malaysia, Maldives, Netherlands, Singapore, Sri Lanka, Taiwan, Thailand and the United States.

Resource Persons

Dr. U.S. Hareesh

Senior Principal Scientist

CSIR- NIIST

Thiruvananthapuram

U. S. Hareesh obtained PhD in Chemistry from Mahatma Gandhi University, Kottayam for the thesis entitled "Chemical Synthesis of Alumina-SiC Ceramic Nanocomposites carried out at the National Institute for Interdisciplinary Sciences and Technology (NIIST-CSIR), Trivandrum and Technical University of Hamburg-Harburg (TUHH), Germany, under the supervision of Dr. K. G. K. Warrier and Dr. M. Padmanabhan (Indian) and Dr-Ing Rolf Janssen (Germany) during 1995-2000. Subsequently, he worked as a visiting scientist at Institute for New Materials, Saarbruecken, Germany during 2001-2004 and as a scientist at the Centre for Ceramic Processing, Advanced Research Centre International (ARCI), Hyderabad during 2004-2011. Dr. Hareesh has contributed in the areas of transparent ceramics, sol gel synthesis and coatings, colloidal processing and structural ceramic nanocomposites. He is currently engaged in the development of advanced functional materials for energy and environmental applications. He has more than 90 publications in the areas of chemistry and materials science, 15 patents and 5 book chapters.

Resource Persons

Dr. Ajit Haridas

Former Chairman (KPCB) & Retired Scientist (CSIR-NIIST)

Thiruvananthapuram

Dr. Ajit Haridas is Former Chairman of the Kerala State Pollution Control Board (KSPCB) and retired scientist (CSIR-NIIST). Experience at the top post on all aspects of environmental laws and regulations, compliance monitoring, preparation of State level action plans for environmental management, preparation of standards, guidelines, new legislations, capacity building,

Experienced Scientist with a demonstrated history of working in the environmental services industry. Skilled in Water Treatment, Environmental Awareness, Management, Environmental Consulting, and Anaerobic Digestion. Strong research professional graduated from University of Delaware, USA and Indian Institute of Technology, Madras.

Resource Persons

Dr. Partha Kundu

Senior Scientist

CSIR-NIIST, Thiruvananthapuram

Research Area:
Environmental engineering, Renewable energy engineering (H2 energy), Pollution abatement (Air/Water/Solid), Bio-remediation, Process engineering & Optimization, Advance Separation process, Modeling & Simulation.

Current Research:
Green H2 generation from various renewable feed stock.
Process development for VOC & Odour control.
Sustainable process for solid waste management (MSW).
Waste to energy engineering.
Biodegradability of alternative to single use plastic materials.

Qualifications:
2016 - PhD (Chemical Engineering), Indian Institute of Technology, Roorkee, India, Department of Chemical Engineering
2011 - M.Tech (Chemical Engineering), Indian Institute of Technology, Roorkee, India, Department of Chemical Engineering
2009 - B.Tech (Chemical Engineering), University College of Science and Technology (UCST), University of Calcutta
2006 - B.Sc (Chemistry Honours), Scottish Church College, University of Calcutta

Resource Persons

Dr. G. Madhu

Retd. Professor

Division of Safety & Fire Engineering

Cochin University of Science and Technology, Kerala

Dr, G. Madhu is a retired Professor, Division of Safety & Fire Engineering and former Professor & Head, Division of Chemical Engineering, at School of Engineering. B.Tech and M.Tech degree in Chemical Engineering from University of Calicut and IIT Madras respectively. Started professional career with FACT Ltd, Kochi in January 1986. Obtained PhD in Environmental Engineering (1994) from CUSAT while working in Industry. More than 18 years of industrial experience in plant operation, process design, environment protection and process safety. Served as Principal of School of Engineering and Dean, Faculty of Engineering. Research interests include Wastewater Engineering, Process Safety Engineering and Bioprocess Engineering.

Resource Persons

Dr. G. Mohan

Professor (Mechanical Engineering)

SCT College of Engineering

Thiruvananthapuram

Dr. Mohan. G is currently working as a professor in mechanical engineering at SCT College of Engineering. He has also served as an energy technologist at the energy management centre (Kerala) from 1998-2001. He did his B.Tech in mechanical engineering from S.V. Regional engineering college, Surat; followed by M.Tech in energy management from DAVV, Indore. He holds a Ph.D degree in mechanical engineering from IIT Madras. Dr. Mohan is a respected figure in the area of renewable energy systems and has made notable contributions to the area of hydrogen storage through his research projects. He has extensive tie-ups with reputed institutes like IISc Bangalore, IIT Bhuvaneshwar and IIT Madras in the area of hydrogen research.

Resource Persons

Mrs. V. Gayathri

Assistant Professor (Biotechnology)

SCT College of Engineering

Thiruvananthapuram

Mrs. Gayathri. V is a senior faculty member in the department of Biotchnology and biochemical Engineering at SCTCE. She holds an M.Sc degree in Microbiology from TNAU. Prior to joining SCTCE, she worked as a research associate at the Central Tuber Crops Research Institute, Thiruvananthapuram; and as a guest faculty at National College, Thiruvananthapuram. She is currently leading the department's research group that works on biohydrogen production.

Resource Persons

Dr. V.K. Chithrakumar

Associate Professor (Mech. Engg.)

SCT College of Engineering

Thiruvananthapuram

Dr. V.K. Chithrakumar is currently an associate professor in the department of mechanical engineering at SCTCE. He has 21 years of experience at teaching. His prime area of interest is hybrid and electric vehicles. He holds a Ph.D degree in mechanical engineering from Kerala University. He is an expert member of several statutory committees constituted by the Government of Kerala.

Resource Persons

Dr. Binod Parameswaran

Principal Scientist

CSIR-NIIST

Thiruvananthapuram

Dr. Binod Parameswaran is a Principal Scientist at Microbial processes and technology division, CSIR-NIIST, Thiruvananthapuram. He has served as Research Associate, Korea Institute of Energy Research (KIER), Daejeon, South Korea and has visited several countries around the world as part of his research endeavors. His areas of interest include Bioprocess Technology, Fermentation, Biopolymers, Biomass Pretreatment Technologies, Biomass to Bio products and Enzyme Technology.

Resource Persons

Dr. M. Shaneeth

Scientist

VSSC (ISRO)

Thiruvananthapuram

Dr. M. Shaneeth currently works at the Fuel Cell Laboratory, Vikram Sarabhai Space Centre. He does research in in-situ characterisation of PEM Fuel Cell catalyst layers, performance & durability of catalysts, design & development of high power density electrodes, stack components, stacks,fuel cell systems, both H2-O2 and H2-Air, portable fuel cells, Water & CO2 electrolyser and fuel all-electrolyser-solar-wind integrated systems for remote power. His current projects are Fuel Cell development, Electrolyser development and integrated system development.

Resource Persons

Dr. Rajeev. K. Sukumaran

Senior Principal Scientist
CSIR-NIIST, Thiruvananthapuram

Dr. Rajeev K Sukumaran is a Senior Principal Scientist at the Microbial processes and Technology division at CSIR-NIIST, Thiruvananthapuram. His areas of expertise include Lignocellulosic Ethanol and Biorefineries, Fermentation Technology, Cell and Molecular Biology.

Academic qualifications:

- MSc Biotechnology: Cochin University of Science and Technology, Kochi, India
- PhD: Biotechnology: Cochin University of Science & Technology, Cochin India
- Post Graduate Diploma in Bioinformatics: Bigtec Pvt Ltd, Bangalore
- Post-Doctoral
    - o Mount Sinai School of Medicine, (Currently -Icahn School of Medicine, Mount Sinai) New York

Resource Persons

Dr. Pinaki Dey

Senior Scientist

CSIR-NIIST, Thiruvananthapuram

Areas of expertise:

Microbial fermentation, Lignocellulosic biorefinery, Membrane separation processes, L(+) lactic acid production and purification, Biodegradable polymers like PHB production, Enzyme Technology, Mathematical modelling and experimental simulation.

Qualifications:

- Ph.D (Engineering), Chemical Engineering, National institute of technology, Durgapur, India, 2012
- M.Tech - Industrial Biotechnology, SASTRA University, Thanjavur, India- 2008
- B.Tech - Biotechnology, Bengal college of Engineering and Technology, WBUT University, Durgapur, India-2006

Awards and recognitions:

- Senior Research Fellow, GREEN Technology Project (DST), 2009 - 2012
- Best Assistant Professor Award (Pearl Foundation, Madurai), 2016
- Best young faculty award (GRABS Educational Charitable Trust, Chennai), 2018

Resource Persons

Dr. R. Venugopal

Joint Chief Controller of Explosives

Petroleum and explosives safety organization

Vadodara, Gujarat

Dr. R. Venugopal is the joint chief controller of explosives at PESO, Vadodara. He did his Ph.D in chemical engineering from Banasthali Vidyapith and has 27 years of experience working in areas such as safety in Oil Refineries, Cross Country Pipelines, Compressed gas storages, Compressed Gas cylinders, CNG stations, Petroleum Retail out lets, Oil Installations, LPG Bottling Plants, Hydrogen storages etc.

Resource Persons

Dr. Krishnakumar. B

Senior Principal Scientist

CSIR-NIIST, Thiruvananthapuram

Dr. Krishnakumar B did his B.Sc. and M.Sc. in zoology under the University of Kerala. Subsequently, in 1994 he joined CSIR-RRL Trivandrum as a research scholar. He pursued his research on Microbiology, and obtained his Ph.D. degree in 2000 from the University of Kerala. In October 2000, he was awarded with the prestigious STA postdoctoral research fellowship from the govt. of Japan, and he joined National Institute for Environmental Studies, Tsukuba, Japan. Until 2003, he continued his postdoctoral studies in Japan. In March 2003, he joined CSIR-RRL as a fellow scientist, and later, on October 2014, he joined RRL as a permanent scientist, and presently working as Senior principal scientist & Professor in the CSIR academy.

His major research activities include:

- Biological waste (Solid & Liquid) treatment systems
- Environment clean-up solutions
- Waste-valorisation systems
- Microbial ecology of engineered biological systems
- Environmental impact of emerging micro-pollutants
- Molecular microbial analysis, etc.

Resource Persons

Dr. Salini P.S

Managing Director& Lead trainer

Samyoga Foundation

An internationally recognized pioneer in yoga training and also in Yoga Philosophy classes, Salini Padmaja Sasikumaran Nair, is the founder of SAMYOGA which is an explorative initiative while working through her own life experience with hundreds of licensed practitioners, Doctors, Instructors around the world. A QCI certified International Yoga Consultant & Teacher; she is appreciated for her discourses on Patanjali Yoga Sutra, the classical text on yoga by Sage Patanjali. She was engaged as Yoga Expert in Seychelles by the Indian Council for Cultural Relations, New Delhi for the conduct of mass yoga sessions as part of the 3rd International Day of Yoga in Mahe, Seychelles. Salini holds a Master's in Yoga, M.phil in Yoga, and PG in Psycho Neurobics. She is also a qualified yoga teacher, children's yoga teacher from Yoga Alliance. As a research scholar, she is currently involved in the therapeutic application of yogic science based on the Patanjali Yogasutras for her Ph.D. in Yoga. She organizes workshops on yoga for marginalized people in the society and provides individual counseling sessions.

Photographs

Inaugural Session
15ᵗʰ January 2024
Guest of Honour: Dr. R. Harikumar

Photographs

Session by Dr. U.S. Hareesh (CSIR-NIIST)
15th January 2024
Topic: Carbon capture technologies

Session by Dr. Ajit Haridas (CSIR-NIIST retd.)
15th January 2024
Topic: Health and environmental aspects of fuel emissions

Session by Dr. Partha Kundu (CSIR-NIIST)
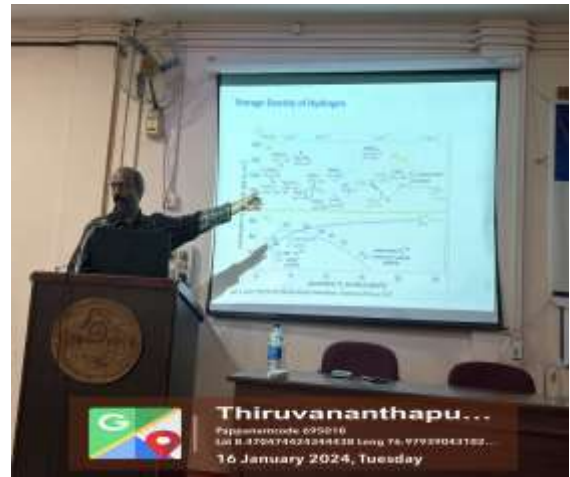**15th January 2024**
Topic: Achieving carbon neutrality

Photographs

Session by Dr. G. Madhu (CUSAT Retd.)
16th January 2024
Topic: Low-carbon energy & Emerging green fuel technologies

Session by Dr. G. Mohan (SCTCE)
16th January 2024
Topic: Hydrogen storage

Session by Mrs. V. Gayathri (SCTCE)
16th January 2024
Topic: Bio-hydrogen production

Photographs

Session by Dr. V.K. Chithrakumar (SCTCE)
17th January 2024
Topic: Hybrid and electric vehicles

Session by Dr. Binod Parameswaran (CSIR-NIIST)
17th January 2024

Session by Dr. Shaneeth. M (ISRO-VSSC)
18th January 2024
Topic: Fuel cell technology

Photographs

Session by Dr. Rajeev K Sukumaran (CSIR-NIIST)
18th January 2024
Topic: Lignocellulosic Bio-ethanol

Session by Dr. Pinaki Dey (CSIR-NIIST)
19th January 2024
Topic: Bio-refineries

Session by Dr. R. Venugopal (PESO)
19th January 2024
Topic: Safety legislations for alternative fuels
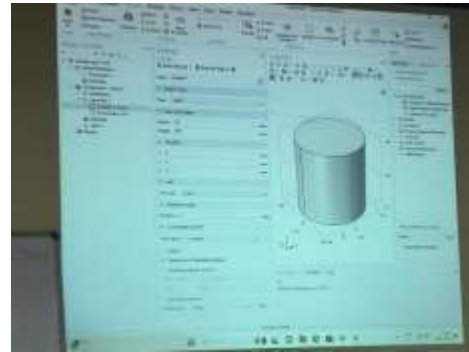
Session by Dr. Krishnakumar. B (CSIR-NIIST)
19th January 2024
Topic: Anaerobic processes for biofuels production

Photographs

Lab session on COMSOL Multiphysics
Expert: Dr. G. Mohan (SCTCE)
15th -18th January 2024

Photographs

Feedback by participants

Photographs

Industrial Visit
CSIR-NIIST
Pappanamcode, Thiruvananthapuram
20th January 2024

Photographs

Valedictory Session
20th January 2024

Photographs

ATAL Faculty Development Programme
Low-emission Fuels: Policies, Technologies, Prospects and Challenges
15th-20th January 2024
Department of Biotechnology and Biochemical Engineering
Sree Chitra Thirunal College of Engineering
Pappanamcode, Thiruvananthapuram-695 018

About the programme:

The objective of the course is to expose and impart technical expertise to the faculty, researchers, and industrialists about the future of productivity and growth in the manufacturing supply chain based on Industry 4.0. Through the lectures of eminent speakers, the programme intends to focus on the practical and applied aspects of the manufacturing supply chain. The course also aims at giving some hands-on experience in this field and enabling the participants to take up research initiatives in these areas.

All the prospective learners in the above topic are encouraged to register and attend the FDP.

Course Content

➢Industry 4.0: Concepts & Principles Building Blocks of Industry 4.0
➢Smart manufacturing and 3D Printing
➢Supply Chain Management
➢Simulation and Modelling of Supply Chain Systems

About SCTCE:

Sree Chitra Thirunal College of Engineering (SCTCE), Thiruvananthapuram was established by the Govt. of Kerala in the year 1995 in memoriam of the Great Maharaja of Travancore and is affiliated to the APJ Abdul Kalam Technological University of Kerala with AICTE approval. The Institution has the broad objective of grooming young men and women into technocrats through the process of engineering education, training and research. SCTCE offers 7 undergraduate and 3 postgraduate courses. SCTCE is also a research centre under APJ Abdul Kalam Technological University since 2015 and offers PhD programmes.

Vision of the institution:

To become an engineering and technology institution which is renowned for producing professionally capable and socially responsible engineers.

Mission of the institute:

To create a learning process for students to acquire engineering fundamentals, in an environment that encourages analysis, teamwork, entrepreneurship and ethical values, thus preparing them for productive careers.

About Mechanical Engineering Department:

The Department of Mechanical Engineering offers three UG programs and one PG programme. It also offers doctoral programs under the APJ Abdul Kalam Technological University.

Faculty Development Programme
on

Industry 4.0
The Future of Productivity and Growth in Manufacturing Supply Chain

24 to 28 April, 2023

Organized by

Department of
Mechanical Engineering
**Sree Chitra Thirunal
College of Engineering**
Thiruvananthapuram-18

Sponsored by

**APJ Abdul Kalam Technological
University Kerala**

Resource Persons:

Experts in the concerned field from academics and industries are invited to deliver lectures in the programme.

Who can apply?

The programme is open to faculty members from Government /Aided / Self Financing Engineering Colleges affiliated to KTU.

How to apply?

The number of participants is limited to 30. Selection will be on a first come first serve basis.

Applications should be submitted online by filling up the Google Form (link provided below) before the last date.

Application Form:

PDF download link

Registration Link:

Online registration link

Registration fees

No registration fee will be collected from the participants.

Certificate

It is compulsory for all the participants to physically attend all the sessions and give feedback to receive the certificate of participation.

Course schedule

5 days offline sessions - 3 hours each on FN and AN

Important dates

Start date of registration: 08/04/2023
Last date of registration :   18/04/2023
Selection intimation   :   20/04/2023

Chief Patron

Dr. Sheeja M. K., Principal

Patron

Prof. Harikuttan K., HOD ME

Co-ordinators

Dr. Kavilal E. G.
Assistant Professor
Department of Mechanical Engineering
Sree Chitra Thirunal College of Engineering
Mobile: 8714247259
Email: kavilal2001@gmail.com

Dr. Anoop M. S.
Assistant Professor
Department of Mechanical Engineering
Sree Chitra Thirunal College of Engineering
Mobile: 7012097130
Email: anoopms@sctce.ac.in

A report on

Faculty Development Programme

'Industry 4.0 - The Future of Productivity and Growth in Manufacturing Supply Chain'

24 to 28/04/2023

Organised by

Department of Mechanical Engineering,

Sree Chitra Thirunal College of Engineering

Sponsored by

A P J Abdul Kalam Technological University, Kerala.

Sl No.	Contents
1	Report
2	Brochure
3	Schedule
4	List of participants
5	Registration details
6	Attandance sheet
7	Feedback forms
8	Participation certificate
9	Profile of resource person
10	Letter of appreciation

Report on
Faculty Development Programme on
'Industry 4.0: The Future of Productivity and Growth in Manufacturing Supply Chain'

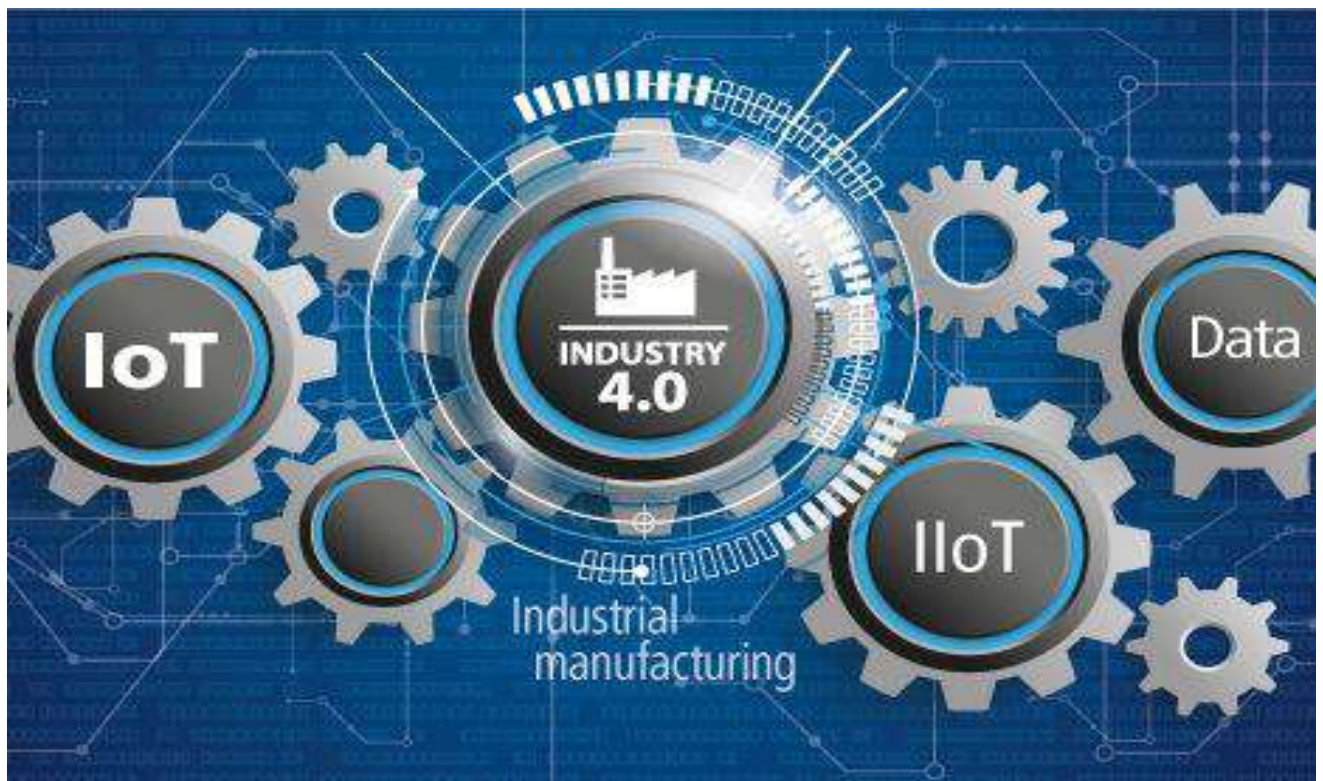A five day KTU- sponsored Faculty Development Programme on "Industry 4.0: The Future of Productivity and Growth in Manufacturing Supply Chain" was organised by the Department of Mechanical Engineering, Sree Chitra Thirunal College of Engineering, Thiruvananthapuram from 24 to 28th April, 2023. The main aim of the programme was to provide a platform for the faculty members from KTU-affiliated institutions to explore the opportunities of Industry 4.0 towards the future of productivity and growth in manufacturing supply chain. The chief guest, Dr. Rajasree M. S., Senior Joint Director of Technical Education inaugurated the programme and delivered the inaugural address. The program was coordinated by Dr. Kavilal E. G. and Dr. Anoop M. S.

The inagruation started with a prayer song. The program began with a warm welcome to all the participants by Dr. Kavilal E. G., Assistant Professor, the coordinator of the Faculty Development Program (FDP). Prof. Harikuttan K., the Head of the Department of Mechanical Engineering a brief explanation of FDP. Dr. Sheeja M. K., Principal , Sree Chitra Thirunal college of Engineering highlighted the significance of the program and its objectives in improving. The chief guest, Dr. Rajasree M. S., Senior Joint Director of Technical Education inaugurated the programme and delivered the inaugural address. In the inaugural address, the chief guest provided an insightful overview of Industry 4.0, highlighting its significance and potential to revolutionize the manufacturing sector. She emphasized that Industry 4.0 represents the fusion of digital technologies, automation, and data analytics to create a new era of manufacturing characterized by interconnectedness, intelligent systems and efficient production processes. Dr. Sheeja M. K, handed over the momento to the chief guest. The vote of thanks was given by Dr. Anoop M. S., the co coordinator of the FDP, expressed gratitude to the chief guest for gracing the event with her solemn presence.

Day 1(24/04/2023)

After inauguration the technical sessions started with key note speech by Dr. Arun Surendran, Strategic Director and Principal, Trinity College of Engineering. His keynote address provided an insightful overview of Industry 4.0, highlighting its significance and potential to revolutionize the manufacturing sector. He emphasized that Industry 4.0 represents the fusion of digital technologies, automation, and data analytics to create a new era of manufacturing characterized by interconnectedness, intelligent systems and efficient production processes.

The afternoon session was taken by Sri. Arun K. R., Technical Head, Commercial Consultancy Service. Introduction to FlexSim: Software for Simulation and Modelling. The session commenced with an overview of FlexSim, a powerful software tool used for simulation and modelling in various industries. The facilitator highlighted the key features and capabilities of FlexSim, including its user-friendly interface, extensive library of objects, advanced visualization, and powerful analytical tools. The session provided participants with valuable insights into the capabilities of FlexSim and its potential applications in their respective fields. The attendees left the session with a solid foundation in simulation modelling using FlexSim and were equipped to apply their newly acquired skills to real-world scenarios.
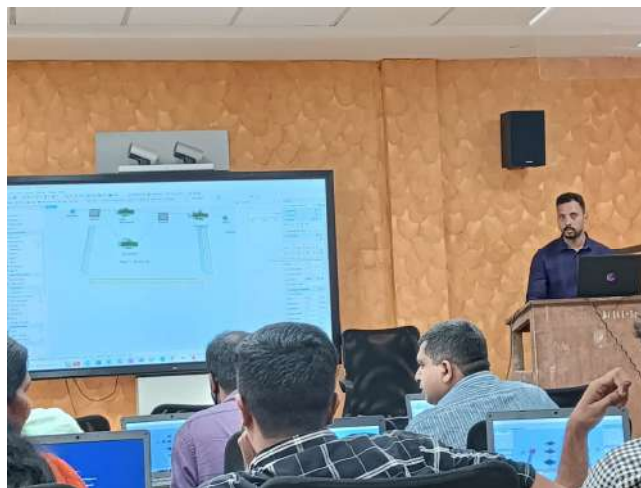
Day 2 (25/04/2023)

The second day of FDP started with talk by Dr. Ravi V. Professor, Department of Humanities, Indian Institute of Space Science and Technology, Thiruvananthapuram, on the topic, Understanding the Voice of Customer in Modern Competent Environment. The session explained how understanding the voice of customers in the competitive world is of

paramount importance for businesses striving to succeed in a crowded marketplace. It involves actively listening to customers, analyzing their feedback, and using those insights to improve products, services, and overall customer experience.

The afternoon session was continuation of hands-on training on FlexSim. The session was delivered by Sri. Brijesh Diwakar, Simulation Consultant, Commercial Consultancy Service. The session delivered in-depth knowledge of FlexSim's capabilities and prospective uses. The participants gained hands on experience with a strong foundation in FlexSim simulation modelling and the ability to use their newly learned skills in practical situations.


Day 3 (26/04/2023)

The third day of FDP started with talk by Er. Binish Moulana APAC Head of Platform Enablement, Principal Dev Ops & SRE on topic, 'Application of Python in Industry 4.0'. The session provided participants with insights into the concept of Industry 4.0, with integration of advanced technologies, automation, and data exchange in the

manufacturing sector. Participants gained understanding of the key components and principles of Industry 4.0 and how Python fits into this transformative paradigm.

The afternoon session was delivered by Dr. Regi Kumar V. Professor, Department of Mechanical Engineering, College of Engineering Trivandrum, on the topic 'Current Trends in Supply chain management'. The participants gained knowledge on how manufacturers can achieve greater operational efficiency, reduce costs, enhance customer satisfaction, and gain a competitive edge in the dynamic marketplace. By leveraging IOT technologies, manufacturing can revolutionize supply chain management by providing enhanced visibility, optimizing asset management, improving inventory control, enabling real-time collaboration, enhancing quality control, supporting sustainable practices, and facilitating data-driven decision-making.
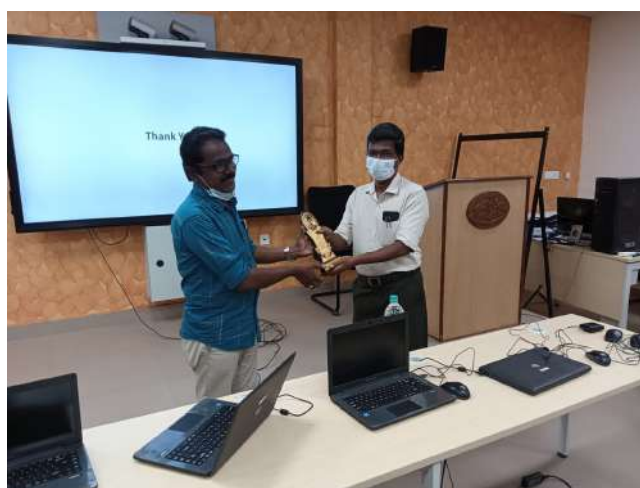
Day 4 (27/04/2023)

The third day of FDP started with talk by Dr. Ravi V. Professor, Department of Humanities, Indian Institute of Space Science and Technology, Thiruvananthapuram, on the topic, From Trash to Treasure- The Value of Reverse Logistics. The talk provided a comprehensive understanding of reverse logistics, which involves the management of product returns, repairs, recycling, and disposal. Participants understand the importance of reverse logistics in maximizing the value of products throughout their lifecycle and minimizing waste. The talk empowered the participants to implement effective reverse logistics strategies, optimize processes, reduce costs, improve sustainability practices, enhance customer satisfaction, and unlock new business opportunities.

The afternoon session was delivered by Dr. Bijulal D. Professor, Department of Mechanical Engineering, Government Engineering College, Barton Hill, Thiruvananthapuram on the topic ' Simulation Modelling of Multi Echelon Supply Chains'. The session provides a valuable information on tool for analyzing, optimizing, and managing complex supply chain systems. It helps in identifying inefficiencies, mitigating risks, optimizing inventory, designing supply chain networks, and enhancing collaborative decision-making, ultimately leading to improved operational performance and customer satisfaction.

Day 5 (28/04/2023)

The third day of FDP started with talk by Sri. Brijesh Diwakar, and continuation of hands-on training on FlexSim. Training sessions provide participants with practical, hands-on experience in using FlexSim. They will learn how to build, analyze, and modify simulation models specific to supply chain scenarios. These skills are valuable in understanding and improving complex supply chain systems.

The second session on third day of FDP started with talk by Dr. Suresh Subramoniam, Director CET School of Management, College of Engineering Trivandrum, on the topic, Role of AI in making Resilient Supply Chain. The session provided participants with valuable knowledge and skills for navigating the evolving landscape of supply chain management. The knowledge on AI applications, decision-making, risk management, automation, and customer-centric approaches to optimize supply chain operations, and ensure their organizations are well-prepared for the future.

The afternoon began with a feedback session where participants were encouraged to share their thoughts and opinions on the overall FDP. The feedback session was structured to gather insights on the strengths of the program, areas for improvement, and specific topics or activities that participants found particularly beneficial or challenging. Participants actively participated in the feedback session and provided valuable input. They expressed appreciation for the quality of the sessions, relevance of the topics and the expertise of the resource persons. Participants appreciated the importance of hands-on exercises on practical applications and case studies to enhance their learning experience.

Following the feedback session, participants took a test to assess their understanding of the concepts covered throughout the FDP. The test consisted of multiple-choice questions. It aimed to evaluate participants' comprehension, critical thinking, and ability to apply the knowledge gained during the program. The test was designed to cover various aspects including the all the sessions' topics of the FDP. Questions were carefully crafted to assess participants' grasp of the theoretical concepts.

After the test, a validatory function was conducted to acknowledge participants achievements and distribute certificates of participation. The validatory function involved a brief ceremony, where distinguished guests, facilitators, and participants gathered to recognize the efforts and dedication of the participants throughout the FDP. Certificates of participation were presented to each participant, acknowledging their active involvement and successful completion of the program. The validatory function also provided an opportunity for participants to engage in discussions on their learning journey during the FDP. The validatory session came to an end by vote of thanks by the coordinators of the FDP,

expressing the gratitude to all the guests, resource persons, participants, KTU for sponsoring the programme and all the supporters.

Media coverage

Faculty development event gets under way

The Hindu Bureau
THIRUVANANTHAPURAM

Former APJ Abdul Kalam Technological University Vice-Chancellor and joint director of the Directorate of Technical Education Rajasree M.S. inaugurated a five-day faculty development programme at the Sree Chitra Thirunal College of Engineering, Pappanamcode, on Monday. The programme was organised for engineering colleges teachers. College principal Sheeja M.K. presided over the function. The classes are being led by industry experts and academics.

ദേശാഭിമാനി

ഫാക്കൽറ്റി ഡെവലപ്മെന്റ് പ്രോഗ്രാം ആരംഭിച്ചു

തിരുവനന്തപുരം

പാപ്പനംകോട് ശ്രീചിത്ര തിരുനാൾ എൻജിനിയറിങ് കോളേജിൽ 'വ്യവസായം: ഉൽപ്പാദന വിതരണ ശൃംഖലയിലെ ഉൽപ്പാദന ക്ഷമതയുടെയും വളർച്ചയുടെയും ഭാവി' എന്ന വിഷയത്തിൽ ഫാക്കൽറ്റി ഡെവലപ്മെന്റ് പ്രോഗ്രാം (എഫ്ഡിപി) ആരംഭിച്ചു. സാങ്കേതിക വിദ്യാഭ്യാസ ജോയിന്റ് ഡയറക്ടർ ഡോ. എം എസ് രാജശ്രീ ഉദ്ഘാടനം ചെയ്തു. ട്രിനിറ്റി എൻജിനിയറിങ് കോളേജ് പ്രിൻസിപ്പൽ ഡോ.

അരുൺ സുരേന്ദ്രൻ മുഖ്യപ്രഭാഷണം നടത്തി.

ശ്രീചിത്ര തിരുനാൾ എൻജിനിയറിൻ കോളേജ് പ്രിൻസിപ്പൽ ഡോ. എം കെ ഷീജ അധ്യക്ഷയായി. എ പി ജെ അബ്ദുൽ കലാം സാങ്കേതിക സർവകലാശാല സ്പോൺസർ ചെയ്യുന്ന പരിപാടിയിൽ വ്യവസായ വിദഗ്ധരും അധ്യാപകരും പങ്കെടുക്കും. സാങ്കേതിക സർവകലാശാലയുടെ കീഴിലുള്ള കോളേജുകളിലെ അധ്യാപകരാണ് പരിപാടിയിൽ പങ്കെടുക്കുന്നത്.

കേരള കൗമുദി

ഫാക്കൽറ്റി ഡെവലപ്മെന്റ് പ്രോഗ്രാം

തിരുവനന്തപുരം: പാപ്പനംകോട് ശ്രീചിത്ര തിരുനാൾ എൻജിനിയറിംഗ് കോളേജിൽ അഞ്ച് ദിവസം നീണ്ടുനിൽക്കുന്ന ഫാക്കൽറ്റി ഡെവലപ്മെന്റ് പ്രോഗ്രാം ഡോ. രാജശ്രീ എം. എസ് ഉദ്ഘാടനം ചെയ്തു. ട്രിനിറ്റി എ

ൻജിനിയറിംഗ് കോളേജ് പ്രിൻസിപ്പൽ ഡോ.അരുൺ സുരേന്ദ്രൻ മുഖ്യപ്രഭാഷണം നടത്തി. ശ്രീചിത്ര തിരുനാൾ എൻജിനിയറിംഗ്കോളേജ് പ്രിൻസിപ്പൽ ഡോ.ഷീജ.എം.കെ അധ്യക്ഷത വഹിച്ചു.

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY
SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING

Statement of Expenditure for FDP on " Industry 4.0 – The Future of Productivity and Growth in Manufacturing Supply Chain "

Department of Mechanical Engineering

Sanction Order No: 1545/2022/KTU

Purpose of Grant: Faculty Development programme (FDP)

Sl.No	Criteria	Particulars					Amount
		Sub No	Name of expert	Date	No of sessions	Rs	
			Honorarium to faculty/external experts other than IIT/NIT				
1		a)	Dr Arun Surendran	24-04-2023	3	3,000.00	
2		b)	Er Arun K R	24-04-2023	3	3,000.00	
3		c)	Er Brijesh Kumar	28-04-2023	3	3,000.00	
4	6	d)	Mr Binish Moulana	26-04-2023	3	3,000.00	24,000.00
5		e)	Dr Reji Kumar V	26-04-2023	3	3,000.00	
6		f)	Dr Bijulal	27-04-2023	3	3,000.00	
7		g)	Er Brijesh Kumar	25-04-2023	3	3,000.00	
8		h)	Dr Suresh Subramanian	28-04-2023	3	3,000.00	
9	7	a)	Dr Ravi V	27-04-2023	1	5,000.00	10,000.00
10		b)	Dr Ravi V	25-04-2023	1	5,000.00	

Sl.No	Criteria	Sub No	Name of personnal	Date	Rs	Amount
11		a)	Dr Shreya M K	28-04-2023	7,500.00	
12	10	b)	Dr Kanilal E G	28-04-2023	4,000.00	15,000.00
13		c)	Anoop M S	28-04-2023	3,500.00	
14		a)	Vishnu V J	28-04-2023	5,000.00	
15	11	b)	Ajay Kumar V R	28-04-2023	5,000.00	11,400.00
16		c)	K Ushanandini	28-04-2023	1,400.00	

ANOOP M.S.
Assistant Professor
Dept. of Mechanical Engineering
Sree Chitra Thirunal College of Engineering

PRINCIPAL
Sree Chitra Thirunal
College of Engineering
Trivandrum - 18

Sl.No	Criteria	Sub No	Item	Name of Agency	Date	Bill No	Rs	Amount
17	9	a)	Taxi charge incurred for Dr Ravi V	Tourist Taxi	24-04-2023	308	4,800.00	4,800.00
18	12	a)	Certificate printing	Print Home	25-04-2023	442	3,300.00	14,625.00
19	12	b)	Report printing	Print Home	25-04-2023	442	6,540.00	
20	12	c)	Paper, Pen, File	SCT employees co-operative Society Ltd	24-04-2023	6671	3,985.00	
21	12	d)	Banner	Print Home	25-04-2023	442	800.00	
22	13	a)	Cotton cloth and Jute Sling bag	Sanchi Bags	22-04-2023	SG00220	11,693.00	12,782.00
23	13	b)	Stationary	Premier towers	22-04-2023	MG2324/1009445	1,089.00	
24	14	a)	Lunch, Tea and snacks	Kailas Hotel	28-04-2023	706	37,500.00	37,500.00
25	15	a)	Memento designing and making	Vaiga crafts	26-04-2023	048	6,600.00	9,600.00
26	15	b)	Certification by Chartered Accountant	CA Alan John Saji	04-03-2024	39/AJS/23-24	3,000.00	
			Total Expenditure					1,39,707.00

Rupees One Lakh Thirty-Nine Thousand Seven Hundred and Seven only

Name & Signature of
Chartered Accountant

Signature of Course Coordinator   Name & Signature of HOD of CE   Name & Signature of Principal/Centre coordinator

ANOOP M.S.
Assistant Professor
of Engineering
of Engineering

PRINCIPAL
25/3/2024 Sree Chitra Thirunal
College of Engineering
Trivandrum - 18

Report

Short Term Course on "Research Challenges in Block chain and Big Data Analytics"

19th to 24th January 2023

Department of Computer Science & Engineering

Sree Chitra Thirunal College of Engineering

Sponsored by

APJ Abdul Kalam Technological University

To

The Joint Director

Academics Section

APJ Abdul Kalam Technological University

Thiruvananthapuram

Sir,

Sub: SCTCE - Releasing the fund after the completion of KTU funded Short Term

Course – forwarding audited expenditure statement and program details - reg.

I am forwarding herewith the audited expenditure statement and program details of KTU funded Short Term Course on **"Research Challenges in Block chain and Big Data Analytics"**organized by Department of Computer Science and Engineering from 19th December to 24th January 2023 for releasing the amount spent by the institution.

Thanking you,

Yours faithfully,

PRINCIPAL

SHORT TERM COURSE ON "RESEARCH CHALLENGES IN BLOCK CHAIN AND BIG DATA ANALYTICS" HELD FROM 19TH TO 24TH JANUARY 2023

NAME AND ADDRESS OF COLLEGE	DEPARTMENT	TITLE OF SHORT TERM COURSE	ACCOUNT DETAILS(FOR CREDITING THE AMOUNT)
Sree Chitra Thirunal College of Engineering	Computer Science and Engineering	"Research Challenges in Block chain and Big Data Analytics"	Account No: 67066395303 Account name: NTIT SCTCE Branch Name: State Bank of India SCT Engineering College Branch, Pappanamcode, Thiruvananthapuram IFSC Code:SBIN0070851

The Department of Computer Science and Engineering of Sree Chitra Thirunal College of Engineering had conducted Short Term Course on "Research Challenges in Bolockchain and Big Data Analytics", sponsored by APJ Abdul Kalam Technological University from 19th to 24th January 2023. The expenditure for the course is given in the table. The detailed bills/ vouchers and other supporting documents are attached. The total expenditure is **Rs.1,25,261/- (One lakh Twenty Five Thousand Two Hundred and Sixty One Only)**. Please take necessary steps to grant the amount and transfer the same to the Account No: 67066395303, Account name: NTIT SCTCE, Branch Name: State Bank of India, SCT Engineering College Branch, IFSC Code:SBIN0070851.

No	Item	Amount
1	Honorarium to faculty/ External experts	Rs. 32,000
2	TA to external experts	Rs.7,640
3	Accommodation to external experts	Rs. 10,000
4	Honorarium to centre coordinator	Rs.7,500
5	Honorarium to course coordinators	Rs.15,000
6	Honorarium to technical assistants for venue arrangement, purchase assistance, data entry etc. (Please specify the number of persons employed for these activities)	Rs 10,000 (4 persons)
7	Cost of training material (Soft Copy / Hard copy / text book etc, Please specify the cost per participant)	Rs. 560
8	Cost of stationeries, consumables, certificate printing, report printing, photography etc.	Rs. 9,111
10	Food & refreshments to participants	Rs. 32,860
11	Any other items (Please specify) Audit Fee	Rs. 560
	TOTAL	**Rs.1,25,261/-**

Dr. Jayasudha J.S.   Sri. Rejimoan R.

Professor in Computer Science & Dean (Academic)   Asst. Professor

Dept. of Computer science

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9.	List of Distinguished Officials present in the programme during inauguration
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14.	Utilization Certificate
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1.   COURSE OBJECTIVE

The main objective of the course is to learn the tools and techniques used for Blockchain and Bigdata analytics and to promote the research in the area of data analytics.

2.   COURSE OUTCOME

At the end of this course, the participants should be able to formulate research problems related to Blockchain and Bigdata analytics and to identify the research challenges in data analytics.

3.   COURSE CONTENTS

Business runs on information. The faster it's received and the more accurate it is, the better. Blockchain is ideal for delivering that information because it provides immediate, shared and completely transparent information stored on an immutable ledger that can be accessed only by permissioned network members. A blockchain network can track orders, payments, accounts, production and much more. And because members share a single view of the truth, you can see all details of a transaction end to end, giving you greater confidence, as well as new efficiencies and opportunities.

Social network analysis focuses on the analysis of pattern of relationships among people, organizations, states and different social entities. The rapid growth of consumer data combined with the impact of social media has created a need to understand the meaningful data. Social network analysis has already been used in a number of areas, primarily focused on criminal activities. Analysis of Big data can lead to increase in sales, fraud detection, pattern recognition and risk prediction in various domains. Social network analysis can be used to detect patterns, establish linkages between individuals and to connect non-obvious relationships. The research works are being carried out in the area of finding the communities from multi-relational social network data for identifying criminals and to detect abnormal behaviors.

The tools and techniques used for analyzing the data posted in social networks are to be familiarized for analyzing the data. The different topics covered in this course includes Scope of Research in Data Analytics, Big Data Security, Research challenges in Data Analytics, Tools and Techniques used for analyzing Big Data, Probability, Plausibility measure, Possibility and necessity measure, Processing and Analysis of data with Hadoop, Spark, Storm Data Analytic tools and Programming using R language. Hands on training sessions were handled for familiarizing the usage of the tools for data analytics, analysis of data with Hadoop, Spark and storm and applications were demonstrated using R language.

4. RESOURCE PERSONS

External Faculty:

1. Sri. Abhilash V.,Block Chain Educator,Mariyambil Apartment.Thrikkakara,Eranakulam TCS.
2. Sri. Anjali K K Block Chain Educator,Mariyambil Apartment, Thrikkakara, Eranakulam TCS
3. Dr. Anu Mary Chacko, Assistant Professor, Department of Computer Science, NIT Calicut.
4. Dr. Vysakh R Department of Information Technology Government Engineering College Painavu Idukki.
5. Sri. Pankaj Kumar, Assistant Professor, Department of Computer Science, Federal Institute of Science and Technology, Angamali.

Internal Faculty for handling the lab sessions along with external faculty

1. Dr. Jayasudha J. S.
   Professor in Computer Science and Dean (Academic),
   Sree Chitra Thirunal College of Engineering,
   Pappanamcode

2. Rejimoan R.,
   Asst. Professor,
   Department of Computer Science & Engineering
   Sree Chitra Thirunal College of Engineering,
   Pappanamcode

5. PARTICIPANTS

Total number of participants are 33 (External participants : 23 and internal participants : 10). External participants were working in different engineering colleges under the APJ Abdul Kalam Technological University Kerala. The participants are faculties from various engineering colleges under the APJ Abdul Kalam Technological University Kerala and other reputed Universities.

No. of External Participants : 23

No. of Internal Participants : 10

Total No. of Participants : 33

6.   PROGRAMME SCHEDULE

Research Challenges in Blockchain and Big Data Analytics

(19th January to 24th January 2023)

Date	9.00 to 9.45	9.45 to 11.10		11.20 to 1:00		1.45-3.00		3.10-5.15	
19/01/23 Thursday	Registration	Introduction - "Blockchain"(Mr. Abhilash P)	Tea Break	Scope of Research in Block chain (Ms. Anjali K K)	Lunch Break	Smart Contracts And Ledgers (Mr. Abhilash P)	Tea Break	Solidity (Ms.Anjali K K)	
20/01/23 Friday	Solidity-Remix IDE(Hands-on) (Ms.Anjali K K)			Ethereum Blockchain Platform (Mr. Abhilash P)		Smart Contract Delpoyment (Ms.Anjali K K)		Truffle Frame Work (Hands on) (Mr. Abhilash P)	
21/01/23 Saturday	Ganache, Geth, MetaMask (Ms. Anjali K K)			Dapp Architecture(Mr. Abhilash P)		Dapp development (Hands-on) (Ms.Anjali K K)		Challenges and Future Scope of Block Chain (Mr. Abhilash P)	
23/01/23 Monday	Self Soveregin Identity And Block Chain (Dr. Anu Chacko)			Big Data SecurityAnd Privacy (Dr. Anu Chacko)		Exploratory data Analysis in R – Hands on (Dr Visakh R)		Descriptive Data Analysis in R – Hands on (Dr. Visakh R)	
24/01/23 Tuesday	Research opportunities and Tools used for Bigdata analysis (Mr. Pankaj Kumar)			Bigdata data analysis using Hadoop – Hands on (Mr. Pankaj Kumar)		Data Analysis using Spark (Hands on) (Mr. Pankaj Kumar)		Storm Data Analysi (Mr. Pankaj Kumar)	Test & Valedictory ceremony

7. LIST OF COORDINATORS & TECHNICAL ASSISTANTS

1. Centre Coordinator	**Dr. Sheeja M K** The Principal Sree Chitra Thirunal College of Engineering
2. Course Coordinator	**1. Dr. Jayasudha J.S.** Professor, Dept. of Computer Science & Engineering Sree Chitra Thirunal College of Engineering Pappanamcode Ph: 9495376533,8848991155, jayasudhajs@gmail.com
	2. Rejimoan R. Assistant Professor, Dept. of Computer Science & Engineering Sree Chitra Thirunal College of Engineering Pappanamcode Ph : 9446459948,9496909948, rejimoan@gmail. com
3. Technical Assistants	1. Sri. Saji S. Second Grade Instructor Dept. of Computer Science & Engineering Sree Chitra Thirunal College of Engineering Pappanamcode
	2. Jayan J. Trade Instructor Dept. of Computer Science & Engineering Sree Chitra Thirunal College of Engineering Pappanamcode
	3. Sri. Sen K.V Trade Instructor Dept. of Computer Science & Engineering Sree Chitra Thirunal College of Engineering Pappanamcode
	4. Smt. Meena S. R. Trade Instructor Dept. of Computer Science & Engineering Sree Chitra Thirunal College of Engineering Pappanamcode

8.   DETAILS OF SESSIONS HANDLED BY EXTERNAL RESOURCE PERSONS

1. Sri. Abhilash V.,Block Chain Educator,Mariyambil Apartment.Thrikkakara,Eranakulam TCS, has handled session on "Inroduction to block chain " from 9.45 to 11.10 am ,Smart Contract and ledgers from 1:45 to 3:00 pm on 19/01/2023,and "Etherium Block chain" platform from 11:20 to 1:00 pm,"Truffle Frame work from 3:10 to 5:15 pm on 20/01/2023 and "Dapp Architecture "from 11.20 to 1.pm ,"Challenges and future scope of block chain" from 3:10 to 5:15 pm on 21/01/2023

2. Sri. Anjali K K Block Chain Educator,Mariyambil Apartment, Thrikkakara, Eranakulam TCS, has handled session on "Scope of Research " from 11.20 to 1:00 pm ," Solidity" from 3:10 to 5:15 pm on 19/01/2023,and "Solidity-Remix IDE" from 9:00 to 11:10 am, "Smart Contract Deployment" from 1:45 to 3:00 pm on 20/01/2023 and "Ganache Geeth Meta Mask" from 9:00 am to 11.10 am,"Dapp Deployment" from 1:45 to 3:10 pm on 21/01/2023

3. Dr. Anu Mary Chacko, Assistant Professor, Department of Computer Science, NIT Calicut has handled session on "Self Sovereign Identity and block chain" from 9.00 to 11.10 on 23/01/2023,"Big data security and privacy" from 11:20 to 1:00 pm

4. Dr. Vysakh R Department of Information Technology Government Engineering College Painavu Idukki has handled session on "Exploratory Data Analysis using R Language from 1.45 to 3.00 and "Descriptive Data Analysis in R- Hands on" from 3:10 to 5:15 pm on 23/01/2023

5. Sri. Pankaj Kumar, Assistant Professor, Department of Computer Science, Federal Institute of Science and Technology, Angamali has handled session "Research Opportunities and tools used for Big Data   analysis" from 9:00 to 11:10 ,"Hands on session Data Analysis using Hadoop" from 11:20 to 1:00 pm "Processing of Data using Spark" 1:45 to 3:00 pm ,"Storm data analysis"" from 3:10 to 4:15 pm on 24/01/2023

9.   LIST OF DISTINGUISHED OFFICIALS OF COLLEGE PRESENT IN THE PROGRAMME DURING INAUGURATION

1.	Dr. Alexander G Sr.Director CDAC Pune
2.	Dr. Sheeja M K, The Principal Sree Chitra Thirunal College of Engineering
3.	Dr.Anil Kumar S H PG Dean Sree Chitra Thirunal College of Engineering
4.	Dr. R Ajith Dean (Planning and Development) Sree Chitra Thirunal College of Engineering
5.	Dr. Anoop Kumar. Head of the Department Dept of ME, Sree Chitra Thirunal College of Engineering
6.	Dr. Soniya B Head of the Department Dept of CSE, Sree Chitra Thirunal College of Engineering
7.	Dr. Antha C S Head of the Department Dept of Applied Sciences, Sree Chitra Thirunal College of Engineering
8.	Dr. Nisha Jose Head of the Department Dept of ECE, Sree Chitra Thirunal College of Engineering
9.	Dr. Subu Surendran Professor Dept of CSE Sree Chitra Thirunal College of Engineering
10.	Dr. Mohan G Professor Dept of ME Sree Chitra Thirunal College of Engineering
11.	Dr. Radakrishnan HOD BT Sree Chitra Thirunal College of Engineering

10.   FEEDBACK/ RECOMMENDATIONS

<div align="center">

Short term Course on
"Research Challenges in Block Chain and Big Data Analytics"
19th to 24th January, 2023

Organized by
Department of Computer Science and Engineering
Sree ChitraThirunal College of Engineering Pappanamcode, Thiruvananthapuram

</div>

	Poor	Average	Good	Excellent/ Useful
1. **The objectives of the training were clearly defined**	1	2	3	4
2. **The topics covered were relevant**	1	2	3	4
3. **The content was organized and easy to follow**	1	2	3	4
4. **Questionnaire and interactions were encouraged**	1	2	3	4
5. **The Resource Persons were knowledgeable about the training topics**	1	2	3	4
6. **The training objectives were met**	1	2	3	4
7. **Venue was adequate and comfortable**	1	2	3	4
8. **Quality of Food**	1	2	3	4
9. **Accommodation**	1	2	3	4

Suggestions for improvement:

Do you have any suggestions for including new sessions in such courses?

FEEDBACK STATISTICS
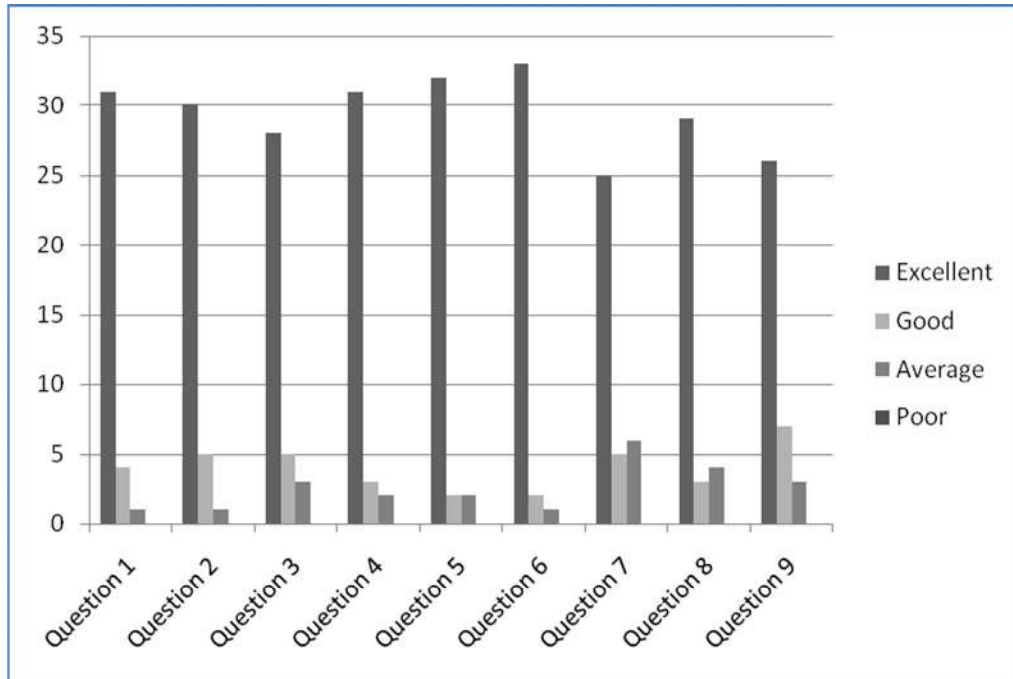
Recommendations & Suggestions given by participants

- The programme was excellent with good resource persons
- This programme was very useful and informative, similar such programmes are to be organized for including more tools used for analyzing big data.
- Include more hands-on sessions
- Try to pre-load software before starting the lab sessions
- Efficient time management is required

UTILIZATION CERTIFICATE

Certified that out of Rs. 1,35,000/- sanctioned by APJ Abdul Kalam Technological University towards financial assistance for the Short Term Course on "Research Challenges in Data Analytics" organized by Department of Computer Science and Engineering, an amount Rs**. 1,25,261/-(One lakh Twenty Five Thousand Two Hundred and Sixty One only**) was utilized for the purpose for which it was sanctioned, as shown in the Statement of Expenditure annexed.

Name and Signature of Co-ordinator	Name and Signature of Head of the Institution	Name and Signature of Accounts Officer/Chartered Accountant

Office Seal

"Research Challenges in Block Chain and Big Data Analytics"
19th to 24th January, 2023

STATEMENT OF EXPENDITURE

The expenditure of the course is as given in the table. The detailed bills/ vouchers and other supporting documents are attached. The total expenditure is **Rs.1,25,261/- (One lakh Twenty Five Thousand Two Hundred and Sixty One only)**.

No	Item	Amount
1	Honorarium to faculty/ External experts	Rs. 32,000
2	TA to external experts	Rs.7,640
3	Accommodation to external experts	Rs. 10,000
4	Honorarium to centre coordinator	Rs.7,500
5	Honorarium to course coordinators	Rs.15,000
6	Honorarium to technical assistants for venue arrangement, purchase assistance, data entry etc. (Please specify the number of persons employed for these activities)	Rs 10,000 (4 persons)
7	Cost of training material (Soft Copy / Hard copy / text book etc, Please specify the cost per participant)	Rs. 560
8	Cost of stationeries, consumables, certificate printing, report printing, photography etc.	Rs. 9,111
10	Food & refreshments to participants	Rs. 32,860
11	Any other items (Please specify) Audit Fee	Rs. 590
	TOTAL	**Rs.1,25,261/-**

Item wise Expenditure Statement (1,2)

Remuneration, Travelling Expenses & DA

No	Name	Date & Session	Remuneration	Travelling Expenses/Local Conveyances
1	Mr.Abhilash P	19/01/2023 (9:45 to 11:10 & 1:45 to 3:00) 20/01/2023 (11:20 to 1:00 & 3:10 to 5:15) 21/01/2023 (11:20 to 1:00 & 3:10 to 5:15)	Rs 9000/-	**Rs.1428/-**
2	Smt. Anjali K K	19/01/2023 (11:20 to 1:00 & 3:10 to 05:15) 20/01/2023 (9:00 to 11:10 & 1:45 to 3:00) 21/01/2023 (9:00 to 11:10 & & 1:45 to 3:00)	Rs 9000/-	**Rs.1428/-**
3	Dr. Anu Mary Chacko	23/01/2023 FN(9.00 to 1.00)	Rs 5000/-	**Rs.1970/-**
4	Dr. Visakh R	23/01/2023 AN(1.45 to 5.15)	Rs 3000/-	**Rs.1756/-**
7	Mr Pankaj Kumar	24/01/2023 FN(9.00 to 4.15)	Rs 6000/-	**Rs.1058/-**
Total Amount			**Rs. 32,000/-**	**Rs.7,640/-**
Total Expenses to resource persons as Remuneration & Travel Expenses				**Rs 39,640/-**

The vouchers showing the remuneration and travelling Expenses and are attached. The Honorarium to faculty/ External experts is Rs 5000/- for faculties from NIT or IIT and it is limited to Rs 1000/hour for other faculties or experts. The local conveyance to resource persons is limited to less than Rs 1000/ day depending on the distance.

Item wise Expenditure Statement (3)

Accommodation to External Experts

No	Name	Date	Name	Accommodation Expenses
1	Mr.Abhilash P	19/1/2023 to 21/3/2023	Mini Residency, Karamana	**Rs 4500/**
2	Smt. Anjali K K	19/1/2023 to 21/3/2023	Mini Residency, Karamana	**Rs 4500/**
3	Mr Pankaj Kumar	24/1/2023	Mini Residency, Karamana	**Rs 1000/**
Total Amount				**Rs.10,000/-**

Item wise Expenditure Statement (4,5)

Honorarium to centre coordinator & Course Co-ordinators

No	Name	Amount
1	Dr. Sheeja M K Principal, SCTCE	Rs 7500/-
2	Dr Jayasudha J S, Professor and Dean (Academic), SCTCE	Rs 7500/-
3	Rejimoan R Assistant Professor SCTCE	Rs 7500/-
	Total Amount	**Rs 21500/-**

As per KTU norms, Honorarium to centre coordinator and course coordinator is Rs.3000/ day which have to be shared between them. For the five day course the amount is Rs 15,000/- which is equally shared by centre coordinator & one of the Course Co-ordinator.

Item wise Expenditure Statement (6)

Honorarium to technical assistants for venue arrangement, purchase assistance, data entry etc.

No	Name	Amount
1	Saji S.	Rs. 2500/-
2	Sen K V	Rs. 2500/-
3	Meena S R	Rs. 2500/-
4	Jayan J	Rs. 2500/-
	Total Amount	**Rs.10000/-**

As per KTU norms the honorarium to technical assistants for venue arrangements, purchase assistance, data entry etc. is limited to Rs 2000/day, applicable during the duration of the programme. The classes were also handled in laboratories for providing hands-on sessions. The support of technical assistants were required during the hands-on sessions in addition to the assistants of venue arrangements, purchase assistance, data entry etc.

Item wise Expenditure Statement (7)

No	Item (Cost of training material)	Name of the shop	Bill No	Date	Amount
1	Course Materials	Sri Sai CAD centre, Eastfort	6152	23/1/23	Rs. 560/-
2	Softcopy of material course in DVD to 35 students				
			Total Amount		**Rs.4,100/-**

Even though KTU suggests Rs. 1000/- per participant, an amount of Rs.114 /- is only spent for participant. The DVD contains the copy of free open source text books in Data Analytics, R Language etc. and the PowerPoint presentations of all resource persons(included in stationeries) .

Item wise Expenditure Statement (8)

Cost of stationeries, consumables, certificate printing, report printing, photography etc.

No	Items	Name of the shop	Date	Bill No	Amount
1	Brochure Printing	Copy Point	7-12-2022	1624	661
2	Printing of Certificates, report binding, Photostats & photography	Devi note books and stationery	18-01-2023	48211	6609
		Vertex Sign Printing Industries	22-03-2023	1625	673
4	Flex Printing	Vertex Sign Printing Industries	18-01-2023	1590	1168
Total Amount					Rs.**9111**/-

Item wise Expenditure Statement (9,10)

Food & refreshments to external experts / Guests and participants

No	Item	Name of the Shop	Date	Bill No	Amount
1	Food and refreshment to Participants	Kailas Hotel	24-01-2023	671	32400
		Gauri marketing agency	16-01-2023	2284	460
		Total Amount			**Rs.32,860/-**

.

Item wise Expenditure Statement (12)

Miscellaneous

No	Name		Bill No	Date	Amount
1	Auditor Charges	Anathan and Sundaram chartered accountants , Poojappura	195	23/3/203	Rs.590/-
Total Amount					**Rs.590 /-**

The account has been audited by a charted account and an amount of Rs. 590/- has been paid as the auditing fee.

15. SUMMARY

The department of Computer Science and Engineering of Sree Chitra Thirunal College of Engineering had conducted a short term course on "Research Challenges in Block Chain and Big Data Analytics" from 19th to 24th January 2023, sponsored by APJ Abdul Kalam Technological University. Total number of participants are 33 (External participants: 23 and internal participants: 10). External participants were working in different engineering colleges under the APJ Abdul Kalam Technological University Kerala. The participants are faculties from various engineering colleges under the APJ Abdul Kalam Technological University Kerala and other reputed Universities.

The workshop was formally inaugurated by Dr. Alexander G, Sr.Director ,CDAC, Pune, with a key note address on "Research Challenges in Block Chain and Big Data Analytics". The participants were inspired by his motivational talk. The key attraction of the course was the hands on session on Analysis of data using Spark and Storm.

We had conducted the course successfully and the total expenditure is **1,25,261** (One lakh twenty five thousand two hundred and sixty one). This amount was spent by the college with the assumption that KTU will reimburse the amount to the college.

Submitted

The Department of Computer Science and Engineering of Sree Chitra Thirunal College of Engineering had conducted Short Term Course on "Research Challenges in Data Analytics", sponsored by APJ Abdul Kalam Technological University and approved by Directorate of Technical Education from 6th to 13th December 2018. The expenditure for the course is given in the table. The detailed bills/ vouchers and other supporting documents are attached. The total expenditure is **Rs.1,54,088/- (One lakh fifty four thousand and eighty eight only)**. Please take necessary steps to forward the attached documents to KTU for refunding the amount and credit it to the Account No: 67066395303, Account name: NTIT SCTCE, Branch Name: State Bank of India, SCT Engineering College Branch, IFSC Code:SBIN0070851.

No	Item	Amount
1	Honorarium to faculty/ External experts	Rs. 32,000
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Dr. Jayasudha J.S.   Sri. Rejimoan R.

Professor in Computer Science & Dean (Academic)   Asst. Professor

                                                                                        Dept. of Computer science

SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING

Pappanamcode, Thiruvananthapuram - 695018

Dept. of Electronics & Communication Engineering

Faculty Development Programme on

Research Perspectives of Machine Learning & Deep Learning for Signal Processing Applications

Sponsored by
APJ Abdul Kalam Technological University
Kerala, India

**2021
SEP
6-10** Online
Mode

A Report on
Faculty Development Programme

RESEARCH PERSPECTIVES OF
MACHINE LEARNING & DEEP LEARNING
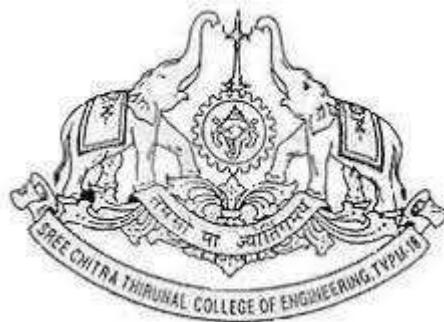# FOR SIGNAL PROCESSING APPLICATIONS
6th to 10th September, 2021

Sponsored by

APJ Abdul Kalam Technological University

Kerala

Organized by

Department of Electronics & Communication Engineering

Sree Chitra Thirunal College of Engineering

Pappanamcode, Thiruvananthapuram,

Kerala

Index

Introduction

A Faculty Development Programme (FDP) is always designed to keep pace with the changing scenario in Technical Education by providing ample opportunities to acquire knowledge about current technological developments in relevant fields and facilitate the up-gradation of new concepts, methods and tools, theory and skills development. Every academic year the APJ Abdul Kalam Technological University of Kerala (KTU) gives financial assistance to its affiliated colleges to conduct such programmes to impart training to the faculties of KTU affiliated colleges in different disciplines of Engineering & Technology. This will promote the professional practices relevant to technical education, motivates the faculty to achieve competitive teaching and learning environment and channelize developments with respect to academic qualifications and personal matters. Sree Chitra Thirunal College of Engineering (SCTCE) faculty members actively organizes and participates in various KTU sponsored FDPs in different disciplines as a part of teaching learning process. Sree Chitra Thirunal College of Engineering (SCTCE), Thiruvananthapuram was established by the Govt. of Kerala in the year 1995 in memoriam of Sree Chithira Thirunal Balarama Varma, the Great Maharaja of Travancore. It is one among the top engineering college in the state of Kerala. The institution has the broad objective of being an active agent of change by responding to the needs and challenges of the times by grooming young men and women into technocrats through the process of engineering education, training and research. Exposing the young minds to the world of technology, SCTCE instills in them plenty of confidence and fortitude to face new challenges and triumph in their chosen areas. The National Board of Accreditation has given accreditation to four branches of this college which includes the Department of Electronics & Communication Engineering. The department offers B.Tech, M.Tech and Ph. D programmes under APJ Abdul Kalam Technological University

  The department of Electronics and Communication Engineering was established during the inception of the institute, in the year 1995. The department grew into a full-fledged one with two batches in the year 2001. The annual intake for undergraduate (B.Tech) programme is currently 120 students. A postgraduate programme (M.Tech) in Signal Processing, with an annual intake of 18 students, was started in the year 2011. The department is an approved research centre under APJ Abdul Kalam Kerala Technological University (KTU) from 2016 and currently there are 6 research scholars in the department. With its state of the art facility and a highly qualified faculty, this department is the best among its counterparts in Kerala. The focus of the department is to produce graduates and post graduates with strong fundamentals in electronics and communication domain and experience in the latest happenings of the industry, so that they can meet the upcoming challenges in the field.

  During the academic year 2021-22 the department of Electronics & Communication Engineering (ECE) of SCTCE got approval for conducting the FDP on Research Perspectives of Machine Learning & Deep Learning for Signal Processing Applications which was conducted from 6th to 10th September, 2021.

About the Programme

Present "Big Data Era" demand technologies that provide high value predictions which leads to better decisions and smart actions in real time without human intervention. Machine and deep learning methodologies help to perform various data analytics in order to make sense of the data for smarter actions. This faculty development programme (FDP) is intended to provide a platform for faculty, research scholars and post graduate students, to upgrade their knowledge and acquire skills in the fundamentals of machine learning and deep learning techniques and its applications in various signal processing domains.

Initially it was planned for an offline FDP program starting from the basics of Machine Learning, progressing towards the state-of-the-art of Deep Learning with hands-on sessions and exploring the domain of signal processing applications. As the pandemic still continues to disrupt normal operations, it was decided to maintain normalcy as much as possible made us to think of the course to go online. Under this context let me give a brief overview of the course.

Recent years have seen a significant widening of scope of Signal Processing research with machine learning playing an important role in the development. Since 2006, Deep learning, a new area of machine learning research, emerged resulting in the wide range of signal and information processing work within the traditional and the new, broadening the scopes.

Various workshops have been devoted exclusively to machine learning/ deep learning techniques and its applications to classical signal processing areas. With this motivation, this FDP is designed aiming to introduce the research perspectives of machine learning techniques and deep learning techniques useful for various signal processing applications.

The following topics were covered: -

1. Perspectives of Machine Learning & Deep Learning Algorithms.
2. Overview of different ML algorithms with its mathematical foundations.
3. Introduction to Gradient Descent Algorithm and its applications in Machine Learning.
4. Preference learning in socio-sensing systems.
5. Basics of CNN, U-Net, RCNN, and Faster R-CNN for object detection.
6. Deep Learning for Medical Image Analysis/Processing.
7. Deep Learning for Natural Language Processing.
8. Machine Learning Techniques in Audio Processing.
9. Deep unfolding for signal processing.
10. Deep Learning for Computer Vision.

Course Outcomes

At the end of the program, the participants was able to

1) **Discuss** the fundamental theoretical and practical concepts in machine learning and deep learning algorithms
2) **Analyze** the mathematical foundations of machine learning and deep learning techniques
3) **Apply** Machine Learning and Deep Learning Algorithms in various domains of signal processing like Computer Vision, NLP, Image Analysis etc.
4) **Evaluate** the performance of Machine Learning and Deep Learning tools and techniques that has been applied for solving specific signal processing problems.
5) **Formulate** machine learning and deep learning models in various real-time practical applications.

Methodology

FDP sessions were conducted via google meet and the meet id for the entire FDP was shared through email. The attendance of each session was taken by circulating a google from. On the last day, (10th September) last session, an assessment test was conducted online. All materials were made available in Google classroom including the recordings of the classes. E-Certificates for the courses were mailed to all participants.

Audience

This faculty development programme (FDP) is intended to provide a platform for faculty, research scholars and post graduate students, to upgrade their knowledge and acquire skills in the fundamentals of machine learning and deep learning techniques and its applications in various signal processing domains. Hence the participants were invited from Faculty members from different engineering colleges under the APJ Abdul Kalam Technological University Kerala.and other Universitie, Research Scholars of AICTE approved institutions, Engineers and Scientists from industry with relevant background. The list of participants is attached as Annexure.

COMMITTEE MEMBERS

Chief Patron:

Shri. Antony Raju
The hon'ble minister for Transport, Kerala (Chairman, Board of Governors, SCTCE)

Patron:

Dr. Jayasudha J. S., The Principal i/c, SCTCE

Convenor:

Dr. Sheeja M. K., Professor & Head, Dept. of ECE, SCTCE

Coordinators:

Prof. Bindu V., Associate Professor, Dept. of ECE, SCTCE
Dr. Lakshmi V. S., Assistant Professor, Dept. of ECE, SCTCE

File Ref.No.KTU/JD(ACADEMICS)/2223/2019

APJ Abdul Kalam Technological University
Thiruvananthapuram

Abstract

Faculty Development Programme (FDP) for the academic Year 2020-21 - Selected - reg

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ACADEMIC SECTION

U.O.No. 1660/2020/KTU   Thiruvananthapuram, Dated: 25.11.2020

Read:-1. Notification dated 03/02/2020
          2.U.O. No. 1600/2020/KTU dated 18.11.2020

ORDER

Proposals were invited for conducting Faculty Development Programme for the academic year 2020-21 from Institutions / professional bodies as per reference 1 cited above.

Vide reference 2, a Committee was constituted for scrutinizing the proposals. Considering the recommendations of the Committee, sanction is accorded by the Hon'ble Vice-Chancellor for conducting the Faculty Development Programme as detailed below (List attached).

The Institutions can conduct FDPs before August 2021. In the present scenario of Covid-19 pandemic, the Institutions can organize FDPs in online mode or in offline mode.

The Colleges shall engage the classes by the expert faculty listed in the proposal. There will be scrutiny regarding the conduct of FDPs by the APJAKTU authorities. The respective course coordinators are required to submit the report of the program as mentioned in the guidelines, after the completion of the program. They are also directed to submit original bills of all transactions made during the program including honorarium, TA, refreshments, reading materials, etc. attested by the Head of the Institution and statement of accounts audited by a Chartered accountant.

Encl:
1. List of FDP sanctioned for the academic year 2020-21
2. Budgetary provisions and instructions for conducting offline mode
3. Budgetary provisions and instructions for conducting online mode.

Sd/-

Dr. Bijukumar R *
Dean (Academic) in Charge

Copy to:-
1. The Principals concerned
2. The Finance Officer
3. VC/PVC/Registrar/Dean(Academics)/Dean(Research)

* This is a computer system (Digital File) generated letter. Hence there is no need for a physical signature.

	ELECTRONICS		
SL.NO.	NAME OF THE HOST INSTITUTION	TITLE OF THE PROGRAMME	COORDINATORS
1	GOV.ENGINEERING COLLEGE KOZHIKODE	Pattern Analysis Applications in Machine Vision and Listening	Dr. Shajee Mohan B S, Assoc. Prof Dr. Abdurahiman V, Asst. Prof
2	NSS COLLEGE OF ENGINEERING, PALAKKAD	Recent Advancements in Wireless Communication Technologies	Dr. Sumi M, Asst. Prof Ashok S Kumar, Asst. Prof
3	SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING, TVM	Research Perspectives of Machine Learning & deep Learning fo signal Processing Applications	Bindu V, Assoc. Prof Lakshmi V S, Asst. Prof
4	LBS COLLEGE OF ENGINEERING, KASARAGOD	LoRaWAN and IoT Applications	Dr. Mary Reena K E, assoc. Prof Reni Sam Mathew, Asst. Prof
5	ADI SHANKARA INSTITUTE OF ENGINEERING AND TECHNOLOGY, KALADY	Power Electronics for Electric Vehicles- Control and Challenges	Dr. Jeno Paul, Professor Deepa Sankar, Assoc. Prof
6	VIMAL JYOTHI ENGINEERING COLLEGE, KANNUR	IoT Based Autonomous Robot Design	Shinu M M, Asst. Prof Dhanoj Mohan, Asst. Prof
7	AMALJYOTHI COLLEGE OF ENGINEERING	Biomedical Instrumentation-Research Challenges	Dr. S N KUMAR, Asst.Prof, EEE Dr GODWINRAJ, Asst.Prof,ECE
8	RAJAGIRI SCHOOL OF ENGINEERING & TECHNOLOGY, KOCHI	Artificial Intelligence and Machine Learning: Theory and Applications	Dr. Hari C V, Asst. Prof
9	AMMINI COLLEGE OF ENGINEERING, MANKARA, PALAKKAD	Computer Vision & Data Mining	Asha Arvind, Asst.Professor
10	SAHRDAYA COLLEGE OF ENGINEERING & TECHNOLOGY, THRISSUR	Deep Learning for Signal Processing-Basics to Implementation	Dr. Vishnu Rajan, Head,Dept.of ECE Binet Rose Devassy, Asst. Prof
11	AHALIA SCHOOL OF ENGINEERING & TECHNOLGY, PALAKKAD	Recent Trends in Artificial Intelligence and Machine Learning	Dr. V Balamurugan, Professor & HOD
12	INSTITUTION OF ELECTRONICS & TELECOMMUNICATION ENGINEERS, PATTOM	Chaos in Biomedical Signal Processing	N Radhakrishnan Nair, Vice Principal,SNIT Adoor
13	MAR BASELIOS CHRISTIAN COLLEGE OF ENGINEERING AND TECHNOLOGY, PEERMADE	Emerging trends and challenges in Low Power VLSI Design	Prof. Anu Mary Mathew, Dept. of ECE
14	AL AMEEN ENGINEERING COLLEGE, SHORANUR	Recent Trends in Utilization of Renewable Energy in Engineering Applications	Dr. K Geetha Varma, Principal & HOD

SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING

Pappanamcode, Thiruvananthapuram - 695018

CELEBRATING **25+** —years of— Excellence

Dept. of Electronics & Communication Engineering
Faculty Development Programme on

Research Perspectives of Machine Learning & Deep Learning for Signal Processing Applications

Sponsored by
APJ Abdul Kalam Technological University
Kerala, India

2021 SEP 6–10
Online Mode

SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING

About the Institution

Sree Chitra Thirunal College of Engineering (SCTCE), Thiruvananthapuram was established by the Govt. of Kerala in the year 1995 in memoriam of Sree Chithira Thirunal Balarama Varma, the Great Maharaja of Travancore. It is one among the top engineering college in the state of Kerala. The institution has the broad objective of being an active agent of change by responding to the needs and challenges of the times by grooming young men and women into technocrats through the process of engineering education, training and research. Exposing the young minds to the world of technology, SCTCE instills in them plenty of confidence and fortitude to face new challenges and triumph in their chosen areas. The National Board of Accreditation has given accreditation to four branches of this college which includes the Department of Electronics & Communication Engineering. The department offers B.Tech, M.Tech and Ph. D programmes under APJ Abdul Kalam Technological University.

Vision of the Institution

To become an engineering and technology institution which is renowned for producing professionally capable and socially responsible engineers.

Mission of the Institution

To create a learning process for students to acquire engineering fundamentals, in an environment that encourages analysis, team work, entrepreneurship and ethical values, thus preparing them for productive careers.

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

About the Department

The department of Electronics and Communication Engineering was established during the inception of the institute, in the year 1995. The department grew into a full fledged one with two batches in the year 2001. The annual intake for undergraduate (B.Tech) programme is currently 120 students. A postgraduate programme (M.Tech) in Signal Processing, with an annual intake of 18 students, was started in the year 2011. The department is an approved research centre under APJ Abdul Kalam Technological University Kerala (KTU) from 2016 and currently there are 6 research scholars in the department. With its state of the art facility and a highly qualified faculty, this department is the best among its counterparts in Kerala. The focus of the department is to produce graduates and post graduates with strong fundamentals in electronics and communication domain and experience in the latest happenings of the industry, so that they can meet the upcoming challenges in the field.

Vision of the Department

To be a centre of quality education and research in the field of Electronics and Communication Engineering, to mould socially responsible engineering professionals.

Mission of the Department

Provide a systematic teaching-learning process, aiming quality education, in an ambience that encourages research, industry interaction and value- based education.

http://www.sctce.ac.in/

About the Programme

Present "Big Data Era" demand technologies that provide high value predictions which leads to better decisions and smart actions in real time without human intervention. Machine and deep learning methodologies help to perform various data analytics in order to make sense of the data for smarter actions.

This faculty development programme (FDP) is intended to provide a platform for faculty, research scholars and post graduate students, to upgrade their knowledge and acquire skills in the fundamentals of machine learning and deep learning techniques and its applications in various signal processing domains.

Important Dates

Submission of Application
03/09/2021
Date of Intimation
04/09/2021
Date of Confirmation
05/09/2021
The selected candidates will be intimated through email only

Registration Details

No registration fee for the participants
Link for registration:
https://forms.gle/MLuWt-fqTvY2YAJ9o8
OR
Scan
This QR Code

Address for Correspondence

Dr. Lakshmi V. S
Assistant Professor
Department of Electronics & Communication Engineering
Sree Chitra Thirunal College of Engineering, Trivandrum.
(m): 9895193140
Email: fdpece@sctce.ac.in

Topics to be Covered

1 Perspectives of Machine Learning & Deep Learning Algorithms

2 Overview of different ML algorithms with its mathematical foundations

3 Introduction to Gradient Descent Algorithm and its applications in Machine Learning

4 Preference learning in socio-sensing systems

5 Deep learning based algorithms for Image Analysis

6 Deep Learning for Medical Image Analysis/Processing

7 Deep Learning for Natural Language Processing

8 Machine Learning Techniques in Audio Processing

9 Deep unfolding for signal processing

10 Deep Learning for Computer Vision

Organizing Committee

Chief Patron....................................
Shri. Antony Raju
The hon'ble minister for Transport, Kerala
(Chairman, Board of Governors, SCTCE)
Patron..
Dr. Jayasudha J. S
The Principal i/c, SCTCE

Convenor...
Dr. Sheeja M. K
Professor & Head, Dept. of ECE, SCTCE
Coordinators...................................
Prof. Bindu V
Associate Professor, Dept. of ECE, SCTCE
Dr. Lakshmi V. S
Assistant Professor, Dept. of ECE, SCTCE

Intended Audience

The faculty members of the AICTE/UGC approved institutions, Research Scholars, PG Scholars, participants from the Government organizations, Industry (Bureaucrats / Technicians / Participants from Industry etc.) and staff of host institutions. Number of participants for FDP are LIMITED to 60.

Faculty Development Programme Speakers

Dr. Ram Prasad K
Shiv Nadar University
Chennai

Dr. Sumitra S
IIST
Thiruvananthapuram

Dr. Birenjith P S
Government Engineering College
Barton Hill, Thiruvananthapuram

Dr. Anup Aprem
National Institute of Technology
Calicut

Dr. Sowmya V
Amrita Center for Computational Engg
and Networking (CEN)
Coimbatore Campus

Mr. Sajith Warrier
Amrita Vishwa Vidyapeetham
Coimbatore Campus

Dr. Sinith M S
Government Engineering College
Thrissur

Dr. Deepak Mishra
IIST
Thiruvananthapuram

Dr. Lakshmi Narasimhan
Indian Institute of Technology,
Palakkad

Prof. Jeena Kleenankandy
Amrita School of Engineering,
Amrita Vishwa Vidyapeetham
University, Coimbatore

Dr. Varun P. Gopi
National Institute of Technology
Tiruchirappalli

SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING

PAPPANAMCODE, THIRUVANANTHAPURAM – 695018

Department of Electronics and Communication Engineering

Faculty Development Programme

on

**"RESEARCH PERSPECTIVES OF MACHINE LEARNING
& DEEP LEARNING FOR SIGNAL PROCESSING APPLICATIONS"**

(6th – 10th September, 2021)

Sponsored by

APJ Abdul Kalam Technological University (KTU), Kerala

****

REGISTRATION FORM

Salutation	:	Dr./Mr./Ms.
Name	:	……………………………………………………………
Participant Category	:	Faculty/Scholar/Industry
Designation	:	………………………………………………………….
Department	:	………………………………………………………….
KTU-ID	:	………………………………………………………….
Institution/University/ Company Name	:	………………………………………………………….
Address for Communication	:	…………………………………………………………………… …………………………………………………………………… …………………………………………………………………… ……………………………………………………………………
E-mail	:	
Phone Number	:	
Is the Institution Approved by AICTE?	:	Yes / No

Signature of the Participant

SPONSORSHIP CERTIFICATE

This is to certify that Dr./Mr./Ms. _____ is an employee of our institution/organization/industry. He/she is sponsored & permitted to attend the programme, if SELECTED. He/she will abide by the rules and regulations of the host institute.

Signature of the Sponsoring Authority
with Date and Seal

Date:

SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING, THIRUVANANTHAPURAM- 695018

Department of Electronics & Communication Engineering

KTU Sponsored FDP on Research Perspectives of Machine Learning and Deep Learning for Signal Processing Applications

Schedule

Date/Day	9.30 A.M. - 12.30 P.M			1.30 P.M. - 4.30 P.M.	
06-09-2021 **Monday**	Inauguration	Perspectives of Machine Learning & Deep Learning Algorithms **Dr. Ram Prasad K** **(Shiv Nadar University, Chennai)**	Lunch Break	Overview of different ML Algorithms with its Mathematical Foundations **Dr. Sumitra S.** **(IIST)**	
07-09-2021 **Tuesday**	Introduction to Gradient Descent Algorithm and its Applications in Machine Learning **Dr. Birenjith P.S.** **(GEC Barton Hill)**			Preference learning in Socio-Sensing Systems **Dr. Anup Aprem** **(NIT Calicut)**	
08-09-2021 **Wednesday**	Deep Learning based Algorithms for Image Analysis **Dr. Sowmya V.** **(Amrita Vishwa Vidyapeetham, Coimbatore)**			Deep Learning for Computer Vision **Dr. Deepak Mishra** **(IIST)**	
09-06-2021 **Thursday**	Machine Learning Techniques in Audio Processing **Dr. Sinith M S.** **(GEC Thrissur)**			Deep Learning for Natural Language Processing **Dr. Jeena Kleenankandy** **(Amrita Vishwa Vidyapeetham, Coimbatore)**	
10-09-2021 **Friday**	Deep Learning for Medical Image Analysis/Processing **Dr. Varun P. Gopi** **(NIT Trichy)**			Deep Unfolding for Signal Processing **Dr. Lakshmi Narasimhan Theagarajan** **(IIT Palakkad)**	Feedback & Valedictory Session

Programme Report

Day 1

Time: 10: 00 am to 12:30 pm

Title of topic: Perspectives of Machine Learning & Deep Learning Algorithms
Resource person: Dr. Ram Prasad K, Assistant Professor, Department of Computer Science and Engineering, Shiv Nadar University Chennai. (Founder & Director, VisionCog Research & Development Pvt. Ltd.)
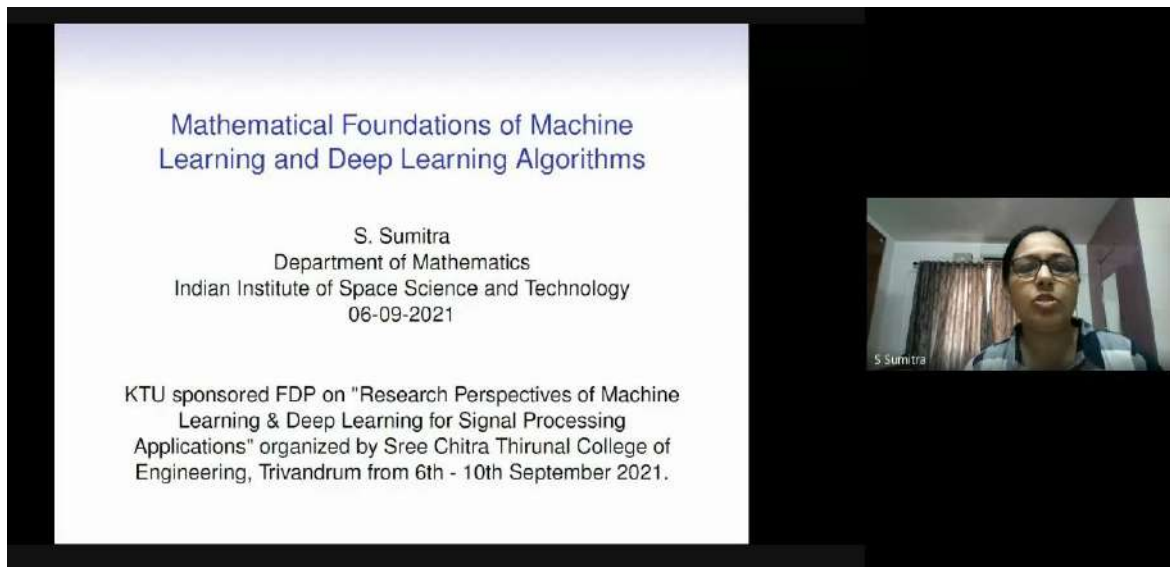

The speaker started the session by introducing artificial intelligence and the need for automation of basic tasks. He also elaborated the difference between artificial intelligence, machine learning and deep learning. The speaker introduced several real world applications of machine learning (ML) such as self-driving cars, amazon recommendation, sentiment analysis, map predictions, object localization. He then explained in detail the ML techniques such as regression, classification, clustering and dimensionality reduction with the help of suitable use cases. Furthermore, the speaker discussed about the working of deep learning (DL) as well as Bayesian deep learning starting from the fundamentals of neural networks and its possible adversarial attacks. He also stressed the need for generalization in deep learning approaches/ networks for practical adaptation. The speaker concluded the session by giving an insight into recent research areas in this domain such as self-supervised learning and geometric deep learning; and the groups/ companies which are working in this area. The audience cleared their queries by the end of the session.

Time: 01: 30 pm to 04:30 pm

Title of topic: Overview of different ML Algorithms with its Mathematical Foundations
Resource person: Dr. Sumitra S. , IIST

The speaker started the session by explaining the fundamentals of machine learning (ML) and the requirements of different ML algorithms for specific applications. She explained the significance of training/ learning the ML algorithm with the characteristic properties of each use case. She elaborated the mathematical concepts behind the three learning methods such as supervised learning, unsupervised learning and reinforcement learning, which are used to make the algorithm intelligent based on the data. The speaker explained that the output data are discrete for classification problem, while they are continuous for regression problems. Different types of classification problems such as binary and multi class were also introduced with the help of simple examples such as modeling/learning for detection of heart disease. The mathematical concepts such as vector space, matrices, range, hyperplane etc required for finding a function that satisfies the given data points were clearly laid in this session. The speaker explained that the regression problem can be represented as a matrix equation and solution may vary depending on the size of matrices. She concluded the session by pointing out the need for minimizing the cost function in order to reduce the error and how to find the optimized value with respect to least square cost optimization problem.
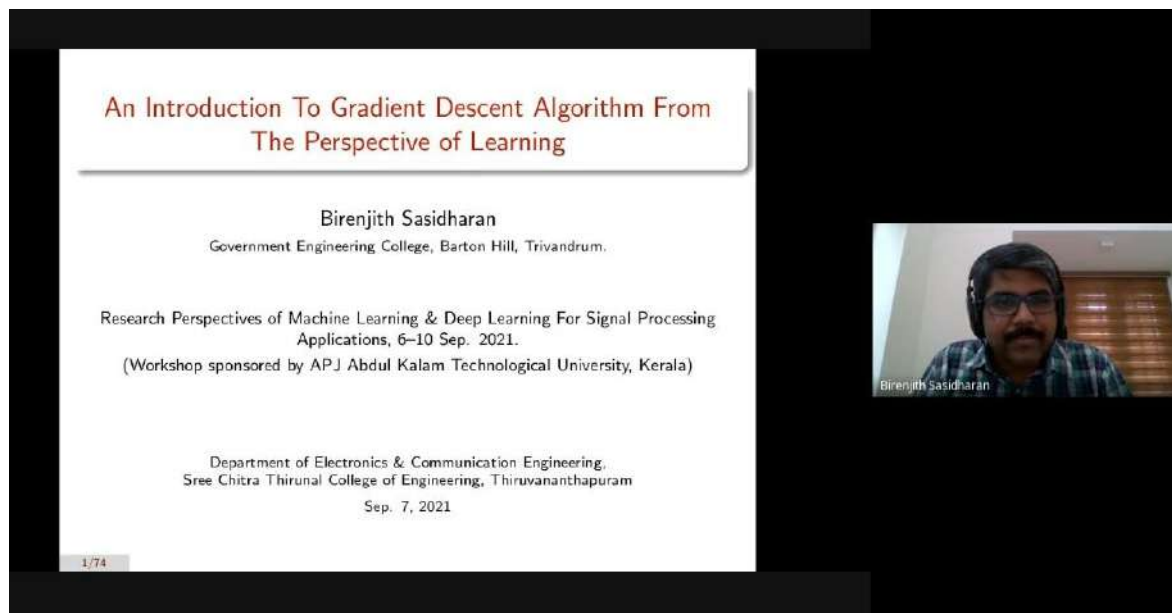
Day 2

Time: 9.30 pm to 12.30 p.m

Title of topic: Introduction to Gradient Descent Algorithm and its Applications in Machine Learning

Resource Person: Dr. Birenjith P.S
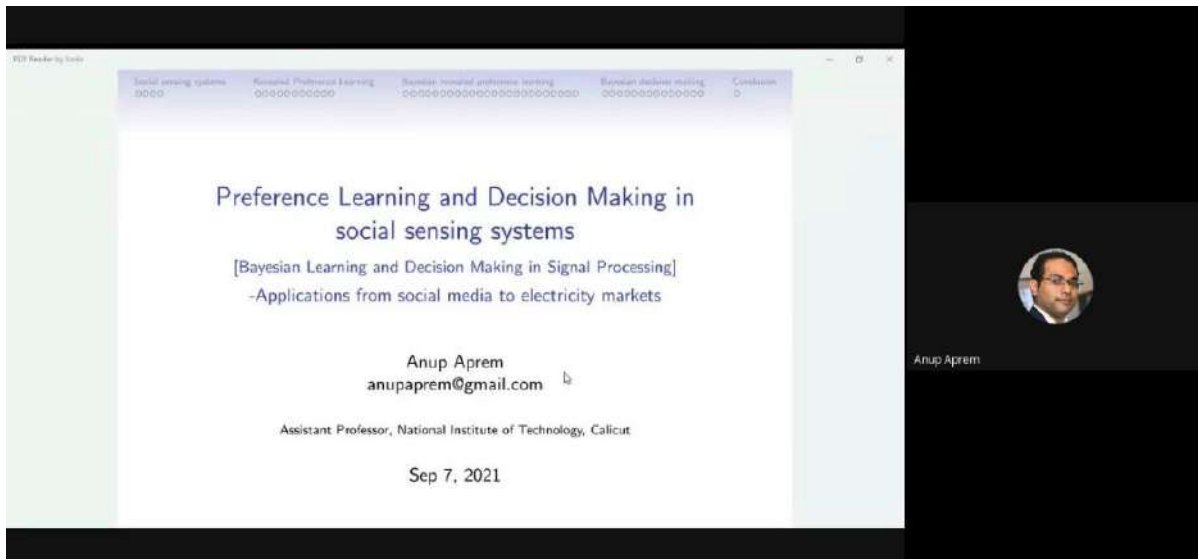
The speaker started the session with the binary classification problem and explained that a linear classifier can be defined using a linear discriminant function, including weight vector, data/ feature vector and bias vector. Through sufficient mathematical proofs, he justified that learning the classifier is equivalent to minimizing the loss function with respect to weight vector, by absorbing bias into weight vector. The speaker pointed out that this method has two computational issues namely, non-invertibility of matrix and finding inverse of large matrices is algorithmically expensive. He also explained that these issues can be resolved through convex optimization, which assumes the function to be convex so that it always guarantees unique global minimum. He then detailed the mathematical fundamentals behind concept of gradient, directional derivative, rate of change along gradient, relationship between gradient, tangent and local minimum for convex functions along with mathematical proofs. The speaker then introduced the gradient descent algorithm (GDL) used to find the minimum for convex optimization problem. The theorem and proof related to convergence rate of gradient descent, tangent-distance lemma, strong- tangent lemma and descent lemma were also explained. The speaker concluded the session by introducing two hot research problems related to federated learning such as quantized model updates and coded gradient aggregation.

Time: 1: 30 am to 4:30 am

Title of topic: Preference learning in Socio-Sensing Systems

Resource Person: Dr. Anup Aprem

The speaker started the session with an overview of social sensing systems and its design challenges. He then introduced the classical framework of preference learning which includes how exactly the human sensors produce data and how it can be utilized for learning data. The speaker explained that the utility function which captures the preference based on human rational behaviour, will be a monotone, continuous and concave function. He detailed the Afriat's theorem which is widely used in this data centric leaning method and it is non-parametric in nature. The linear perturbation model used for dynamic utility maximization was also elaborated with the help of examples. The speaker then explained Bayesian preference learning by taking multi-agent problem as a motivating example. He also gave a detailed explanation of Gaussian process and its use for Bayesian optimization and algorithm. Then Bayesian decision making with human sensors was discussed with respect to the system model for interactive advertising in personalized live social media; using Markov decision process (MDP) and partially observable Markov decision process (POMDP).
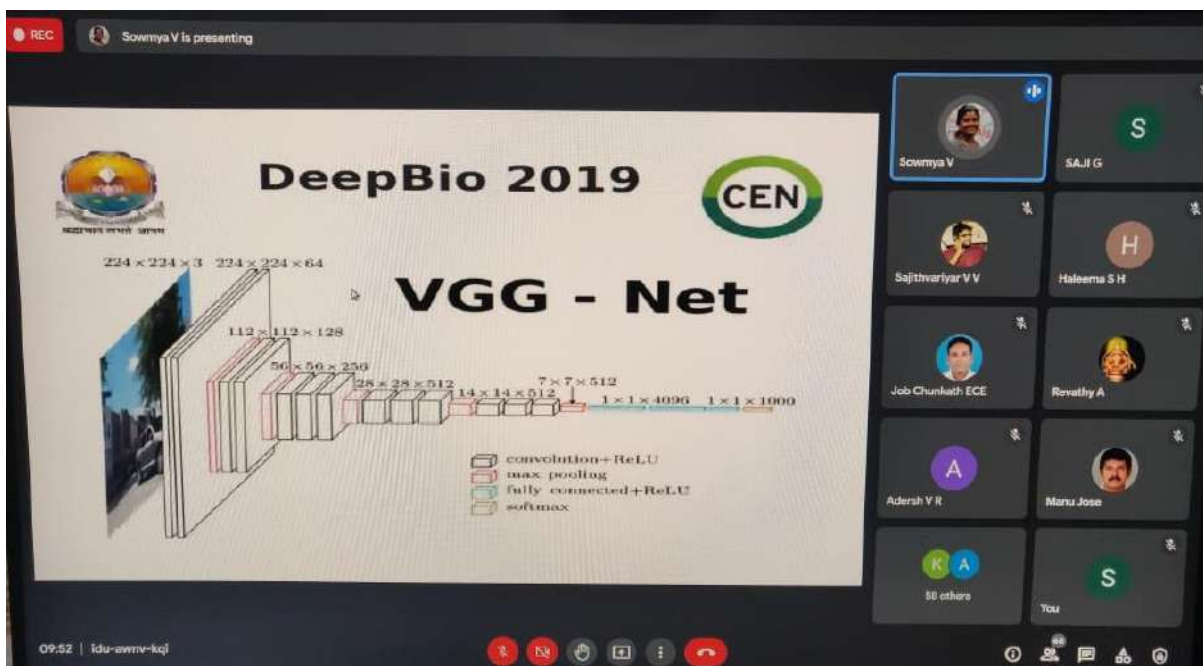
Day 3

Time: 9: 30 am to 12:30 pm

Title of topic: Deep Learning based Algorithms for Image Analysis

Resource Person: Dr. Sowmya V.

The speaker introduced CNN, VGG architecture, followed by detailed explanation of U-Net, which is the CNN used for biomedical image segmentation. She then started with binary classification examples such as pixel level semantic segmentation, electron microscopic image segmentation and modifications done in CNN and DNN architectures to attain the required localization accuracy based on the constraints. The speaker also detailed about the mathematical computations done in each layer, number of filters and its size calculation etc. She also gave an insight into contracting path, expansive path and upsampling with transposed convolution with simple numerical examples. The modified U-Net architecture with less number of learnable parameters proposed for Nuclei segmentation was also explained in detailed with simulation results. This is followed by a hands on session on implementation of deep learning of medical image analysis. The speaker introduced the sample GPU/CPU configurations, Python virtual environment and system requirements. The familiarization of neural network front end and backend, and implementation of brain tumor segmentation was also demonstrated.

Time: 1:30 pm to 4:30 pm

Title of topic: Deep Learning for Computer Vision
Resource Person: Dr. Deepak Mishra
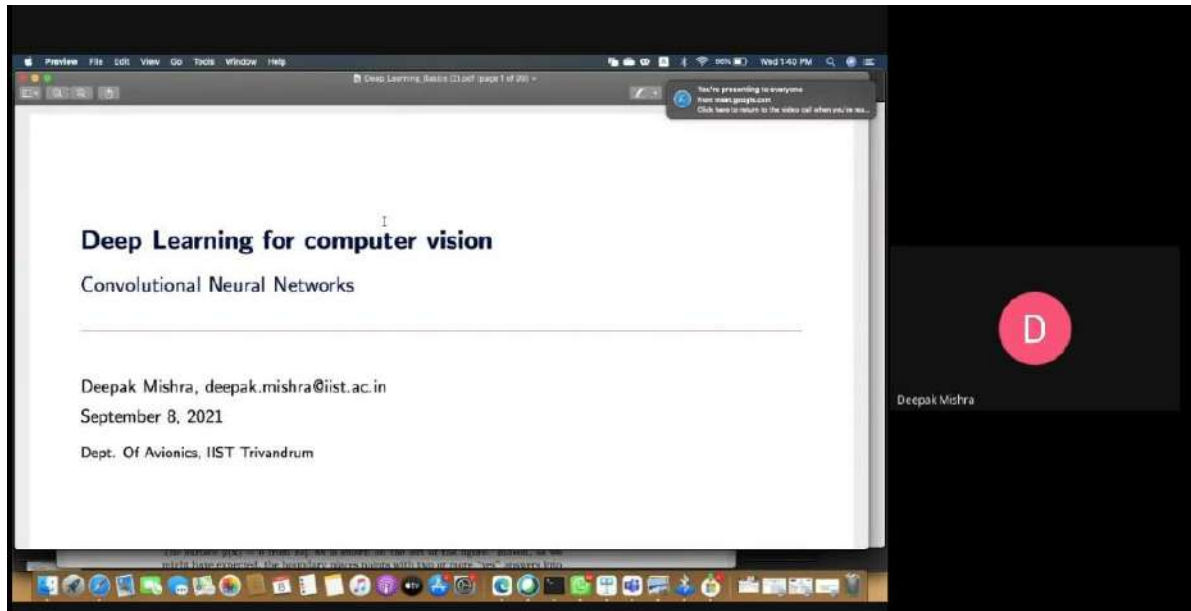
The speaker started with the history of deep learning and its types such as supervised, un-supervised, self-supervised and reinforcement learning. In the supervised learning, the linear classifiers, logistic regression and softmax classifiers were detailed. The mathematical modeling of neuron in neural networks was explained from the concept of neuron, which is the brain computational unit. The idea of multiple layers is actually coming from the non-linear activation functions and he explained some of these functions such as sigmoid, tanh, ReLu. He then gave a detailed explanation about neural networks, forward propagation, and training of DNN which includes objective functions, backward propagation and how an objective function can be selected for a particular application. The speaker then extended the concept of neural network to convolutional neural network, its architecture and layers, and its applications in computer vision. He concluded the session by giving the case study of VGG, a deep neural network developed for image recognition, visualizing what CNN learns and transfer learning.
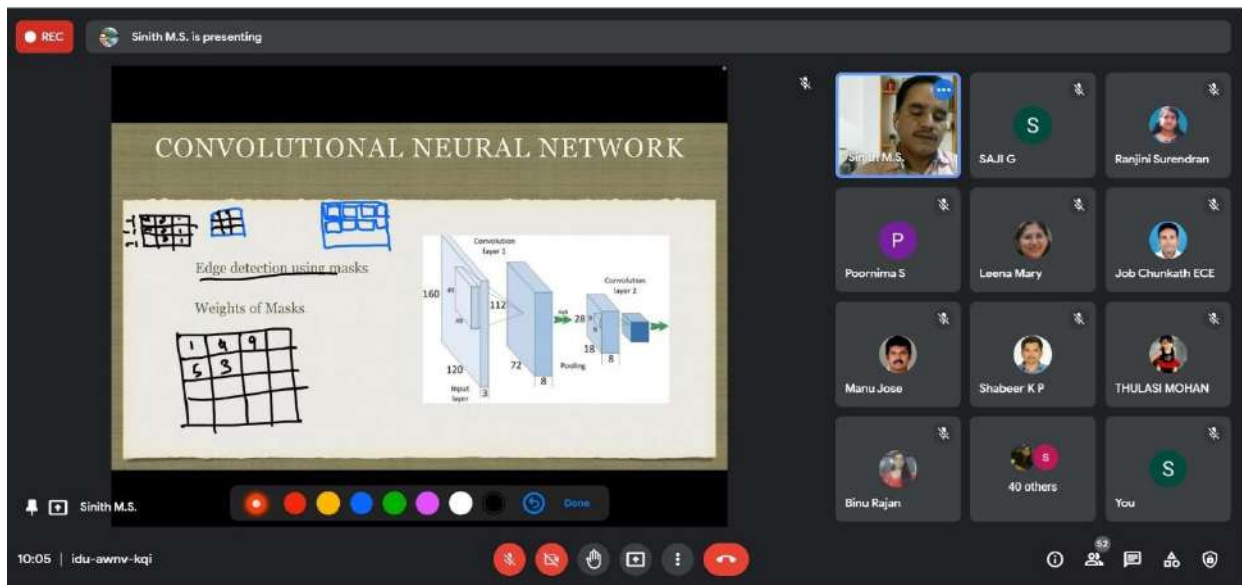
Day 4

Time: 09: 30 am to 12:30 am

Title of topic: Machine Learning Techniques in Audio Processing

Resource Person: Dr. Sinith M S.

The speaker started the session with perceptron, stimulus and response, and explanation of logistic regression. He then explained audio analysis and convolutional neural network used for this task with the help of examples such as Spectrogram analysis. The recurrent neural network and gated recurrent unit for audio analysis were also explained, followed by the discussion on differences between GRU and LSTM network used for this application. The speaker also demonstrated the tensor implementation of audio analysis using GAN generated audio. He then moved on with the overview of machine learning specifically for musical signals, starting from the Fourier analysis of signals produced by various musical instruments such as violin, flute etc. After detailing the different terms associated with music signals and raga, he has justified the relationship between Fibonacci series and Indian classical music. The speaker concluded the session by giving an insight into the mathematical model for raga recognition and the use of wavelets and adaptive filters in this application. The audience cleared their queries by the end of the session.

Time: 1:30 am to 4:30 pm

Title of topic: Deep Learning for Natural Language Processing

Resource Person: Dr. Jeena Kleenankandy,

The speaker introduced the idea of natural language processing and its applications, followed by the role of machine learning in NLP, its challenges and evolution. She then talked about the neural NLP systems which consists of neurons and perceptrons; and the difference between traditional ML and deep learning in NLP applications, with respect to the basic model. The speaker also presented the word representation problem with the help of simple examples, and then introduced neural word embeddings and working of skip gram. She then extended the concept into sentential and phrase representation. She introduced the traditional deep learning network, recurrent NN and its types, followed by the detailed explanation of long term short memory (LSTM) networks. The speaker concluded the session by introducing the transformers, which is the state of the art in NLP, classic NLP problems, DL-NLP research directions etc and also shared several useful links and resources.

Day 5

Session-1

Time: 9:30 pm to 12:30 pm

Title of topic: Deep Learning for Medical Image Analysis/Processing

Resource Person: Dr. Varun P. Gopi,

The speaker in the initial portion of his presentation gave an idea of taxonomy of artificial intelligence, applications and general model of machine learning. He then explained ANN structure, different types of learning, activation function, forward and backward propagation, cost function, hyper parameters, overfitting etc. The speaker explained the importance, challenges and types of deep learning networks, followed by the detailed explanation of convolutional network architecture and difference between traditional ML and transfer learning. The object detectors used in deep learning such as RCNN, fast RCNN, single shot detector and YOLO were also covered. The speaker finally gave a detailed overview of medical image applications such as Colonal polyp detection, CNN based optic disc segmentation, CNN based age related macular degeneration classification using OCT images, RNN based 3D image segmentation, general adversarial networks (GAN), Cycle GAN for image authentication, Liver lesion classification using GAN.

Time: 1: 30 am to 3:30 am

Title of topic: Deep Unfolding for Signal Processing

Resource Person: Dr. Lakshmi Narasimhan Theagarajan, IIT Palakkad

The speaker started the session by introducing the architecture of deep neural networks along the equation connecting each layer. He detailed the importance of activation function and the different types of functions such as logistic, tanh(x), ReLU and softmax. The importance of training lies in the fact that given an input, how close do we want to be with respect to output. Therefore, the training accuracy depends on minimizing the cost function which is relating the input and target output based on weights. He also explained in detail the Gradient descent and stochastic Gradient descent algorithm used for solving the optimization problem, and also the forward pass and backward propagation methods used for finding the gradients. He also introduced universal approximation theorem which essentially tells us that any function can be deep neural networks. The speaker then explained the sparse coding problem which has applications in image restoration, denoising, compressed sensing and sparse regression, super resolution etc. He concluded the session by introducing iterative shrinkage and thresholding algorithm, alternating direct method of multipliers and robust PCA.

Valedictory Function
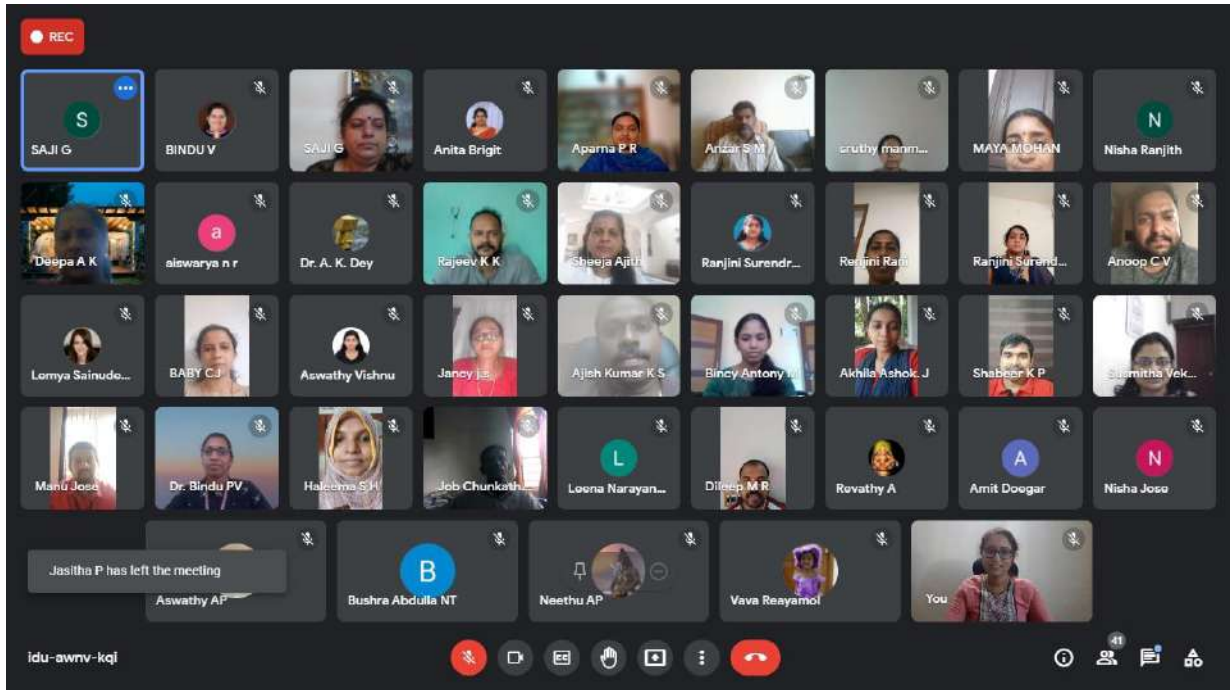
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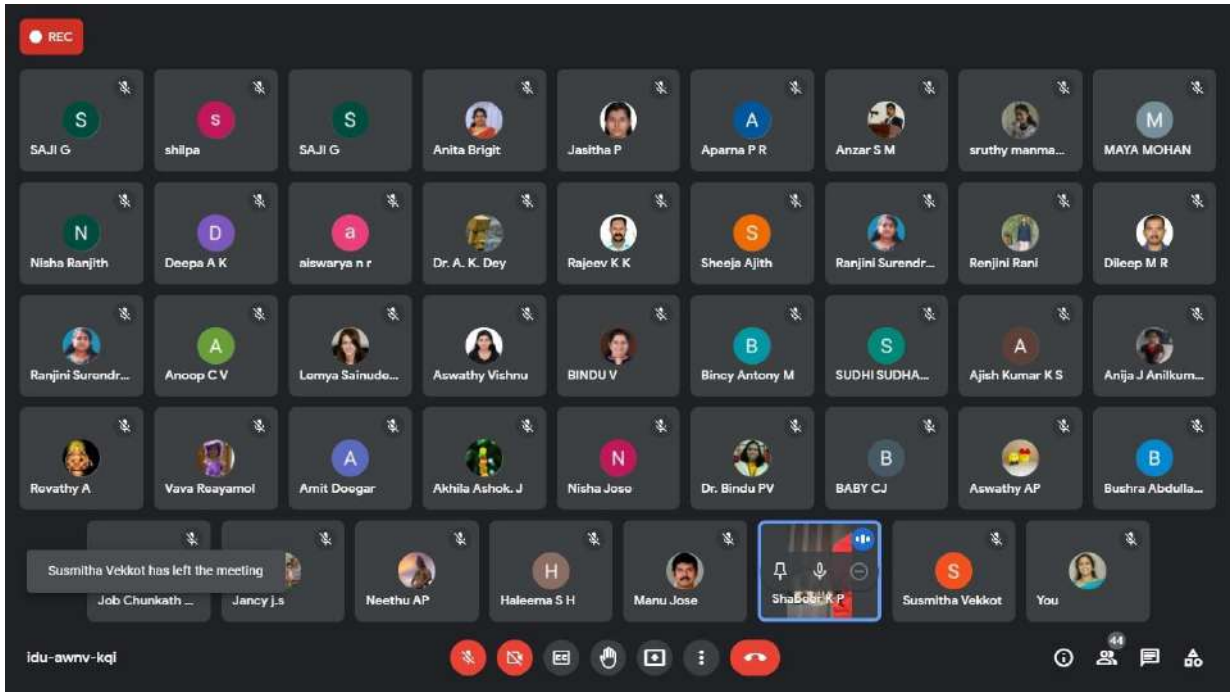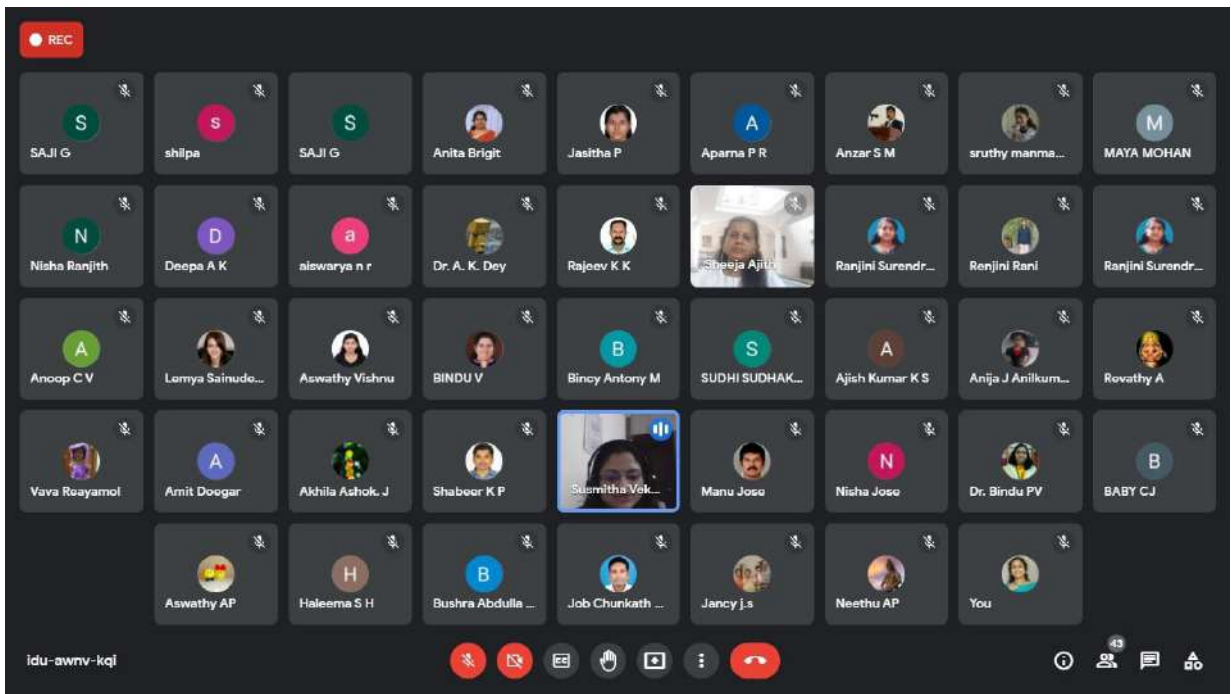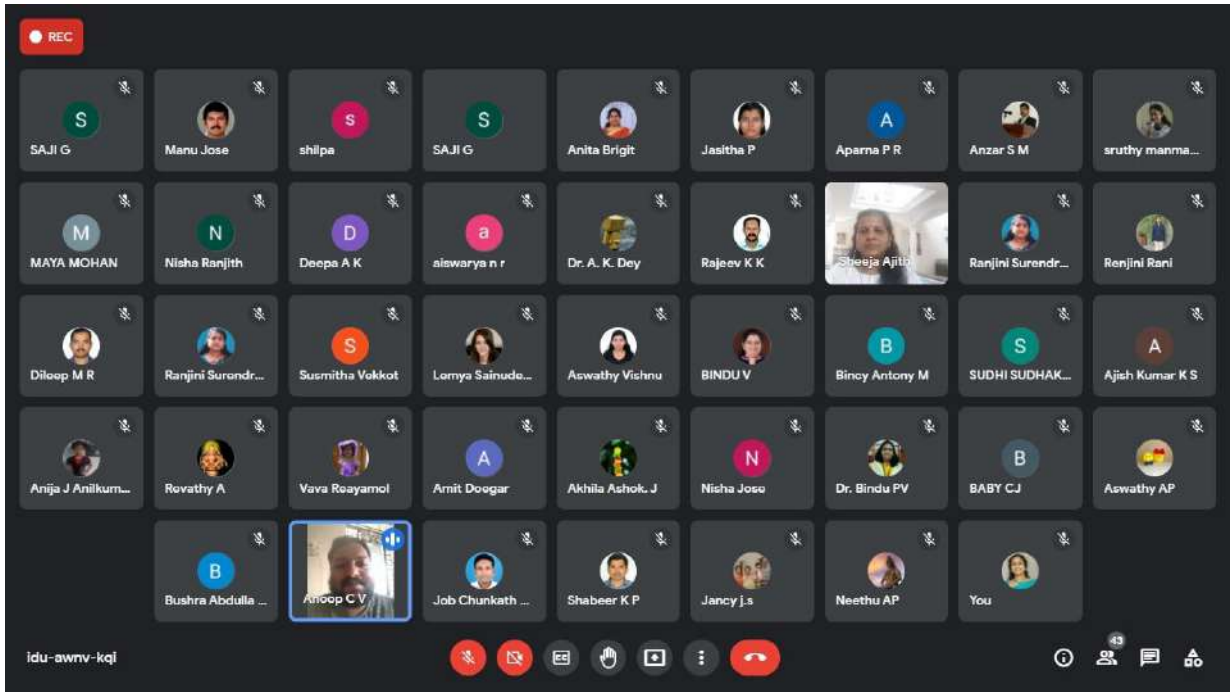
Dr Deepak Mishra

Professor & Head

Department of Avionics

Indian Institute of Space Science and Technology Trivandrum, India.

Education

- Postdoctoral Fellow, (2007-2009) Health Science Center, University of Louisville Louisville, Kentucky, USA.
- Ph.D. in Electrical Engineering, (2003-2007). Indian Institute of Technology Kanpur, India.
- M.Tech. in Instrumentation, (2001-2003). Devi Ahilya University, Indore (M.P.), India.
- B. E., Electrical Engineering, (1997-2000). Bhilai Institute of Technology, Durg (C.G.), India.

Experience

- January 2021-Till date, Professor and Head, Dept. of Avionics, Indian Institute of Space Science and Technology Trivandrum, India.
- December 2019- January 2021, Associate Professor and Head, Dept. of Avionics, Indian Institute of Space Science and Technology Trivandrum, India.
- January 2015- December 2019, Associate Professor at Dept. of Avionics, Indian Institute of Space Science and Technology Trivandrum, India.
- August 2010 – December 2014: Assistant Professor at Dept. of Avionics, Indian Institute of Space Science and Technology Trivandrum, India.
- March 2009 – August 2010: Sr IT Engineer at CMC Limited, Hyderabad, India
- Jan 2007 – Jan 2009- Postdoctoral Fellow at University of Louisville, KY, USA
- July 2004-Dec 2007, Teaching Assistant at Indian Institute of Technology Kanpur, India

Research Work / Area

Computer vision, Image processing, Deep/Machine learning, Signal processing, Information Security and Biometrics, Mathematical Modeling (related to Computational Neuroscience).

Awards

- SSI Young Scientist Award – 2012 from System Society India, New Delhi, India

Funded Project

- IIST-ISRO Project
    - Development and Analysis of Image Fusion Techniques for Satellite Images (Co-Investigator: Dr. Sarvesh Kumar, IIST)
    - Object-based high resolution (optical) image analysis for landslide and land use land cover classification (Co-Investigator Dr. Tapas R Martha, NRSC Hyderabad, Dr. Ramarao, IIST)
    - Development of Virtual Reality Model for Disaster Simulation (Shri. Sashidar Reddy, NRSC Hyderabad)

Journals

- Guided MDNet tracker with guided samples, The Visual Computer, 2021
- HeartNetEC: a deep representation learning approach for ECG beat classification
- ,
- Biomedical Engineering Letters, 2021
- Harnessing feedback region proposals for multi-object tracking, IET Computer Vision, 2020
- Dictionary learning technique and penalized maximum likelihood for extending measurement range of a Rayleigh lidar, Journal of Applied Remote Sensing, 2020
- Variable Search Space Converging Genetic Algorithm for Solving System of Non-linear Equations, Journal of Intelligent Systems, 2020
- Retraining a Pruned Network: A Unified Theory of Time Complexity, Springer Nature Computer Science, 2020
- Feasibility of Using AM3358 Beagle Board for Networked Realtime Signal Acquisition, Internet of Things, 2020
- Litu Rout, Rajesh Sadanandan, Deepak Mishra, "**Application of image enhancement and a mixture of Gaussian approach in combustion research**", Journal of Sādhanā, May 01, 2019, Vol 44, pp. 114, 2019.
- Priya Mariam Raju, Deepak Mishra, Rama Krishna Sai S Gorthi, "**Detection based long term tracking in correlation filter trackers**", Journal of Pattern Recognition Letters, May 01, 2019, Vol 122, pp. 79-85, 2019.
- Pinaki Ranjan Sarkar, Deepak Mishra, Gorthi RK Sai Subhramanyam, "**Automatic attendance system using deep learning framework**", Machine Intelligence and signal analysis, pp. 335-346, 2019.
- Satish Nirala, Deepak Mishra, K Martin Sagayam, D Narain Ponraj, X Ajay Vasanth, Lawrence Henesey, Chiung Ching Ho, "**6 Image fusion in remote sensing based on sparse sampling method and PCNN techniques**", Journal of Machine Learning for Big Data Analysis, Dec 17, 2018, Vol 1, pp. 149, 2018.
- Akshay Pandit Vetal, Darshika Singh, Rakesh Kumar Singh, Deepak Mishra, "**Reconstruction of apertured Fourier Transform Hologram using compressed sensing**", Journal of Optics and Lasers in Engineering, Dec 01, 2018, Vol 111, pp. 227-235, 2018.

- Rohit Gandikota, Deepak Mishra, "**How You See Me**", Journal of arXiv preprint arXiv:1811.08152, Nov 20, 2018.
- D Mishra, Ahmad Taher Azar, Amit Joshi, "**Information and Communication Technology**", Journal of Advances in Intelligent Systems and Computing, Vol 625, 2018.
- Deepak Mishra Haribabu K, Ayushi Jain, Swetha, Sai Gorthi, "Incorporating rotational invariance in convolutional neural network architecture", Journal of Pattern Analysis and Applications, pp. 1-14, 2018.
- Rachit Saluja, GRKS Subrahmanyam, Deepak Mishra, RV Vinu, Rakesh Kumar Singh, "**Compressive correlation holography**", Journal of Applied Optics, Aug 20, 2017, Vol 56, pp. 6949-6955, 2017.
- Madan Kumar Rapuru, Sumithra Kakanuru, Pallavi M Venugopal, Deepak Mishra, Gorthi RK Sai Subrahmanyam, "**Correlation-based tracker-level fusion for robust visual tracking**", Journal of IEEE Transactions on Image Processing, Apr 28, 2017, Vol 26, pp. 4832-4842, 2017.
- Haribabu Kandi, Deepak Mishra, Subrahmanyam RK Sai Gorthi, "**Exploring the learning capabilities of convolutional neural networks for robust image watermarking**", Journal of Computers & Security, Mar 01, 2017, Vol 65, pp. 247-268, 2017.
- G Gopakumar, K Hari Babu, Deepak Mishra, Sai Siva Gorthi, Gorthi RK Sai Subrahmanyam, "**Cytopathological image analysis using deep-learning networks in microfluidic microscopy**", Journal of JOSA A, Jan 01, 2017, Vol 34, pp. 111-121, 2017.
- Vinitha Ramdas, Sai Subrahmanyam RK Gorthi, Deepak Mishra, "**Simultaneous speech coding and de-noising in a dictionary-based quantized CS framework**", International Journal of Speech Technology, Sep 01, 2016, Vol 19, pp. 509-523, 2016.
- Pothuri Ram Sukumar Rahul Waghmare, Sai Subrahmanyam Gorthi, Deepak Mishra, Rakesh Singh, "Particle Filter based Phase Estimation in Digital Holographic Interferometry", Journal of the Optical Society of America A, Jan 13, 2016.
- Deepak Mishra, Rahul G. Waghmare, R.K. Sai Subrahmanyam Gorthi, "**Wrapped statistics-based phase retrieval from interference fringes**", Journal of Modern Optics, 2016.
- Sai Subrahmanyam Gorthi Ankush Chatterjee, Deepak Mishra, "**Enhancing Face Recognition Under Unconstrained Background Clutter Using Color Based Segmentation**", Advances in Signal Processing and Intelligent Recognition Systems, Vol 425, pp. 51-62, 2016.
- L Vidya, V Vivekanand, U Shyamkumar, Deepak Mishra, "**RBF-network based sparse signal recovery algorithm for compressed sensing reconstruction**", Advances in Signal Processing and Intelligent Recognition Systems, Mar 01, 2015, Vol 63, pp. 66-78, 2015.

- Anita Thakur, Deepak Mishra, "**Fuzzy Contrast Mapping for Image Enhancement**", 2015.

- D Mishra, A Seth, "**Comparative Study of Geometric and Image-Based Modelling and Rendering Techniques**", Journal of arXiv preprint, 2014.

- Deepak Mishra, Nishank Kumar, "Stereo Vision System for Real-Time Applications", International Journal of Information Processing, Vol 8, pp. 12-22, 2014.

- Deepak Mishra, Abhishek Yadav, Prem K Kalra, "**A novel multiplicative neural network architecture motivated by spiking neuron model**", Journal of the Indian Institute of Science, Vol 86, pp. 465, 2013.

- D Ranjan, D Mishra, SH Hasan, "**Bioadsorption of arsenic: an artificial neural networks and response surface methodological approach**", 2011.

- Deepak Mishra, Prem K Kalra, "AN ENERGY FUNCTION APPROACH FOR FINDING ROOTS OF CHARACTERISTIC EQUATION", Journal of Industrial & Engineering Chemistry Research, Vol 50, pp. 9852-9863, 2011.

- NM Mellen and Deepak Mishra, "Endogenous Burster Distribution in Rat Ventrolateral Medulla Overlap Respiratory Rhythmogenic Networks", Journal of Neuroscience, June 23, 2010, 30(25):8383-8392.

- Sudipta Ray, Prem Kumar Kalra, Deepak Mishra, Abhishek Yadav, "**Non-linear Dynamical Analysis of Point Neuron Models and Signal Propagation along Axon**", Vol 8, 2008.

- Prem Kumar Kalra, Rajiv Shekhar, and Deepak Mishra, "Application of Neural Network in the Stock Market Indian Journal of Capital Market", Vol. 1, Issue 1, pp. 6-13, April-June 2007.

- Deepak Mishra, Abhishek Yadav, Sudipta Ray, Prem Kumar Kalra, "**Artificial Neural Network Type Learning with Single Multiplicative Spiking Neuron**", Int. J. Comput. Syst. Signal, Vol. 8, pp. 29-41, 2007.

- Abhishek Yadav, Deepak Mishra, R. N. Yadav, Sudipta Ray, Prem Kumar Kalra, "Time-series prediction with single integrate-and-fire neuron". Appl. Soft Comput., Vol. 7, No. 3, pp. 739-745, 2007.

- Mishra, D., Yadav, A., Ray, S., and P.K. Kalra, "A Learning Algorithm for a Novel Neural Network Architecture Motivated by Integrate-And-Fire Neuron Model", Neural Network World, pp. 513-532, 2006.

- Mishra, D., Yadav, A., Ray, S., and P.K. Kalra, "A Novel Multiplicative Neural Network Architecture Motivated by Spiking Neuron Model", Journal of Indian Institute of Science Bangalore, 86, pp. 465–479, 2006.

- Mishra, D., A.K. Shukla, and P.K. Kalra, "OR-Neuron Based Hopfield Neural Network for Solving Economic Load Dispatch Problem", Neural Information Processing – Letters and Reviews, pp. 249-259, 2006.

- Mishra, D., and P.K. Kalra, "Modified Hopfield Neural Network Approach for Solving Nonlinear Algebraic Equations", Engineering Letters on Soft Computing in Artificial Intelligence, Data and Web Mining, Machine Learning, 2006.

- Mishra, D., Yadav, A., Ray, S., and P.K. Kalra, "Controlling Synchronization of Modified FitzHugh-Nagumo Neurons under External Electrical Stimulation", NeuroQuantology, Vol 4, No 1, pp. 50-67, 2006.
- Mishra, D., Ucar, A., "Pspice Realization of the Ucar Prototype Delay Model", International Journal of Nonlinear Sciences and Numerical Simulation, Vol. 7; No. 2, pp. 209-214, 2006.
- Mishra, D., A. Yadav, S. Ray, and P.K. Kalra, "Levenberg-Marquardt Learning Algorithm for Integrate-and-Fire Neuron Model", Neural Information Processing – Letters and Reviews, Vol. 9, No.2, 2005, pp. 41-51.
- Deepak Mishra, Abhishek Yadav, Sudipta Ray, Prem K Kalra, "**Effects of noise on the dynamics of biological neuron models**", Soft Computing as Transdisciplinary Science and Technology, 2005, pp. 61-69.

Magazine Articles

- Dwivedi, A., Mishra, D., and Kalra, P.K., "Handling Uncertainties – using Probability Theory to Possibility Theory", Directions, The Magazine of IIT Kanpur, Vol. 7, No. 3, pp. 1 – 12, 2006.
- Mishra, D, Yadav, A, Ray, S. and Kalra, P.K., "Exploring Biological Neuron Models", ", Directions, The Magazine of IIT Kanpur, Vol. 7, No. 3, pp. 13 – 22, 2006.

International Conference

- Rama Rao Nidamanuri, Deepak Mishra, Kumari Pooja: "MULTI-SCALE DILATED RESIDUAL CONVOLUTIONAL NEURAL NETWORK FOR HYPERSPECTRAL IMAGE CLASSIFICATION", IEEE WHISPERS, 2019.
- Mohammed MN Sahal, Deepak Mishra, Namya Gupta, Rajesh Sadanandan: "**Application of Digital Image Processing Method for Spray Characterization**", 2019 6th International Conference on Signal Processing and Integrated Networks (SPIN), 2019, pp. 91-96.
- Minha Mubarak, Thomas James Thomas, Sheeba Rani J, Deepak Mishra: "Higher order Dictionary Learning for Compressed Sensing based Dynamic MRI reconstruction", BMVC 2019.
- Pratik Ratadiya and Deepak Mishra: "An attention ensemble based approach for multilabel profanity detection", IEEE ICDM workshop, 2019.
- Arnab Karmakar, Deepak Mishra, Anandmayee Tej: "**Stellar Cluster Detection using GMM with Deep Variational Autoencoder**", 2018 IEEE Recent Advances in Intelligent Computational Systems (RAICS), 2018, pp. 122-126.
- Deepak Mishra: "**The sixth visual object tracking vot2018 challenge results**", Proceedings of the European Conference on Computer Vision (ECCV), 2018.
- Litu Rout, Priya Mariam Raju, Deepak Mishra, Rama Krishna Sai Subrahmanyam Gorthi: "**Learning Rotation Adaptive Correlation Filters in Robust Visual Object Tracking**", Asian Conference on Computer Vision, 2018, pp. 646-661.

- P Aswathy, Deepak Mishra: "**Deep GoogLeNet Features for Visual Object Tracking**", 2018 IEEE 13th International Conference on Industrial and Information Systems (ICIIS), 2018, pp. 60-66.
- Deepan Das, Deepak Mishra: "**Unsupervised Anomalous Trajectory Detection for Crowded Scenes**", 2018 IEEE 13th International Conference on Industrial and Information Systems (ICIIS), 2018, pp. 27-31.
- Litu Rout, Deepak Mishra, Rama Krishna Sai Subrahmanyam Gorthi: "**Rotation adaptive visual object tracking with motion consistency**", 2018 IEEE Winter Conference on Applications of Computer Vision (WACV), 2018, pp. 1047-1055.
- Litu Rout, Deepak Mishra, Rama Krishna Sai Subrahmanyam Gorthi: "**WAEF: Weighted Aggregation with Enhancement Filter for Visual Object Tracking**", Proceedings of the European Conference on Computer Vision (ECCV), 2018.
- Pinaki Ranjan Sarkar, Deepak Mishra, Gorthi RK Sai Subrahmanyam: "**Classification of Breast Masses Using Convolutional Neural Network as Feature Extractor and Classifier**", Proceedings of 2nd International Conference on Computer Vision & Image Processing, 2018, pp. 25-36.
- Pilli Madalasa, Gorthi RK Sai Subrahmanyam, Tapas Ranjan Martha, Rama Rao Nidamanuri, Deepak Mishra: "**Bayesian Approach for Landslide Identification from High-Resolution Satellite Images**", Proceedings of 2nd International Conference on Computer Vision & Image Processing, 2018, pp. 13-24.
- Ayushi Jain, Gorthi RK Sai Subrahmanyam, Deepak Mishra: "**Rotation Invariant Digit Recognition Using Convolutional Neural Network**", Proceedings of 2nd International Conference on Computer Vision & Image Processing, 2018, pp. 91-102.
- PL Aparna, Rahul G Waghmare, Deepak Mishra, RK Sai Subrahmanyam Gorthi: "**Effective Denoising with Non-local Means Filter for Reliable Unwrapping of Digital Holographic Interferometric Fringes**", Proceedings of 2nd International Conference on Computer Vision & Image Processing, 2018, pp. 13-24.
- Pinaki Ranjan Sarkar, Deepak Mishra, Gorthi RKSS Manyam: "**Improving Isolated Bangla Compound Character Recognition Through Feature-map Alignment**", 2017 Ninth International Conference on Advances in Pattern Recognition (ICAPR), 2017, pp. 1-5.
- Ayushi Jain, Gorthi RK Sai Subrahmanyam, Deepak Mishra: "**Stacked Features Based CNN for Rotation Invariant Digit Classification**", International Conference on Pattern Recognition and Machine Intelligence, 2017, pp. 527-533.
- Anita Thakur, Deepak Mishra: "**Hyper spectral image classification using multilayer perceptron neural network & functional link ANN**", **2017 7th International Conference on Cloud Computing, Data Science & Engineering-Confluence**, 2017, pp. 639-642.
- Kumar Rohit, RK Sai Subrahmanyam Gorthi, Deepak Mishra: "**Applicability of Self-Organizing Maps in Content-Based Image Classification**", Proceedings of

International Conference on Computer Vision and Image Processing, 2017, pp. 309-321.

- Rahul G Waghmare, Deepak Mishra, GRK Sai Subrahmanyam: "**Signal Tracking Approach based Phase Estimation for Analysis of Thermal Expansion by Digital Holographic Interferometry**", 3D Image Acquisition and Display: Technology, Perception and Applications, 2016, pp. JW4A. 15.

- Abhishek Kumar, S. Nithin Shrivatsav, G. R. K. S. Subrahmanyam, Deepak Mishra: "**Application of transfer learning in RGB-D object recognition**", 2016 International Conference on Advances in Computing, Communications and Informatics (ICACCI), 2016, pp. http://ieeexplore.ieee.org/document/7732.

- G. R K S. Subrahmanyam M. k. Rapuru, S. Kakanuru, Deepak Mishra: "ECCV The Visual Object Tracking VOT2016 workshop", ECCV The Visual Object Tracking VOT2016 workshop, 2016, pp. 777-823.

- P Ram Sukumar, Rahul G Waghmare, Rakesh Kumar Singh, Gorthi RK Sai Subrahmanyam, Deepak Mishra: "**Phase unwrapping with Kalman filter based denoising in digital holographic interferometry**", 2015 International Conference on Advances in Computing, Communications and Informatics (ICACCI), 2015, pp. 2256-2260.

- C Preetha, Sai Subrahmanyam Gorthi, Deepak Mishra: "**Compressive sensing framework for simultaneous compression and despeckling of SAR images**", 2015 Eighth International Conference on Advances in Pattern Recognition (ICAPR), 2015, pp. 1-6.

- D. Mishra V. Mohan, N. R. N. Raj: "**Randomized Hough transform-based vision algorithm for small unmanned aerial vehicles using an airbag**", 2015 IEEE International Conference on Computer Graphics, Vision and Information Security (CGVIS), 2015, pp. 185 - 189.

- Deepak Mishra, Param Uttarwar: "**Development of a Kinect-Based Physical Rehabilitation System**", Third International Conference on Image Information Processing, 2015, pp. 387 - 392.

- Anita Thakur, Joss Benny, Brijesh Singh Butola, Deepak Mishra: "**Restoration of space variant motion blurred images using adaptive particle filter techniques**", 2015 4th International Conference on Reliability, Infocom Technologies and Optimization (ICRITO) (Trends and Future Directions), 2015.

- D Mishra, PR Sukumar, RG Waghmare, RK Singh, GRKS Subrahmanyam: "Phase unwrapping with Kalman filter based denoising in digital holographic interferometry", Advances in Computing, Communications and Informatics (ICACCI), 2015.

- Vinitha Ramdas, Deepak Mishra, Sai Subrahmanyam Gorthi: "**Speech coding and enhancement using quantized compressive sensing measurements**", 2015 IEEE International Conference on Signal Processing, Informatics, Communication and Energy Systems (SPICES), 2015, pp. 387 - 392.

- G R K Sai Waghmare, Rahul G Subrahmanyam, Deepak Mishra: "Signal tracking approach for simultaneous estimation of phase and instantaneous frequency", 2015 IEEE International Conference on Signal Processing, Informatics, Communication and Energy Systems (SPICES), 2015, pp. 1-5.
- Madhu S Nair R. Raji, Deepak Mishra: "A Novel Texture Based Automated Histogram Specification for Color Image Enhancement Using Image Fusion", International Conference on Information and Communication Technologies - ICICT 2014.
- Vinitha Ramdas, Deepak Mishra,Sai Subrahmanyam Gorthi: "Efficient Speech Coding using a Hybrid Dictionary in a Quantized CS Framework",EIGHTH INTERNATIONAL CONFERENCE ON IMAGE AND SIGNAL PROCESSING (ICISP 2014).
- Sai Siva Gorthi, Deepak Mishra,G. R. K. Sai Subrahmanyam,Rahul G. Waghmare: "Extended Kalman Filter based Phase Estimation in Digital Holographic Interferometry", EIGHTH INTERNATIONAL CONFERENCE ON IMAGE AND SIGNAL PROCESSING (ICISP 2014).
- Sai Subrahmanyam Gorthi, Deepak Mishra,Nishank Kumar: "Development of Fast and Accurate Stereo Vision System for Robotic Arm Application with Sub-pixel Accuracy",EIGHTH INTERNATIONAL CONFERENCE ON IMAGE AND SIGNAL PROCESSING (ICISP 2014).
- V. Vivekanand, L. Vidya, U.Shyam Kumar, Deepak Mishra: "**Noise immunity analysis of compressed sensing recovery algorithms**",International Conference On Signal Processing And Integrated Networks (SPIN), 2014.
- Rahul G Waghmare, Deepak Mishra: "**UKF based multi-component phase estimation in digital holographic Moiré**",2013 Fourth National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), 2013, pp. 1-4.
- L Vidya, V Vivekananad, U ShyamKumar, Deepak Mishra, R Lakshminarayanan: "**Feasibility study of applying compressed sensing recovery algorithms for launch vehicle telemetry**", 2013 Annual International Conference on Emerging Research Areas and 2013 International Conference on Microelectronics, Communications and Renewable Energy, 2013, pp. 1-4.
- K Chitra, Sudin Dinesh, Deepak Mishra, V Brinda, V.R Lalithambika, B Manoj Kumar: "**3D information retrieval for visual odometry system of planetary exploration rovers - A stereo vision approach**", 2013 International Conference on Advances in Computing, Communications and Informatics (ICACCI), 2013.
- Abhishek N Patil, Deepak Mishra: "**A novel stereoscopic approach for smooth navigation of rover**", 2012 IEEE International Conference on Computational Intelligence and Computing Research, 2012, pp. 1-4.
- Prem Kumar Kalra, Deepak Mishra, Kanishka Tyagi: "A Novel Complex-Valued Counterpropagation Network", Proceedings of the IEEE Symposium on Computational Intelligence and Data Mining, CIDM 2007 CIDM 2007, pp. 81-87

- Deepak Mishra, N. Subhash Chandra Bose, Arvind Tolambiya, Ashutosh Dwivedi, Prabhanjan Kandula, Ashiwani Kumar, Prem K. Kalra, "Color Image Compression with Modified Forward-Only Counterpropagation Neural Network: Improvement of the Quality using Different Distance Measures," icit, pp. 139-140, 9th International Conference on Information Technology (ICIT'06), 2006

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- Mishra D, Sumitra P., S. Gopalakrishnan, P. Mathur, "Automatic Flood Warning System", INCON, Pune, India, 2005.

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National Conferences

- Aprameyo Roy, Deepak Mishra: "**ECNN: Activity Recognition Using Ensembled Convolutional Neural Networks**", TENCON 2019-2019 IEEE Region 10 Conference (TENCON), 2019, pp. 757-760.
- Pallavi Venugopal M, Deepak Mishra, Gorthi R K Sai Subrahmanyam: "**Computationally Efficient Deep Tracker: Guided MDNet**", **Twenty-third National Conference on Communications (NCC)**, 2017.
- Sumithra Kakanuru, Madan Kumar Rapuru, Deepak Mishra, Sai Subrahmanyam Gorthi: "**Complementary tracker's fusion for robust visual tracking**", Proceedings of the Tenth Indian Conference on Computer Vision, Graphics and Image Processing, 2016, pp. 51.
- Haribabu Kandi, Deepak Mishra, GRK Subrahmanyam: "**A differential excitation based rotational invariance for convolutional neural networks**", Proceedings of the Tenth Indian Conference on Computer Vision, Graphics and Image Processing, 2016, pp. 70.
- Jay Shah, Deepak Mishra: "**Integrated algorithm for different tracking challenges**", 2015 Fifth National Conference on Computer Vision, Pattern Recognition, Image Processing and Graphics (NCVPRIPG), 2015, pp. 1-4.
- K Haribabu, GRKS Subrahmanyam, Deepak Mishra: "**A robust digital image watermarking technique using auto encoder based convolutional neural networks**", 2015 IEEE Workshop on Computational Intelligence: Theories, Applications and Future Directions (WCI), 2015, pp. 1-6.
- Deepak Mishra, Supriya Chakraborty, Mukul Sarkar: "**Reflection based blood pulsation measurement using linear polarization of light**", 2015 IEEE SENSORS, 2015, pp. 1-4.
- V Vivekanand, L Vidya, U Shyam Kumar, Deepak Mishra: "**Radial basis function cascade network for sparse signal recovery (RASR)**", 2014 Twentieth National Conference on Communications (NCC), 2014, pp. 1-5.

- SK Jain, Vinod Senecha, Deepak Mishra, SC Joshi: "**Electron cyclotron resonance plasma diagnostics to study microwave power coupling with Langmuir probe**", Proceedings of the DAE-BRNS Indian particle accelerator conference, 2011.
- Deepak Mishra, K Chitra: "**PERFORMANCE ANALYSIS OF FEATURE DETECTOR AND FEATURE MATCHING ALGORITHMS STEREO VISION BASED APPROACH FOR VISUAL ODOMETRY SYSTEM OF PLANETARY ROVERS**", Advances in Modeling, Optimization and Computing (AMOC - 2011).
- Mishra, D, Yadav, A, Ray, S. and Kalra, P.K., "Bifurcation Analysis in Modified FitzHugh-Nagumo Neuronal Model", National Conference on Control and Dynamical Systems (NCCDS '05), Jan 27,28 – 2005, Indian Institute of Technology – Bombay, Mumbai, 2005.
- Mishra, D, Yadav, A, Ray, S. and Kalra, P.K., "Some Aspects of the Dynamical Analysis of Integrate and fire Neuron Model and Synaptic Interaction", National Conference on Recent Advances in Power Signal Processing and Control, (APSC 2004) National Institute of Technology – Rourkela, Orissa, pp. 174 – 179, 2004.

Invited Lectures/Talks

- Basic and Advanced Image Processing Techniques, CMC Ltd Hyderabad, Dec 2009.
- Orientation descriptor based fingerprint matching, CMC Ltd Hyderabad, April 2009.
- Application of Symbolic and Control System Toolbox, Indian Institute of Technology Kanpur, May 16?17, 2006.
- An Introduction to Artificial Neural Network and Artificial Intelligence, KNIET, Banda, November 19?20, 2005.
- Introduction to Matlab and Simulink for Engineers, Government Engineering College?Raipur, October 4, 2005.
- Dynamical Aspects and Learning in Biological Neuron Models, Indian Institute of Technology Kanpur, August 26, 2004.

Patents, Awards and Recognitions

- Finalist in Tata innovista 2010.
- NIH postdoctoral fellowship at University of Louisville KY, USA for 2007/2008
- IBM travel grant for attending the ICONIP?2004.
- Teaching Assistantship at IIT Kanpur
- Graduate Aptitude Test of Engineers (National Level, AIR 300)

Dr Ram Prasad K

ram.krish@visioncog.com ; ram.pk2002@gmail.com

Assistant Professor, [Shiv Nadar University Chennai,](#)Chennai, Tamil Nadu, India
Teaching and Research in Artificial Intelligence using Machine Learning.

Previous Experiences

Founder & Director

[VisionCog Research and Development Pvt. Ltd.](#)

Sep 2018 - Present3 years 6 months

Thiruvananthapuram Area, India

VisionCog R&D is a unique initiative to pursue both training and research activities in Computing and Artificial Intelligence. Major subfields of AI which VisionCog R&D focuses are Machine Learning / Deep Learning, Computer Vision and Biometrics.

Independent Researcher

Senior Consultant

Jan 2018 - Present4 years 2 months

Artificial Intelligence, Machine Learning, Deep Learning, Computer Vision, Biometrics

Postdoctoral Research Fellow

[Dublin City University](#)

Sep 2015 - Aug 20172 years

Dublin, Ireland

Working in the EU project ASSISTID, developing intelligence based personalized virtual tutoring systems for people with Intellectual Disability (ID) and Autism Spectrum Disorder (ASD) to improve the speech and language skill. The project ASSISTID is funded by European Union Marie Curie Actions and Irish charity organization RESPECT (http://www.assistid.eu/).

Researcher

[Universidad Autonoma de Madrid (with Dr. Julian Fierrez, and Dr. Daniel Ramos)](#)

May 2011 - Jul 20154 years 3 months

Madrid Area, Spain

Working towards developing new Image Processing and Pattern Recognition Algorithms in the context of Latent/Forensic Fingerprint data. Project funded through Marie Curie Research Fellowship in the project Bayesian Biometrics for Forensics (BBfor2), Biometrics Evaluation and testing (BEAT).

Worked in the developement of Dynamic (On-line) Signature Verification system of UAM. Implemented C library of the verification system for Windows, Linux and Android platforms for commercial deployment.

Researcher (Visiting)

[Halmstad University (with Prof. Josef Bigun)](#)

Sep 2013 - Dec 20134 months

Halmstad, Sweden

Latent Fingerprint Image Analysis, Orientation field based partial fingerprint registration.

Researcher (Visiting)

[University of Twente (with Prof. Raymond Veldhuis)](#)

Sep 2012 - Dec 20124 months

Enschede Area, Netherlands

Developed Pattern Recognition algorithms for forensic fingerprints.

Software Engineer

[Geodesic](#)

Jul 2008 - Mar 20112 years 9 months

Bengaluru Area, India

Fingerprint Image Enhancement, Fingerprint Matching, Handwriting Recognition, GoogleMaps based application.

Intern

Geodesic Limited

Dec 2007 - Jun 20087 months

Bengaluru Area, India

Online Handwritten Character Recognition using Elastic Matching and Quadratic Discrimination.

Lecturer, Department of Information Technology

Muslim Association College of Engineering

Jul 2003 - Aug 20052 years 2 months

Thiruvananthapuram Area, India

C Programming, Data Structures, Discrete Mathematics, Algorithm Design & Analysis, Theory of Computation

Education

- **Universidad Autónoma de Madrid**
  Universidad Autónoma de Madrid
  Doctor of Philosophy (Ph.D.)Computer Science and Telecommunication Engineering
  2011 - 2015
- **Chennai Mathematical Institute**
  Chennai Mathematical Institute
  Master of ScienceComputer Science
  2006 - 2008
- **Manonmaniam Sundaranar University**
  Manonmaniam Sundaranar University
  Bachelor of EngineeringInformation Technology
  1999 - 2003

Publications

- **From Biometric Scores to Forensic Likelihood Ratios**
  Handbook of Biometrics for Forensic Science, Springer International Publishing Mar 2017
- **Visual Speech Encoding based on Facial Landmark Registration**
  Irish Machine Vision and Image Processing Conference Aug 2016
- **Integrating rare minutiae in generic fingerprint matchers for forensics**
  IEEE International Workshop on Information Forensics and Security (WIFS) Dec 2015
- **Pre-Registration of Latent Fingerprints based on Orientation Field**
  IET Biometrics Mar 2015
- **Pre-registration for improved latent fingerprint identification**
  22nd International Conference on Pattern Recognition (ICPR) Aug 2014

- **Mobile signature verification: Feature robustness and performance comparison**
  IET Biometrics Jun 2014
- **Partial Fingerprint Registration for Forensics using Minutiae-Generated Orientation Fields**
  2nd International Workshop on Biometrics and Forensics Mar 2014
- **Evaluation of AFIS-Ranked Latent Fingerprint Matched Templates**
  Pacific-Rim Symposium on Image and Video Technology Feb 2014
- **Automatic Region Segmentation for High-resolution Palmprint Recognition: Towards Forensic Scenarios**
  Proc. 47th IEEE International Carnahan Conference on Security Technology (ICCST) Nov 2013
- **On the importance of rare features in AFIS-ranked latent fingerprint matched templates**
  Proc. 47th IEEE International Carnahan Conference on Security Technology (ICCST) Nov 2013
- **Towards Quantification of the Weight of Evidence with Partial Fingermarks on Real Forensic Casework**
  Biometric Technologies in Forensic Science, BBfor2 Conference Nov 2013
- **Towards regional fusion for high-resolution palmprint recognition**
  26th SIBGRAPI-Conference on Graphics, Patterns and Images (SIBGRAPI) Sep 2013
- **Dynamic signature verification on smart phones**
  International Conference on Practical Applications of Agents and Multi-Agent Systems Jun 2013

Dr. Sowmya V.

Asst. Professor
Amrita Center for Computational Engineering and Networking (CEN), Coimbatore Campus.

Research Interest: Bio-Medical Image Processing, Bio-Medical Signal Processing, Color Image Processing, Deep Learning, Hyperspectral Image Processing, Image Analysis using Drones, Machine Learning, Pattern Classification

Achievements

- Received "**Women In AI Leadership Awards 2019** (Only Academician among the winners)" sponsored by Jigsaw Academy, during the one day Conference, "The Rising 2019" on Women in Analytics and AI, organized by the Analytics India on March 8, 2019 at Taj Hotel, Bangalore.

- Awarded with Deep Learning Instructor Ambassadorship Grant by NVIDIA (December 2018).

Professional Experience

- Programmer Analyst Trainee at Cognizant Technology Solutions, Chennai (August 2010 -June 2011).

- Assistant Professor, Center for Excellence in Computational Engineering and Networking, Amrita Vishwa Vidyapeetham, Coimbatore, (July 2011-till date).

- Successfully defended her Ph. D. Thesis titled, "Significance of Incorporating Chrominance Information for Scene Classification" on July 2018 under the supervision of Dr. D. Govind, Assistant Professor (SG), CEN, and Dr. K. P. Soman, Professor & Head, CEN, Amrita School of Engineering, Coimbatore.

- Promoted as Assistant Professor (Senior Grade) on November 2015.

Research Area

- Color Image Processing

- Hyperspectral Image Processing

- Pattern Classification

- Machine Learning

- Deep Learning

- Bio-Medical Signal Processing

- Bio-Medical Image Processing

- Image Analysis using Drones

Active Reviewer in the following SCI Indexed Journals

1. **ISPRS Journal of Photogrammetry and Remote Sensing (Elsevier)**.
2. **Computers and Electronics in Agriculture (Elsevier)**.
3. **Computer and Information Sciences (Elsevier)**.
4. **Neural Networks (Elsevier)**.
5. Remote Sensing Letters (Taylor & Francis).
6. Signal, Image and Video Processing (Springer).
7. Digital Signal Processing (Elsevier).
8. International Journal of Image and Data Fusion.

Invited Talks

- Rendered a session on "Basic theory of Deep Neural and Convolutional Network" during "**Two days workshop on Machine Learning – Hands on with Matlab and Python**" , organized by Center for Development Advanced Computing (C-DAC), Trivandrum during 5-6 July, 2019.
- Rendered a session on "**Fundamentals of Computer Vision using NVIDIA DIGITS** " (as a part of NVIDIA DLI University Ambassador Grant) during "CSIR sponsored National Level Seminar on Deep Learning" , organized by P.A.College of Engineering and Technology, Pollachi on June 26, 2019.
- Rendered a session on "**Fundamentals of Computer Vision using NVIDIA DIGITS** " (as a part of NVIDIA DLI University Ambassador Grant) during "FDP on Deep Learning for Object Detection", organized by Sona College of Technology, Salem on June 21, 2019.
- Rendered a session on "**Generative Adversarial Networks (GAN)**", along with the hands on in python at a **National Level Faculty Development Program on "Deep Learning Unfolded"**, conducted by Amrita School of Engineering, Amritapuri Campus, Kollam on May 31, 2019.
- Rendered a session on "**Drones for Forestry Applications**" at a monthly seminar conducted by the Institute of Forest Genetics and Tree Breeding (IFGTB), Indian Council of Forestry Research and Education, Coimbatore, India on May 30, 2019.
- Delivered one day workshop on "**Fundamentals of Deep Learning for Computer Vision – Hands-on using NVIDIA DIGITS**" at KMEA College of Engineering, Aluva on May 14, 2019. This was certified and sponsored by NVIDIA as a part of "NVIDIA Deep Learning Instructor University Ambassadorship Award".
- Delivered a guest lecture on "**Opportunities in Remote Sensing**" at Avinashilingam Institute of Home Science and Higher Education for Women, Coimbatore on March 6, 2019.
- Delivered one-day workshop on "**Computational Tools Needed for Data Science (with hands-on in Matlab and Python)**" during the 9th National Level Tech fest – Anokha 2019 organized by Amrita School of Engineering, Coimbatore during February 14-16, 2019.
- Delivered a guest lecture on "**Machine Learning**" at Karpagam College of Engineering, Coimbatore on January 24, 2019.
- Invited talk on "Deep Learning" in Two days IEEE workshop on Machine Learning held at **Kalasalingam University** on 2-3 Feb, 2018.

- Invited talk on "Deep Learning for Bio-medical Application" in ICMR Sponsored Seminar on Deep Learning Techniqies and Tools for Medical Application organized by Department of Computer Science and Engineering, **Mepco Schlenk Engineering College, Sivakasi** on 17/01/2018.
- Delivered a lecture on "Deep Learning for Medical Image Processing" in "TEQIP Sponsored Artificial Intelligence for Biomedical Applications" organized by **TKM College of Engineering, Kollam**, on 14th Dec, 2017.
- Delivered a lecture on "Drone based Hyperspectral Imaging for Precision Agriculture" in "Refresher Course for Computer Science" organized by **Bharathiar University**, on 21st Nov, 2017.
- Delivered a lecture on "Data Mining" for MBA students of **Avinashilingam University** on 18th March 2017.
- Delivered a session on "Least square based image processing" as a part of short term training programme on Digital Signal Processing and its Applications held at **Govt.Engineering College, Thrissur** on 5th Dec, 2016.
- Rendered hands on training in "Support Vector Machines using Libsvm and Weka" for M.Tech students of the **Department of Electronics and Communication Engineering, Rajiv Gandhi Institute of Technology, Kottayam** on 18-12-2015.
- Delivered one day session on 'PDE and Image Processing" in two days "National Level Workshop on Signal and Image Processing" conducted by **Department of Information Technology, Sona College of technology, Salem** during 4-5 Dec, 2015.
- Rendered a lecture on "PDE based Image Processing" in "A training workshop on Advanced Optimization, Deep Learning Applications (AODA)" organized by organized by the **Centre for Excellence in Computational Engineering and Networking (CEN), Amrita Vishwa Vidyapeetham (University), Coimbatore**, during January 30 – February 2, 2014.
- Rendered Invited Guest Lecture on "Remote Sensing and Applications of GIS" at **Avinashilingam University, Coimbatore, 2012**.
- Rendered a talk on "Hyperspectral Image Processing" at "**First National Workshop** on "**Sparse Image and Signal Processing (SISP-2011)**", organized by the Centre for Excellence in Computational Engineering and Networking (CEN), Amrita Vishwa Vidyapeetham (University), Coimbatore.

Awards
- Awarded "Bharat Excellence" and "Best Indian Global Personalities" by Friendship Forum of India at Delhi on July 28, 2019.
- Awarded "Best Engineering College Teacher" by Society for Engineering Education Enrichment (SEEE) at Dr.N.G.P Institute of Technology, Coimbatore on July 20, 2019.
- Awarded with "Excellence in Research for the academic year 2016-2017" by Amrita School of Engineering, Coimbatore, Amrita Vishwa Vidyapeetham on 23rd Institution day held on 10th January 2018.

- Awarded with "Best Young Researcher Award" rendered by Integrated Intelligent Research Groups on the occasion of Republic Day Achievers award 2018, celebrated at Loyola-ICAM College of Engineering and Technology (LICET), Chennai.
- Awarded with PG Merit Scholarship for University Rank Holders – Rs.40000 by University Grants Commission (UGC), New-Delhi in the year 2008.
- Awarded with "Young Women Educator and Researcher" by National Foundation for Entrepreneurship Development (NFED), Coimbatore on 4th Women's Day Awards celebrated on 8th March 2017 at Grand Reagent Coimbatore.
- Awarded with "Young Women Achiever (in recognition of Your Role, Outstanding Contributions, Significant Achievements and Sustained Excellence in the field of Engineering) of the Women Awards – VIWA 2016" celebrated on 5 March 2016 at Radha Regent Chennai.
- Received third prize in Essay Competition conducted by Amrita nature club on the occasion of International Women's Day on March 8th, 2014.
- Awarded with title "Associate of the month of January 2011" for project excellence by Cognizant Technology Solutions (CTS), Chennai.
- Awarded with shield for securing University First Rank in M.TECH (Remote Sensing and Wireless Sensor Networks) (2008-2010) by Amrita Vishwa Vidyapeetham, Coimbatore.
- Awarded with Gold Medal for University First Rank in B.Sc., (Physics) (2003-2006) by Avinashilingam University, Coimbatore.
- Awarded with cash award of Rs.5000 for securing First Place in the paper presented in National Level Seminar on Signal Processing held at Sree NarayanaGuru Institute of Science and technology, Kochi.
- Awarded with "Swami Vivekananda Award" for Excellence in Education by Yuva Kendra Association, Madurai.

Professional Activities

- Actively Participated in the "**Accenture Learning Symposium workshops on Deep Learning and DevOps**", conducted on March 13-14, 2018 at Amrita School of Engineering, Coimbatore.
- Successfully cleared the assessment test and completed a hands on workshop on "**Artificial Intelligence and Deep Learning**," held at Kongu Engineering College, Erode from July 28 – 30, 2018, conducted by leadingIndia.ai, a nation wide initiative by Bennett University, Greater Noida, India. (Listed as one of the toppers in the assessment)
- Presented a paper tiled, "**Inspiring stories from Indian Freedom Movement**" in SADGAMAYA 5119, Cultural Camp organized by Amrita Vishwa Vidyapeetham, Coimbatore on 29-30 June 2017.
- Event Coordinator – '**Cook without Fire or Wire**' of Amrita Cultural Fest "Amritotsavam-2015'.
- Participated in one day Seminar on "**Projects in Signal & Image Processing, Communication, embedded, Robotics, Networks and VLSI**", organized by Department of Electronics and Communication Engineering, SNS College of Engineering, Coimbatore on 20th July, 2013.

- Participated in Faculty Development programme on "**Linear Algebra and Applications**" organized by the department of Mathematics and Centre for Continuing Education held at National Institute of Technology, Calicut during 07-13 July 2013.
- Participated in National Workshop on "**Computer Vision and Image Processing Techniques**" organized by Department of Computer Science and Engineering, Amrita Vishwa Vidyapeetham, Coimbatore on 15-16 March 2013.
- Participated in two days workshop on "**Geospatial Technologies for Coastal Resources Management**", organized by Department of Earth and Space Sciences, Indian Institute of Space Science and Technology (IIST), Thiruvananthapuram on 19-20 May 2012.
- Participated in two days workshop on "**Machine Vision and Image Processing using Labview**", organized by Department of Instrumentation and Control Systems Engineering, PSG College of Technology, in association with NI Systems (India) Pvt.Ltd, Bangalore on 18-19 May 2012.
- Participated in "**Second Edition of Amrita International Conference of Women in Computing**" organized by Department of Computer Science and Engineering, Amrita Vishwa Vidyapeetham, Coimbatore on 9-11 January 2012.
- Co-ordinator of the "**First National Workshop on "Sparse Image and Signal Processing (SISP-2011)**", organized by the Centre for Excellence in Computational Engineering and Networking (CEN), Amrita Vishwa Vidyapeetham, Coimbatore during 23rd Dec-26th Dec,2011.

Presentations

- Presented two papers entitled "Significance of Contrast and Structure Features for an Improved Color Image Classification System", Improved Color Scene Classification System using Deep Belief Networks and Support vector Machines", in **2017 International Conference on Signal and Image Processing, ICSIPA-2017**, Kuching, Malaysia, 12-14 Sep.2017.
- Presented a paper entitled ""Edge Detection Using Sparse Banded Filter Matrices" – **Second International Symposium on Computer Vision and the Internet (VisionNet'15)** held at SCMS School of Engineering, Aluva, Kochi on Aug 10-13, 2015. Publisher: Elsevier Procedia Computer Science Journal. (Published)
- Presented a paper entitled "Role of Teachers in Nation Building" in the **seminar for College Faculty on Swami Vivekananda's thoughts in the modern context** organized by Swami Vivekananda 150th Birth Anniversary Celebration Committee, Coimbatore Region in association with Hindusthan Arts and Science, Coimbatore on September 7, 2013.
- Rendered a lecture on "Signal and Image Processing Application" on two days workshop on **Sparse Image and Signal Processing-2013** organized by organized by the Centre for Excellence in Computational Engineering and Networking (CEN), Amrita Vishwa Vidyapeetham, Coimbatore.
- Rendered a talk on "Hyperspectral Image Processing" at "**First National Workshop on Sparse Image and Signal Processing (SISP-2011)**, organized by the Centre for Excellence in Computational Engineering and Networking (CEN), Amrita Vishwa Vidyapeetham, Coimbatore.

- Presented a paper entitled "A Decision Tree Based Land Cover Image Classification Using Color Space and Texture" in **2011 IEEE International Conference on Computational Intelligence and Computing Research**, at Cape Institute of Technology, Levengipuram, Kanyakumari, India.
- Presented a paper entitled "An Effective pre-processing algorithm for detecting noisy spectral bands in hyperspectral imagery" in **International Symposium on Ocean Electronics, SYMPOL 2011** at Cochin university of Science and Technology (CUSAT), Kochi.
- Presented a paper entitled "A Decision Tree Based Land Cover Image Classification Using Color Space and Texture" in **National Level Seminar on Signal Processing** held at **S**ree Narayana Guru Institute of Science and technology, Kochi.
- Rendered Invited Guest Lecture on "Remote Sensing and Applications of GIS" at **Avinashilingam University, Coimbatore.**

Achievements

- Awarded with Cash Prize of Rs.2000 (each for a Semester) for securing First Rank in M. Tech. (I- IV Semester) Examination by Amrita Vishwa Vidyapeetham, Coimbatore.
- Proficiency Holder in M.Sc (2006- 2008)
- Short listed for the National level presentation in "Einstein's Year of Physics – 2005" conducted by the members of "Indian Association of Physics-Mumbai".
- Published an article in Tamil in Amrita University Magazine, Amritadhwani 2013.

Social Activities

- Active National Service Scheme (NSS) volunteer during the period 2003- 2006.
- Actively participated in ten day Special Camping Programme organized at a village by Avinashilingam University Coimbatore.
- Actively participated in three days Residential Youth Camp on Achieving Human Excellence organized by Ramakrishna Mission Vidhyalaya, Coimbatore.
- Actively participated in Resources Mobilization for Leprosy eradication.
- Actively served as volunteer on the occasion of the 59th and 60th birthday celebrations of Sri Mata Amnritanandamayi Devi during 26-27 September, 2012,2013.

S. Sumitra, Ph.D.
Associate Professor
Department of Mathematics

Indian Institute of Space Science and Technology Trivandrum

Education

- Ph.D. in Machine Learning, Department of Automatic Control & Systems Engineering, The University of Sheffield, UK.
- M.Tech. in Computer and Information Science, Department of Computer Science, Cochin University of Science and Technology, India.
- M.Sc. in Mathematics, Department of Mathematics, Cochin University of Science and Technology, India.

Experience

- Researcher, Center for Environmental Implications of Nanotechnology, The University of California, Los Angeles, US.
- Researcher, Terry Fox Laboratory, British Columbia Cancer Research Center, Vancouver, Canada.
- Researcher, INSERM/U887, UFR STAPS, University of Burgundy, Dijon, France.

Research Work / Area

Development of theoretical frame work for Machine Learning algorithms and its application to real world problems.

Journals

1. Salim A., Shiju S.S., Sumitra S. (2022). Neighborhood Preserving Kernels for Attributed Graphs. Accepted for publication in IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI).
2. Salim A., Shiju S.S., Sumitra S. (2020). Design of multi-view graph embedding using multiple kernel learning. Engineering Applications of Artificial Intelligence 90.
3. Aravindh A., Shiju S.S. and Sumitra S. (2019). Kernel Collaborative Online Algorithms for Multi-Task Learning. Ann Math Artif Intell 86, 269–286 doi:10.1007/s10472-019-09650-w.
4. Shiju S. S and Sumitra S. (2017). Multiple Kernel Learning using Single Stage Function Approximation for Binary Classification Problems. International Journal of Systems Science, 48(16): pp. 3569-3580, doi:10.1080/00207721.2017.1381892.
5. Shiju S. S, Asif Salim and Sumitra S. (2017). Multiple Kernel Learning using Composite Kernel Functions. Engineering Applications of Artificial Intelligence, 64, 391-400.
6. Sumitra S. Nair and T. J. Todd. (2015). Supervised Pre-clustering for Sparse Regression. International Journal of Systems Science, 46(7): pp. 1161-1171.
7. R. Liu, R. Rallo, S.George, Z. Ji, Sumitra. Nair, A. E. Nel, and Y. Cohen (2011). Classification NanoSAR Development for Cytotoxicity of Metal Oxide Nanoparticles. Small 7 (8), 1118-1126.

8. R. Rallo, B. France, R. Liu, Sumitra. Nair, S. George, R. Damoiseaux, F. Giralt, A. E. Nel, K. A. Bradley, and Y. Cohen (2011). Self-Organizing Map Analysis of Toxicity-Related Cell Signaling Pathways for Metal and Metal Oxide Nanoparticles. Environmental Science & Technology, 45(4): 1695-1702.

9. T. J. Dodd , Sumitra. Nair, and R. F. Harrison (2010). The Effect of the Order of Parameterisation in Gradient Learning for Kernel Methods. IET Control Theory and Applications, 4(10), 2141-2151.

10. Sumitra. Nair, R. French, D. Laroche, and E. Thomas (2010). The Application of Machine Learning Algorithms to the Analysis of Electromyographic Patterns from Arthritic Patients IEEE Transactions on Neural Systems & Rehabilitation Engineering , Vol 18, No. 2, pp-174-184.

Conference Papers

1. Adarsh Kappiyath, V.S.Silpa, S.Sumitra. (2022). Self-supervised Enhancement of Latent Discovery in GANs, Proceedings of the Association for the Advancement of Artificial Intelligence (AAAI'22).

2. Adarsh Kappiyath, V.S.Silpa, S.Sumitra. (2021). Disentagled Based Active Learning. International Joint Conference on Neural Networks (IJCNN), 1-8.

3. Rahul Vashisht, H.Viji, T.Sundarajan, D.Mohankumar, S.Sumitra. (2018). Structural Health Monitoring of Cantilever Beam, A case study – using Bayesian Neural Networks and Deep Learning. 2nd International Conference on Structural Integrity (ICONS).

4. Salim A., Shiju S.S., Sumitra S. (2017). Effectiveness of Representation and Length Variation of Shortest Paths in Graph Classification. In: Shankar B., Ghosh K., Mandal D., Ray S., Zhang D., Pal S. (eds) Pattern Recognition and Machine Intelligence. PReMI 2017. Lecture Notes in Computer Science, vol 10597. Springer, Cham.

5. Shiju S.S., Salim A., Sumitra S. (2017). Formulation of Two Stage Multiple Kernel Learning Using Regression Framework. In: Shankar B., Ghosh K., Mandal D., Ray S., Zhang D., Pal S. (eds) Pattern Recognition and Machine Intelligence. PReMI 2017. Lecture Notes in Computer Science, vol 10597. Springer, Cham. **[Received Best Student Presentation Award from Springer]**.

6. S. Sumitra and A. Aravindh. Kernel online multi-task learning (2016). In Computational Intelligence, Cyber Security and Computational Models, volume 412 of Advances in Intelligent Systems and Computing, pages 55-64. Springer Singapore.

7. Manu Subramanian S, Jishy Samuel and Sumitra S (2014). Comparative study of similarity measures for launch vehicle telemetry data. Proc. of IEEE International Conference on Information, Communication and Embedded Systems (ICICES) , Chennai , pp 253-258.

8. T. J. Dodd, Sumitra. Nair, and R. F. Harrison (2005). Gradient Based Methods: Functional vs Parametric Forms.Proceedings of the 16th IFAC World Congress Prague.

PhD. Thesis

· Function Estimation Using Kernel Methods for Large Data Sets (2007), Department of Automatic Control & Systems Engineering, The University of Sheffield, UK.

Invited Talks

- Mathematical Foundations of Machine Learning and Deep Learning: Talk delivered in "KTU sponsored FDP on "Research Perspectives of Machine Learning & Deep Learning for Signal Processing Applications", Organized by Department of Electronics & Communication Engineering, Sree Chitra Thirunal College of Engineering, Trivandrum, on 06, September, 2021.
- Introduction to Deep Learning: Talk delivered in "KTU sponsored 3 Day Online FDP on 'Data Analytics using R', Organized by Department of Computer Science and Engineering, Thangal Kunju Musaliar Institute of Technology, Kollam, on 25, June, 2021.
- Machine Learning: Talk delivered in "Refresher Course in Data Analytics and Machine Learning", Organized by the Human Resource Development Centre, University of Kerala, on 24, February, 2021.
- Theory of Kernel Methods: Talk delivered in "TEQIP course on Essential Mathematics for Machine Learning", Organized by the Department of Mathematics, Indian Institute of Technology (IIT) Roorkee, on 26 November, 2020.
- Introductory Concepts in Machine Learning: Talk delivered in "Online AICTE Training and Learning (ATAL) faculty development programme on Application of Artificial Intelligence in Power System Operation and Control", Organized by the Department of Electrical Engineering, National Institute of Technology (NIT) Calicut, on 09, November 2020.
- IOT Applications in Machine learning: Talk delivered in "Five day online ATAL sponsored faculty development programme on Secure and Intelligent IoT System Design, Organized by the Department of Electronics and Communication, College of Engineering, Kallooppara", on 18, September, 2020.
- Pattern Discovery and Data Mining: Talk delivered in "Webinar Series in Artificial Intelligence", Organized by VSSC, Thiruvananthapuram, on 3, September, 2020.
- Introduction to Machine Learning: Talk delivered in "National Workshop on Deep Learning" (NWDL'2020)", Organized by the Department of Computer Science and Research Centre, University of Kerala, Kariavattom, Thiruvananthapuram, on 13 January 2020.
- Machine Learning and Neural Networks: Talk delivered in "KTU Sponsered FDP on Computer Vision and Machine Learning", Organized by the Department of Computer Science and Engineering and Department of Information Technology College of Engineering, Perumon, on 24 July 2019.
- Machine Learning and its Applications: Talk delivered in "AICTE-QIP Sponsered One Week Short Term Course on Research Issues and Challenges in Data Science and Big data Analytics", Organized by Department of Information Technology, Thiagarajar College of Engineering, Madurai, on 20 March 2019.
- Advanced Machine Learning: Talk delivered in "AICTE Sponsered 5 Day Workshop on Artificial Intelligence and Machine Learning", Organized by Additional Skill Acquisition Programme (ASAP), at Barton Hill College of Engineering, Trivandrum, on 25 February, 2019.

- Machine Learning: Talk delivered in "UGC Sponsered Refresher Course in Mathematics and Statistics", Organized by the UGC-Human Resource Development Center, Bharathiar University, Coimbatore, on 23 February 2019.
- Fundamental Algorithms in Machine Learning and its Research Perspectives: Talk delivered in "Faculty Development Programme on Research Trends in Biomedical and Satellite Image Processing", Organized by the Department of Computer Science & Engineering, TKM College of Engineering, Kollam, on 04 January 2019.
- Basic Machine Learning Algorithms: Talk delivered in "AICTE-ISTE Sponsered One Week Refresher Programme on Deep Learning", Organized by the Department of Computer Science & Engineering, College of Engineering, Muttathara, Thiruvananthapuram, on 12 December 2018.
- Machine Learning Algorithms: Talk delivered in "TEQIP Two day Workshop on Recent Trends and Research Challenges in Deep Learning", Organized by Thiagarajar College of Engineering, Madurai, on 30 August 2018.
- Kernel Algorithms: Talk delivered in "Training Programme on Artificial Intelligence", Organized by VSSC, Thiruvananthapuram, on 20 August 2018.
- Supervised and Unsupervised Learning: Talk delivered in "Training Programme on Artificial Intelligence", Organized by VSSC, Thiruvananthapuram, on 16 August 2018.
- Regression Algorithms: Talk delivered in "Faculty Development Program on Artificial Intelligence and Machine Learning", Organized by the Electronics and Communication Department, Mohandas College of Engineering, Thiruvananthapuram, on 17 July 2018.
- Mathematical Foundations of Machine Learning Algorithms: Talk delivered in "Faculty Development Program on Machine Learning", Organized by the Department of Computer Science, St. Thomas College of Engineering & Technology, Kozhuvalloor - Chengannur, on 13 July 2018.
- Kernel Deep Learning: Talk delivered in "Short Term Course on Deep Learning and Applications", Organized by the Center for Interdisciplinary Research, College of Engineering, Trivandrum, on 19 April 2018.
- Learning with Data: Talk delivered in "Workshop on Statistical Methods for (Astro) Physics", Organized by Pure & Applied Physics, Mahatma Gandhi University, on 16 March 2018.
- Kernel Methods: Talk delivered in the "National Seminar on Machine Intelligence", Organized by the Department of Computer Science, University of Kerala, on 28 March 2017.
- Classification Algorithms: Talk delivered in the TEQIP II Sponsored Faculty Development Programme on "Recent Trends in Signal Processing", Organized by the Department of Electronics and Communication Engineering, College of Engineering, Cherthala, on 3 March 2017.
- Support Vector Machines: Talk delivered in the TEQIP II Sponsored Research Colloquium on "Recent Advances in Soft Computing", Organized by the Department of Computer Science & Engineering and Information Technology, College of Engineering, Kidangoor, on 27 February 2017.

- Introduction to Data Mining: Talk delivered in the TEQIP II Sponsored Faculty Development Programme on "Mathematics for Engineers", Organized by the Department of Applied Science, College of Engineering, Adoor, on 20 January 2017.

- Pattern Recognition & Machine Learning Methods for Image Processing:Talk delivered in the Faculty Training Programme on "Tools and Techniques In Image Processing", Organized by the Department of Computer Engineering, College of Engineering, Chengannur, on 18 January 2017.

- The Framework of Kernel Methods: Talk delivered in the National Workshop on "Machine Learning and Big Data", Organized by the Department of Computer Science, Amrita School of Engineering, Amritapuri Campus, on 09 June 2016.

- Optimization Techniques in Machine Learning: Talk delivered in the TEQIP II Sponsored Faculty Development Programme on "Contemporary Developments in Optimization Techniques and its Applications", Organized by the Department of Computer Application and Department of Electrical & Electronics Engineering, TKM College of Engineering, Kollam, on 20 May 2016.

- Mathematics of Kernel Methods: Talk delivered in the TEQIP II Sponsored Short Term Training Programme in "Mathematical Models in Data Mining", Organized by the Division of Applied Sciences & Humanities, School of Engineering, Cochin University of Science and Technology, on 04 April 2016.

- Linear Algebra Applications in Computer Vision : Talk delivered in the Workshop on "Computer Vision: Techniques & Applications", Organized by the Department of Computer Science & Engineering,College of Engineering, Karunagappally, on 17 March 2016.

- Supervised Learning Algorithms: Talk delivered in the TEQIP II Sponsored Faculty Training Programme on "Advancements And Algorithms In Image Processing", Organized by the Department of Computer Science & Engineering,College of Engineering, Karunagappally, on 28 January 2016.

- Theory of Kernel Methods: Talk delivered in the AICTE sponsered 14 Days Summer School Faculty Development Training Programme on "Soft Computing Techniques for the Engineering Research and its Applications"(SCTERA'15) , Organized by the Department of Electronics and Communication Engineering, Sri Ramakrishna Engineering College, Coimbatore, 12 June 2015.

- Applications of Machine Learning in the field of Biomedical Engineering: Talk delivered in the   "National Seminar on Transforms and Medical Data Interpretation", Organized by the Department of Biomedical Engineering, Sri Ramakrishna Engineering College, Coimbatore, 18 February, 2015.

- Applications of Machine Learning in the field of Image Processing: Talk delivered in the "Short term training programme on Digital Image Processing", Organized by the Department of Computer Science and Engineering, Rajiv Gandhi Institute of Technology, Kottayam, 05 – 09 January 2015.

- Regression prediction model,: Talk delivered in the "Short term training programme on Predictive Analytics", Organized by the Department of Computer Science and Engineering, Rajiv Gandhi Institute of Technology, Kottayam, 25 – 27 June 2014.
- Methods for Knowledge Extraction: Talk delivered in the "Faculty Development Programme on Soft Computing", Organized by the Department of Computer Science, Government Engineering College, Sreekrishnapuram, 09 – 11 January 2014.
- Algorithms for Mining the Web: Talk delivered in the "National Seminar on Computing and Communication", Organized by the School of Computer Sciences, Mahatma Gandhi University, 13 December 2013.
- Introduction to Machine Learning Algorithms: Talk delivered in the "Five-day Course on Spatial Statistical Tools in Data Processing and Analysis", Organized by the Systems Science & Informatics Unit, Indian Statistical Institute, Bangalore, 26 – 30 November 2012.
- RKHS Methods in Machine Learning: Talk delivered in the "National Conference on Applied Linear Algebra and Transform Techniques", Organized by the Department of Sciences and Humanities, Mar Baselios College of Engineering and Technology, Thiruvananthapuram, 10 – 11 July 2012.
- Function Approximation in RKHS: Talk delivered in the "National Conference on Mathematics of Soft Computing", Organized by the Department of Mathematics, National Institute of Technology, Calicut, 5 – 7, July 2012.
- Introduction to Machine Learning: Talk delivered in the "Short Term Course on Soft and Evolutionary Computing", Organized by the Department of Avionics, Indian Institute of Space Science and Technology, Thiruvananthapuram, 19 – 21, December 2011.

Session Chair

Session on Computing, International Conference on Computing, Communication and Signal Processing (ICCCSP-2016), organized by the Department of Electronics and Communication Engineering and the Department of Computer Science and Engineering of College of Engineering Karunagappally, 8 July 2016.

1. *Women in Computing Symposium,* IEEE International Conference on Recent Advances in Intelligent Computational Systems 2015, 10 December 2015.
2. *Session on Big Data*, IEEE International Conference on Recent Advances in Intelligent Computational Systems 2013, 20 December 2013.

Sree Chitra Thirunal College of Engineering
Department of Electronics & Communication Engineering
List of Participants

1. Faculties from External KTU Affiliated Colleges/ AICTE approved Institutions

Sl No.	Name	Name of the Institution
1	Adersh V. R.	College of Engineering Trivandrum
2	Aishwarya Rajeev	Coorg Institute of Technology
3	Aiswarya N. R.	Heera College of Engineering and Technology
4	Ajish Kumar K. S.	Government Engineering College Wayanad
5	Alfred Thomas	Government Engineering College Wayanad
6	Ali Akbar N.	Government Engineering College Thrissur
7	Ameenudeen P. E.	College of Engineering Trivandrum
8	Amit Doegar	NITTTR Chandigarh
9	Anitha L.	Royal College of Engineering and Technology
10	Anjali S. V.	Muthoot Institute of Technology and Science, Ernakulam
11	Anju J. S.	Government Engineering College Bartonhill
12	Anju K. B.	Govt engineering college wayanad
13	Anuja A. C.	Heera College of Engineering and Technology
14	Aruna A. S.	College of Engineering Vadakara
15	Baby C. J.	Government College of Engineering Kannur
16	Bincy Antony M.	Government College of Engineering Kannur
17	Binet Rose Devassy	Sahrdaya College of Engineering and Technology
18	Bushra Abdulla N. T.	Sree Narayana Guru College of Engineering and Technology, Payyannur
19	Dhanya S.	Muthoot Institute of Technology and Science, Ernakulam
20	Dileep M. R.	Govt College of Engineering Kannur
21	Dilna P. M.	Government Engineering College Wayanad
22	Dinu A. G.	College of Engineering Perumon, Kollam
23	Dr. Susmitha Vekkot	Amrita School of Engineering, Amrita Vishwa Vidyapeetham
24	Dr. Amar Kumar Dey	Bhilai Institute of Technology, Durg
25	Dr. Anita Brigit Mathew	Ilahia College of Engineering and Technology
26	Dr. Anzar S. M.	TKM College of Engineering Kollam
27	Dr. Bindu P. V.	Government College of Engineering Kannur
28	Dr. Maya Mohan	NSS College of Engineering
29	Dr. Poornima S.	Rajagiri School of Engineering and Technology
30	Dr.Rasmi A.	Royal College of Engineering and Technology
31	Gregorious Jose C.	IES College of Emgineering Chitillappilly
32	Jisha C. S.	John Cox Memorial CSI Institute of Technolgy
33	Job Chunkath	Government Engineering College Thrissur
34	Joseph George	Adi Shankara Institute of Engineering and Technology
35	Kalpana George	Model Engineering College Thrikkakara
36	Dr. Leena Mary	Rajiv Gandhi Institute of Technology Kottayam

37	Leena Narayanan	Sree Narayana Guru College of Engineering and Technology, Kannur
38	Lemya Sainudeen	Royal College of Engineering and Technology
39	Manu Jose	Viswajyothi College of Engineering and Technology, Vazhakulam
40	Neetha K.	Adishankara Institute of Engineering and Technology, Kalady
41	Nikesh P.	Government Engineering College Wayanad
42	Nisha J. R.	Marian Engineering College
43	Nisha S. M.	Royal College of Engineering and Technology
44	Nishley E. Joseph	Marian Engineering College
45	Prajitha M. V.	Royal College of Engineering and Technology
46	Rajeev K. K.	Government College of Engineering Kannur
47	Ranjini Surendran	Viswajyothi College Of Engineering & Technology, Vazhakulam
48	Ranjini Surendran	Viswajyothi College of Engineering and Technology,Vazhakulam
49	Renjini Rani K. S.	John Cox Memorial CSI Institute of Technology
50	Shabeer K. P.	Government Engineering College Wayanad
51	Sidharth N.	NSS College of Engineering, Palakkad
52	Sivakumar R.	College of Engineering Trivandrum
53	Sreedevi M. G.	College of Engineering, Punnapra
54	Sreenivasulu K. N.	Nagarjuna College of Engineering and Technology
55	Sruthy Manmadhan	NSS College of Engineering
56	Subha P. S.	Marian Engineering College
57	Subhija E. N.	Government Engineering College Thrissur
58	Sudhi S.	College of Engineering Trivandrum
59	Swapna H.	Marian Engineering College
60	Teena Joseph	Musaliar College of Engineering and Technology, Pathanamthitta
61	Thulasi Mohan	Royal College of Engineering and Technology
62	Vivitha Vijay	Mahaguru Institute of Technology
63	Dr. Sinith M. S.	Government Engineering College Thrissur
64	Dr. Birenjith P. S.	Government Engineering College Barton Hill

2. Faculties from SCT College of Engineering

Sl No.	Name	Name of the Institution
1	Aparna P. R.	Sree Chitra Thirunal College of Engineering
2	Asha S.	Sree Chitra Thirunal College of Engineering
3	Binu Rajan M. R.	Sree Chitra Thirunal College of Engineering
4	Deepa A. K.	Sree Chitra Thirunal College of Engineering
5	Dr. Libish T. M.	Sree Chitra Thirunal College of Engineering
6	Dr. Jisu Elsa Jacob	Sree Chitra Thirunal College of Engineering
7	Kavitha K. V.	Sree Chitra Thirunal College of Engineering
8	Kumar G. S.	Sree Chitra Thirunal College of Engineering
9	Nisha Jose K.	Sree Chitra Thirunal College of Engineering
10	Preeja V.	Sree Chitra Thirunal College of Engineering
11	Preetha V. H.	Sree Chitra Thirunal College of Engineering
12	Rejimoan R.	Sree Chitra Thirunal College of Engineering
13	Rejimol Robinson R. R.	Sree Chitra Thirunal College of Engineering
14	Sajith Sethu P.	Sree Chitra Thirunal College of Engineering
15	Sandhya L.	Sree Chitra Thirunal College of Engineering
16	Soja Salim	Sree Chitra Thirunal College of Engineering
17	Dr. Soniya B.	Sree Chitra Thirunal College of Engineering
18	Dr. Sreejith B. J.	Sree Chitra Thirunal College of Engineering
19	Sumesh C. K.	Sree Chitra Thirunal College of Engineering

3. Research Scholars

Sl No.	Name	Name of the Institution
1	Anoop C. V.	National Institute of Technology Calicut
2	Divya Sasidharan	NSS College of Engineering Palakkad
3	Jasitha P.	National Institute of Technology Calicut
4	Remya Gopalakrishnan	National Institute of Technology Calicut
5	Remya R. Nair	NSS College of Engineering Palakkad
6	Sajeer M.	National Institute of Technology Calicut
7	Shahnazeer C. K.	Pondicherry University Karaikal Campus Karaikal
8	Athira Shaji	Sree Chitra Thirunal College of Engineering

4. PG Scholars

Sl No.	Name	Name of the Institution
1	Aarya P. Ajith	LBS Institute of Technology for Women
2	Akhila Ashok J.	LBS Institute of Technology for Women
3	Amina Seyyadali S.	LBS Institute of Technology for Women
4	Anija J. Anilkumar	LBS Institute of Technology for Women
6	Arya J. Kumar	LBS Institute of Technology for Women
7	Aswathy Vishnu	LBS Institute of Technology for Women
8	Aswathy A. P.	LBS Institute of Technology for Women
9	Febi B. S.	LBS Institute of Technology for Women
10	Gouri Nandhana	LBS Institute of Technology for Women
11	Haleema S. H.	LBS Institute of Technology for Women
12	Jancy J. S.	LBS Institute of Technology for Women
13	Neethu A. P.	LBS Institute of Technology for Women
14	Niji K. Raj	LBS Institute of Technology for Women
15	Nimi S. Das	LBS Institute of Technology for Women
16	Pooja Das	LBS Institute of Technology for Women
17	Revathy A.	LBS Institute of Technology for Women
18	Shilpa M.	LBS Institute of Technology for Women
19	Adhithya Ajayan	Sree Chitra Thirunal College of Engineering
20	Anamica S. Nair	Sree Chitra Thirunal College of Engineering
21	Aswani K. Raj	Sree Chitra Thirunal College of Engineering
22	Farzana Nazar	Sree Chitra Thirunal College of Engineering
23	Harishma S. Nair	Sree Chitra Thirunal College of Engineering
24	Jishnu G. M.	Sree Chitra Thirunal College of Engineering
25	Jumana A	Sree Chitra Thirunal College of Engineering
26	Kavya G. Krishna	Sree Chitra Thirunal College of Engineering
27	Lingesh Siva S.	Sree Chitra Thirunal College of Engineering
28	Nisa Shihab S.	Sree Chitra Thirunal College of Engineering
29	Parvathy Lakshmy	Sree Chitra Thirunal College of Engineering
30	Reshma M. S.	Sree Chitra Thirunal College of Engineering
31	Vignesh U. S.	Sree Chitra Thirunal College of Engineering

<div align="center">

Sree Chitra Thirunal College of Engineering
Department of Electronics & Communication Engineering
Attendance Statement

</div>

Sl No.	Name	06-09-2021		07-09-2021		08-09-2021		09-09-2021		10-09-2021	
		FN	AN	FN	AN	FN	AN	FN	AN	FN	AN
1	Adersh V. R.	X	X	X	X	X	X	X	X	X	X
2	Aishwarya Rajeev	X	X	X	X	X	X	X	X	X	X
3	Aiswarya N. R.	X	X	X	X	X	X	X	X	X	X
4	Ajish Kumar K. S.	X	X	X	X	X	X	X	X	X	X
5	Alfred Thomas	X	X	X	X	X	X	X	X	X	X
6	Ali Akbar N.	X	X	X	X	X	X	X	X	X	X
7	Ameenudeen P. E.	X	X	X	X	X	X	X	X	X	X
8	Amit Doegar	X	X	X	X	X	X	X	X	X	X
9	Anitha L.	X	X	X	X	X	X	X	X	X	X
10	Anjali S. V.	X	X	X	X	X	X	X	X	X	X
11	Anju J. S.	X	X	X	X	X	X	X	X	X	X
12	Anju K. B.	X	X	X	X	X	X	X	X	X	X
13	Anuja A. C.	X	X	X	X	X	X	X	X	X	X
14	Aruna A. S.	X	X	X	X	X	X	X	X	X	X
15	Baby C. J.	X	X	X	X	X	X	X	X	X	X
16	Bincy Antony M.	X	X	X	X	X	X	X	X	X	X
17	Binet Rose Devassy	X	X	X	X	X	X	X	X	X	X
18	Bushra Abdulla N. T.	X	X	X	X	X	X	X	X	X	X
19	Dhanya S.	X	X	X	X	X	X	X	X	X	X
20	Dileep M. R.	X	X	X	X	X	X	X	X	X	X
21	Dilna P. M.	X	X	X	X	X	X	X	X	X	X
22	Dinu A. G.	X	X	X	X	X	X	X	X	X	X
23	Dr. Susmitha Vekkot	X	X	X	X	X	X	X	X	X	X
24	Dr. Amar Kumar Dey	X	X	X	X	X	X	X	X	X	X
25	Dr. Anita Brigit Mathew	X	X	X	X	X	X	X	X	X	X
26	Dr. Anzar S. M.	X	X	X	X	X	X	X	X	X	X
27	Dr. Bindu P. V.	X	X	X	X	X	X	X	X	X	X
28	Dr. Maya Mohan	X	X	X	X	X	X	X	X	X	X
29	Dr. Poornima S.	X	X	X	X	X	X	X	X	X	X
30	Dr.Rasmi A.	X	X	X	X	X	X	X	X	X	X
31	Gregorious Jose C.	X	X	X	X	X	X	X	X	X	X
32	Jisha C. S.	X	X	X	X	X	X	X	X	X	X
33	Job Chunkath	X	X	X	X	X	X	X	X	X	X
34	Joseph George	X	X	X	X	X	X	X	X	X	X
35	Kalpana George	X	X	X	X	X	X	X	X	X	X
36	Dr. Leena Mary	X	X	X	X	X	X	X	X	X	X
37	Leena Narayanan	X	X	X	X	X	X	X	X	X	X
38	Lemya Sainudeen	X	X	X	X	X	X	X	X	X	X
39	Manu Jose	X	X	X	X	X	X	X	X	X	X
40	Neetha K.	X	X	X	X	X	X	X	X	X	X
41	Nikesh P.	X	X	X	X	X	X	X	X	X	X
42	Nisha J. R.	X	X	X	X	X	X	X	X	X	X
43	Nisha S. M.	X	X	X	X	X	X	X	X	X	X
44	Nishley E. Joseph	X	X	X	X	X	X	X	X	X	X
45	Prajitha M. V.	X	X	X	X	X	X	X	X	X	X
46	Rajeev K. K.	X	X	X	X	X	X	X	X	X	X
47	Ranjini Surendran	X	X	X	X	X	X	X	X	X	X
48	Ranjini Surendran	X	X	X	X	X	X	X	X	X	X

49	Renjini Rani K. S.	X	X	X	X	X	X	X	X	X	X
50	Shabeer K. P.	X	X	X	X	X	X	X	X	X	X
51	Sidharth N.	X	X	X	X	X	X	X	X	X	X
52	Sivakumar R.	X	X	X	X	X	X	X	X	X	X
53	Sreedevi M. G.	X	X	X	X	X	X	X	X	X	X
54	Sreenivasulu K. N.	X	X	X	X	X	X	X	X	X	X
55	Sruthy Manmadhan	X	X	X	X	X	X	X	X	X	X
56	Subha P. S.	X	X	X	X	X	X	X	X	X	X
57	Subhija E. N.	X	X	X	X	X	X	X	X	X	X
58	Sudhi S.	X	X	X	X	X	X	X	X	X	X
59	Swapna H.	X	X	X	X	X	X	X	X	X	X
60	Teena Joseph	X	X	X	X	X	X	X	X	X	X
61	Thulasi Mohan	X	X	X	X	X	X	X	X	X	X
62	Vivitha Vijay	X	X	X	X	X	X	X	X	X	X
63	Dr. Sinith M. S.	X	X	X	X	X	X	X	X	X	X
64	Dr. Birenjith P. S.	X	X	X	X	X	X	X	X	X	X
65	Aparna P. R.	X	X	X	X	X	X	X	X	X	X
66	Asha S.	X	X	X	X	X	X	X	X	X	X
67	Binu Rajan M. R.	X	X	X	X	X	X	X	X	X	X
68	Deepa A. K.	X	X	X	X	X	X	X	X	X	X
69	Dr. Libish T. M.	X	X	X	X	X	X	X	X	X	X
70	Dr. Jisu Elsa Jacob	X	X	X	X	X	X	X	X	X	X
71	Kavitha K. V.	X	X	X	X	X	X	X	X	X	X
72	Kumar G. S.	X	X	X	X	X	X	X	X	X	X
73	Nisha Jose K.	X	X	X	X	X	X	X	X	X	X
74	Preeja V.	X	X	X	X	X	X	X	X	X	X
75	Preetha V. H.	X	X	X	X	X	X	X	X	X	X
76	Rejimoan R.	X	X	X	X	X	X	X	X	X	X
77	Rejimol Robinson R. R.	X	X	X	X	X	X	X	X	X	X
78	Sajith Sethu P.	X	X	X	X	X	X	X	X	X	X
79	Sandhya L.	X	X	X	X	X	X	X	X	X	X
80	Soja Salim	X	X	X	X	X	X	X	X	X	X
81	Dr. Soniya B.	X	X	X	X	X	X	X	X	X	X
82	Dr. Sreejith B. J.	X	X	X	X	X	X	X	X	X	X
83	Sumesh C. K.	X	X	X	X	X	X	X	X	X	X
84	Anoop C. V.	X	X	X	X	X	X	X	X	X	X
85	Divya Sasidharan	X	X	X	X	X	X	X	X	X	X
86	Jasitha P.	X	X	X	X	X	X	X	X	X	X
87	Remya Gopalakrishnan	X	X	X	X	X	X	X	X	X	X
88	Remya R. Nair	X	X	X	X	X	X	X	X	X	X
89	Sajeer M.	X	X	X	X	X	X	X	X	X	X
90	Shahnazeer C. K.	X	X	X	X	X	X	X	X	X	X
91	Athira Shaji	X	X	X	X	X	X	X	X	X	X
92	Aarya P. Ajith	X	X	X	X	X	X	X	X	X	X
93	Akhila Ashok J.	X	X	X	X	X	X	X	X	X	X
94	Amina Seyyadali S.	X	X	X	X	X	X	X	X	X	X
95	Anija J. Anilkumar	X	X	X	X	X	X	X	X	X	X
96	Arya J. Kumar	X	X	X	X	X	X	X	X	X	X
97	Aswathy Vishnu	X	X	X	X	X	X	X	X	X	X
98	Aswathy A. P.	X	X	X	X	X	X	X	X	X	X
99	Febi B. S.	X	X	X	X	X	X	X	X	X	X
100	Gouri Nandhana	X	X	X	X	X	X	X	X	X	X
101	Haleema S. H.	X	X	X	X	X	X	X	X	X	X

102	Jancy J. S.	X	X	X	X	X	X	X	X	X	X
103	Neethu A. P.	X	X	X	X	X	X	X	X	X	X
104	Niji K. Raj	X	X	X	X	X	X	X	X	X	X
105	Nimi S. Das	X	X	X	X	X	X	X	X	X	X
106	Pooja Das	X	X	X	X	X	X	X	X	X	X
107	Revathy A.	X	X	X	X	X	X	X	X	X	X
108	Shilpa M.	X	X	X	X	X	X	X	X	X	X
109	Adhithya Ajayan	X	X	X	X	X	X	X	X	X	X
110	Anamica S. Nair	X	X	X	X	X	X	X	X	X	X
111	Aswani K. Raj	X	X	X	X	X	X	X	X	X	X
112	Farzana Nazar	X	X	X	X	X	X	X	X	X	X
113	Harishma S. Nair	X	X	X	X	X	X	X	X	X	X
114	Jishnu G. M.	X	X	X	X	X	X	X	X	X	X
115	Jumana A	X	X	X	X	X	X	X	X	X	X
116	Kavya G. Krishna	X	X	X	X	X	X	X	X	X	X
117	Lingesh Siva S.	X	X	X	X	X	X	X	X	X	X
118	Nisa Shihab S.	X	X	X	X	X	X	X	X	X	X
119	Parvathy Lakshmy	X	X	X	X	X	X	X	X	X	X
120	Reshma M. S.	X	X	X	X	X	X	X	X	X	X
121	Vignesh U. S.	X	X	X	X	X	X	X	X	X	X

Assessment - KTU Sponsored FDP on "Research Perspectives of Machine Learning & Deep Learning for Signal Processing Applications"

Final Evaluation

* Required

1. Email *

   _____

2. Name *

   _____

3. Designation *

   _____

4. Name of Institution *

   _____

Untitled Section

5. Spam email detection is an example of :

   Mark only one oval.

   ⚪ Named Entity Recognition

   ⚪ Sentiment Analysis

   ⚪ Text classification

   ⚪ Word Sense Disambiguation

6. "I saw her duck" is an example of :

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○ Syntactic Ambiguity

○ Semantic Ambiguity

○ Pragmatic Ambiguity

○ Referential ambiguity.

7. "I saw the girl with a telescope" is an example of :

Mark only one oval.

○ Syntactic Ambiguity

○ Semantic Ambiguity

○ Pragmatic Ambiguity

○ Referential ambiguity.

8. Which of these is not a recursive neural network

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○ LSTM

○ GRU

○ Transformer

○ None of these

9. Which of these is not an LSTM gate

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○ Input gate

○ Latent gate

○ Forget gate

○ Output gate

10. The belief state in a POMDP (finite state and action spaces) can be computed using

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○ Hidden Markov Model filter

○ ARMA filter

○ Weiner filter

○ Laplace filter

11. What is R-CNN?

Mark only one oval.

○ Region based Convolutional Neural Network.

○ Receiver based Convolutional Neural Network.

○ Recurrent based Convolutional Neural Network.

○ Recording based Convolutional Neural Network.

12. What are the other two names of transpose convolution?

Mark only one oval.

○ Fractional Stride and Deconvolution.

○ Dilated Convolution and Atrous Convolution

○ Spatially Separable Convolution and Depthwise Convolution

○ None of these

13. What is the concept involved behind upsampling?

Mark only one oval.

○ Transpose Convolution.

○ Pooling

○ Padding

○ None of these

14. Encoder and Decoder embedded with copy and crop is the uniqueness of U-Net architecture

   Mark only one oval.

   ◯ True

   ◯ False

15. Contracting path and Expanding path are the two paths involved in U-Net architecture?

   Mark only one oval.

   ◯ True

   ◯ False

16. The input to a system is a Gaussian process. In which of the following systems, the output will not be a Gaussian process.

   Mark only one oval.

   ◯ squaring

   ◯ integration

   ◯ differentiation

   ◯ None of these

17. How is LSTM different from GRU?

   Mark only one oval.

   ◯ LSTM has a forgetting factor while GRU doesn't have.

   ◯ Both are not related

   ◯ GRU has a forgetting factor while LSTM doesn't have.

   ◯ Both are same

18. What is the advantage of RNN with respect to CNN?

Mark only one oval.

○ RNN is faster than CNN

○ RNN can model sequential data

○ RNN in not based on Neural Network while CNN is based on it.

○ Both are uncorrelated

19. Back propagation network uses gradient descent algorithm, True or false

Mark only one oval.

○ True

○ False

20. Which of the following cannot represent sequential data?

Mark only one oval.

○ RNN

○ CNN

○ GRU

○ HMM

○ None of these

21. The set { (1,-2,6), (5,-10,30) } is

Mark only one oval.

○ Linearly dependent

○ Linearly independent

○ Basis

○ None of these

22. If W is subspace of vector space V then

Mark only one oval.

○ dim W = dim V

○ dim W < dim V

○ dim W > dim V

○ dim W ≤ dim V

23. In gradient descent algorithm, we move

Mark only one oval.

○ along the direction of gradient

○ along the opposite direction of gradient

○ along the direction orthogonal to gradient

○ along the direction that depends both on gradient and current point

24. In the paradigm of federated learning as applied to auto-fill feature of smart-phone keyboards, newly formed words will be auto-completed for a user

Mark only one oval.

○ only if the specific user has already used it

○ if any of the users have used it once

○ if sufficient number of users have used it sufficiently many times

○ Any of these

25. Federated learning ensures

Mark only one oval.

- ( ) privacy of users data
- ( ) fast learning
- ( ) distributed learning of centralized model
- ( ) both privacy of users data and distributed learning of centralized model

26. Multi layer Neural Network with linear activation functions is a linear classifier

Mark only one oval.

- ( ) True
- ( ) False

27. In supervised learning

Mark only one oval.

- ( ) we need to have both training samples and true output labels associated with each training example
- ( ) we only need training example
- ( ) We only need true output labels associated with each training example
- ( ) none of these

28. Pooling layers are widely used for a number of reasons

Mark only one oval.

- ( ) Gain robustness to exact location of the features
- ( ) Reduce computational (memory) cost
- ( ) Help preventing overfitting
- ( ) Increase receptive field of following layers
- ( ) All of these

29. Which of the following activation functions can lead to vanishing gradients?

Mark only one oval.

- ◯ ReLU
- ◯ Tanh
- ◯ Leaky ReLU
- ◯ None of these

30. Which of the following formulation helps to recover a low rank signal + sparse signal?

Mark only one oval.

- ◯ Gradient descent
- ◯ Iterative shrinkage and thresholding
- ◯ Robust PCA
- ◯ MMSE

31. A neural network can be trained by

Mark only one oval.

- ◯ Message passing
- ◯ Expectation-Maximization
- ◯ Back propagation
- ◯ Matrix factorization

32. The thresholding operation in ISTA arises due to

Mark only one oval.

- ◯ L1 norm regularization
- ◯ Gradient descent
- ◯ Lp,q norm regularization
- ◯ L2 norm regularization

33. Why is overfitting more likely to occur on smaller datasets?

Mark only one oval.

- ◯ Because in a smaller dataset, your validation data is more likely to look like your training data
- ◯ Because there isn't enough data to activate all the convolutions or neurons
- ◯ Because with less data, the training will take place more quickly, and some features may be missed
- ◯ Because there's less likelihood of all possible features being encountered in the training process

34. The most suitable activation function for hidden layer

Mark only one oval.
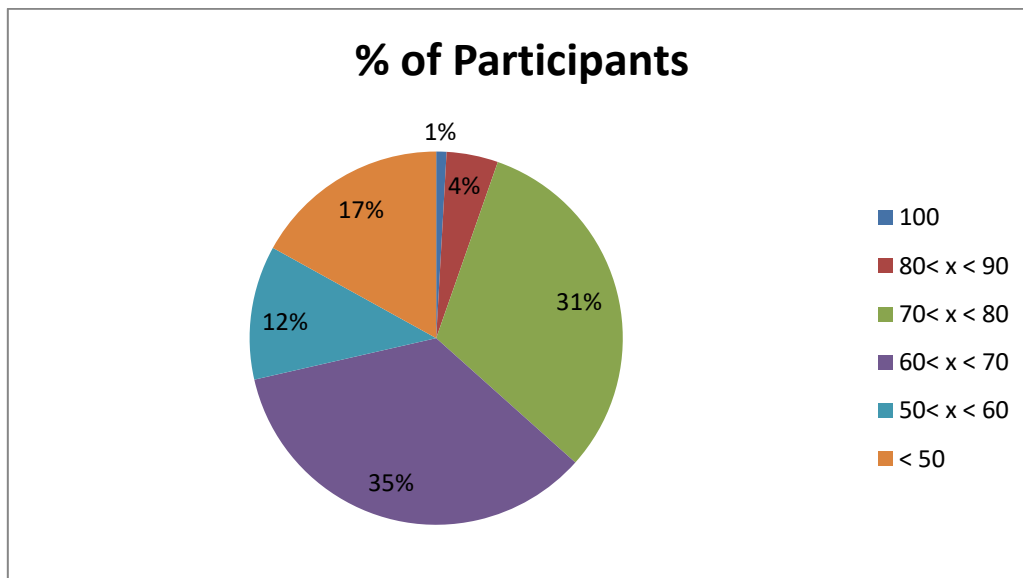
- ◯ Sigmoid
- ◯ Softmax
- ◯ ReLU
- ◯ Tanh

Sree Chitra Thirunal College of Engineering
Department of Electronics & Communication Engineering
Insights of Final Assessment Test Results

Total Number Participants Attended		112
Average point scored	Median	Range
21.43 / 30 points	22/ 30 points	6 - 30 points

Score	% of Participants
100	0.9
80< x < 90	4.5
70< x < 80	31.3
60< x < 70	34.8
50< x < 60	11.6
< 50	17.0

Feedback for "Perspectives of Machine Learning & Deep Learning Algorithms" by Dr. Ram Prasad K

70 responses

Publish analytics

1. Speakers's knowledge of the subject

Copy

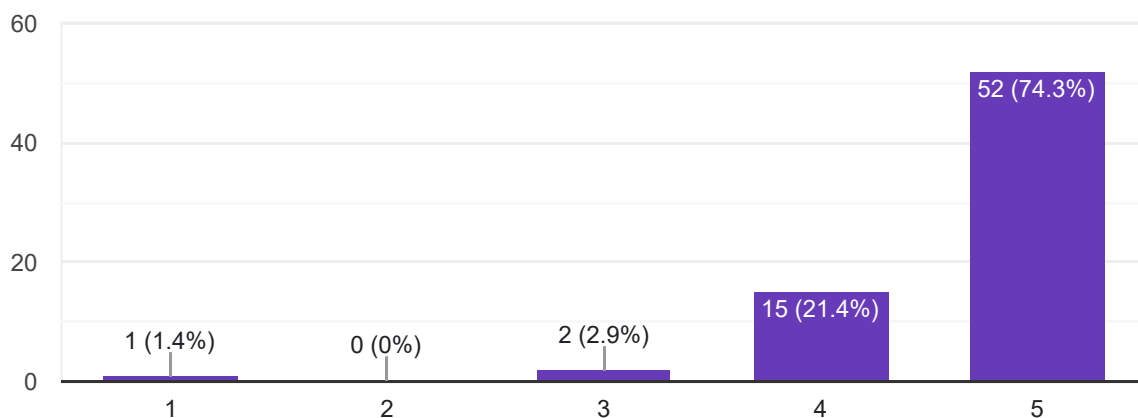70 responses

Bar chart showing responses for "Speaker's knowledge of the subject":
- 1: 0 (0%)
- 2: 1 (1.4%)
- 3: 2 (2.9%)
- 4: 14 (20%)
- 5: 53 (75.7%)
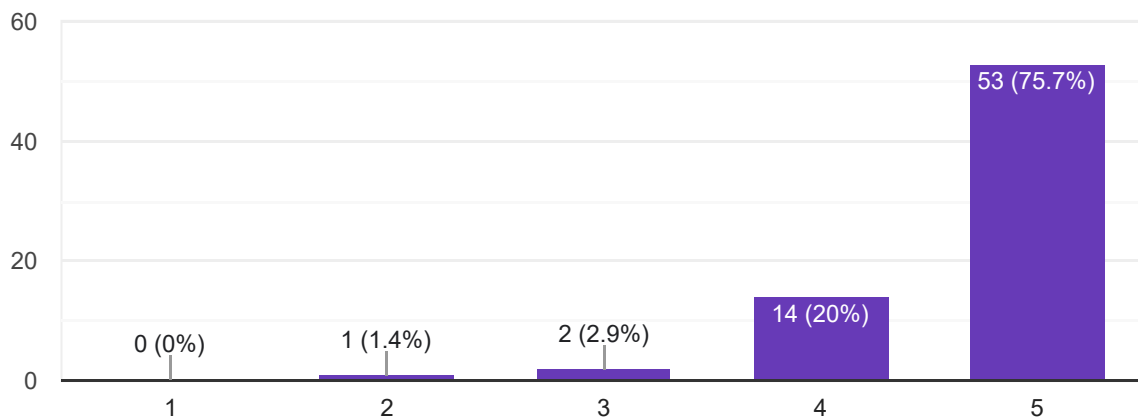
2. Speaker's preparedness for the session

Copy

70 responses

Bar chart showing responses for "Speaker's preparedness for the session":
- 1: 1 (1.4%)
- 2: 0 (0%)
- 3: 2 (2.9%)
- 4: 15 (21.4%)
- 5: 52 (74.3%)

3. Speaker's ability to convey the contents delivered

Copy

70 responses

- 1: 0 (0%)
- 2: 1 (1.4%)
- 3: 1 (1.4%)
- 4: 14 (20%)
- 5: 54 (77.1%)
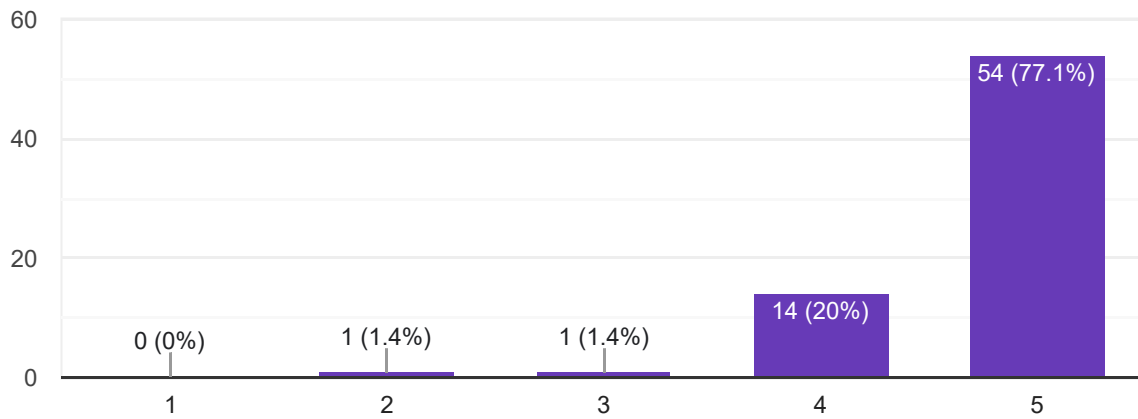
4. Relevance of the content of the presentation

Copy

70 responses

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- 2: 0 (0%)
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- 5: 52 (74.3%)
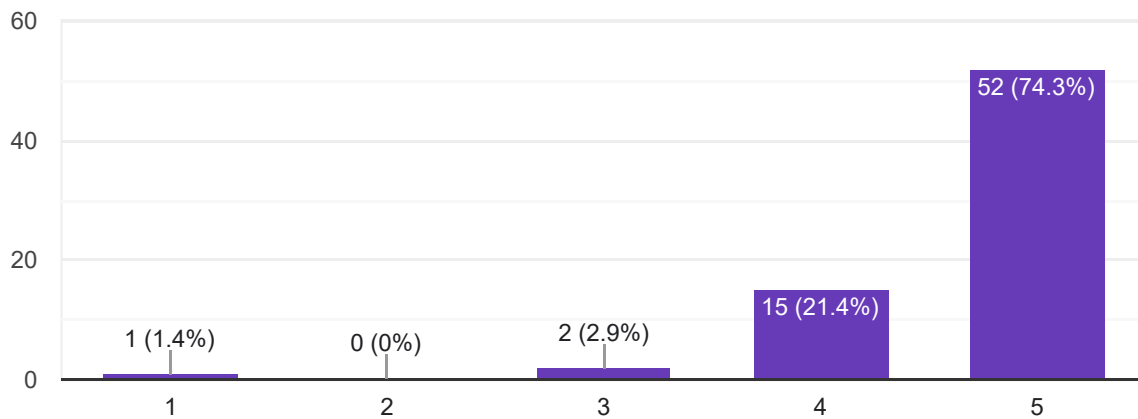
5. Overall effectiveness of the session

Copy

70 responses

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- 4: 14 (20%)
- 5: 53 (75.7%)
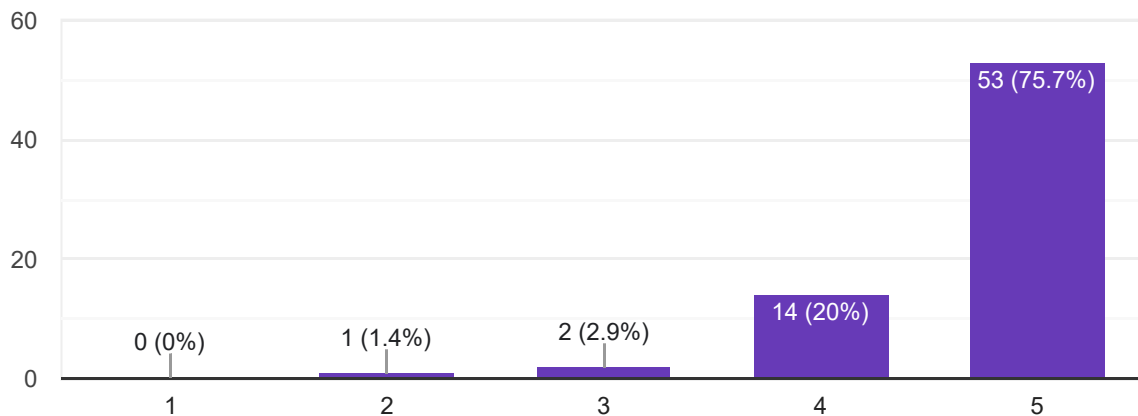
6. Strengths of this Session

26 responses

Sir,Started from the basics and explained using simple examples

Good background knowledge

Got more information about the perspectives

Understanding

Gave an overview of machine learning techniques including the latest trends.

Excellent presentation, was able to understand the topics clearly

Information on latest research in the area

Very Relevant Topic

Well explained

Effective

research ideas

Information about textbook for Deep learning and job search sites

very informative

Excellent Way of Presentation

Good presentation

Able to understand about the basic concept of machine learning and deep learning clearly

easy explanation

Knowledge on latest trends

Excellent

Detail explanation

Relevant

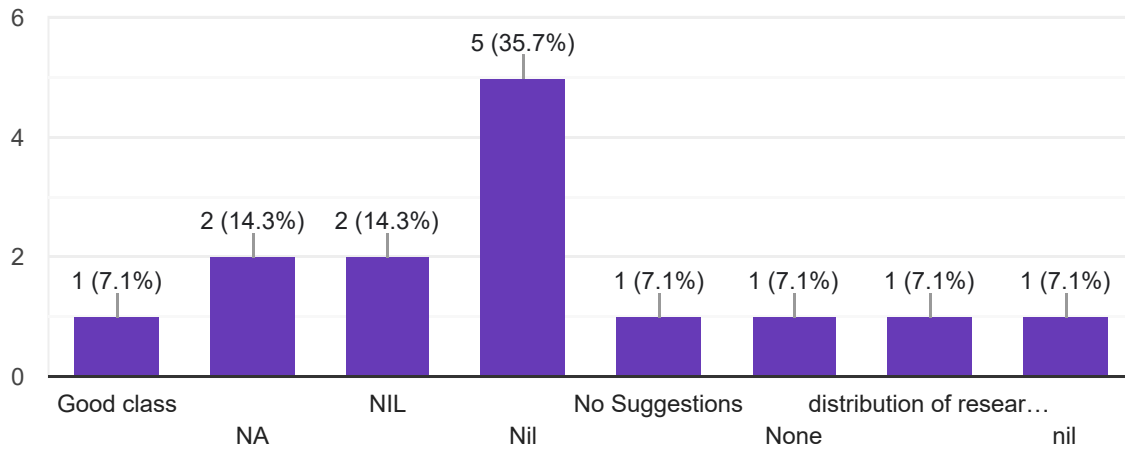Informative session

Good

Knowledge gain

Speakers's knowledge

good

7. Suggestions for improvement
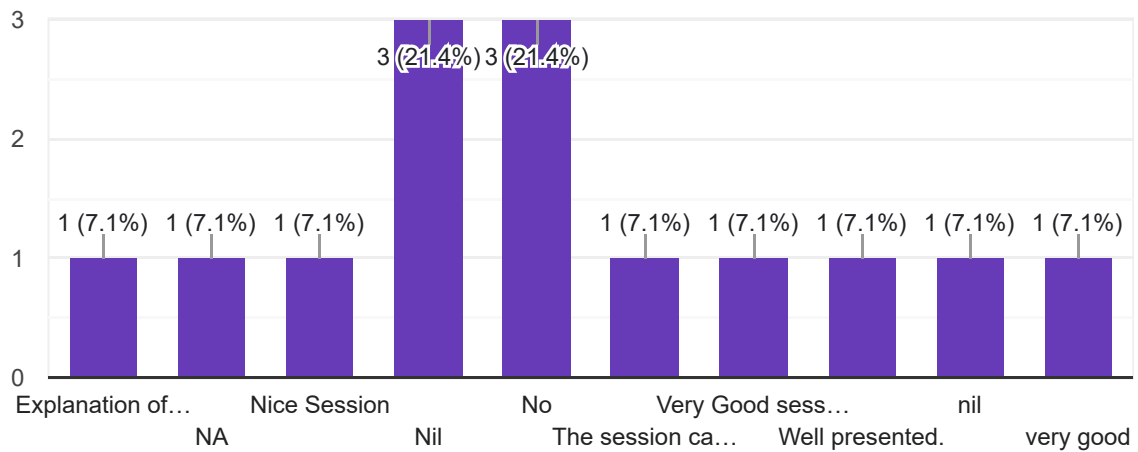
Copy

14 responses

Bar chart with categories and counts:
- Good class: 1 (7.1%)
- NA: 2 (14.3%)
- NIL: 2 (14.3%)
- Nil: 5 (35.7%)
- No Suggestions: 1 (7.1%)
- None: 1 (7.1%)
- distribution of resear…: 1 (7.1%)
- nil: 1 (7.1%)

8. Any additional comments

Copy

14 responses

Bar chart with categories and counts:
- Explanation of…: 1 (7.1%)
- NA: 1 (7.1%)
- Nice Session: 1 (7.1%)
- Nil: 3 (21.4%)
- No: 3 (21.4%)
- The session ca…: 1 (7.1%)
- Very Good sess…: 1 (7.1%)
- Well presented.: 1 (7.1%)
- nil: 1 (7.1%)
- very good: 1 (7.1%)

Google Forms

Overall FDP Feedback

KTU FDP on " Research Perspectives of Machine Learning & Deep Learning for Signal Processing Applications"

Ratings have been provided on a scale of 1 to 5, 1 being worst and 5 being excellent.

1. 1.   Relevance of the FDP Topics   *

   Mark only one oval.

	1	2	3	4	5
	⬭	⬭	⬭	⬭	⬭

2. 2.   Usefulness of Information presented in various sessions *

   Mark only one oval.

	1	2	3	4	5
	⬭	⬭	⬭	⬭	⬭

3. 3.   Quality of presentations *

   Mark only one oval.

	1	2	3	4	5
	⬭	⬭	⬭	⬭	⬭

4.   4.   Overall organization of the FDP *

Mark only one oval.

	1	2	3	4	5
	◯	◯	◯	◯	◯

5.   5.   Extent to which FDP met your expectations *

Mark only one oval.

	1	2	3	4	5
	◯	◯	◯	◯	◯

6.   6. Strengths of the FDP

_____

_____

_____

_____

_____

7.   7. Suggestions for improvement

_____

_____

_____

_____

_____

8.   8. Any additional comments

_____

_____

_____

_____

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Google Forms

Overall FDP Feedback

58 responses

1. Relevance of the FDP Topics
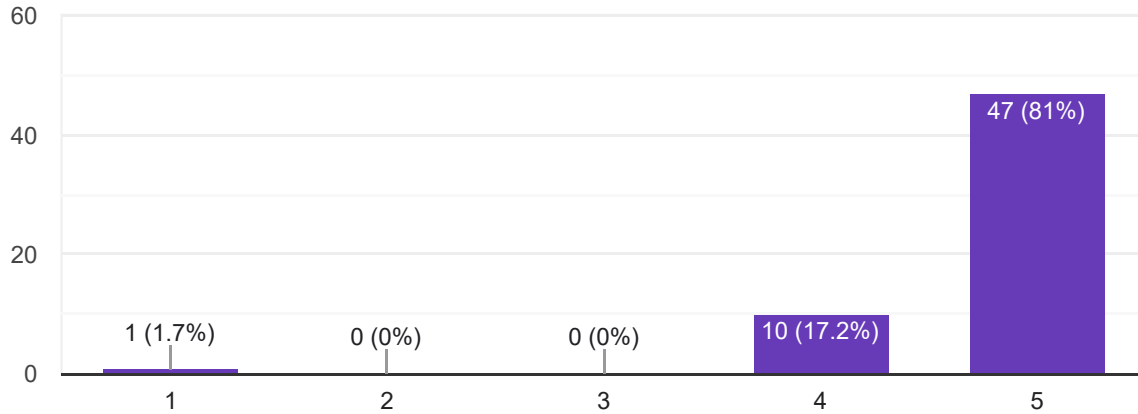
58 responses

Copy

47 (81%)

10 (17.2%)

1 (1.7%)   0 (0%)   0 (0%)

60

40

20

0

1   2   3   4   5

2. Usefulness of Information presented in various sessions

58 responses

Copy

42 (72.4%)

Copy chart

15 (25.9%)

1 (1.7%)   0 (0%)   0 (0%)

60

40

20

0

1   2   3   4   5
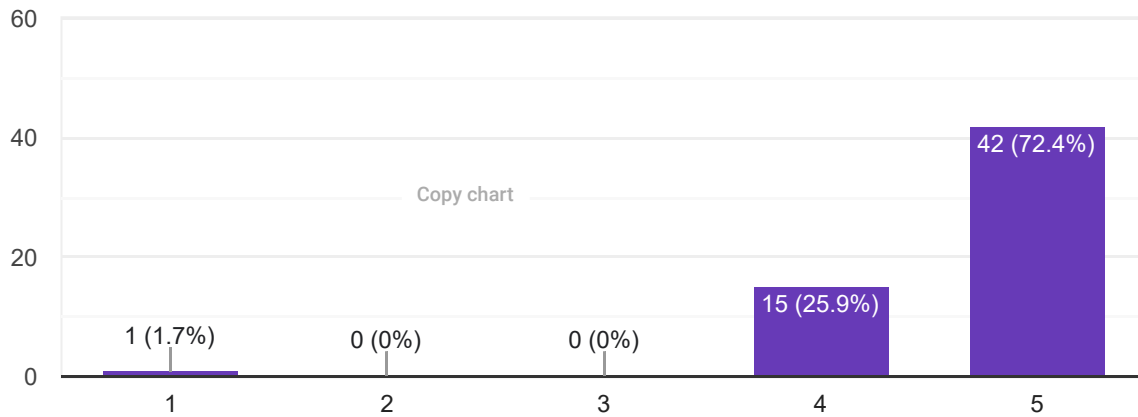
3. Quality of presentations

58 responses

Rating	Count
1	1 (1.7%)
2	0 (0%)
3	1 (1.7%)
4	15 (25.9%)
5	41 (70.7%)
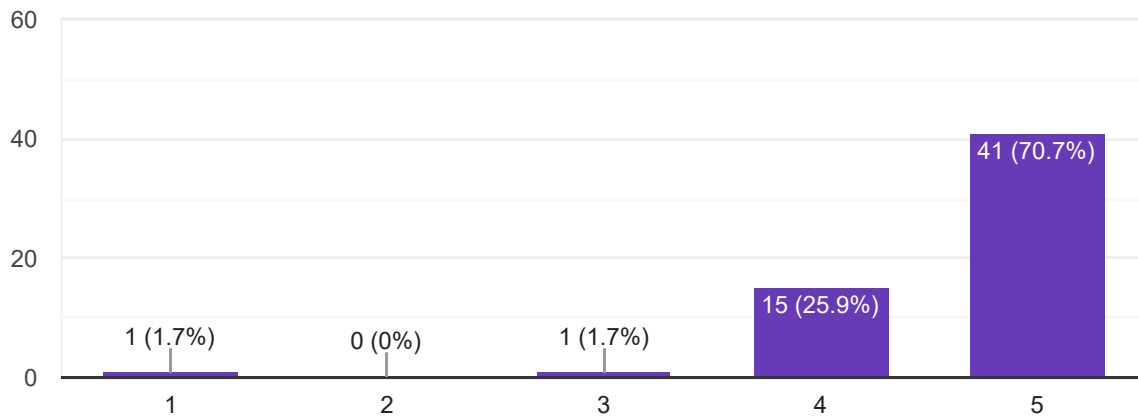
4. Overall organization of the FDP

58 responses

Rating	Count
1	1 (1.7%)
2	0 (0%)
3	0 (0%)
4	12 (20.7%)
5	45 (77.6%)
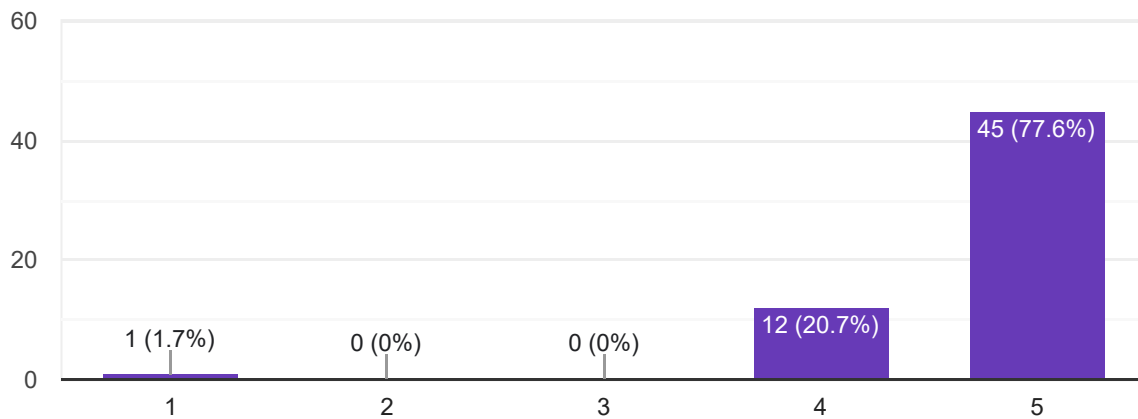
Copy chart

5. Extent to which FDP met your expectations

58 responses

Rating	Count
1	1 (1.7%)
2	0 (0%)
3	1 (1.7%)
4	18 (31%)
5	38 (65.5%)
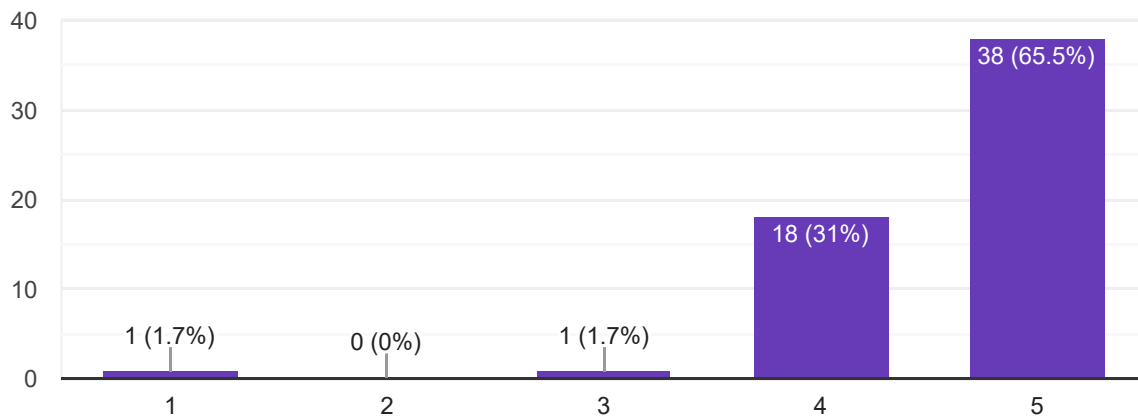
6. Strengths of the FDP

15 responses

All the sessions were very informative and excellent presentation and also very interesting

All the sessions were very useful.

Resource persons selection

Excellent

Good sessions

Learned more about the current topics and its applications in various fields

Excellent resource persons

Knowledge gain

Competent resource persons with willingness to answer doubts

Contents, Speakers, the team behind

Very much effective for the persons who are doing research in this area.

Excellent

Eminent Speakers

Copy chart

Hand on sessions, research resources

Good session

7. Suggestions for improvement

11 responses

Nil

No suggestions... Everything was up to the mark

nil

Continuous three hours is tedious task. Can reduce to two hours as per ktu on upcoming fdps.

Can be split-up into a series of FDPs focusing on different aspects

Little bit lengthy, max 4 hrs with 15mints break in between each hour

Include Hands on session

NIL

No Suggestion

8. Any additional comments

8 responses

Nil

TRy to include histopathology area   Copy chart

No

Looking forward to attend an offline session at SCT!!!!

Well Done

Very Good FDP

Google Forms

SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING

Pappanamcode, Thiruvananthapuram 695018, Kerala

(Established in 1995 under the Govt. of Kerala)

KTU Sponsored Faculty Development Programme on
"Research Perspectives of Machine Learning and Deep Learning for Signal Processing Applications"

SCTCE/FDPEC/MDL-F53

CERTIFICATE

This is to certify that

Sreenivasulu K. N.

Nagarjuna College of Engineering and Technology, Bangalore

has participated in the Five-Day Online Faculty Development Programme on "Research Perspectives of Machine

Learning and Deep Learning for Signal Processing Applications" sponsored by APJ Abdul Kalam Technological

University, Kerala and organized by the Department of Electronics & Communication Engineering, SCT College of

Engineering, Pappanamcode, Thiruvananthapuram from 6th to 10th September 2021.

Dr. Lakshmi V S	Prof. Bindu V	Dr. Sheeja M K	Dr. Jayasudha J S
Coordinator	Coordinator	Head of the Department, ECE	Principal

SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING, PAPPANAMCODE, THIRUVANANTHAPURAM

Report on Five days Online FDP on "THE ART GALLERY OF ENGINEERING GRAPHICS "

Event Type   : **FACULTY DEVELOPMENT PROGRAM (FDP) Sponsored by APJ Abdul Kalam Technological University**

Date / Duration   : 2ND – 6TH AUGUST, 2021 (FIVE DAYS)

Chief Patron   : Dr. Jayasudha J S, Principal, SCTCE

Convener   : Dr. Anoopkumar S, HOD - Mechanical

Coordinators   : Dr. S H Anilkumar, Professor
                             Dr. Arun M, Assistant Professor

Total no of Participants: 64 (Internal Count = 26 & External Count = 38)

Objective of the event: The Objective of this FDP is to create awareness and emphasize the need for Engineering Graphics in all the branches of Engineering, to follow basic drawing standards and conventions and to develop skills in three-dimensional visualization of engineering component.

Outcome of event:

      1) The faculty will be able to teach the students to prepare drawings as per BIS standards, effectively deal with specific geometrical problems in plane geometry involving lines and draw orthographic projection of engineering components working from pictorial drawings.

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Description / Report on Event:

    The five days online FDP program began with Prayer and Welcome speech by the coordinator Dr. S H Anilkumar. Inaugural function was addressed by Principal Dr. Jayasudha J S who expressed the importance of engineering graphics in all the engineering streams. The FDP was inaugurated by Dr. C Muraleedharan, HOD (ME) NIT Kozhikode, who explained the impact of Engineering Graphics in the daily life of an Engineer. Dean Student Affairs Dr. R Ajith stressed the importance of practicing and perfecting ones drawing skills. Head of the

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On the First day of FDP **Dr. C Muraleedharan**, has narrated the importance of Engineering Graphics and explained the projection of points and lines followed by Review of fundamentals by Dr. Anilkumar S H. In the AN session, **Dr. K N Anilkumar,** Associate Professor, RIT Kottayam, presented the concept of views and projections.

During Second Day, **Dr. K N Anilkumar,** narrated the topic Projection of Solids with his real models. This was followed by discussion on different concepts of Projection of solids and the auxiliary plane method. Sections of solids was delivered by **Dr. S H Anilkumar**. In the AN session **Dr. Manu R** Professor, NIT Kozhikode presented IS code of practice in Engineering Graphics followed by Dr. Arun's activity.

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The FDP has provided an overview of Engineering Graphics that helps the teaching community in implementing effective tools in Graphics. The program ended by advising

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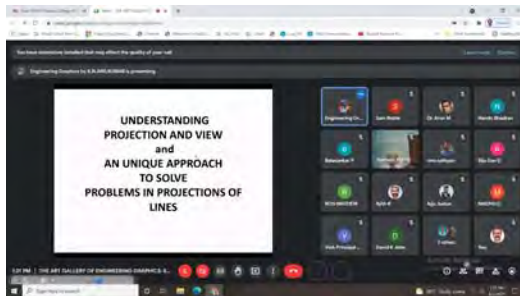
Feedback / Suggestions:

1. Satisfied with the organizing committee.

2. Conducted each sessions without delay.

3. One suggestion is that it would have ended at 3.30pm each day. Because we people from private colleges were attending it from college as most of the other faculties were from home. Anyway it was a nice experience to know that how our students feel about our online classes from their point of view.

4. Excellent conduction of programmes.

5. I feel it as a sharing of knowledge from a generation to the next.

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7. Thanks a lot for conducting this FDP especially in this pandemic time. Really I appreciate the brains and hand behind this successful venture.

Addressing by Chief Guest **Dr. C Muraleedharan, HOD (ME), NIT Kozhikode**

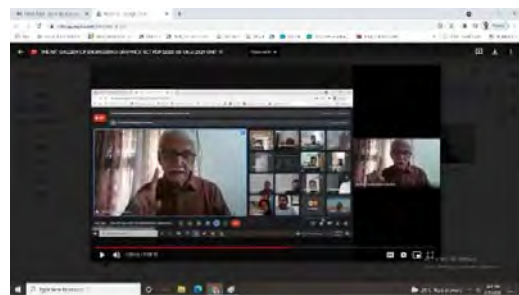Session by **Dr K. A Shafi, Professor, TKMCE**

Session by **Sri. K N Anilkumar**, Associate Professor, RIT Kottayam

Presentation By Resource person

Deliberating the Isometric Projections on Day3 by **Dr. N Asok kumar**, CET

Addressing State of Art Teaching by **Dr. N R Unnikrishna Kartha**

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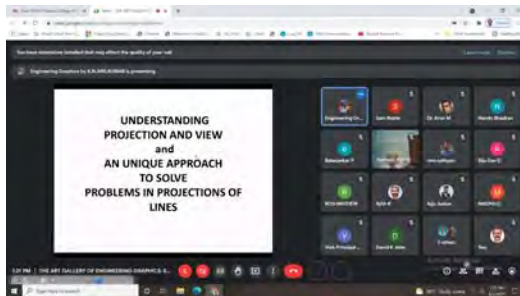
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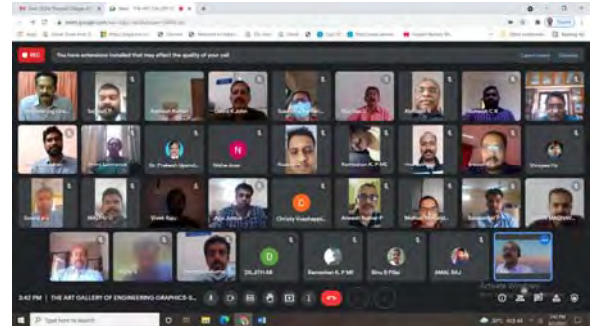
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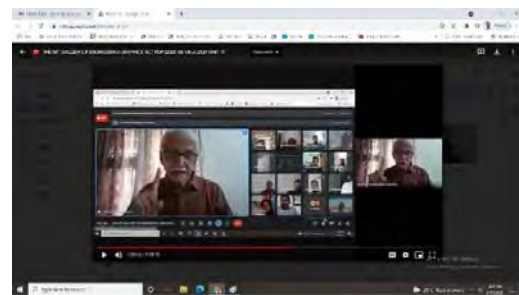

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Deliberating the Isometric Projections on Day3 by **Dr. N Asok kumar**, CET

Addressing State of Art Teaching by **Dr. N R Unnikrishna Kartha**

<div align="center">

Workshop

on

Outcome Based Education

Sri Chitra Thirunal College of Engineering, Thiruvananthapuram

</div>

Good teachers want good learning to occur as a result of their teaching. Good learning means, besides recalling information, acquiring the ability of problem-solving and critical and creative thinking. Students learn well when

- they are provided information about the course outcomes (what the students should be able to do at the end of the course), their responsibilities, and the criteria used to evaluate their performance
- the assessment is in alignment with the stated outcomes
- instructional activities are designed and conducted to facilitate them to acquire the stated outcomes, and they are actively engaged and challenged at the right level

A course inan Undergraduate Engineering program in India needs to be designed and conducted to facilitate the students' meeting the identified Course Outcomes. The core courses together should facilitate attaining the Program Outcomes (POs) identified by the National Board of Accreditation and the Program Specific Outcomes (PSOs) identified by the Department. The two-day workshop facilitates the participants to write Course Outcomes (COs) of courses of their choice in the OBE-NBAAccreditation framework and experience computing attainments of COs, POs, and PSOs.

Workshop Outcomes

WO1. Understand Outcome Based Education and Program Outcomes

WO2. Understand the Revised-Bloomtaxonomy of learning

WO3. Write Program Specific Outcomes (PSOs) for an undergraduate engineeringprogram.

WO4. Write Course Outcomes (COs) for an engineering course to meet the selected subset of Program Outcomes and Program Specific Outcomes.

WO5. Compute the attainment of COs, PSOs, and POs

Resource Persons: Prof. N.J. Rao and Prof. K. Rajanikanth

Time-Table

Monday, 7-6-21

16.30-18.00: OBE, Accreditation and Program Outcomes   N. J. Rao

Tuesday, 8-6-21

16.30-18.00: Program Specific Outcomes and Taxonomy of Learning   K. Rajanikanth

Wednesday, 9-6-21

16.30-18.00: Taxonomy of Learning and Taxonomy Table   N. J. Rao

Thursday, 10-6-21

16.30-18.00: Writing Course Outcomes and Tagging   K. Rajanikanth

Friday, 11-6-21

16.30-18.00: Attainment of COs   N. J. Rao

Saturday, 12-6-21

11.00-12.30: Attainment of PSOs and POs   K. Rajanikanth

12.30-13.00: Discussions

FDP on E Mobility

KTU -Faculty Development Program
on **E Mobility**
26th June - 1st July 2019
REGISTRATION FORM

Name   :
Gender   :
D.O.B & Age   :
Designation:
Institution   :
Qualification   :
Experience in Years   :
Address for Communication. :

Mobile No :
E-mail ID:
Preferred Cuisine   : Veg./Non-Veg
Accommodation Required(Payment Basis): Yes/No

Sponsorship Certificate

Mr/Mrs./
Dr_____
is an employee of our Institute/College and is hereby sponsored for attending the KTU-faculty development program on "E-Mobilty" from 26th June to 2nd July 2019 at SCT College of Engineering Trivandrum. He/ She will be permitted to attend the course if selected.

Place: Signature of

Date: the sponsoring authority with seal

Patrons:

Sri. K. R. Jyothilal IAS, Principal Secretary (Transport) Govt. of Kerala
Prof(Dr.) K. Prabhakaran Nair, Principal, SCTCE

Coordinators:

Dr. Boby Philip,
Associate Professor in Electrical &Electronics Engg.
Dr.Anilkumar S. H.,
Professor in Mechanical Engg.

Contact details:

Mobile Numbers: 9447340870/ 9495741482
Email: boby@sctce.ac.in
College website: https://www.sctce.ac.in/

Important dates:

Last date for registration: **21st June 2019**
Confirmation by selected participants: **24th June 2019**

College Location (Plus code for Google Map): FXCH+6Q Thiruvananthapuram, Kerala

APJ Abdul Kalam Technological University (*Kerala Technological University*)
sponsored

Interdisciplinary
Faculty Development Program on
E- Mobility

26th June to 1st July 2019

Organised by
Department of Mechanical Engg. &
Division of Electrical Engg.

SCT College of Engineering, Pappanamcode, Thiruvananthapuram 695018

About the course:

United Nations' Environment Program(UNEP) estimates that each year 2-4 million premature deaths occur due to outdoor pollution. Road transport which extensively uses fossil fuels, is a major contributor to local air pollution and smog.

World energy council in its 2017 report says that transport systems have significant impact on environment and account for 20 to 25% world energy consumption and carbon dioxide emission. Quest for low carbon systems and cleaner have pushed the transportation electrification to greater levels.

E-mobility or Electric – Mobility refers to transportation electrification and allied technological transformations and amalgamations.

Course Objective:

The course is designed to impart training to engineering college faculty on different aspects of E-mobility. The course intends to make faculty aware of major advancements and possibilities of transportation electrification such that they can motivate students to find environmentally safe and economically viable transportation solutions suiting Indian conditions.

Areas covered:

• Transformation from IC engine driven vehicles to hybrid and electric vehicles
• Power Electronics and Drives for E-Mobility
• Battery management systems of E Vehicles.
• Charging Infrastructure for E-vehicles
• Electric, Hybrid Electric and Plug-in Hybrid Electric Vehicle System Architectures
• Modelling Simulation and Control of EVs
• Connected Cars

Resource Persons:

Experts/ researchers from industries/CDAC-Trivandrum /ANERT and engineering college faculty will engage classes.

About the organising institution:

Sree Chitra Thirunal College of Engineering was established in 1995 under Department of Transport Government of Kerala with it being the first college in south India to offer a BTech program in Automobile Engineering. It also became one of the seven colleges in Kerala State to have come under the first phase of Technical Education Quality Improvement Program(TEQIP) of Government of India.

The college has the distinction of being one of the few colleges in Kerala to get accredited in early 2000's. Currently, four BTech programs are NBA accredited. The college has conducted training in Automobile Engineering to persons from Industry. At present Mahindra Pride School in collaboration with Mechanical Engineering Department conducts skill development courses in the college campus. TATA ELXSI had in 2016 chosen this institution from a group institutions from entire India for imparting training(State of the art Automobile Technologies) within the college campus for enabling new graduates to join the job as full fledged engineers on completion of their studies.

This Kerala Technological University sponsored faculty development program is being organised jointly by Division of Electrical Engg. and Department of Mechanical Engineering of SCT College of Engineering.

How to apply:

Advance registration for the course can be done through the link:

http://bit.do/eTKko

The hard copy registration application form in given format along with sponsorship certificate should be produced when the selected participants come for attending the program. Scanned copies of the above documents should also be submitted to the contact e-mail address indicated while applying for the course online.

Who can apply:

This being an interdisciplinary course, faculty from AICTE approved Engineering Colleges from all disciplines can apply. Number of participants is limited to 30.

Registration fee:

Registration is free for faculty from KTU affiliated engineering colleges. Others will have to pay a fee of Rs500.

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

FACULTY DEVELOPMENT PROGRAMME (FDP)

PROFORMA FOR SENDING PROPOSALS

(FOR AFFILIATED COLLEGES, PROFESSIONAL BODIES & OTHER AGENCIES)

Note: Before filling up the proforma, please read carefully the rules and conditions

(To be filled in by the course coordinator)

1	Name and Address of the Host Institution	SREE CHITRA THIRUNAL COLLEGE OF ENGINEERING, PAPPANAMCODE P.O, THIRUVANANTHAPURAM - 695018
2	Title of the programme (This should convey the content & main thrust of the programme)	E-Mobility
3	Name, Designation and Address of the course coordinator (s) (One coordinator preferred, more than two not permitted)	1. **Dr. S.H Anilkumar**, Professor in Mechanical Engineering, SreeChitraThirunal College of Engineering 2. **Dr. Boby Philip** Associate Professor, Electrical engg., SreeChitraThirunal College of Engineering
4	Telephone , Mobile and Email of the coordinator(s)	0471 2490772, 9447340870, shakumar69@gmail.com 9495741482, write2boby@gmail.com
5	Highest Qualification of the coordinator(s)	PhD (NITC), PhD (IIT Kharagpur)
6	Area of specialization	1. Heat Transfer- Mechanical Engg., 2. Control systems- Electrical Engg.
7	Teaching Experience (Years)	22yrs, 17yrs
8	Industry Experience (Years)	Nil, 2yrs
9	Number of papers published	5, 5
10	Number of Short Term Courses attended	12, 10
11	Number of Short Term Courses conducted earlier	3, 1
12	Specilisation area for which the proposal is made (Please select one)	**Civil / Mechanical / Electrical and Electronics / Electronics** / **Computer science** / Basic Science

		Others (Please Specify) **Inter disciplinary**
13	The course is basically (Please select one)	1. Subject updating course **2. Emerging area** 3. Pedagogy 4. Others (Specify)
14	Whether the proposal covers any of the categories indicated (Select one)	**1. Industry Involvement** **2. Emerging Area** 3. Education Technology 4. Others (Specify)
15	Duration of the programme (Select one)	**1. Five working days** 2. Three working days
16	Proposed dates for the programme (Specify dates, which may be changed later, if required)	**27th May to 31st May 2019**

<div align="center">

COURSE DETAILS

</div>

1	Significance & Objective of the programme (List one or two major objectives)	Impart training to Engineering college teachers on emerging area of E-mobility.
2	Course Content/Coverage (List 5 to 8 major topics with proposed duration of coverage in hours for each topic)	1. Electric mobility-transformation from IC engine driven vehicles to hybrid and electric vehicles 2. Power Electronics and Drives 3. Battery management systems 4. Charging Infrastructure for E-vehicles 5. Electric, Hybrid Electric and Plug-in Hybrid Electric Vehicle System Architectures 6. Modelling Simulation and Control of EVs
3	Course Schedule	1. Total working days = five 2. Lecture = 21hrs 3. Lab/Practicals=3hrs 4. Industry visits =6 hrs 5. Others (Specify) = hrs Total = 30hrs
4	Details of special equipments or laboratory facilities available for the course.	Central Computing Facility

5	Collaboration with industry/ other institutions/ departments (indicate name of the organization, nature of collaboration and experts involved)	C-DAC, KAL E-auto facility (industrial visits)		
6	Details of course faculty (List details of faculty)			

Name and Designation	Institute	Highest Qualification	Specialisation
Dr. Z. V. Lakaparampil	AmalJyothi College of Engineering	PhD	Power Electronics and Drives
Dr. Dinesh Gopinath	GEC Idukki	PhD	Power Electronics, Switched Mode Power Conversion
Er. AjithGopi	ANERT	M Tech	Power Systems
Dr. Archana R.	Federeal Institute of Science and Technology Angamally	PhD	System Modelling Control Systems
Er. Amal S.	CDAC-T	BTech	Electrical and Electronics, Modelling and Control of EVs
Prof. Chitrakumar V K	SCT College of Engineering	MTech	Thermal Engineering, Electric and Hybrid Vehicles

7	Facilities available (Tick the relevant items)	1 **Smart class rooms** 2 **Video conferencing** 3 Live streaming facility 4 Others (Specify)

Budget		
No of days = five	No of participants = 40	

Sl:No	Particulars	Amount
1	Honorarium to faculty/ External experts	24000
2	TA to external experts	5000
3	Accommodation to external experts	5000
3	Local conveyance of external experts	1000

4	Honorarium to centre coordinator	5000
5	Honorarium to course coordinators	2x 5000=10000
6	Honorarium to technical assistants for venue arrangement, purchase assistance, data entry etc. (Please specify the number of persons employed for these activities)	2x1000x5=10000
7	Cost of training material (Soft Copy / Hard copy / text book etc, Please specify the cost per participant)	40000
8	Cost of stationeries, consumables, certificate printing, report printing, photography etc.	15000
9	Food& refreshments to external experts / Guests	4000
10	Food& refreshments to participants	50000
11	Any other items (Please specify)	2000
12	Miscellaneous	5000
	TOTAL	**161000/-**
	Expected cost per participant	Rs 4025/-

We certify that the details given above are correct to the best of my knowledge and belief and I will organize the programme satisfactorily if approved. I also promise that I will abide by the terms and conditions of the University for conducting the Faculty Development Programmes and submit the final report within 15 days of the programme.

1. Dr. S H Anilkumar   2. Dr. Boby Philip

   Professor in Mech. Engg.   Associate Professor in Electrical Engg.

   Dated signature of the coordinators with name and designation

I agree to provide all necessary assistance and facilities of the institute for the conduct of the above programme.

Dated signature of the Head of the institution.

Submitted

We are planning to apply for conducting a faculty development programme on **"E-Mobility"** from **18thJune** to **22ndJune 2019.** Kindly forward the application for five days faculty development programme.

1. Dr. Boby Philip,   2. Dr. S H Anilkumar

   Associate Professor,   Professor,

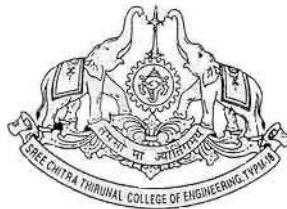   Electrical Engg.,   Mechanical Engg.,

Report on

Emerging Trends and Future Applications of Microelectronics & MEMS

Faculty Development Programme
from
20th to 25th June, 2019

Organized by

Department of Electronics & Communication

Engineering

Sree Chitra Thirunal College of Engineering

Pappanamcode, Thiruvananthapuram, Kerala

Funded by

APJ Abdul Kalam Technological University

Kerala

From
Nisha Jose K,   Aparna P.R
Assoc. Professor   Asst. Professor
Dept. of ECE   Dept. of ECE
SCTCE   SCTCE

To
The Dean (Academics)
APJ KTU, Tvm

Sir
Sub: Reimbursement of expenditure for KTU sponsored FDP conducted by SCTCE

We had obtained sanction for conducting an FDP entitled "Emerging Trends and Future Applications of Microelectronics and MEMS" vide KTU proceedings dated KTU/JD (ACADEMICS)/2223/2019 dated 16.04.2019 (Course no 24). The program has been held from 20 th-25th June 2019 in the Department of Electronics & Communication Engineering, SCT Engineering College, Tvm. We are hereby attaching details of the above program including audited statement of accounts and original bills of expenditure.

Steps may please be taken for sanctioning and reimbursing the expenditure of the above program to the account of CCE, SCTCE, SBI Account No 67000581338, SBI SCT Engineering College Branch, IFSC code : SBIN0070851, Tvm.

19/5/2020   Nisha Jose K, Aparna P.R.
Trivandrum   Course Coordinators

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1. Background and Objectives
2. Course Outcome
3. Participants
4. Methodology
5. Overview of Course Contents

Annexures

Annex A : About the Programme

Annex B : About the Programme

Annex C : About the Programme

Executive Summary

A KTU sponsored Faculty Development Program (FDP) on "Emerging Trends and Future Applications of Microelectronics and MEMS" was conducted from 20 th-25th June 2019 in the Department of Electronics & Communication Engineering, SCT Engineering College, Trivandrum with an objective to provide an exposure to the faculty members, research scholars and masters' students in the above field. A total of 24 faculty members, including 16 external participants attended the course, which included expert talks from eminent personalities from national level reputed institutions. The program was conducted as per sanction obtained from KTU vide KTU proceedings dated KTU/JD (ACADEMICS)/2223/2019 dated 16.04.2019 (Course no 24).

Inaugural Session

The event was inaugurated by Principal, Dr.Prabhakaran Nair, in presence of all HODs and Deans. The FDP Coordinator, Nisha Jose K welcomed all dignitaries, participants and resource persons. Dr.Libish T.M., HoD (ECE), informed about the importance of MEMS design, in the modern era of Electronics. Prof. P. Mohanachandran Nair, who had arrived from Sarabhai Institute of Engineering and Technology appreciated that the event included expert talks from various reputed institute and industry, such IISc Bangalore, IIST and ISRO. Aparna P.R, FDP coordinator, expressed sincere thanks to everyone.

Concluding Session and feedback session

Most of participants expressed appreciation of the course contents and expertise of the resource persons. Suggestions were given for improvements in future. Feedback forms were collected from participants. Certificates and training material were distributed to the participants.

1. Background and objective of the course

Course Topic: Emerging Trends and Future Applications of Microelectronics and MEMS

Micro-Electrical Mechanical Systems, or MEMS, is a technology that consists of electronic components, sensors, mechanical actuators, and structures that are built on a micro and nano scale. Microelectronic technology is the integration of electronic components and MEMS devices in a functioning circuit or product.

The objective of the course was to introduce the various technologies, applications and emerging trends for research in realm of Microelectronics and MEMS to the participants.

2. Course Outcomes

The participant must be able to

- Review the design principles of MEMS
- Understand the microelectronic fabrication and packaging techniques for MEMS

- List the applications and emerging trends in the fields of microelectronics and MEMS

3. Participants

Faculty members from KTU affiliated engineering colleges

4. Methodology

Lectures, Interactive sessions, Case studies and Seminars by experts from industry

5. Overview of Course Contents

20.6.2019. FN

Design Trends in MEMS: Nisha Jose K, Department of EC, SCTCE

A broad introduction to microelectronic systems and MEMS sensors. The topic was designed to give a comprehensive introduction to how the microelectronics industry has been affected by the implementation of MEMS technology and MEMS sensors. The talk included examples of the history of MEMS devices, the applications of MEMS devices, and reviewing current events to highlight new devices and emerging MEMS technologies.

20.6.2019. AN

Optoelectronics &Optical MEMS (MOEMS): Dr Sooraj, Dept of Avionics, IIST

Optical MEMS comprises advanced techniques to manipulate light with superior precision and speed to realize compact yet versatile optoelectronic systems. This lecture covered the necessary theory, basic practical aspects, and the device and system concepts for these closely related fields such as microoptics , propagation of light, diffractive optics and holograms, effects of real micro optical elements in an optical path, system concepts, micro fabrication of optical microstructures.

21.06.2019 FN

Nanostructure based Gas Sensors: Dr Palash Kumar Basu, Dept of Avionics, IIST

The development of solid state gas sensors based on micro transducers and nanostructured sensing materials is the key point in the design of portable measurement systems able to reach sensing and identification performance comparable with analytical ones. The technology involves development of the sensing material, but also the choice of the transducer mechanism and its structure, in the electrical characterization of the performance and in the design of suitable measurement setups. This lecture included the most recent advances and overview in design and measurements for applications in gas sensors, along with their relevant features and technological aspects, characterization and measurements methodologies; gas sensor based systems and applications.

21.06.2019 AN

Microelectronics : Dr Ajayan K. R, C.E.T.

Microelectronics deals with the designing and manufacturing of micro-level electronic designs and components made up of semiconductor materials.

The lecture focussed on chip design and IC fabrication. The topics covered include: modelling of microelectronic devices, basic microelectronic circuit analysis and design, physical electronics of semiconductor junction and MOS devices, relation of electrical behaviour to internal physical processes, development of circuit models, and uses and limitations of various models.

22.06.2019 FN

Industrial visit to IIST could not be arranged due to non-completion of renovation works at the labs. A distinguished lecture by an eminent scientist at the fabrication facility in IISc Bangalore was arranged instead.

MEMS and IC Fabrication Technology : Dr Y PrabhakaraRao, IISc Bangalore

MEMS requires a basic understanding of IC fabrication technology, or microfabrication, the primary enabling technology for the development of MEMS. The major steps in IC fabrication technology which are film growth, doping, lithography, etching, dicing, and packaging were discussed in this lecture.

The lecture included video demonstrations of fabrication facility in IISc Bangalore.

22.06.2019 AN

MEMS/ NEMS and their aerospace applications : Dr Sreelal, VSSC, ISRO

Nano- and micro-electromechanical systems (NEMS/MEMS) are useful for applications ranging from chemical sensors and relays to logic devices. This lecture included the design of MEMS accelerometers, gyroscopes, electrostatic actuators, and microresonators; interfacial engineering for NEMS/MEMS; magnetic nanoparticles, spin electronic materials and sensors, Flexible substrates for electronics, sensors, and energy conversion platforms; Nanofabrication and nanopatterning technologies, including self-assembly for device fabrication.

24.06.2019 FN

In the absence of Prof. Shajahn E.S, C. E.T., who was expected to handle a lab session on Introduction to MEMS Design Software, following class was arranged, about practical issues in MEMS interfacing.

MEMS Interface Electronics : Dr Anoop C.S., Dept of Avionics, IIST

MEMS Interface Electronics deals with the combination of sensors, actuators and signal conditioning circuits, so that the micromechanical system configuration is complete. This lecture dealt with various aspects of the output signals coming from the transducers before processing and after processing, how signals are fed to actuators

etc. Sensor signals are not digital in nature, requiring the analog to digital conversion before further processing with the help of either micro controller or microprocessor.

24.06.2019 AN

Reduced order modelling of MEMS: Dr.Boby Philip, Dept of EE, SCTCE

This lecture dealt with the dynamics of MEMS, represented by partial-differential equations (PDEs) and associated boundary conditions. The method to treat these distributed-parameters problems is to reduce them to ordinary-differential equations (ODEs) in time and then solve the reduced equations either numerically or analytically.

25.06.2019 FN

Nanomechanical Sensors and MEMS accelerometers :Dr.SeenaV, Dept of Avionics, IIST

This talk dealt with MEMS accelerometers which are one of the simplest but also most applicable micro-electromechanical systems. MEMS accelerometers are indispensable in automobile industry, computer and audio-video technology. The talk included the capacitor accelerometers, working and applications and also a quite extensive description of MEMS fabrication. Finally, several research topics were discussed.

25.06.2019 AN

Radio Frequency MEMS : Nisha Jose K, Dept of EC, SCTCE

This talk focused on the modeling, design, technology and applications of RF Micro-Electro-Mechanical Systems (MEMS) and how RF MEMS technology benefits the fields of intelligent communication systems, radars and sensors. The lecture included electromechanical models for RF MEMS devices through analytical techniques. The high potential of RF MEMS on building a variety of reconfigurable high-frequency components and systems were subsequently presented in detail.

ANNEX A-1 : Programme Schedule

Date						
20/06/2019 Thursday	***Inauguration, Design Trends in MEMS (9.00-9.30am)*** *Ms.Nisha Jose K, SCTCE*	***Design Trends in MEMS (9.30-12.30)*** *Ms.Nisha Jose K, SCTCE*	**T E A** **B R E A K**	***Optoelectronics &Optical MEMS (MOEMS) (1.30-3.00pm)*** *Dr. Sooraj, IIST*	**L U N C H** **B R E A K**	***Optoelectronics &Optical MEMS (MOEMS) (3.00-4.30pm)*** *Dr. Sooraj, IIST*
21/06/2019 Friday	***Nanostructure based Gas Sensors (9.30-10.30am)*** *Dr.Palash Kumar Basu, IIST*	***Nanostructure based Gas Sensors (10.30-12.30)*** *Dr.Palash Kumar Basu, IIST*		**Microelectronics (2-3.00pm)** *Dr. Ajayan K R, CET*	**T E A** **B R E A K**	**Microelectronics (3.00-5.00pm)** *Dr. Ajayan K R, CET*
22/06/2019 Saturday	***MEMS and IC Fabrication Technology (9.30-10.30am)*** *Dr. Y P PrabhakaraRao, IISc*	***MEMS and IC Fabrication Technology (10.30-12.30)*** *Dr. Y P PrabhakaraRao, IISc*		***MEMS/NEMS and their Aerospace Applications (1.30-3.00pm)*** *Dr.Sreelal, VSSC*		***MEMS/NEMS and their Aerospace Applications (3.00-4.30pm)*** *Dr.Sreelal, VSSC*
24/06/2019 Monday	***MEMS Interface Electronics (9.30-10.30am)*** *Dr. Anoop C S, IIST*	***MEMS Interface Electronics (10.30-12.30)*** *Dr. Anoop C S, IIST*		***Reduced Order Modelling of MEMS (1.30-3.00pm)*** *Dr. Boby Philip, SCTCE*		***Reduced Order Modelling of MEMS (3.00-4.30pm)*** *Dr. Boby Philip, SCTCE*
25/06/2019 Tuesday	***Nano mechanical Sensors and MEMS Accelerometers (9.30-10.30am)*** *Dr. Seena, IIST*	***Nano mechanical Sensors and MEMS Accelerometers (10.30-12.30)*** *Dr. Seena, IIST*		***Radio Frequency MEMS (1.30-3.00pm)*** *Ms.Nisha Jose K, SCTCE*		***Radio Frequency MEMS, (3.00-4.30pm) Test , Feedback Concluding session (4.30-5.30pm)*** *Ms.Nisha Jose K, SCTCE*

ANNEX A-2:
List of Participants from KTU Affiliated Colleges
A : List of External Participants

1. Biji G

Govt Engineering College Bartonhill

2. Sreejith A R

St.Thomas College Of Engineering And Technology,

Chengannur

3. Hitha P S

AdiShankara Institute Of Engineering And Technology,

Kalady

4. Darsana S

College Of Engineering,

Chengannur

5. Sajitha.P

Lourdes Matha Science And Technology

6. Jinju Joy

Lourdes Matha College Of Science And Technology

7. Bincy Louis

Lourdes Matha College Of Science And Technology

8. Sreelekshmi R C

Lourdes Matha College Of Science And Technology

9. Anupama A S

Sarabhai Institute Of Science & Technology

10. Deepambika V A

LBS Institute Of Technology For Women

11. Rahul R

John Cox Memorial CSI Institute Of Technology

12. Nithin B R

John Cox Memorial CSI Institute Of Technology

13. S Chandrasekharan Nair

Sarabhai Institute Of Science & Technology

14. Abhilash V Nair

LBS Institute Of Technology For Women

15. Dr.Pmc Nair

Sarabhai Institute Of Science & Technology

16. Sreejith B J

KTU

B : List of Internal Participants

1. Dr.Libish T.M.

SCTCollege Of Engineering

2. Jisu Elsa Jacob

SCT College Of Engineering

3. Sajeer M

SCT College Of Engineering

4. Asha S

SCT College Of Engineering

5. Jayasudha J.S.

SCT College Of Engineering

6. Nelwin Raj N. R.

SCT College Of Engineering

7. Reshmi Krishnan S

SCT College Of Engineering

8. Preetha V H

SCT College Of Engineering

ANNEX A-3
List of Coordinators & Technical Assistants

1. Centre Coordinator   **Dr.K.Prabhakaran Nair**

                                         The Principal

                                         SCTCE

2. Course Coordinators   1. **Nisha Jose K**

                                         Associate Professor

                                         SCT College of Engineering

                                         Pappanamcode

                                     2. **Aparna P.R.**

                                         Assistant Professor

                                         SCT College of Engineering

                                         Pappanamcode

3. Technical Assistants   **Jayakumar R**

                                         Trade Instructor

                                         SCT College of Engineering

                                         Pappanamcode

ANNEX A-4
List of Resource Persons

1. Dr. Sooraj
Assistant Professor,
Dept. Of Avionics,
Indian Institute of Space Science and Technology

2. Dr. Palash Kumar Basu
Associate Professor,
Dept. of Avionics,
Indian Institute of Space Science and Technology,
Trivandrum

3. Dr. Ajayan K R
Associate Professor,
Dept of ECE,
College of Engineering
Trivandrum

4. Dr. Y P Prabhakara Rao
Visiting Scientist,
Indian Institute of Science (IISc),
Bangalore

5. Dr. Sreelal Sreedharan Pillai
Engineer-SG,
Section Head SED?DSG
VSSC, Trivandrum-695022

6. Dr. Anoop C S
Assistant Professor,
Dept. of Avionics,
Indian Institute of Space Science and Technology (IIST),
Trivandrum

7. Dr. Boby Philip
Associate Professor,
Electrical Engineering Division,
SCT College of Engineering,

Pappanamcode, Tvpm

8. Dr. Seena V

Associate Professor,

Dept. of Avionics,

Indian Institute of Space Science and Technology,

Trivandrum

9. Ms. Nisha Jose K

Associate Professor,

Dept of ECE,

SCT College of Engineering,

Pappanamcode, Tvpm

ANNEX A-5

List of Distinguished Officials of College present in the programme during inauguration

1. Dr.K.Prabhakaran Nair
   The Principal
   SCTCE

2. Dr.Libish T M

Head of the Department

Dept. Of ECE, SCTCE

3. Dr.Jayasudha J S

Dean (Academic, R & D)

SCTCE

4. Prof. Sarathchandradas

Dean P.G. Studies

SCTCE

5. Dr.R.Ajith

Dean Student Affairs

SCTCE

ANNEX A-6
TEST QUESTIONS
SCT College of Engineering, Trivandrum
FDP on
Emerging Trends and Future applications of Microelectronics & MEMS
TEST QUESTIONS

Time : 40 minutes   **Marks :20**

1.Following is not an example of transducer.   **(2)**
(A) Analogue voltmeter
(B) Thermocouple
(C) Photo electric cell
(D) Pneumatic cylinder

2. Sacrificial materials are used in   **(2)**
(A) Surface micromachining
(B) Bulk micromachining
(C) Ion Implantation
(D) All of the above

3.Automotive airbag sensor employs   **(2)**
(A) MEMS accelerometers
(B) Optical MEMS
(C) Pressure sensors
(D) MEMS gaseous sensors

4. The following is not a static performance parameter to be looked into before selecting a transducer   **(2)**
(A) Range
(B) Deflection
(C) Stability
(D) Error

5. Discuss the basics of MEMS fabrication.   **(4)**

6. Explain Optical Applications of MEMS devices.
                    (4)

7. Describe electrical interconnection in sensor packaging   for MEMS
                    (4)

FDP on
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TEST QUESTIONS

Time : 40 minutes   **Marks :20**

Name of participant :
Institution   :

1.Following is not an example of transducer.   (2)

(A) Analogue voltmeter
(B) Thermocouple
(C) Photo electric cell
(D) Pneumatic cylinder

2. Sacrificial materials are used in   (2)

(A) Surface micromachining
(B) Bulk micromachining
(C) Ion Implantation
(D) All of the above

3.Automotive airbag sensor employs   (2)

(A) MEMS accelerometers
(B) Optical MEMS
(C) Pressure sensors
(D) MEMS gaseous sensors

4. The following is not a static performance parameter to be looked into before selecting a transducer   (2)

(A) Range
(B) Deflection
(C) Stability
(D) Error

5. Discuss the basics of MEMS fabrication.   (4)
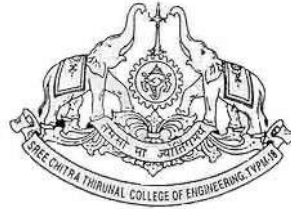
6. Explain Optical Applications of MEMS devices.
**   (4)**

7. What is the method of electrical interconnection in sensor packaging
**   (4)**

FEEDBACK FORM
FDP on
Emerging Trends and Future applications of Microelectronics
& MEMS

	Poor	Average	Good	Excellent/ Useful
1. **The objectives of the training were clearly defined**	1	2	3	4
2. **The topics were relevant**	1	2	3	4
3. **The content was organized and easy to follow**	1	2	3	4
4. **Questionnaire and interactions were encouraged**	1	2	3	4
5. **The Resource Persons were knowledgeable about the training topics**	1	2	3	4
6. **The training objectives were met**	1	2	3	4
7. **Venue was adequate and comfortable**	1	2	3	4
8. **Quality of Food**	1	2	3	4
9. **Accommodation**	1	2	3	4

Suggestions for improvement:

ANNEX B-1
Submission and Auditors Certificate.

Sanction has been obtained to conduct FDP "Emerging Trends and Future Applications of Microelectronics and MEMS" by Nisha Jose K and Aparna P.R., Department of Electronics and Communication, SCTCollege of Engineering, Trivandrum vide KTU proceedings dated KTU/JD (ACADEMICS)/2223/2019 dated 16.04.2019 (Course no 24). The programme has been conducted successfully from 20th to 25th June 2019 at SCT College of Engineering, Trivandrum. An amount of Rs 1,65,272 (Ruppees one lakh sixty five thousand two hundred and seventy two only) was spent for the program according to the rules and regulations of KTU.

We hereby certify that the we have verified the bills and relevant documents submitted before us for our verification.

Nisha Jose K, Aparna P. R.   Dr. K. Prabhakaran Nair   Name & Signature of Accountsofficer/

Course Coordinators   Centre Coordinator   Chartered Accountant

          Principal, SCTCE

ANNEX B2
Bill wise Statement of Expenditure for FDP
Emerging Trends and Future Applications of Microelectronics & MEMS

Sl No	Item	Bill details	Bill Amount (Rs)	Sanctioned amount	Payment Amount
I	**Honorarium to faculty/ External experts**				
	Ms. Nisha Jose K		3000	3000	
	Dr. Boby Philip		3000	3000	
	Dr. Ajayan K R		3000	3000	
	Ms. Nisha Jose K		3000	3000	
Ia	**Honorarium to faculty/ External experts from IIT/ IIM/ National Institutes**				**42000**
	Dr. Sooraj	IIST	5000	5000	
	Dr.Palash Kumar Basu	IIST	5000	5000	
	Dr. Y P Prabhakara Rao	IISc Bangalore	5000	5000	
	Dr.Sreelal	VSSC, ISRO	5000	5000	
	Dr. Anoop C S	IIST	5000	5000	
	Dr. Seena V	IIST	5000	5000	
	Total		**42000**	**42000**	
II	**TA to external experts**				
	Dr. Y P Prabhakara Rao	Make my Trip Flight Economy class 1000000061744461 dated 10/6/2019	8469	8469	**9286**
	Dr. Y P Prabhakara Rao	OLA Taxi Bangalore 21/06/2019	817	817	
	Total		**9286**	**9286**	
III	**Accommodation to external experts**				
	Dr. Y P Prabhakara Rao	The Central residency /No.TCR/FO/2224 dated 22/06/2019	**3613**	**3613**	**3613**
IV	**Local conveyance to resource persons**				
	Dr. Ajayan K R	Taxi	600	600 (Maximum 1000)	**5280**
	Dr. Sooraj	Taxi	900	900(Maximum 1000)	

	Dr.Palash Kumar Basu	Taxi	900	900(Maximum 1000)	
	Dr.Sreelal	Taxi	540	540(Maximum 1000)	
	Dr. Anoop C S	Taxi	900	900(Maximum 1000)	
	Dr. Seena V	Taxi	900	900(Maximum 1000)	
	Dr. Y P Prabhakara Rao	Taxi	540	540(Maximum 1000)	
	Total		**5280**	**5280**	
V	**Honorarium to course/Center coordinators**				
	Centre coordinator Principal (Dr.) K. Prabhakaran Nair		5000	5000	**15000**
	Course coordinator (1) Assoc. Prof. Nisha Jose K		5000	5000	
	Course coordinator (2) Asst. Prof. Aparna P.R.		5000	5000	
	Total		**15000**	**15000**	
VI	**Honorarium to technical assistants**				
	R. Jaya Kumar (Venue arrangements, Purchase assistance, Data entry)		**10000**	**10000**	**10000**
VII	**Cost of training material to participants**				
	Hard Copy	Merriments/No. 11167 dated 21/06/2019	8560		**24000**
		Merriments/No. 11093 dated 22/06/2019	9720		
		A-Line Print House/No. 154 dated 25/06/2019	4000		
		A-Line Print House/No. 158 dated 25/06/2019	3260		
	Total / Cost per participant=Total/24		**25540** (cost per participant=1064)	**24000** (cost per participant=1000)	
VIII	**Stationeries, consumables, certificates printing, report printing, photography**				
		New Harisree Book Centre/No. 568 dated 20/06/2019	350		
	Stationery	New Harisree Book Centre/No.572 dated 22/06/2019	2800		

		Premier office equipment Co./No.FY1920/2245652 dated 18/06/2019	1928		
	Consumable	Print Home/No.103 dated 20/06/2019	780		
		Print Home/No.156 dated 18/06/2019	2200		
	Certificate Printing	Print Home/No.157 dated 25/06/2019	2000		
	Report Printing	Icenet Cyber café/No.9211 dated 25/06/2019	2000	**12058 (Maximum 15000)**	**12058**
	Total		**12058**		
IX	**Food & refreshments to external experts / Guests**				
	Meals, Tea and Snacks	SCTCE Canteen/ No.952 dated 25/6/2019	**4940**	**4940**	**4940**
X	**Food & refreshments to participants**				
	Meals, Tea and Snacks	Divine sweets and catering/No.218 dated 22/06/2019	16500		
	Meals, Tea and Snacks	Divine sweets and catering/ No.219 dated 24/06/2019	11000		
	Meals, Tea and Snacks	Ranis Home Caterers No 38 dated25/06/2019	3825		
	Total / Cost per participant per day=Total/(24x5)		**31325** (Cost per participant per day =261)	**30000** (Cost per participant per day =250	**30000**
XI	**Miscellaneous**				
	Flower bouquet	Kumar Flower Mart / No.111 dated 20/06/2019	750		
	Cleaning	Smt. Sarojam	3000		
	Lamp (big), Carpet rental, Venue arrangements	Sulekha Event Services / No 25 dated 19/06/2019	4750		
	Total		**8500**	**8500(Maximum 10000)**	**8500**

VIII	Audit Fee	595	595	595
	TOTAL	**168137**	**165272**	**165272**

Nisha Jose K, Aparna P. R.
Course Coordinators

Dr. K. Prabhakaran Nair
Centre Coordinator
Principal, SCTCE

Name & Signature of Accounts officer/
Chartered Accountant