A.Y. 2020-21 - Collaborative Activities

The following are the list of Collaborative Activities done at the Institution for the academic year 2020-21:

S. No.	Details	Total
1	Research Collaborations	57
2	Faculty Exchange	5
3	Student Internship	59
4	On-The-Job training	10
Total		131

A.Y. 2020-21 - Collaborative Activities

The following are the list of Collaborative Activities done at the Institution for the academic year 2020-21:

S No	Details			Total
1	Research Collaborations	Proposal Collaborations	5	57
		Fellowship Collaborations	7	
		Journal Collaborations	29	
		Proceeding Collaborations	6	
		Collaboration of Books	2	
		Collaboration of Book Chapters	5	
		Collaboration of Edited Books	1	
		Collaboration of Patents	2	
2	Faculty Exchange			5
3	Student Internship			59
4	On the Job Training			10
			Total	131

1. Research - Proposal Collaborations

1. **Prof.Dr.V.Rajendran**

Temporary Registration No. : TPN / 54891

Ministry of Science & Technology
Government of India

Project Proposal On

"Empowerment of Sustainable Model Villages through Integrated Technologies of Energy, Water and Air"

Submitted to

Division : Technology Missions Division

Programme or Scheme : Integrated Technology Interventions for Sustainable Environment (ITISE)

Submitted by

Project Investigator:

Prof. V Rajendran

DR.N.G.P. ARTS AND SCIENCE COLLEGE-KALAPATTI

Part 1 : General Information

General Information:

1.Name of the Institute/University/Organisation submitting the Project Proposal :

DR.N.G.P. ARTS AND SCIENCE COLLEGE

2. State	Tamilnadu
3. Principal Investigrator Name:	Prof. V Rajendran
4. Category:	OBC
5. Type of the Institue :	Academic Institutions (Private)
6. Project Title :	Empowerment of Sustainable Model Villages through Integrated Technologies of Energy, Water and Air
7. Division :	Technology Missions Division
8. Programme Or Scheme :	Integrated Technology Interventions for Sustainable Environment (ITISE)
9. Academic Area :	Agriculture Science, Chemical Science, Earth and Atmospherical Science, Life Science,
10. Application Area :	Climate Change, Energy, Health, Science Communications, Water,
11. Goverment National Initiative :	Make in India, Swasth Bharat, Swachh Bharat,
12. Type of Proposal :	Proposal Against Call
13. Project Duration :	3 Years and 0 Months
14. Proposal Submit Date :	30/06/2020
15. Project Keywords :	villages, empowerment, integrated technology, energy, water, air

16. Project Summary :

Statement of the problem
In a country with large population, energy and natural resources NR conservation through sustainable and environmental friendly technologies is inevitable. This is particularly important when 304 million people in forest and interior villages living without electricity and energy. They primarily depend on kerosene and firewoods for lighting and cooking [Census, 2011]. Additionally, mobile phones are important communication system for them to connect to the rest of the country. However, mobile batteries recharging is difficult, and the problem is even severe during summer and disaster periods. Further, the continued dependence and depeletion of conventional energy and NR irreversibly damaged the forest ecosystem, increased human-wildlife conflict, lead to climate change and global warming, and water and air pollution. As a result, millions are deprived of access to safe drinking water and face serious health problem from contaminated water usage. This situation is further compounded by reduced fresh water availability, climate change and drought. Similarly, sand dusts emanating from stone quarries, brick kiln and other related activities lead to classical widespread occupational lung diseases. Therefore, harnessing free and non-polluting energy from virtually inexhaustible resources such as solar high solar insolation designing simple and affordable water purification units technologically scalable sewage water treatment plant to recycle sewage water for domestic use and simple and affordable air filtration units to prevent occupational sand dust exposure are the only viable solutions. In the present study, totally six villages from two districts in the state of Tamil Nadu prevailing with defined scenario are selected to establish solar energy harnessing units, and water processing and purification units to meet their houshold and community needs, and become independent and self-reliant community.
Objectives
•Establish solar energy harnessing, stoarge and charging units to power lighting/essential electrical devices and solar cooker in the identified villages from four foothill and two rural locations in Coimbatore and Erode districts respectively
•Provide safe drinking water dispensing units to identified villages, and scalable sewage water treatment plant to recycle sewage water for domestic use and reduce the dependence on fresh water
•Fabrication of low-cost and multi-purpose air face-mask to prevent occupational particle pollutant exposure and consequent lung diseases
•To impart training and develop required skill sets among household/community members to become technologically and socio-economically independent and sustainable model villages
•To replicate the success of model villages in other parts of the country with similar need and utility

Methodology
Energy During the implementation of SPV system, 100 Watt monocrystalline silicon solar panel sizing can be fixed for a designated area in a rooftop of a particular house or depending upon its available space. The total nominal installation capacity of the system is to generate 100 Watts/hour with working model of three LED bulb and one DC ceiling fan for continuous five hours. A typical SPV consists of a PV module, battery, solar charge-controller and end use appliances, and the benchmark cost of this system is Rs. 18000. The solar rooftops carry a warranty for five years with a panel warranty of 25 years. Further, Government is paying for first 100 units per house and that amount can be save to a great extend in-case of already electrified subscriber. For household solar lighting, large scale installation and distribution of electricity requires huge area in a village and leads to more transmission loss, installation and maintenance charge etc. Hence, it is aimed to implement single house roof top stargery at both electrified and unelectrified villages depending on its usage. Further, the installmentcan bare the monthly bill of kerosene or save some units of monthly electricity bill.

The impact of usage of mobile phones threatens to escalate necessity of electricity for battery charging due to over use and there is a need to promote the integrated and sustainable management of natural resources. The goal of achieving low cost solar power bank has focused to support and enhance existing different livelihood strategies in the rural areas due to lack of affordability for electricity and high costs of supply to remote areas. This portable power bank is useful in public places and more than one user can charge their devices. 12 volts is the key component of any solar photovoltaic system that converts sun's energy to electric voltage. The output electrical voltage from the solar panel varies drastically due to the position of the sun and the intensity of the sunrays.

The system contains solar panel able to generate a voltage of In order to regulate the output voltage from the solar panels and to prevent batteries from overcharging a voltage regulator circuit is used between solar panel and the battery. Lithium polymer battery is used to store the charge for further. The battery is connected to a USB port from where the mobile or other battery powered device can be connected for charging without requiring connection from residential power source.

Design and Fabrication of box type solar cooker with inbuilt paraboloid reflector The cooker box consists of a top open Black painted inner box kept inside of another box and the space between the two boxes is filled with glass wool insulation to minimize the heat loss. Joining small pieces of reflector has made the inner paraboloid concentrator. It is supported firmly with a rigid frame. Its size and shape is such that when exposed to the sun in the normal direction, a point focus is formed. The focal length of the disc is equal to the linear distance from the centre of the potholder to the vertex of the dish, presuming that the cooker pot is kept at the focus of the paraboloid. The rim angle of the disc is the angle subtended by the line joining a point on the aperture of the disc to the focal point with the axis of the paraboloid measured with respect to the focal plane. The gap between reflector and the wooden box is filled with insulating material to minimize heat losses through the sides and bottom of the box. A glass window has been fixed on the top of the box for trapping heat by the greenhouse effect. The cooking vessel is a black painted aluminium vessel in order to observe most of the reflected solar radiation from the reflector. The cooking vessel rests on a specially designed holder.

The solar radiation after reflection from the paraboloid reflector, focused at the focal point of paraboloid dish, thereby increases the intensity of the radiation at the cooking vessel, which is kept at the focal point of paraboloid reflector. Calibrated Copper- Constantan thermocouples shielded at suitable points on the cooker measure the temperature of different elements of the cooker. The proposed box type solar cooker consists of an outer box, inner box, insulation,

paraboloid concentrator, lid of the box glass cover, stand, tracking and thermocouple. The front and side view of the proposed solar cooker's 3D diagram is shown in the figure 3.

Water Water is essential for various metabolic and excretory processes in human. Water intended for human consumption must be free from organisms and chemical substances that may be hazard to health. Activated carbon filtration is a commonly used adsorption technology for the removal of contaminants Certain organics such as unwanted taste, odours, micropollutants and chlorine from drinking water or wastewater in which the contaminants adsorbed onto the surface of the carbon materials. The efficiency of the adsorption process mainly depends on adsorbent and contaminant characteristics. The use of carbon in the form of charcoal has been used for the treatment of water to remove unwanted impurities. Activated carbon is a material prepared from natural materials wood products, coconut shell etc., with a high degree of porosity and an extended surface area. The carbon is "activated" by subjecting it to thermal activation and high temperature 800-1000176C usually without oxygen. The activation produces carbon with many pores and a high specific surface area. It is then crushed to produce a granular or pulverized carbon product. Activated carbon filtration setup treats all water coming into the house. A model filtration unit is arranged with various activated carbons to filter the water samples, which are collected from identified villages. The hardness and TDS of collected water samples are tested and then treated with various activated carbons for the removal of impurities. The obtained results are compared with before and after treatment of water samples with all activated carbons. From the result, we can choose an activated carbon with excellent adsorption capacity. The selected activated carbon is used in the filtering medium for the removal of impurities from water at identified villages.

Sewage contains high quantity of harmful impurities and diseases causing bacteria both from organic and inorganic matters. Thus, such sewages should not be disposed directly into natural sources, which lead to polluted environment. Thus, it is essential to treat the sewage by adopting proper method. Normally, the sewage treatment plant involve 3 main steps that has been depicted in flow chart. First, all the sewage water from the receiving tank, allowed to pass through screening and grit chamber where large solids such as inorganic waste, sludge materials, grid are removed. The sludge allows settling in separate tank. Then, in skimming tank, oils, fats, waxes, soaps and grease can be removed by blowing chlorine gas and granular activated carbon block filters. In the secondary treatment, the effluent undergo biological treatment can be achieved by submerged diffusion aerated lagoons along with activated sludge method which use membrane microfiltration and active sludge plants such as saprotrophic bacteria, protozoan, amoebae, algae which decompose all the microorganism. Then the sludge is made to settle down in Sludge decomposer chamber where it converts all the sewage into combustible gases like methane CH4 and carbon dioxide CO2 that can be used as fuel. The decomposed sludge can be either disposed or used as a fertilizer. Finally the effluent, resulting with the fine removal of solids and organic matters, then goes for tertiary treatment method which enables the quality and pH of water before discharging or recycling using Ozone disinfection process that include UV radiation chlorination.

Deliverables
Solar power harnessing and storage units
Solar power cooker design and distribution
Safe drinking water dispensing units
Low-cost and multi-purpose air face-mask to prevent occupational particle pollutant exposure

Scalable sewage water treatment plant to recycle sewage water for domestic use and reduce the dependence on fresh water

Harnessing solar power solar cells and solar cooker to meet daily household energy need in self-sustainable manner

The outcomes of proposed project as well as gained experience and expertise expected to provide much needed capability for further technology development and training

The outcomes of proposed project as well as gained experience and expertise expected to advance scientific knowledge in the filed of this proposed study

Self-sustainable, self-reliant and environment friendly livelihood model that can be replicated across the country with similar need and utility

Benefits
India's population and industrial energy needs not yet met by the fossil fuel and renewable energy resources. Presently, renewable other than hydro-power resources contribute only ~18 of India's energy mix. Out of this, the utilization of solar thermal energy through the solar collectors is a very small fraction. However, in future, solar collectors based systems may become one of the important sources of power for providing fuel for cooking and electrical energy for localized use in thousands of remote locations all over India.

A person can involve for product maintenance in adopted field

Self-reliant communities and sustainable environment

To enhance and create awareness about the usage of renewable energy like solar energy.

The raw materials used for the construction of solar cookers are locally available and it is not a hazardous materials.

Also, the available energy resource is completely free from fossil fuels and can be easily meet out the CDM.

Possibility of replication of project in similar areas
Initially, the project is going to install in a single house and after proper analysis of pros and cons of the system, can be extend to more number of houses. Similarly, there is a possibility to involve other similar areas in this project. Once, this is successful, generation capacity can be increased in all possible ways and can be sale to near by electricity board. It is benefit to both project beneficiary and state

Part 2: Particulars of Investigators

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Part 3: Suggested Refrees

Suggested Refrees: NA

Part 4: Financial Details

Financial Details:

A. Non - Recurring

A1. Non-Recurring (e.g. equipments, accessories etc.)

S.	Equipments	Qty.	Justification	1 Year	Total
1.	Aerated, grease removal and Diffusion tank	6	9.To remove the grit, sludge, oils, fats, waxes, soaps and grease and decompose the entire microorganism.	2038998	2038998
2.	Anemometer (0 to 2 m/s: (±0.05 m/s), ±5% of value 0 to +50 °C:(±0.5 °C)	3	3.To measure the wind speed	300000	300000
3.	Charcoal Crusher	1	13.To reduce particle size enough so that the material can be processed into finer particles in a grinder	300000	300000
4.	Construction of work shed/structures	1	For the fundamental analysis, data verification and for the effective execution of the proposed work, the above listed equipment are needed.	1100000	1100000
5.	Digital Multimeter (accuracy-0.000001)A , (120-360)V, 6A)	3	7.It can be used to control process current in Electrochemical workstation.	500001	500001
6.	High Quality 3D Printer (HP)(Bed-34W, 300x400mm, Hot upto200 deg. C) 220V	1	6.It will be used to fabricate holder and flexible base of face mask	1950000	1950000
7.	High Voltage Programmable DC Power Supply with control system (0-360) V, Resol-0.5 V, 20A	1	8.It can be used as main power source for electrochemical work station, the cheap AAO membrane can be fabricated by using electrochemical work station	500000	500000
8.	Laptop with Printer (core i7, 1 TB, SSD Hard disk, 16GB RAM with 2GB Graphic card)	3	15.It is required to collect data during field visits to adopted six villages with the aid of three JRF and three field workers from three institutions.	375000	375000
9.	Mechanical shaker with temperature control	2	14.Used to mix, blend, or agitate substances in a tube or flask by shaking them.	300000	300000
10.	Muffle furnace(1110)deg., 40L, 320 x 490 x250mm	3	12.To analyze the huge amount of the sample at high temperature and to determine the percent of ash content in those materials.	1527000	1527000
11.	pH meter (9V/500Hr. continuous use, 192x104x134mmwith 12V DC adapter)	9	10.To measure hydrogen-ion activity (acidity or alkalinity) in solution, water quality for drinking water	108000	108000
12.	Pyrheliometer (Temp:-40 to +80 deg. C, slope angle:1to 2deg.)	3	2.To measure the direct solar radiation from the Sun	600000	600000
13.	Solar pathfinders (Vertical: 20-90 degrees, "Horizontal" : 0-20 degrees)	3	4.To identify the shadow region path of sun on solar panel	150000	150000
14.	Solar PV test kit (1999 w/m², 10mA - 1500.0A, 600V DC or 600V AC rms)	6	5.To identify the solar irradiance range, essential for installation of panel at a particular place to get maximum performance	196998	196998
15.	Solar Pyranometer (200W/m2-radi.,temp. 2%, res. time-less than 15 sec.)	3	1.To measure the diffused solar radiation from the atmosphere	450000	450000
16.	TDS kit(Accuracy: 2%F.S,range:0-9990PPM/0-999(US/cm)	15	11.To measure the Total Dissolved Solids (TDS) of water.	225000	225000
			Total	**10620997**	**10620997**

A2. Others Non-Recurring : NA

B. Recurring

B.1 Project Staff

S.	Project Staff	No.	Justification	1 Year	2 Year	3 Year	Total
1.	JRF	3	M.Sc+ GATE/NET	1205280	1205280	0	2410560
2.	Others	3	Scientific Administrative Assistant/ Field worker	777600	777600	777600	2332800
3.	SRF	3	M.Sc+ GATE/NET with 2 years JRF completion	0	0	1360800	1360800
			Total	**1982880**	**1982880**	**2138400**	**6104160**

B.2 Consumable

S.	Items	Qty.	Justification	1 Year	2 Year	3 Year	Total

1.	6V solar panel Li-ion battery Microcontroller Connecting wires Microcontrollers chip & wires	700	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	1750000	1750000	1750000	5250000
2.	Carbon Filtration setup	700	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	3500000	3500000	3500000	10500000
3.	Chemicals (Phosphoric acid, Perchloric acid, Nylon, Ethanol)	1	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	450000	450000	450000	1350000
4.	Glasswares	1	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	150000	150000	150000	450000
5.	Solar Battery Led Bulb (3 No's) DC ceiling Fan Cables Solar Invertor	700	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	0	0	2450000	2450000
6.	Solar Panel -Monocrystalline silicon Solar Mounting Structure Solar Charge Controller	700	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	12600000	12600000	12600000	37800000
7.	Stationery	1	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	120000	120000	120000	360000
8.	Wooden Board Glass Wool Metal Parabolic dish Copper Vessel with Lid Polar Automatic Movements Metal frames with Wheels Glass Plate Honeycomb Glass vessel Hinges and Handles	700	The consumable includes constructional materials for Solar power House, Solar power bank, Solar Cooker, Carbon filtration set up, Sewage plant and Face air mask for the 2100 houses in 6 different villages identified in the proposal. For the mass and qualitative production of the products, the colleges require the above listed consumables.	8400000	8400000	8400000	25200000
			Total	**26970000**	**26970000**	**29420000**	**83360000**

B.3 Travel

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Field activities	out the travel expenses for carrying the proposed products to the adopted interior villages.	0	120000	90000	210000
2.	DST review meetings	The Budget may be utilized for attending Conferences/Seminars/Workshops, DST review meetings and to meet out the travel expenses for carrying the proposed products to the adopted interior villages.	30000	30000	30000	90000
3.	Field activities	The Budget may be utilized for attending Conferences/Seminars/Workshops, DST review meetings and to meet out the travel expenses for carrying the proposed products to the adopted interior villages.	90000	0	0	90000

4.	Project logistics	The Budget may be utilized for attending Conferences/Seminars/Workshops, DST review meetings and to meet out the travel expenses for carrying the proposed products to the adopted interior villages.	60000	30000	60000	150000
		Total	**180000**	**180000**	**180000**	**540000**

B.4 Contingency

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Computer time, secretarial assistance, documentation, lab/field trials, maintenance/ servicing of equipment, etc.	While working on the project, the team requires financial support for maintenance and servicing of equipment, incidental expenses, fabrication cost and documentation expenses.	230000	100000	200000	530000
2.	Cost of technology Installation	While working on the project, the team requires financial support for maintenance and servicing of equipment, incidental expenses, fabrication cost and documentation expenses.	700000	700000	1400000	2800000
3.	Fabrication Cost	While working on the project, the team requires financial support for maintenance and servicing of equipment, incidental expenses, fabrication cost and documentation expenses.	2100000	2100000	2100000	6300000
		Total	**3030000**	**2900000**	**3700000**	**9630000**

B.5 Any Other Head

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Expert Honorarium	Honoraria have to be given to the experts for the guidance through their knowledge in subjects and technical fields.	300000	100000	100000	500000
2.	Solar house field testing /Mask Product testing/Model filtration setup testing/Solar Cooker Demos	The required fund is to be used for field and product testing along with the demos and trainings for all the beneficiaries in the identified villages.	150000	300000	375000	825000
3.	Training's about the products	The required fund is to be used for field and product testing along with the demos and trainings for all the beneficiaries in the identified villages.	150000	225000	300000	675000
		Total	**600000**	**625000**	**775000**	**2000000**

B.6 Overhead

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Institutional Overheads	Institutional support provided to the project	500000	500000	500000	1500000
		Total	**500000**	**500000**	**500000**	**1500000**

Budget Head Summary in (INR)

Budget Head	Year-1	Year-2	Year-3	Total
1- Non-Recurring				
Equipment	10620997	0	0	**10620997**
2- Recurring				
Project Staff	1982880	1982880	2138400	**6104160**
Travel	180000	180000	180000	**540000**
Overhead	500000	500000	500000	**1500000**
Contingency	3030000	2900000	3700000	**9630000**
Consumable	26970000	26970000	29420000	**83360000**
Any Other Head	600000	625000	775000	**2000000**
Total	**43883877**	**33157880**	**36713400**	**113755157**

PFMS Details:

PFMS Unique Code Available: Yes

PFMS Unique Code : DrNGPASC

Part 5: Current Ongoing Project

Current Ongoing Project: NA

2. Dr.S.Gowri

Temporary Registration No. : TPN / 58268

Project Proposal On

"Instigating the Socio-economic and Self-employment Status of Rural Women"

Submitted to

Division :SEED

Programme or Scheme : WOMEN TECHNOLOGY PARK

Submitted by

Project Investigator:

Dr. SK Jayanthi

VELLALAR COLLEGE FOR WOMEN-Erode

Part 1 : General Information

General Information:

1.Name of the Institute/University/Organisation submitting the Project Proposal :

VELLALAR COLLEGE FOR WOMEN

2. State	Tamilnadu
3. Principal Investigrator Name:	Dr. SK Jayanthi
4. Category:	OBC
5. Type of the Institue :	Academic Institutions(Government)
6. Project Title :	Instigating the Socio-economic and Self-employment Status of Rural Women
7. Division :	SEED
8. Programme Or Scheme :	WOMEN TECHNOLOGY PARK
8. Academic Area :	
10. Application Area :	Entrepreneurship and Innovation,
11. Goverment National Initiative :	Make in India, Startup India, Smart Village,
12. Type of Proposal :	Proposal Against Call
13. Project Duration :	3 Years and 0 Months
14. Proposal Submit Date :	31/10/2020
15. Project Keywords :	Value Added, Entrepreneur, Rural Women Empowerment, Self Sustainability, Solid Waste Management
16. Project Summary :	

Objectives
•Impart training and empower household/SC/ST/economically weaker community with adequate skill trainings.
•Transit knowledge and newer technology for the development of immune boosting and eco-friendly value added products.
•Ensure the "Make in India" concept for under privileged women by improving their subsistence to make them more self-reliant.
•Promote gender equality and enhance the future prosperity among rural women community to become technologically and socio-economically independent and sustainable.

Methodology

The current proposal focuses on women empowerment to provide sustainable rural livelihood. In this context, location specific problems faced by women have been identified in six adopted villages and feasible technological solutions to add value to locally available agricultural solid wastes and natural resources in a sustainable way are proposed. The proposed technological interventions are user friendly, easily learned, practiced and performed.

Banana fiber extraction Decorticator machine is employed to extract fiber from banana stem. The extraction process involves a combination of water retting and scraping steps. Actually, the retting enhances mechanical properties the fiber. Steam explosion is given to obtain high quality fiber.

Microgreens Nutrient Film Techniques NFT is one of the most common traditional systems used to grow Microgreens. The approach involves species selection fertilization, biofertilizers, and lighting and growth stage at harvest are to be addressed with respect to crop physiology and quality as well as pH handling and application, temperature, atmospheric composition and packaging. It has immense potential to produce many of the vegetables, leafy vegetables, tubers and other at microscale.

Briquettes The screw type briquette machines are used to press the raw materials and it is allowed for carbonizing, grinding/ shredding, mixture with binder and briquetting. Dryer is used for drying and then packaging.
Rapid bio-drying technology is to be adopted for making cow-based value added products.

Immune boosting Moringa fresh leaves, pods and Amla fruit are used to prepare organic health care products with the help of industrial dehydrated machine and powdered.
Outcome
•Application of science and technology for women's welfare, especially in rural areas

•The rural women will be sensitized and encouraged to strengthen their capabilities by utilizing natural resources around them for developing eco-friendly products facilitating their sustenance and socio-economic development

•The women shall be empowered for ensuring their contribution in the national economic progress
Hypothesis
An estimated nearly 62 of the total Indian population is rural and dependent on agriculture where women constitute the larger workforce. However, agricultural contribution to country's GDP is around 16-18. This sector is already facing myriad problems such as over dependence, poor wages, distress migration, malnutrition, poor government schemes implementation, lack access to quality healthcare and educational facilities etc. It is further compounded by COVID-19 pandemic and lead to loss jobs and livelihood. Therefore, tailored approaches involving the locally available resources, knowledge, technology and expertise to empower rural women, SC/ST, economically weaker section, farmers, youth and improve their economical, social and health status are highly important, and it should be achieved through sustainable development. The aim of this proposal is to integrate those approaches and provide them in a single platform, involve students from targeted villages for programme execution and sharpen the knowledge and analytical skills of targeted population to deal with any current or future problems. The rural women from Chinnapuliyur 49, Karapparai 42, Perumugai 50 and Kongarpalayam 51 villages of Erode district, and Nellithurai 51, and Veliyangadu 50 villages of Coimbatore district are the targeted population of this proposal.
Needs
Supporting rural women in developing and running their own businesses would enable more of them to work and lift the quality of their employment. 'We are more powerful when we empower each other' will be the main focal point. Aiming to understand and address their economic issues in a broader context by developing women with sound

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Category:	OBC

Co-Investigator:

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Category:	OBC

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Category:	OBC

Part 3: Suggested Refrees

Suggested Refrees:

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Academic Area:	
Application Area:	Food and agriculture,
State:	Tamilnadu
District:	Thanjavur
City:	Thanjavur
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Application Area:	Food and agriculture,
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District:	Tiruchirappalli
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Academic Area:	
Application Area:	Basic Science,
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District:	Pondicherry
City:	Kalapet
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Pin Code:	605014

Part 4: Financial Details

Financial Details:

A. Non - Recurring

A1. Non-Recurring (e.g. equipments, accessories etc.)

S.	Equipments	Qty.	Justification	1 Year	Total
1.	Autoclave	3	Sterilization	54000	54000
2.	Bakery oven	1	Drying microspeans	50000	50000
3.	Banana fiber extractor	4	To extract fiber from banana pseudostem	320000	320000
4.	Banana fiber paper making machine	1	To make fiber based products	200000	200000
5.	Banana yarn making machine	5	For spinning banana fibers to make yarn	300000	300000
6.	Bobbin, circle, charkha, pim and shuttle	10	Weaving accessories for looming purpose	50000	50000
7.	Boiling unit	1	Liquid Sterilization	82000	82000
8.	Briquettes	5	Conversion of Solid waste into briquettes	150000	150000
9.	Camera	1	Recording evidences	95000	95000
10.	cold oil press machine	2	Extract oil	90000	90000
11.	Commercial Flour Grinding Machine	4	To make powder	370000	370000
12.	Cow dung agarbatti machine	1	Making agarbattis	100000	100000
13.	Cow dung cake making machine	1	Making cow dung cake	12000	12000
14.	Cow dung cups making machine	1	Making cow dung cups	50000	50000
15.	Cow dung dhoopa making machine	1	Making dhoopa	125000	125000
16.	Cow dung manure pit making	1	Making cow dung pits	50000	50000
17.	Cow dung mosquito repellant making machine	1	Making mosquito coils	300000	300000

18.	Cow dung pots making machine	1	Making cow dung pots	19000	19000
19.	Dehydration Machine	4	Remove Moisture Content	170000	170000
20.	dung log making machine	1	Making cow dung logs	46000	46000
21.	fiber cutting Chopper	1	Cutting the banana fiber	200000	200000
22.	Laptop with Printer	3	Documentation and Report Preparation	150000	150000
23.	Loom complete with all accessories	2	To weave the fiber	190000	190000
24.	Manual Cap Sealing Machine	2	Leak proof sealing	73000	73000
25.	Panchgavya floating diya making machine	1	Making Diya	10000	10000
26.	pH meter (SV/500/Hr. continuous use, 192x104x134mm with 12V DC adaptor)	2	Measure Hydrogen ion Concentration	24000	24000
27.	Pulverizer	1	Powdering	50000	50000
28.	Seed Shelling Machine	4	Removal of seed coat	100000	100000
29.	Sieve Sets	2	To get coarse powder	35000	35000
30.	Weighing Balance	4	Accurate Measurement	73000	73000
			Total	3538000	3538000

A2. Others Non-Recurring

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Construction of work shed or structures	Construction of Women Techno Park	500000	0	0	500000
		Total	500000	0	0	500000

B. Recurring

B.1 Project Staff

S.	Project Staff	No.	Justification	1 Year	2 Year	3 Year	Total
1.	Project Assistant	1	Graduate in any discipline	259200	259200	259200	777600
			Total	259200	259200	259200	777600

B.2 Consumable

S.	Items	Qty.	Justification	1 Year	2 Year	3 Year	Total
1.	Banana pseudo stem purchase Carriage Expenses (Truck), Saw dust purchase Cow dungs, Dyes, binders for making cow dung products and accessories	1	Raw Materials for Proposed work	320000	555000	555000	1430000
2.	Stationery	1	To carry out training programme	30000	30000	30000	90000
			Total	350000	585000	585000	1520000

B.3 Travel

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Field Activities	To carry out field investigation, collection of raw materials and hands-on-training	40000	40000	40000	120000
2.	DST review meetings	To conduct review meetings	20000	20000	20000	60000
		Total	60000	60000	60000	180000

B.4 Contingency

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Computer table, secretarial assistance, documentation, lab/field trials, maintenance/ servicing of equipment, etc.	Service, maintenance and daily operations	50000	50000	50000	150000
		Total	50000	50000	50000	150000

B.5 Any Other Head

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Trainings about the products	Hands-on-training, production of products and marketing	0	300000	300000	600000

2.	Trainings about the products	Provide trainings for targeted population	550000	0	0	550000
3.	Expert Honorarium	To invite experts for demonstration and training	0	100000	100000	200000
4.	Expert Honorarium	To invite experts for demonstration and training purpose	300000	0	0	300000
		Total	850000	400000	400000	1650000

B.6 Overhead

$.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Institutional Overheads	Utilization of available infrastructure and resources	427000	427000	427000	1281000
		Total	427000	427000	427000	1281000

Budget Head Summary in (INR)

Budget Head	Year-1	Year-2	Year-3	Total
1- Non-Recurring				
Equipment	3538000	0	0	3538000
Others Non-Recurring	500000	0	0	500000
2- Recurring				
Project Staff	259200	259200	259200	777600
Travel	60000	60000	60000	180000
Overhead	427000	427000	427000	1281000
Contingency	50000	50000	50000	150000
Consumable	350000	585000	585000	1520000
Any Other Head	850000	400000	400000	1650000
Total	6034200	1781200	1781200	9596800

PFMS Details:

PFMS Unique Code Available: Yes

PFMS Unique Code : VCW

Part 5: Current Ongoing Project

Current Ongoing Project: NA

3. Dr.R.Senthil Kumar

Temporary Registration No. : TPN / 58505

Project Proposal On

"IoT BASED AGRONOMIC ASSISTING DEVICES"

Submitted to

Division :Technology Development Transfer

Programme or Scheme : Device Development Programme

Submitted by

Project Investigator:

Dr. THIAGARASU V

GOBI ARTS AND SCIENCE COLLEGE-Gobi

Part 1 : General Information

General Information:

1.Name of the Institute/University/Organization submitting the Project Proposal :

GOBI ARTS AND SCIENCE COLLEGE

2. State	Tamilnadu
3. Principal Investigator Name:	Dr. THIAGARASU V
4. Category:	OBC
5. Type of the Institue :	Academic Institutions(Government)
6. Project Title :	IoT BASED AGRONOMIC ASSISTING DEVICES
7. Division :	Technology Development Transfer
8. Programme Or Scheme :	Device Development Programme
9. Academic Area :	Agriculture Science, Physical Science,
10. Application Area :	Digital technologies, Food and agriculture, Security,
11. Goverment National Initiative :	Make in India, Digital India, Smart Village,
12. Type of Proposal :	Proposal Against Call
13. Project Duration :	3 Years and 0 Months
14. Proposal Submit Date :	12/11/2020
15. Project Keywords :	Drone, IoT, Zigbee, ultrasonic sensor, LoRaWAN, prototype
16. Project Summary :	

India is a primarily an agro-based country. Agriculture and its related sectors are the major sources of livelihood in India. Tamil Nadu plays a significant role as it produces considerable amount of agro-based products.

Erode district Turmeric zone of Tamil Nadu is situated in the western agro climatic region and hence the district is making essential contributions to the agricultural sector of India. The cropping pattern in the district is directly proportional to its soil type and available water sources. For instance, in the wet blocks of the district like Gobichettipalayam, Sathyamangalam, Bhavani produces the crops like paddy, sugarcane, cotton, turmeric, tobacco, coconut, groundnut are grown abundantly. While in the dry and semi-arid blocks of the district like Anthiyur, Ammapettai produces the crops like Jowar, Ragi, Maize, Finger Millet and Pulses are grown extensively. Most of the villagers of Erode district relies on the rainfall for cultivation hence the crops like millets and groundnuts are grown exclusively. Besides agriculture, cattle rearing are the common livelihood of Erode district and also a major source of income apart from agriculture.

In India, specifically wild boars and wild elephants are responsible for crop damage. The usage of electrical fencing could be harmful for wild animals and also against the law. IoT enabled drone for wild life monitoring uses GPS location and visual information to aid in wild life inspection. Drone based method is employed to monitor the intruded wild animals which not only damages agricultural crops but also kills lot of people and domestic animals. Drone system utilizes GPS tracking system which not only signals the user regarding the unwelcomed arrival of wild boars and wild elephants in agricultural lands but also engages itself to drive out the wild animals.

It is proposed to develop IoT enabled agronomical assisting devices to promote and protect agricultural sector in India. In this proposal, five different types of devices are proposed to meet out the aforesaid requirements.

Drone is used to monitor the intrusion of wild animals based on the zigbee protocol sensor and IoT to setup wireless transmission system.

Flash floods monitoring device is used to detect the floods by using distance detection and interrelated computing system.
Smart Cold Storage Monitoring Device is a system that monitors temperature and humidity based on IoT enabled DHT11 sensor with the temperature range of 0oC to 50oC using microcontroller and will alert the user by sending SMS.

Soil Nutrient Monitoring system integrates multiple soil parameters like NPK levels, PH level and Moisture level with high accuracy using LoRa wireless technology network.

On the successful implementation of the aforesaid proposed devices IoT based Agronomic Assisting Devices from lab to land increases the life style of the rural farmers of India. The farmers are protected from natural calamities like flash floods, wild animal intrusion and loss of nutrient in soil.

Part 2: Particulars of Investigators

Principal Investigator:

1. Name:	Dr. THIAGARASU V
Gender:	Male
Date of Birth:	11/03/1964
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Co-Investigator:

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Institute/University:	GOBI ARTS AND SCIENCE COLLEGE
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3. Name:	Dr. R SENTHIL KUMAR
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Designation :	ASSOCIATE PROFESSOR
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Institute/University:	DR. N.G.P. ARTS AND SCIENCE COLLEGE
State:	Tamilnadu

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Category:	OBC

Part 3: Suggested Refrees

Suggested Refrees: NA

Part 4: Financial Details

Financial Details:

A. Non - Recurring

A1. Non-Recurring (e.g. equipments, accessories etc.)

S.	Equipments	Qty.	Justification	1 Year	Total
1.	Application Server and Mobile Application (perpetual License) LoRaWAN	1	A stand-alone mobile application is an application that doesn't require external services to run (which is very rare, by the way). The application server will receive this call, make the call to the external service, and filter it and return only what your application requested. This will reduce the amount of data transiting over mobile internet and thus increase the performance of your application.	472000	472000
2.	Drone Components with Server	7	Using DJI Mavic Mini 4KM FPV Drone with 2.7K Camera 3-Axis Gimbal can help to detect animal movement on a real-time basis covering large areas. They provide GPS location and visual information to aid in wild animal's inspection.	840000	840000
3.	LoRa IoT Kit - N Single Channel LoRa Gateway	1	•LoRa IoT kit will show how to build LoRa network, and how to use the network to send data from a LoRa sensor node to various IoT servers. When used as a private LoRa network, the LoRa gateway will connect your other LoRa nodes up to 500 meters – 5km however expect up to 10km range (when in line of sight) when connecting your LoRa node to a LoRa gateway.	80000	80000
4.	LoRaWAN Server - N Single Channel LoRa Gateway	1	Connect the LoRaWAN Server Interfacing.	450000	450000

5.	Server PC for Data Logging (LoRaWAN)	1	The server also needs enough working memory and processing power to process file and program accesses for various users as quickly and faultlessly as possible. Whether the hardware requirements can be fulfilled by a standard PC or whether a special server setup is required primarily depends on the number of users.	230100	230100
			Total	2072100	2072100

A2. Others Non-Recurring : NA

B. Recurring

B.1 Project Staff

S.	Project Staff	No.	Justification	1 Year	2 Year	3 Year	Total
1.	JRF	1	As per UGC norms, eligible JRF candidate will be recruited. The candidates having IoT skills will be preferred.	401760	401760	0	803520
2.	Project Assistant	4	Master Degrees in CS/IT/ICT & MCA candidates from Recognized University or equivalent.	1036800	1036800	1036800	3110400
3.	SRF	1	As per UGC norms, eligible JRF candidate will be promoted to SRF caider.	0	0	453600	453600
			Total	1438560	1438560	1490400	4367520

B.2 Consumable

S.	Items	Qty.	Justification	1 Year	2 Year	3 Year	Total
1.	5V Moisture sensor module	1	This soil sensor module is constructed with 2 probes. These probes of the soil sensor module is used to measure the volumetric content of water. The two probes allow the current to pass through the soil and then it gets the resistance value to measure the moisture value.	10000	0	0	10000
2.	Arduino processor Uno	1	The Arduino Uno is a microcontroller board based on the ATmega328 datasheet. It has 14 digital input/output pins of which 6 can be used as PWM outputs, 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.	10000	0	0	10000
3.	DHT 11 sensor, Arduino ATmega328P, LCD Character Display,GSM SIM800C, Power Adapter, PCB, Mild Steel Enclosure	1	This sensor is used in various applications such as measuring humidity and temperature values in heating, ventilation and air conditioning systems. Weather stations also use these sensors to predict weather conditions. The humidity sensor is used as a preventive measure in homes where people are affected by humidity.	412500	412500	412500	1237500
4.	DHT22 Digital temperature and humidity sensor module AM2302	1	This is a calibrated digital temperature and humidity module with onboard sensor DHT22 (AM2302), which features higher accuracy and wider measuring range than DHT11. It can be used for detecting ambient temperature and humidity, through the standard single-wire interface.	17500	0	0	17500
5.	Distance Detection Sensor, Water Flow Meter cum Sensor	10	Distance detection sensors are used to measure water flow stack height, fast measurement supporting exact positioning as well as an extensive range of materials detection. Water Flow Meter cum Sensor measures the volumetric flow rate and speed of water.	155000	0	0	155000
6.	Electrical Wires and Testing	1	Electrical Wires are used to connect more devices and sensors, enabling the transfer of signals from one device to other.	25000	25000	25000	75000
7.	GSM GPRS Module	1	A GSM GPRS Module is used to enable communication between a microcontroller or a microprocessor and the GSM / GPSR Network. Here, GSM stands for Global System for Mobile Communication and GPRS stands for General Packet Radio Service.	25000	0	0	25000
8.	LCD Character display 16*2	1	To display the temperature reading. A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers.	10000	0	0	10000

9.	Mild steel enclosure MS1	1	An electrical enclosure is a cabinet for electrical or electronic equipment to mount switches, knobs and displays and to prevent electrical shock to equipment users and protect the contents from the environment. The enclosure is the only part of the equipment which is seen by users.	37500	0	0	37500
10.	Miscellaneous	1	Stationary and Maintenance Charges	40000	45000	40000	125000
11.	Model Design	1	To design and analyse the function of working model.	265000	265000	265000	795000
12.	Multichannel Indoor Gateway	1	It lets to bridge LoRa Wireless Network to an IP network via Wi-Fi, Ethernet.	37800	0	0	37800
13.	NPK sensor module	1	Detection of nitrogen, phosphorus, and potassium (NPK) nutrients of soil using optical transducer. The optical transducer is implemented as a detection sensor which consists of three LEDs as light source and a photodiode as a light detector. The wavelength of LEDs is chosen to fit the absorption band of each nutrient.	197500	0	0	197500
14.	Outdoor Gateway with 8dBi Fiber Glass Antenna, Lightening arrester, UPS, Mounting Pole and complete accessories	1	It's used for edge computing capability to support different use cases in the field of IoT technology.	232400	0	0	232400
15.	pH and Electrical conductivity sensor	1	PH and conductivity are key parameters to measure the acidity and the basicity of a substance while monitoring the level of nutrients, salts or impurities present. PH and conductivity measurements are used in a variety of applications, including boiler maintenance and agriculture, as well as aquariums and aquaculture.	30000	0	0	30000
16.	Power adapter AC/DC-20/12v	1	AC/DC adapter, AC converter or charger, an AC adapter is an external power supply used with devices that run on batteries or have no other power source. AC adapters help reduce the size of a laptop computer by alleviating the need for a standard sized power supply.	7500	0	0	7500
17.	Ultrasonic Sensor	252	Ultrasonic sensors work on the same principles like a radar system. An ultrasonic sensor can convert electric energy into acoustic waves and vice versa. If they strike an object, it emits short high frequency sound pulses at regular intervals and then they are reflected back as echo signals to the sensor.	630000	0	0	630000
18.	Weather Station	1	Weather station measures barometric pressure, air temperature, relative humidity, wind direction and velocity, rainfall and other meteorological factors.	70000	0	0	70000
			Total	2214300	747500	742500	3704300

B.3 Travel

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Travel Expenses	To encourage the research assistants to get participated in umpteen numbers of symposiums, workshops, conferences and seminars to update their knowledge in the proposed research field. Besides, to gather required data, the research assistants have to travel to various places across the state of Tamil Nadu.	60000	60000	60000	180000
		Total	60000	60000	60000	180000

B.4 Contingency

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1.	Contingencies	While working on the project the team requires financial support for maintenance and servicing of sensors and devices, incidental expenses, construction cost and documentation expenses.	190000	0	0	190000
2.	Contingency	While working on the project the team requires financial support for maintenance and servicing of sensors and devices, incidental expenses, construction cost and documentation expenses.	0	175000	165000	340000
		Total	190000	175000	165000	530000

B.5 Any Other Head

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1 .	Field Visit, Training, Demo & Honorarium	To visit and to fix the sensors in the flash floods affected areas of Moyar River and tributaries of Bhavani river. To visit the wild boar damaged agriculture lands foot hills of Western Ghats. To provide training for research assistants and to test drones and their performances. For demo purposes of drones, honorarium should be given.	225000	175000	175000	575000
		Total	225000	175000	175000	575000

B.6 Overhead

S.	Description	Justification	1 Year	2 Year	3 Year	Total
1 .	Overhead Expenses	For the organization of the PI towards meeting their costs for overhead expenses on the project including infra structural facilities etc.	497014	477264	479040	1453318
		Total	497014	477264	479040	1453318

Budget Head Summary in (INR)

Budget Head	Year-1	Year-2	Year-3	Total
1- Non-Recurring				
Equipment	2072100	0	0	2072100
2- Recurring				
Project Staff	1438560	1438560	1490400	4367520
Travel	60000	60000	60000	180000
Overhead	497014	477264	479040	1453318
Contingency	190000	175000	165000	530000
Consumable	2214300	747500	742500	3704300
Any Other Head	225000	175000	175000	575000
Total	6888974	3073324	3111840	12882238

PFMS Details:

PFMS Unique Code Available: No

Type of Registration :	Academic Institutions(Government)
PAN Number :	AAATG4032E
Agency Name :	GOBI ARTS AND SCIENCE COLLEGE
Act Registration No. :	ACTXX10F1960/S.NO. 40 OF 1967
Registering Authority :	Any Other
Registering Authority Other :	REGISTRAR OF ASSURANCES
TIN Number :	-

TAN Number :	CMBG03580D
GST Number :	-
Block No /Building /Village /Name of Premises :	GOBI ARTS & SCIENCE COLLEGE
Road/Street/Post Office :	KARATTADIPALAYAM POST
Area/Locality :	GOBICHETTIPALAYAM
City :	GOBICHETTIPALAYAM
Pin Code :	638453
State :	Tamilnadu
District :	Erode
Contact Person :	Prof. Dr. V. THIAGARASU
Designation :	PRINCIPAL
Phone Number :	04285241139
Mobile Number :	9842741139
Email ID :	principalgasc@gmail.com
Bank Name :	BANK OF INDIA
Branch Address of the Bank :	ERODE - SATHY ROAD, KARATTADIPALAYAM
Bank Branch Name :	LAKKAMPATTI
Bank Account Number of the Beneficiary :	820810110015213
IFSC Code of the bank :	BKID0008208
MICR Code of the bank :	638013003

Part 5: Current Ongoing Project

Current Ongoing Project:

1. Project Title:	DST FIST
Funding Department:	Department of Science & Technology
Project Duration :	3 Years 0 Months

Total Project Cost (in Rs.) :	3950000.00
Start Date in :	February 2020
Project Expected end in :	January 2023

Project Expected Outcomes :

(Establishment of advanced instrumental facilities in the research laboratory for Research Scholars.)

2. Project Title:	DBT Star College Scheme
Funding Department:	Department of Bio Technology
Project Duration :	3 Years 0 Months
Total Project Cost (in Rs.) :	8200000.00
Start Date in :	August 2020
Project Expected end in :	July 2023

Project Expected Outcomes :

(To Train maximum stakeholders for igniting Scientific Thinking among Under Graduate students)

3. Project Title:	DBT Star College Scheme Dr NGP Arts and Science College
Funding Department:	Department of Bio Technology
Project Duration :	3 Years 0 Months
Total Project Cost (in Rs.) :	8400000.00
Start Date in :	March 2018
Project Expected end in :	March 2021

Project Expected Outcomes :

(To Train maximum stakeholders for igniting Scientific Thinking among Under Graduate students)

4. Prof.Dr.V.Rajendran

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ePPMS

Design and development of personalized smart and economical Oxygen concentrator

File Number : CVD/2021/000123

Submitted By : Dr. Venkatachalam Rajendran

Submission Date : 30-Jun-2021

PROPOSAL DETAILS

(CVD/2021/000123)

Dr. Venkatachalam Rajendran
veerajendran@gmail.com
Principal(CENTRE FOR NANO SCIENCE AND TECHNOLOGY)
Dr.N.G.P Arts and Science College
Dr.ngp arts and science collegedr.ngp nagar-kalapati road, Coimbatore, Tamil nadu-641048

Technical Details :

Scheme :	Short-term special call on COVID-19		
Research Area :	Critical Components and Innovations in Oxygen Concentrators (COVID-19)		
Duration :	12 Months	**Contact No :**	+919994137373
Date of Birth :	02-Nov-1962		
Nationality :	INDIAN	**Total Cost (INR) :**	86,17,880

Project Summary :

The pandemic of SARS-CoV-2 unexpectedly put the world on the back foot and raised the medical demand manifold in a shorter period of time that left the leading manufacturers of medical equipment unreasonable to meet. Oxygen support devices like ventilators and oxygen concentrators are vital among the list in COVID-19 patient's effective management. However, they are costlier, having operational disadvantages and most importantly digital and remote health monitoring unabled. Therefore, the current proposal is been put forth to address those problems through employing multiple strategies such as alternative material selection, innovative design and indigenous production. There are three main components in oxygen concentrator. In the air inlet section, we propose to fit with an alternative membrane dryer made of either polymer or ceramic based or polymeric-ceramic composite to reduce capital cost, noise, energy and chemical consumption, and enhance durability. Next in the N2/O2 separation section, we propose to develop two different adsorbent materials; cost-effective zeolites layered with graphene and MOFs. At the out section, we proposed to integrate with IoT platform to facilitate remote and smart healthcare montiroing. Therefore, the objective of this proposal as follows; develop and test cost-effective and eco-friendly membrane air filters, multilayer and two-dimensional M-metal-organic frameworks adsorbent(s) for enhanced N2/O2 separation, integration of IoT based wireless patient's health monitoring system and development of personalized, smart and economical Oxygen concentrator. Thereby, become self-reliant in medical equipment manufacturing. Additionally, oxygen concentrators also used to attain improved physical exercise tolerance and sleep quality, and enhanced mental alertness.

Objectives :

Develop and test cost-effective and eco-friendly membrane for air filtration Develop and test multilayer adsorbent(s) for enhanced N2/O2 separation Develop and test two-dimensional M-metal-organic frameworks (M-MOF-74) Design, develop and test an IoT based wireless patient's health monitoring system Design and develop personalized, smart and economical Oxygen concentrator Become self-reliant in medical equipment manufacturing

Keywords :

Oxygen Concentrator, Polymer membrane, Modified Zeolite, Synthesized Graphene, M-MOF, Biomedical Monitoring

Expected Output and Outcome of the proposal :

Efficient and eco-friendly membrane air-filters with broader application potential Efficient and cost-effective multilayered N2/O2 separators Efficient and cost-effective two-dimensional MOFs based N2/O2 separators Remote and real-time health monitoring Smart and portable Oxygen concentrator with multiple use Self-reliance in medical health instruments manufacturing (Oxygen concentrator)

Suitability of the proposed work in major national initiatives of the Government:

Make in India, Startup India, Digital India

Theme of Proposed Work:

Health, Manufacturing

Collaboration Details for last 5 Years :

S.No.	Name	Type of Collaboration
1	Wilhelm K Aicher Professor Department of Urology, University of Tübingen Hospital Waldhörnlestr. 22, 72072, Tübingen Germany [01-May-2016 to 30-Apr-2018]	D S T D A A D

Planned Collaboration for the proposed work with any foreign scientist/ institution ? **No**

SNo.	CO-PI Details
1	 **Girija K** kgirija.ngp@gmail.com Assistant Professor(Department of Physics) **Dr.N.G.P Arts and Science College** Dr.NGP Arts and Science CollegeDr.NGP Nagar-Kalapati Road, TAMIL NADU, COIMBATORE D.O.B : 19 Jul, 1984
2	 **SENTHILKUMAR RAMASAMY** sen07mca@gmail.com Professor(Computer Applications) **Dr.N.G.P Arts and Science College** Dr.NGP Arts and Science CollegeDr.NGP Nagar-Kalapati Road, TAMIL NADU, COIMBATORE D.O.B : 24 May, 1983
3	 **Yogeswari** yogs.phy@gmail.com Assistant Professor(Physics) **Vellalar College for Women,Thindal** Maruthi Nagar, Thindal, Erode,TN, TAMIL NADU, ERODE D.O.B : 07 Jun, 1983
4	 **Venugopal D** venugac.rdv@gmail.com Assistant Professor(Physics) **Gobi Arts & Science College (Autonomous)** Karattadipalayam, Gobichettipalayam, TAMIL NADU, ERODE D.O.B : 05 Jun, 1971
5	**J Indira** indira@vcw.ac.in Assistant Professor(Department of Chemistry) **Vellalar College for Women,Thindal** Maruthi Nagar, Thindal, Erode,TN, TAMIL NADU, ERODE

File No. : CVD/2021/000123 | Page 2 of 122

1. Research - Fellowship Collaborations - Academic Year (2020-21)

1. Dr. V. Rajendran – Leadership for Academics Program

Sanction Letter

Penn GSE
GRADUATE SCHOOL OF EDUCATION
UNIVERSITY of PENNSYLVANIA

3700 Walnut Street
Philadelphia, PA 19104-6216
www.gse.upenn.edu

October 26, 2021

Professor Rajendran Venkatachalam
Dr. N.G.P. Arts and Science College,
Kalapatti Road, Coimbatore

LETTER OF INVITATION

Dear Professor Rajendran Venkatachalam,

As the growing availability of vaccines brings COVID-19 pandemic under control, and international travel is set to resume in November with the lifting of U.S. travel restrictions, after postponing several times our Leadership for Academicians Program (LEAP) originally scheduled to take place at the University of Pennsylvania (Penn) on March 22-28, 2020, we are very excited to finally be able to host you at Penn on December 5-11, 2021.

Convened by the Tata Institute of Social Sciences, Mumbai under the aegis of Ministry of Human Resource Development, Government of India and in collaboration with the University of Pennsylvania Graduate School of Education (Penn GSE), LEAP is a fully-funded leadership development program for second level academic administrators of publicly funded higher education institutions in India.

The international component of the program, offered by Penn GSE will focus on the following goals:

- Present the U.S. context and draw out the implications this context creates for leadership;
- Identify and introduce the ideas, tools, strategies and ways of leading that can be leveraged effectively to create responsive, accountable universities; and
- Facilitate the intentional translation from the U.S. context and application to the Indian one so participants can apply such learnings to their own situations.

All expenses associated with your participation in LEAP in the United States will be covered by the Tata Institute of Social Sciences, Mumbai, India with grants received from Ministry of Human Resource Development, Government of India.

This letter may be used to obtain your visa to visit the United States on December 5-11, 2021 to attend the training at the University of Pennsylvania's campus in Philadelphia.

As you prepare for your trip, please review the travel guidelines issued by the United States' Centers for Disease Control and Prevention (CDC) at https://www.cdc.gov/coronavirus/2019-ncov/travelers/noncitizens-US-air-travel.html.

Although the University of Pennsylvania's mask and vaccination requirements are well aligned with those of CDC, there will be a few additional steps you'll need to comply with, including using Penn OpenCampus app to perform daily symptom checks. For additional information about our COVID-19 protocols please visit https://coronavirus.upenn.edu/content/visitors.

We look forward to welcoming you at Penn GSE.

Sincerely,

Dr. Matthew Hartley
Professor of Education,
Associate Dean for Academic Affairs,
University of Pennsylvania Graduate School of Education
Executive Director, Penn AHEAD

UNIVERSITY of PENNSYLVANIA

Approval Letter

Dr. N.G.P. ARTS AND SCIENCE COLLEGE — APPROVAL

(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu & Accredited by NAAC with 'A' Grade (2nd Cycle)
Dr. N.G.P.-Kalapatti Road, Coimbatore-641 048, Tamil Nadu, India.
Website: www.drngpasc.ac.in | Email: info@drngpasc.ac.in. | Phone: +91-422-2369100

AY 2020 -21

Ref. No: DRNGPASC/MA/2021-22/03 **Date : 23/10/2021**

From
The Principal

To
The Madam Secretary

Approval is requested to attend the second part of the LEAP programme at UPenn, USA sponsored by Government of India during December 6-10, 2021 at UPenn, USA.

Date of leaving from Coimbatore 4th December 2021.

Date of arrival 13/14th December 2021.

Submitted to Madam Secretary for _____

(Prof.Dr.V.Rajendran)
Principal

Approval Status	**Approved**		**Not Approved**	

Comments:

25/10/21
Madam Secretary

Dr. N.G.P. Arts And Scien... College (Autonomous)
APPROVED
2021-2022 373

Certificate

Penn GSE
GRADUATE SCHOOL OF EDUCATION
UNIVERSITY of PENNSYLVANIA

This Certificate of Completion is awarded to

Professor Rajendran Venkatachalam

for participation in a week-long immersive program
of study of higher education in the United States of America
as a part of the

Leadership for Academicians Program (LEAP)

provided in partnership with the Tata Institute of Social Sciences
on December 6-10, 2021.

Dr. Peter Eckel, Senior Fellow and Director of Leadership Programs

Dr. J. Matthew Hartley, Professor, Associate Dean of Academic Affairs

2. Dr. R. Senthil Kumar – INSA Visiting Scientist Programme

Sanction Letter

INDIAN NATIONAL SCIENCE ACADEMY
Bahadur Shah Zafar Marg, New Delhi – 110002

Madhvendra Narayan
Assistant Executive Director – II

INSA/SP/VSP-39/2021-22/
31st May, 2021

Dr. R. Senthil Kumar
Department of Computer Applications
Dr. N. G. P. Arts Science College,
Coimbatore-641048,
Tamil Nadu, India

Sub: INSA Visiting Scientist Programme 2021 for FY 2021-22.

Dear Dr. Senthil Kumar,

This is with reference to your application for INSA Visiting Scientist Programme 2021 for FY 2021-22. I am happy to inform you that you have been selected for the award of INSA Visiting Scientist FY 2021-22 under which you can visit the Institute (Name of Visiting Institute as mentioned in your application) for a period of **2 months** on following terms conditions:

1. **During the fellowship period you will be paid consolidated amount of Rs. 30,000/- (maximum) per month to cover your expenses related to boarding, lodging, travel etc.**
2. Candidate selected as Visiting Fellow must avail this Fellowship on or before **31 January, 2022. No Claim bills for payment will be accepted by the Academy after March 31, 2022.**
3. In case of any Change in Parent Institute, it should be informed to INSA before submission of Claim Bill.
4. Grant will be made to Parent Institute on completion of the visit upon submission of Claim Bill (in duplicate) duly forwarded by Parent Institute along with UC/SOE as per enclosed proforma.
5. A short report (2-3 typed pages) should be sent to the Academy immediately after completion of the visit along with a certificate from the Host Institute.

Kindly communicate your acceptance.

With best wishes,

Yours sincerely,

(M Narayan)

Encl. Claim Bill UC (available on website also)

Copy to:

1. Principal, Dr. N. G. P. Arts Science College, Coimbatore-641048, Tamil Nadu, India

Approval Letter

Dr. N.G.P. ARTS AND SCIENCE COLLEGE
(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu & Accredited by NAAC with 'A' Grade (2nd Cycle)
Dr. N.G.P.-Kalapatti Road, Coimbatore-641 048, Tamil Nadu, India.
Website: www.drngpasc.ac.in | Email: info@drngpasc.ac.in. | Phone: +91-422-2369100

Approval
AY 2021-22

Ref. No: CSCs/2021-22/38 **Date:30.11.2021**

From	Through	To
Dr. R. Senthil Kumar Professor-CSCs	Dean-R&D HoD	The Madam Secretary The Principal

- Approval is requested to submit the report and carry out the final implementation under the guidance of **Dr. Rajesh P.Barnwal**, Principal Scientist at AI & IoT Lab, Information Technology Group, **CSIR-Central Mechanical Engineering Research Institute,** Durgapur (INSA Visiting Scientist Programme 2021) from 03.01.2022 to 15.01.2022 and to avail Special On-Duty for the same.

Encl:

- Offer Letter

30/11/2021 (Dr. R.Senthil Kumar) **Staff**

30/11/21 (Dr. A.Muthusamy) **HoD**

30/11/21 (Dr.S.Balasubramanian) **Dean-R&D**

Submitted to Madam Secretary for Approval.

1/12/21 (Prof. Dr. V. Rajendran) **Principal**

Approval Status	Approved		Not Approved	

Comments:

1 day - on Duty given.
(31/1/22 to 15/1/22)

1/12/21 **Madam Secretary**

Dr. N.G.P. Arts And Science College (Autonomous)
APPROVED
2021-2022 467

Certificate

CSIR-Central Mechanical Engineering Research Institute
Mahatma Gandhi Avenue, Durgapur [W.B.]
https://www.cmeri.res.in

To Whom It May Concern

This is to certify that ***Dr. R. Senthil Kumar*** from ***Dr. N.G.P. Arts and Science College, Coimbatore-641048, Tamil Nadu, India*** worked with me under ***INSA visiting scientist programme 2021-22*** for a duration of two months i.e., ***from 12th Nov. 2021 to 12th Jan. 2022*** in online-cum-offline mode.

Further to certify that he also made a visit to the undersigned at ***CSIR-CMERI, Durgapur*** during ***03rd – 12th January' 2022*** for the afore-mentioned purpose.

During the said period, he worked on '***Instance segmentation based precise object detection in UAV images using Mask R-CNN***".

Wish him all the best for his future endeavour.

12/01/2022

[Rajesh P. Barnwal]

Place: Durgapur
Date: 12th January' 2022

Dr. Rajesh P. Barnwal
Scientist, Information Technology Group
CSIR-Central Mechanical Engineering Research Institute
(Under DSIR, Ministry of Science & Technology, Govt. of India)
MG Avenue, Durgapur-713209, W.B., India

3. Prof. Dr. V. Rajendran - Top 2% World Scientist - Indian Researcher

Proof

PLOS BIOLOGY

FORMAL COMMENT

Updated science-wide author databases of standardized citation indicators

John P. A. Ioannidis[1,2,3,4]*, Kevin W. Boyack[5], Jeroen Baas[6]

1 Department of Medicine, Stanford University, Stanford, California, United States of America, **2** Department of Epidemiology and Population Health, Stanford University, Stanford, California, United States of America, **3** Department of Biomedical Data Science, Stanford University, Stanford, California, United States of America, **4** Meta-Research Innovation Center at Stanford (METRICS), Stanford University, Stanford, California, United States of America, **5** SciTech Strategies, Inc., Albuquerque, New Mexico, United States of America, **6** Research Intelligence, Elsevier B.V., Amsterdam, the Netherlands

* jioannid@stanford.edu

OPEN ACCESS

Citation: Ioannidis JPA, Boyack KW, Baas J (2020) Updated science-wide author databases of standardized citation indicators. PLoS Biol 18(10): e3000918. https://doi.org/10.1371/journal.pbio.3000918

Received: August 3, 2020

Accepted: September 18, 2020

Published: October 16, 2020

Funding: The authors received no specific funding for this work.

Competing interests: I have read the journal's policy and the authors of this manuscript have the following competing interests. JPAI is a member of the editorial board of *PLOS Biology*. JB is an Elsevier employee. Elsevier runs Scopus and ICSR Lab, which is the source of this data, and also runs Mendeley Data, where the database is now stored.

There was great interest in the databases of standardized citation metrics across all scientists and scientific disciplines [1], and many scientists urged us to provide updates of the databases. Accordingly, we have provided updated analyses that use citations from Scopus with data freeze as of May 6, 2020, assessing scientists for career-long citation impact up until the end of 2019 (Table-S6-career-2019) and for citation impact during the single calendar year 2019 (Table-S7-singleyr-2019). Updated databases and code are freely available in Mendeley (https://dx.doi.org/10.17632/btchxktzyw). The original database (version 1) can also be found in https://data.mendeley.com/datasets/btchxktzyw/1, the updated (version 2) can also be found in https://data.mendeley.com/datasets/btchxktzyw/2, and any subsequent updates that might appear in the future will be generally accessible in https://dx.doi.org/10.17632/btchxktzyw.

S6 and S7 tabulated data include all scientists who are among the top 100,000 across all fields according to the composite citation index [2] when self-citations are included and/or when self-citations are not included. Furthermore, in the current update, Tables S6 and S7 include also scientists who are not in the top 100,000 according to the composite index but are nevertheless within the top 2% of scientists of their main subfield discipline, across those that have published at least five papers. Another new feature in this update is that Tables S6 and S7 include new columns showing for each scientist the rank of their composite citation index within their subfield discipline (with and without self-citations) and the total number of authors within the subfield discipline. For example, for Kevin W. Boyack, rank is 50 and 52 for the composite citation index with and without self-citations, respectively, among the total of 10,391 scientists whose main subfield discipline is "Information and Library Sciences." This extension allows the inclusion of more comprehensive samples of top-cited scientists for fields that have low citation densities and therefore would be less likely to be found in the top 100,000 when all scientific fields are examined together. Comparisons of citation metrics are more meaningful when done within the same subdiscipline. Of course, even within the same subdiscipline, different areas may still possess different citation densities, and assessing citation indicators always require caution.

Field and subfield discipline categories use the Science-Metrix classification as in our previous work [1], but multidisciplinary journals that were previously not assigned to a Science-Metrix field or subfield [3] have now been assigned to a specific field and subfield using a character-based convolutional deep neural network. This machine learning approach was trained with a set consisting of over a million entries was found to be outperforming other approaches

such as Wikipedia and Yahoo! Answers [4]. This allows a more accurate classification of scientists who publish many papers in multidisciplinary journals.

Tables S8 and S9 provide the 25th, 50th, 75th, 90th, 95th, and 99th percentile thresholds for each field and each subfield for career-long and single year 2019 impact based on citations and, separately, based on the composite indicator. The formula to calculate the composite indicator for career-long impact is derived by summing the ratio of log of 1 + the indicator value over the maximum of those indicator logs for 6 indicators (NC, H, Hm, NCS, NCSF, NCSFL) [3]:

$$c_i = \frac{\log(NC_i+1)}{\max\log(NC+1)} + \frac{\log(H_i+1)}{\max\log(H+1)} + \frac{\log(Hm_i+1)}{\max\log(Hm+1)} + \frac{\log(NCS_i+1)}{\max\log(NCS+1)} + \frac{\log(NCSF_i+1)}{\max\log(NCSF+1)} + \frac{\log(NCSFL_i+1)}{\max\log(NCSFL+1)}$$

The formula to calculate the composite indicator for single year 2019 impact follows the same principle and only uses citations from publications published in 2019. Maximum log values across the population are in separate tables for career (S10) and single year 2019 (S11).

Given the increasing attention given to the analysis of self-citations, we also include in Tables S8 and S9 data for each discipline and each subdiscipline of the 95th and 99th percentile threshold for the percentage of self-citations and for the ratio of citations over citing papers within the set of selected top-cited researchers. Very high proportion of self-citations and/or ratio of citations over citing papers may or may not be justifiable and may require a closer look at the citation practices of these scientists. A percentage (4.9%) of the scientists who are in the top 2% of their subdiscipline for career-long impact when self-citations are included are no longer in the top 2% of their subdiscipline when self-citations are excluded, and 0.01% ($n = 15$) of these fall below the top 10%. Some scientists have extremely high ratios of citations over citing papers, far exceeding the 99th percentile threshold. Many papers by the same scientist may be fully legitimately often cited together in the same article. However, some authors have been found to manipulate peer-review to add multiple citations to their works [5,6].

Publications in author profiles currently have 98.1% average precision and 94.4% average recall [7]. Comments for correction of author profiles should be addressed to Scopus, preferably by use of the Scopus to ORCID feedback wizard (https://orcid.scopusfeedback.com/).

Acknowledgments

This work uses Scopus data provided by Elsevier through ICSR Lab.

References

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Subject-wise ranking of top 2% scientist from India (all fields)

Downloded/compiled based on an independent study done by Stanford University scientists (for methodology and data visit)- https://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.3000918

Note world-wide full list of top 2% (all countries) can be found at shorturl.at/qHIJ4

authfull	Field	Inst_name	Rank world-wide (by subject area)	C-score	Top %	Number of papers	First year of publication	Latest year of publication
Munjal, M. L.	Acoustics	Indian Institute of Science, Bengaluru	222	3.51272993	0.794218661	173	1970	2020
Harsha, S. P.	Acoustics	Indian Institute of Technology Roorkee	267	3.45305773	0.95520893	148	2003	2020
Tandon, Naresh	Acoustics	Indian Institute of Technology Delhi	347	3.30931028	1.241413852	67	1986	2020
Narayanan, S.	Acoustics	Indian Institute of Information Technology Design and Manu	356	3.36077914	1.273611906	151	1978	2019
Balasubramaniam, Krishnan	Acoustics	Indian Institute of Technology Madras	401	3.32571982	1.434602175	364	1988	2020
Darpe, Ashish K.	Acoustics	Indian Institute of Technology Delhi	642	3.14688114	2.296794505	55	2002	2020
authfull	**Field**	**Inst_name**	**Rank world-wide (by subject area)**	**C-score**	**Top %**	**Number of papers**	**First year of publication**	**Latest year of publication**
Ganguli, Ranjan	Aerospace & Aeronautics	Indian Institute of Science, Bengaluru	51	3.80796775	0.111273537	306	1973	2020
Sujith, R. I.	Aerospace & Aeronautics	Indian Institute of Technology Madras	474	3.17041715	1.03418934	212	1997	2020
Rathakrishnan, E.	Aerospace & Aeronautics	Indian Institute of Technology Kanpur	566	3.11444448	1.234918072	204	1985	2020
Hablani, Hari B.	Aerospace & Aeronautics	Indian Institute of Technology Indore	655	3.05047223	1.429101303	80	1977	2019
Viswanath, P. R.	Aerospace & Aeronautics	National Aerospace Laboratories India	744	3.00896818	1.623284533	50	1974	2012
Ratnoo, Ashwini	Aerospace & Aeronautics	Indian Institute of Science, Bengaluru	790	2.98447101	1.723648899	89	2007	2020
authfull	**Field**	**Inst_name**	**Rank world-wide (by subject area)**	**C-score**	**Top %**	**Number of papers**	**First year of publication**	**Latest year of publication**
Inderjit, I.	Agronomy & Agriculture	University of Delhi	96	3.9263396	0.168865435	102	1990	2019
Sahrawat, K. L.	Agronomy & Agriculture	University of Agricultural Sciences, Dharwad	153	3.79753866	0.269129288	237	1975	2017
Kumar, Rajeev	Agronomy & Agriculture	Panjab University	182	3.75964603	0.320140721	378	1994	2020
Singh, Anil	Agronomy & Agriculture	Motilal Nehru National Institute of Technology Allahabad	197	3.72819391	0.346525945	560	1974	2019
Singh, K. P.	Agronomy & Agriculture	Bhabha Atomic Research Centre	215	3.70343723	0.378188215	434	1965	2019
Singh, Harpal	Agronomy & Agriculture	All India Institute of Medical Sciences, New Delhi	379	3.54286263	0.666666667	447	1948	2019
Kumar, Dinesh	Agronomy & Agriculture	Sanjay Gandhi Postgraduate Institute of Medical Sciences Lu	392	3.52936537	0.689533861	520	1984	2020
Pathak, Himanshu	Agronomy & Agriculture	ICAR - Indian Agricultural Research Institute, New Delhi	425	3.49891014	0.747581354	155	1996	2020
Aggarwal, Pramod K.	Agronomy & Agriculture	International Maize and Wheat Improvement Centre (CIMM	432	3.49446502	0.759894459	122	1980	2020
Kumar, Anil	Agronomy & Agriculture	Wadia Institute of Himalayan Geology	621	3.36509245	1.092348285	678	1990	2020
Aulakh, Milkha S.	Agronomy & Agriculture	Punjab Agricultural University	721	3.31824366	1.26824978	64	1976	2017
Ghosh, Probir Kumar	Agronomy & Agriculture	Indian Council of Agricultural Research	898	3.25026984	1.579595427	105	1994	2020
Carberry, Peter	Agronomy & Agriculture	International Crops Research Institute for the Semi-Arid Trop	953	3.22839313	1.676341249	98	1985	2020
Taraldar, J. C.	Agronomy & Agriculture	ICAR - Central Arid Zone Research Institute, Jodhpur	992	3.21160249	1.744942832	96	1978	2017
Mishra, P. K.	Agronomy & Agriculture	ICAR - Vivekananda Parvatiya Krishi Anusandhan Sansthan, A	1017	3.2037043	1.788918206	213	1974	2020
Singh, Jay Shankar	Agronomy & Agriculture	Babasaheb Bhimrao Ambedkar University	1038	3.19579653	1.82585752	52	2004	2019
Minhas, P. S.	Agronomy & Agriculture	ICAR - National Institute of Abiotic Stress Management, Bara	1042	3.19446994	1.83289358	102	1986	2020
authfull	**Field**	**Inst_name**	**Rank world-wide (by subject area)**	**C-score**	**Top %**	**Number of papers**	**First year of publication**	**Latest year of publication**
Ali, Imran	Analytical Chemistry	Jamia Millia Islamia	24	4.37924687	0.027542835	325	1986	2020
Malhotra, B. D.	Analytical Chemistry	Delhi Technological University	429	3.6950557	0.492328173	343	1974	2020
Goyal, Rajendra N.	Analytical Chemistry	Indian Institute of Technology Roorkee	514	3.63418087	0.589875713	290	1974	2020
Agrawal, Y. K.	Analytical Chemistry	Gujarat Forensic Sciences University	632	3.59459201	0.725294651	337	1971	2016
Pandey, Prem C.	Analytical Chemistry	Indian Institute of Technology Banaras Hindu University	740	3.51442793	0.849237408	123	1984	2019
Singh, Ashok Kumar	Analytical Chemistry	Indian Institute of Technology Roorkee	760	3.50511063	0.87218977	284	1985	2020
Singh, Saranjit	Analytical Chemistry	National Institute of Pharmaceutical Education and Research	887	3.44761924	1.017937271	169	1986	2020
Jain, A. K.	Analytical Chemistry	Indian Institute of Technology Roorkee	1068	3.38084404	1.225656151	152	1967	2017
Bhushan, Ravi	Analytical Chemistry	Indian Institute of Technology Roorkee	1112	3.36578047	1.276151348	212	1981	2020
Vijayalakshmi, M. A.	Analytical Chemistry	Vellore Institute of Technology, Vellore	1344	3.29990295	1.542398751	164	1979	2020
Raj, C. Retna	Analytical Chemistry	Indian Institute of Technology Kharagpur	1567	3.24286119	1.798317592	86	1997	2020
Basavaiah, Kanakapura	Analytical Chemistry	University of Mysore	1671	3.21798684	1.917669876	264	1997	2020
Aggarwal, Suresh Kumar	Analytical Chemistry	Bhabha Atomic Research Centre	1724	3.20621648	1.978493636	237	1979	2019
authfull	**Field**	**Inst_name**	**Rank world-wide (by subject area)**	**C-score**	**Top %**	**Number of papers**	**First year of publication**	**Latest year of publication**
Pal, G. P.	Anatomy & Morphology	Shri M.P. Shah Medical College	102	2.95631998	1.748971193	24	1973	2001
Nayak, Satheesha B.	Anatomy & Morphology	Melaka-Manipal Medical College, Manipal University	117	2.91146465	2.00617284	189	1995	2020
Agarwal, Anil Kumar	Anesthesiology	Department of Paediatric Orthopaedics, Chacha Nehru Bal C	498	3.38720278	1.445993031	328	1976	2020
authfull	**Field**	**Inst_name**	**Rank world-wide (by subject area)**	**C-score**	**Top %**	**Number of papers**	**First year of publication**	**Latest year of publication**
Mittal, Sanjay	Applied Mathematics	Indian Institute of Technology Kanpur	102	3.79608762	0.645365391	135	1991	2020
authfull	**Field**	**Inst_name**	**Rank world-wide (by subject area)**	**C-score**	**Top %**	**Number of papers**	**First year of publication**	**Latest year of publication**
Lokhande, Chandrakant D.	Applied Physics	D. Y. Patil University, Kolhapur	186	4.25704401	0.082719607	513	1982	2020
Kumar, Manoj	Applied Physics	Motilal Nehru National Institute of Technology Allahabad	210	4.22981285	0.093393105	787	1974	2013
Kumar, Sandeep	Applied Physics	All India Institute of Medical Sciences, New Delhi	358	4.08475909	0.159213007	262	1985	2014
Sarma, D. D.	Applied Physics	Indian Institute of Science, Bengaluru	360	4.08241197	0.160102466	467	1980	2020
Patil, Pramod S.	Applied Physics	Shivaji University	391	4.06160831	0.173889067	455	1988	2020
Ogale, Satish	Applied Physics	Indian Institute of Science Education and Research, Pune	399	4.0587585	0.177446899	534	1978	2020
Kumar, Vijay	Applied Physics	Dr Vijay Kumar Foundation	630	3.94213176	0.280179315	345	1979	2020
Ghosh, Aswini	Applied Physics	Indian Association for the Cultivation of Science	770	3.88504308	0.342441385	259	1967	2020
Sood, A. K.	Applied Physics	Indian Institute of Science, Bengaluru	775	3.88157807	0.34466503	432	1979	2020
Srivastava, A. K.	Applied Physics	University of Lucknow	978	3.8155759	0.434945031	496	1969	2010
Avasthi, D. K.	Applied Physics	Amity University, Noida	1105	3.78173397	0.491425624	726	1982	2020
Late, Dattatray	Applied Physics	Amity University, Maharashtra	1135	3.77403464	0.504767496	165	2004	2020
Kumar, Sanjeev	Applied Physics	Indian Institute of Science, Bengaluru	1202	3.75773163	0.534564343	431	1972	2019

4. Dr. N. Ravikumar - Post-Doctoral Research Fellow

Sanction Letter

UiO : Faculty of Mathematics and Natural Sciences
University of Oslo

Ravikumar Nattudurai
11/1, Vedikaranvalasu
Kothayam Post,
Oddanchatram Taluk
Dindigul District
Tamil, Nadu
India

Date: 06.05.2020
Your ref.:
Our ref.: 2020/1005 ELITHORE

Offer of employment

The University of Oslo is pleased to make you an offer of employment as Postdoctoral Research Fellow, position code 1352 at Department of Physics.

Enclosed with this letter, you will find your employment agreement and a supplementary information form. If you accept the offer, please sign the agreement and return it together with the completed supplementary information form to the Faculty administration as soon as possible and within two weeks of receipt of this letter.

In the event that you do not wish to accept this offer of employment, please indicate on the supplementary information form accompanying this letter and send it back to us, along with the other contents of the letter.

At this time, the start date for your employment has not yet been determined. Please indicate your start date on the supplementary information form. This date should be agreed upon with the Department of Physics and written into the appropriate field on the supplementary information form when you return this and the signed employment agreement. The employment agreement will be amended by the officer in charge.

If you come from a country outside the EU/EEA and wish to work in Norway, you need a residence permit. If you do not already have a residence permit, you must apply for a residence permit for work. For more information regarding work and residence permits and how to apply, please see: http://www.udi.no/en/

The application to the Norwegian Directorate of Immigration (UDI) must include an offer of employment form from UDI. This will be provided for you by the host unit.

Faculty Administration
Postal addr.: PO Box 1032 Blindern, 0315 Oslo
Visiting addr.: Sem Sælands vei 24

Phone: (+47) 22 85 52 00
Telefax: (+47) 22 85 63 39
postmottak@mn.uio.no

Org. no.: 971 035 854

Nattudurai Ravikumar
Minister Ditleffs vei 20
0862 OSLO

Universitetet i Oslo
Problemveien 7
0371 Oslo

Org.:Biofysikk og medisinsk fysikk

Arbeidsgiver: 00971035854 Universitetet i Oslo
6071614 Nattudurai Ravikumar Fnr. 07029218964

Lønnsavregning for Juni 2021 Lønningsdato: 11.06.2021

Stillingskode	L.tr	Still%	Lønnsans.	Tj.sted / Tj.stad
1352 Postdoktor	59	100,00	01.09.2020	Biofysikk og medisinsk fy

Tabell	%	Kontonr				Feriep.tilgode
	25	12249173434				0,00

Art	Navn	Periode	Ant/grunnl Kor mange	Sats	Beløp
1001	Bruttolønn	05.2021			700,00
1001	Bruttolønn	06.2021			44.500,00
OF11	Utbet.FP ord. ferieår	06.2021			11.529,29
7002	Pensjonstr m/innbet	05.2021			14,00-
7002	Pensjonstr m/innbet	06.2021			890,70-
OF19	Ferietrekk ordinært	06.2021	5,00-	2.053,85	10.269,23-
/LRP	Avdrag lån/Forskudd	06.2021			2.509,00-
/453	Skattbar feriegodtgjør	06.2021		11.529,29	
1402	Ford gr.l. fors.m/innb	06.2021		102,25	
/441	Trukket %-trekk	06.2021	46.548,00	25	11.637,00-

Årslønn 100%: 534.400 Netto beløp: 31.409,36

Hittil i år	Av.pl.ytelser	Pensj.innsk.	Forsk.trekk	Fagforening	Opptj.feriep.
	90.464,56	1.781,40-	22.613,00-	0,00	30.471,69

	Saldo inkasso	Saldo pål.tr.	Saldo lån / forskudd	Overtid ant.timer.	
			12.542,00	0,00	

Utbetalingen må betraktes som et forskudd. Det tas forbehold om endelig godkjenning fra LO Stat,Unio og YS Stat, og Stortingets samtykke av lønnsoppgj. (Gjelder ikke ansatte på Stortinget)

Lønnstakeren/lønnstakaren må ta vare på lønnsavregningen/lønnsavrekninga. Den er kvittering for betalt skatt, pensjon, kontingenttrekk o.l.

Approval Letter

Dr. N.G.P. ARTS AND SCIENCE COLLEGE
(An Autonomous Institution, Affiliated to Bharathiar University, Coimbatore)
Approved by Government of Tamil Nadu and Re-accredited by NAAC with 'A' Grade
DST – FIST | DBT – Star College Scheme
Dr. N.G.P.-Kalapatti Road, Coimbatore – 641 048, Tamil Nadu, India
Website: www.drngpasc.ac.in | Email: drngparts@kmch.ac.in. | Phone: +91 - 422 - 2369100

Ref. No: PY/2019-20/ 165 **Date: 16.06.2020**

From	Through	To
Dr N Ravikumar Assistant professor Department of Physics	Dean/HoD	The Principal

- Approval is requested for doing Post-Doctoral Research Fellow in University of Oslo in association with Oslo Hospital, Norway under on duty (Faculty Improvement Programme) from 01.09.2020 to 17.09.2023.

Staff in charge 16/06/2020 HoD 16/06/2020 Dean 16/6/20

Submitted to Madam Secretary for Approval

Principal 16/6/20

Approval Status	Approved		Not Approved	

Comments:

Study Leave given.

Madam Secretary 17/6/2020

Dr. N.G.P. Arts and Scien... College (Autonomous) ...roved 2020-21 12

Note:

- We can consider under Faculty Improvement Programme (FIP)
- On-duty leave (without salary) may be given
- It will be counted for Staff Role and useful for NAAC/NIRF

5. Dr. C. Venkatesan - Summer Research Fellowship Programme

Sanction Letter

From: <sumfel@ias.ac.in>
Date: Wed 11 Mar, 2020, 14:30
Subject: SRF Selections - 2020
To: <venkatesh3579@gmail.com>

Mr C Venkatesan
Department of Biochemistry
Dr N.G.P. Arts & Science College
Kalapatti Road, Nehru Nager
Coimbatore 632048 (Tamil Nadu)

Dear Mr Venkatesan,

This has reference to your application LFT23 for an IASc-INSA-NASI Summer Research Fellowship in 2020. We are happy to offer you a Fellowship to work for two months during this summer subject to verification of your marks as stated by you in the application with the marks sheets. You will be working with Dr Dinkar Sahal, International Centre for Genetic Engineering & Biotechnology, New Delhi (e-mail: dinkar@icgeb.res.in).

We have tried as far as practicable to assign you to a guide who works in your area of interest. Where that has not been possible, you will work with the assigned guide in a related area that will be determined by the guide, and trust that the experience will be fruitful to you. We will not be able to make any change in this regard.

This Fellowship is subject to the following norms:

* The duration of the Fellowship is eight weeks (56 days - including Sundays and General Holidays), and is not to be reduced. If you do not complete this requirement, you will not be paid the fellowship amount and the certificate that is usually issued on completion.
* You will be provided a III-tier A/c train fare from Coimbatore to ICGEB, New Delhi and back.
* You will be paid a Fellowship of Rs. 18,750/- per month towards your boarding, lodging and local transport expenses*.
* For all those working in institutions in New Delhi, INSA will coordinate in making the accommodation arrangements at IIT - New Delhi and Miranda House (for girls) during mid-May to mid-July subject to availability. Those working during other period are requested to

make their own accommodation arrangements. Dr (Ms) Seema Mandal will act as the co-ordinator and she can be contacted by e-mail (sci-soc@insa.nic.in); off. Tel. (011) 2322 1931 to 1950 [Ext. 459]. You are requested to contact Dr Mandal for all accommodation related enquiries.

Please also go through carefully & comply with all the Instructions given in the attached sheet.

You are advised to get in touch with Dr Sahal immediately to work out the exact period of your visit. In the meantime please communicate with Mr C S Ravi Kumar, Coordinator, Science Education Programme, your acceptance of this Fellowship. We would need a joining report from you upon your arrival, and a brief report of your work at the end of four weeks so that your Fellowship for the first month can be paid. After the receipt of the final report, we shall release the remaining amount due to you along with your travel fare.

We urge you to convey your acceptance of this fellowship within 7 days by both online (the userid and password given at the bottom of the email) as well as by returning the Form of Acceptance posted to you. Even if you are not able to accept the fellowship, this should be communicated to the Academy immediately (both by email: sumfel@ias.ac.in with a cc to your guide; and in the Form of Acceptance) so that the fellowship can be offered to another candidate in the waiting list.

With best wishes,

Yours sincerely,

Professor M.R.N. Murthy
Chairman, Joint Science Education Panel, IASc

* It is recommended that each Summer Research Fellow be covered by a personal health/accident insurance policy during the period of summer-training. The Academies will not provide any insurance cover. Therefore, the responsibility for purchase of insurance rests with you.

==========

https://web-japps.ias.ac.in:8443/fellowship2020/userlogin.jsp

Username: LFT23
Password: 8ey4n43bp5

6. Dr. S. Gowri - CSIR Summer Research Training Programme

Certificate

CSIR-SUMMER RESEARCH TRAINING PROGRAM
(CSIR-SRTP)2020 ONLINE

JUNE TO AUGUST, 2020

SL. NO.: CSIR/SRTP/2020/NEIST/5183

NAME: Dr. Gowri S

CSIR-SUMMER RESEARCH TRAINING PROGRAM
(CSIR-SRTP)2020 ONLINE

CSIR-SUMMER RESEARCH TRAINING PROGRAM (CSIR-SRTP)
2020 ONLINE HAS THE FOLLOWING ACTIVITIES

Eminent Scientist Lectures, Special Sessions, Project specific classes, Elocution video, Poster designing, Essay writing, Assignments / Project works given by mentor/coordinator & Summer Research Project Completion Report

CANDIDATE'S NAME: Dr. Gowri S SL. NO.: CSIR/SRTP/2020/NEIST/5183

GRADE: A

HOST INSTITUTE: CSIR-NEIST

MENTOR'S NAME: DR. IVY KANUNGO

REMARKS

.....

MENTOR

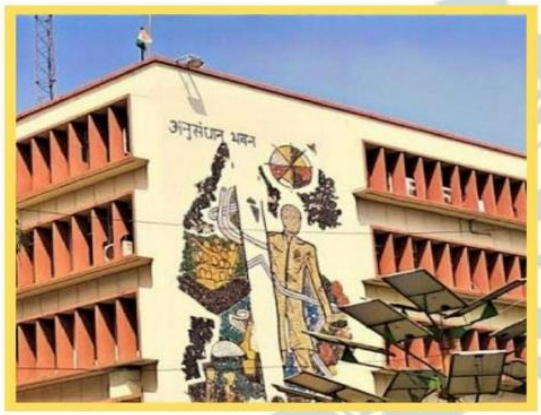
CSIR-SUMMER RESEARCH TRAINING PROGRAM (CSIR-SRTP)2020 ONLINE

CERTIFICATE

Name: Dr. Gowri S **Sl. No.:** CSIR/SRTP/2020/NEIST/5183

has completed all the requirements of the CSIR-Summer Research Training Program (CSIR-SRTP) 2020 online during June to August, 2020 coordinated by CSIR-NEIST, Jorhat

DR. G. NARAHARI SASTRY	PROF. ALOK DHAWAN	DR. SHEKHAR C. MANDE
DIRECTOR CSIR-NORTH EAST INSTITUTE OF SCIENCE AND TECHNOLOGY	DIRECTOR CSIR-INDIAN INSTITUTE OF TOXICOLOGY RESEARCH	DIRECTOR GENERAL, CSIR SECRETARY, DSIR, GOVT. OF INDIA



7. Dr. K. Rajathi - CSIR Summer Research Training Programme

Certificate

सीएसआईआर-भारतीय विषविज्ञान अनुसंधान संस्थान
CSIR-INDIAN INSTITUTE OF TOXICOLOGY RESEARCH

CSIR-SUMMER RESEARCH TRANING PROGRAMME
(CSIR-SRTP) 2020 ONLINE

CERTIFICATE

This is to certify that
Dr. K.Rajathi Palanivelrajan, Dr. N. G. P. Arts and Science College, Coimbatore
has participated in the CSIR-Summer Research Training Programme (ONLINE) 2020
at CSIR-Indian Institute of Toxicology Research, Lucknow,
held during June – August, 2020 and successfully completed
the programme.

R. Parthasarathi	Dr. Devendra Parmar	Professor Alok Dhawan
Coordinator	Head, HR	Director
CSIR-SRTP@IITR	CSIR-IITR	CSIR-IITR

26.09.2020

विषविज्ञान भवन, 31, महात्मा गाँधी मार्ग, लखनऊ-226001, उ.प्र., भारत VISHVIGYAN BHAWAN, 31, MAHATMA GANDHI MARG, LUCKNOW-226001, U.P., INDIA

1. Research - Journal Collaborations – Academic Year (2020 - 21)

Biomolecular Spectroscopy

journal homepage: www.elsevier.com/locate/saa

ZnO nanoparticles as efficient sunlight driven photocatalyst prepared by solution combustion method involved lime juice as biofuel

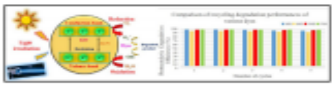
V. Gowthambabu [a,1], A. Balamurugan [b,1], R. Dhivya bharathy [a,1], S. Satheeshkumar [c,1], S.S. Kanmani [a,1,*]

[a] Department of Physics, Dr. N. G. P. Arts and Science College, Coimbatore – 641048, Tamilnadu, India
[b] Department of Physics, Government Arts and Science College, Avinashi – 641654, Tamilnadu, India
[c] Centre for Nano Science and Technology, K.S. Rangasamy College of Technology, Tiruchengode -637215, Tamilnadu, India

HIGHLIGHTS

- ZnO nanoparticles synthesised by solution combution method with lemon juice extract.
- Samples were characterized by XRD, UV–Vis, PL, FESEM, TEM, XPS, PDS.
- Structural and morphological characterizations confirmed the formation of wurzite hexagonal structure.
- XPS and PL analysis confirms that the synthesized ZnO will offer effective photocatalytic action.
- Exhibits excellent photocatalytic degradation of various organic dyes under UV and sun light (Vis) illumination.
- The maximum photocatalytic degradation efficiency was observed about 98.8% for PRA dyes under75 minutes of sunlight irradiation duration.

GRAPHICAL ABSTRACT



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ABSTRACT

We have prepared high purity Zinc oxide (ZnO) nanoparticles (NPs) by solution combustion synthesis (SCS) method with the aid of lime juice extract. From powder X-ray diffraction (XRD) spectra, it is observed that the ZnO NPs possess single phase, hexagonal wurzite structure with sharp intense peak at (101) plane, agrees with the planes of SAED pattern. Further, the crystallite size is found to be around 18 nm. UV–Vis analysis shows strong UV absorbance band at 381 nm and PL measurements reveals the presence of strong UV emission at 347 nm along with few weak visible emissions. Optical studies infer the existence of lower recombination rate of electron-hole pair, influence the photocatalytic activity of ZnO. From XPS measurements, presence of oxygen rich states on surface are also confirmed (O 1 s states). The degradation performance and reusability of four different dyes (methylene blue (MB), methyl orange (MO), rhodamine B (RhB), Pararosaniline (PRA)) under UV and sunlight irradiations are carried out to illustrate the photo-catalytic activity in presence of a catalyst like ZnO NPs. Comparatively, about 98.8% of PRA and MB dyes are photodegraded at 90 and 75 min of sunlight irradiation, respectively. Among these two, PRA dye shows maximum degradation performance with shorter irradiation time

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Investigation on temperature-dependent structural, dielectric and impedance characteristics of Cu-doped $CaFe_xTi_{1-x}O_{3-\delta}$ nanotitanates

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ABSTRACT

In recent days, the development of low-cost, sustainable, efficient electrode materials for energy storage applications is of great interest. Herewith, Cu-doped $Ca(Ti_{0.9}Fe_{0.1})O_{3-\delta}$ (Cu:CTF) double-perovskite electroceramic, heat-treated at diverse temperatures (800–1100 °C) were prepared using sol–gel technology. X-ray diffraction pattern confirmed the orthorhombic structure of the prepared Cu:CTF perovskites. Significant traces of TiO_2, CuO vanishes at elevated temperatures, which is evident from the XRD pattern. Further, the secondary phase traces were also observed in XRD, but without changing its crystal structure of Cu:CTF nanotitanate. The crystalline nature of the Cu:CTF ceramic was identified around 750 °C employing TG/DTA. UV–visible spectroscopy demonstrates the poor visible absorbance region towards the red shift with the bandgap variation of 5.28–5.42 eV. The nature of the Cu:CTF particles were analyzed using electron microscopes with the estimated particle size between 52 and 190 nm. Considering the action of temperature and frequency, complex impedance spectroscopy was utilized to analyse the inter- and intra-grain inclusions. Complex impedance spectroscopy study confirms the existence of dipole–dipole relaxation and Maxwell–Wagner (MW) polarisation for the samples heated above 900 °C. However, the a.c. test reveals the presence of conduction due to the addition of Cu^{2+} ions to $CaTi_{1-x}Fe_xO_{3-\delta}$ perovskite, which enhances oxygen vacancies and is strongly dependent on the inhibition of the hopping conduction mechanism.

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Secure and Efficient Fire-fly Data Routing Algorithm for Wireless Sensor Networks in IoT Monitoring Systems

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Abstract. In the Electronics world the sensor is used in IoT applications. The sensed data need to be transfer to the appropriate devices as input for further processing. Clustering used to group the sensors which could form cluster and select the nodes head from the cluster. The head of each cluster receives the forwarded data through the cluster member and pass on to nearest permanent fixed station. Identifying cluster head and shortest route identification is a major challenge. This paper proposed a novelty on hybrid decision making algorithm with firefly routing algorithm (HDMFRA) for Cluster Head selection. This research work focusing of three main criteria which could save the energy and extend the life activation of the node, through the usage of energy, amount of nodes adjacent and energy consumption from permanent fixed station. To aggregate the data in optimized manner and to transfer the data in efficient manner Fire Fly routing algorithm was used. Simulation results show that proposed algorithm HDMFRA network in homogeneous environment is effective and prolonging the life time of the node by 25%.

1. Introduction

IoT is a networks which connects the object together. In urban areas for promoting new developments and functions IoT related applications were developed as it is technological revolution which connects the real world of physical devices in which wireless sensor plays a vital role to communicate and response according to the needs of the applications [1][12]. Sensor are very small and consumes very low-power. Inorder to transfer the data quickly the cluster head was needed which could decreases the utilizing of energy will be less and effective [2][14]. The active time of the sensor node will be more when the node utilized in the short network or by the non-hazardous areas. Replacing the battery of sensor in hazardous areas was very difficult. During sensor nodes in active stage at each moment there will be depletion of energy. Activating the data in the sensor and passing the data towards base station will consume more energy, Failure of single sensor nodes destruct whole networks [15]. As the Network lifetime depends on each node design the network in such a manner that energy should be efficiently used by the network. Huge amount of nodes and permanent fixed station [17] will form wireless sensor networks. More energy will be consumed when there was a communication between the sensor nodes every time with their neighbouring nodes.

The data sensed by the sensor of different application such room temperature monitoring system in intensive care unit called source networks and the base station called as the sink nodes. A sensor networks utilizes the limited energy supply in conventional sensor networks. Energy consumption will

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Enhancement of Corrosive-Resistant Behavior of Zn and Mg Metal Plates Using Biosynthesized Nickel Oxide Nanoparticles

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Abstract
In this work, nickel oxide nanoparticles (NiO NPs) were synthesized using ultrasonic wave-assisted green synthesis route with *Delonix elata* leaf extract as a reducing and capping agent. The phase structure, crystallinity, thermal and physical stability, surface morphology, and surface area of the produced NiO NPs were investigated using X-ray diffraction, field-emission scanning electron microscopy high-resolution transmission electron microscopy, thermogravimetric/differential thermal analysis, and Brunauer–Emmett–Teller analysis. The surface properties such as roughness and hardness of NiO NP-coated plates were determined using atomic force microscopy and nanoindentation techniques. The electrochemical corrosion behavior of NiO NPs was studied in the presence of an aqueous electrolyte medium, that is, 3.5% NaCl, 6 M KOH, 1 M HCl, and 1 M H_2SO_4. The Tafel plot showed that the corrosive nature of Zn and Mg plates significantly decreases when the plates were coated with the prepared high surface area and mesoporous NiO NPs under all electrolytes, especially in acidic medium, that is, 1 M H_2SO_4.

Keywords Green synthesis · NiO NPs · Nanoindentation · Linear sweep voltammetry · Tafel plot · Anticorrosive behavior

1 Introduction

Corrosion is one of the essential research regions that have been attracting the attention of researchers for over 10 years. Long-term durability of commercial product applications such as pigments, heat exchangers, and boiler tubes mainly depends on the rate of corrosion of the materials [1, 2]. Corrosion is the retrogression of the metals due to their response to a corrosive element in their surroundings, including oxygen, carbon dioxide, chlorine, and fluorine [3–5]. Corrosion of metals has extreme fiscal effects and is an enormous problem all over the world. Various strategies have been used to protect metals from corrosion.

Zinc (Zn), magnesium (Mg), and their alloys have been

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TRUST LEVEL EVALUATION BASED ASYMMETRIC CRYPTOGRAPHY PROTOCOL FOR FLEXIBLE ACCESS CONTROL IN FOG COMPUTING

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ABSTRACT

The foremost problems in the fog-enabled cloud computing model are security guarantees and data Access Control (AC) because of the imitation of data by invaders. To enhance the security of this system, an Extended Communication Latency-based Authentication Scheme (ECLAS) that solves the mobility and similar locality legitimate login failures via applying two-factor authentication and a keystroke dynamics computation with obfuscated Round Trip Latency (RTL) of each users. But, the data need to accessed by other user should fulfill an be expected authentication and defend against dishonest access or login. So, data AC at cloud or fog nodes is greatly essential in many applications of fog-enabled cloud systems. Therefore in this article, a Flexible AC (FAC) protocol is introduced with the ECLAS for controlling the data access in fog-enabled cloud systems according to the trust estimated by the user in the cloud and reputations created by the amount of fog nodes in a flexible way via applying the Elliptic Curve Cryptography (ECC) and Proxy Re-Encryption (PRE). In this scheme, multi-dimensional controls are proposed on cloud and fog data access according to the strategies set by the user. The user encrypts its information with asymmetric secret key and this key is split into many segments for supporting different control policies. So, the user encrypts various segments of secret key with different encryption keys which are accordingly handled by the user and an amount of fog nodes regarding various reputation characteristics in different scenarios. Then, the user or fog nodes manage the data access using data encryption by the user. Finally, the experimental results exhibit the effectiveness of the proposed FAC as compared to the state-of-the-art AC schemes.

KEYWORDS

Fog computing, Cloud computing, Extended CLAS, Access Control, Trust, Reputation, Elliptic curve encryption.

1. INTRODUCTION

Fog computing is typically a decentralized paradigm to process and accumulate the data between the origin and a cloud structure. Based on this paradigm, the necessity of processing and

Influence of anionic precursors on electrochemical properties of tin oxide nanoparticles: a comparative analysis

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ABSTRACT

A cost-effective chemical precipitation method has been adopted to synthesis tin oxide (SnO_2) nanomaterials with the help of two different anionic sources (NH_3OH and NaOH). Initially, the X-ray diffraction (XRD) studies confirm the formation of regular rutile tetragonal crystal structure of SnO_2. The functional group analysis by Fourier transform infra-red (FTIR) spectroscopy identifies the presence of Sn-OH stretching mode of vibration. The morphological with elemental confirmation by HRSEM with EDAX analysis observes the formation of SnO_2 agglomeration in appropriate ratio (Sn and O) without showing any other impurities. The particle size analysis (PSA) reveals that the synthesized SnO_2 nanomaterials are in a nano-sized range of 10 nm to 33 nm. The optical analysis using UV–Visible (UV) and photoluminescence (PL) spectroscopy reveals that the bandgap energy of synthesized materials is found to be 4.12 eV and 4.14 eV, blue-shifted from bulk materials. The electrochemical behavior of synthesized tin oxide nanomaterials as working electrodes are examined by a conventional three-electrode system with analyzed parameters such as cyclic voltammetry (CV), galvanostatic charge–discharge (GCD) and electrochemical impedance spectroscopy (EIS). This study exposes the highest specific capacitance C_{sp} value of 405.15 F g^{-1} at a scan rate of 1 mV s^{-1} and 403.72 F g^{-1} at a current density of 0.5 Ag^{-1}. The highest energy density and power density value of 27.48 Wh kg^{-1} at 0.5 Ag^{-1} and 145.83 W kg^{-1} at 1 Ag^{-1}, respectively, presents a promising positive working electrode material for supercapacitor applications.

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Effects of processing parameters on green synthesised ZnO nanoparticles using stem extract of *Swertia chirayita*

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ARTICLE INFO

Keywords:
Swertia chirayita
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Hydrothermal
Antibacterial activity
Photocatalytic activity

ABSTRACT

This study focuses on the effective synthesis of ZnO nanoparticles from the stem extract of *Swertia chirayita* via the use of zinc acetate as precursor. Three different synthesis methods namely Sonication, Wet-chemical and Hydrothermal methods were used in the development of ZnO nanoparticles, due to its simple and easily scalable attributes. A comparative assessment was subjected over the prepared ZnO nanoparticles to evaluate the influence over the nanoparticles physico-chemical property and also to determine the most effective processing method to green synthesise ZnO nanoparticles. The ZnO nanoparticles synthesised demonstrates retainment of spherical crystalline structure, even though the processing parameters of the ZnO nanoparticles were varied during its synthesis. ZnO nanoparticles synthesised using hydrothermal process exhibits smaller particle size (17 nm), better photocatalytic activity (88.67%) and antibacterial activity against *Escherichia coli* (26 mm) and *Staphylococcus aureus* (28 mm) compared to the other ZnO nanoparticles. These results could be strongly attributed to the smaller particle size due to the controlled pressure and temperature employed during the production of ZnO using hydrothermal process. The observed result revealed the calibrable nature of the ZnO nanoparticles property in virtue of its processing parameters and also its high affectivity in biomedical application.

1. Introduction

Materials controlled to the nano regime (less than 100 nm), shows unique behaviour because, because of its higher surface/volume ratio and wider band gap between valence and conduction band resulting in unique property (García Marín et al., 2013; Kathirvelu et al., 2009). Over the decade, metal oxides and semiconductors having nano dimensions have attracted considerable interests in many fields such as optical sciences (Liu et al., 2004; Smith et al., 2013), Electronics (Meyer et al., 2012; Robertson, 2005), Medical science (Choi et al., 2008; Hao et al., 2010), Target drug delivery (Faraji and Wipf, 2009; Son et al., 2005) and Textiles (Karthik et al., 2018; Becheri et al., 2008).

Nano ZnO is considered as one of the most versatile materials due to its direct wide band gap of (3.3eV) and a large excitation binding energy (60 meV) at room temperature (Alivov et al., 2003; Ohta et al., 2000). Hence, it has seen a wide range of applications in fields such as catalytic science (Seo et al., 2017), energy devices (Bellard et al., 2001), chemical sensors (Ahmad et al., 2014) and upto electronic devices (Chen et al., 2015). ZnO nanoparticles are formed due to the intertwinning of hexagonally packed sublattices (Owolabi et al., 2016). The crystalline arrangement of the ZnO nanoparticles shows wurtzite structure which matches with GaN, hence, extensively used in various semiconductor application (Minimala et al., 2014). Researchers over the past decade had extensively studied the antibacterial activities of ceramics such as ZnO so as to substitute the conventional organic powder for the treatment of various diseases (Sirelkhatim et al., 2015; Saha et al., 2018; Khan et al., 2020). Metal oxides such as ZnO are preferred more than the conventional organic powder as mineral elements such as Zinc are essential to humans, and can exhibit effective antibacterial activity devoid of sunlight (Zhao et al., 2017; Dhandapani et al., 2020; Hilty et al., 2014). Recently, researchers have also reported about incorporating ZnO nanoparticles in polymeric matrix to enhance the effective mechanical and antibacterial activity of the nanocomposite material for bioengineering applications (Augustine et al., 2014; Díez-Pascual et al., 2014; Sharmin et al., 2015). Therefore, ZnO is one of the

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REVIEW ARTICLE

Does epigenetics have a role in age related macular degeneration and diabetic retinopathy?

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KEYWORDS
Age-related macular degeneration (AMD);
Diabetic Retinopathy (DR);
Epigenetics;
Gene expression

Abstract Epigenetic mechanisms play an important part in the regulation of gene expression and these alterations may induce long-term changes in gene function and metabolism. They have received extensive attention in bridging the gap between environmental exposures and disease development via their influence on gene expression. DNA methylation is the earliest discovered epigenetic alteration. In this review, we try to examine the role of DNA methylation and histone modification in Age related macular degeneration (AMD) and Diabetic Retinopathy (DR), its vascular complications and recent progress. Given the complex nature of AMD and DR, it is crucial to improve therapeutics which will greatly enhance the quality of life and reduce the burden for millions of patients living with these potentially blinding conditions.

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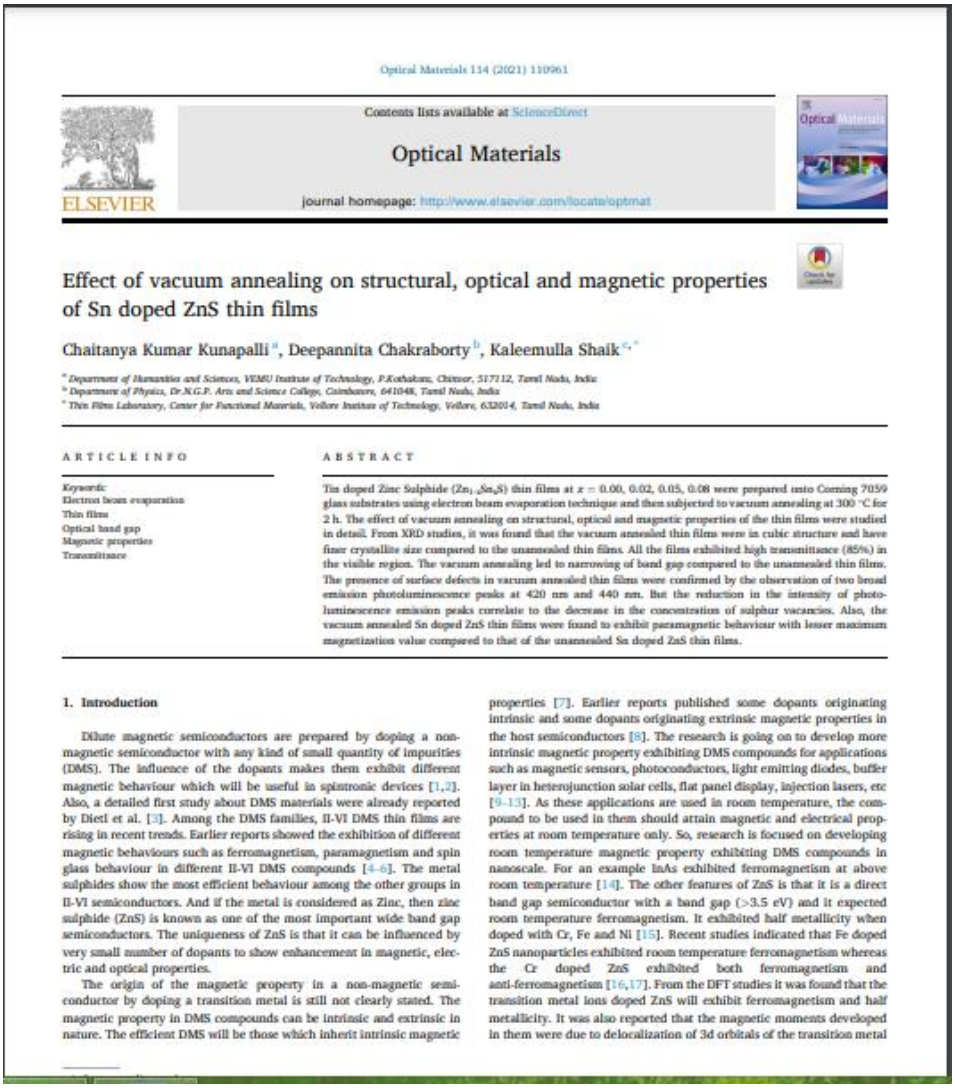

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Effect of vacuum annealing on structural, optical and magnetic properties of Sn doped ZnS thin films

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Transmittance

ABSTRACT

Tin doped Zinc Sulphide ($Zn_{1-x}Sn_xS$) thin films at $x = 0.00, 0.02, 0.05, 0.08$ were prepared onto Corning 7059 glass substrates using electron beam evaporation technique and then subjected to vacuum annealing at 300 °C for 2 h. The effect of vacuum annealing on structural, optical and magnetic properties of the thin films were studied in detail. From XRD studies, it was found that the vacuum annealed thin films were in cubic structure and have finer crystallite size compared to the unannealed thin films. All the films exhibited high transmittance (85%) in the visible region. The vacuum annealing led to narrowing of band gap compared to the unannealed thin films. The presence of surface defects in vacuum annealed thin films were confirmed by the observation of two broad emission photoluminescence peaks at 420 nm and 440 nm. But the reduction in the intensity of photoluminescence emission peaks correlate to the decrease in the concentration of sulphur vacancies. Also, the vacuum annealed Sn doped ZnS thin films were found to exhibit paramagnetic behaviour with lesser maximum magnetization value compared to that of the unannealed Sn doped ZnS thin films.

1. Introduction

Dilute magnetic semiconductors are prepared by doping a non-magnetic semiconductor with any kind of small quantity of impurities (DMS). The influence of the dopants makes them exhibit different magnetic behaviour which will be useful in spintronic devices [1,2]. Also, a detailed first study about DMS materials were already reported by Dietl et al. [3]. Among the DMS families, II-VI DMS thin films are rising in recent trends. Earlier reports showed the exhibition of different magnetic behaviours such as ferromagnetism, paramagnetism and spin glass behaviour in different II-VI DMS compounds [4–6]. The metal sulphides show the most efficient behaviour among the other groups in II-VI semiconductors. And if the metal is considered as Zinc, then zinc sulphide (ZnS) is known as one of the most important wide band gap semiconductors. The uniqueness of ZnS is that it can be influenced by very small number of dopants to show enhancement in magnetic, electric and optical properties.

The origin of the magnetic property in a non-magnetic semiconductor by doping a transition metal is still not clearly stated. The magnetic property in DMS compounds can be intrinsic and extrinsic in nature. The efficient DMS will be those which inherit intrinsic magnetic properties [7]. Earlier reports published some dopants originating intrinsic and some dopants originating extrinsic magnetic properties in the host semiconductors [8]. The research is going on to develop more intrinsic magnetic property exhibiting DMS compounds for applications such as magnetic sensors, photoconductors, light emitting diodes, buffer layer in heterojunction solar cells, flat panel display, injection lasers, etc [9–13]. As these applications are used in room temperature, the compound to be used in them should attain magnetic and electrical properties at room temperature only. So, research is focused on developing room temperature magnetic property exhibiting DMS compounds in nanoscale. For an example InAs exhibited ferromagnetism at above room temperature [14]. The other features of ZnS is that it is a direct band gap semiconductor with a band gap (>3.5 eV) and it expected room temperature ferromagnetism. It exhibited half metallicity when doped with Cr, Fe and Ni [15]. Recent studies indicated that Fe doped ZnS nanoparticles exhibited room temperature ferromagnetism whereas the Cr doped ZnS exhibited both ferromagnetism and anti-ferromagnetism [16,17]. From the DFT studies it was found that the transition metal ions doped ZnS will exhibit ferromagnetism and half metallicity. It was also reported that the magnetic moments developed in them were due to delocalization of 3d orbitals of the transition metal

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Efficient photocatalytic degradation of 2,4-dinitrophenol over mesoporous Zr and Ce co-doped TiO_2 under visible light

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ABSTRACT

In the present study, zirconium and cerium co-doped mesoporous TiO_2 photocatalysts were prepared by sol–gel technique using Pluronic P123 as the structure-directing agent. The prepared catalytic materials were characterized by X-ray diffraction, high-resolution transmission electron microscopy, N_2 sorption studies, diffuse reflectance UV-vis absorption spectroscopic analysis and X-ray photoelectron spectroscopy. Zirconium and cerium co-doping on TiO_2 induces visible-light absorption and decreases the bandgap energy. Zirconium and cerium co-doped mesoporous titania exhibit a high surface area with a large pore diameter. The photocatalytic activity has been evaluated for the photodegradation of 2,4-dinitrophenol under visible light illumination. The optimum loading of Zr^{4+} and Ce^{4+} to TiO_2 was found to be 0.5 wt.%. Ce^{4+} and Zr^{4+} active sites are good electron scavengers, which can easily trap the excited electrons and shift the electrons to the adsorbed oxygen molecules and therefore efficiently extending the lifetime of the electron-hole pair. Moreover, Zr^{4+}/Ce^{4+}-TiO_2 showed excellent photocatalytic activity towards the degradation of 2,4-dinitrophenol under visible light irradiation due to the formation of a large quantity of $^{\bullet}OH$ and $O_2^{\bullet-}$ radicals.

Keywords: Nanomaterials; Mesoporous; Zr^{4+}/Ce^{4+}-TiO_2; Photocatalytic degradation; 2,4-dinitrophenol

IMPACT OF DOUBLE-DIFFUSION AND SLIP OF ORDER 2 ON CONVECTION OF CHEMICALLY REACTING OLDROYD-B LIQUID WITH CATTANEO-CHRISTOV DUAL FLUX

by

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Abstract

This article express the outcomes of mixed convective flow of a chemically reacting Oldroyd-B liquid (OBL) with Cattaneo-Christov double flux (CCDF) under the consequence of second order slip (SS), heat absorption (HA)/heat generation (HG) and Newtonian cooling (NC)/Newtonian heating (NH). The governing PDEs are converted into ODEs using suitable variables. The homotopy analysis method (HAM) is employed to solve these resultant equations. The outcomes of diverse physical parameters, like, relaxation time, retardation time, Richardson number, buoyancy ratio, Prandtl number, radiation, heat absorption/generation, Schmidt number, chemical reaction, suction/injection, slip and Newtonian heating are discussed.

Keywords: *Oldroyd-B liquid; Cattaneo-Christov double flux; Newtonian heating; Homotopy analysis method; heat generation; Second order slip.*

1 Introduction

The non-Newtonian liquids play a vital role in industry, engineering, pharmaceuticals etc. Example of such liquids are shampoos, sugar solutions, polymeric liquids, blood, inks and it cannot illustrated as a linear constitutive model. Many liquid models were developed to exhibit the features of non-Newtonian liquids. Usually non-Newtonian liquids can be segregated as liquids of rate, differential and integral types. Among these classification, rate type liquids were considered for memory and elastic effects. One of the simplest rate type of liquid is OBL and this liquid predicts the retardation and relaxation time characteristics. This liquid was initiated by Oldroyd [1] in 1950. It is useful in chemical and process industry when they encounter both the elastic and memory effects exhibited by most biological and polymers liquids. Rajagopal and Bhatnagar [2] derived the exact solution of simple OBL. Analytical solution of 3D OBL with Soret and Dufour effects were derived by Farooq et al. [3]. Several studies about OBL flow are found in under different conditions are Fetecau et al. [4], Liu et al. [5], Jamil et al. [6] and Motsa and Ansari [7].

Heat transfer mechanism is a natural phenomenon and it occurs due to variations of temperature within the same object or between bodies and this is very useful in many industrial processes, like, cooling of

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ORIGINAL COMMUNICATION

CLINICAL ANATOMY WILEY

Genetic risk factors for lumbar disc disease

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Abstract

Aim and Background: Lumbar disc degeneration (LDD) is thought to be multifactorial in origin. Very recently the focus has shifted to the involvement of a family of candidate genes in the pathogenesis of LDD. There is particular emphasis on the vitamin D receptor gene (VDR gene). The VDR polymorphisms FOK1, TAQ1, and APO1 have been variably associated with LDD.

Objective: To evaluate the association between the FOK1/Taq1 genes and LDD.

Materials and Methods: One hundred unrelated healthy (asymptomatic) individuals who presented for routine health checkup and 93 consecutive patients (43 males and 50 females) with no history of low back pain were enrolled in the study after informed consent was obtained. The MRI images of cases and controls were graded and peripheral blood samples were collected from all participants and sent for genetic analysis.

Results: Individuals with the dominant genotype for Taq1 had a significantly higher association with LDD than those without it. There was no association between LDD and the Fok1 genotype.

Conclusion: Genetic predisposition is an important risk factor for LDD.

KEYWORDS
FoK1 and Taq 1 genes, lumbar disc degeneration, lumbar disc disease, vitamin D receptor gene

1 | INTRODUCTION

Degeneration of the lumbar disc (lumbar disc disease, LDD) is the commonest cause of low back pain. LDD is considered an epidemic owing to its universal distribution and common occurrence. It is a major cause of work absenteeism and economic loss (Andersson, 1999; Chan, Song, Sham, & Cheung, 2006). It is a major concern that the incidence of LDD and low back pain is increasing amongst the younger population (Rathod et al., 2012).

The bodies of the vertebrae alternate with fibrocartilaginous produced under the control of specific genes including COL1A1, COL9A2, MMP3, and VDR. Polymorphisms in any of these genes can result in defective discs, which can lead to intervertebral disc disease. Genetic involvement in LDD is a newer concept still being researched in different populations around the world. The older philosophy states that the disc becomes less hygroscopic with advancing age and dehydration results. This leads to disc degeneration. In due course, the spine in the affected region loses its stability (Inoue, 1981). The initial clinical manifestation of LDD is low back pain, and as it progresses, radiculopathy ensues (Buckwalter, 1995; Heliovaara, 1989).

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Computation of eccentricity associated topological descriptors through Python for comb tree

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Abstract. Topological manifestation of a graph G is a numerical value which reveals it's topological properties. The eccentricity of one node u ∈ V (G)(that is $e_G(u)$), is the greatest distance between u and also any other vertex of G. The degree of a In this paper, we are using Python program to compute eccentricity related Topological indices for Comb tree with any number of vertices, relation between descriptors and the bounds for indices also.

Keywords: Comb tree; eccentricity; Python; topological index;

1. Introduction

An chemical compound's molecular structure can be represented by a graph in which we represent atoms of molecule as vertex of that graph and bonds between atoms as edges of the graph. This type of graph is called molecular graph or chemical graph. In Recent days inter discipline research is has high impact, especially mathematical chemistry is highly influencing in drug manufacturing, medicinal chemistry and bio chemistry etc.

We present bounds and comparison of various greatest distance based index of widely used chemical structures which often appear in mathematical chemistry.

Using Python we can compute all topological descriptors in minimum ravage of all resources. Python is dynamic language. Now a days python is highly influencing language in all fields. Readers who are having significance can test out the program in the net repl.it

https://repl.it/@Manimekalai/eccentricity-based-index
https://repl.it/@Manimekalai/Total-Eccentricity-index

Various indices was introduced in various periods of time for a graph A ,

Eccentric connectivity descriptor [4,8,9,10] , $\xi(A) = \sum_{v \in V} d(v)\varepsilon(v)$

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Photocatalytic degradation of Bisphenol-A in water under sunlight irradiation over ZnO nanoparticles fabricated by Ethiopian cactus pear fruit peel infusions

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ABSTRACT

Bisphenol-A (BPA) is found as a persistent endocrine disruptor chemical in most environmental monitoring. Hence, in this research degradation of BPA was carried out under irradiation of sunlight in the presence of zinc oxide nanoparticles (ZnO-NPs) synthesized using cactus pear fruit peel (CPFP) infusions. The fabricated ZnO-NPs exhibited greater photocatalytic efficiency of BPA under sunlight irradiation and near-complete mineralization of BPA was achieved. The degradation percentage was sturdily reliant on factors such as the catalyst size (10 – 50 nm) and structure (hexagonal), BPA concentration (10 mg L^{-1}), catalyst load (25 mg L^{-1}) and irradiation time (8 h) and pH (6.5). This study proposed that the cactus pear fruit peel mediated ZnO-NPs (CP-ZnO-NPs) photocatalytic degradation is an adaptable, pecuniary, environmentally beneficent and proficient method for BPA deduction in the aqueous phase.

1. Introduction

Zinc Oxide nanoparticles (ZnO-NPS) have attracted much attention in nanotechnology research among other metal oxides due since it is non-toxic, non-hygroscopic metal oxide with high photosensitivity, mainly in the degradation of various pollutants. ZnO has a huge excitation binding energy (60 MeV), wide bandgap (3.37 eV) and truncated threshold influence for optical impelling and thus reflected a less-cost substitute photocatalyst for removal of organic pollutants in aqueous phase [1]. Numerous methods are used to formulate ZnO nanoparticles, still, microwave-assisted green synthesis is known as an effective method as they are a single step, cost-effective and quick reaction and controlled morphology of particles, less thermal gradient problems and also less involvement of chemical agents, etc [2].

Research Article

Free radical scavenging activity of developed herbal formulation

Sasikala Subramani*, Kannikaparameswari Nachimuthu

ABSTRACT

Objective: Medicinal plants have played a key role in the prevention and treatment of diseases since ancient period. They are also potential sources of drugs and nutrients. *Boerhavia diffusa* and *Achyranthes aspera* are widely used medicinal plants in Ayurvedic treatment for a variety of ailments including kidney diseases. The present study was designed to assess the free radical scavenging capacity of herbal formulated medicinal plants, *B. diffusa* and *A. aspera*. **Materials and Methods:** Ethanolic extracts of herbal formulation were prepared and evaluated for their free radical scavenging capacity using various *in vitro* chemical assays such as 2,2-diphenyl-1-picrylhydrazyl, 2,2'-azinobis(3-ethylbenzothiazolin-6-sulfonic acid), ferric reducing antioxidant power, hydroxyl radical, and superoxide anion radical scavenging activities. **Results:** The ethanolic extract of herbal formulation showed potential radical scavenging activity against the radicals generated *in vitro* as the result was compared with the standard at the same concentration. **Conclusion:** The present research concluded that herbal formulated medicinal plants, *B. diffusa* and *A. aspera*, were found to be more effective due to the combined activity of the individual components. Hence, it is concluded that herbal formulation of these plants may provide efficient, supportive, or alternative treatment procedures for numerous health ailments.

KEY WORDS: 2, 2-Azinobis(3-ethyl benzoline-6-sulfonic acid), 2,2-Diphenyl-1-picrylhydrazyl, Ferric ion, Hydroxyl, Superoxide

INTRODUCTION

The traditional drugs all over the globe nowadays revealed by an extensive activity of researches on diverse plant species and their therapeutic values. Plants possess different bioactivities such as antioxidant anticancer and anti-inflammatory activities. Every biomolecule presents in the living cells is damaged by oxidative reaction with reactive oxygen species (ROS).[1]

ROS and their metabolites can direct consequences on cell injury and may stimulate the development of disease. Free radicals have been concerned on the basis of several diseases such as liver cirrhosis, atherosclerosis, cancer, and diabetes and compounds that can scavenge free radicals have immense effect in ameliorating these diseases.[2] Antioxidants thus play a key role to defend the human body against therefore, reducing its ability to damage. Natural products have served as a chief resource of drugs for centuries, and about half of the pharmaceutical in use today are derived from natural products. The use of natural products, mostly plants, to manage diseases, is a century-old practice that leads to the innovation of more than half of all recent pharmaceuticals.[3]

Boerhavia diffusa Linn. (Nictaginaceae) has been extensively studied for its therapeutic actions and chemical constituents. The roots are the source of a novel class of isoflavonoids known as rotenoids, flavonoids, glycosides, purine nucleoside, lignans, ecdysteroids, xanthones, and steroids. A variety of animal studies and their trials have confirmed the presence of potential therapeutic activities, such as immunomodulation, hepatoprotection, antidiabetic activity, anti-inflammation, antifibrinolysis, anticancer activity, and dieresis.[4]

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Research articles

Polymorphism induced magnetic transitions in $Ni(OH)_2$ nanostructures

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ABSTRACT

The article describes the impact of complexing agent on the phase changing property of $Ni(OH)_2$ nanostructures (NSs). $Ni(OH)_2$ was prepared by facile hydrothermal method and polymorphism have been obtained by employing two different complexing agent while keeping other parameters constant during synthesis. The α-and β-$Ni(OH)_2$ NSs phase was formed confirmed by XRD and FTIR. FESEM and TEM images reveals that the 3D-flower like α-$Ni(OH)_2$ nanostructure and formation randomly oriented nanopetals of β-$Ni(OH)_2$ NSs. Magnetic features of both α-and β-$Ni(OH)_2$ phases were studied using SQUID magnetometer. α-and β-$Ni(OH)_2$ exhibit blocking temperature at 6 K and 25 K, correspondingly and irreversible hysteresis behavior below blocking temperature. α-$Ni(OH)_2$ shows paramagnetic to superparamagnetic transition whereas β-$Ni(OH)_2$ shows paramagnetic to antiferromagnetic transition as temperature varies from 2 to 50 K.

1. Introduction

Multifunctional properties of layered double hydroxide nanomaterials generate much interest due to its potential applications. The physical and chemical properties of these layered double hydroxide materials were determined by its structure. Among Layered double hydroxides, $Ni(OH)_2$ find potential applications in Ni-based rechargeable batteries, electrochemical supercapacitors, as magnetic material, etc. [1]. $Ni(OH)_2$ is a isostructural compound which can exist in two polymorphism via α- and β phase. Both α- and β phases crystallizes in hexagonal structure with stacked layers and usually forms as thin flakes/platelets [2]. α-$Ni(OH)_2$ (will be referred as ANH) has hexagonal hydrotalcite-like structure with intercalated anions and water molecules, however β-$Ni(OH)_2$(will be referred as BNH) crystallizes in hexagonal structure without intercalated anions and water molecules [3]. Compared to BNH phase, ANH has disordered stacking layers with large C-axis size 7.5–32 Å [4]. To date, different solution methods has been employed to synthesis both ANH and BNH nanostructures (NSs). In the typical synthesis of $Ni(OH)_2$ NSs, no precipitation occurs when simply the Ni ion precursors are used [5]. To induce the nucleation of $Ni(OH)_2$ complexing agent is necessary. Hence complexing agent playing a significant role in construction and phase confirmation of $Ni(OH)_2$ NSs. Control over the phase transformation can be easily obtained by using different complexing agent and also by varying its concentration. This would lead us to prepare highly stable $Ni(OH)_2$ NSs that would not undergo instant phase transformation. Complexing agents like NH_3 [6], urea [7], NaOH [8], ethylenediamine [9], hexamethylenetetramine [10] has been used to synthesis both ANH and BNH nanostructures. Polymorphism also induced by varying the synthesis temperature and by addition of extra co-ordination agents and its influence on the electrochemical properties of $Ni(OH)_2$ were studied [11]. To the best of our knowledge no report is available on the complexing agent induced polymorphism. Extensive amount of work is reported on electrochemical properties of $Ni(OH)_2$ but magnetic features of $Ni(OH)_2$ are rarely reported. The reports are also controversial to each other that Tiwari *et al.* [12] reported that BNH exhibits paramagnetic to ferromagnetic behavior. Rall *et al.* [13] reported that BNH show metamagnetic behavior and ANH possess paramagnetic to ferromagnetic transition. In the report published by Liu *et al.* [14] magnetic property of ANH was determined as transition from paramagnetic to

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Noticeable improvement in the toxic gas-sensing activity of the Zn-doped TiO_2 films for sensing devices

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Zn-doped TiO_2 films were deposited on ultrasonically treated alumina substrates *via* the automatic nebulizer spray pyrolysis method. In this study, the thickness of the as-prepared films was gradually reduced, and their Brunauer–Emmett–Teller (BET) surface area and pore volume results were notably improved; in addition, values for the blue-shifted sharp edge absorption with an enlarged bandgap (E_g) were revealed in the deposited films. The agglomerated granular form has evolved into tiny grains with porous brighter particles scattered over the surface of the coated films. The sensing performance to reducing gases for combustible gas of ammonia (NH_3) and volatile organic compounds of methanol (CH_4O) and formaldehyde (HCHO) with the function of operating temperature and gas concentration were studied, and the highest sensing response of the hazardous formaldehyde (HCHO) reducing gas was noticed.

1. Introduction

In recent years, the amount of toxic and dangerous gases has been increasing dramatically due to the rapid technological impact on the medical, automotive, infrastructure and industrialization sectors, causing enormous outdoor and indoor pollution and numerous undesirable health effects.[1] Gas leak measurements play an important role in the area of nuclear power plants,[2] soil/wastewater treatment,[3] food and cosmetics,[4,5] and in the pharmaceutical industry[6] to monitor and alarm the dangerous gas levels. Toxic and dangerous matrices have been tested *via* calorimetric, conductive, gravimetric, optical, and numerous other sensing methods.[7] Of all, conductive metal oxide sensors are considered efficient due to their ability to operate at low humidity levels. Furthermore, they can detect environmental pollutant gases, including combustibles, because of the abundant adsorption of oxygen and the good catalytic effects.[8]

The most promising metal oxides sensors such as ZnO, WO_3, SnO_2, In_2O_3, and TiO_2 are used to detect combustible and volatile organic compounds (VOCs) as a function of change in resistance to the target gases.[9] Among them, TiO_2 and TiO_2-derived materials are significant for emerging environmental refinement.[10] TiO_2 has been extensively used in numerous applications such as a water treatment material, photocatalyst and gas sensor.[11–14] Despite numerous features, gas sensor-related parameters such as gas concentration, high operating temperature, sensor response, and selectivity are the main concerns that need to be improved. They can possibly be improved by doping the metal into metal oxides.[15] As with numerous combinational metal oxides, the metal-doped TiO_2 is a potential composition to improve the gas detection response, selectivity, stability, and even TiO_2 properties, such as Fermi level (E_f), electrical conductivity, and forbidden gap (E_g) value. Numerous studies have been devoted to the metal ion-doped TiO_2 gas detection such as Ag–TiO_2,[13] Sn–TiO_2, Nb–TiO_2 and Cr–TiO_2,[16] but no specific results are available for the stabilized anatase phase of additive mixed TiO_2 for the detection of combustible and volatile organic compounds. This report shows the characterization and gas sensing performance of anatase-phased Zn-doped TiO_2 for the combustible gas ammonia (NH_3), and volatile organic compounds methanol (CH_4O) and formaldehyde (HCHO) as the function of operating temperature and gas concentration.

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A Flexible Access Control with User Revocation in Fog-Enabled Cloud Computing

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***Abstract* - The major challenging task in the fog-enabled cloud computing paradigm is to ensure the security for accessing the data through cloud and fog nodes. To solve this challenge, a Flexible Access Control using Elliptic Curve Cryptography (FAC-ECC) protocol has been developed in which the user data are encrypted by multiple asymmetric keys. Such keys are handled by both users and fog nodes. Also, data access is controlled by encrypting the data through the user. However, the main problem is to guarantee the privacy and security of resources after processing of User Revocation (UR) by data owners. The issue of UR is needed to consider for satisfying the dynamic change of user access in different applications like healthcare systems, e-commerce, etc. Therefore in this article, a FAC-UR-ECC protocol is proposed to control the data access and realize the UR in fog-enabled cloud systems. In this protocol, a revocable key aggregate-based cryptosystem is applied in the fog-cloud paradigm. It is an extension of the key-aggregate cryptosystem such that a user is revoked if his/her credential is expired. First, the subset-cover model is combined into FAC-ECC protocol to design an efficient revocable key-aggregate encryption depending on multi-linear maps which realizes the user's access control and revocation. It can simplify the user's key management efficiently and delegate various clients with decryption permission. Also, it can accomplish revocation of user access privileges and the FAC efficiently. By using this protocol, both the user's secret key and the ciphertext are preserved in a fixed size. The security of accessing the data is highly enhanced by updating the ciphertext through the data owners successfully. At last, the experimental results exhibit the efficiency of FAC-UR-ECC compared to the FAC-ECC protocol.**

Keywords—fog-enabled cloud computing; flexible access control; elliptic curve cryptography; user revocation; key management

I. INTRODUCTION

Fog computing is usually a distributed model to transfer and aggregate the information between the source and a server model. Using this model, the need for transmitting and aggregating a massive amount of unnecessary data is avoided. So, the communication burden is lowered and the performance is significantly enhanced. Principally, it is driven by the substantial growth of Internet-of-Things (IoT) platforms. However, due to the increased workload on the cloud database, there are several problems with interoperability and compatibility when a common client-server paradigm is taken into consideration.

This new paradigm, which provides an open distributed solution, deals with these problems. This is achieved by a new fog model that is hierarchically communicated between the cloud and the target client [1-3]. Typically, a fog system has limited information storage data centers and big data distribution centers. Due to fewer demands of resources, it faces great challenges in detecting and defending threats by introducing the whole community of integrated solutions. However, for a fog-enabled cloud system, there are no flawless protections and measures. Similarly, authentication and consensus solutions cannot be applied since fog services were provided on the edges of the network. The fog systems have been designed with several risks that cannot be accessed in the data center. Fog networks usually contain a variety of access types to the protected data center to transmit verification information and collect audit logs. However, it is approximated in a particular scenario e.g., smart grid.

A control device such as the isolated customer support authentication dial or compact AC directory is maybe not known for this communication [4]. Besides, it is difficult to understand whether authentication must be carried out centrally for client systems when isolated authentication data transmission would be missing. The basic access control requirements are necessary, but it defines an audit authentication through forwarding common AC. Many effective threats use authentication recommendations. Most confidential keys are not secure but are essential in authentication recommendations for system services. In contrast, attackers frequently improve hidden key negotiation techniques. The problems in these hidden keys are solved by multifactor authentication [5]. It usually requires other encrypted data for authentication with normally hidden messages. However, it has several restrictions and new threats. The intruder will possibly be the customer with a bogus device to enter his/her additional code which will be configured by the intruder to mimic the legitimate users.

Thus, CLAS was recommended to use the RTL between customers and authenticators to ensure security in regular multifactor authentication methods [6]. It allows RTL and customer's normal permissions and implements them for securing the compromise of the hidden key. Besides, the login is limited to profile sites whenever extra data is

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Research Article

Mixed Convection and Thermally Radiative Flow of MHD Williamson Nanofluid with Arrhenius Activation Energy and Cattaneo–Christov Heat-Mass Flux

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In this paper, we explored the impact of thermally radiative MHD flow of Williamson nanofluid over a stretchy plate. The flow in a stretchy plate is saturated via Darcy–Forchheimer relation. Cattaneo–Christov heat-mass flux theory is adopted to frame the energy and nanoparticle concentration equations. Additionally, the mass transfer analysis is made by activation energy and binary chemical reaction. Activation energy is invoked through the modified Arrhenius function. The intention of the current investigation is to enhance the heat transfer rate in industrial processes. The non-Newtonian nanofluids have more prominent thermal characteristics compared to ordinary working fluids. The governing models are altered into ODE models, and these models are numerically solved by applying the MATLAB bvp4c algorithm. The graphical and tabular interpretations have scrutinized the impact of sundry distinct parameters. The fluid speed escalates for enhancing the Richardson number, and it falls off for higher values of the Weissenberg number. It is noticed that the fluid temperature declines for higher values of the Brownian motion parameter and it grows for larger values of the thermophoresis parameter. The activation energy enriches the heat transfer gradient and suppresses the local Sherwood number. Additionally, the more significant heat transfer gradient occurs in heat-absorbing nonradiative viscous nanofluid and a smaller heat transfer gradient occurs in heat-generating radiative Williamson nanofluid. Also, we noticed that a higher heat transfer gradient appears in the Fourier model than in the Catteneo–Christov model. In addition, the comparative results are confirmed and reached an outstanding accord.

1. Introduction

Cooling and heating procedures are essential in many industries, and fluids make this process. The effectual cooling techniques are essential for cooling a higher thermal system in a short time. However, ordinary fluids such as ethylene glycol, engine oil, and water have poor thermal conductivity and do not fulfill the demand for powerful heat transfer cooling agents. Considering the needs of modern industry, including microelectronics, chemical production, and power generation plants, we need to establish a new type of fluids that will be efficient in cooling thermal systems. Nanofluid is a fluid consisting of nanoparticles (nanosized particles) such as oxides, nitrides, carbides, and metals stably and uniformly suspended in a base fluid. These fluids overcome the difficulty of the base fluids and act as an agent of efficient cooling.

IMPACT OF DOUBLE-DIFFUSION AND SLIP OF ORDER 2 ON CONVECTION OF CHEMICALLY REACTING OLDROYD-B LIQUID WITH CATTANEO-CHRISTOV DUAL FLUX

by

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Abstract

This article express the outcomes of mixed convective flow of a chemically reacting Oldroyd-B liquid (OBL) with Cattaneo-Christov double flux (CCDF) under the consequence of second order slip (SS), heat absorption (HA)/heat generation (HG) and Newtonian cooling (NC)/Newtonian heating (NH). The governing PDEs are converted into ODEs using suitable variables. The homotopy analysis method (HAM) is employed to solve these resultant equations. The outcomes of diverse physical parameters, like, relaxation time, retardation time, Richardson number, buoyancy ratio, Prandtl number, radiation, heat absorption/generation, Schmidt number, chemical reaction, suction/injection, slip and Newtonian heating are discussed.

Keywords: *Oldroyd-B liquid; Cattaneo-Christov double flux; Newtonian heating; Homotopy analysis method; heat generation; Second order slip.*

1 Introduction

The non-Newtonian liquids play a vital role in industry, engineering, pharmaceuticals etc. Example of such liquids are shampoos, sugar solutions, polymeric liquids, blood, inks and it cannot illustrated as a linear constitutive model. Many liquid models were developed to exhibit the features of non-Newtonian liquids. Usually non-Newtonian liquids can be segregated as liquids of rate, differential and integral types. Among these classification, rate type liquids were considered for memory and elastic effects. One of the simplest rate type of liquid is OBL and this liquid predicts the retardation and relaxation time characteristics. This liquid was initiated by Oldroyd [1] in 1950. It is useful in chemical and process industry when they encounter both the elastic and memory effects exhibited by most biological and polymers liquids. Rajagopal and Bhatnagar [2] derived the exact solution of simple OBL. Analytical solution of 3D OBL with Soret and Dufour effects were derived by Farooq et al. [3]. Several studies about OBL flow are found in under different conditions are Fetecau et al. [4], Liu et al. [5], Jamil et al. [6] and Motsa and Ansari [7].

Heat transfer mechanism is a natural phenomenon and it occurs due to variations of temperature within the same object or between bodies and this is very useful in many industrial processes, like, cooling of nuclear reactor, power generation, electronic devices cooling and magnetic drugs targeting. Fourier [8] initiated “Fouriers law of heat conduction" and there is no material satisfy this law. Then, Cattaneo [9] made some modification by including a relaxation time parameter for heat flux in order to avoid the paradox of heat conduction. After that, Christov [10] improved the Cattaneo model by introducing the thermal relaxation

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Research Article

Numerical and Analytical Investigation for Darcy-Forchheimer Flow of a Williamson Fluid over a Riga Plate with Double Stratification and Cattaneo-Christov Dual Flux

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The Darcy-Forchheimer flow of a Williamson fluid over a Riga plate was analyzed in this paper. Energy and mass equations are modeled with Cattaneo-Christov theory and double stratifications. The governing PDE models are altered into ODE models. These models are numerically solved by MATLAB bvp4c and analytically solved by the homotopy analysis method. The impact of governing flow parameters on fluid velocity, fluid temperature, fluid concentration, skin-friction coefficient, local Nusselt number, and local Sherwood number is scrutinized via graphs and tables. We acknowledged that the speed of the fluid becomes diminishes for more presence of porosity parameter. Also, we noted that the thermal and solutal boundary layer thicknesses are waning due to their corresponding stratification parameters. In addition, the maximum decreasing percentage of skin friction is obtained when the suction/injection parameter varies from 0.0 to 0.4 for Williamson and viscous fluids. The maximum increasing percentage of local Nusselt number occurs when the suction/injection parameter varies from 0.4 to 0.8 for Williamson and viscous fluids.

1. Introduction

Non-Newtonian fluids are extensively implemented in diverse industrial processes such as petroleum drilling, drawing of plastic films, fibre spinning, and food production. The Williamson fluid model is one of the simplest non-Newtonian models to replicate the viscoelastic shear-thinning attributes, see Williamson [1]. The flow of thermally radiative Williamson fluid on a stretching sheet with chemical reaction was disclosed by Krishnamurthy et al. [2]. They proved the fluid temperature falling off due to the presence of the Williamson parameter. Khan et al. [3] demonstrated the impact of slip flow of Williamson nanofluid in a porous medium. They exposed that the surface drag force suppresses due to rising the Williamson fluid parameter. The 2D unsteady radiative Williamson fluid flow on a permeable stretching surface was deliberated by Hayat et al. [4]. They noticed that the fluid speed becomes slow when the Williamson parameter is high. Nadeem et al. [5] examined the Williamson fluid flow past a stretching sheet, and they found that the skin friction coefficient decreases with enhancing the Williamson parameter. Make use of the Keller box procedure to solve the problem of MHD flow of Williamson fluid over a stretching sheet by Salahuddin et al. [6]. Their outcome shows that the Williamson fluid parameter leads to suppress the fluid velocity. Few significant analysis for this area is seen in Refs. [7, 8].

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BALANCED RANK DISTRIBUTION LABELING OF LADDER GRAPHS, COMPLETE GRAPHS AND COMPLETE BIPARTITE GRAPHS

P. HEMALATHA[1], S. GOKILAMANI[2], §

Abstract. A balanced rank distribution labeling of a graph G of order n is a new kind of vertex labeling from $\{1, 2, 3, ..., k\}(n \leq k \in Z^+)$ which leads to a balanced edge labeling of G called edge ranks. In this paper, the balanced rank distribution labeling of ladder graphs $L_{n/2}$ for even $n \geq 6$, complete graphs K_n for $n \geq 3$ and complete bipartite graphs $K_{n/2,n/2}$ for even $n \geq 4$ have been investigated and obtained the results on balanced rank distribution number ($\mathbf{brd}(G)$) for the given graphs as follows:

(i) $\mathbf{brd}(L_{n/2}) = 3n - 15$, for even $n \geq 12$
(ii) $\mathbf{brd}(K_n) = n$, for $n \geq 3$
(iii) $\mathbf{brd}(K_{n/2,n/2}) = n$, for even $n \geq 4$

Keywords: Labeling of graphs, Balanced rank distribution labeling, Edge ranking, Balanced rank distribution number, Strongly and Weakly balanced rank distribution graphs.
AMS Subject Classification: 05C78

1. Introduction

All graphs $G(V, E)$ considered here are finite, simple and undirected. Let P_n and K_n denote a path and a complete graph on n vertices respectively. The cartesian product $G\Box H$ of graphs G and H is a graph such that (i) the vertex set of $G\Box H$ is cartesian product $V(G) \times V(H)$ and (ii) two vertices (u_1, u_2) and (v_1, v_2) are adjacent in $G\Box H$ if and only if either $u_1 = v_1$ and u_2 is adjacent to v_2 in H, or $u_2 = v_2$ and u_1 is adjacent to v_1 in G. The ladder graph L_p is a planar graph with $2p$ vertices and $3p-2$ edges. It is the cartesian product of two path graphs, one is P_2 and other one is P_p. For positive integers p and q, $K_{p,q}$ denotes the complete bipartite graph with vertex partitions of cardinality p and q. For a real x, $\lfloor x \rfloor$ and $[x]$ respectively denote the floor function and greatest integer function that gives the greatest integer less than or equal to x as the output and $\lceil x \rceil$ is the ceiling function that gives the least integer greater than or equal to x as the output. A graph labeling is an assignment of values to the vertices or edges subject to specific constraints. The three significant features of most interesting graph labeling problems are

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Structural, optical and magnetic properties of vacuum annealed Fe, Mn doped NiO nanoparticles

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Abstract
Iron (Fe) substituted nickel oxide ($Ni_{1-x}Fe_xO$) and manganese (Mn) substituted ($Ni_{1-x}Mn_xO$) nanoparticles at $x = 0.05$ were prepared using solid-state reaction. The synthesized $Ni_{1-x}Fe_xO$ and $Ni_{1-x}Mn_xO$ nanoparticles were annealed in vacuum at a pressure of 1×0^{-3} mbar at two different temperatures of 473 K and 673 K for 1 h. The influence of vacuum annealing on the physical properties of $Ni_{1-x}Fe_xO$ and $Ni_{1-x}Mn_xO$ nanoparticles were studied. The vacuum annealed nanoparticles were characterized by XRD, SEM, EDS, UV–Vis-NIR and VSM instruments to study their structural, surface, chemical, optical and magnetic properties, respectively. From the XRD results it was found that $Ni_{1-x}Fe_xO$ nanoparticles were in cubic structure with Fe impurity phases whereas the $Ni_{1-x}Mn_xO$ nanoparticles exhibited cubic structure without any impurity phases. The crystallite sizes of the nanoparticles were in the range of 25–30 nm. From the EDS spectra, it was found that the elements such as Fe, Ni, Mn and O were in almost stoichiometric ratio. An increase in optical band gap for $Ni_{1-x}Fe_xO$ and $Ni_{1-x}Mn_xO$ nanoparticles were observed with an increase of annealing temperature. The pure NiO and doped NiO nanoparticles exhibited ferromagnetism at room temperature. The strength of magnetization decreased in NiO with a rise in annealing temperature. The $Ni_{1-x}Fe_xO$ and $Ni_{1-x}Mn_xO$ nanoparticles were ferromagnetic at room temperature and the magnetization increased with increase in vacuum annealing temperature. The highest magnetization of 1.4 emu/g, 0.85 emu/g and 0.76 emu/g were observed for NiO, $Ni_{1-x}Fe_xO$ and $Ni_{1-x}Mn_xO$ nanoparticles, respectively at 673 K. The nanoparticles will be suitable for storage device applications.

Keywords X-ray diffraction · Semiconductor · Transparent conducting oxides · Solid-state reaction

1 Introduction

Currently, high importance is given on nanostructured metal oxide such as indium oxide (In_2O_3), tin oxide (SnO_2), zinc oxide (ZnO), titanium dioxide (TiO_2), etc. These metal oxides exhibit high electrical conductivity, optical transmittance with wide band gap (> 3.0 eV). In addition to these existing properties, if these oxide nanostructures exhibit magnetism, they will find more applications in future. Generally, magnetic nanoparticles are widely studied because of their fundamental and technological interest as they exhibit novel structural, chemical, optical, electrical and magnetic properties [1–4]. A considerable research work has been carried out on ferrites as they possess above all properties. Ferrites such as cobalt, nickel, manganese, zinc will exhibit good thermal stability, poor conductivity, low cost, high dielectric and magnetic properties. The ferrites find in many applications such as lithium-ion battery, high-density data storage, magnetic recording, magnetic fluids, etc. A detailed investigation has been made on nanoferrites by Dippong et al. [5–7]. They have extensively studied the physical properties of pure and doped cobalt ferrites. The magnetic nanoparticle plays an important role in disease diagnosis, magnetic refrigeration, microwave absorber, drug delivery for cancer treatment, antibiotic, etc. [8–10]. Due to

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TEMPERATURE DEPENDENCE OF HOMOGENEOUS ANATASE-PHASED TiO_2 FILMS CHARACTERIZATION AND GAS-SENSING BEHAVIORS

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Anatase-phased TiO_2 films were prepared at different temperatures (350, 400, 450 and 500°C) using automated nebulizer spray pyrolysis (ANSP) method. The structural study (XRD) revealed the amorphous nature at 350°C and remaining samples (400, 450 and 500°C) show the tetragonal structure with $2\theta^\circ = 25.78$, 38.43, 48.49 and 55.54 corresponding to (101), (004), (200) and (105) reflected planes and it is well fitted with standard data. The compositional XPS analysis confirmed the core level primary element of Ti 2p, O 1s and valance band (VB) of Ti 3p, Ti 3s, O 2s peaks in the prepared samples. The 3D optical profilometer has shown that the thickness of the prepared films was decreased by increase in temperature. The AFM study exhibited average roughnesses (Ra) of the prepared films such as 0.058, 0.147, 0.176 and 0.194 nm, respectively. The surface morphological study of FESEM has shown the cracked uneven distributed nature (350°C) turn into evenly distributed closed packed agglomerated particles by the influence of temperature. The oscillating nature of transmittance (%) with redshift of the sharp absorption edge was observed in UV–Vis–NIR spectrophotometer and found the bandgap value about 3.58 eV to 3.33 eV through Tauc's relation. The gas-sensing behavior has shown better response to C_2H_6O reducing gas at 300°C operating temperature with 150 ppm gas concentration.

Keywords: ANSP method; XRD and XPS study; 3D optical profilometer; AFM and FESEM study and gas-sensing behavior.

1. Introduction

Synthesis and physical properties of comprehensive TiO_2 films have been extensively considered in current research, but detailed studies of the electrical properties toward gas-sensing analysis of anatase-phased TiO_2 films are rare. The sensing gas molecules are immense consequences in pollution monitoring the environment, control of chemical processes, space missions and agricultural and medical applications. Naturally, titanium is constantly bonded to other elements, and

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Development of $CuAlO_2$-Encapsulated Reduced Graphene Oxide Nanocomposites: An Efficient and Selective Electrocatalyst for Detection of Neurodegenerative Disorders

Thirumalairajan Subramaniam,* Girija Kesavan, and Ganesh Venkatachalam

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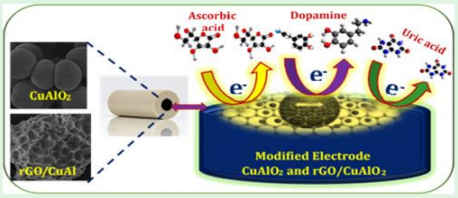
ABSTRACT: Carbon-based nanomaterials continue to simulate wide interest in diverse disciplines including electrochemical biosensors, which have great ability to function as next-generation clinical diagnostics. Motivated by this point, we for the first time developed a $CuAlO_2$-encapsulated reduced graphene oxide (rGO) nanocomposite by a facile wet-chemical process to modify a glassy carbon electrode for dopamine detection with high selectivity and good sensitivity. The size, shape, phase purity, chemical composition, and surface area were investigated for the samples through transmission electron microscopy, scanning electron microscopy, high-resolution transmission electron microscopy, X-ray photoelectron spectroscopy, X-ray diffraction, and Brunauer–Emmett–Teller analysis. The electrocatalytic performance was studied using cyclic voltammetry and amperometric technique. The modified rGO/$CuAlO_2$ nanocomposite electrode showed an enhanced electrochemical performance compared to other electrodes and pure $CuAlO_2$ electrodes due to the strong promoting effect between rGO and $CuAlO_2$. Both the oxidation current and concentration were proportional and show a linear range of 9.2×10^{-8} to 1.6×10^{-7} M having a detection limit of 15 nM at S/N = 3. Further, the biosensor successfully neglected the interference of ascorbic and uric acid and exhibited enhanced selectivity, improved sensitivity, and stability toward dopamine formulations. Most obviously, the real-time analysis of the electrochemical biosensor may be proved using the clinical diagnostics in the near future.



KEYWORDS: *rGO/$CuAlO_2$, electrochemical, biosensor, shape, size, dopamine*

1. INTRODUCTION

Neurotransmitters are the most significant messengers of the nervous system, and any deviation in their activities and balances can cause serious neurological, psychiatric, and cognitive disorders.[1,2] Among them, neurological disorders such as depression, schizophrenia, stress-related disease, and addiction are caused because of the abnormal function of the dopaminergic system.[3] Dopamine (DA) occurs in the highest amounts of 50 nmol g^{-1} in the portion of the human brain called caudate nucleus. However, DA occurs in low concentrations for a healthy individual, and it completely becomes null for persons affected with neurological disorders, especially, Parkinson's disease.[4] Detection of DA has been most favorably accomplished using electrochemistry with the ultimate task being the existence of high sensitivity and good selectivity toward DA detection. Several technologies including electrochemistry, chemiluminescence, spectrophotometry, and so forth have been used to detect DA.[5−8] These were designed for *in vivo* observation of DA at its physiological equivalent levels of 900−600 nM in Parkinson's patients medicated with L-dopa, and in the human brain, it changes in the range of 100 nM to 1 μM on DA release.[9−12] However, the release of DA and the following changes all happen in less than a few seconds, and hence the small changes in the concentration can be misestimated due to time-based resolution of these methods.[13]

Electrochemical biosensor-modified electrode can sense DA from the cerebral system at the nanomole level.[14−17] However, these biosensors have poor selectivity toward DA as these were designed with no recognition unit or molecular recognition. Ascorbic acid (AA), uric acid (UA), and DA have similar oxidation potentials, and hence discrimination of DA from AA and UA remains a challenge.[18] In the detection of DA, poor selectivity and sensitivity occurs as the surface of the electrodes is fouled by the products obtained during AA and UA oxidation.[19] This can be improved by choosing an appropriate

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Technical Efficiency Estimates of Stochastic Production Frontier Model using Rayleigh Distribution

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Abstract. The present study is attempted to estimate the Technical Efficiency level of paddy farmers in Thiruvarur District of Tamil Nadu, India using Stochastic Production Frontier Model to know the variations in efficiency among the farmers and to analyse the policy making decisions for improving the efficiency. A Cobb-Douglas Production function was considered in which the technical inefficiency effects are defined by a model with Rayleigh distribution. Primary data from 300 households in Thiruvarur district during the year 2015-16, Tamil Nadu were used. The results show that the Technical Efficiency of paddy farmers in the study area ranged from 11 to 85 percent with an average of 55 percent. The average Technical Efficiency level implied 55 percent of the farmers in the study area realised their technical abilities. Based on the technical efficiency score, the average potential to increase the paddy production was 35 percent and if the minimum efficiency farmer can reach the maximum level then the cost can save up to 87 percent. The MLE result shows that Farm Yard Manure and Chemical fertilizers are positively related to the Technical Efficiency. The socio economic factors influencing Technical Efficiency was identified using linear regression model and the result shows that sex of the farmer, education and credit are the important factors to increase the Technical Efficiency.

Keywords: Rayleigh distribution, Cobb-Douglas production function, Stochastic Production Frontier Model, Technical Efficiency, Maximum Likelihood Estimates, Linear regression.

INTRODUCTION

Usually, the efficiency production function analysis focuses on estimating average and frontier production functions (Farrell, 1957). The main pioneers of the Stochastic Production Frontier Model (SPFM) were Aigner, Lovell and Schmidt (1977), Meeusen and van den Broeck(1977) and Battese and Corra (1977) in which they were the first to introduced additional random variables, representing noise and technical inefficiency, in the production models.

In Stochastic Production Frontier Model, the component of noise follows a normal distribution with mean 0 and variance σ^2 .so, the two sided distribution models risk factors not directly controlled by the firm. On the contrary, the distribution, followed by technical inefficiency terms, may vary in relation to the assumptions made on the model, but it is always one-sided: this depends on the production that must lie from a same part with respect to the frontier. Meeusen and van den Broeck (1977) assigned an exponential distribution, Battese and Corra(1977) -half normal distribution, Aigner et al. (1977)-exponential and half normal, Greene (1990) -Gamma distribution and Stevenson (1980)-truncated normal distribution to the inefficiency error term. In this paper, uniform distribution is assigned for u. In this study, the technical inefficiency component follows a Rayleigh distribution.

Firm efficiency represents a relationship between output units that the firm produced with a given set of inputs. Efficiency can be decomposed into Technical and Allocative Efficiencies. Mathematical models that relate

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Solving LPP with Stochastic Neutrosophic Pythagorean Z numbers

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Abstract. This document gives the idea of Neutrosophic Pythagorean Z numbers, operations on neutrosophic Pythagorean Z numbers which helps us to overcome the situation where the truth membership function, indeterminacy membership function and non- membership function is greater than one in uncertainty and reliability. Also stochastic LPP is used to solve the Numerical Example.

INTRODUCTION

In the real world, uncertainty is a pervasive phenomenon. Much of the decisions taken are based on uncertainty. Humans have a remarkable capability to make rational decisions based on information which is uncertain, imprecise and/or incomplete. Formalization of this capability, at least to some degree, is a challenge that is hard to meet. When an easily solved problem ends up with difficult optimization problems, there one may consider the new concept called Z numbers. The concept of Z numbers has been recently introduced in decision making analysis. Zadeh [5] defined Z numbers related with an uncertain variable. Smarandache [2] proposed the concept of neutrosophic set which is generalization of fuzzy set theory and intuitionistic fuzzy sets. Pythagorean set theory is a documented technique to manage uncertainty in the optimization problem. Yager [3, 4] generalized Pythagorean fuzzy set, which is a new tool to deal with vagueness considering the membership and non-membership satisfying the Pythagorean condition. It may be used to characterize the uncertain information more sufficiently and accurately than intuitionistic fuzzy set. Pythagorean fuzzy set has attracted great attention of many scholars that have been extended to new types and these extensions have been used in many areas such as decision making, aggregation operators, and information measures was given by Beliakov, James [1]. Because of such a growth, one may present an idea on Pythagorean fuzzy set with aim of offering a clear perspective on the different concepts. In particular, one may provide neutrosophic Pythagorean Z environment to deal with uncertainty and reliability. This technique is considered as a standard decision making procedure, mainly when NPZNs are functional in real decision making problems. In this paper, the researcher defines Neutrosophic Pythagorean Z numbers (NPZNs) where some of its mathematical operations are defined and various theorems are also stated to show the combination of NPZNs. The researcher proposes θ – cut of NPZN and considers the real time example in this chapter to show the value of the work. The data is collected from fifty different persons and were consolidated as neutrosophic numbers for various restrictions. And the same is formulated as LPP and solved using NPZLPP and SNPZLPP to give the suggestions for customer in choosing better bike to get maximum profit with the utilization of available resources.

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Molecular Descriptors of Dodecagonal Network with Python Program and Bounds Based on New Parameters for Some Topological Indices

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Abstract. Dodecagonal network with m rows and n columns are analysed by its topological indices. Tetrahedron, hexahedron, octahedron, dodecahedron and icosahedrons are known as platonic solids. These shapes are mainly in outer protein shell of many viruses especially HIV and herpes. Characteristics, Bounds and relation between some topological descriptors are analyzed in this work, for the above platonic solids and their Plane embeddings to study their properties.

INTRODUCTION

Platonic solids are very special because of every face is regular polygon (whose side lengths are equal and angles are equal)with same shape and size. There are only five regular polyhedrons and all its faces are regular polygons and same number of faces meet at each corner. We know about crystals and their formation in nature. Also many microscopic organism includs algae and many species. These molecules have many applications in nanotechnology and biomedical research.

A connected graph without loop is called network. Chemical reaction network theory is dealing with modelling the real chemical systems. It is one of the applied Mathematical area. Mathematical Chemistry is a branch which deals with the structure of Chemical Compounds. It also attract pure Mathematicians for the problems arise from the mathematical structure of the Chemical compounds. It depicts the Biomedical and chemical properties of nano particles. Topological descriptors used to predict chromatographic retention times, Vapour pressure, Heat of formation, surface tension etc. In last 50 years, degree based indices are widely studied [1]. Reads can visit https://repl.it/@Manimekalai/dodecagon-M1 , https://repl.it/@Manimekalai/Hyper-and-multiple for python program.

DEFINITIONS

The 1st and 2nd Zagreb indices presented by Gutman and Trinajstic in [7] are.

$$M_1(A)= \sum_{uv\in E(A)} (\deg(u)+\deg(v))$$

$$M_2(A)= \sum_{uv\in E(A)} (\deg(u)\deg(v))$$

Furtula and Gutman [5] presented the forgotten topological index as:

$$F(A)= \sum_{v\in V(A)} \deg(v)^3 = \sum_{uv\in E(A)} (\deg(u)^2+\deg(v)^2)$$

Ghorbani and Azimi [6] defined the two multiple Zagreb indices of a graph A as

$$PM_1(A)= \prod_{uv\in E(A)} \deg(u)+\deg(v)$$

$$PM_2(A)= \prod_{uv\in E(A)} \deg(u)\deg(v)$$

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ORIGINAL PAPER

Comparison of Eosin yellowish dye–sensitized and CdS-sensitized TiO_2 nanomaterial–based solid-state solar cells

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Abstract
In the present work, Eosin yellowish (EY) dye–sensitized and CdS-sensitized TiO_2 photoanodes prepared by doctor blade technique, for dye (DSSC)- and semiconductor-sensitized solar cell (SSSC) by engaging different forms of solid-state electrolyte. To begin with, the TiO_2 and CdS/TiO_2 nanomaterials are synthesized by the solvothermal method and the changing of physical properties is examined from structural, optical, morphological, and chemical composition measurements. The formation of anatase tetragonal phase TiO_2 and hexagonal phase CdS are investigated from XRD. UV-vis and photoluminescence studies expose that the nanomaterials loaded with different amounts of CdS on TiO_2 extend the absorption wavelength region from ultraviolet to visible. The photovoltaic performances of pure and CdS-added TiO_2 nanoparticle have studied by current-voltage measurement and impedance spectral response. We have achieved the highest solar conversion efficiency of 2.89% with the aid of the CdS-sensitized TiO_2 photoanode. CdS-sensitized TiO_2 photoanode shows good stability as inferred from transient photocurrent and photovoltage measurements. Overall investigation describes that the inclusion of CdS into the TiO_2 photoanodes gradually increase efficiency and stability.

Keywords TiO_2 · Nanoparticles · CdS sensitizer · Solid-state electrolyte · Impedance spectra

Introduction

Nowadays, nanomaterials and its various forms of nanostructures have attracted great attention as fundamental building blocks for the development of next-generation solar energy devices and those have high performance with novel functionalities such as flexibility and mobility [1]. The solar conversion efficiency of wide bandgap semiconductors is not enough to satisfy social needs since only 3% of solar light lies in the ultraviolet range. Many research groups have made considerable efforts to extend the solar conversion response up to visible region from UV by using organic dyes and narrow bandgap semiconductors as a sensitizer.

Already different types of dye-sensitized solar cells (DSSC) have been worked out by employing various forms of photoanodes like TiO_2 and ZnO nanostructures, making a composite of TiO_2 with ZnO and doping with different periodic elements like Ti, Sn, Mg, Zn, and also with various dyes (Ru N719, N3, eosin yellowish (EY), etc.) [2]. Along with new features and progress remarks made for last few decades in the area of DSSC and bulk heterojunction polymer solar cell using organic chromophores like dyes and polymers, respectively, called semiconductor-sensitized solar cells (SSSC) have attracted greater attention due to its superior visible light harvesting efficiency [3]. The solar conversion efficiency of SSSC is low as ~ 3% when compared with ruthenium dye-sensitized TiO_2-based DSSC (12%) [4]. A quite different approach is required for making a metal oxide semiconductor (MOS) matrix with quantum dot (QD) deposition, since the size of QD is higher than dye molecules [5]. Hence, the good coupling and favorable band alignment between MOS (TiO_2) and semiconductor sensitizer (CdS) for efficient charge separation are the key requirement factors for further improving the cell performance [6].

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1. Research - Proceeding Collaborations - Academic Year (2020-21)

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Hybrid Form of Cuckoo Search Algorithm with Hill Climbing Algorithm Based Optimization of Lifetime, Energy and Also Detection of Sybil Attack in WSN

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Abstract— A new protocol for the collection of data called Broadcasting Combined with Multi-NACK/ACK (BCMN/A) (BCMN/A, of which NACK; inferring for "Negative-Acknowledgment", ACK for "Acknowledgment") protocol is intended based on the evaluation strategy. Throughout the data collection process, the BCMN/A protocol achieve energy and delay feasibility in both intra-cluster and inter-cluster. In the situation of intra-cluster, a cluster head propagates NACK during the round of TDMA collection to identify the nodes which do not transmit data to prevent the nodes that effectively transmit data via retransmission. The design work created a new Hybrid Cuckoo Search with the algorithm for Hill Climbing (HCSHC), enhances the optimum solution to modify the search agent mechanism by estimating the optimum path value, i.e. HCSHC integrating Cuckoo Search (CS) to Hill Climbing (HC) through an analysis approach attempting to use earlier information on both the previous search experience to accelerate differentiation. A hybrid CS-HC algorithm is therefore implemented in this article; it strengthens the search agent's optimal solution upgrading process by determining the optimal network path value. The node transport delay is similarly a protocol comprised of the delay of data gathering inside the cluster as well as the delay of data transmitted to the sink. There is also a new concept for Sybil attack detection that increases network topology security while transmitting and receiving data packets. Sybil attacks will be regarded as the most important assaults designed and developed by the various detection algorithms and systems. However, the current algorithms also need intelligence to boost detection accuracy. The suggested HCSHC algorithm is therefore designed for the detection of Sybil attack by identity verification.

Keywords — *Broadcasting; Sybil Attack; Cuckoo Search.*

1. Introduction

Wireless Sensor Networks (WSNs) refers to a group of spatially dispersed and dedicated sensors for monitoring and recording the physical conditions of the environment and organizing the collected data at a central location [1]. WSNs can be defined as a self-configured and infrastructure-less wireless networks to monitor physical or environmental conditions, such as temperature, sound, vibration, pressure, motion or pollutants and to cooperatively pass their data through the network to a main location or sink where the data can be observed and analyzed. In WSNs, location information of nodes plays an important role in many location-aware applications, such as geographical routing [2], environmental monitoring, tracking applications, network coverage checking, and location-based information querying. In these applications, it is useless to gather the nodes' information without locations. In addition, correct locations are necessary; otherwise, it is still meaningless to get the location information. In many localization systems, a small proportion of nodes equipped with Global Positioning System (GPS) (i.e., anchor nodes or localized nodes) are a feasible way in the deployment of WSNs due to the high cost of GPS technology. Anchor nodes with location information can assist sensor nodes which are unaware locations to get their locations. GPS and local positioning algorithms can be used to obtain location and positioning information [3]. WSNs enable new

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Impact of Oxidation Number on the Structural and Optical Properties of Sn Doped ZnO Nanoparticles

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Abstract: Tin(II) doped zinc oxide nanoparticles (Sn:ZnO) were prepared using green synthesis method. Aloe Vera broth gel was used to extract oxides for preparing Sn(II):ZnO nanoparticles. After synthesizing the precursors, the oxides were mixed in stoichiometry ratios to attain different concentration of tin (x = 0.02, 0.04 & 0.06) in zinc oxide host lattice. The XRD studies indicated the formation of single-phase cubic structure and 39 nm to 25 nm of crystallite size for the prepared nanoparticles. The doping of tin in ZnO nanoparticles influenced in the narrowing of band gap from 3.18 eV to 3.07 eV.The room temperature paramagnetic behaviour was observed for Sn doped ZnO nanoparticles.

Keywords: Transparent conducing oxide; Zinc oxide; Nanoparticles; Green synthesis

1. INTRODUCTION

Generally, wide band gap oxide nanoparticles/ nanostructured nanomaterials are given high importance as they can find in many optoelectronic applications. In other way these are called as transparent conducting oxides (TCO). These TCO possess the peculiar properties such as high transmittance and low electrical resistivity. These properties will be best suited for many device applications such as electrodes for flat panel displays and also for highly sensitive touch screens on mobile phones or laptops, research is going on in full swing to discover new materials falling under this category [1,2]. Indium tin oxide (ITO) has been considered as one of the best TCOmaterials [3-6]. But the metal indium is high cost and find its scarcity. Hence search began for alternate TCO materials. As the population is increasing continuously, the demand for electronic devices also increases. Hence a large number of electronic devices are manufactured to fulfil the demand. Zinc oxide can also be considered as replacement to ITO[7].The pure and doped ZnO are also finding their role as TCO[8-11] and they find applications in drug delivery agent [12,13], antibiotic agent having antibacterial properties, electrode material, touch screens, etc. [14-17]. The magnetic zinc oxide find applications in magneto-opto-electronic applications [18-20]. In order to make wide band gap oxide semiconductor (TCO) into magnetic semiconductor, different magnetic and transition metal ions were added into the TCO material to make into magnetic semiconductor

Among the various synthesis methods, nanoparticles prepared by green synthesis are in recent trends of research. The advantages of this method are non-hazardous, low cost and biodegradable. The precursors can be obtained from the leaves or biological products such as bacteria, fungi, etc. Thus, in the present article, the precursors were extracted from Aloe Vera leaf. Generally, plants are the home of many reducing agents like flavonoids, terenoids, alkaloids, amino acids, chelating products, etc.. They are the phytochemicals which will acts like stabilizing agents also during the synthesis of nanoparticles. So, this kind of synthesis of nanoparticles from leaves/fruits extract is termed as plant mediated synthesis. In plant mediated synthesis, extract from parts of the plant either leaves or flower is mixed with a solution of the metal to be extracted. The synthesis conditions such as concentration of phytochemicals, the surrounding atmosphere, temperature and pH value of the solvent manipulates the size of the nanoparticles as well as their properties. The green synthesis is much

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cheaper and easier to prepare nanoparticles compared to physical and chemical route methods. The green synthesized nanoparticles were mostly prefecred as anti-bacterial, anti-parasitic and anti-fungal agents, compared to the nanoparticles synthesized by physical-chemical methods. In green synthesis, the biological materials will be acting as the natural reducing agent to form the nanoparticle as well as the capping agent to control the size of the nanoparticles.

Hence both the dopant tin oxide and host zinc oxide are extracted in nanoparticles form from the aloe vera extract. The dopant is chosen as Tin oxide (SnO) due to its high transparency and high conductivity. Also the host that is zinc oxide and dopant tin oxide are paramagnetic in nature at room temperature. Several reports stating the influence of Sn^{4+} ions doping in Zn^{2+} ion position has been published earlier. But in this the influence of Sn in +2 oxidation state on the properties of ZnO nanoparticles will be studied in detail. The present work intends to check the change in magnetic ordering when the host and dopant have same oxidation number.

2. GREEN SYNTHESIS OF OXIDES

For green synthesis of Zinc oxide and tin oxide, nitrates of zinc and chloride of tin along with deionized water are required. The role of plant extract was done by the leaves of Aloe Vera. The fresh leaves were cleaned with deionized water and then chopped off in small pieces. The gel was flushed out from the inner layers of the Aloe leaves. The gel collected from the leaves were weighed and 20 g of them was dissolved in deionized water using magnetic stirrer to obtain the broth. The Zinc oxide nanoparticles were obtained by adding 20 g of broth in drop wise manner in the 0.2 M of zinc nitrate solution. Then the solution was stirred in magnetic stirrer for 2 hr to form precipitate of zinc oxide. After the formation of precipitate, the solution was centrifuged for 2 min at 400 rpm. Then the centrifuged sample was dried using hot plate to obtain the nanoparticles of zinc oxide (ZnO). The same procedure is repeated for the extraction of tin oxide (SnO) using the broth gel and tin chloride solution. After procuring the nanoparticle of oxides, tin oxide (SnO) is doped in zinc oxide (ZnO) using agate mortar pestle for different concentrations of tin. Then the mixed powders were sintered in muffle furnace for 2hrs at 600 °C.

The synthesized pure and doped nanoparticles were then characterized for structural properties using X-ray diffractometer (Bruker D8, Advance PXRD). The elemental characterization of the nanoparticles was done by energy dispersive X-ray (EDX) (JEOL,Japan). The optical properties were done by UV-VIS-NIR diffuse reflectance spectrometer (JASCO V-670) and Fluorescence spectrophotometer (Horiba Jobin Yvon Fluoromax-4). The magnetic studies were obtained by vibrating sample magnetometer (VSM) (Lake Shore 7303).

3. RESULT AND DISCUSSION

3.1 Structural Properties

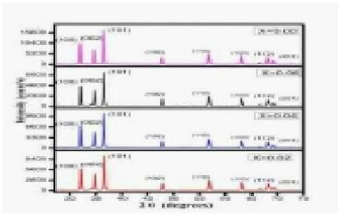

Fig. 1 X-ray diffraction patterns of $Zn_{1-x}Sn_xO$ nanoparticles at x = 0.00, 0.02, 0.04 and 0.06

Fig. 1 shows the X-ray diffraction pattern for the green synthesized pure and tin doped zinc oxide nanoparticles. The diffraction peaks in the diffraction pattern were exactly coincided with hexagonal structure of ZnO [JCPDS #80-0075]. Among the different diffraction peaks, the (1 0 1) diffraction peak at a diffraction angle of 36.5° was predominant. All these diffraction peaks are clear indication of hexagonal structure of synthesized nanoparticles. The diffraction peaks related to any other impurities were not found in XRD pattern which is a clear indication of absence of unintentional impurities in the synthesized nanoparticles. No noticeable change in diffraction peaks was observed

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Effect of Annealing on Structural and Optical Properties of Mn: ITO Thin Film

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Abstract.Thin films of Mn (5 at.%) doped ITO were coated on corning glass substrates using the electron beam evaporation technique. The substrates were maintained at a temperature of 350 °C. The deposited thin films were then air annealed at 100 °C, 200 °C, 300 °C and 400 °C for 1 hr. The structural properties of as deposited and air annealed films were studied. The effect of annealing temperature on the structural, compositional and optical properties of the thin films was studied using X-ray diffractometer (XRD) and UV-Vis-NIR Diffuse reflectance spectrophotometer (DRS).

Keywords: annealing, (Mn,Sn) codoped ITO, thin films

1. INTRODUCTION

Different transparent conducting oxides (TCO) like ZnO, In_2O_3, TiO_2, SnO, CdO were doped with varied transition metals and studied the structural and optical properties of them [1-4]. The researchers are trying to find a way to increase the properties of TCO by annealing them. Annealing is a type of heat treatment to enhance the crystallinity and decrease the dislocation of atoms. The annealing affects the macroscopic characteristics of TCO in nanostructured state. This leads to change in structural and optical property of TCO on annealing. The TCOs find applications in LED, photodiodes, energy efficient windows, touch screens, surface layers in electroluminescent applications, solar cells etc. [5-13]. Among them, In_2O_3 is one of the best TCO material having high hardness, efficient chemical stability, high adhesion quality and photochemical properties. It finds applications in photovoltaic devices, biocatalytic redox transformations and flat panel displays [14-20]. The influence of annealing on the properties of ITO has already been reported by many researchers [21-24]. The crystallite size is affected by the annealing temperature. Some of the researchers have shown that there is an increase in the crystallite size as well as enhancement in the optical properties on increasing the annealing temperature [25-28]. This manuscript deals with the effect of annealing on the structural and optical properties of Mn doped ITO thin film.

2. EXPERIMENTAL METHOD

The precursor powders of In_2O_3, SnO_2 and MnO_2 were taken in stoichiometry and milled for 16 hrs using planetary ball mill to form $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ nanoparticles. After sintering the grinded $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ nanopowder at 950 °C for 8 hrs, it was taken as sample in the graphite crucible. The deposition of $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ on glass substrate was carried out using electron beam evaporation coating method. The substrate temperature was maintained to be at 350°C and the vacuum is maintained at 2*10-3 mbar throughout the coating period. The deposited thin films were then annealed at various temperatures such as 100 °C, 200 °C, 300 °C and 400 °C in presence of air for 1 hr in horizontal tubular furnace. The structural and optical properties of as deposited and annealed samples were studied using X-ray diffractometer (XRD) and Diffuse reflectance spectra (DRS). The obtained results were compared and the influence of annealing on the properties was studied.

3. RESULTS AND DISCUSSION

Fig.1(a). depicts the XRD profiles for as deposited and annealed $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ thin films at

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different temperatures. The bottom layer depicts the XRD pattern for as deposited $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ thin film. The layers above the bottom layer depict the XRD pattern of $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ thin films annealed at different temperatures. From the figure it was confirmed that the XRD patterns of all the samples match with the XRD profile of In_2O_3 [JCPDS card no. 06-0416]. So, it was reported that the thin films have cubic structure. From the fig. absence of secondary phase was reported. This suggests that the Mn and Sn replace the In ions in the host lattice. The absence of secondary phases or cluster of metals indicates the complete substitution of dopants in the host lattice

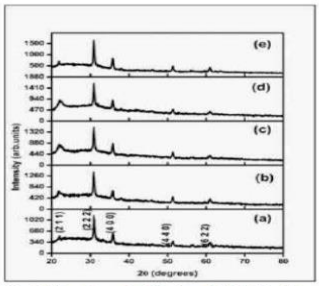


Fig. 1(a): XRD pattern for Mn doped ITO thin films (a) as deposited and annealed at (b) 100°C (c) 200 °C (d) 300 °C and (e) 400 °C.

Fig. 1(b) shows the XRD pattern of as deposited and air annealed $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ thin films in the range of 30°-32°. From the fig.1(b), it was observed that there is increase in the intensity of the predominant peak (2 2 2) at 31° on increasing the annealing temperature. It has also been observed from fig.1(b) that the predominant peak shifts to lower angle on increasing the annealing temperature. The crystallite size was found to increase from 17 nm to 21 nm on increasing the annealing temperature. This suggests that increase in the annealing temperature helps in the enhancement of crystalline properties of thin films. The slight shift in the peak position to lower angle confirms the substitution of dopants in the host lattice. The lattice parameter was found to increase from 9.38 A° to 10.37 A° on increasing the annealing temperature. The strain and dislocation density of thin films were found to decrease from 25 * 10-4 to 17 * 10-4 and 64 * 1014 to 24.8 * 1014 m-2, respectively. These behaviors of decreasing strain and dislocation density with increasing annealing temperature confirms that annealing helps to enhance the crystallinity of the sample[29,30]. The increase in crystallite size also indicates that the tensile strain is dominant as suggested by Gupta et al. [32]. Similar behavior was obtained on annealing of transition metal doped ZnO by Mathew et al. [31].

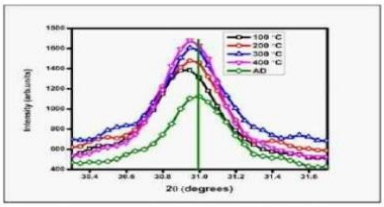
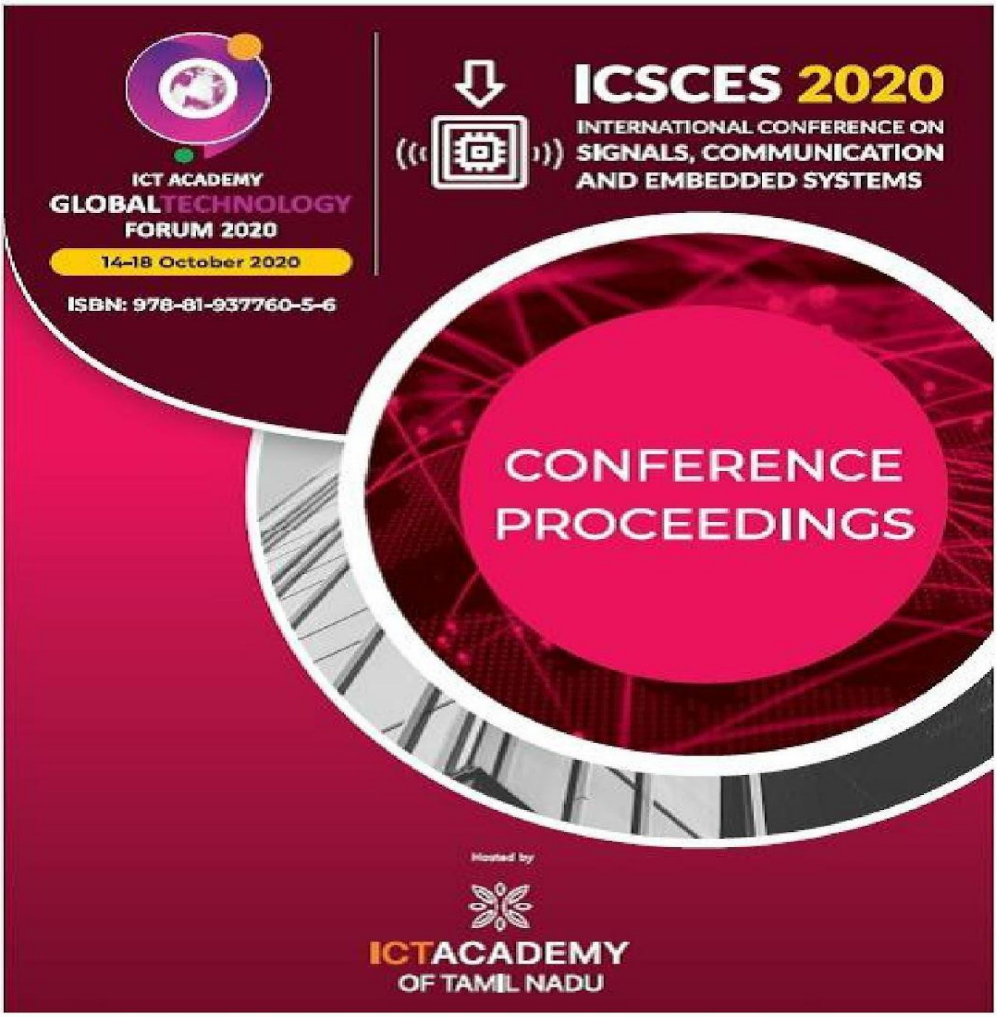


Fig. 2(b): XRD pattern for Mn doped ITO thin films in the range of 30°-32°.

Fig.2 (a). depicts the decrease in absorption band on increasing the annealing temperature. Fig. 2 (b). depicts the increase in transmittance of Mn doped ITO thin films on increasing the annealing temperature after 100°C. The transmission value for as deposited $(In_{0.90}Mn_{0.05}Sn_{0.05})_2O_3$ thin film was found as 70 %. On annealing to 100°C, the transmittance decreases to 65%. On further increasing the annealing temperature from 200°C to 400°C, the transmittance increases from 65% to 88%. The increase in transmission on increasing annealing indicates the enhanced diffusion of Mn and Sn ions in the In_2O_3 lattice of thin films. The same kind of behavior was observed for Titanium (Ti) and Gallium (Ga) codoped ZnO by Chen et al.[33].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Butterfly Algorithm Boosted Deep Random Vector Functional Link Network for Keystroke Dynamics

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Abstract. In the advanced information technology, cyber-attacks are crucial act which is spread throughout the world to hack confidential information such as intellectual property, secret of trade, banking details, etc. Handling such security threats is very challenging and many security schemes are in existence. Continuous Keystroke Dynamics Authentication (CKDA) is most important and interesting authentication techniques which is non-intrusive, permanent and inexpensive. It enhances the logical access security based on the typing rhythm. But CKDA needs a huge number of samples to analyse and register typing characteristics of users. There are many existing works on continuous authentication using standard machine learning models to understand its pattern. Still, there is an absence of deep understanding on keystroke forms depending on free text, mainly due to the adaptability and unpredictability of free text keystroke. It is very challenging to signify discrete keystroke using statistical constrained keystroke time features. Thus, this paper focuses on constructing a boosted continuous identity authentication model using Deep Random Vector Functional Link Network (DRVFLN). Unlike standard deep learning model which uses random values for parameters involved in classification, DRVFLN assigns the fine-tuned parameter value using the knowledge of Butterfly Optimization Algorithm (BOA). The experimental results proved that the Boosted Deep Random Vector Functional Link Network (BDRVFLN) prominently produce higher accuracy rate in classification of users as genuine or imposter using Continuous Keystroke Dynamic Authentication.

Keywords: Security, Authentication, Continuous Keystroke Dynamic Authentication, Deep Random Vector Functional Link Network, Butterfly Optimization Algorithm, classification

1 Introduction

Authentication is one of the important technique to ensure data integrity and user identity. Data integrity is secure data transmission between the network and the user within the optimal time assignment [1]. User identity is based on passwords, tokens or PIN numbers. Among several authentication models, keystroke dynamics is one of the strongest authentication systems which recognize the person by their typing rhythm. This increases the strength of security because it not only checks the correct password value, but also the typing rhythm for entering the password. Still, after processing initial log, the system does not know about the user change during each session. Suppose if the user fails to log out or unattended after logged on, without locking the system, then there is a high chance of imposter who will gain the access of the system. In such situation, the impostors need not worry about the password and pretend as genuine users with the typing rhythm. They may access the file, delete, copy or modify the content in the name of genuine user. This unsecured situation can be tackled by verifying that whether the user has changed after the log on process. This system is known as continuous authentication system [2]. Since, the user still uses keyboard after the procedure of log in, document typing, etc., keystroke dynamics can be used to accomplish continuous authentication. The major variance of Static Keystroke Dynamics and Continuous Keystroke Dynamics is in the former method typed information is fixed while in latter, it is dynamic and continuous verification is done.

The two foremost needs of a novel continuous authentication system are the user should not be disturbed with their daily activities and every single keystroke has to be identified for discovering users' genuinity [3]. Many existing approaches are developed for continuous authentication based on verifying the genuineness of a user depending on fixed actions. Numerous datasets are used in this area of research to authenticate the users on static or continuous

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Secure and Efficient Fire-fly Data Routing Algorithm for Wireless Sensor Networks in IoT Monitoring Systems

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Secure and Efficient Fire-fly Data Routing Algorithm for Wireless Sensor Networks in IoT Monitoring Systems

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Abstract. In the Electronics world the sensor is used in IoT applications. The sensed data need to be transfer to the appropriate devices as input for further processing. Clustering used to group the sensors which could form cluster and select the nodes head from the cluster. The head of each cluster receives the forwarded data through the cluster member and pass on to nearest permanent fixed station. Identifying cluster head and shortest route identification is a major challenge. This paper proposed a novelty on hybrid decision making algorithm with firefly routing algorithm (HDMFRA) for Cluster Head selection. This research work focusing of three main criteria which could save the energy and extend the life activation of the node, through the usage of energy, amount of nodes adjacent and energy consumption from permanent fixed station. To aggregate the data in optimized manner and to transfer the data in efficient manner Fire Fly routing algorithm was used. Simulation results show that proposed algorithm HDMFRA network in homogeneous environment is effective and prolonging the life time of the node by 25%.

1. Introduction

IoT is a networks which connects the object together. In urban areas for promoting new developments and functions IoT related applications were developed as it is technological revolution which connects the real world of physical devices in which wireless sensor plays a vital role to communicate and response according to the needs of the applications [1][12]. Sensor are very small and consumes very low-power. Inorder to transfer the data quickly the cluster head was needed which could decreases the utilizing of energy will be less and effective [2][14]. The active time of the sensor node will be more when the node utilized in the short network or by the non-hazardous areas. Replacing the battery of sensor in hazardous areas was very difficult. During sensor nodes in active stage at each moment there will be depletion of energy. Activating the data in the sensor and passing the data towards base station will consume more energy, Failure of single sensor nodes destruct whole networks [15]. As the Network lifetime depends on each node design the network in such a manner that energy should be efficiently used by the network. Huge amount of nodes and permanent fixed station [17] will form wireless sensor networks. More energy will be consumed when there was a communication between the sensor nodes every time with their neighbouring nodes.

The data sensed by the sensor of different application such room temperature monitoring system in intensive care unit called source networks and the base station called as the sink nodes. A sensor networks utilizes the limited energy supply in conventional sensor networks. Energy consumption will

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MHD bioconvective flow of a thermally radiative nanoliquid in a stratified medium considering gyrotactic microorganisms

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Abstract.

The impact of gyrotactic microorganisms of a stratified flow of a thermally radiative NL with heat absorption is highlighted. In addition, magneto NL with an inclined magnetic field is included. Suitable transformations are adopted to convert the governing PDEs into an nonlinear ODEs. Homotopy analysis method (HAM) is employed to solve these ODEs analytically. The impact of sundry parameters on VP, TP, NPWFP, MMDP, SFC, LNN and LDMM are graphically explained. We compare our results to available results in literature survey.

Keywords: Nanoliquid, Heat generation/absorption, Gyrotactic microorganisms, Radiation, Stratification.

1. Introduction

Most of the engineering and industrial processes, the HT phenomenon is essential. The ordinary fluids, like, ethylene, oil, water, glycol, toluene are poor HT properties, since they have poor thermal conductivity. Many scientists tried in several ways to raise the thermal conductivity. One of the simplest method is to suspend nano-sized particles, such as gold, titanium, aluminum, copper, iron or their oxides in the ordinary liquids to enhance its thermal properties. These liquids are used in microchips, fuel cells, microelectronics, solid state lightening, bio-medicine, etc. The NL flow over a stretching tube was analyzed by Ahmed et al.[1]. Kasmani et al.[2] found the analytical and numerical solutions of viscous NL flow past a moving wedge. Chemically reactive NL flow over a wedge with suction and heat absorption was analyzed by Kasmani et al.[3]. They found that the HT coefficient enhances with raising the values of chemical reaction parameter. Some useful studies in this directions are ([4]-[6]). Bioconvection is the microscopic convection of liquid which is created by density gradient when swimming of motile microorganisms. It is used in bio-fuel, promising renewable power source, bio-diesel and hydrogen gas. The stability of bioconvection in a porous medium was examined by Kuznetsov and Avramenko[7]. Nguyen-Quang et al.[8] analyzed the stability of gravitactic micro-organisms in a porous medium. The impact of bioconvective NL with gyrotactic microorganisms was

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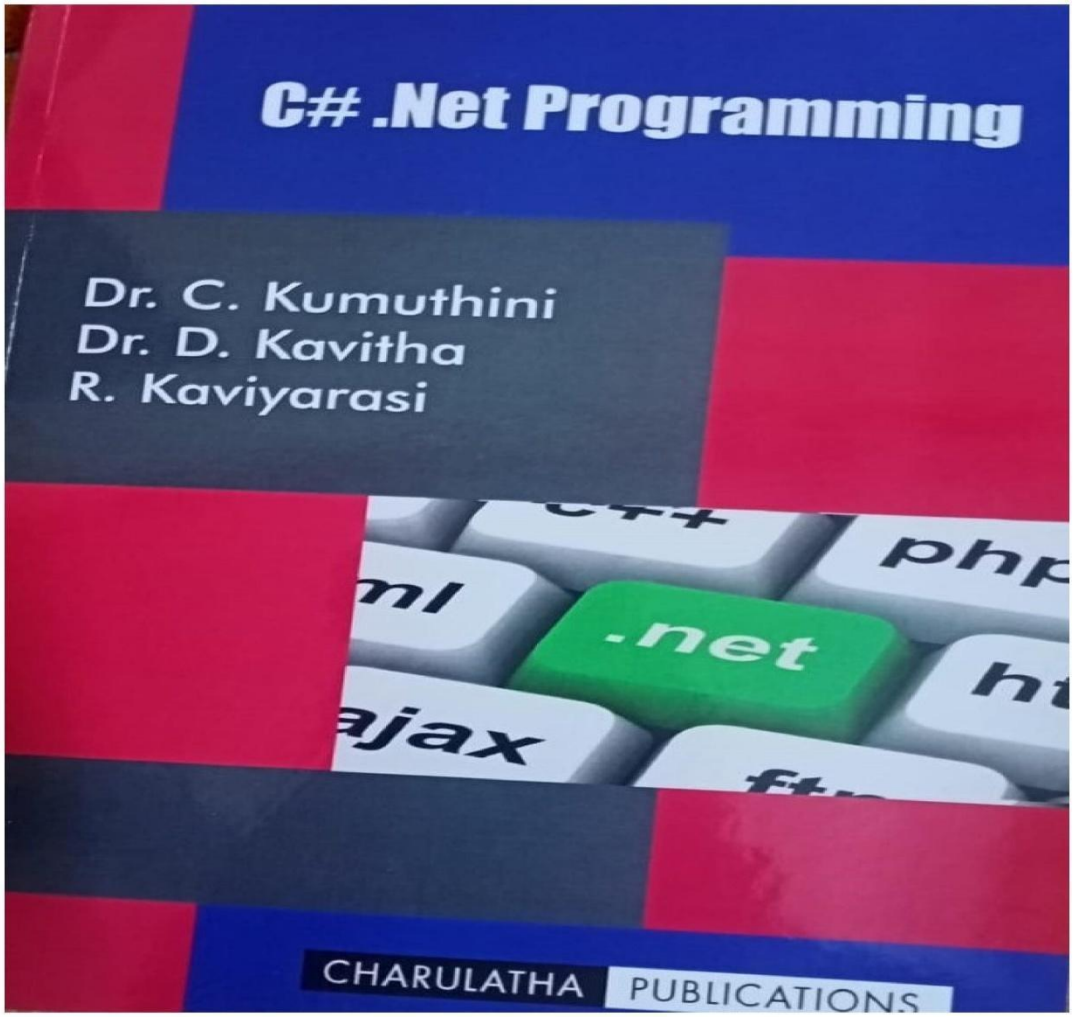

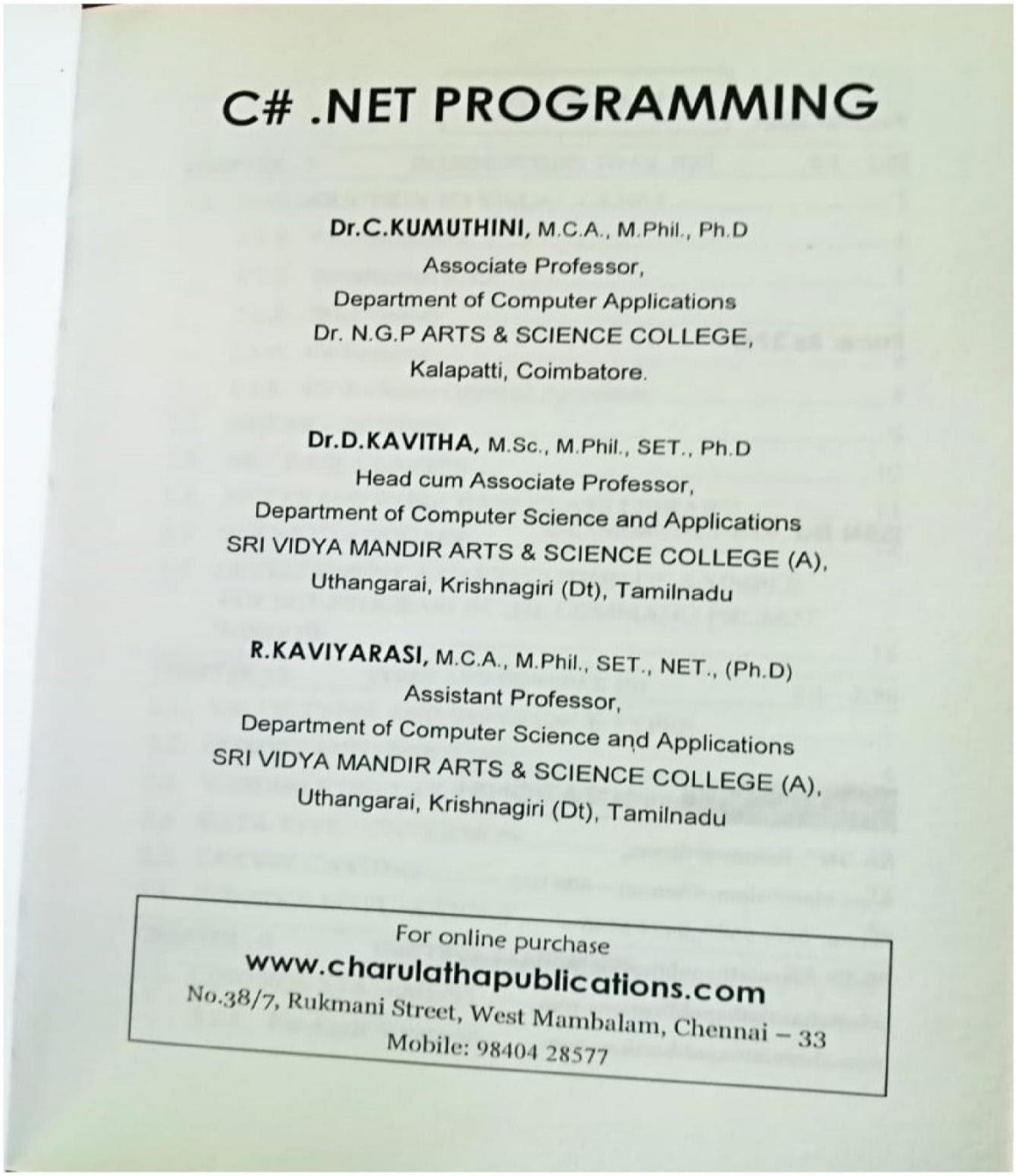

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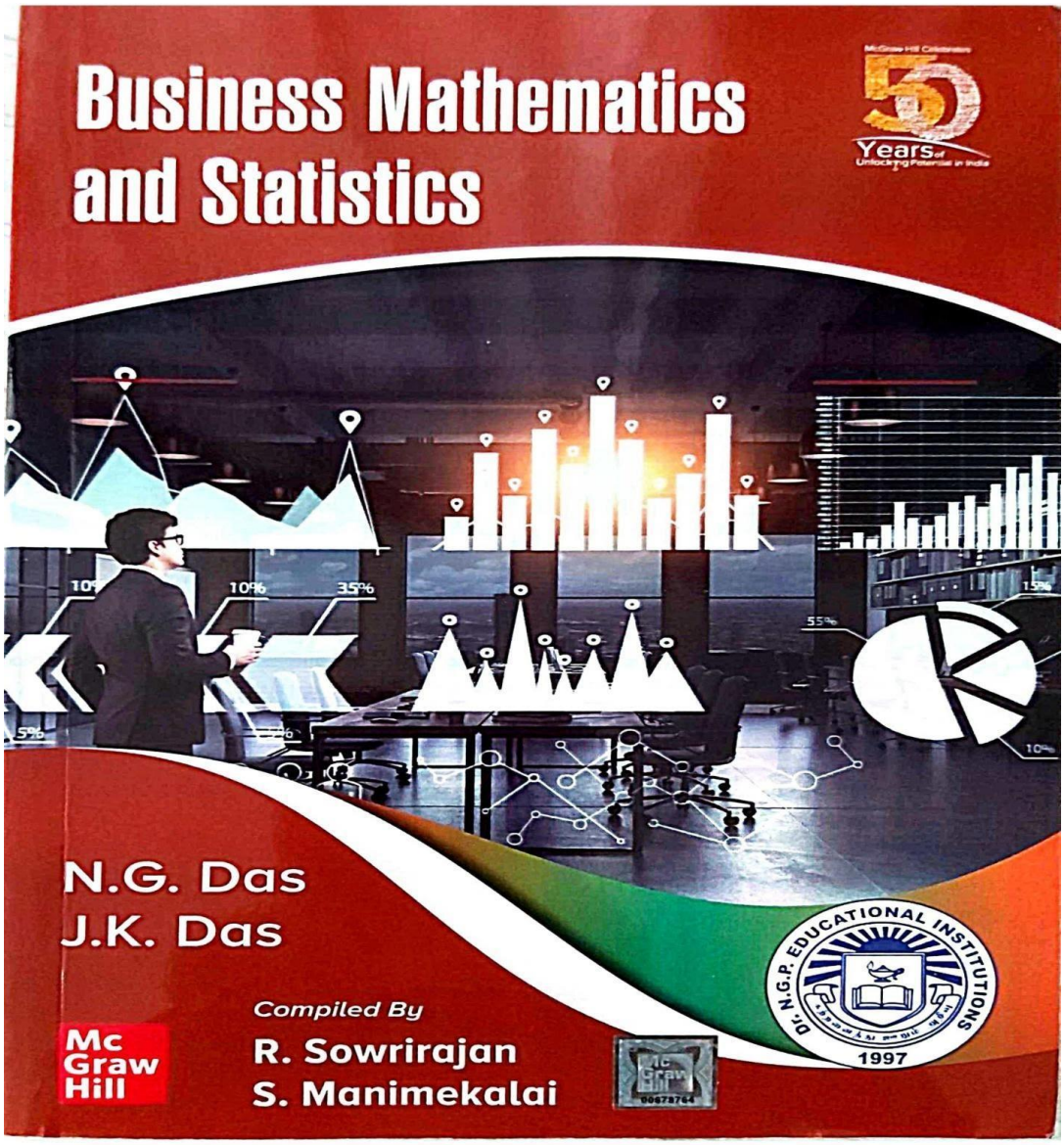
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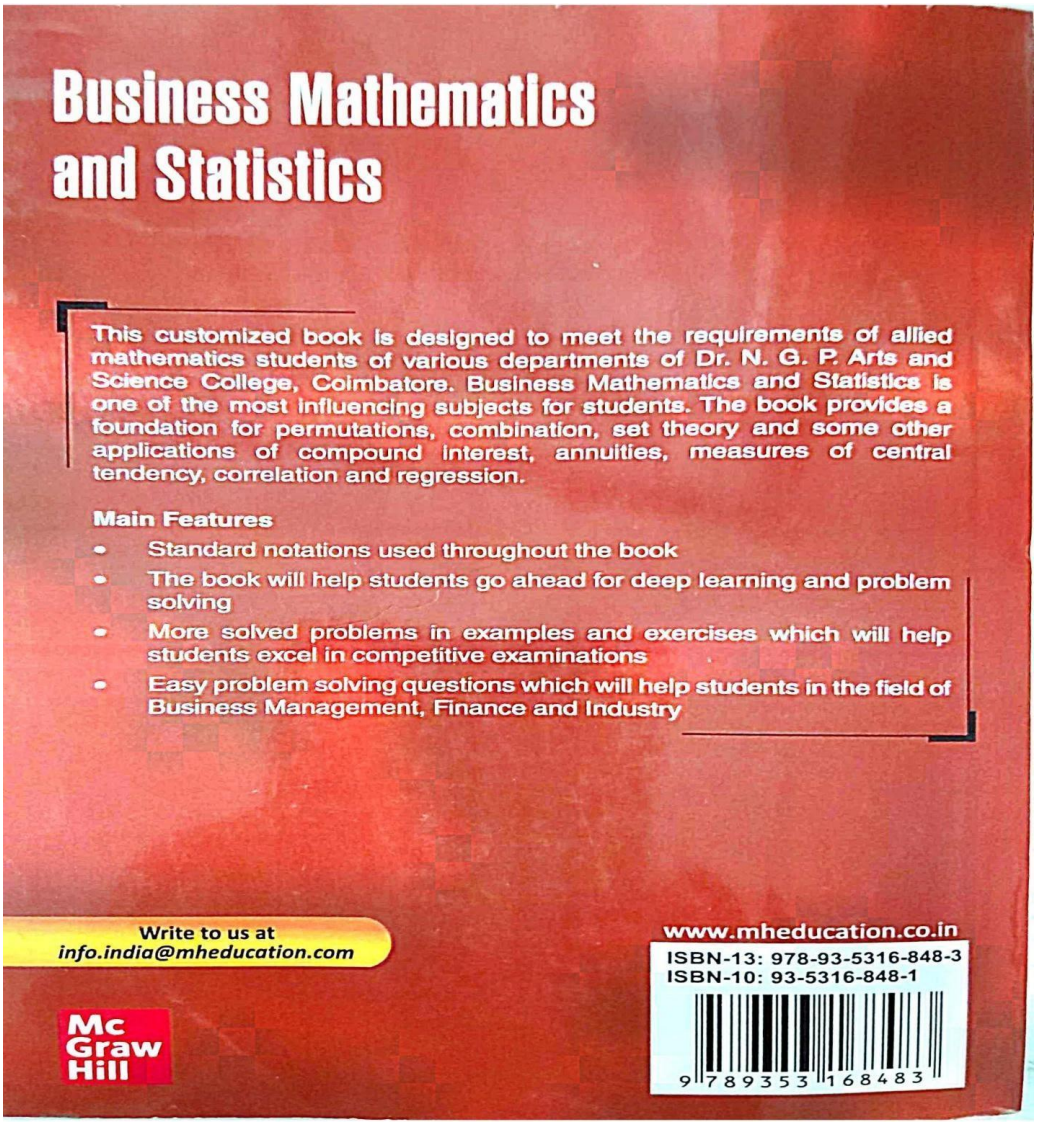
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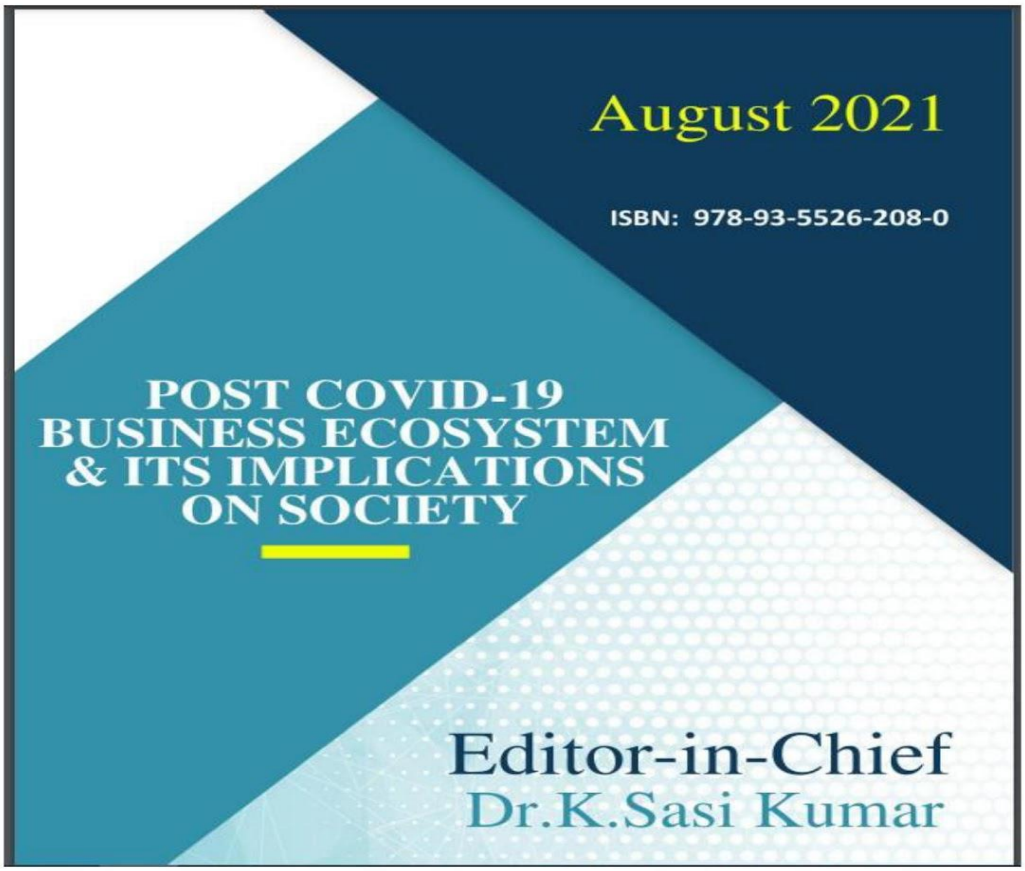

POST COVID-19 BUSINESS ECOSYSTEM & ITS IMPLICATIONS ON SOCEITY

Editor in Cheif

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POST COVID-19 BUSINESS ECOSYSTEM & ITS IMPLICATIONS ON SOCEITY - August 2021

A STUDY ON EXPLORING THE IMPACT OF COVID-19 ON TRAVEL BEHAVIOUR WITH SPECIAL REFERENCE TO COIMBATORE CITY

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ABSTRACT

Coronavirus Disease (COVID-19) outbreak poses serious concerns to the travel industries. Efforts to contain COVID-19 prompted unscheduled closure of Travel industries worldwide. COVID-19 travel closures left over travellers. The study investigates the impact of COVID-19 on travel industries. The collected data were analysed using Percentage analysis .The results show that COVID-19 has adverse effects on travel industries. The study underscores the damaging effects of COVID-19 on travel sector and the need for all educational institutions, educators, teachers and learners. Hence, the researcher has taken the step to explore the impacts of covid-19 on travel behaviour and mode preference during covid-19 pandemic. It is found that customers are used to travel only for family functions and commitments. They are very much concerned about wearing masks and other safety measures to be taken during covid 19 pandemic.

INTRODUCTION:

Pandemics are not exactly a novel phenomenon strictly related to the current modern societies as they were recorded since ancient times. Travel is the movement of people between distant geographical locations. Travel can be done by foot, bicycle, automobile, train, boat, bus, airplane, ship or other means, with or without luggage, and can be one way or round trip. Leisure travel is when a person spends money on lodging, food, and recreation while taking a vacation trip, and business travel is when a person travels for work and spends money on lodging and food.

The purpose of travel is connected with building social relationships, opportunities to learn and grow, and commitment. It gives us the chance to be truly engaged in an activity, to develop new skills and to discover new cultures. It brings us closer to ourselves and others. There are different types of travel like the weekend break, the package holiday, the group

About the Editor-in-Cheif

Dr. K. Sasi Kumar has done his schooling at Erode and Under Graduate studies from Periyar University. He holds his Master's in Business Administration from Anna University Coimbatore. He also holds Post Graduate Degree in Human Resource Management. Completed his Ph.D. in Management from Bharathiyar University in 2018. He has a distinction of clearing National Eligibility Test (NET) in Management. He started the career as Research Assistant, Placement Officer, Lecturer, currently serving as an Assistant Professor in the Department of Commerce & Management at Vivekanandha College, Tiruchengode, Tamil Nadu, India having 12+ years of teaching, learning and research experience.

His areas of expertise include Retail & Supply Chain Management, Human Resource Management. To his credit, he published more than 20 articles in reputed National and International journals including UGC indexed and conference volume proceedings. Participated and presented several papers in many National and International conferences. In addition acting as President - Indian Association of Social Sciences Research (IASSR), Editor-In-Chief at International Journal of Innovation in Social Sciences, Editor of Thaavan International Journal of Research in Marketing Mangement, Active member of many professional bodies. He delivered invited talks and lectures as a Chief Guest in various Universities & colleges. Organizing Secretary of International conferences, Faculty Development Programs, Workshops and serving as a convener and member in several committees and event organizer of various Academic Programmes.

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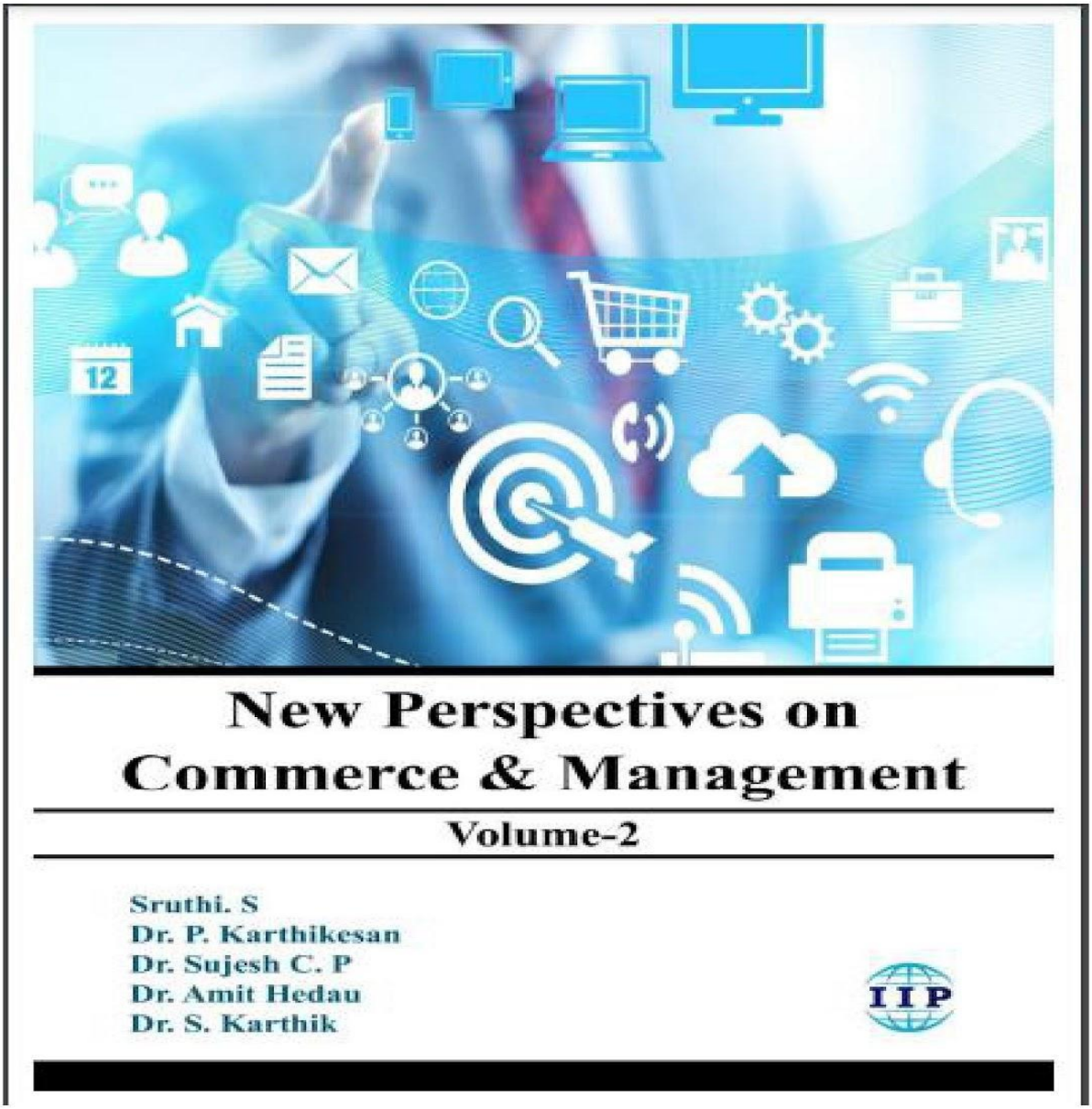
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A Study on Service Quality of the Hotels with Special Reference to East Zone of Coimbatore City

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Abstract

Service quality leads to higher profitability and customer satisfaction. Nowadays one of the biggest challenges for managers in the hotel industry is to provide and sustain customer satisfaction. Customer requirements for quality products and service in the hotel industry have become increasingly evident to professionals. Hence, this study focused on the service quality of Hotels with special reference to waiting time for service in East Zone of Coimbatore City. It is found that there is no much difference between customer's expectation and quality of service delivery.

Key words: Service Quality, Expectation, Satisfaction, Hotels

I. Introduction to Service Quality

Quality improvement and adherence to accepted norms of quality are central to the modern concept of marketing of services. The quality of service delivery results in customer satisfaction and their retention as it reinforces the perception that the value of the service received is greater that the price paid for it. Some important concepts are: Modern quality concepts result in better profitability, which is the main goal of all the business. Quality control has much to do with changing the frame of mind and psychology of the service provider and particularly the front-end and back-end employees actually providing the services. We need to know how this fundamental change in attitude can be brought about.

Traditionally, most service providers have felt that they know all there is to know about the customers and their requirements. This smug or self-satisfied approach needs to be changed. Development of feedback systems is very essential part of the quality improvement. How this can be used to develop better quality standards is an issue of immense importance. Goal setting and adherence to the goals are both essential to ensure continuous improvement in the quality standards.

II. Objectives of the Study

- To determine the level of service quality in hotel in east zone of Coimbatore City.

A Study on Customer Preference and Service Quality towards the Hotels with Special Reference to East Zone ofCoimbatore City

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Abstract

Customer requirements for quality products and service in the hotel industry have become increasingly evident to professionals. Consumer preferences are defined as the subjective (individual) tastes, as measured by utility, of various bundles of goods. They permit the consumer to rank these bundles of goods according to the levels of utility they give the consumer. Note that preferences are independent of income and prices. Ability to purchase goods does not determine a consumer's likes or dislikes. Hence, this study focused on the customer preference and service quality towards Hotels in East Zone of Coimbatore City It is found that there is no significance variance between preference of hotel by the respondent and their level of service quality offered by hotel on the tangibles of food is served hot and fresh, reliability of food is tasty and rich in flavor, responsiveness of employee are never too busy to respond to your requests, assurance of employees have the knowledge to answer your questions and Empathy of hotel employees understand Customer specific needs.

Keywords: Consumer, Preference, Service Quality, Requirement

I. Introduction

The precursor to the modern hotel was the inn of medieval Europe, possibly dating back to the rule of Ancient Rome. These would provide for the needs of travelers, including food and lodging, stabling and fodder for the traveler's horse(s) and fresh horses for the mail coach. Famous London examples of inns include the George and the Tabard. A typical layout of an inn had an inner court with bedrooms on the two sides, with the kitchen and parlour at the front and the stables at the back.

For a period of about 200 years from the mid-17th century, coaching inns served as a place for lodging for coach travelers (in other words, a roadhouse). Coaching inns stabled teams of horses for stagecoaches and mail coaches and replaced tired teams with fresh teams. Traditionally they were seven miles apart, but this depended very much on the terrain.

Some English towns had as many as ten such inns and rivalry between them was intense, not only for the income from the stagecoach operators but for the

About Editors

Sruthi. S, MA (Economics), M.Com., NET, SET is working as Managing Editor in Journal of Exclusive Management Science. She had participated in more than 150 National and International Conferences and presented Research papers in 102 International / National Conferences. She had published many Research Papers in National and International Books having ISBN and also in many International Peer Reviewed and Refereed Journals including UGC CARE listed and Scopus indexed Journals. She authored 3 academic books with ISBN.She received Global Educational Awards 2020 titled "Best Researcher" for remarkable achievements in the field of Research and Publications and also received Global Professionals- Educationalist Awards titled "International Star Excellence Award" in the year 2020 from Sarojini Research and Development Council, New Delhi. She edited more than 28International and National Books having ISBN.

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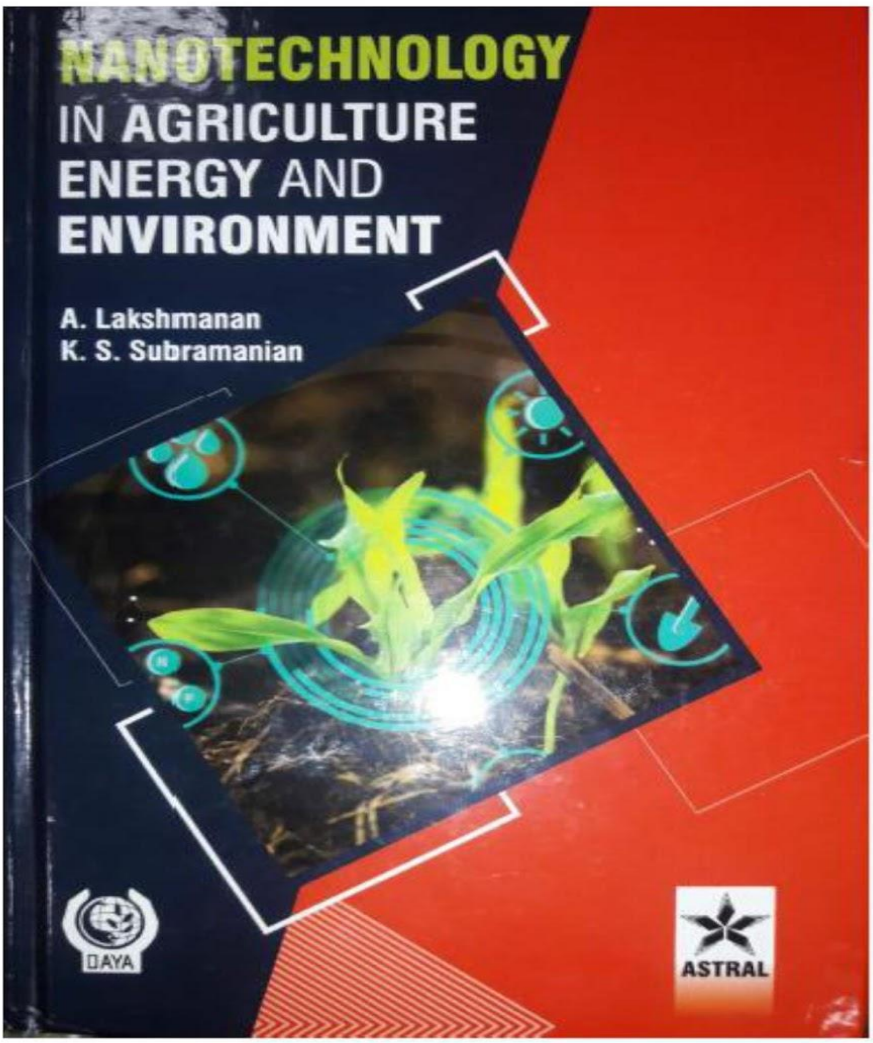
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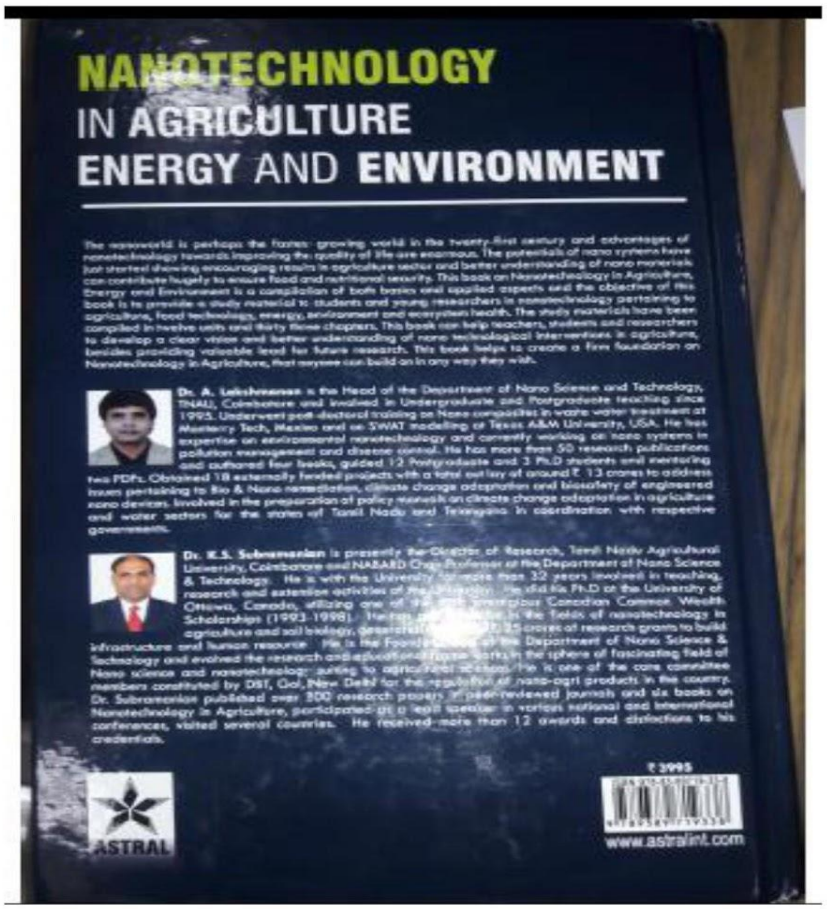
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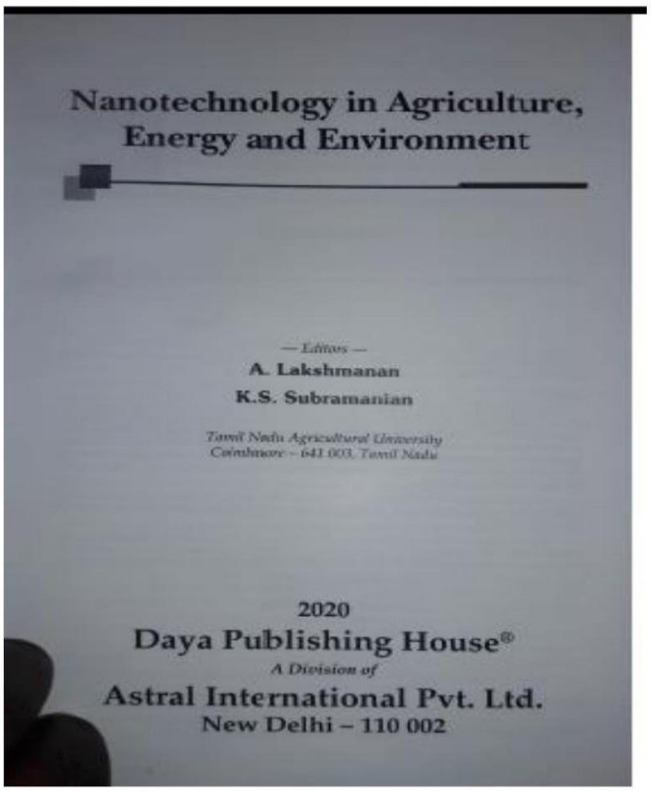
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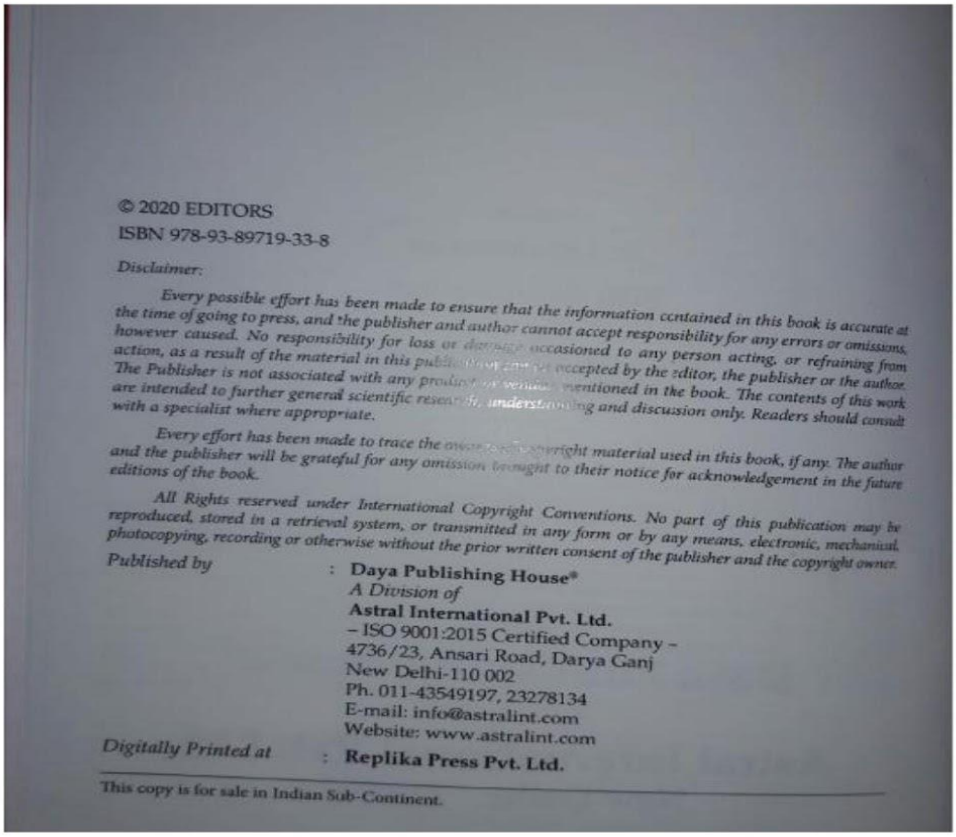

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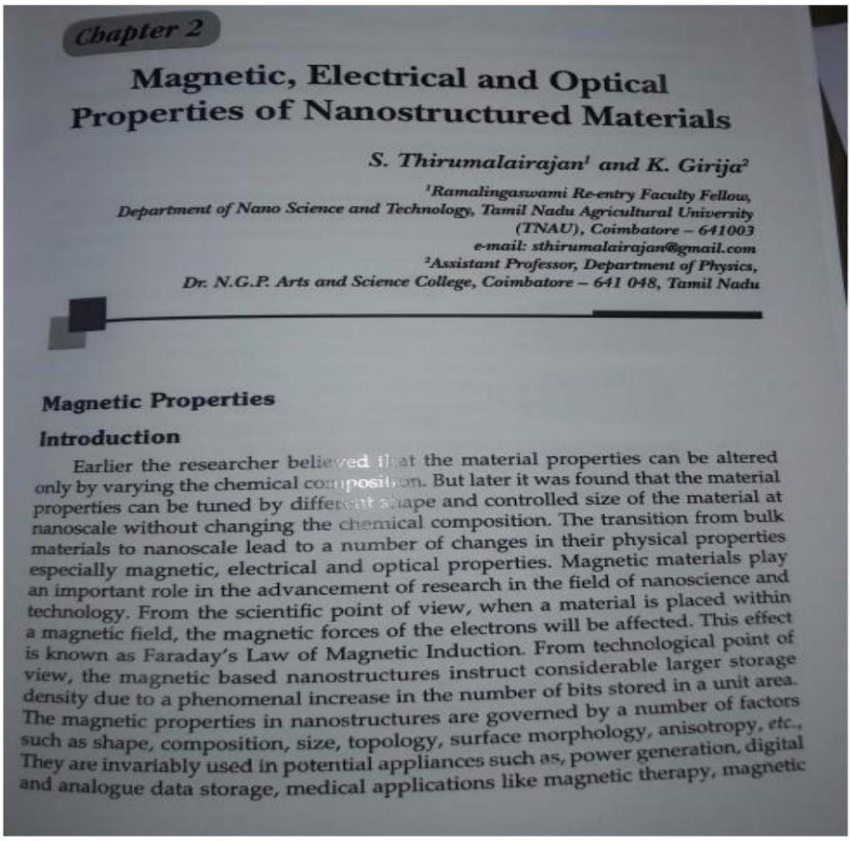

Chapter 2

Magnetic, Electrical and Optical Properties of Nanostructured Materials

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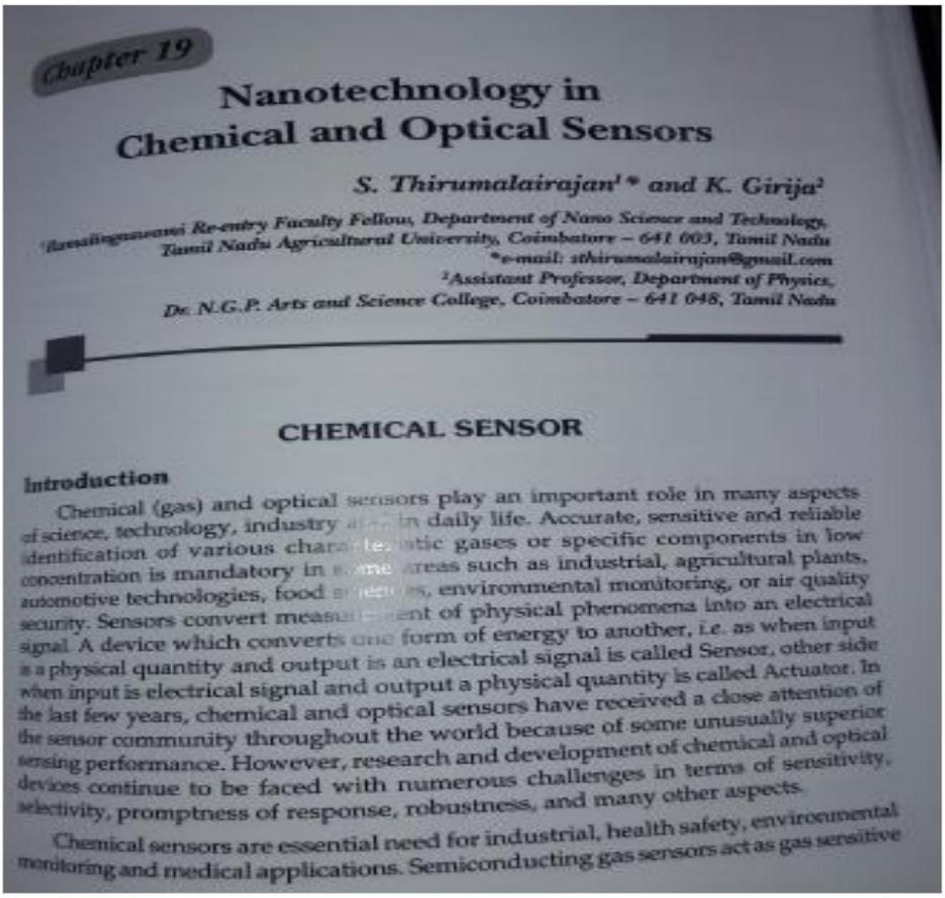
Magnetic Properties

Introduction

Earlier the researcher believed that the material properties can be altered only by varying the chemical composition. But later it was found that the material properties can be tuned by different shape and controlled size of the material at nanoscale without changing the chemical composition. The transition from bulk materials to nanoscale lead to a number of changes in their physical properties especially magnetic, electrical and optical properties. Magnetic materials play an important role in the advancement of research in the field of nanoscience and technology. From the scientific point of view, when a material is placed within a magnetic field, the magnetic forces of the electrons will be affected. This effect is known as Faraday's Law of Magnetic Induction. From technological point of view, the magnetic based nanostructures instruct considerable larger storage density due to a phenomenal increase in the number of bits stored in a unit area. The magnetic properties in nanostructures are governed by a number of factors such as shape, composition, size, topology, surface morphology, anisotropy, *etc.*, They are invariably used in potential appliances such as, power generation, digital and analogue data storage, medical applications like magnetic therapy, magnetic



Chapter 19

Nanotechnology in Chemical and Optical Sensors

*S. Thirumalairajan[1] * and K. Girija[2]*

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CHEMICAL SENSOR

Introduction

Chemical (gas) and optical sensors play an important role in many aspects of science, technology, industry and in daily life. Accurate, sensitive and reliable identification of various characteristic gases or specific components in low concentration is mandatory in some areas such as industrial, agricultural plants, automotive technologies, food applications, environmental monitoring, or air quality security. Sensors convert measurement of physical phenomena into an electrical signal. A device which converts one form of energy to another, i.e. as when input is a physical quantity and output is an electrical signal is called Sensor, other side when input is electrical signal and output a physical quantity is called Actuator. In the last few years, chemical and optical sensors have received a close attention of the sensor community throughout the world because of some unusually superior sensing performance. However, research and development of chemical and optical devices continue to be faced with numerous challenges in terms of sensitivity, selectivity, promptness of response, robustness, and many other aspects.

Chemical sensors are essential need for industrial, health safety, environmental monitoring and medical applications. Semiconducting gas sensors act as gas sensitive

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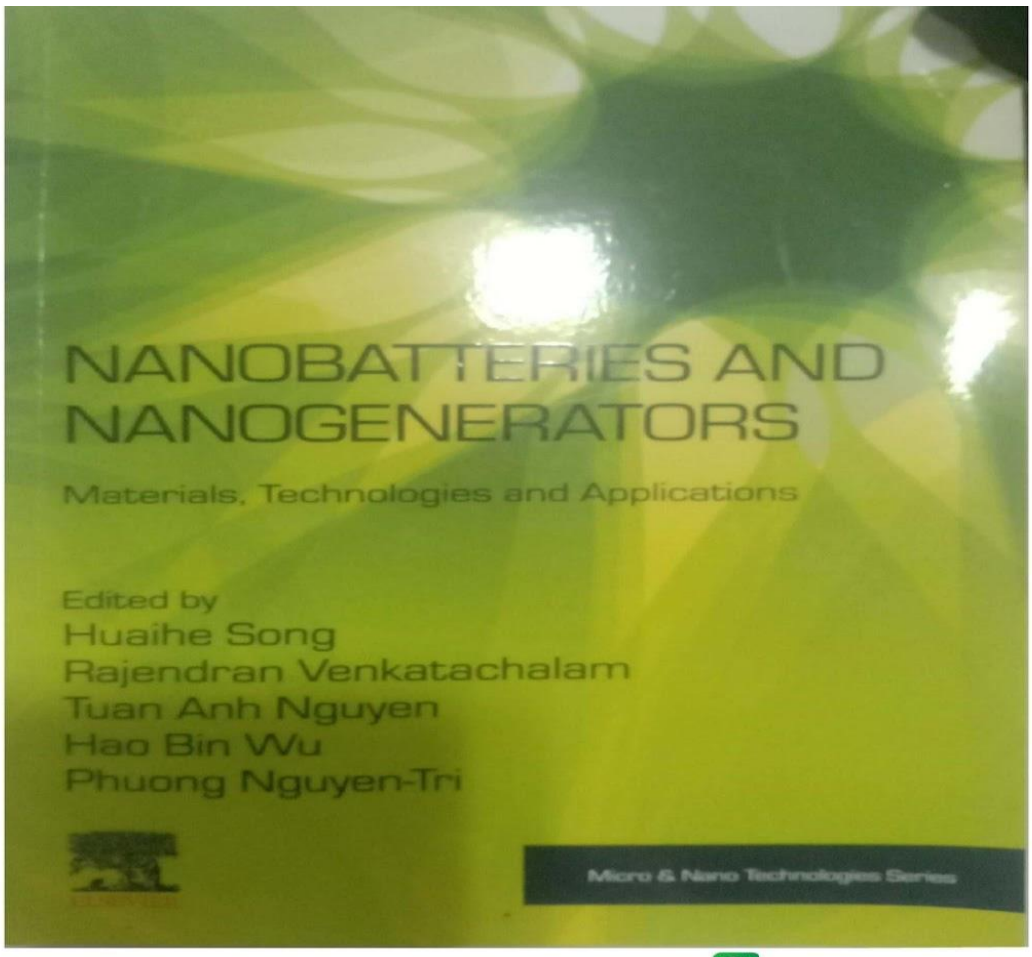

NANOBATTERIES AND NANOGENERATORS

Materials, Technologies and Applications

Edited by Hualhe Song, Rajendran Venkatachalam, Tuan Anh Nguyen, Hao Bin Wu and Phuong Nguyen-Tri

Nanobatteries and Nanogenerators: Materials, Technologies, and Applications Nanobatteries and Nanogenerators: Materials, Technologies, and Applications addresses the fundamental design concepts and promising applications of nanobatteries and nanogenerators. Particular application areas include healthcare, biomedical, smart nanodevices, and nanosensors, which may require new electric power sources, including battery on a chip, self-powered ability, and nanostructured electric power sources. In this regard, nanobatteries and nanogenerators represent the next generation of electric power.

The term "nanobattery" can refer not only to the nanosized battery but also to the uses of nanotechnology in a macrosized battery for enhancing its performance and lifetime. Nanobatteries can offer many advantages over the traditional battery, including higher power density, shorter charging time, and longer shelf life.

Nanogenerators refer to the use of nanosized devices and materials to convert mechanical, thermal, and light-based energies into electricity. Similar to traditional battery, in nanobatteries, the chemical energy is converted into electricity. Besides, hybridization between battery/nanobattery and nanogenerators can convert directly the natural energy to chemical energy and can also deliver a sustainable power supply for long-lasting operation.

Hualhe Song is Professor at the State Key Laboratory of Chemical Resource Engineering, College of Materials and Engineering, Beijing University of Chemical Technology, China. His research focuses on the area of carbon-based materials for energy storage.

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Phuong Nguyen-Tri is Professor at the Department of Chemistry, Biochemistry and Physics at the University of Québec à Trois-Rivières, Canada. His research focuses on agrocomposites, nanocomposites, polymer blends, crystallization of ultrathin films, nanostructuration of blends, polymer aging, smart coatings, hybrid nanoparticles, personal protective materials, and rupture mechanisms of polymer materials.

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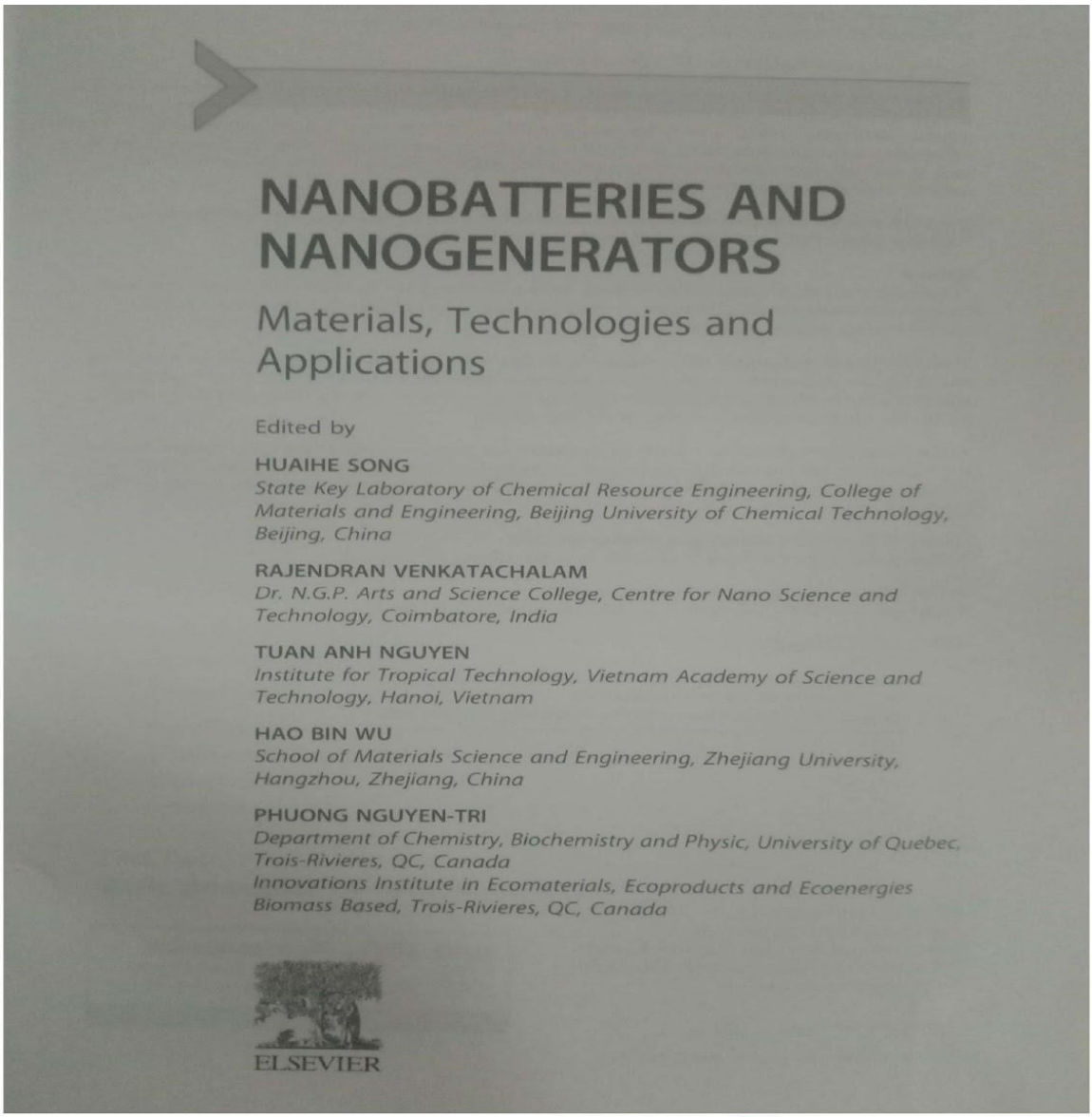

NANOBATTERIES AND NANOGENERATORS

Materials, Technologies and Applications

Edited by

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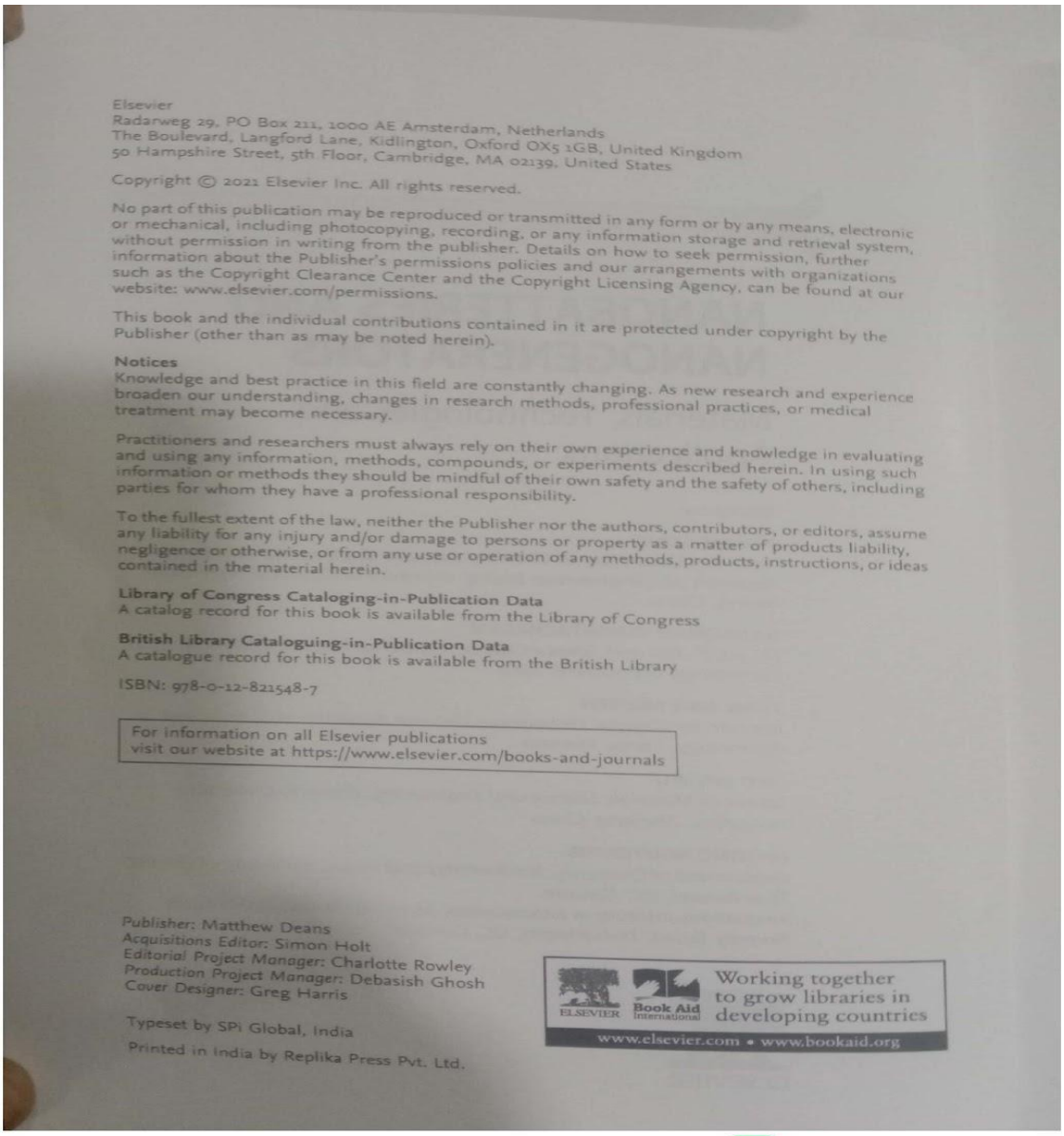

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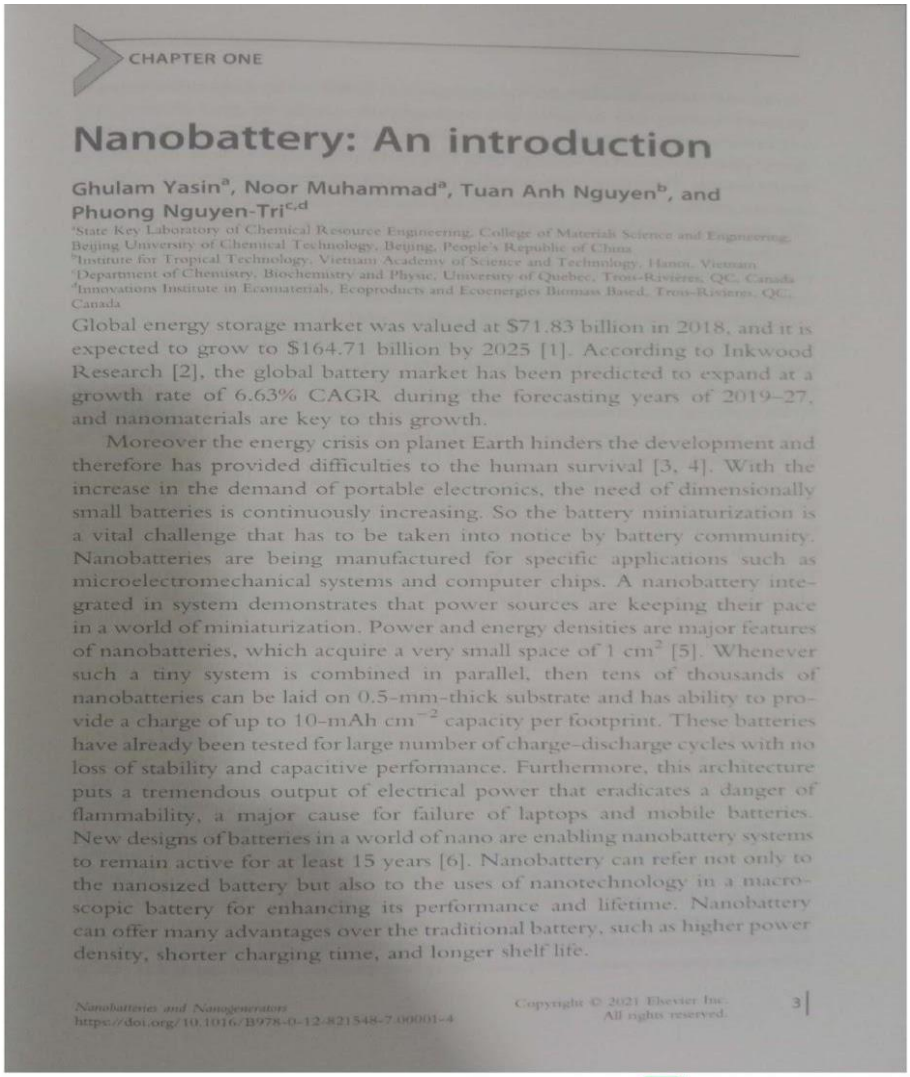

CHAPTER ONE

Nanobattery: An introduction

Ghulam Yasin[a], Noor Muhammad[a], Tuan Anh Nguyen[b], and Phuong Nguyen-Tri[c,d]

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Global energy storage market was valued at $71.83 billion in 2018, and it is expected to grow to $164.71 billion by 2025 [1]. According to Inkwood Research [2], the global battery market has been predicted to expand at a growth rate of 6.63% CAGR during the forecasting years of 2019–27, and nanomaterials are key to this growth.

Moreover the energy crisis on planet Earth hinders the development and therefore has provided difficulties to the human survival [3, 4]. With the increase in the demand of portable electronics, the need of dimensionally small batteries is continuously increasing. So the battery miniaturization is a vital challenge that has to be taken into notice by battery community. Nanobatteries are being manufactured for specific applications such as microelectromechanical systems and computer chips. A nanobattery integrated in system demonstrates that power sources are keeping their pace in a world of miniaturization. Power and energy densities are major features of nanobatteries, which acquire a very small space of 1 cm^2 [5]. Whenever such a tiny system is combined in parallel, then tens of thousands of nanobatteries can be laid on 0.5-mm-thick substrate and has ability to provide a charge of up to 10-mAh cm^{-2} capacity per footprint. These batteries have already been tested for large number of charge–discharge cycles with no loss of stability and capacitive performance. Furthermore, this architecture puts a tremendous output of electrical power that eradicates a danger of flammability, a major cause for failure of laptops and mobile batteries. New designs of batteries in a world of nano are enabling nanobattery systems to remain active for at least 15 years [6]. Nanobattery can refer not only to the nanosized battery but also to the uses of nanotechnology in a macroscopic battery for enhancing its performance and lifetime. Nanobattery can offer many advantages over the traditional battery, such as higher power density, shorter charging time, and longer shelf life.

Nanobatteries and Nanogenerators
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1. Research – Patent Collaborations - Academic Year (2020-21)

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(61) Patent of Addition to Application Number	:NA
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Filing Date	:NA

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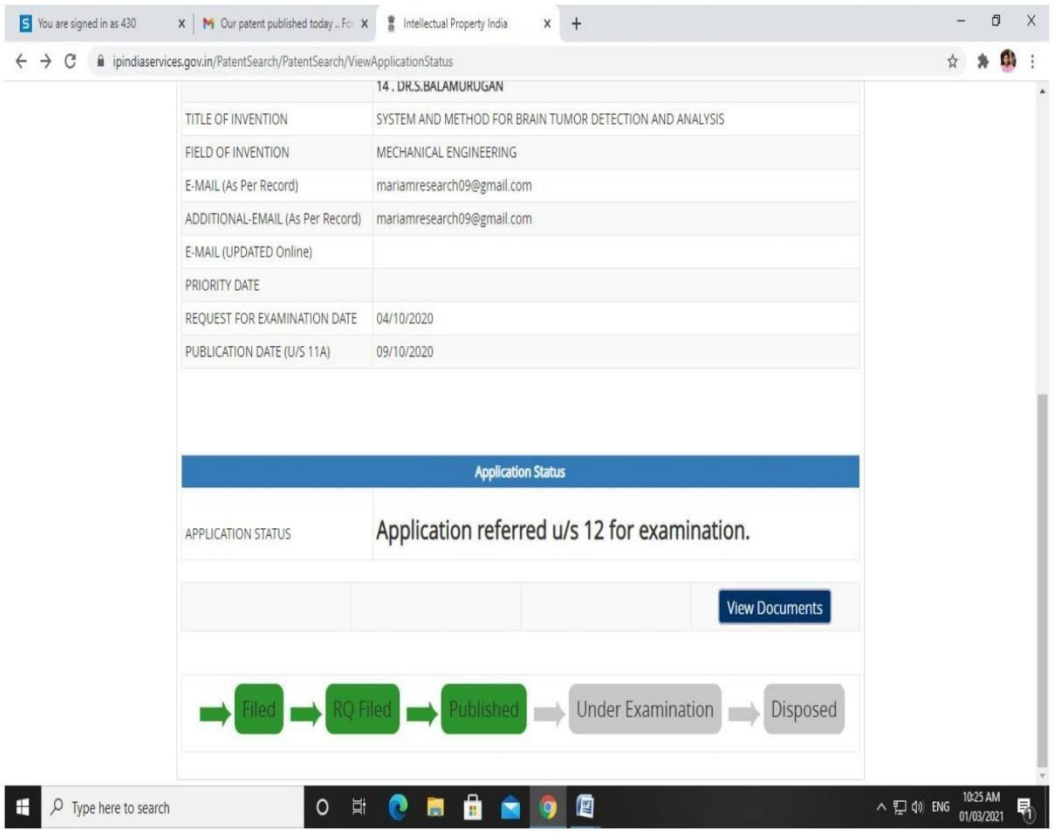
(57) Abstract :
Smart and efficient sensor-based library management system is aimed at implementing techniques to manage the library of books in a smarter way to avoid the theft or misplaced of books are valuable and it's important to safeguard them from irresponsible readers as well as borrowers. The proposed invention is implemented based on the internet of things by embedding a microchip into the books. The scanners will record the book name along with details of the borrower before the borrower leaves the library premises. The stress of the librarian is reduced since the proposed invention will follow up with the buyer at regular intervals of the time.

No. of Pages : 17 No. of Claims : 6

ABSTRACT

SMART AND EFFICIENT SENSOR BASED LIBRARY MANAGEMENT SYSTEM

Smart and efficient sensor-based library management system is aimed at implementing techniques to manage the library of books in a smarter way to avoid the theft or misplaced of books are valuable and it's important to safeguard them from irresponsible readers as well as borrowers. The proposed invention is implemented based on the internet of things by embedding a microchip into the books. The scanners will record the book name along with details of the borrower before the borrower leaves the library premises. The stress of the librarian is reduced since the proposed invention will follow up with the buyer at regular intervals of the time.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FIELD OF INVENTION
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04/10/2020
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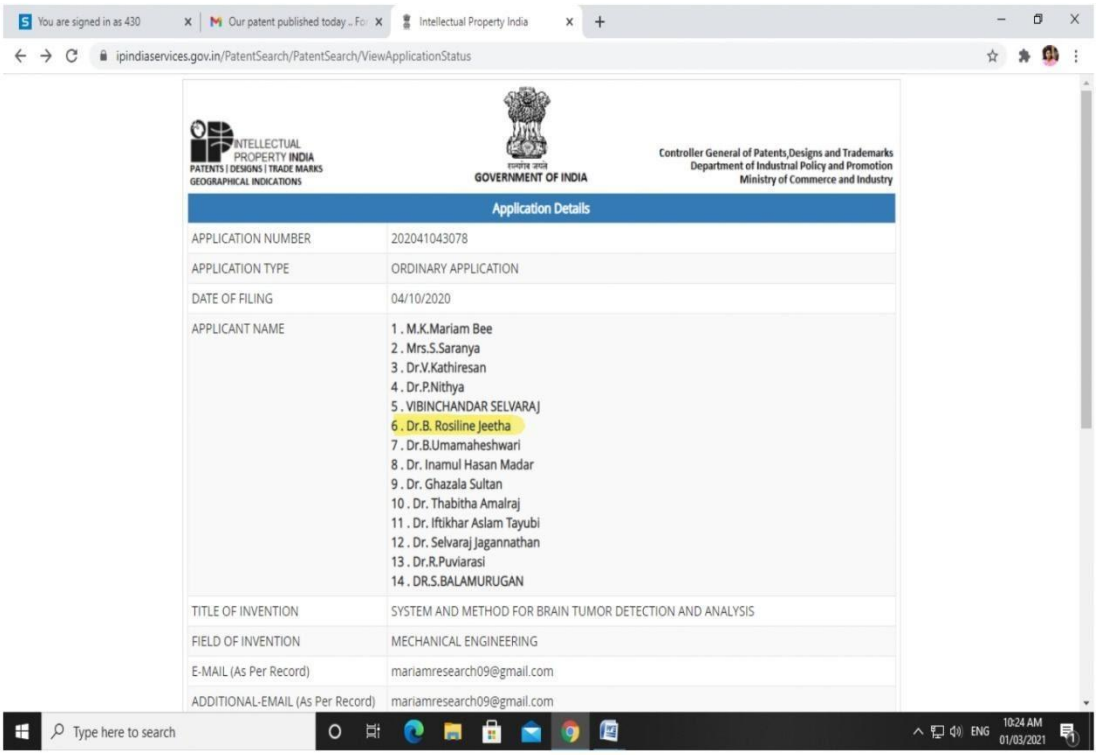

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TITLE OF INVENTION	SYSTEM AND METHOD FOR BRAIN TUMOR DETECTION AND ANALYSIS
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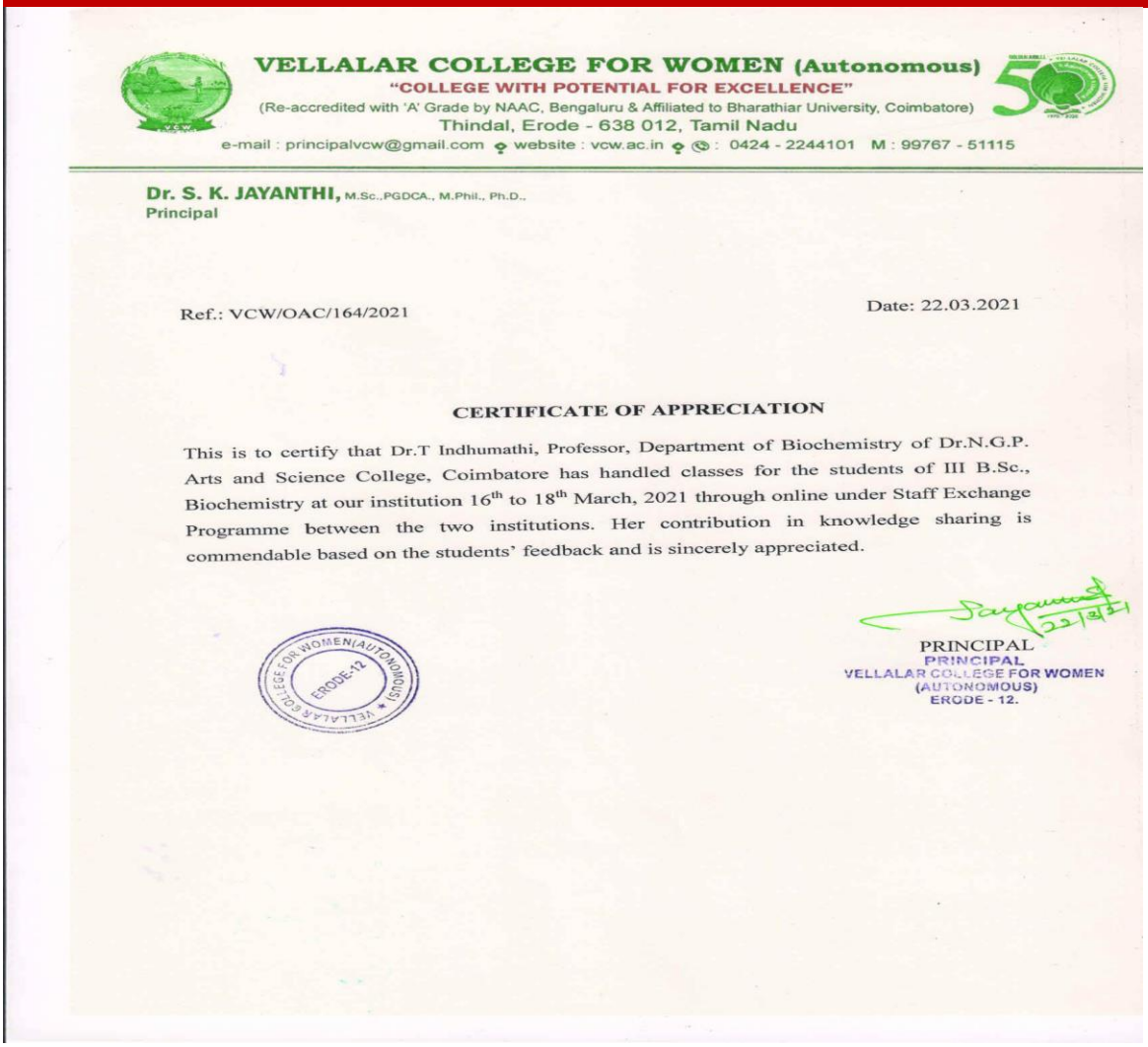
2. Staff Exchange - Academic Year (2020-21)



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Principal

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Date: 22.03.2021

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This is to certify that Dr.T Indhumathi, Professor, Department of Biochemistry of Dr.N.G.P. Arts and Science College, Coimbatore has handled classes for the students of III B.Sc., Biochemistry at our institution 16th to 18th March, 2021 through online under Staff Exchange Programme between the two institutions. Her contribution in knowledge sharing is commendable based on the students' feedback and is sincerely appreciated.

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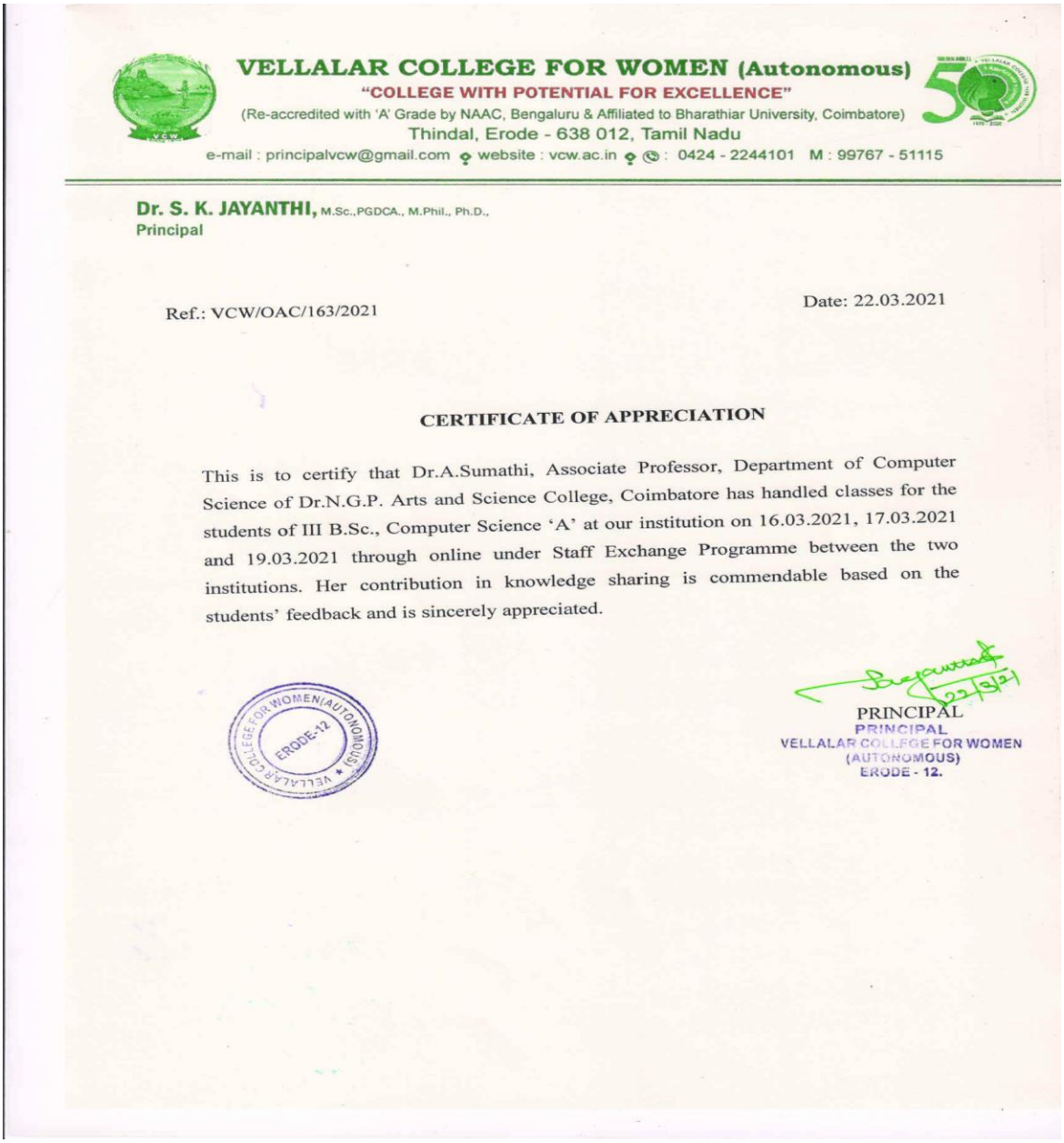

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CERTIFICATE OF APPRECIATION

This is to certify that Dr.A.Sumathi, Associate Professor, Department of Computer Science of Dr.N.G.P. Arts and Science College, Coimbatore has handled classes for the students of III B.Sc., Computer Science 'A' at our institution on 16.03.2021, 17.03.2021 and 19.03.2021 through online under Staff Exchange Programme between the two institutions. Her contribution in knowledge sharing is commendable based on the students' feedback and is sincerely appreciated.

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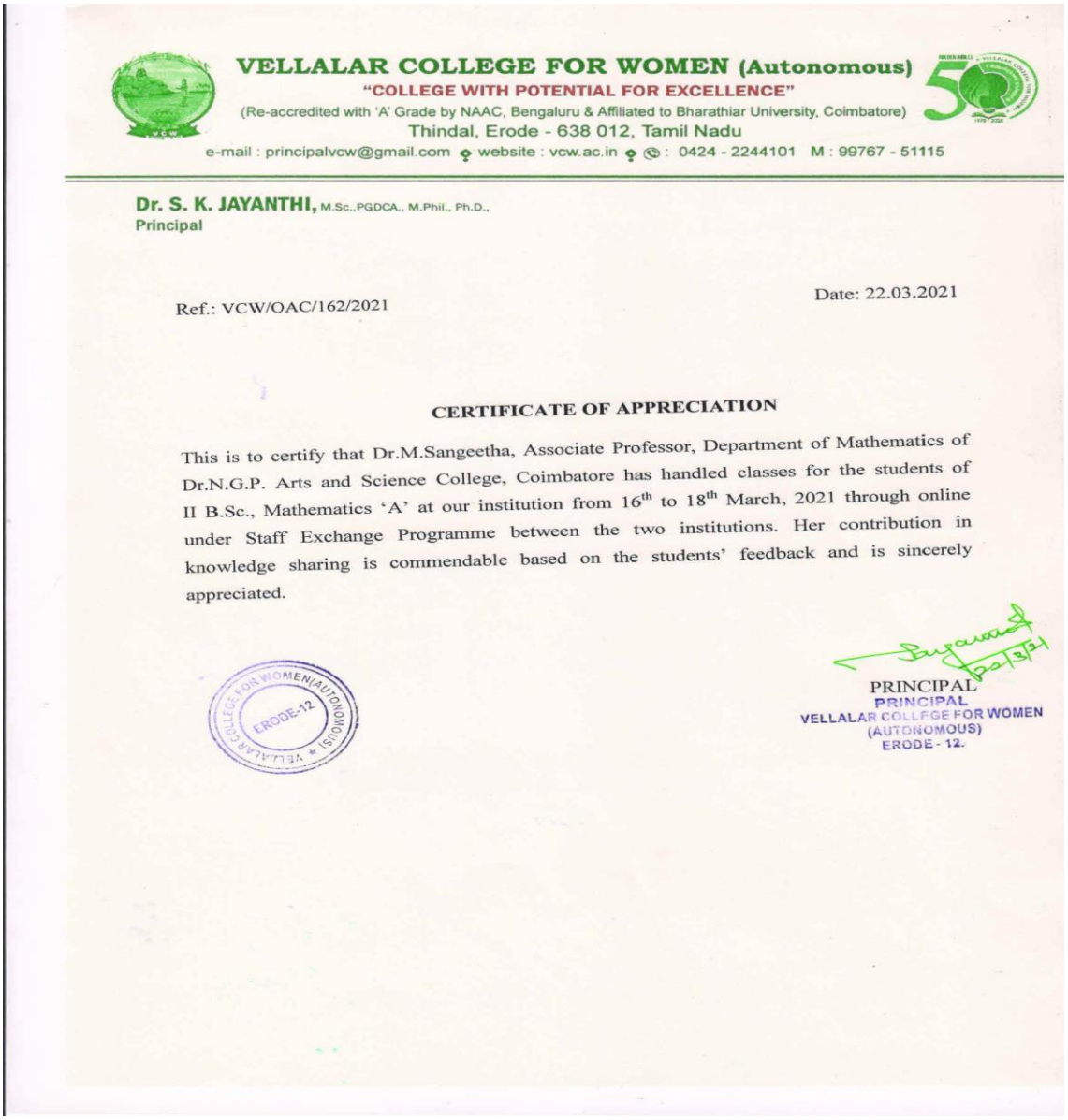

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CERTIFICATE OF APPRECIATION

This is to certify that Dr.M.Sangeetha, Associate Professor, Department of Mathematics of Dr.N.G.P. Arts and Science College, Coimbatore has handled classes for the students of II B.Sc., Mathematics 'A' at our institution from 16th to 18th March, 2021 through online under Staff Exchange Programme between the two institutions. Her contribution in knowledge sharing is commendable based on the students' feedback and is sincerely appreciated.

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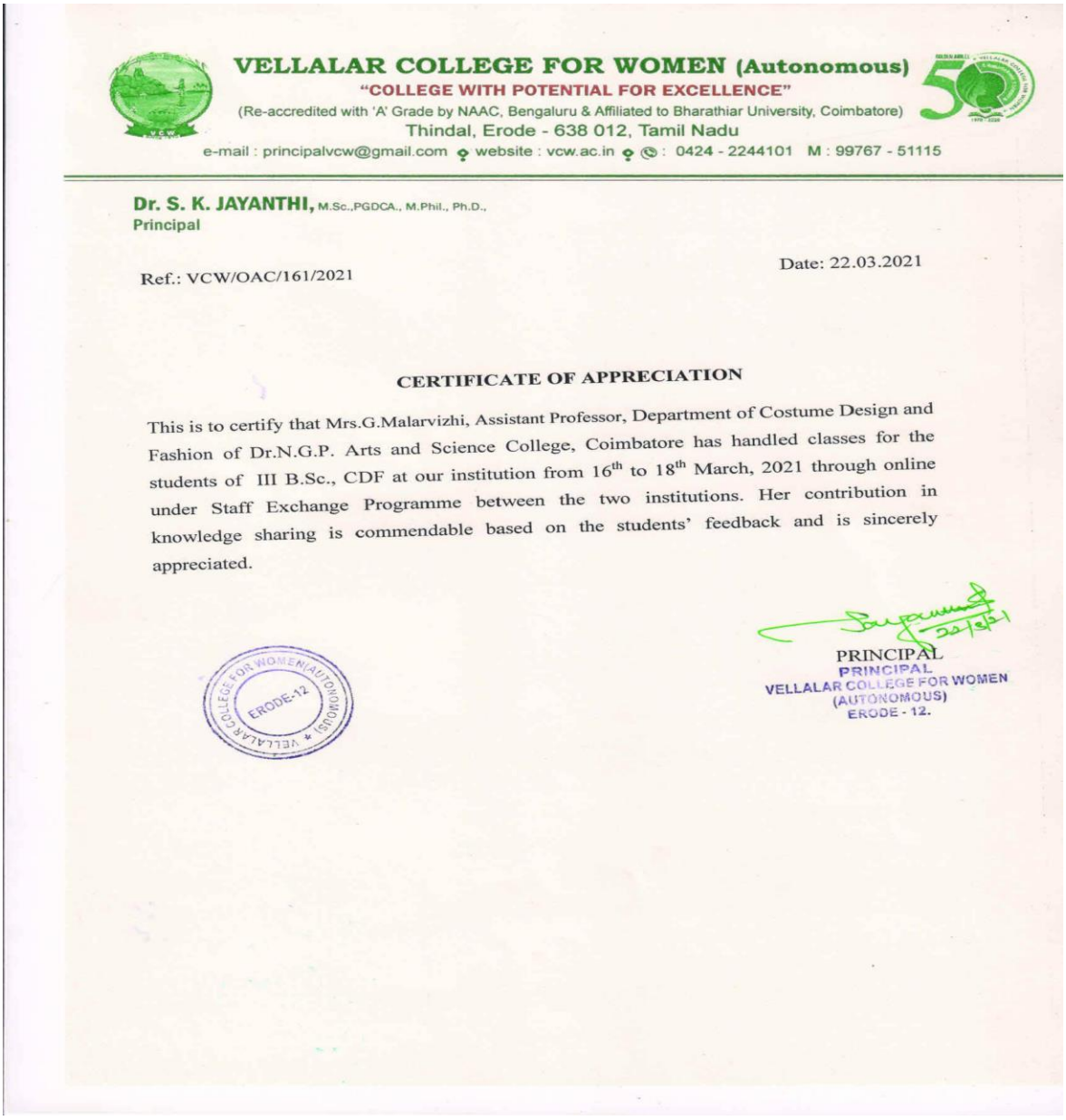

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Principal

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Date: 22.03.2021

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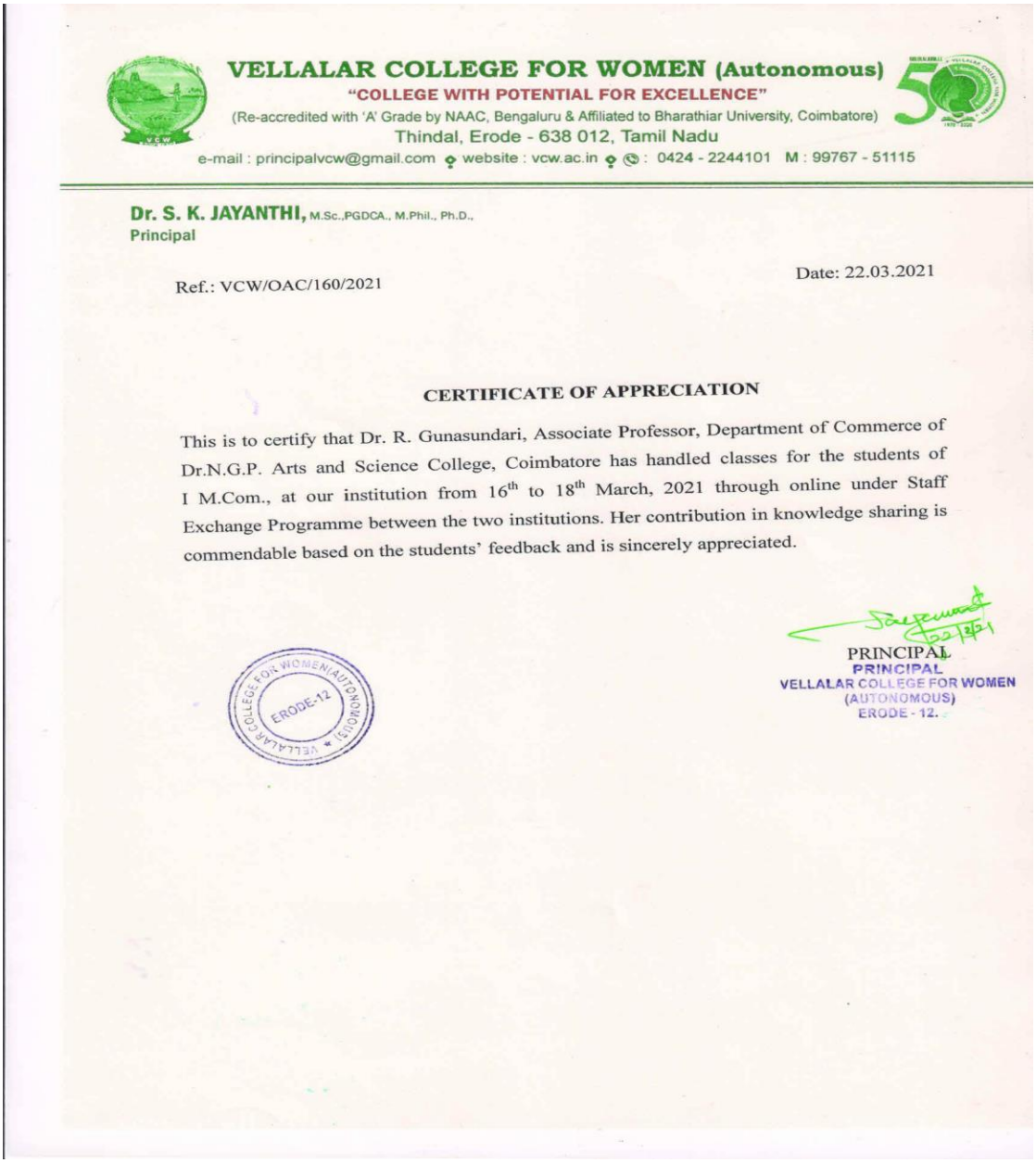

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This is to certify that Dr. R. Gunasundari, Associate Professor, Department of Commerce of Dr.N.G.P. Arts and Science College, Coimbatore has handled classes for the students of I M.Com., at our institution from 16th to 18th March, 2021 through online under Staff Exchange Programme between the two institutions. Her contribution in knowledge sharing is commendable based on the students' feedback and is sincerely appreciated.

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4. Student Internship - Academic Year (2020-21)

ஆக்கம்
AAKKAM - KCS
KOVAI CONSULTANCY SERVICES

Date: 02.06.2021

TO WHOMSOEVER IT MAY CONCERN

This is to inform that **ABINAYA R, 191AT001 B.Com. (ACCOUNTING AND TAXATION)**, Dr.N.G.P. Arts and Science College, Coimbatore has successfully completed her Virtual **INDUSTRIAL TRAINING** on **"DIGITAL MARKETING"** in our concern from 18-05-2021 to 01-06-2021. We found her performance during this industrial training period has been satisfactory.

We wish all the best for her future endeavors.

For KOVAI CONSULTANCY SERVICES

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This is to certify that Mr. **T.AJAY** currently pursuing **Bachelor of Commerce With Information Technology** bearing the Registration Number (**191CI001**) has carried out the work entitled on **Python With Pen testing** under my supervision during the period of (18/05/2021 to 08 /06 /2021). He was found hardworking, punctual and inquisitive, during the tenure of internship.

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Authorised signatory
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Date: 06-10 -2021

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This is to certify that Mr. **S.AKSHAY** currently pursuing **BACHELOR OF COMMERCE WITH INFORMATION TECHNOLOGY** bearing the Registration Number (**191CI002**) has carried out the work entitled on **PYTHON WITH WEB PENTESTING** under my supervision during the period of (18/05/2021 to 08/06 /2021). He was found hardworking, punctual and inquisitive, during the tenure of internship.

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Authorised signatory
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ANTONY ASWIN F

has successfully completed a training course of "ANDROID APPLICATION DEVELOPMENT" from May 2021 to June 2021.

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TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr.Jaiganesh D (Reg No:191CA118)** final year Student of BCA From **Dr.NGP Arts and Science College,** has successfully completed his Internship Training in **"Python"** from our esteemed organization from 9th August 2021 to 21st August 2021.

His performance and conduct were found to be very good.

During this period, he was sincere and regular in attending all the phases of InternshipTraining Program.

For Accent Techno Soft

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TO WHOMSOEVER IT MAY CONCERN

This is to certify the student Ms. JAMUNARANI S (191CA119) pursuing her second year BCA in Dr. NGP Arts and Science College, Coimbatore has completed her internship on Web Technologies in our concern from 28th June 2021 to 28th July 2021.

All the Best for her Future!

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This is to certify that Mr. Abenav.C (ID.No.191CE001) a student of B.Sc.Chemistry (II[nd] year), Dr.N.G.P Arts and Science College, Coimbatore has successfully completed 15 days of Internship programme from 5[th] April 2021 to 21[st] April 2021 at M/s Priyadarishini Chemicals, During this period of his internship he was found punctual, attentive and dedicative. He learned about Industrial Chemicals and its processes like Vibro polishing chemicals, Metal treatment chemicals, Rust preventive oils and Water treatment chemicals.

In this Internship they have done a mini project of formulation and development of Fabric conditioner and Detergent powder.

Based on this, his performance and contribution in internship programme is GOOD.

For M/s Priyadarishini Chemicals,

The HR Manager

(Mr. Ramkumar Murugan)

Place : Coimbatore

Date : 21.04.2021

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Date: 05.05.2021

CERTIFICATE OF INTERNSHIP

This is to certify that **Mr. ASWAPATHI.R (191CE004)** a student of **B.Sc (chemistry)** Bharthiyar University Dr N.G.P Arts and Science College has successfully completed his long term internship program for 15 days from 16th April to 05th May 2021 in our concern.

During the period of his internship program with us he was found punctual, hardworking and dedicative. Then he learned about quality analysis of Screen print machineries used for printing, printing& print processing of cloths & also recipes for printing.

His performance & contribution towards this internship program is **EXCELLENT**

We wish him all the best for his future endeavors...

For AGPL ROTARY PRINTING
(Unit of Anthony Garments Pvt Ltd)

AGPL ROTARY PRINTING GM TIRUPUR

Authorized signatory
(Mr. MARIA VICTOR. K)

Factory Address :
SF.No221/2D, Ponnan Thottam,
Murugampalayam, Iduvampalayam Post,
Tirupur - 641 687, Tamil Nadu, India

Reg Office :
No.3, Athimaramthottam,
Sirupooluvapatti (P.o), Tirupur - 641 603.
Cell: 7397729406

E-mail : victor@agplindia.in
Web : www.agplindia.in
TIN No : 33932306337
Pan No : AAECA7839C

GST NO: 29CEMPS476MIZF

Mob : 9620408310
E-Mail : sakthisanthoshkumar04@gmail.com

SRI MAHALAKSHMI DYEING WORKS

Specialists in Silk and Crape Dyeing

Date: 25.04.2021

TO WHOM IT MAY CONCERN

It is certified that **Mr. M. Aswin** pursuing *B.Sc. Chemistry in Dr.N.G.P Arts and Science College, Coimbatore* has successfully accomplished a summer internship in the field of chemicals during the period from 10th April 2021to 24th April 2021 at Sri Mahalakshmi Dyeing Works Unit I under the steward of Mr. S.Santhoshkumar.

This is to state that he is familiarized with all the departments. operations and process along with a Chemicals overview committed in the production process of the organization during the period.

For Sri Mahalakshmi Dyeing Works

P.Sakthivel
(Managing Director)

Let him get a better future

No.22, 1st Cross, Vinayakanagar, Silk Board, Near Ram...

arjuna MILK

GSTIN : 33AAMCS4120L1ZB
PAN No : AAMCS4120L
CIN No : U15209TZ2008PTC014759

SKA DAIRY FOODS INDIA PRIVATE LTD.,

(ISO 9001 : 2015, ISO 22000 : 2005, ISO 14001 : 2015 EIA Certified Company)
Regd. Office / Factory-1 158/1, South Muthampatti Post, Valappady-Tk., Salem - 636 111, Tamilnadu, India.
Phone : 04292 - 222733, 222655, Email Id : skadairy@gmail.com

Date : 15.04.2021

CERTIFICATE

*This is to certify that **Mr. Deepan S** student of Dr.N.G.P. Arts and Science College, Coimbatore have completed his internship training at our company S K A Dairy Foods India (P) Ltd., located at South Muthampatty post, Vazhapady , Salem , Tamilnadu- 636111 .*

Course of study : IInd B.Sc. Chemistry

Reg. No : 191CE008

Period : 01.04.2021 TO 12.04.2021

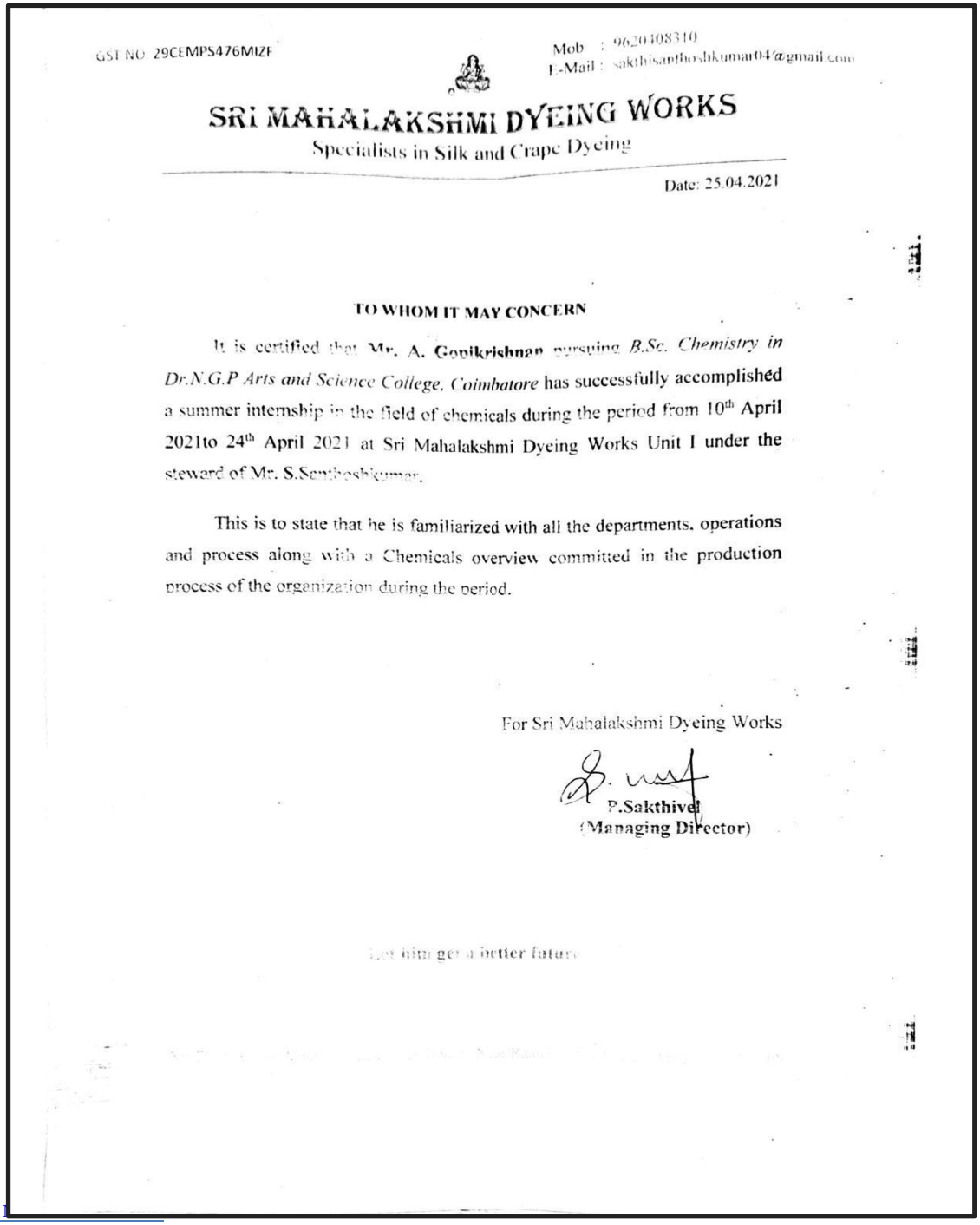
During this period he was found Punctual, hard working and inquisitive. We wish his every success in Life.

Human Resource Department

S.K.A. DAIRY FOODS INDIA (P) LTD
SOUTH MUTHAMPATTI (P.O)
Vazhapadi. Salem - 636 111

SKA DAIRY FOODS INDIA (P) LTD. SOUTH MUTHAMPATTI SALEM (D) TAMILNADU, INDIA * VAZHAPADI-636 111 *

Factory-2 Sathinayakanpalli Village, Kakkadasam Post, Denkanikotta-Tk, Krishnagiri - 635 107, Tamilnadu.
Phone : 04292 - 222733, 222655, E-mail Id : skadairythally@gmail.com



GST NO: 29CEMPS476MIZF

Mob : 9620408310
E-Mail : sakthisanthoshkumar04@gmail.com

SRI MAHALAKSHMI DYEING WORKS

Specialists in Silk and Crape Dyeing

Date: 25.04.2021

TO WHOM IT MAY CONCERN

It is certified that **Mr. A. Gopikrishnan** pursuing *B.Sc. Chemistry in Dr.N.G.P Arts and Science College, Coimbatore* has successfully accomplished a summer internship in the field of chemicals during the period from 10th April 2021to 24th April 2021 at Sri Mahalakshmi Dyeing Works Unit I under the steward of Mr. S.Santhoshkumar.

This is to state that he is familiarized with all the departments. operations and process along with a Chemicals overview committed in the production process of the organization during the period.

For Sri Mahalakshmi Dyeing Works

P.Sakthivel
(Managing Director)

A-1 SKC SINCE 1975

GST : 33AALFS3622F1ZE

Sri Kannan & Co.,

Date: 05.05.2021

CERTIFICATE OF INTERNSHIP

This is to certify that **Ms GOWRI R B** (191CE011) from the Department of chemistry, Dr.NGP College of Arts and Science College-Coimbatore, has undergone 15 Days of internship programme at SRI KANNAN & CO (A-1 SKC COW GHEE) from 19th April To 5th May. During the period of internship programme she gained good practical knowledge, was sincere, enthusiastic and hard working. Her conduct was good.

Chemist Incharge

Manager – QA

For SRI KANNAN & Co.,

Partner

Authorized Signature

Corporate Office : No. 25/1A, A1 SKC Towers, Thirumalai Lane, Opp. Benzz Park Hotel, T. Nagar, Chennai - 17. : 2834 2755 / 3755 : 98404 70444
Factory : No. 5, K.R.R. Thottam, Mangalam Road, Tirupur - 641 604. India. : +91-0421-4323225, 4312666

www.a1skc.com E-mail : a1skcghee1975@gmail.com, skcghee@yahoo.com
a1skcgheechennai @skcghee1 a1skcghee skcghee

PRIYADARISHINI CHEMICALS

An ISO 9001 Certified Company

Mfrs. : Metal Treatment, Phosphating, Vibro Polishing Chemicals & Medias Speciality Water Treatment Chemicals, Coolants & Rust Preventive Oils, Construction Chemicals, Sanitizer Disinfectant Fluids, Domestic Chemicals & Safety Items.

Dlrs. : Acids, Chemicals, Solvents, Lubricants, Lab Chemicals & Equipments, Gloves etc.,

Ref No. PRICHEM/HR/1907

Date :

CERTIFICATE OF INTERNSHIP

This is to certify that Ms. Gowthamy. V (ID.No.191CE012) a student of B.Sc.Chemistry (II nd year), Dr.N.G.P Arts and Science College, Coimbatore has successfully completed 15 days of Internship programme from 5th April 2021 to 21st April 2021 at M/s Priyadarishini Chemicals. During this period of her internship she was found punctual, attentive and dedicative. She learned about Industrial Chemicals and its processes like Vibro polishing chemicals, Metal treatment chemicals, Rust preventive oils and Water treatment chemicals.

In this Internship they have done a mini project of formulation and development of Fabric conditioner and Detergent powder.

Based on this, her performance and contribution in internship programme is GOOD.

For M/s Priyadarishini Chemicals,

The HR Manager
(Mr. Ramkumar Murugan)

Place : Coimbatore

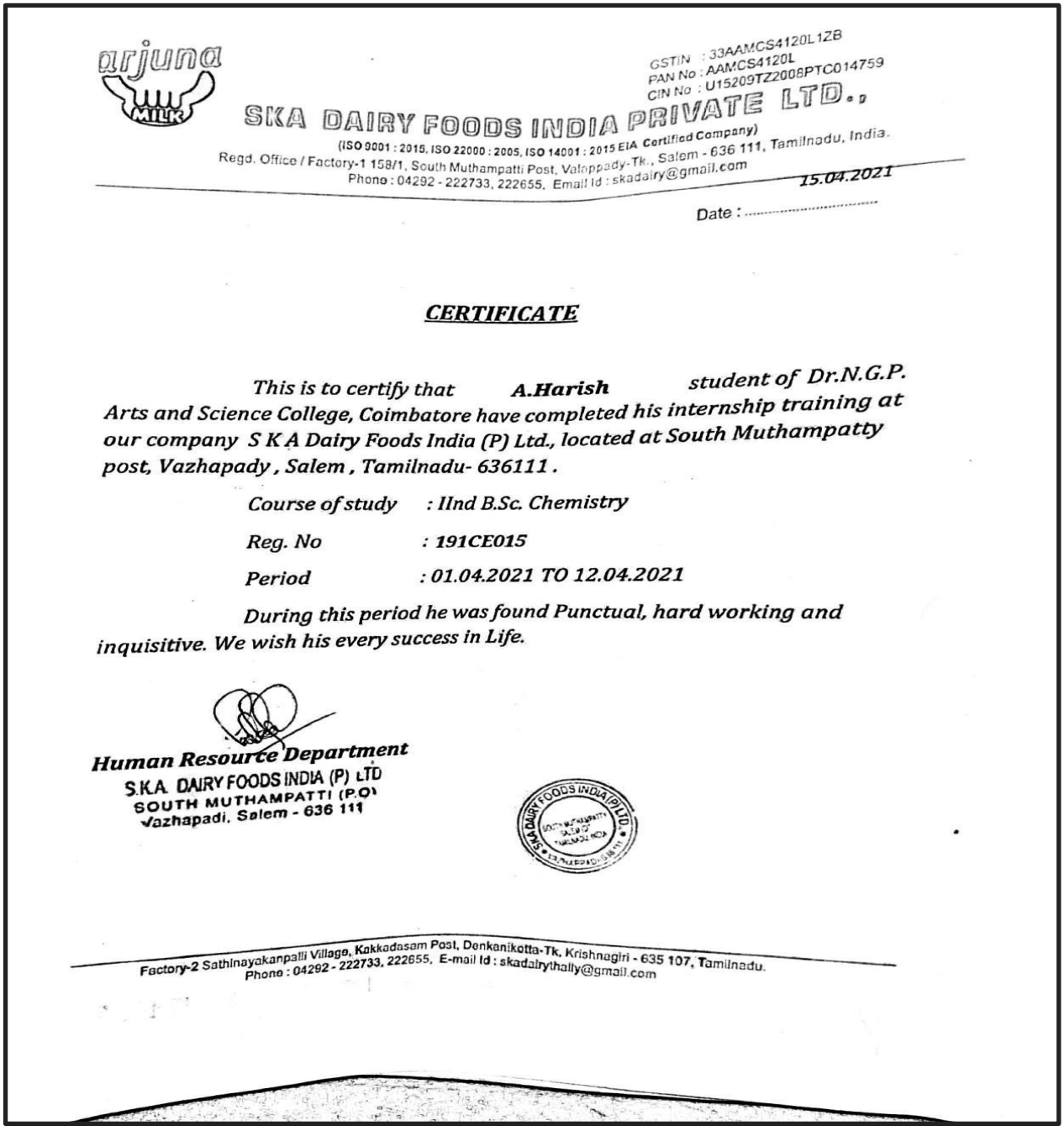
Date : 21.04.2021

"PRICHEM SERVES TO METAL INDUSTRIES"

GST No.: 33AKBPM1863C1ZN
POISON LICENCE No.: 22/2015
DRUG LICENCE No.: TN 00005918/2020

D.No. 49/2, Guru Building,
Nava India Road,
Near SNR Sons College, K.R. Puram,
Coimbatore - 641 006

Mobile : 85088 88111, 98428 22310
Email : info@prichemgroups.com
sales@prichemgroups.com
Web : www.prichemgroups.com



arjuna MILK

GSTIN : 33AAMCS4120L1ZB
PAN No : AAMCS4120L
CIN No : U15209TZ2008PTC014759

SKA DAIRY FOODS INDIA PRIVATE LTD.

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Regd. Office / Factory-1 158/1, South Muthampatti Post, Valappady-Tk., Salem - 636 111, Tamilnadu, India.
Phone : 04292 - 222733, 222655, Email Id : skadairy@gmail.com

Date : 15.04.2021

CERTIFICATE

This is to certify that **A.Harish** student of Dr.N.G.P. Arts and Science College, Coimbatore have completed his internship training at our company S K A Dairy Foods India (P) Ltd., located at South Muthampatty post, Vazhapady , Salem , Tamilnadu- 636111 .

Course of study : IInd B.Sc. Chemistry

Reg. No : 191CE015

Period : 01.04.2021 TO 12.04.2021

During this period he was found Punctual, hard working and inquisitive. We wish his every success in Life.

Human Resource Department
S.K.A. DAIRY FOODS INDIA (P) LTD
SOUTH MUTHAMPATTI (P.O)
Vazhapadi, Salem - 636 111

S.K.A. DAIRY FOODS INDIA (P) LTD.

Factory-2 Sathinayakanpalli Village, Kakkadasam Post, Denkanikotta-Tk, Krishnagiri - 635 107, Tamilnadu.
Phone : 04292 - 222733, 222655, E-mail Id : skadairythally@gmail.com

A-1 SKC

GST : 33AALFS3822F1ZE

Sri Kannan & Co.,

Date: 05.05.2021

CERTIFICATE OF INTERNSHIP

This is to certify that **Mr. KARTHICK K R (191CE018)** from the Department of chemistry, Dr.NGP College of Arts and Science College-Coimbatore, has undergone 15 Days of internship programme at SRI KANNAN & CO (A-1 SKC COW GHEE) from 19th April To 5th May. During the period of internship programme he gained good practical knowledge, was sincere, enthusiastic and hard working. His conduct was good.

Chemist Incharge

Manager – QA

For SRI KANNAN & Co.,

Partner

Authorized Signature

Corporate Office : No. 26/1A, A1 SKC Towers, Thirumalai Lane, Opp. Benzz Park Hotel, T. Nagar, Chennai - 17. : 2834 2753 / 3753 : 98404 70444
Factory : No. 5, K.G.R. Thottam, Mangalam Road, Tirupur - 641 604. India. : +91-0421-4322225, 4312566

www.a1skc.com E-mail : a1skcghee1975@gmail.com, skcghee@yahoo.com
a1skcgheechennai @skcghee1 a1skcghee skcghee

AGPL Rotary Printing

(A UNIT OF ANTHONY GARMENTS PVT.LTD.,)

Date: 05.05.2021

CERTIFICATE OF INTERNSHIP

This is to certify that Ms. **JEMIMA.M (191CE017)** a student of **B.Sc (chemistry)** Bharthiyar University Dr N.G.P Arts and Science College has successfully completed her long term internship program for 15 days from 16th April to 05th May 2021 in our concern.

During the period of her internship program with us she was found punctual, hardworking and dedicative. Then she learned about quality analysis of Screen print machineries used for printing, printing & print processing of cloths & also recipes for printing.

Her performance & contribution towards this internship program is **EXCELLENT**

We wish here all the best for her future endeavors...

For AGPL ROTARY PRINTING
(Unit of Anthony Garments Pvt Ltd)

AGPL ROTARY PRINTING GM TIRUPUR

Authorised signatory
(Mr. MARIA VICTOR. K)

Factory Address :
SF.No221/2D, Ponnan Thottam,
Murugampalayam, Iduvampalayam Post,
Tirupur - 641 687, Tamil Nadu, India

Reg Office :
No.3, Athimaramthottam,
Sirupooluvapatti (P.o), Tirupur - 641 603.
Cell: 7397729406

E-mail : victor@agplindia.in
Web : www.agplindia.in
TIN No : 33932306337
Pan No : AAECA7839C

KPM PROCESSING MILL PRIVATE LIMITED

ISO 9001, ISO 14001, GOTS / OCS and Oeko-Tex Certified Company

S.F.NO.254/3A, 1A(Part), Karalpudur Village, Chinnakaral,
Arulpuram (Post), Tirupur - 641 605.
Cell : 97509 60257
E-mail : kpmprocessingmill@gmail.com

Date: 24/04/2021.

CERTIFICATE OF INTERNSHIP

This is to certify that **Ms. NAVINA .SJ (191CE024)** a student of **B.Sc. (CHEMISTRY)** Bharathiar University, Dr.N.G.P Arts and Science College has successfully completed her long term internship program for 17 days from 4th April 2021 to 24th April 2021 in our concern.

During the period of her internship program with us she was found punctual, hardworking and dedicative. Then she learned about quality analysis of dyeing, machineries used for dyeing, different method of dyeing, processing of cloths & also recipes for dyeing.

Her performance & contribution towards this internship program is **EXCELLENT**.

We wish her all the best for her future endeavors...

For KPM PROCESSING MILL PRIVATE LIMITED,

TIRUPUR

Authorised signatory

(Mr. RAMESH KUMAR)

GSTIN : 33AAECK1574A1Z2 , PAN : AAECK1574A

GST NO: 29CEMPS476MIZF

Mob : 9620408310
E-Mail : sakthisanthoshkumar04@gmail.com

SRI MAHALAKSHMI DYEING WORKS

Specialists in Silk and Crape Dyeing

Date: 25.04.2021

TO WHOM IT MAY CONCERN

It is certified that **Mr. M. Prakash** pursuing *B.Sc, Chemistry in Dr.N.G.P Arts and Science College, Coimbatore* has successfully accomplished a summer internship in the field of chemicals during the period from 10th April 2021to 24th April 2021 at Sri Mahalakshmi Dyeing Works Unit I under the steward of Mr. S.Santhoshkumar.

This is to state that he is familiarized with all the departments, operations and process along with a Chemicals overview committed in the production process of the organization during the period.

For Sri Mahalakshmi Dyeing Works

P.Sakthivel
(Managing Director)

Let him get a better future

No.22, 1st Cross, Vinayakanagar, Silk Board , Near Ramakrishna Tower, Bangalore -560 068

PRIYADARISHINI CHEMICALS

An ISO 9001 Certificd Company

Mfrs. : Metal Treatment, Phosphating. Vibro Polishing Chemicals & Medias Speciality Water Treatment Chemicals, Coolants & Rust Preventive Oils, Construction Chemicals, Sanitizer Disinfectant Fluids, Domestic Chemicals & Safety Items.
Dlrs. : Acids, Chemicals, Solvents, Lubricants, Lab ChemicaLs & Equipments, Gloves etc.,

PRICHEM/HR/1910

Ref No. Date :

CERTIFICATE OF INTERNSHIP

This is to certify that Ms. Rajalakshmi.M (ID.No.191CE029) a student of B.Sc.Chemistry (II nd year), Dr.N.G.P Arts and Science College, Coimbatore has successfully completed 15 days of' Internship programme from 5 th April 2021 to 21 st April 2021 at M/S Priyadarshini Chemicals, During this period of his internship he was found punctual, attentive and dedicative. He learned about Industrial Chemicals and its processes like Vibro polishing chemicals, Metal treatment chemicals, Rust preventive oils and Water treatment chemicals.

In this Internship they have done a mini project of formulation and development of Fabric conditioner and Detergent powder.

Based on this, his performance and contribution in the internship programme is GOOD.

For M/s Priyadarishini Chemicals,

The HR Manager
(Mr. Ramkumar Murugan)

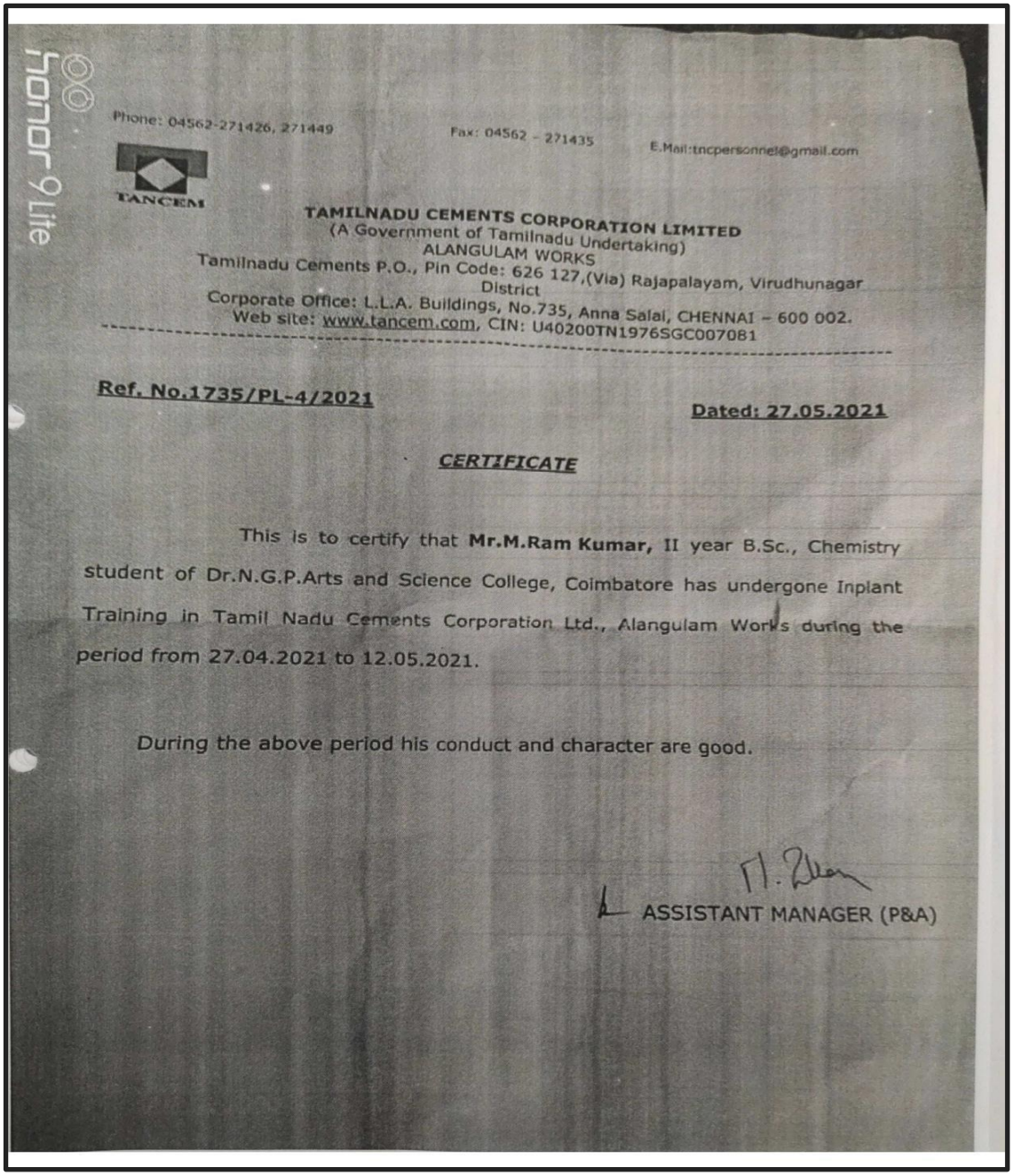
Place : Coimbatore
Date : 21.04.2021

PRICHEM SERVES TO METAL INDUSTRIES

GST No: 33AKBPM1863C1ZN
POISON LISENCE No: 22 / 2015
DRUG LICENCE No:
TN00005918/2020

D.No.49/2, Guru Building,
Nava India Road,
Near SNR Sons College, K.R. Puram
Coimbatore - 641006

Mobile : 850888811, 9842822310
Email : info@prichemgroups.com
sales@prichemgroups.com,
Web : www.prichemgroups.com



honor 9 Lite

Phone: 04562-271426, 271449 Fax: 04562 - 271435 E.Mail:tncpersonnel@gmail.com

TANCEM

TAMILNADU CEMENTS CORPORATION LIMITED
(A Government of Tamilnadu Undertaking)
ALANGULAM WORKS
Tamilnadu Cements P.O., Pin Code: 626 127,(Via) Rajapalayam, Virudhunagar District
Corporate Office: L.L.A. Buildings, No.735, Anna Salai, CHENNAI – 600 002.
Web site: www.tancem.com, CIN: U40200TN1976SGC007081

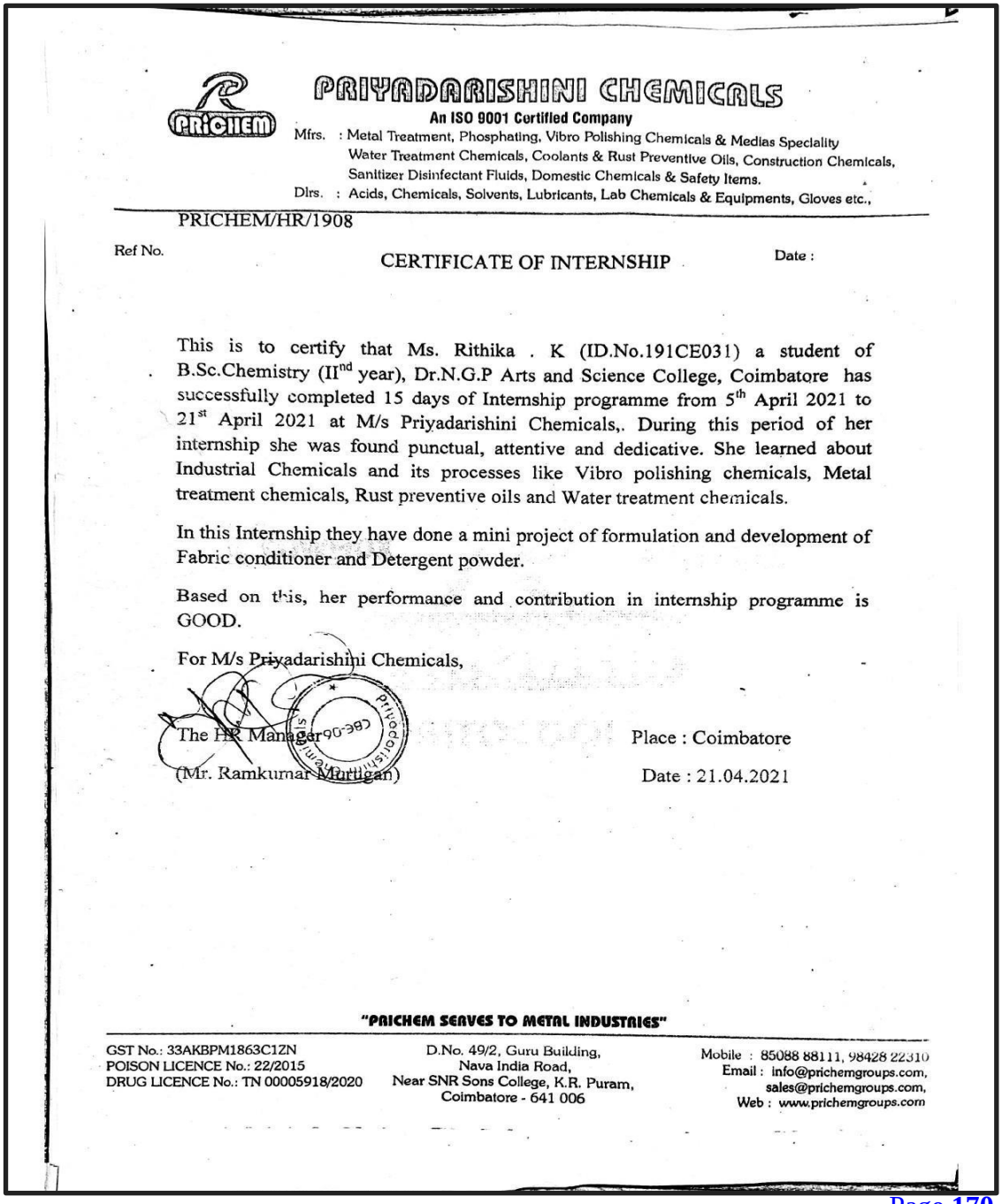
Ref. No.1735/PL-4/2021 **Dated: 27.05.2021**

CERTIFICATE

This is to certify that **Mr.M.Ram Kumar,** II year B.Sc., Chemistry student of Dr.N.G.P.Arts and Science College, Coimbatore has undergone Inplant Training in Tamil Nadu Cements Corporation Ltd., Alangulam Works during the period from 27.04.2021 to 12.05.2021.

During the above period his conduct and character are good.

ASSISTANT MANAGER (P&A)



PRIYADARISHINI CHEMICALS

An ISO 9001 Certified Company

Mfrs. : Metal Treatment, Phosphating, Vibro Polishing Chemicals & Medias Speciality Water Treatment Chemicals, Coolants & Rust Preventive Oils, Construction Chemicals, Sanitizer Disinfectant Fluids, Domestic Chemicals & Safety Items.

Dlrs. : Acids, Chemicals, Solvents, Lubricants, Lab Chemicals & Equipments, Gloves etc.,

PRICHEM/HR/1908

Ref No.

CERTIFICATE OF INTERNSHIP

Date :

This is to certify that Ms. Rithika . K (ID.No.191CE031) a student of B.Sc.Chemistry (IInd year), Dr.N.G.P Arts and Science College, Coimbatore has successfully completed 15 days of Internship programme from 5th April 2021 to 21st April 2021 at M/s Priyadarishini Chemicals,. During this period of her internship she was found punctual, attentive and dedicative. She learned about Industrial Chemicals and its processes like Vibro polishing chemicals, Metal treatment chemicals, Rust preventive oils and Water treatment chemicals.

In this Internship they have done a mini project of formulation and development of Fabric conditioner and Detergent powder.

Based on this, her performance and contribution in internship programme is GOOD.

For M/s Priyadarishini Chemicals,

The HR Manager

(Mr. Ramkumar Murugan)

Place : Coimbatore

Date : 21.04.2021

"PRICHEM SERVES TO METAL INDUSTRIES"

GST No.: 33AKBPM1863C1ZN
POISON LICENCE No.: 22/2015
DRUG LICENCE No.: TN 00005918/2020

D.No. 49/2, Guru Building,
Nava India Road,
Near SNR Sons College, K.R. Puram,
Coimbatore - 641 006

Mobile : 85088 88111, 98428 22310
Email : info@prichemgroups.com,
sales@prichemgroups.com,
Web : www.prichemgroups.com

Certificate of Internship

This is to certify that Mr.**S.Sanjeev Raj**, a student of (B.Sc.Chemistry) Bharathiyar University, Dr.N.G.P Arts and Science College has successfully completed a 15 days from 10th April 2021 to 25th April 2021 long internship programme at **SRI MAHALAKSHMI DYEING WORKS** during the period of her internship programme with us he was found punctual, hard working and dedicative. Then he learned about dying works and chemicals and metal treatment industrial chemicals.

Based on this his performance & contribution in internship programme is **EXCELLENT** .

For **SRI MAHALAKSHMI DYEING WORKS.**

The Manager.

Date: 25.04.21

Mr.Sakthivel

Place: Bangalore

AGPL Rotary Printing

(A UNIT OF ANTHONY GARMENTS PVT.LTD.,)

Date: 05.05.2021

CERTIFICATE OF INTERNSHIP

This is to certify that Ms. **SANTHIYA.S (191CE036)** a student of **B.Sc (chemistry)** Bharthiyar University Dr N.G.P Arts and Science College has successfully completed her long term internship program for 15 days from 16th April to 05th May 2021 in our concern.

During the period of her internship program with us she was found punctual, hardworking and dedicative. Then she learned about quality analysis of Screen print machineries used for printing, printing & print processing of cloths & also recipes for printing.

Her performance & contribution towards this internship program is **EXCELLENT**

We wish here all the best for her future endeavors...

For AGPL ROTARY PRINTING
(Unit of Anthony Garments Pvt Ltd)

AGPL ROTARY PRINTING GM TIRUPUR

Authorised signatory
(Mr. MARIA VICTOR. K)

Factory Address :
SF.No221/2D, Ponnan Thottam,
Murugampalayam, Iduvampalayam Post,
Tirupur - 641 687, Tamil Nadu, India

Reg Office :
No.3, Athimaramthottam,
Sirupooluvapatti (P.o), Tirupur - 641 603.
Cell: 7397729406

E-mail : victor@agplindia.in
Web : www.agplindia.in
TIN No : 33932306337
Pan No : AAECA7839C

O/o.Assistant Director Sericultue,
Post Box No.7,
Melagaram,
Nannagaram (Post),
Tenkasi - 627 811

Date: 05/05/2021

INTERNSHIP PROGRAM

This is to Certify that Mr. Shivajith M. Murali (191CE039), a Student of B.Sc., (CHEMISTRY) Bharathiar University, Dr.N.G.P Arts and Science College has successfully completed his long term internship program for 17 days from 5th April 2021 to 25th April in our conern.

During the period of his internship program with us he was found punctual, hardworking and dedicative. Then he learned about Cocoon quality analysis and Reeling and Twisting activities .

His performance & contribution towards this internship program is **GOOD**

Asst. Director of Sericulture
Tenkasi.

Place: Tenkasi
Date: 05/05/2021

PRIYADARISHINI CHEMICALS

An ISO 9001 Certified Company

Mfrs. : Metal Treatment, Phosphating. Vibro Polishing Chemicals & Medias Speciality
Water Treatment Chemicals, Coolants & Rust Preventive Oils, Construction Chemicals,
Sanitizer Disinfectant Fluids, Domestic Chemicals & Safety Items.
Dlrs. : Acids, Chemicals, Solvents, Lubricants, Lab ChemicaLs & Equipments, Gloves etc.,

PRICHEM/HR/1910

Ref No. Date :

CERTIFICATE OF INTERNSHIP

This is to certify that Ms. Shruthi (ID.No.191CE040) a student of B.Sc.Chemistry (II nd year), Dr.N.G.P Arts and Science College, Coimbatore has successfully completed 15 days of Internship programme from 5 th April 2021 to 21 st April 2021 at M/S Priyadarshini Chemicals, During this period of his internship he was found punctual, attentive and dedicative. He learned about Industrial Chemicals and its processes like Vibro polishing chemicals, Metal treatment chemicals, Rust preventive oils and Water treatment chemicals.

In this Internship they have done a mini project of formulation and development of Fabric conditioner and Detergent powder.

Based on this, his performance and contribution in the internship programme is GOOD.

For M/s Priyadarishini Chemicals,

The HR Manager

(Mr. Ramkumar Murugan)

Place : Coimbatore
Date : 21.04.2021

PRICHEM SERVES TO METAL INDUSTRIES

GST No: 33ARBPM1863C1ZN
POISON LISENCE No: 22 / 2015
DRUG LICENCE No:
TN00005918/2020

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Nava India Road,
Near SNR Sons College, K.R. Puram
Coimbatore - 641006

Mobile : 850888811, 9842822310
Email : info@prichemgroups.com
sales@prichemgroups.com,
Web : www.prichemgroups.com

AGPL Rotary Printing

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Date: 05.05.2021

CERTIFICATE OF INTERNSHIP

This is to certify that **Mr. SUBASH.R (191CE045)** a student of **B.Sc (chemistry)** Bharthiyar University Dr N.G.P Arts and Science College has successfully completed his long term internship program for 15 days from 16th April to 05th May 2021 in our concern.

During the period of his internship program with us he was found punctual, hardworking and dedicative. Then he learned about quality analysis of Screen print machineries used for printing, printing& print processing of cloths & also recipes for printing.

His performance & contribution towards this internship program is **EXCELLENT**

We wish him all the best for his future endeavors...

For AGPL ROTARY PRINTING
(Unit of Anthony Garments Pvt Ltd)

AGPL ROTARY PRINTING GM TIRUPUR

Authorized signatory
(Mr. MARIA VICTOR. K)

Factory Address :
SF.No221/2D, Ponnan Thottam,
Murugampalayam, Iduvampalayam Post,
Tirupur - 641 687, Tamil Nadu, India

Reg Office :
No.3, Athimaramthottam,
Sirupooluvapatti (P.o), Tirupur - 641 603.
Cell: 7397729406

E-mail : victor@agplindia.in
Web : www.agplindia.in
TIN No : 33932306337
Pan No : AAECA7839C

SYNTHESIS CHEMICAL LAB

Dealers in : Laboratory Grade Chemicals, Commercial Chemicals, Industrial Acids & Solvents, Lab Glasswares, Lab Instruments, Lab Furnitures & Water Treatment Chemicals

DATE: 30.04.2021

CERTIFICATE OF INTERSHIP

This is to certify that Ms. K M VARSHA (191CE051)a student of II B,sc (CHEMISTRY) Bharathiar University,Dr.N.G.P Arts and science college has successfully completed her long term Internship program for 15 Days from 14th April 2021 to 30th April 2021 in our concern.

During The period of her Internship program with us she learned about quality analysis of water and food, and she made some Detergent products.

Her performance & contribution towards this Intership program is GOOD.

We wish her all the best for her future endeavors....

FOR SYNTHESIS CHEMICAL LAB

AUTHORISED SIGNATORY

TIN : 33132030327 CST : 1168626
 # 89, Sathik Basha Street, Rathinapuri, Coimbatore - 641 027
Email : synthesischemicallab@gmail.com | Mob : +91 90433-46686, 90038-36953

AGPL Rotary Printing

(A UNIT OF ANTHONY GARMENTS PVT.LTD.,)

Date: 05.05.2021

CERTIFICATE OF INTERNSHIP

This is to certify that **Mr. YAGAVAN.P (191CE056)** a student of **B.Sc (chemistry)** Bharthiyar University Dr N.G.P Arts and Science College has successfully completed his long term internship program for 15 days from 16th April to 05th May 2021 in our concern.

During the period of his internship program with us he was found punctual, hardworking and dedicative. Then he learned about quality analysis of Screen print machineries used for printing, printing& print processing of cloths & also recipes for printing.

His performance & contribution towards this internship program is **EXCELLENT**

We wish him all the best for his future endeavors...

For AGPL ROTARY PRINTING
(Unit of Anthony Garments Pvt Ltd)

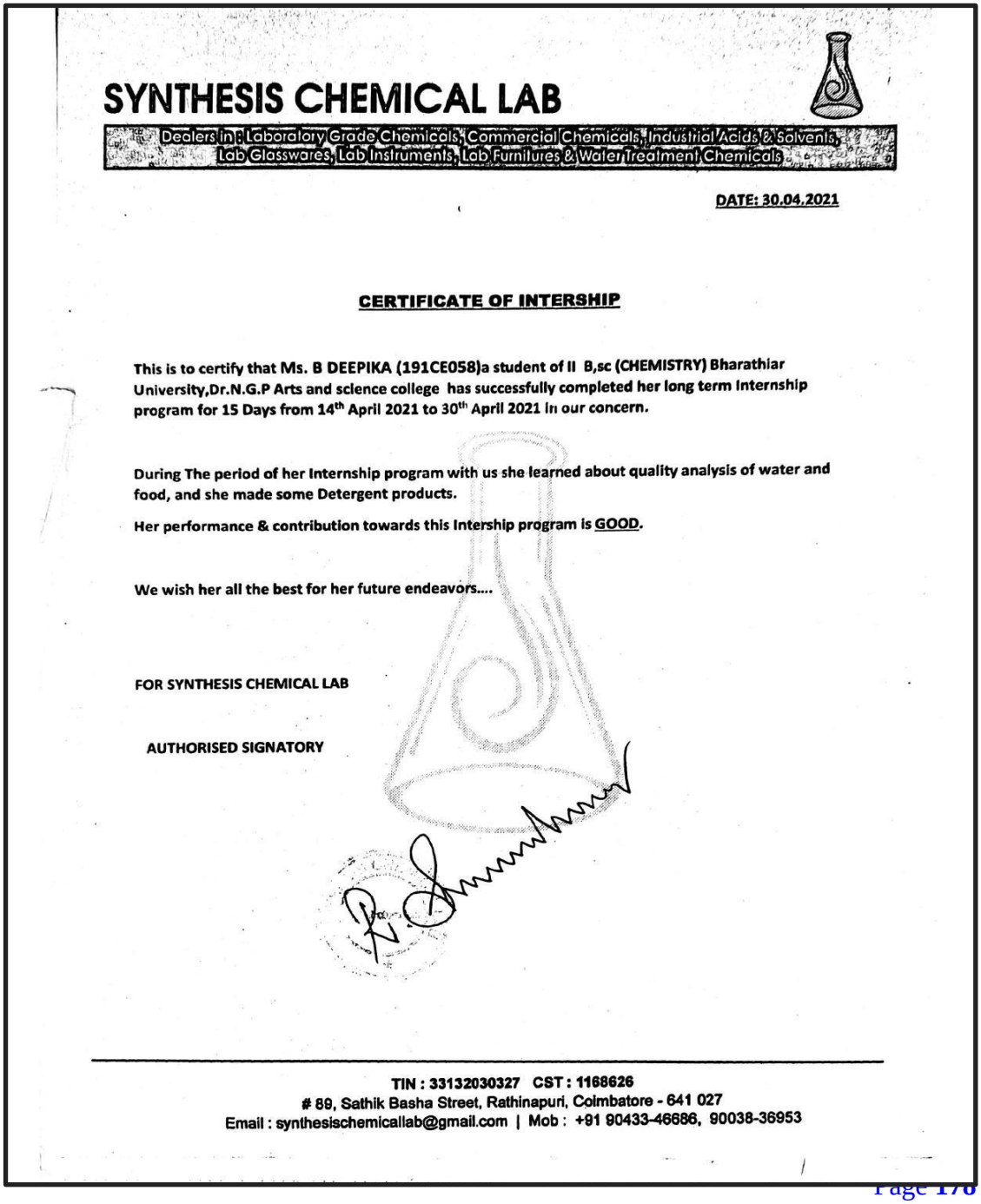
AGPL ROTARY PRINTING GM TIRUPUR

Authorized signatory
(Mr. MARIA VICTOR. K)

Factory Address :
SF.No221/2D, Ponnan Thottam,
Murugampalayam, Iduvampalayam Post,
Tirupur - 641 687, Tamil Nadu, India

Reg Office :
No.3, Athimaramthottam,
Sirupooluvapatti (P.o), Tirupur - 641 603.
Cell: 7397729406

E-mail : victor@agplindia.in
Web : www.agplindia.in
TIN No : 33932306337
Pan No : AAECA7839C



SYNTHESIS CHEMICAL LAB

Dealers in : Laboratory Grade Chemicals, Commercial Chemicals, Industrial Acids & Solvents, Lab Glasswares, Lab Instruments, Lab Furnitures & Water Treatment Chemicals

DATE: 30.04.2021

CERTIFICATE OF INTERSHIP

This is to certify that Ms. B DEEPIKA (191CE058)a student of II B,sc (CHEMISTRY) Bharathiar University,Dr.N.G.P Arts and science college has successfully completed her long term Internship program for 15 Days from 14th April 2021 to 30th April 2021 in our concern.

During The period of her Internship program with us she learned about quality analysis of water and food, and she made some Detergent products.

Her performance & contribution towards this Intership program is GOOD.

We wish her all the best for her future endeavors....

FOR SYNTHESIS CHEMICAL LAB

AUTHORISED SIGNATORY

TIN : 33132030327 CST : 1168626
89, Sathik Basha Street, Rathinapuri, Coimbatore - 641 027
Email : synthesischemicallab@gmail.com | Mob : +91 90433-46686, 90038-36953

Net Tel Solutions India Pvt Ltd
Excellence in Service
NTS

03.08.2021
Coimbatore

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms. Khushi Jaiswal B (Reg No:191CS027)** Final Year Student of B.Sc(CS) From **Dr. NGP Arts and Science College** has successfully completed her Internship Training in **"Python"** from our esteemed organization from 16th July 2021 to 30th July 2021.

For Net Tel Solution India Pvt Ltd

Authorized Signatory

S203, Ram Nagar, Nehru Street, Coimbatore - 641 009
www.nettelsolutions.in info@nettelsolutions.in

GATEWAY SOFTWARE SOLUTIONS

ISO 9001:2015

Date: 28/07/2021

TO WHOMSOEVER IT MAY CONCERN

This is to certify the student Mr. S. LOKESH (191CS028) pursuing his second year B.Sc (CS) in Dr. NGP Arts and Science College, Coimbatore has completed his internship on Web Technologies in our concern from 28th June 2021 to 28th July 2021.

All the Best for his Future!

GATEWAY SOFTWARE SOLUTIONS

Manager

Mobile: 7397078885
E-mail : nfo@gatewaysoftwaresolutions.com / Webiste : gatewaysoftwaresolutions.com

ACCENT TECHNO SOFT
Quality Matters...
An ISO 9001:2015 Certified

17.07.2021
Coimbatore

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr.Mohammed Afsal M F (Reg No: 191CS029)** IIIrd Year Student of B.Sc(CS) from **Dr.NGP Arts & Science College** has successfully completed his Internship Training in **"Cyber Security"** from our esteemed organization from 28th June 2021 to 16 July 2021.

His performance and conduct were found to be very good.

During this period, he was sincere and regular in attending all the phases of Internship Training Program.

For Accent Techno Soft

Authorized Signatory

#203, Nehru Street, Ram Nagar, Coimbatore - 641 009
www.accenttechnosoft.com 0422 - 4212232 info@accenttechnosoft.com

ALTITUDES
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Phone: 0422-4520 405
Mail Id: hr@myaltitudes.com
Website: www.myaltitudes.com

03.12.2020

Coimbatore

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms.Swetha Chanchal.R (Reg No:181CR156) III B.COM (Corporate Secretaryship) Student of **Dr.N.G.P Arts And Science College**, Coimbatore had Successfully completed her Virtual Internship program on **"Imports and Exports"** in our firm from 16th November 2020 to 2nd December 2020.

Her performance found to be good during all phases of Internship program.

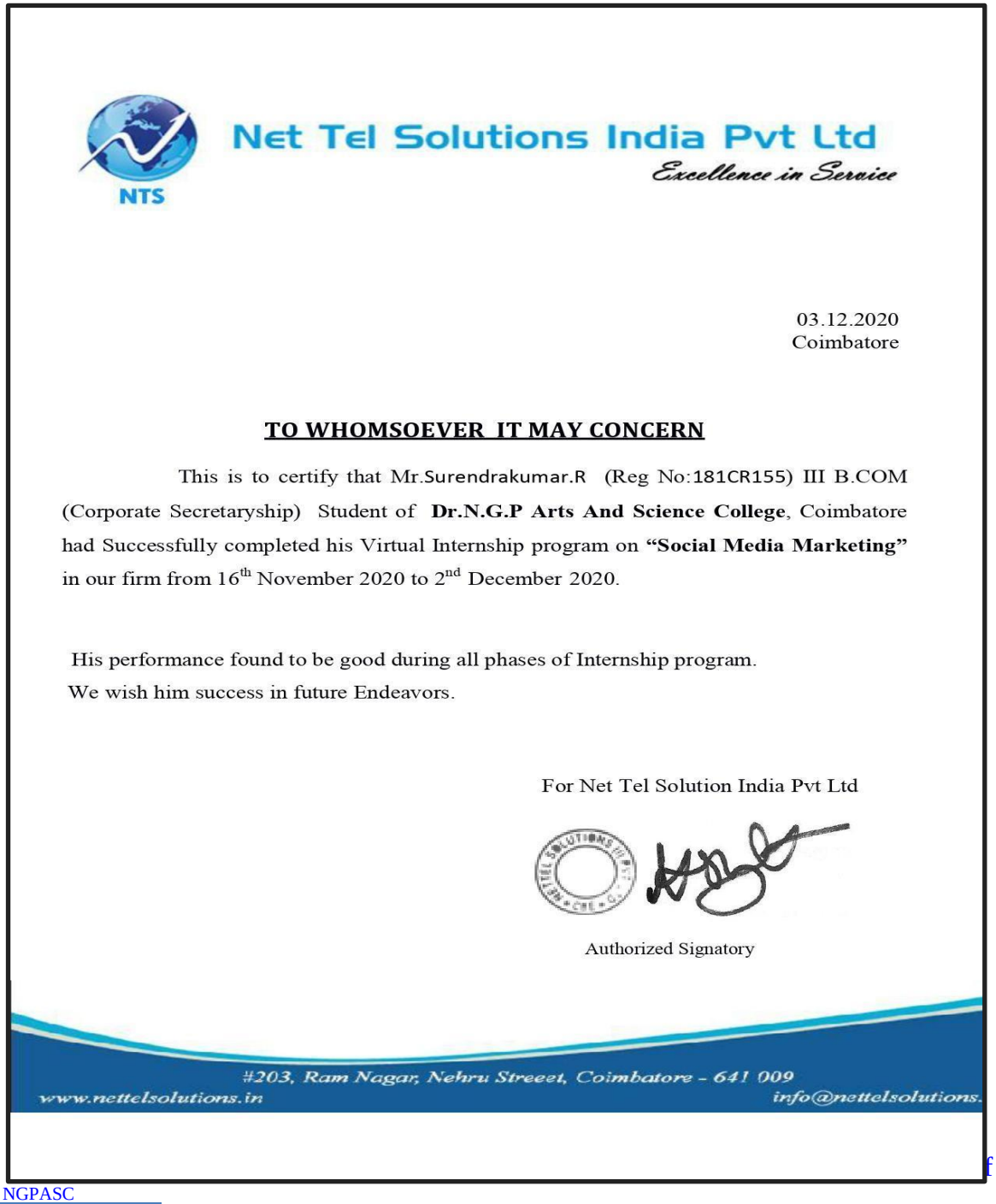
We wish him success in future Endeavors.

Authorized Signatory

ALTITUDES COIMBATORE 27

For Altitudes

1 H Vishwanathapuram , Rathinapuri , Coimbatore 641027



Net Tel Solutions India Pvt Ltd
Excellence in Service

NTS

03.12.2020
Coimbatore

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr.Surendrakumar.R (Reg No:181CR155) III B.COM (Corporate Secretaryship) Student of **Dr.N.G.P Arts And Science College**, Coimbatore had Successfully completed his Virtual Internship program on **"Social Media Marketing"** in our firm from 16th November 2020 to 2nd December 2020.

His performance found to be good during all phases of Internship program.
We wish him success in future Endeavors.

For Net Tel Solution India Pvt Ltd

Authorized Signatory

#203, Ram Nagar, Nehru Streeet, Coimbatore - 641 009
www.nettelsolutions.in info@nettelsolutions.

THE CAMBODIA MILLS LIMITED

No 3504, Trichy Rd, Nandha Nager, Ondipudur,
TAMIL NADU 641016

Date: 10.04.2021

Sub: internship completion letter

This is to certify that Miss. Elakeya j a student has successfully completed 15days (From 28 March 2021 to 6 April 2021) internship programmes at this the Cambodia mills limited.

During period of her internship programme with us he was fund punctual, hardworking and inquisitive.

We wish her every success in life

For: Cambodia mills limited

Authorized signature

Sindhu®

Sindhu Cargo Services Ltd.,
(An ISO 9001: 2008 Certified Company)
No. 40/25, Kannusamy Road, R. S. Puram
Coimbatore - 641002, Tamil Nadu, India
Tel:+91 8033912291

E-mail: info@sindhucargo.com

To Whom So Ever It May Concern

This is to certify that Mr.Adithyaa Ganesh.A has undergone an internship in our company from 22/03/2021 to 9/04/2021.

He has undergone training in activities of Import and Export Custom Clearances, Freight Forwarding, Warehouse Management and Transportation. He has exhibited immense interest in these fields. He is a quick learner and has excellent communication skills. I have noticed that he is very intelligent and manages his time very well.

We wish him all the best for his future endeavors.

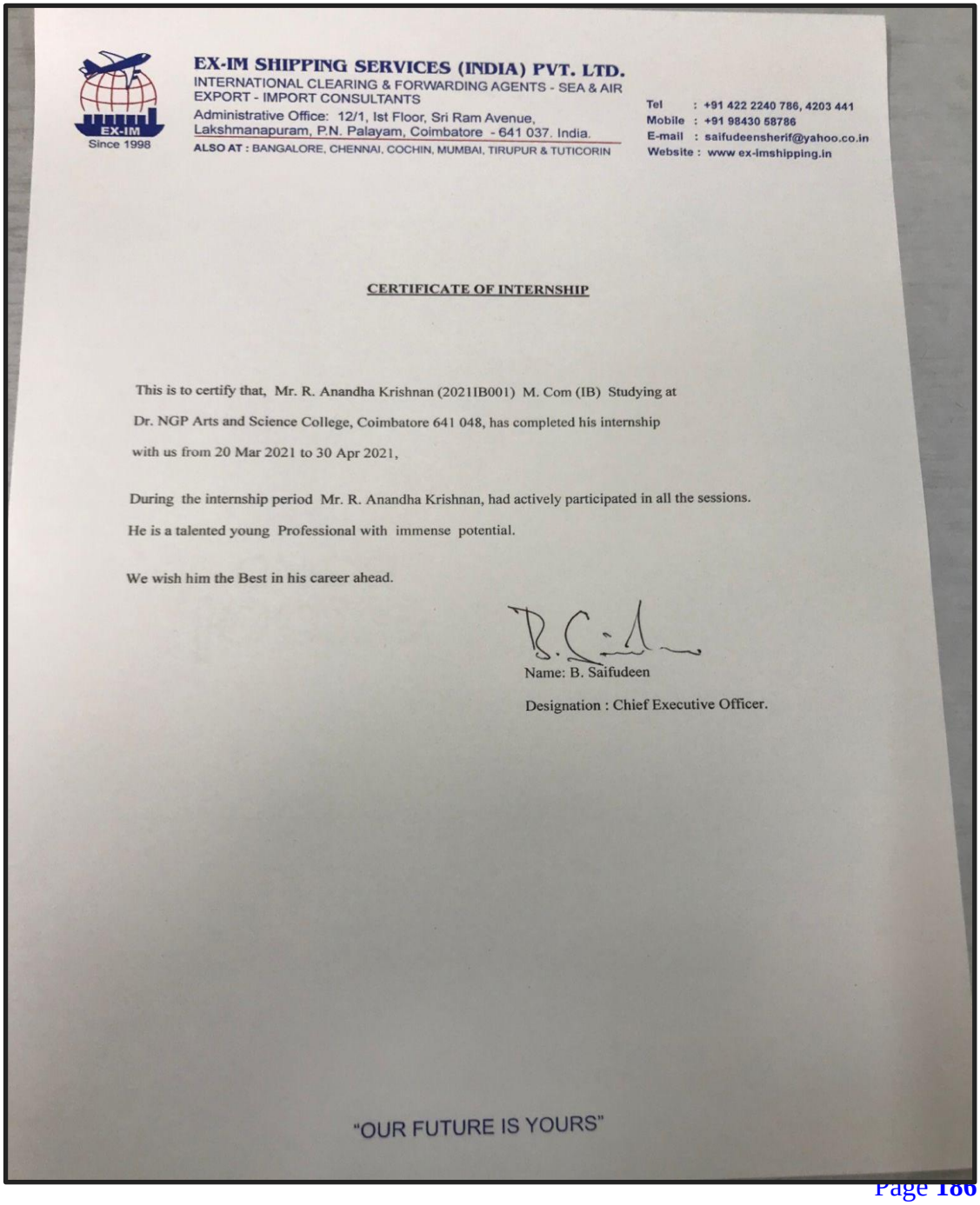
Yours Sincerely,
For Sindhu Cargo Services Ltd

G. Balaraju
Managing Director

SINDHU CARGO SERVICES LTD

IATA

SOLUTIONS ACROSS THE GLOBE



EX-IM SHIPPING SERVICES (INDIA) PVT. LTD.
INTERNATIONAL CLEARING & FORWARDING AGENTS - SEA & AIR
EXPORT - IMPORT CONSULTANTS
Administrative Office: 12/1, Ist Floor, Sri Ram Avenue,
Lakshmanapuram, P.N. Palayam, Coimbatore - 641 037. India.
ALSO AT : BANGALORE, CHENNAI, COCHIN, MUMBAI, TIRUPUR & TUTICORIN
EX-IM Since 1998

Tel : +91 422 2240 786, 4203 441
Mobile : +91 98430 58786
E-mail : saifudeensherif@yahoo.co.in
Website : www ex-imshipping.in

CERTIFICATE OF INTERNSHIP

This is to certify that, Mr. R. Anandha Krishnan (2021IB001) M. Com (IB) Studying at Dr. NGP Arts and Science College, Coimbatore 641 048, has completed his internship with us from 20 Mar 2021 to 30 Apr 2021,

During the internship period Mr. R. Anandha Krishnan, had actively participated in all the sessions. He is a talented young Professional with immense potential.

We wish him the Best in his career ahead.

Name: B. Saifudeen

Designation : Chief Executive Officer.

"OUR FUTURE IS YOURS"

Provet
Excellence through Innovation

Provet Pharma Private Limited
CIN : U24231TN2009PTC073198

Certificate of Internship

We the undersigned do hereby proudly present this Certificate of Internship for outstanding honourable effort of **Mr. ASWIN KUMAR J**, Pursuing I year in the department of M.com (International Business), Dr NGP College of Arts & Science for his successful completion of export procedure and documentation from 25th March 2021 to 10th April 2021.

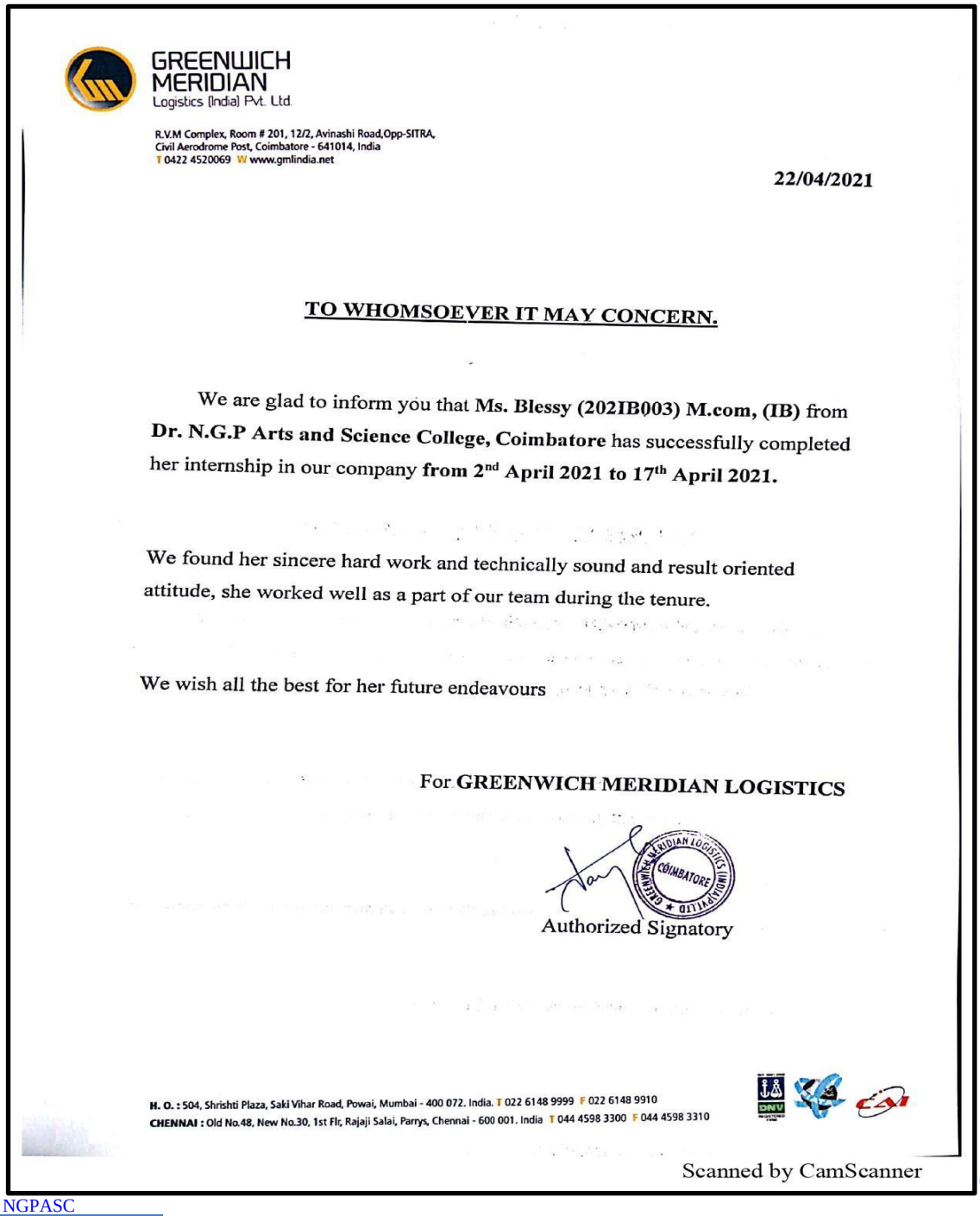
During the training period of Internship his conduct was good.

for **Provet Pharma Private Limited**,

PROVET PHARMA PVT. LTD. Chennai-32

Santhiya,
Assistant Manager - HR & Admin

Regd. Office : No.9, 1st Floor, Chakrapani Street, 2nd Lane,Narasingapuram Extension, Maduvankarai, Guindy, Chennai - 600 032.
Telefax : + 91 44 2244 2124 / 2127 E-mail : info@provet.in Web : www.provet.in



GREENWICH MERIDIAN
Logistics (India) Pvt. Ltd.

R.V.M Complex, Room # 201, 12/2, Avinashi Road,Opp-SITRA,
Civil Aerodrome Post, Coimbatore - 641014, India
T 0422 4520069 W www.gmlindia.net

22/04/2021

TO WHOMSOEVER IT MAY CONCERN.

We are glad to inform you that **Ms. Blessy (202IB003) M.com, (IB)** from **Dr. N.G.P Arts and Science College, Coimbatore** has successfully completed her internship in our company **from 2nd April 2021 to 17th April 2021.**

We found her sincere hard work and technically sound and result oriented attitude, she worked well as a part of our team during the tenure.

We wish all the best for her future endeavours

For **GREENWICH MERIDIAN LOGISTICS**

GREENWICH MERIDIAN LOGISTICS (INDIA) PVT. LTD. COIMBATORE

Authorized Signatory

H. O. : 504, Shrishti Plaza, Saki Vihar Road, Powai, Mumbai - 400 072. India. T 022 6148 9999 F 022 6148 9910
CHENNAI : Old No.48, New No.30, 1st Flr, Rajaji Salai, Parrys, Chennai - 600 001. India T 044 4598 3300 F 044 4598 3310

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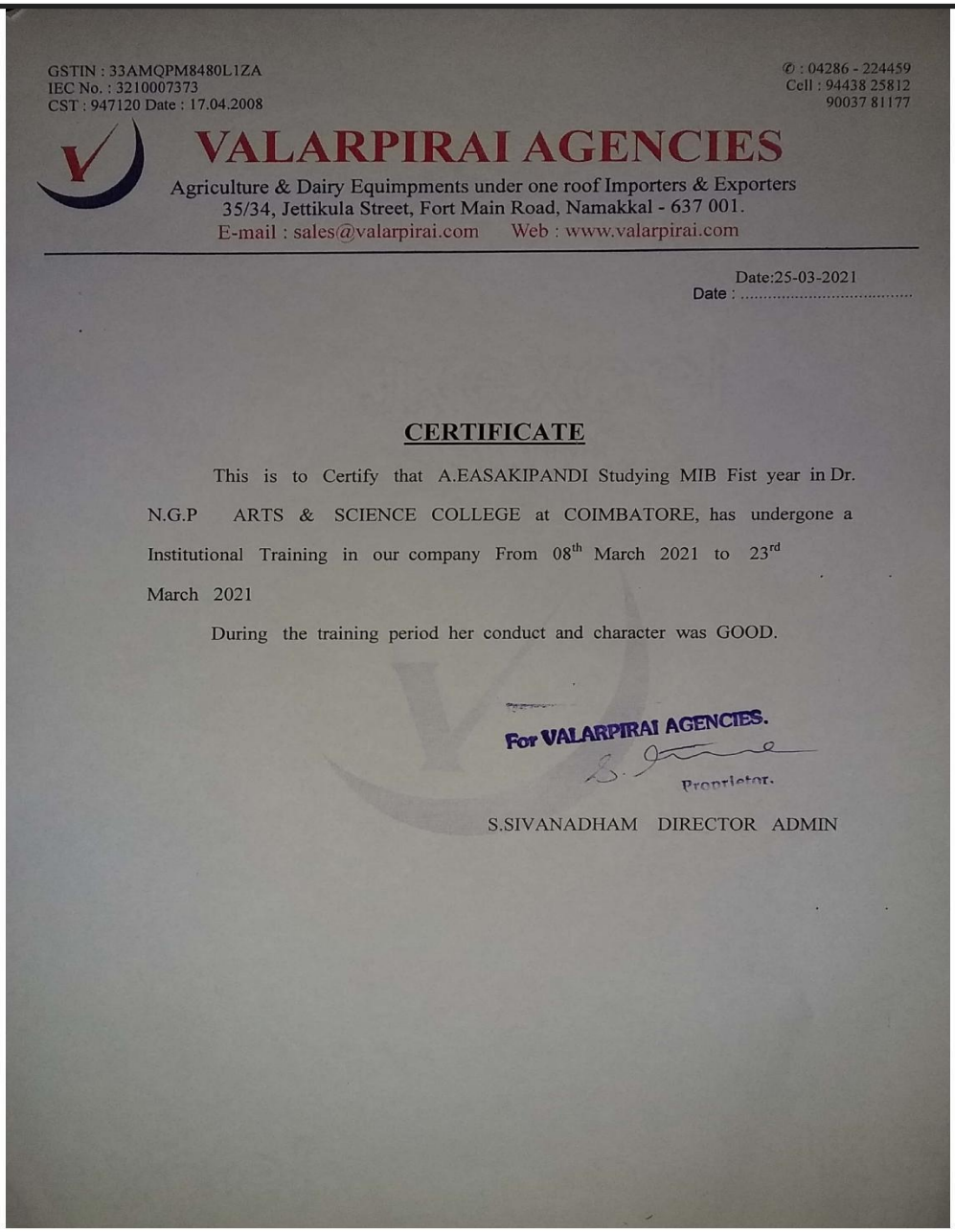


GSTIN : 33AMQPM8480L1ZA
IEC No. : 3210007373
CST : 947120 Date : 17.04.2008

✆ : 04286 - 224459
Cell : 94438 25812
90037 81177

VALARPIRAI AGENCIES

Agriculture & Dairy Equimpments under one roof Importers & Exporters
35/34, Jettikula Street, Fort Main Road, Namakkal - 637 001.
E-mail : sales@valarpirai.com Web : www.valarpirai.com

Date:25-03-2021
Date : .....

CERTIFICATE

This is to Certify that A.EASAKIPANDI Studying MIB Fist year in Dr. N.G.P ARTS & SCIENCE COLLEGE at COIMBATORE, has undergone a Institutional Training in our company From 08th March 2021 to 23rd March 2021

During the training period her conduct and character was GOOD.

For VALARPIRAI AGENCIES.

Proprietor.

S.SIVANADHAM DIRECTOR ADMIN

SMART WAY
INDUSTRIAL AUTOMATION

CST NO: 1168324 WWW.SMARTWAYIA.COM INFO@SMARTWAIA.COM

TO WHOMSOEVER IT MAY CONCERN

This is to inform you that Mr. HARIHARAN.B **(Reg. No.202IB026)** doing **I Year MIB** in DR.N.G.P ARTS AND SCIENCE COLLEGE, Coimbatore. Has completed his industrial exposure in our organization from March 22 2021 to April 9 2021.

His conduct and performance during the period was good.

We wish him all the best in the future.

For SMART WAY INDUSTRIAL AUTOMATION

Proprietor

SMART WAY INDUSTRIAL AUTOMATION CBE-9

Address: Shop No.109, M.R Complex,Nehru Street, Coimbatore, Tamilnadu-641009.

Ecstasy Logistics®

14-APR-2021

Coimbatore

To whomsoever it may concern

We hereby certify that **Ms. Mowshika U.** pursuing **First year M.Com (IB) Dr. N.G.P. ARTS AND SCIENCE COLLEGE (Autonomous)** has successfully completed her Industrial Training on the project in our organization from 07-APR-2021 to 12-APR-2021

During this period the student was found to be extremely productive and enthusiastic.

We wish her all the best in his all future endeavours.

Signature with Company seal

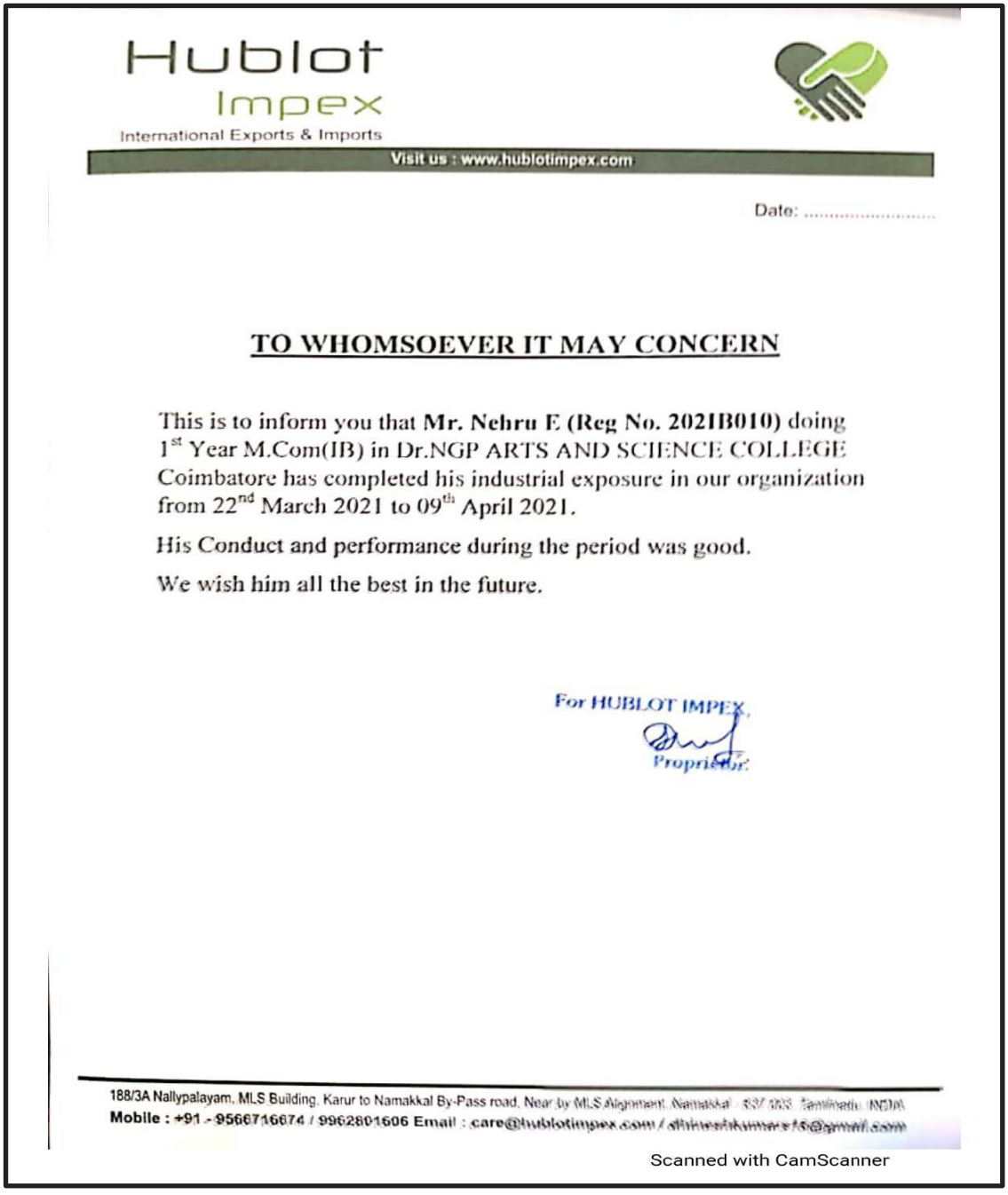
For ECSTASY LOGISTICS

Proprietor

Ecstasy Logistics®
No. 118 A, Opp Band Boxe, AK NAGAR
Near NSR Road 'S Bend', Saibaba Colony
Coimbatore – 641 011. Tamilnadu, INDIA
Phone : +91 422 4975054

Regd. Off: NO. 118A, AK NAGAR, OPP BAND BOXE,
NARAYANAGURU MISSION ROAD,
SAIBABA COLONY, COIMBATORE - 641011
TAMIL NADU, INDIA
TEL: +91 422 4975054

GST NO : 33AVDPS9966R1ZE
PAN NO : AVDPS9966R



Hublot Impex
International Exports & Imports
Visit us : www.hublotimpex.com

Date: .....

TO WHOMSOEVER IT MAY CONCERN

This is to inform you that **Mr. Nehru E (Reg No. 202IB010)** doing 1st Year M.Com(IB) in Dr.NGP ARTS AND SCIENCE COLLEGE Coimbatore has completed his industrial exposure in our organization from 22nd March 2021 to 09th April 2021.

His Conduct and performance during the period was good.

We wish him all the best in the future.

For HUBLOT IMPEX,
Proprietor

188/3A Nallypalayam, MLS Building, Karur to Namakkal By-Pass road, Near by MLS Alignment, Namakkal - 637 003. Tamilnadu. INDIA.
Mobile : +91 - 9566716674 / 9962801606 Email : care@hublotimpex.com / dhineshkumar15@gmail.com

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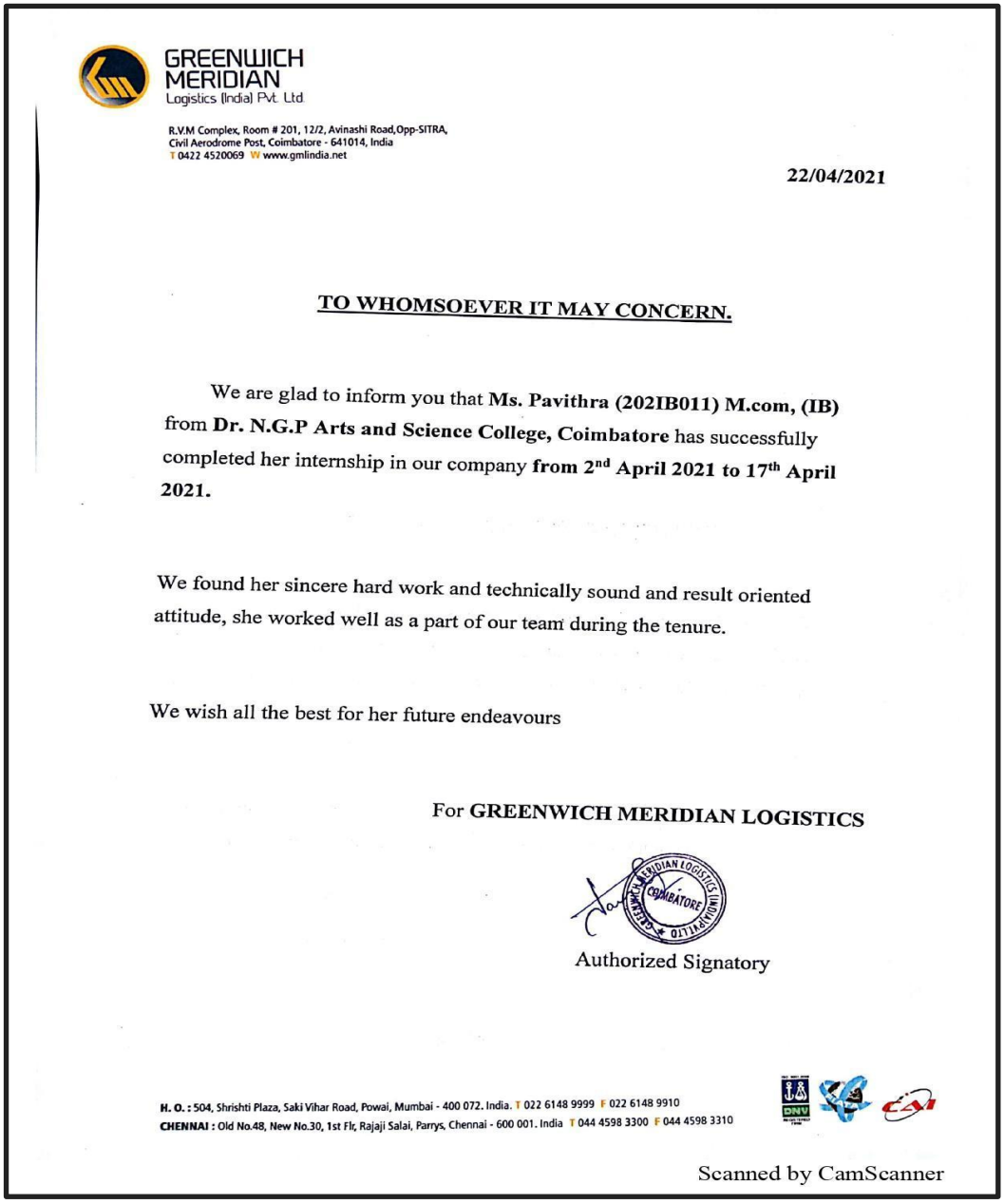

GREENWICH MERIDIAN
Logistics (India) Pvt. Ltd.

R.V.M Complex, Room # 201, 12/2, Avinashi Road,Opp-SITRA,
Civil Aerodrome Post, Coimbatore - 641014, India
T 0422 4520069 W www.gmlindia.net

22/04/2021

TO WHOMSOEVER IT MAY CONCERN.

We are glad to inform you that **Ms. Pavithra (202IB011) M.com, (IB)** from **Dr. N.G.P Arts and Science College, Coimbatore** has successfully completed her internship in our company **from 2nd April 2021 to 17th April 2021.**

We found her sincere hard work and technically sound and result oriented attitude, she worked well as a part of our team during the tenure.

We wish all the best for her future endeavours

For **GREENWICH MERIDIAN LOGISTICS**

Authorized Signatory

H. O. : 504, Shrishti Plaza, Saki Vihar Road, Powai, Mumbai - 400 072. India. T 022 6148 9999 F 022 6148 9910
CHENNAI : Old No.48, New No.30, 1st Flr, Rajaji Salai, Parrys, Chennai - 600 001. India T 044 4598 3300 F 044 4598 3310

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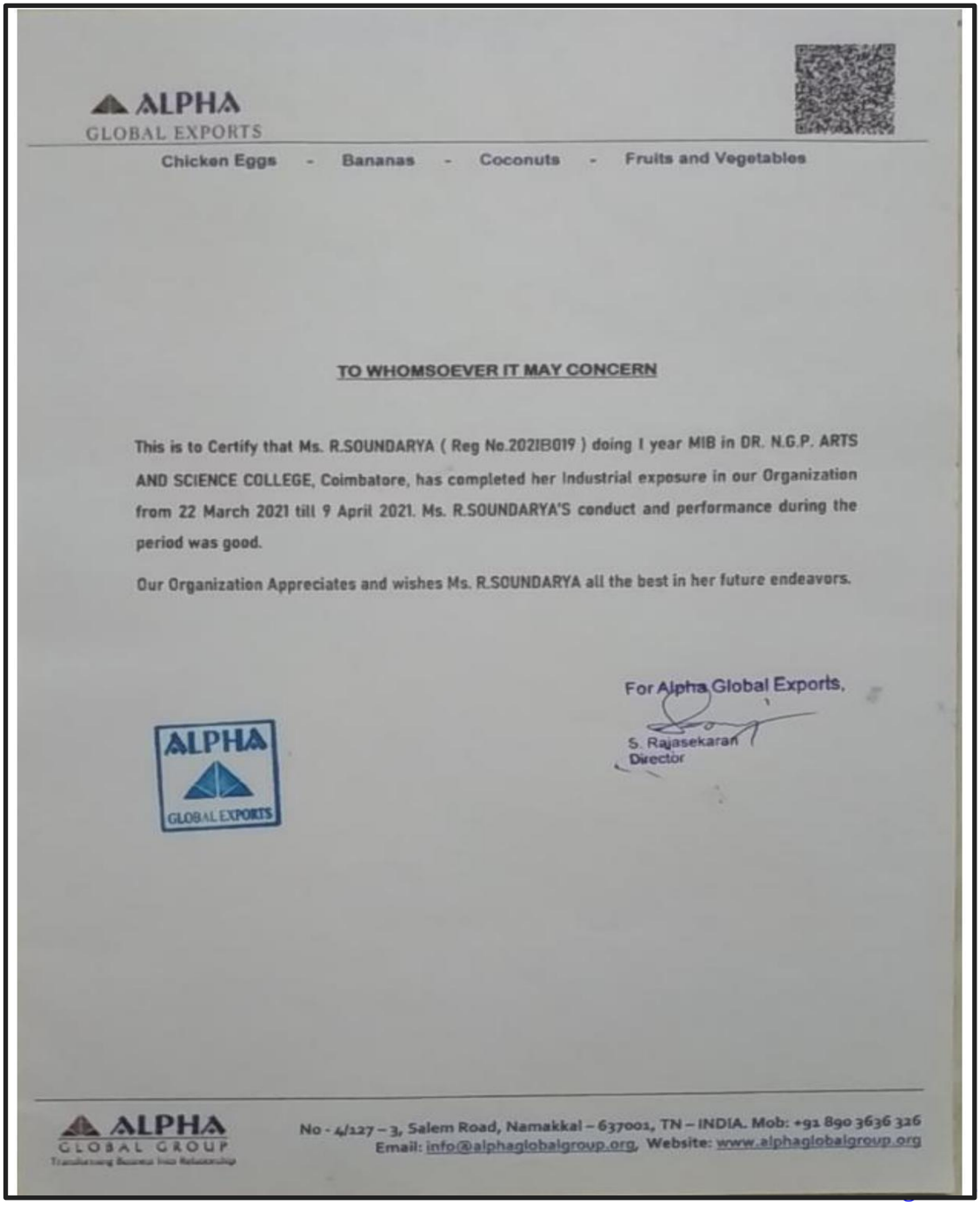


ALPHA
GLOBAL EXPORTS

Chicken Eggs - Bananas - Coconuts - Fruits and Vegetables

TO WHOMSOEVER IT MAY CONCERN

This is to Certify that Ms. R.SOUNDARYA (Reg No.2021B019) doing I year MIB in DR. N.G.P. ARTS AND SCIENCE COLLEGE, Coimbatore, has completed her Industrial exposure in our Organization from 22 March 2021 till 9 April 2021. Ms. R.SOUNDARYA'S conduct and performance during the period was good.

Our Organization Appreciates and wishes Ms. R.SOUNDARYA all the best in her future endeavors.

For Alpha Global Exports,

S. Rajasekaran
Director

ALPHA
GLOBAL EXPORTS

ALPHA
GLOBAL GROUP
Transforming Business into Relationship

No - 4/127 – 3, Salem Road, Namakkal – 637001, TN – INDIA. Mob: +91 890 3636 326
Email: info@alphaglobalgroup.org, Website: www.alphaglobalgroup.org

SMART WAY
INDUSTRIAL AUTOMATION

CST NO: 1168324 WWW.SMARTWAYIA.COM INFO@SMARTWAIA.COM

TO WHOMSOEVER IT MAY CONCERN

This is to inform you that Mr. ROBIN ABISHAKE.A **(Reg. No.202IB013)** doing **I Year MIB** in DR.N.G.P ARTS AND SCIENCE COLLEGE, Coimbatore. Has completed his industrial exposure in our organization from March 22 2021 to April 9 2021.

His conduct and performance during the period was good.

We wish him all the best in the future.

For SMART WAY INDUSTRIAL AUTOMATION

Proprietor

SMART WAY INDUSTRIAL AUTOMATION CBE - 9

Address: Shop No.109, M.R Complex,Nehru Street, Coimbatore, Tamilnadu-641009.

K M KNITWEAR PRIVATE LIMITED.,

(Garments Division)
Mfrs & Exporters Of Hosiery Garments

Date: 25.03.2021

CERTIFICATE

This is to certify that M. ROHINI studying MIB First year in Dr. N.G.P ARTS & SCIENCE COLLEGE at COIMBATORE, has Undergone a Institutional Training in our Company From 08th March 2021 to 23rd March 2021.

During the training period her conduct and character was GOOD.

For K M KNITWEAR PRIVATE LIMITED

Authorised Signatory

S.SIVANANDHAM DIRECTOR ADMIN

Regd. Office : 14-D,E,F, Lakshmi Nagar, First Street, City Garden, Tirupur - 641602.
GSTIN : 33AABCJ3447N1ZF I.E. Code : 3204000664 CIN : U17111TZ2003PTC010755
Tel : 91 - 421 - 430 7777, Fax : 91 - 421 - 2234621, 4307799 • E-mail : mail@kmknitwear.com • Web : www.kmknitwear.com

SMART WAY
INDUSTRIAL AUTOMATION

WWW.SMARTWAYIA.COM INFO@SMARTWAIA.COM

TO WHOMSOEVER IT MAY CONCERN

This is to inform you that Mr. S.karthikeyan (Reg. No.202ib007) doing I Year MIB in **DR.N.G.P ARTS AND SCIENCE COLLEGE**, Coimbatore. Has completed his industrial exposure in our organization from March 22-2021 to April 09-2021.

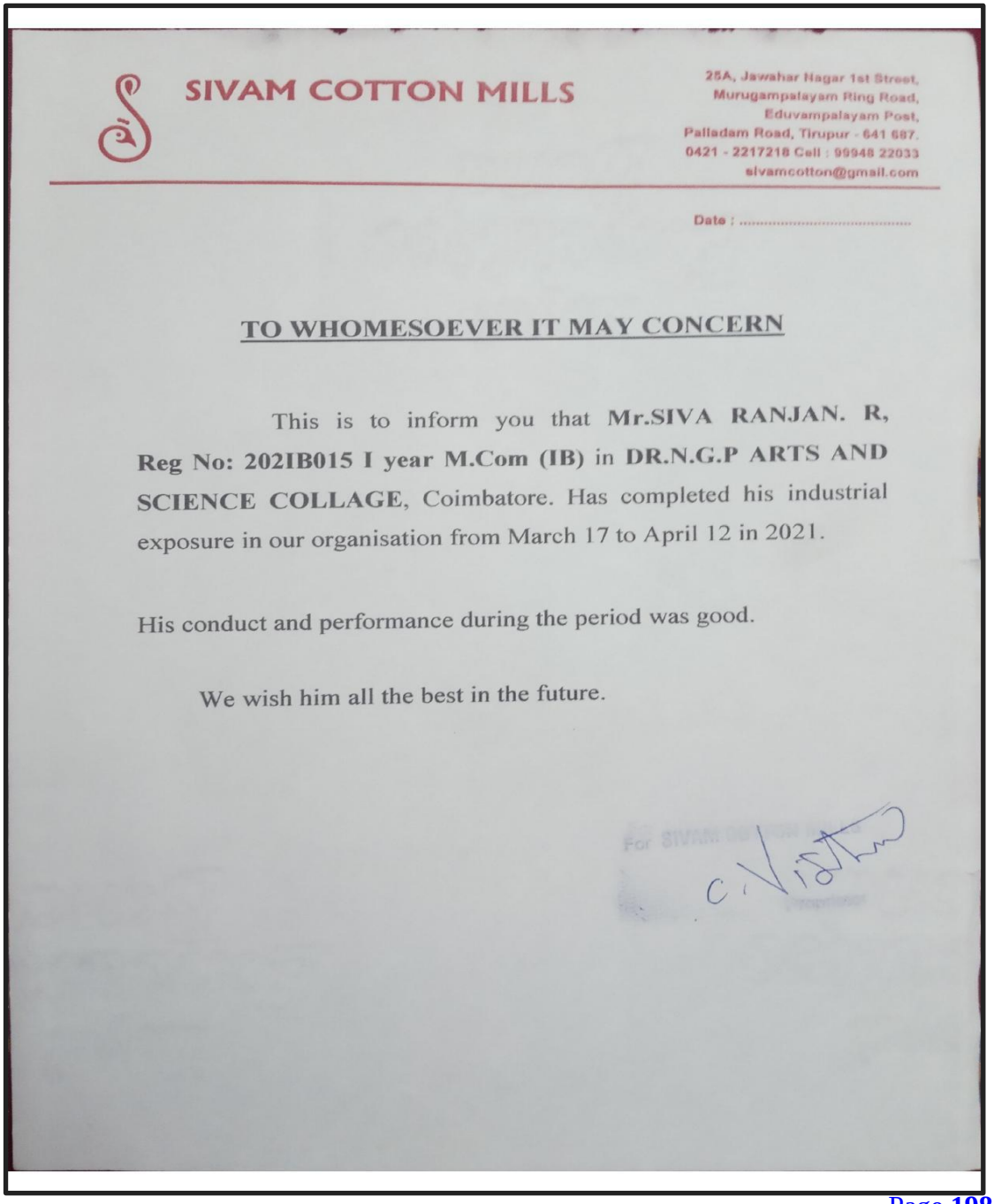
His conduct and performance during the period was good.

We wish him all the best in the future.

For **SMARTWAY INDUSTRIAL AUTOMATION**

SMART WAY INDUSTRIAL AUTOMATION COIMBATORE

Office: No.109, M.R Complex,Nehru Street, Coimbatore,Tamil Nadu-641009



SIVAM COTTON MILLS

25A, Jawahar Nagar 1st Street,
Murugampalayam Ring Road,
Eduvampalayam Post,
Palladam Road, Tirupur - 641 687.
0421 - 2217218 Cell : 99948 22033
sivamcotton@gmail.com

Date : .....

TO WHOMESOEVER IT MAY CONCERN

This is to inform you that **Mr.SIVA RANJAN. R, Reg No: 202IB015 I year M.Com (IB)** in **DR.N.G.P ARTS AND SCIENCE COLLAGE**, Coimbatore. Has completed his industrial exposure in our organisation from March 17 to April 12 in 2021.

His conduct and performance during the period was good.

We wish him all the best in the future.

For SIVAM COTTON MILLS

C. Vijay

BESTOMECH INDUSTRIES

10/04/2021

TO WHOMSOEVER IT MAY CONCERN.

We are glad to inform you that **Ms. Sivanisha (202IB016) M. Com, (IB)** from **Dr. N.G.P Arts and Science College, Coimbatore** has successfully completed her internship in our Company **from 24th March 2021 to 10th April 2021**.

We found her sincere hard work and technically sound and result oriented attitude, she worked well as a part of team during the tenure.

We wish all the best in her future endeavors

For **BESTOMECH INDUSTRIES**

Authorized Signatory

Regd. Office : 68 Kasthuriswamy Naidu Layout, Lakshmipuram, Peelamedu, Coimbatore - 641 004
Unit II : S.F. No. 912/3B, Kalapatti Village, Karruparayanpalayam, Mylampatti (P.O.), Coimbatore - 641 062
Unit III : S.F. No. 218-A& 218-B, Annamalai Industrial Park, Kalapatti , Coimbatore - 641 035
Phone : 0422- 2900226, E.mail:info@bestomech.com GSTIN No. : 33AADFB2987Q1ZY

A.S. and Associates

TO WHOM SO EVER IT MAY CONCERN

This is to certify that Mr. **SIVASAKTHI.R.S** (Reg.no: 2021B017), Studying **M.com (International Business)** in **N.G.P Arts and Science College (Autonomous)** has undergone as Internship Training in our company from (29th March 2021 to 12th April 2021)

During this training period he has shown keen interest in knowing the function of our various departments and his performance is highly commended.

For A.S and Associates
K. K. Sivaraj
Managing Partner
12/04/2021.

No 403, Edayar Street, Coimbatore – 641001. Email: asandassociatescbe@gmail.com
Ph: 0422 2343280 / 97915 91611 / 98427 73867

Provet
Excellence through Innovation

Provet Pharma Private Limited
CIN : U24231TN2009PTC073198

Certificate of Internship

We the undersigned do hereby proudly present this Certificate of Internship for outstanding honourable effort of **Mr. M SOOSAI SNOWSAN**, Pursuing I year in the department of M.com (International Business), Dr NGP College of Arts & Science for his successful completion of export procedure and documentation from 25th March 2021 to 10th April 2021.

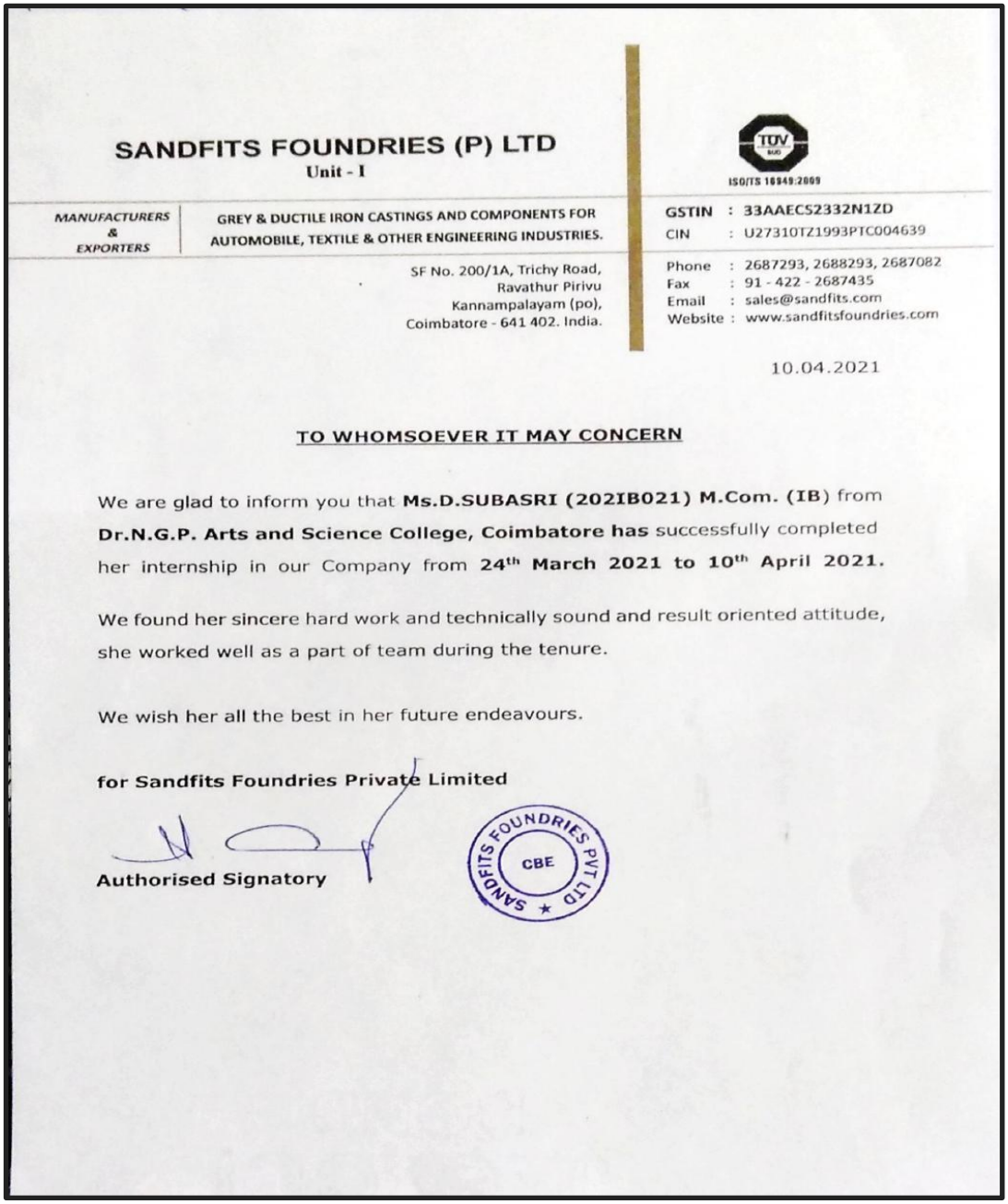
During the training period of Internship his conduct was good.

for **Provet Pharma Private Limited,**

PROVET PHARMA PVT. LTD. Chennai-32

Santhiya Jegatheesan,
Assistant Manager - HR & Admin

Regd. Office : No.9, 1st Floor, Chakrapani Street, 2nd Lane,Narasingapuram Extension, Maduvankarai, Guindy, Chennai - 600 032.
Telefax : + 91 44 2244 2124 / 2127 E-mail : info@provet.in Web : www.provet.in



SANDFITS FOUNDRIES (P) LTD
Unit - I

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CIN : U27310TZ1993PTC004639

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Ravathur Pirivu
Kannampalayam (po),
Coimbatore - 641 402. India.

Phone : 2687293, 2688293, 2687082
Fax : 91 - 422 - 2687435
Email : sales@sandfits.com
Website : www.sandfitsfoundries.com

10.04.2021

TO WHOMSOEVER IT MAY CONCERN

We are glad to inform you that **Ms.D.SUBASRI (202IB021) M.Com. (IB)** from **Dr.N.G.P. Arts and Science College, Coimbatore has** successfully completed her internship in our Company from **24th March 2021 to 10th April 2021.**

We found her sincere hard work and technically sound and result oriented attitude, she worked well as a part of team during the tenure.

We wish her all the best in her future endeavours.

for Sandfits Foundries Private Limited

Authorised Signatory

SANDFITS FOUNDRIES PVT LTD CBE

SMART WAY
INDUSTRIAL AUTOMATION

CST NO: 1168324 WWW.SMARTWAYIA.COM INFO@SMARTWAIA.COM

TO WHOMSOEVER IT MAY CONCERN

This is to inform you that Mr.SUDESH KRISHNAN.U **(Reg. No.2021B022)** doing **I Year MIB** in DR.N.G.P ARTS AND SCIENCE COLLEGE, Coimbatore. Has completed his industrial exposure in our organization from March 22 2021 to April 9 2021.

His conduct and performance during the period was good.

We wish him all the best in the future.

For SMART WAY INDUSTRIAL AUTOMATION

Proprietor

SMART WAY INDUSTRIAL AUTOMATION CBE - 9

Address: Shop No.109, M.R Complex,Nehru Street, Coimbatore, Tamilnadu-641009.

Aotearo METAL COATINGS

Date: 12.05.2021
Place: Coimbatore

TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Mr. SUJITH.S (Reg:No: 202IB028)**, Studying **M.com (International Business)** in **Dr.N.G.P Arts and science college (Autonomous)** has undergone an Internship Training in our company for a period of 15 days and he has been to the company from (28th March 2021 to 7th April 2021).The rest days was given him as learn from home due to Covid 19 issues.

During this training period he has show keen interest in knowing the function of our various departments, knowing the different type of forms and documents needed for import and export purposes and his performance is highly commended .

For Aotearo Metal Coatings Pvt.Ltd

Factory : Coimbatore,
B.O : Hyderabad, Bangalore, Chennai
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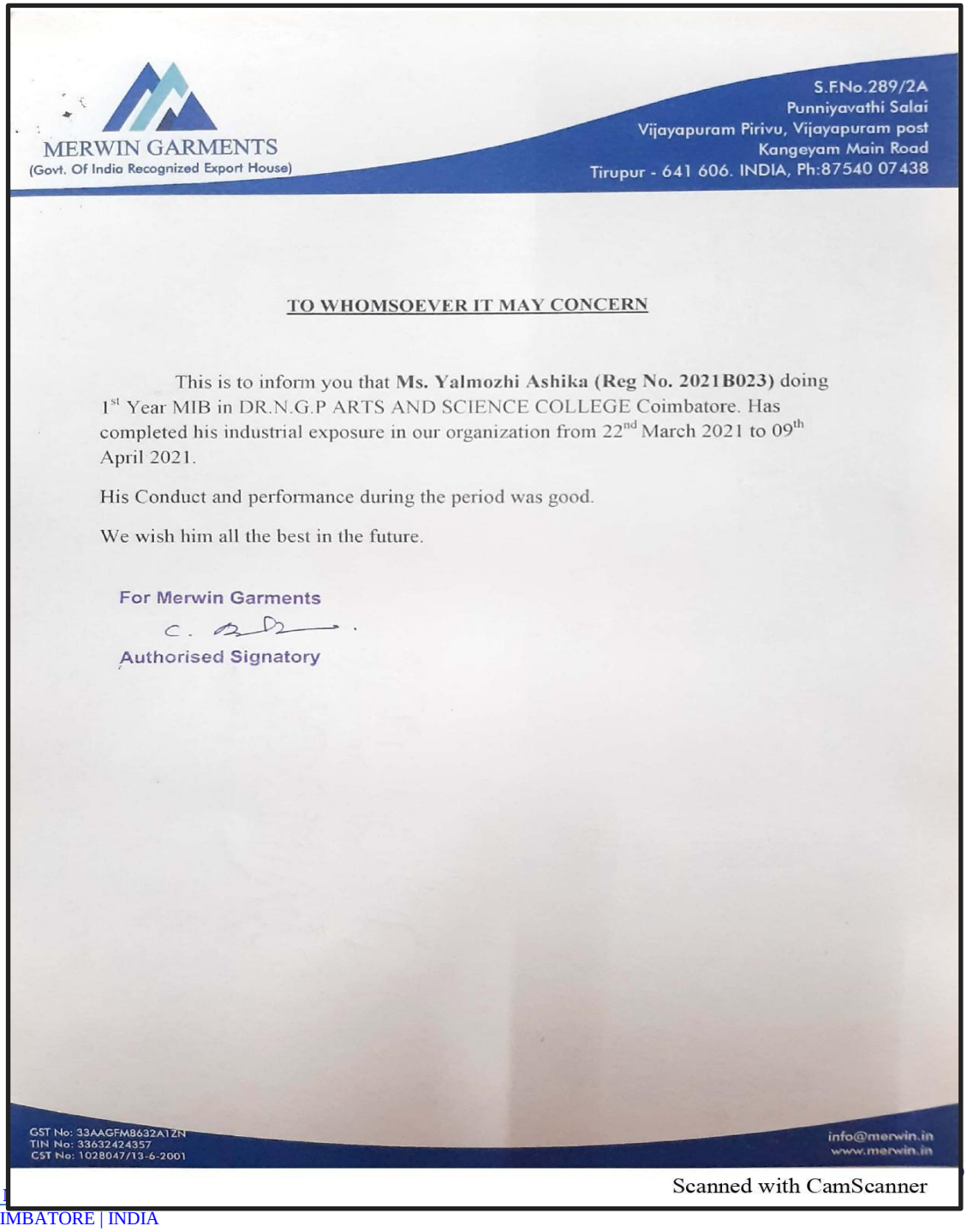
Mail: info@aotearo.com, aotearo2015@gmail.com web: www.aotearo.com



MERWIN GARMENTS
(Govt. Of India Recognized Export House)

S.F.No.289/2A
Punniyavathi Salai
Vijayapuram Pirivu, Vijayapuram post
Kangeyam Main Road
Tirupur - 641 606. INDIA, Ph:87540 07438

TO WHOMSOEVER IT MAY CONCERN

This is to inform you that **Ms. Yalmozhi Ashika (Reg No. 2021B023)** doing 1st Year MIB in DR.N.G.P ARTS AND SCIENCE COLLEGE Coimbatore. Has completed his industrial exposure in our organization from 22nd March 2021 to 09th April 2021.

His Conduct and performance during the period was good.

We wish him all the best in the future.

For Merwin Garments

Authorised Signatory

GST No: 33AAGFM8632A1ZN
TIN No: 33632424357
CST No: 1028047/13-6-2001

info@merwin.in
www.merwin.in

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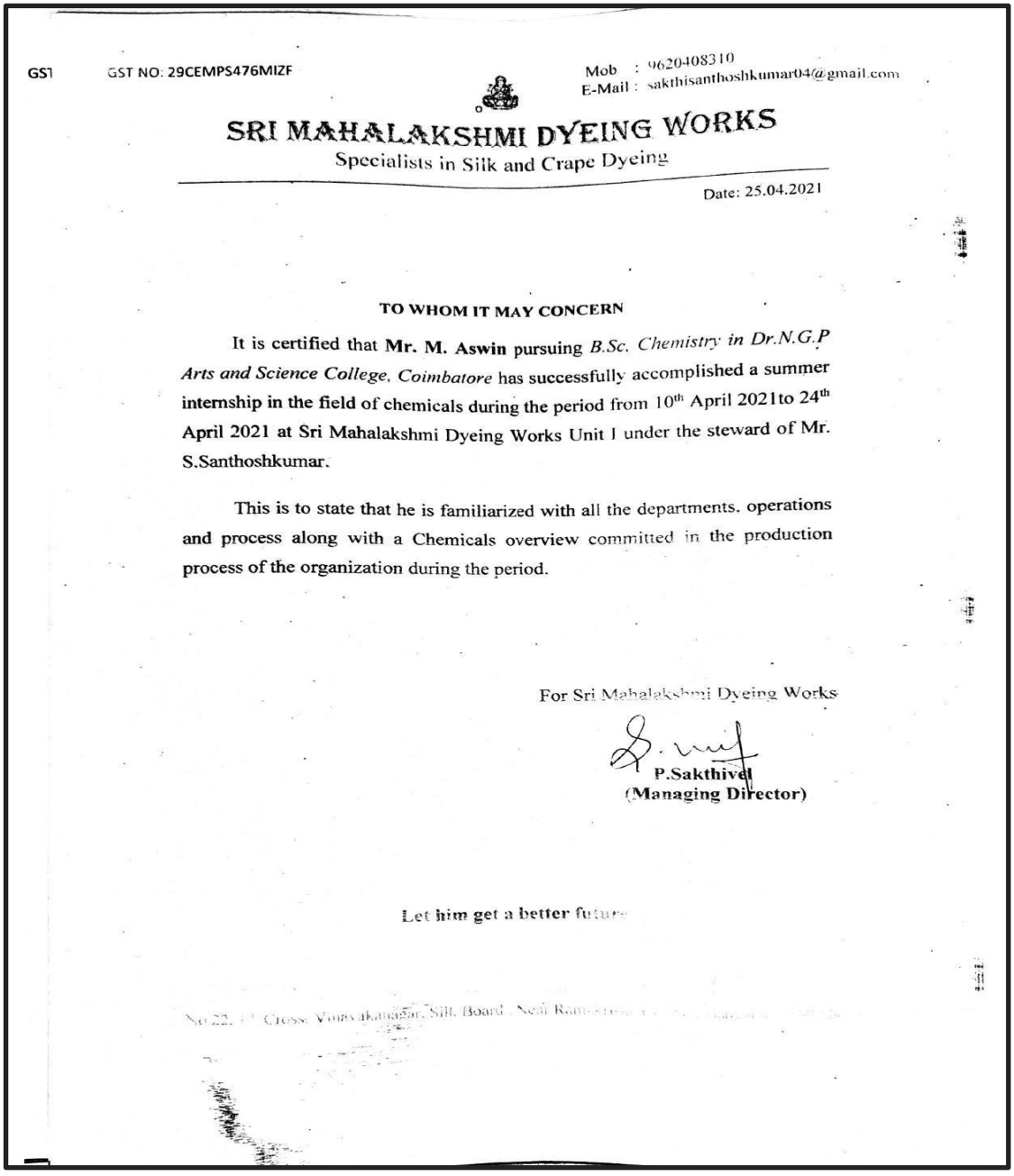


GST GST NO: 29CEMPS476MIZF

Mob : 9620408310
E-Mail : sakthisanthoshkumar04@gmail.com

SRI MAHALAKSHMI DYEING WORKS

Specialists in Silk and Crape Dyeing

Date: 25.04.2021

TO WHOM IT MAY CONCERN

It is certified that **Mr. M. Aswin** pursuing *B.Sc. Chemistry in Dr.N.G.P Arts and Science College, Coimbatore* has successfully accomplished a summer internship in the field of chemicals during the period from 10th April 2021to 24th April 2021 at Sri Mahalakshmi Dyeing Works Unit I under the steward of Mr. S.Santhoshkumar.

This is to state that he is familiarized with all the departments. operations and process along with a Chemicals overview committed in the production process of the organization during the period.

For Sri Mahalakshmi Dyeing Works

P.Sakthivel
(Managing Director)

Let him get a better future

No 22, 1st Cross, Vinayakapuram, Silk Board, Near Ramakrishna [illegible]

GATEWAY SOFTWARE SOLUTIONS

ISO 9001:2015

Date: 28/07/2021

TO WHOMSOEVER IT MAY CONCERN

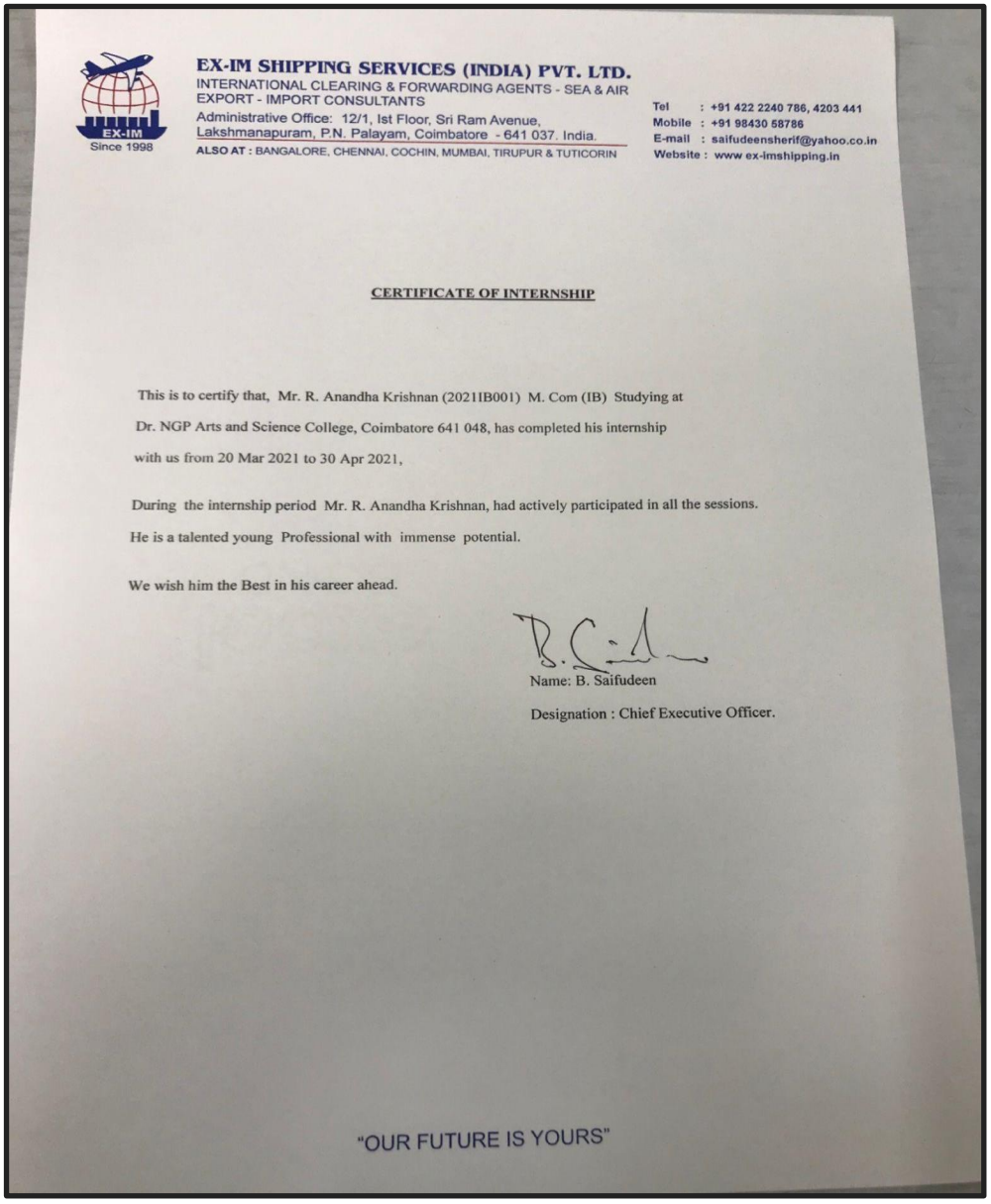
This is to certify the student Mr. S. LOKESH (191CS028) pursuing his second year B.Sc (CS) in Dr. NGP Arts and Science College, Coimbatore has completed his internship on Web Technologies in our concern from 28th June 2021 to 28th July 2021.

All the Best for his Future!

GATEWAY SOFTWARE SOLUTIONS

Manager

Mobile: 7397078885
E-mail : info@gatewaysoftwaresolutions.com / Website : gatewaysoftwaresolutions.com



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EXPORT - IMPORT CONSULTANTS
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CERTIFICATE OF INTERNSHIP

This is to certify that, Mr. R. Anandha Krishnan (2021IB001) M. Com (IB) Studying at Dr. NGP Arts and Science College, Coimbatore 641 048, has completed his internship with us from 20 Mar 2021 to 30 Apr 2021,

During the internship period Mr. R. Anandha Krishnan, had actively participated in all the sessions.

He is a talented young Professional with immense potential.

We wish him the Best in his career ahead.

Name: B. Saifudeen

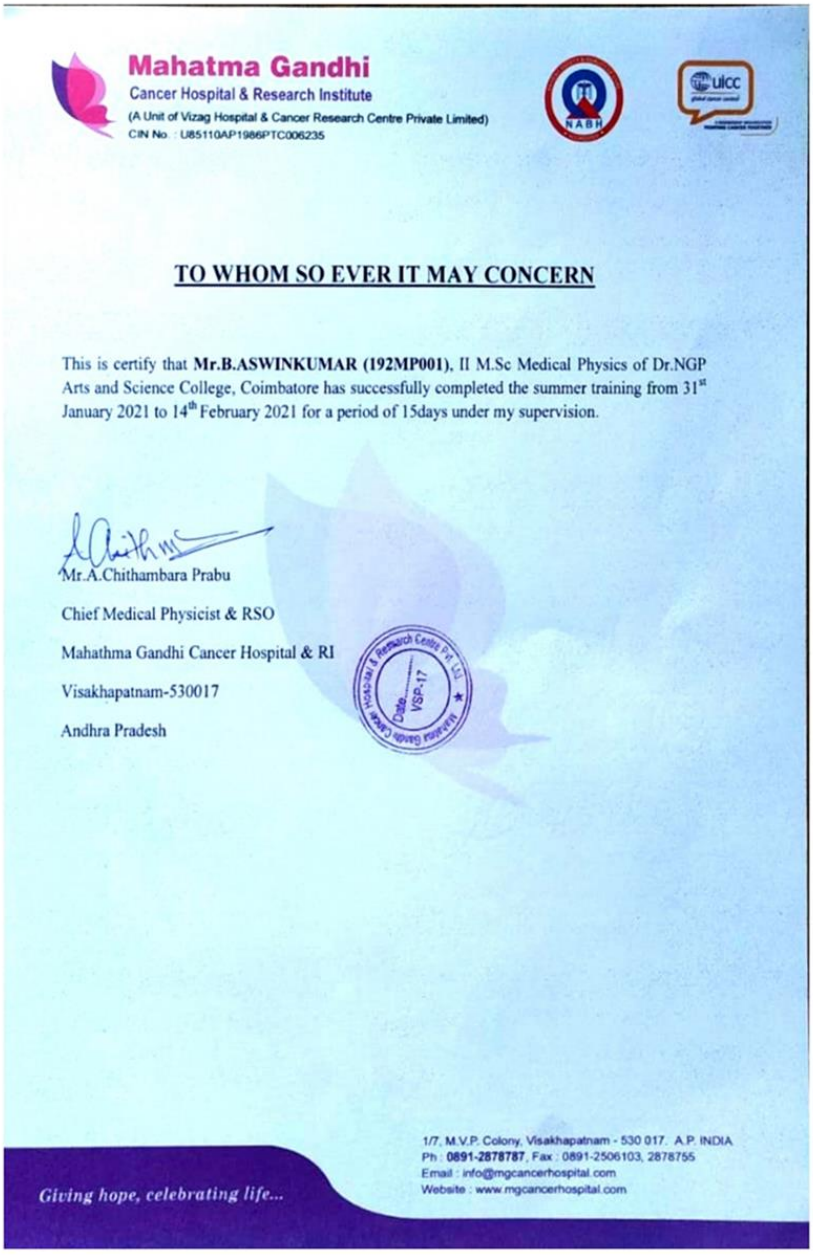
Designation : Chief Executive Officer.

"OUR FUTURE IS YOURS"

4. On the Job Training

S.No	Roll No.	Student Name	Title	Company Name and Address
1	192MP001	B. Aswinkumar	On the Job Training	Mahatma Gandhi Cancer Hospital & Research Institute Visakhapatnam, Andhra Pradesh
2	192MP002	S. Dineshkumar	On the Job Training	Apollo Hospitals Visakhapatnam, Andhra Pradesh
3	192MP003	S. Geethanjali	On the Job Training	Erode Cancer Centre Erode, Tamil Nadu
4	192MP004	V. Gogul Priean	On the Job Training	Dharan Cancer Speciality Centre Salem, Tamil Nadu.
5	192MP005	V.Jeeva	On the Job Training	RadOn Cancer Centre Hubballi, Karnataka
6	192MP006	V. D. Jeevitha	On the Job Training	Kauvery Hospital Trichy, Tamil Nadu
7	192MP007	M. Kiruba Shiney Rajam	On the Job Training	Kauvery Hospital Trichy, Tamil Nadu
8	192MP008	S. Padmaprabha	On the Job Training	Guru Hospital Madurai, Tamil Nadu

9	192MP009	T. Vijaya lakshmi	On the Job Training	Erode Cancer Centre Erode, Tamil Nadu
10	192MP010	R. Yadhumithra	On the Job Training	Dr.G.Viswanathan CBCC Cancer Centre, Trichy, Tamil Nadu



Mahatma Gandhi
Cancer Hospital & Research Institute
(A Unit of Vizag Hospital & Cancer Research Centre Private Limited)
CIN No. : U85110AP1986PTC006235

TO WHOM SO EVER IT MAY CONCERN

This is certify that **Mr.B.ASWINKUMAR (192MP001)**, II M.Sc Medical Physics of Dr.NGP Arts and Science College, Coimbatore has successfully completed the summer training from 31st January 2021 to 14th February 2021 for a period of 15days under my supervision.

Mr.A.Chithambara Prabu
Chief Medical Physicist & RSO
Mahathma Gandhi Cancer Hospital & RI
Visakhapatnam-530017
Andhra Pradesh

1/7, M.V.P. Colony, Visakhapatnam - 530 017. A.P. INDIA
Ph : 0891-2878787, Fax : 0891-2506103, 2878755
Email : info@mgcancerhospital.com
Website : www.mgcancerhospital.com

Giving hope, celebrating life...

Regd. Office : Apollo Hospitals Enterprise Limited, No. 19, Bishop Gardens, Raja Annamalaipuram, Chennai-600 028.
Corporate Indentity Number (CIN) : L85110TN1979PLC008035

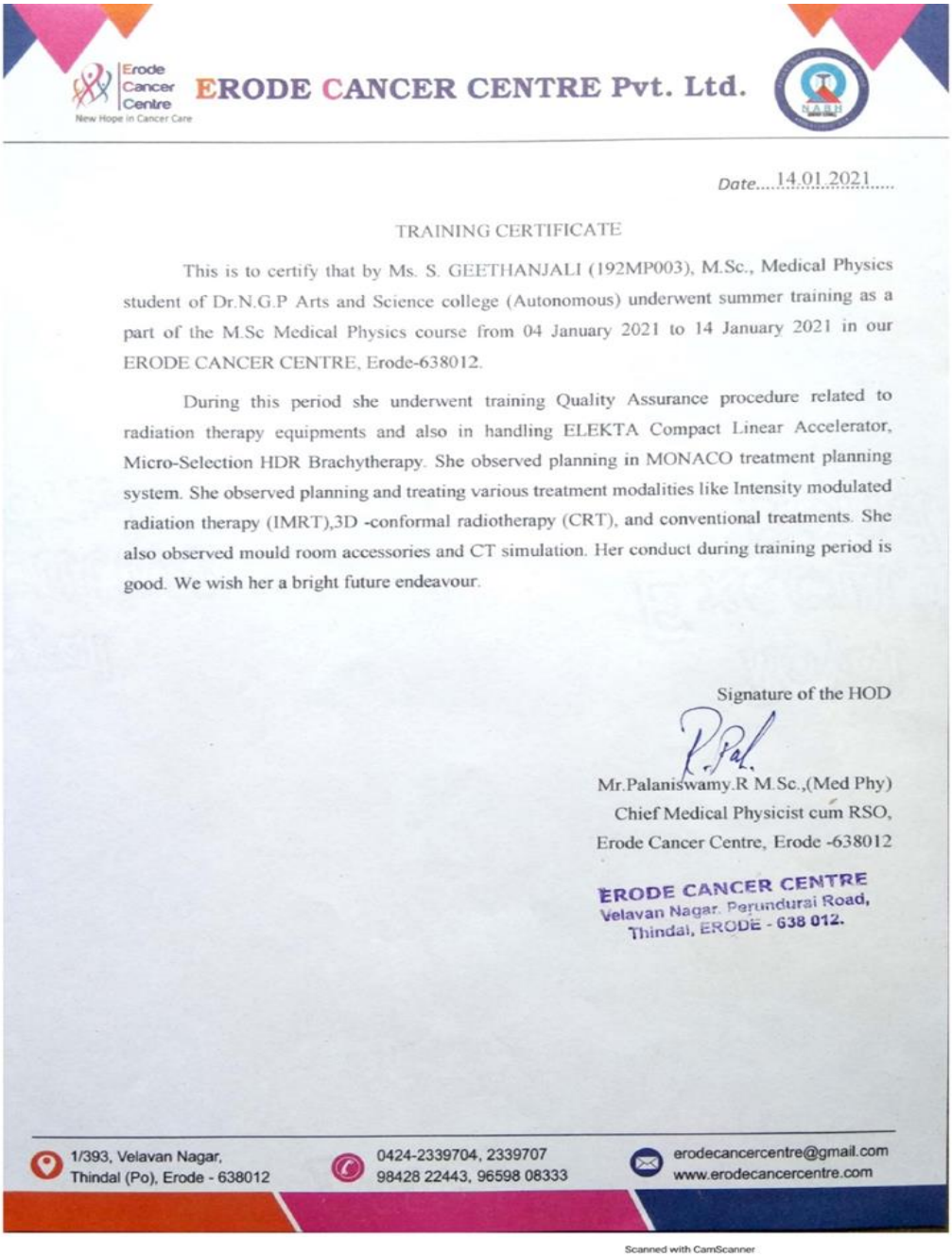
TRAINING COMPLETION CERTIFICATE

To Whom It May Concern

This is to certify that **Mr. S.DINESH KUMAR (192MP002),** student of Dr. N.G.P. Arts and Science College, Coimbatore has undergone his summer training from 04-01-2021 to15-01-2021. This certificate of completion is endowed to him, for an outstanding accomplishment of short course at our institute. He had observed all technical aspects of Radiation Therapy including mould room and CT procedures, Quality Assurance of Radiotherapy equipment and Radiation protection shielding calculations. This is to certify that he had stayed extremely supportive and never held back when it came to volunteer both time and energies. He was very sincere and attentive during the course of training.

Mr. D. YOGARAJA
Chief Medical Physicist & RSO
Department of Radiotherapy.

Apollo Hospitals, Health City, Arilova, Chinagadhili, Visakhapatnam 530 040. A.P., India. Emergency Call : 1066
0891-2867777 / 2727272, Fax No. 0891-2867899 / 2560858
E-mail : apollo_vizag@apollohospitals.com www.apollovizag.com
Regd. Office : Apollo Hospitals Enterprise Limited, No. 19, Bishop Gardens, Raja Annamalaipuram, Chennai-600 028.
Tel : +91-44-28293333, Fax : +91-44-28290956
Corporate Indentity Number (CIN) : L85110TN1979PLC008035



Erode Cancer Centre
New Hope in Cancer Care

ERODE CANCER CENTRE Pvt. Ltd.

Date....14.01.2021.....

TRAINING CERTIFICATE

This is to certify that by Ms. S. GEETHANJALI (192MP003), M.Sc., Medical Physics student of Dr.N.G.P Arts and Science college (Autonomous) underwent summer training as a part of the M.Sc Medical Physics course from 04 January 2021 to 14 January 2021 in our ERODE CANCER CENTRE, Erode-638012.

During this period she underwent training Quality Assurance procedure related to radiation therapy equipments and also in handling ELEKTA Compact Linear Accelerator, Micro-Selection HDR Brachytherapy. She observed planning in MONACO treatment planning system. She observed planning and treating various treatment modalities like Intensity modulated radiation therapy (IMRT),3D -conformal radiotherapy (CRT), and conventional treatments. She also observed mould room accessories and CT simulation. Her conduct during training period is good. We wish her a bright future endeavour.

Signature of the HOD

Mr.Palaniswamy.R M.Sc.,(Med Phy)
Chief Medical Physicist cum RSO,
Erode Cancer Centre, Erode -638012

ERODE CANCER CENTRE
Velavan Nagar, Perundurai Road,
Thindal, ERODE - 638 012.

1/393, Velavan Nagar,
Thindal (Po), Erode - 638012

0424-2339704, 2339707
98428 22443, 96598 08333

erodecancercentre@gmail.com
www.erodecancercentre.com

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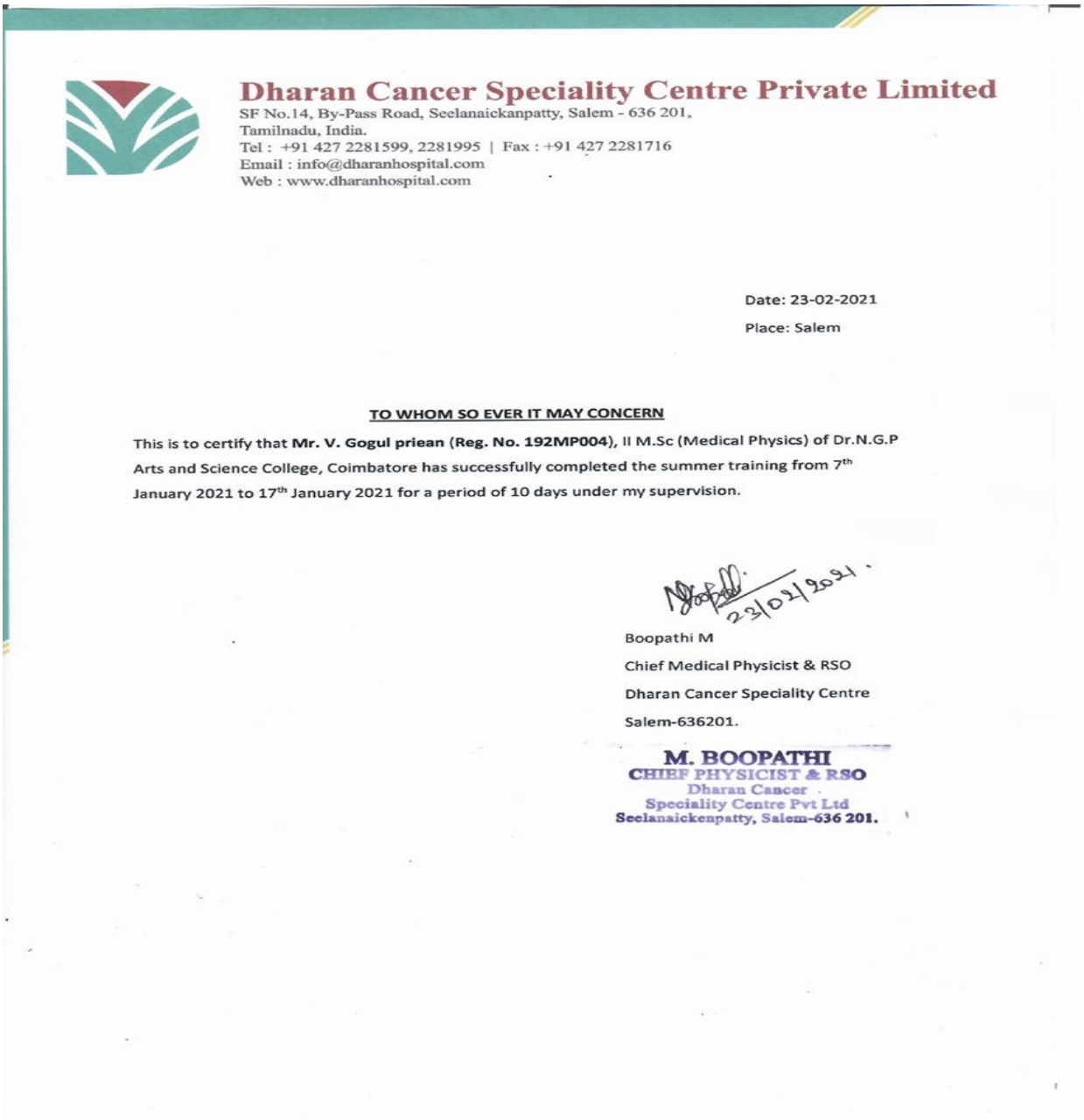


Dharan Cancer Speciality Centre Private Limited
SF No.14, By-Pass Road, Seelanaickanpatty, Salem - 636 201,
Tamilnadu, India.
Tel : +91 427 2281599, 2281995 | Fax : +91 427 2281716
Email : info@dharanhospital.com
Web : www.dharanhospital.com

Date: 23-02-2021
Place: Salem

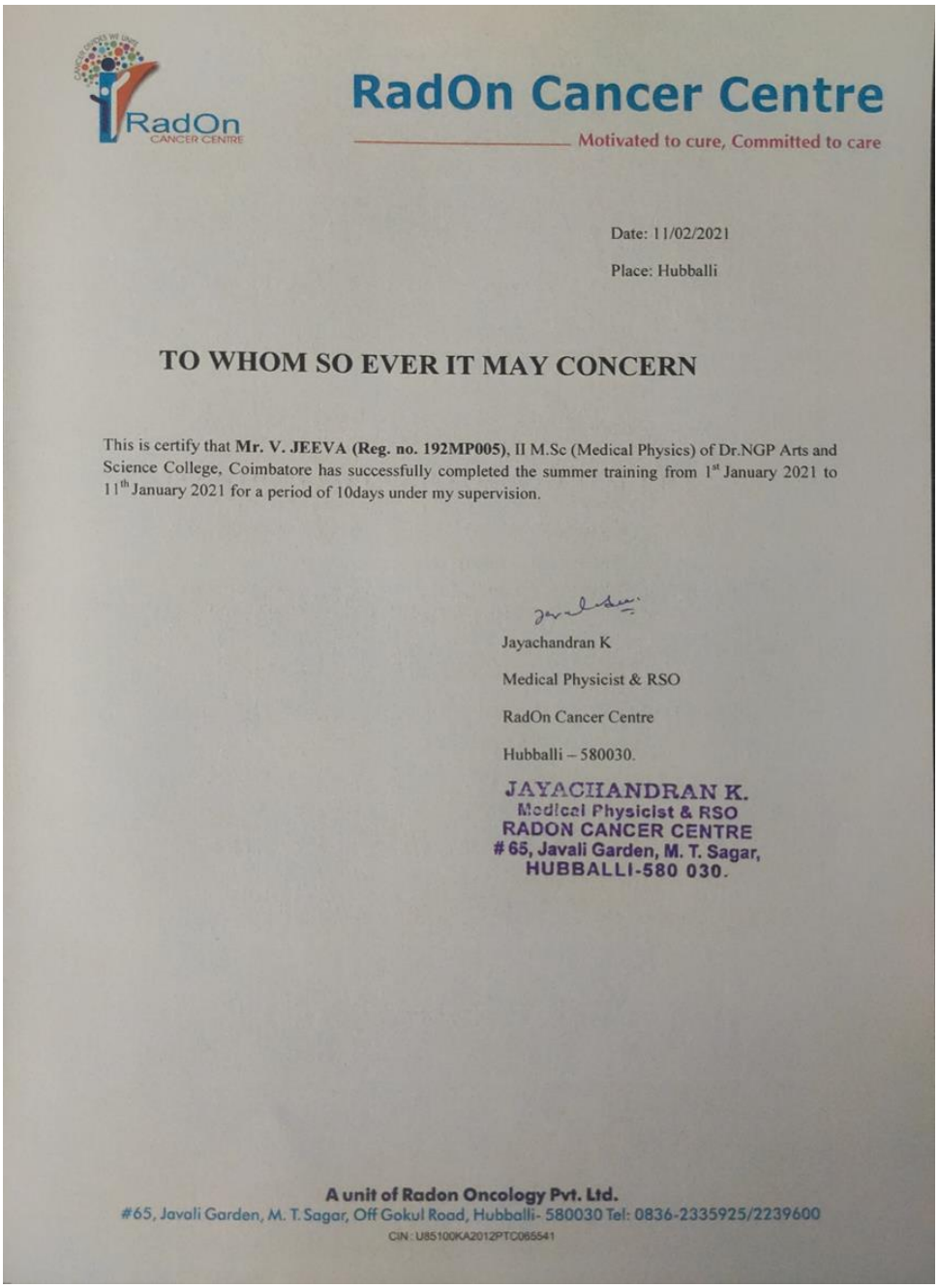
TO WHOM SO EVER IT MAY CONCERN

This is to certify that **Mr. V. Gogul priean (Reg. No. 192MP004)**, II M.Sc (Medical Physics) of Dr.N.G.P Arts and Science College, Coimbatore has successfully completed the summer training from 7th January 2021 to 17th January 2021 for a period of 10 days under my supervision.

23/02/2021

Boopathi M
Chief Medical Physicist & RSO
Dharan Cancer Speciality Centre
Salem-636201.

M. BOOPATHI
CHIEF PHYSICIST & RSO
Dharan Cancer
Speciality Centre Pvt Ltd
Seelanaickenpatty, Salem-636 201.



RadOn Cancer Centre

Motivated to cure, Committed to care

Date: 11/02/2021

Place: Hubballi

TO WHOM SO EVER IT MAY CONCERN

This is certify that **Mr. V. JEEVA (Reg. no. 192MP005)**, II M.Sc (Medical Physics) of Dr.NGP Arts and Science College, Coimbatore has successfully completed the summer training from 1st January 2021 to 11th January 2021 for a period of 10days under my supervision.

Jayachandran K

Medical Physicist & RSO

RadOn Cancer Centre

Hubballi – 580030.

JAYACHANDRAN K.
Medical Physicist & RSO
RADON CANCER CENTRE
65, Javali Garden, M. T. Sagar,
HUBBALLI-580 030.

A unit of Radon Oncology Pvt. Ltd.
#65, Javali Garden, M. T. Sagar, Off Gokul Road, Hubballi- 580030 Tel: 0836-2335925/2239600
CIN: U85100KA2012PTC065541

THE NEW AGE FAMILY HOSPITAL

kauvery hospital

CERTIFICATE

This is to certify that JEEVITHA.V.D was in the department of MEDICAL PHYSICS as M.Sc,. Medical Physics -TRAINEE from 11-01-2021 to 21-01-2021.

Mr. S.Karthik
Medical physicist & RSO
Department of Oncology
Kauvery hospital, Tennur,
Trichy.

kauvery hospital | No. 1, K.C. Road, Tennur, Trichy - 620 017.
CIN U85110TN1997PLC039491
P 0431 - 4022555 | E info@kauveryhospital.com | W www.kauveryhospital.com
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kauvery hospital

CERTIFICATE

This is to certify that KIRUBA SHINEY RAJAM.M was in the department of MEDICAL PHYSICS as M.Sc,. Medical Physics -TRAINEE from 11-01-2021 to 21-01-2021.

Mr. S.Karthik
Medical physicist & RSO
Department of Oncology
Kauvery hospital, Tennur,
Trichy.

kauvery hospital |No. 1, K.C. Road, Tennur, Trichy - 620 017.
CIN - U85110TN1997PLC039491
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+91 87 54 314930

info@guruhospitals.com

www.guruhospitals.com

Date: 19/Feb/2021

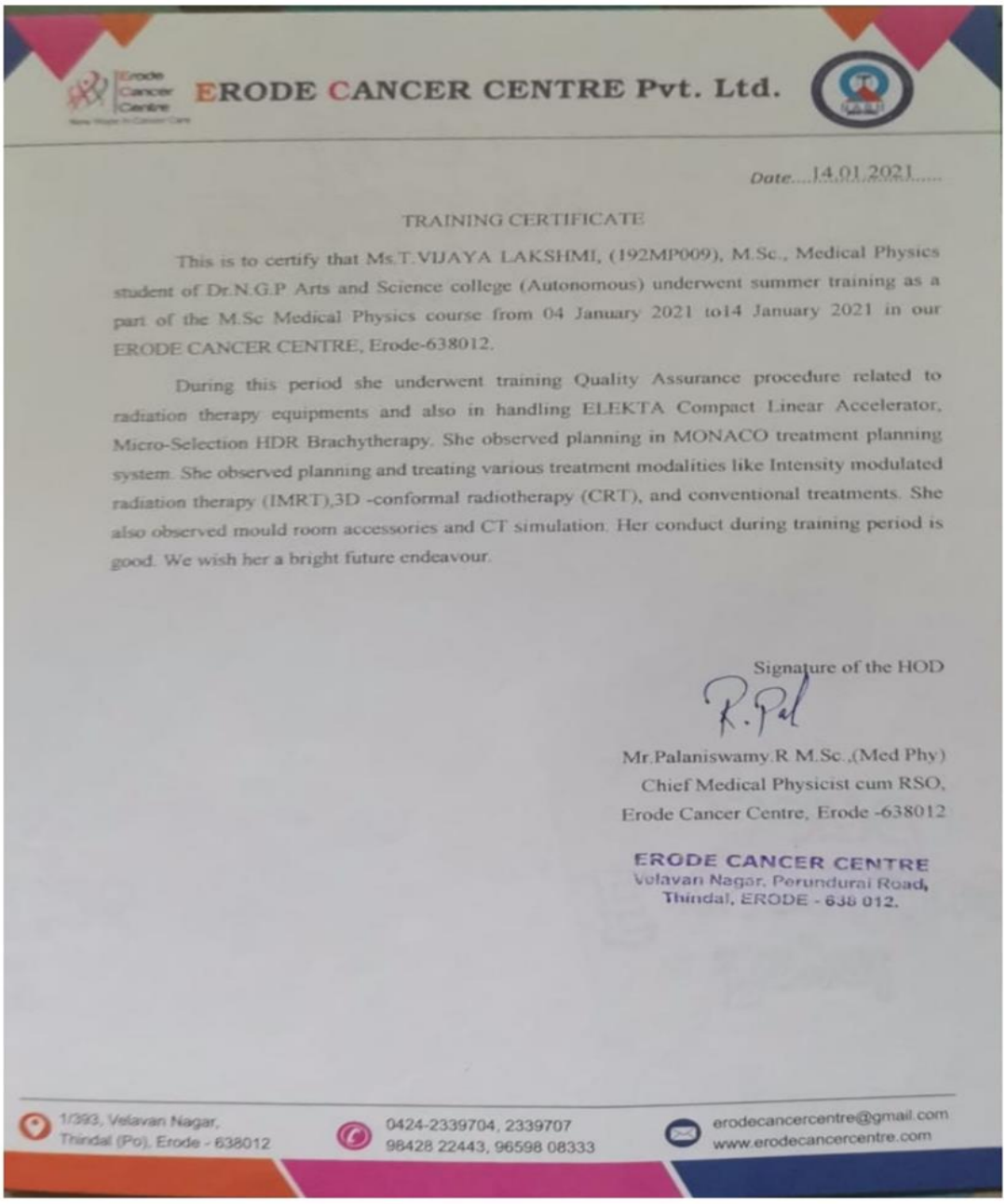
Training Certificate

This is to certify that **Ms. PADMA PRABHA** , student from Dr. NGP Arts and Science College, Coimbatore, Tamil Nadu has undergone field training from **15/01/2021** to **25/01//2021** in the department of radiation oncology, Guru Hospitals, Madurai, Tamil Nadu. During her training she had wide exposure to execution of 2DRT, 3DRT & IMRT techniques using Mosaiq 2.1.4 Oncology Information System (OIS). She observed the making of thermoplastic moulding procedures for all cases including Head and Neck, Thorax, Pelvic and Breast. She observed CT simulation process for all cases using GE duel slice CT Machine. Electron custom block making procedures and shielding procedures were observed by her. She helped and assisted physicist in carrying out daily, monthly and patient specific quality assurance program. During her tenure her conduct and character were found to be good.

GURU HOSPITAL 4/120F, Pandikoil Ring Rd MADURAI-625107

Antony Paull J.
Medical Physicist & RSO.
Department of Radiation Oncology.

Dr.Murugesh Linga Perumal., MD RT.
Head & Radiation Oncologist.
Department of Radiation Oncology.



ERODE CANCER CENTRE Pvt. Ltd.

Date....14.01.2021.....

TRAINING CERTIFICATE

This is to certify that Ms.T.VIJAYA LAKSHMI, (192MP009), M.Sc., Medical Physics student of Dr.N.G.P Arts and Science college (Autonomous) underwent summer training as a part of the M.Sc Medical Physics course from 04 January 2021 to14 January 2021 in our ERODE CANCER CENTRE, Erode-638012.

During this period she underwent training Quality Assurance procedure related to radiation therapy equipments and also in handling ELEKTA Compact Linear Accelerator, Micro-Selection HDR Brachytherapy. She observed planning in MONACO treatment planning system. She observed planning and treating various treatment modalities like Intensity modulated radiation therapy (IMRT),3D -conformal radiotherapy (CRT), and conventional treatments. She also observed mould room accessories and CT simulation. Her conduct during training period is good. We wish her a bright future endeavour.

Signature of the HOD

R.Pal

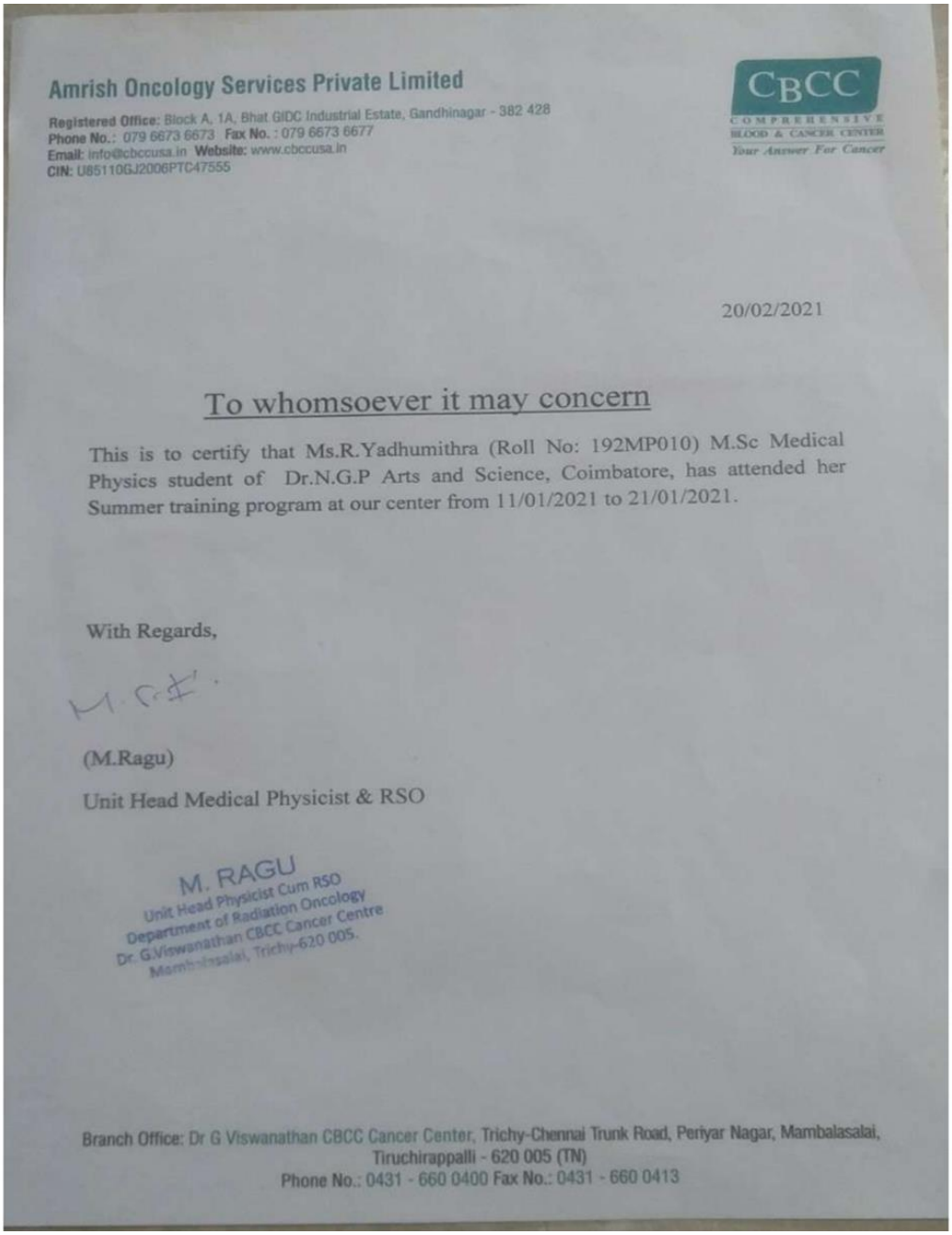
Mr.Palaniswamy.R M.Sc.,(Med Phy)
Chief Medical Physicist cum RSO,
Erode Cancer Centre, Erode -638012

ERODE CANCER CENTRE
Velavan Nagar, Perundurai Road,
Thindal, ERODE - 638 012.

1/393, Velavan Nagar,
Thindal (Po), Erode - 638012

0424-2339704, 2339707
98428 22443, 96598 08333

erodecancercentre@gmail.com
www.erodecancercentre.com



Amrish Oncology Services Private Limited

Registered Office: Block A, 1A, Bhat GIDC Industrial Estate, Gandhinagar - 382 428
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Email: info@cbccusa.in **Website:** www.cbccusa.in
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20/02/2021

To whomsoever it may concern

This is to certify that Ms.R.Yadhumithra (Roll No: 192MP010) M.Sc Medical Physics student of Dr.N.G.P Arts and Science, Coimbatore, has attended her Summer training program at our center from 11/01/2021 to 21/01/2021.

With Regards,

M. RAGU
Unit Head Physicist Cum RSO
Department of Radiation Oncology
Dr. G.Viswanathan CBCC Cancer Centre
Mambalasalai, Trichy-620 005.

(M.Ragu)

Unit Head Medical Physicist & RSO

Branch Office: Dr G Viswanathan CBCC Cancer Center, Trichy-Chennai Trunk Road, Periyar Nagar, Mambalasalai, Tiruchirappalli - 620 005 (TN)
Phone No.: 0431 - 660 0400 Fax No.: 0431 - 660 0413