

Government Engineering College Palakkad
Sreekrishnapuram, Kerala - 678633



Report on Research & Development
(2019-2022)

ABSTRACT

Government Engineering College Palakkad (GECp) was established in 1999 at Sreekrishnapuram village of Palakkad. The college runs six undergraduate courses of study, namely Computer Science & Engineering, Electronics & Communication Engineering, Information Technology, Mechanical Engineering, Electrical & Electronics Engineering and Civil Engineering. Department of Computer Science and Engineering runs a postgraduate program in Computational Linguistics and Department of Mechanical Engineering offers a postgraduate program in Robotics. Over the past decades, GECp has made a steady progress in terms of academic excellence, infrastructure and development of key subsystems. The College has got good infrastructure facilities such as smart class rooms, library, central computing facility, e-learning centre, laboratories & workshops equipped with machines and ancillaries comparable with industrial standards, seminar halls, open air auditorium and various amenities such as hostels (men and women), staff quarters, canteen, co- operative society etc. The institute has well established Student Counseling Cell, Entrepreneurship Development Club, National Service Scheme, Alumni Association and Parent Teacher Association. The student chapters of professional bodies like the IEEE, ISTE and the different clubs and forums offer a wide range of opportunities for students to nurture their talents thereby promoting their overall development and leadership qualities. The Research and Development (R & D) Committee under TEQIP II aims to nurture research culture in the College by promoting research in newly emerging and challenging frontier areas of Engineering and Technology. It encourages the students and faculty to undertake the research in newly emerging frontier areas including multidisciplinary fields. This enhances the general research capability of budding technocrats.

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Chapter 1

INTRODUCTION

Vision

Excellence through the wings of science and technology

Mission

To transform youth to talented engineers with creativity and integrity who can meet the technological challenges for the service of society

As embedded in the Mission and Vision statements of GEC Palakkad (GECP), the institution aims to provide quality education for transforming the students into talented and socially responsible technocrats. In the learning and growth perspective, the effectiveness of the education system offered depends on the opportunities for development of the primary stakeholders like students and faculty of the institution and the association/involvement/support of other stakeholders like industries, alumni, parents and community/society for this purpose.

The R & D committee was formed with an objective to encourage and promote cutting-edge research based on the proven capabilities and expertise of faculty and students. The Committee facilitate strengthening of the Institute's research capabilities; proactively promote basic research and monitor quality of research work done.

Despite the COVID-19 pandemic having had a severe impact on the on-campus activities due to the college having to close its premises in response to lockdown measures, the scholastic and co-scholastic pursuits were recommenced with full vigor by the start of 2022. In this report, the activities planned and implemented by GECP during 2019 – 22 to meet the stated mission and vision, are summarized in the forthcoming chapters.

Chapter 2

R & D Initiatives

The objective of R & D Committee is to promote research activities among students and faculty as well as to provide a robust platform for sharing and implementing innovative and creative ideas to facilitate exchange of information and interaction among the various research institutes and industries to develop skilled manpower in various engineering fields.

2.1 Recommendations of Research Committee

- Informing the faculty members about various research schemes that are offered by the various government and other funding agencies.
- Encouraging faculty members to submit their research project proposals to the funding agencies.
- Providing financial assistance to the faculty members to publish/present research papers in journals/conferences.
- Promoting Research culture among the staff by conducting special sessions by eminent researchers in those areas.
- Encouraging faculty members to register for Ph.D.

2.2 Steps taken to Promote Research

The policy to promote research culture in the college is given below:

- As per the G.O.(Rt).No. 237/2021/HEDN Dated Thiruvananthapuram 08/02/2021, Government issued guidelines for the utilization of the four funds for ensuring the sustainability of TEQIP II initiatives.
- As per these guidelines students can purchase spares, consumables or tools not exceeding Rs.20000/- as incidental expenses for the course project or other technical/research purposes.
- Research seed money up to Rs.2 lakh can be sanctioned to the faculty members

having 15 years or less service for the purchase of equipment/consumables etc.

- Research publication charges for journal publications are reimbursed to the faculty who has published their papers in reputed journals.
- MoUs with reputed institutes viz. IIT Palakkad, Integrated Rural Technology Centre (IRTC) repute. Faculty and students benefit from these MoU's as they are being exposed to enriched knowledge and real time experiences.
- The faculties are encouraged to apply for research grants to various funding agencies and Principal investigator/coordinator is given autonomy for executing projects.
- Motivate the students to write research papers, to do research-oriented project works and paper presentations at National and International level.
- Motivate the faculty members to visit the leading Institutions and consult subject experts to acquire new ideas in research.
- Industrial experts are invited to the institution for interaction with faculty and students to promote the industry need based research.
- Senior academicians from other institutions / universities are invited to share their expertise.

2.3 MoUs

The MoUs are aimed at enhancing cooperation between our institution and the respective institutions for student/faculty training, internships, projects, collaborative research and entrepreneurship promotion. GEC Palakkad has signed MoUs with the following institutions so far:

Sl No	Name of the organization	Type of collaboration
1	IRTC Mundur, Palakkad	Projects, internships, joint research
2	IIT Palakkad	Projects, internships, joint research, invited talks
3	TECHIN, IIT Palakkad	Projects, internships, joint research, entrepreneurship
4	K-Disc TVM	Innovation, startups, ODOI, YIP
5	ICT Academy Kerala	Internships, Students Training, Placement
6	Metal Industries Shornur	Projects, internships

Sl No	Name of the organization	Type of collaboration
7	ICCONS Shornur	Internships, Students Training, Joint Research
8	NanoTech Dyanmics, Defence Park, Ottapalam	Internships, Students Training, Joint Research
9	Sastra Robotics, Infopark, Kochi	Joined research, internship, invited talks
10	ZestyBeanz, Technopark Trivandrum	students training, internships
11	Saron Innovature Labs, Sreekrishnapuram	Students Training, Joined Projects

2.4 Collaborative Research and Learning (CoRAL) Centre

Kerala is one of India's most progressive States in terms of social welfare and quality of life. The Government of Kerala which has initiated a number of schemes in various other sectors has recently adopted a firm stance in improving its higher education sector with prime focus on research. The State has consciously set aside considerable amount of funds in the recent budget for the enrichment of research and learning in the higher education sector.

In this juncture, this centre is aimed to bridge a conspicuous gap existing between the research produced by the academics in the academic institutions and problems in the society warranting intelligent, sustainable and environmental friendly technological solutions. There are a good number of central and state funded research institutes in almost all the districts of the state. Apart from these, there are several small and medium scale industries in many of the districts. The local issues of regions are handled by the local self-governments. Currently these agencies/institutes and the academia of the state function as two verticals with minimum interaction between them. This scenario needs urgent intervention whereby a centre can be established which acts as a link, facilitating a mutual give and take between research institutes, industries, LSGDs and Government missions on one side and academic institutions on the other. This is also expected to attract researchers to do more meaningful research, thereby spearheading their objectives to reach out to the society. It is in this context that CoRaL can play a pivotal role. CoRaL pave the way for the seamless interaction between the academia of the state with other stakeholders which includes research institutes, industries, LSGDs and Government Missions in the state paving way to quick, intelligent, sustainable and environment friendly technological solutions to problems/issues in the society.

Chapter 3

Committee

As per the G.O.(Rt).No. 237/2021/HEDN Dated Thiruvananthapuram 08/02/2021, Government issued guidelines for the utilization of the four funds for ensuring the sustainability of TEQIP II initiatives. As per these guidelines students can purchase spares, consumables or tools not exceeding Rs.20000/- as incidental expenses for the course project or other technical/research purposes. Research seed money up to Rs.2 lakh can be sanctioned to the faculty members having 15 years or less service for the purchase of equipment/consumables etc. As per the guidelines, the institution shall form Research Guidance Committee (RGC) with eminent professors/scientists for strengthening/promoting the research activities in the institution, enhance industry interaction and to foster industry relevant research. The Research Guidance committee (RGC) provides support and guidance to faculty and students to take up research and innovative development relevant to industry as well as society.

The research guidance committee review the proposals submitted by the students/faculty and shortlists the proposals for sanctioning seed money. The maximum amount admissible for the Research Assistance, eligibility, terms and conditions etc shall also be finalized by the RGC. The committee shall offer guidance for submitting proposals for funded projects from various reputed agencies as well as guidance for accreditation as well as NIRF ranking.

The Research and Development (R & D) Committee under TEQIP-II is chaired by Principal and consists of the Research Coordinator, Heads of the departments, and senior faculty members of the College. R & D Committees monitor and address the issues of research in every department of the entire institute and recommend for the approval by the RGC. It provides advisory support in selecting the R & D proposals for implementing R & D activities through analysis of technological trends and identification of thrust areas

The members of Research Guidance Committee of GECP are as follows:

Senior Research Advisor (SRA) : Dr. Ganesh Natarajan,

Associate Professor, Department of Mechanical Engineering,
IIT Palakkad

Chairperson : Dr. P C Reghu Raj, Principal

Members: Dr. Anitha R, Assistant Professor, ECE Department – Coordinator (R & D Committee)

Dr. Mahipal D, Professor, ME Department

Dr. Dhanya K M, Associate Professor, IT Department

Dr. Vinita Chellappan, Associate Professor, EEE Department

Dr. Swaraj K P, Associate Professor, CSE Department

Details of the R & D committee Members are listed below

Year	R & D Committee Members
2022-23	Dr. Anitha R, Assistant Professor, ECE Department – Coordinator (R & D Committee) Dr. Mahipal D, Professor, ME Department Dr. Dhanya K M, Associate Professor, IT Department Dr. Vinita Chellappan, Associate Professor, EEE Department Dr. Swaraj K P, Associate Professor, CSE Department
2021-22	Dr. Anitha R, Assistant Professor, ECE Department – Coordinator (R & D Committee) Prof. Balu John, Professor, CSE Department Dr. Remesh Babu K R, Associate Professor, IT Department Dr. Vinita Chellappan, Associate Professor, EEE Department Dr. Promode Das K, Assistant Professor, ME Department
2020-21	Dr. Anitha R, Assistant Professor, ECE Department – Coordinator (R & D Committee) Balu John, Professor, CSE Department Dr. Remesh Babu K R, Associate Professor, IT Department Dr. Vinita Chellappan, Associate Professor, EEE Department Dr. Promode Das K, Assistant Professor, ME Department
2019-20	Dr. Anitha R, Assistant Professor, ECE Department – Coordinator (R & D Committee) Dr. Reena Murali, Professor, CSE Department Dr. Remesh Babu K R, Associate Professor, IT Department Prof. Jose Sebastian T K, Associate Professor, EEE Department Dr. Promode Das K, Assistant Professor, ME Department

Chapter 4

Achievements

4.1 PhD Awarded

Six faculty members from various departments successfully completed PhD from reputed institutions. The details of faculty members who were awarded PhD are listed as follows

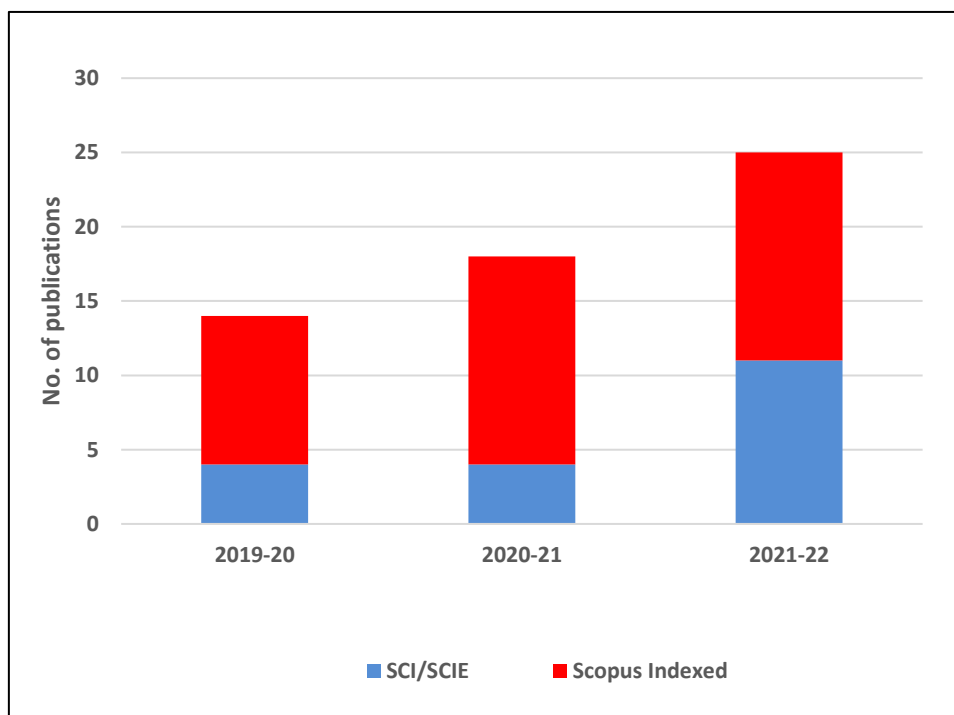
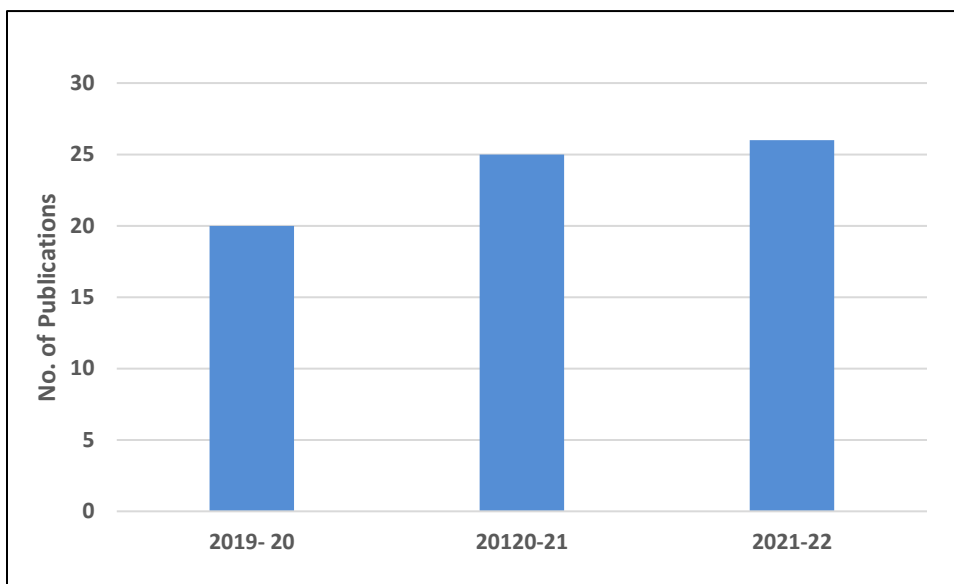
Sl.No	Name	Department	Year	Awarding Institution
1	Dr. Sangeetha U	IT	2022	NIT Calicut
2	Dr. Silpa Sangeeth L R	IT	2022	IIT Madras
3	Dr. Safeer Babu	IT	2021	IIT Madras
4	Dr. R Jayadevan	ECE	2021	Calicut University
5	Dr. Rani M R	IT	2021	NIT Calicut
6	Dr. K R Remesh Babu	IT	2019	CUSAT
6	Dr. K Balakrishnan	ME	2019	Anna University

4.2 Patent

- Dr. A R Jayan granted US Patent on “Method and System for Consonant-Vowel Ratio modification for improving speech perception” Patent no. **US 10176824B2 dated January 8, 2019**
- Mr. Muhammedali Shafeeque K., Assistant Professor, EEE Dept has filed an Indian patent for his work on “A novel design for a rotary generator using triboelectric effect” (**Application no. 202041037140 Dated 28/08/2020**)
- Dr. Remesh Babu K.R. **filed patent on** "Portable Public Surveillance Device with an AI Driven Face Recognition Computational Module for Large Scale Community Policing" (**The Patent Office Journal No. 41/2020 Dated 09/10/2020**)
- Dr. Remesh Babu K R, Dr. Sangeetha U, Dr. A Selvakumar filed a patent on “A Real Time Automatic Intelligent System And Method For Wild Animal Monitoring And Counting Device Based On A Deep Convolutional Neural Network”. (**Application no. 202241013392 Dated 11/03/2022**)

4.3 Publications by faculty and students

The number of publications by faculty increased in last three years. The number of scholarly journal articles published in SCI/SCIE indexed, Scopus indexed journals and refereed journals and conferences each year is growing as shown below.



The publications by faculty in last three years are listed below

2021-22

Faculty Name	Department	Publication Details
Dr. P. C. Reghu Raj	CSE	Rahmath K, R., Reghu Raj, P. C., & PC, R. (2022). Malayalam Question Answering System Using Deep Learning Approaches. IETE Journal of Research, 1-13. DOI: 10.1080/03772063.2022.2077846 [SCIE Indexed]
		Thambi, S. V., & ReghuRaj, P. C. (2022, February). Towards Improving the Performance of Question Answering System using Knowledge Graph-A Survey. In 2022 Second International Conference on Artificial Intelligence and Smart Energy (ICAIS) (pp. 672-679). IEEE. [Scopus Indexed]
		Thambi, S. V., & ReghuRaj, P. C. (2022, March). Graph Based Document Model and its Application in Keyphrase Extraction. In 2022 IEEE International Conference on Signal Processing, Informatics, Communication and Energy Systems (SPICES) (Vol. 1, pp. 92-98). IEEE. [Scopus Indexed]
Divya K U	Mathematics	Udayan, D. K., & Somasundaram, K. (2021). The Inequalities of Merris and Foregger for Permanents. Symmetry, 13(10), 1782. [SCIE Indexed]
		Udayan, D. K., & Somasundaram, K. (2022, March). “Direct sum of star matrices”, Journal of Analysis and Applications, 20(1), 69-80. [Scopus Indexed]
		Udayan, D. K., & Somasundaram, K. (2022). Some Results on Majorization of Matrices. Axioms, 11(4), 146. [SCIE Indexed]
		Divya, K. U., & Somasundaram, K. (2022). Permanent dominance conjecture for derived partition. Bulletin of The Institute of Combinatorics and its Applications, 95, 84-92 [Scopus Indexed]
Panchami V. U.	CSE	Panchami, V. U., & Manish, T. I. (2021, June). Bladder Cancer Prediction Using Genetic Algorithm and Fuzzy Rule-Based System. In 2021 International Conference on Communication, Control and Information Sciences (ICCISc) (Vol. 1, pp. 1-6). IEEE. [Scopus Indexed]
Dr. Anitha R	ECE	Shadrach, F. D., Kandasamy, G., & Raghunathan, A. (2022). Classification of leaf diseases using modified genetic algorithm and normalized sum square deviation. DYNA-Ingeniería e Industria, 97(3). [SCIE Indexed]

Faculty Name	Department	Publication Details
		Shadrach, F. D., Kandasamy, G., & Raghunathan, A. (2021). Anomaly Detection in Vitis Vinifera Using Neural Networks and Radon Transform. In Advances in Electrical and Computer Technologies (pp. 707-717). Springer, Singapore [Scopus Indexed]
Dr. K R Remesh Babu	IT	Remesh Babu K R, Preetha K G, Saritha S, and Rinil K R. 2021. An Energy Efficient Intelligent Method for Sensor Node Selection to Improve the Data Reliability in Internet of Things Networks. KSII Transactions on Internet and Information Systems, 15, 9, (2021), 3151-3168. DOI: 10.3837/tiis.2021.09.004. [SCIE Indexed]
		Remesh Babu K R, Preetha K G, Saritha S, and Rinil K R. 2022. Virtual Modelling and Analysis of Manual Material Handling Activities among Warehouse Workers in Construction Industry. WORK: A Journal of Prevention, Assessment & Rehabilitation, [Accepted][SCIE Indexed]
Dr. K R Remesh Babu	IT	Preetha, K. G., Antony, S. K., KR, R. B., Saritha, S., & Sangeetha, U. (2022). Design and Implementation of an Augmented Reality Mobile Application for navigating ATM counters (AR-ATM). Industrial Robot: the international journal of robotics research and application [SCIE Indexed]
Sajitha M	IT	Sajitha, M., Kavitha, D., & Reddy, P. C. (2022). An optimized whale-based replication node prediction in wireless sensor network. Wireless Networks, 1-17. [SCI Indexed]
		Sajitha, M. (2022). LCLS: A method for detecting clone nodes in Heterogeneous WSN. International Conference on Network Control, Computing, Communication with cyber security and Real time implementation of Physical System
Dr. Rani M R	IT	Simi, M. R., Bindhu, B. K., Varghese, A., & Rani, M. R. (2022). Optimization of DRASTICA vulnerability assessment model by Wilcoxon rank sum non parametrical statistical test. Materials Today: Proceedings, 58, 121-127. [Scopus Indexed]
Dr. Rani M R	IT	Simi, M. R., Bindhu, B. K., Abin Varghese, D., & Rani, M. R (2022, March). Ground water vulnerability assessment of kodoor river basin by integrated drastic method. YMER, 21(3) [Scopus Indexed]

Faculty Name	Department	Publication Details
Dr. Jiji K S	EEE	Sreekumar, A., & Jiji, K. S. (2021, May). A Survey of DC-DC Converters for Fuel Cell Electric Vehicle Applications. In 2021 2nd International Conference for Emerging Technology (INCET) (pp. 1-5). IEEE. [Scopus Indexed]
Dr. Joseph Peter	EEE	Peter, J., & Ramchand, R. (2021). Space vector PWM-based current error boundary investigations for three-level VSI fed induction motor drive. International Transactions on Electrical Energy Systems, 31(12), e13228. [SCIE Indexed]
Muhammedali Shafeeque K	EEE	Baiju, V., Asif Sha, A., Sajid, N. M., & Muhammedali Shafeeque, K. (2022). Simulation and performance study of a two-bed adsorption cooling system operated with activated carbon-ethanol. Proceedings of the Institution of Mechanical Engineers, Part C: Journal of Mechanical Engineering Science, 236(7), 3804-3817. [SCI Indexed]
		Shaima, E. K., Sajeew, N., & Kormath, S. A. A. (2022, February). A New H-bridge Switched Capacitor Based Five Level Inverter. In 2022 IEEE Delhi Section Conference (DELCON) (pp. 1-6). IEEE. [Scopus Indexed]
Dr. Vinita C	EEE	Anjana Narayanan, Athulya P C, Rahmath T A, Vismaya A, Stella Kurian, Vinita Chellappan (2022). SRM Motor Control using Conventional and Full- Order-Terminal SMC Controller. In 2nd ASIANCON 2022 Technically Co-Sponsored by IEEE Bombay Section, Pune, India. [Scopus Indexed]
Dr.Vinita C	EEE	Jeslin Joy, Alpha M M, Anupama V M, Muhammed Sabeel P, Vinita Chellappan. Dynamic Modeling and Current Control of a Solar powered Battery Storage System. In 2nd ASIANCON 2022 Technically Co-Sponsored by IEEE Bombay Section, Pune, India [Scopus Indexed]
		Sagar Suresh, Joseph Peter, Vinita Chellappan. (2022, July) Mathematical Modeling and Speed Control of 6/4 Switched Reluctance Motor Drive. In IEEE International Conference on Futuristic Technologies in Control System & Renewable Energy – ICFCR 2022, Kuttippuram, Malappuram, Kerala, India. . [Scopus Indexed]
		Anees A, Aslam V K, Drishya K, Rasmi K R, Sulaiman P M, Vinita Chellappan, Joseph Peter. Isolated Boost Converter and Inverter System for Domestic Applications. In IEEE International Conference on Futuristic Technologies in Control System & Renewable Energy – ICFCR 2022, Kuttippuram, Malappuram,

Faculty Name	Department	Publication Details
		Kerala, India. [Scopus Indexed]
Dr. E. R. Lisy.	EEE	Saleem, A., & Lisy, E. R. (2022). Three Dimensional Nonlinear Guidance Law for Exact Impact Time Control. IEEE Access, 10, 67350-67362. [SCIE Indexed]

2020-21

Faculty Name	Department	Publication Details
Dr.P C Reghu Raj	CSE	Reji Rahmath K, P.C Reghu Raj, and Rafeeqe P.C. Pre-trained Word Embeddings for Malayalam Language: A Review . In Proc. IEEE Int. Conf. on Artificial Intelligence and Smart Systems (ICAIS-2021), 25-27 Mar 2021, JCT College of Engg, Coimbatore. [Scopus Indexed]
Raji R Pillai	CSE	Chakraborty, D., Chandran, L. S., Padinhatteeri, S., & Pillai, R. R. (2021, July). Algorithms and Complexity of s-Club Cluster Vertex Deletion. In International Workshop on Combinatorial Algorithms (pp. 152-164). Springer, Cham.
		Chandran, L. S., Das, S. K., Hell, P., Padinhatteeri, S., & Pillai, R. R. (2021, February). Template-Driven Rainbow Coloring of Proper Interval Graphs. In Conference on Algorithms and Discrete Applied Mathematics (pp. 452-470). Springer, Cham.
Dr.Bindu P	ECE	Sarath, J. V., & Palakkal, B. P. (2021, January). Design and Analysis of DRA based Antenna for FPV Applications. In 2021 IEEE Second International Conference on Control, Measurement and Instrumentation (CMI) (pp. 56-60). IEEE. [Scopus Indexed]
		Sarath, J. V., BIJU, K., & RANI, L. (2021). REVIEW OF ANTENNAS USED IN FPV/WLAN APPLICATIONS. Acta Technica Corviniensis-Bulletin of Engineering, 14(1).
Dr. Anitha R	ECE	Jai Shankar, B., Murugan, K., Obulesu, A., Finney Daniel Shadrach, S., & Anitha, R. (2021). MRI image segmentation using bat optimization algorithm with fuzzy c means (BOA-FCM) clustering. Journal of Medical Imaging and Health Informatics, 11(3), 661-666. [SCIE Indexed]

Faculty Name	Department	Publication Details
Dr. Anitha R	ECE	Shadrach, F. D., Kandasamy, G., & Raghunathan, A. (2021). Anomaly Detection in Vitis Vinifera Using Neural Networks and Radon Transform. In Advances in Electrical and Computer Technologies (pp. 707-717). Springer, Singapore. [Scopus Indexed]
Rani L	ECE	Sarath, J. V., BIJU, K., & RANI, L. (2021). REVIEW OF ANTENNAS USED IN FPV/WLAN APPLICATIONS. Acta Technica Corviniensis-Bulletin of Engineering, 14(1).
Dr. Sangeetha U	IT	Sangeetha, U., & Babu, A. V. (2021). Service differentiation in IEEE 802.11 ah WLAN under restricted access window based MAC protocol. Computer Communications, 172, 142-154. [SCI indexed]
Dr. Silpa Sangeeth L R	IT	Sangeeth LR, S., Mathew, S. K., & Potdar, V. (2020). Information Processing view of Electricity Demand Response Systems: A Comparative Study Between India and Australia. Pacific Asia Journal of the Association for Information Systems, 12(4), 2. [Scopus indexed]
Dr. Sabeer Babu	IT	Thayyil, S. B., Yadav, S. K., Polthier, K., & Muthuganapathy, R. (2021). Local Delaunay-based high fidelity surface reconstruction from 3D point sets. Computer Aided Geometric Design, 86, 101973. [SCI Indexed]
Dr. Remesh Babu K R	IT	Babu, K. R., & Madhu, K. P. (2021). Intelligent Secure Storage Mechanism for Big Data. Webology, 18(SI01), 246-261. [Scopus indexed]
		Divya Visakh, Dr. Reena Murali, Dr. Ramesh Babu K R (2021, June) A Content Transfer Approach: Rule based Table to Text Generation, IJIRSET, Vol 10, Issue 6DOI:10.15680/IJIRSET.2021.1006373.
Dr. Rani M R	IT	Philip, G., Rani, M. R., & Subashini, R. (2020, June). On computing the Hamiltonian index of graphs. In International Computer Science Symposium in Russia (pp. 341-353). Springer, Cham.[Scopus indexed]
Stella Kurian	EEE	Kurian, S., & Nisha, G. K. (2022). Torque Ripple Minimization of SRM Using Sliding-Mode Current Controller and Torque-Sharing Function. In Power Electronics and High Voltage in Smart Grid (pp. 339-351). Springer, Singapore..[Scopus indexed]

Faculty Name	Department	Publication Details
Muhammedali Shafeeque K	EEE	Kormath, S. A. A., Shafeeque, K. M., & Ajmal, K. T. (2020, July). Non-Isolated Five Switch CCM Boost Inverter. In 2020 International Conference on Electronics and Sustainable Communication Systems (ICESC) (pp. 1056-1061). IEEE. [Scopus Indexed]
		Salma, K., Shafeeque, K. M., & Ajmal, K. T. (2020, November). Non-Isolated DCM/DCD Operated Step-Up Inverter Derived Novel CCM Operated Five Switch Step-Up/Down Inverter for Renewable Energy Applications. In 2020 International Conference on Power Electronics and Renewable Energy Applications (PEREA) (pp. 1-6). IEEE. [Scopus Indexed]
Dr. Joseph Peter	EEE	Srivastava, S., Chattopadhyay, O., Athikkal, S., Majumdar, I., & Peter, J. (2020). A Non Isolated High Gain DC-DC Converter for DC Microgrid Application. International Journal of Electrical Engineering and Technology, 11(2).
Dr.Jiji K S	EEE	RG, A. S., Jiji, K. S., Chandran, D., & Abhiram, A. (2020, November). A lead-acid battery charger using modified bridgeless configuration of SEPIC PFC converter. In 2020 23rd International Conference on Electrical Machines and Systems (ICEMS) (pp. 1769-1774). IEEE. [Scopus Indexed]
		Sasi, D. K., & Jiji, K. S. (2020, September). Interleaved Bidirectional DC/DC Converter Topologies for Solar based Standalone Distributed Generation Systems. In 2020 IEEE International Conference on Power Systems Technology (POWERCON) (pp. 1-6). IEEE. [Scopus Indexed]
		Sasi, D. K., & Jiji, K. S. (2020, September). Interleaved Bidirectional DC/DC Converter Topologies for Solar based Standalone Distributed Generation Systems. In 2020 IEEE International Conference on Power Systems Technology (POWERCON) (pp. 1-6). IEEE. [Scopus Indexed]
Dr. Suneesh S S	ME	Karthika, A. S, Suneesh, S. S., Anil Lal S, and Jayachandran, T. Numerical Simulation and Characterization of Swirl Fluid Motion through Cylindrical Chambers. Journal of Aerospace Sciences and Technologies, 2020, Vol.72, No.4, pp.218-228.
Dr. Madhusood-anan M R	ME	Fernandes, J., Kang, S., & Mannoor, M. (2021). Numerical comparative study on the performance of open photoacoustic cells. Journal of Mechanical Science and Technology, 35(4), 1473-1485. [SCIE Indexed]

Faculty Name	Department	Publication Details
Dr. K Balakrishnan	ME	Balakrishnan, K., Devadasan, S. R., Thilak, V. M. M., & Soundaram, D. S. (2020). Leagile manufacturing paradigm in the production of jet pump-an implementation experience. International Journal of Productivity and Quality Management, 30(4), 462-487. [Scopus Indexed]
		Santhos, M., Senthil, V., Devadasan, S. R., & Balakrishnan, K. (2021). Emergence of ISO 9001: 2015 standard and its linkage with world class manufacturing strategies. International Journal of Productivity and Quality Management, 33(1), 46-56. [Scopus Indexed]

2019-20

Faculty Name	Department	Publication Details
Dr. Chithira P R	ECE	Chithira, P. R., & Vasudevan, V. (2019). Potential Critical Path Selection Based on a Time-Varying Statistical Timing Analysis Framework. IEEE Transactions on Very Large Scale Integration (VLSI) Systems, 27(6), 1438-1449. [SCI Indexed]
Dr. A R Jayan	ECE	Manohar, K., Jayan, A. R., & Rajan, R. (2020, September). Quantitative analysis of the morphological complexity of Malayalam language. In International Conference on Text, Speech, and Dialogue (pp. 71-78). Springer, Cham. [Scopus Indexed]
Dr. Anitha R	ECE	Anitha, R., Gunavathi, K., & Shadrach, F. D. (2020, December). Investigation on the musical features of carnatic ragas using neutrosophic logic. In Journal of Physics: Conference Series (Vol. 1706, No. 1, p. 012051). IOP Publishing. [Scopus Indexed]
Dr. Jayadevan R	ECE	Jayadevan, R. & Sheeba, V. (2020). A Semantic Image Retrieval Technique Through Concept Co-occurrence Based Database Organization and DeepLab Segmentation. Journal of Computer Science, 16(1), 56-71. https://doi.org/10.3844/jcssp.2020.56.71 [Scopus Indexed]
Dr.K R Remesh Babu	IT	Remesh Babu, K. R., & Samuel, P. (2019). Service-level agreement-aware scheduling and load balancing of tasks in cloud. Software: Practice and Experience, 49(6), 995-1012. [SCI indexed]
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		Silpa Sangeeth L R(2019). Behavioral Demand Response: A Green IS Platform to Increase Residential Energy Efficiency”, SIGGreen Pre-ICIS 2019 Workshop held in Munich, Germany
Dr. Sangeetha U	IT	Sangeetha, U., & Babu, A. (2019). Performance analysis of IEEE 802.11 ah wireless local area network under the restricted access window-based mechanism. International Journal of Communication Systems, 32(4) [SCIE Indexed]
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Dr. Sabeer Babu	IT	Thayyil, S. B., Parakkat, A. D., & Muthuganapathy, R. (2020). An input-independent single pass algorithm for reconstruction from dot patterns and boundary samples. Computer Aided Geometric Design, 80, 101879. [Scopus Indexed]

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Dr. Jayasree M	CSE	Amrutha C and Jayasree M (2019). Profile summarization from semantic data using deep neural network model. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
Dr. Reena Murali	CSE	Anisha T S, Rafeeqe P C and Reena Murali(2019). Text to SQL Query Conversion Using Deep Learning: A Comparative Analysis. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
		Aswathy K S, Rafeeqe P C and Reena Murali (2019). Deep Learning Approach for the Detection of Depression in Twitter. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
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Raseek C	CSE	Lakshmi K and Raseek C (2019). An approach towards Question Answering using Apposite Context. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
Irshad M	CSE	Muhammed Shameem K and Irshad M (2019). Automatic Hybrid Mathematical Word Problem Solver. In international Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
Naseer C	CSE	Muhsina V P and Naseer C (2019). Domain Specific Publication Recommendation using Deep Learning Approach. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur

Faculty Name	Department	Publication Details
Shibily Joseph	CSE	Pavithra C P and Shibily Joseph(2019). Presented paper titled Deep Learning Approach For Rumor Detection In Twitter : A Comparative Analysis. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
Rafeeqe P C	CSE	Pradeep T, Rafeeqe P C and Reena Murali (2019). Natural Language to NoSQL Query Conversion using Deep Learning. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
Naseer C	CSE	Resmi P and Naseer C (2019). A Deep Learning Approach for Polite Dialogue Response Generation. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
Raseek C	CSE	Sandeep Nithyanandan and Raseek C (2019). Deep learning Models for Word Sense Disambiguation: A Comparative Study. In International Conference on Systems, Energy and Environment (ICSEE 2019) Kannur
Dr. Anitha R	ECE	Devi D, Shafeeq K, Tom Jose, Uma P U, Anitha R (2020). Traffic rule violation detection system using machine learning and image processing techniques" on AICTE sponsored 2 day National on Innovations in Communication Networks, Information Security, Embedded Systems and Signal Processing Thrissur
Dr. Silpa Sangeeth L R	IT	Saikrishnan C., Shreeram Unni, Anagha V., Vrinda T.K., Silpa Sangeeth L R (2021). Image to Image Translation in Video Call using Residual Based StyleGAN Encoder. In International Conference on Micro-electronics, Signals and Systems
Ebey S Raj	IT	Aparna Thomas, Syam Mohan, Vishak M.B., Farseeena Sirin, Ebey S Raj (2021). SafePass - An Automatic Contactless Entry Control System. In International conference on International Conference on Emerging Trends in Engineering Kozhikode
Dr. Anitha R	ECE	Aswathi G R, Anjana R, Arjun R, Aswathy K K, Anitha R (2022). Electa - The Automated Polling Process Management System. In the National Conference On Current & Emerging Technologies

Chapter 5

Funded Projects

5.1 Centre for Engineering Research and Development (CERD)

Centre for Engineering Research and Development (CERD) of Kerala Technological University (KTU) has provided a platform for faculty and students of the affiliated Engineering Colleges in the State to pursue their interest in applied research. Various schemes are implemented by the University to motivate, mentor and support Researchers. Necessary assistance is being provided to carryout research and translate innovative ideas to prototypes. The Centre acts as a catalyst to create an environment conducive to research and helps to enhance the research culture in the institutions.

CERD – College level unit

Centre for Engineering Research and Development is established by the Government of Kerala for the purpose of promoting engineering research. CERD unit and innovation centre offer funding for deserving student projects and for faculty. Good industry institute interaction and thereby exposure to the students are ensured from CERD funding. CERD is being coordinated by Mr. Vishnuprasad K from September 2021, was coordinated by Dr.K P Mohahan from June 2019, Mr. Job Chunkath from 2018 June onwards and was coordinated by Gopi C up to May 2018.

Following are the activities carried out under the CERD cell of the institutes

- Supported student projects with potential to develop into products.
- Has improved networking with subunits such as Entrepreneurship Development Club (EDC), Technology Business Incubation(TBI), Industry Institution Interaction Cell (IIIC) and Institute of Electrical and Electronics Engineers (IEEE). This has helped students to participate in competitions such as the C-DAC grid computing Challenge and win prize
- Students are confident enough to conduct programs such as ASAP and INSPIRE to acquire skills and content beyond the syllabus.

- The project of setting up an Innovation Centre, named **PRAGATI**, under CERD is nearing completion at a cost of Rs. **10.0 lakhs** (Principal Investigator: Dr P.C. Reghu Raj/Gopi C)
- **A Centre of Excellence in Advanced Computing** is being set up in the institution with the assistance from CERD, Trivandrum. **Rs.20.0 lakhs** has been received for this project, and C. Naseer, Asst. Professor (CSE) is the Principal Investigator of this project.
- Extends support for Faculty/Student research publications and Journal publication
- Extended logistic support for the face-to-face meet with successful innovators conducted by the EDC and IEEE, which included interactions with Innovators and Entrepreneurs.
- Extended support for participation in the National conferences (NATCON) organized by CERD. A project titled LED-based solar simulator from the UG students won a consolation prize in the Project Competition section. Paper and poster was presented by PG student K.Nibeesh.
- Organized various seminars and projects for the benefit of students.

Student Projects Funded during 2020 – 2021 Academic Year

Sl. No.	Name of Principal Investigator	Branch	Project Title	Sanctioned Amount (Rs.)
1	Sajitha M, Assistant Professor	EEE	Smart Energy Meter with remote load switching And anti energy theft system.	10,000

Student Projects Funded during 2019 – 2020 Academic Year

Sl. No.	Name of Principal Investigator	Branch	Project Title	Sanctioned Amount (Rs.)
1	Shibily Joseph, Associate Professor, Prof. Anuraj N (Co investigator)	CSE	VARUNA (AI-ROBOT) a.k.a Autonomous Marine debris detection and collection robot	38,500
2	Anwar Hussain M, Associate Professor	ECE	ROVIZ the service robot	31,000
3	Vijeesh V. Assistant Professor	ECE	24 * 7 electric scooter service	29,000
4	R. Jayadevan, Assistant Professor	ECE	Automatic e-ticketing system	18,000
5	Dr. Vinita Chellappan, Associate Professor, Muhammedali Shafeeque K (Co-Investigator)	EEE	Optimal path planning for UAV (Unmanned Aerial Vehicle)	47,000

Activates during the 2019-2020

1. Travel assistance (Rs. 20,000) to Rohit.K (S1 ECE) attend IEEE conference at Stanford university Thailand.
2. Financial Assistance (Rs.25,000) to Prof.Anisha.A, Civil engineering dept. for the project low cost incinerator. The project was completed in January 2022.



Principal Dr.P C Reghuraj with students on the completion of CERD funded project Low Cost Incinerator

5.2 TEQIP Funded Projects

Following are the students' project approved for availing the research seed money under TEQIP-II during 2021-22

Sl No	Project Title	Principal Investigator	Estimate Amount(Rs.)
1	Automatic temperature and mask scan entry at workplace	Vishnuprasad K, AP/ECE	8,500
2	ELECTA - The automated polling process management system	Dr.Anitha R, AP/ECE	7,550
3	Automated Aeroponic System	Vidhun M, AP/EEE	20,000
4	Smart segregation of wastes and bin monitoring system	Dr.Bindu P, HoD/ECE	12,150
5	Tele robotics for miniature crafting	Dr.R Jayadevan, AP/ECE	16,820
6	Smart parking management system	Hariprasad B, AP/ECE	13,000
7	Braille glove	Lincy K, AP/ECE	8,100
8	Multipurpose waste collection machine	Dr. A. Selvakumar , Professor/ ME	17,740
9	DC motor interfacing using PIC microcontroller	Abdul Kareem Puthiyaveetil, AP/EEE	29,000
10	Railway track surveillance using IoT-based autonomous robot	Ebey S Raj, AP/IT	12,620
11	IoT based smart waste management system	Ebey S Raj, AP/IT	12,870



Braille Gloves to assist visual and hearing-impaired people for communication and learning.



Multipurpose waste collection machine



Smart Segregation of wastes and Bin Monitoring System

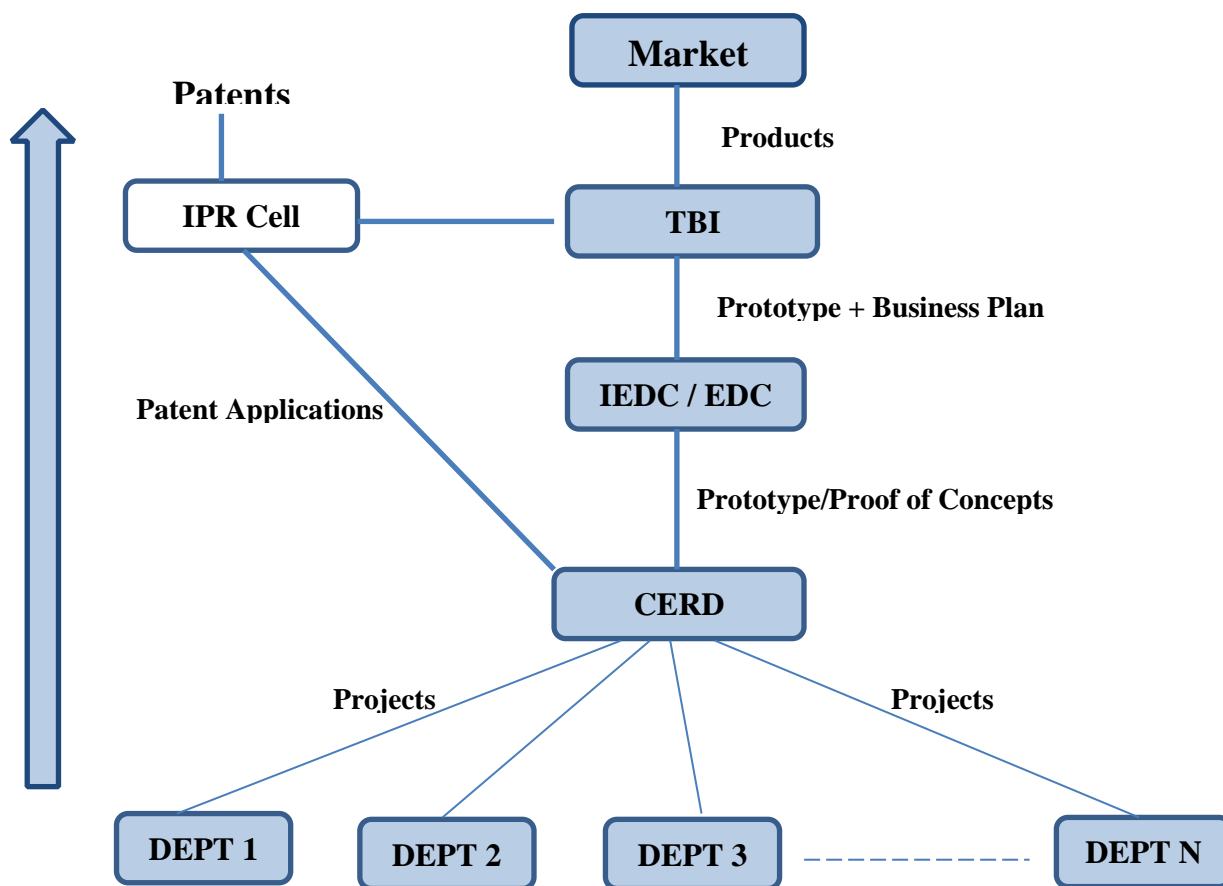


Automated Aeroponic System

5.3 National Innovation and Startup Policy (NISP)

National Innovation and Startup Policy(NISP) intends to guide Higher Education Institutions(HEIs) for promoting students' driven innovations & start-ups and to engage the students and faculty in innovation and start up activities in campus. The policy aims at enabling HEIs to build, streamline and strengthen the innovation and entrepreneurial ecosystem in campus and will be instrumental in leveraging the potential of student's creative problem solving and entrepreneurial mind-set, and promoting a strong intra and inter institutional partnerships with ecosystem enablers and different stakeholders at regional, national and international level.

Responsibility for implementing NISP in the institution has been fixed on the joint team of CERD, IEDC, IPR Cell and TBI Executive/Management Committees. The process followed in NISP implementation is shown as a flowchart below:



The CERD center supports students' innovations, by way of routing their fund requests to the Head office, arranging training programs, and providing tools and technical support for innovative projects through the Innovation Centre and Centre of Excellence in Advanced Computing that have been set up under CERD. When the project ideas pass the initial stage (proof of concept) in the respective labs/ Departments, the next stage is IEDC (Innovation and Entrepreneurship Development Cell), which was set up with the initial funding and guidance from the Kerala Startup Mission. This cell can provide small seed funding to viable prototypes if the concerned students express willingness to pursue entrepreneurship through startups. Another unit that closely works with IEDC is the ED Club (EDC in short), which channelises some funds from the District Industries Centre Palakkad for projects that have good business potential.

The next stage is the Technology Business Incubator (TBI), which is a prominent facility in GEC Palakkad under Directorate of Technical Education, Kerala. Proposals are invited from young entrepreneurs with innovative ideas to start new venture in different areas of technology. The incubatees can use the facility provided in TBI for a maximum period of three years.

Students, staff and the members of the TBI will be assisted by the IPR Cell to file patents, copy rights, etc., to secure IPR through the Patent Information Centre (PIC) of the Kerala State Council for Science, Technology and Environment (KSCSTE), Trivandrum. The selected start-up companies will be provided with office space, broadband internet, and technical advice to develop their ideas into marketable products. Depending on the progress, support for marketing, branding, technology transfer, securing IPR, etc. may also be extended by TBI.

- TeQlot Innovantz, one of the incubatees, manufactured Automatic Sanitizer Dispenser and other similar devices to fight COVID-19, which were appreciated by the Dept. of Health Service, FHC Sreekrishnapuram.
- One of our initial incubatees, M/s. *Saron Innovatures Ltd.* came up with an innovative product for dispensing hand sanitizer using touchless technology that hit the market and was able to do good business. TeQlot, another firm in the TBI started the production of automatic sanitizer dispensers and other products that helped to a great extent in fighting the pandemic. The company made a turnover of approx. 8 lacs during fiscal year 2020-21.



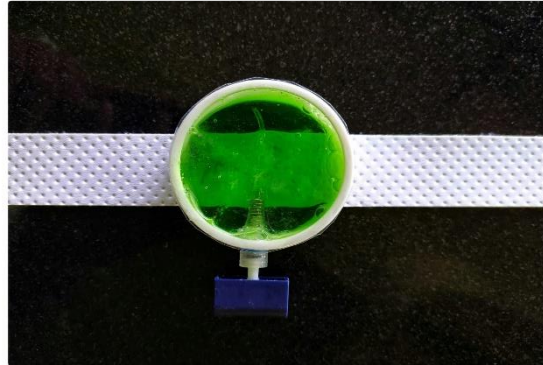
**Automatic Sanitizer Dispensers developed
By M/s. Saron Innovature LLP**

**Automatic Sanitizer Dispensers developed
By M/s. TeQlot Innovantz**

- Rohit K (B.Tech ECE 2019-23 Batch) , - Selected as one among the 5 best projects (Aero Water Maker) in Young Innovators Program 2018-21 by Kerala Development and Innovation Strategic Council (K -DISC). He also developed an instrument “Leg for Backpack” to reduce the impact of the weight of back pack. He also developed a wrist band for dispensing sanitizer



Aero water Maker developed by Rohit K (B.Tech ECE 2019-23 Batch)



Leg for Backpack and Sanitizing Band developed by Rohit K

- Amal Mohammed (B.Tech ECE 2017-2021 Batch) developed a voice assistant system to operate bike.

ശബ്ദമുപയോഗിച്ച് സ്റ്റാർട്ടാവും, അമലിന്റെ ബൈക്ക്

ഒണ്ണാർക്കാട്: ശബ്ദമുപയോഗിച്ച് ബൈക്ക് പ്രവർത്തിപ്പിക്കുന്ന വിദ്യയുമായി രംഗത്തെത്തിയിരിക്കുകയാണ് നായാടിക്കുന്ന് സ്വദേശി അമൽ മുഹമ്മദ്. അമൽ 'സ്റ്റാർട്ട്' എന്ന് പറഞ്ഞാൽ ബൈക്ക് സ്റ്റാർട്ടാകും.

ഓഫ് എന്ന് പറഞ്ഞാൽ എൻജിൻ തനിയെ ഓഫാകുകയും ചെയ്യും. ശ്രീകൃഷ്ണപുരം എൻജിനീയറിങ് കോളജിലെ ബി.ടെക് വിദ്യാർഥിയാണ് അമൽ. അർദ്ധ്യ നോ മൈക്രോ കൺട്രോളർ ബോർഡ് സിസ്റ്റമുപയോഗിച്ചാണ് ഈ വിദ്യ കണ്ടുപിടിച്ചത്. വയർലെസ് സംവിധാനമാണ് പ്രാവർത്തികമാക്കിയത്. ഏത് ശബ്ദവും സ്വീകരിക്കില്ലെന്നതിനാൽ ബൈക്ക് സുരക്ഷിതമാണ്. വോയ്സ് കൺട്രോൾ ബൈക്ക് സിസ്റ്റം വിപണിയിലാക്കാനാണ് പദ്ധതി. പൊതു മതാമത്ത് വകുപ്പിലെ എക്സിക്യൂട്ടീവ് എൻജിനീയർ പി. മുഹമ്മദ് ഇത് സഹായിക്കാനും നെല്ലിപ്പുഴ ഡി.



ശബ്ദമുപയോഗിച്ച് സ്റ്റാർട്ട് ചെയ്യുന്ന ബൈക്കുമായി അമൽ മുഹമ്മദ് എച്ച്.എസിലെ അധ്യാപിക ഉമ്മു സൽമയുടെയും മകനാണ്.

- Students of B.Tech ECE (2016-21 Batch) Abhijith A., Abhiram Ramesh, Ajith V., Saranya C., Sudarsanan A.K., Tom Jose under Guidance of Prof. Vishnuprasad K won Second prize in IEEE Kerala section Let's Innovate challenge and Consolation prize for best design in KTU ventilator challenge for the project titled **“SWAS : Portable mechanical ventilator”**

File Ref.No.KTU/JD(RESEARCH)/2082/2020

**APJ Abdul Kalam Technological University
Thiruvananthapuram**

Abstract

APJAKTU - CERN - Project Proposals - Emergency Ventilator Challenge - Financial Assistance - Sanctioned Orders issued.

CERN

U.O.No. 743/2020/KTU Thiruvananthapuram, Dated: 13.05.2020

Read:-1. List of selected team of students.

ORDER

In the wake of COVID-19 pandemic, APJAKTU COVID -19 cell and Centre for Engineering Research and Development (CERN) under the University invited designs with prototype of low cost portable ventilators from the students of Engineering Colleges affiliated to APJAKTU, online.

Thirty Four valid entries were received from Engineering Colleges out of which, five entries submitted the prototype of Emergency Ventilators. others could not submit the prototype.

The experts evaluated the design only entries and selected Five teams for Financial Assistance.

Accepting the recommendation of the Judging Panel it is decided to provide a Financial Assistance of ₹ 10,000/- each to all five teams for the development of prototype of Emergency Ventilator. However APJAKTU reserves the rights of Intellectual property of these designs. Commercial development / patenting should be routed through APJAKTU. It is also decided to sanction ₹ 5,000/- each to all five teams in advance.

Sl. No	Name of college	Name of Faculty Mentor	Amount
1	Government Engineering College, Sreekrishnapuram, Palakkad	Vishnuprasad K.	10,000
2	Mar Athanasius College of Engineering, Kothamangalam	Vinod Eldho Baby. Dinto Mathew	10,000
3.	Model Engineering College, Thrikkakkara	Minimol B.	10,000

- Young Innovator Program (YIP) attended by Abhijith A (B.Tech ECE 2016-20) with Chief Minister Sri. Pinarayi Vijayan at Trivandrum



YOUNG INNOVATOR'S PROGRAMME
2019-22





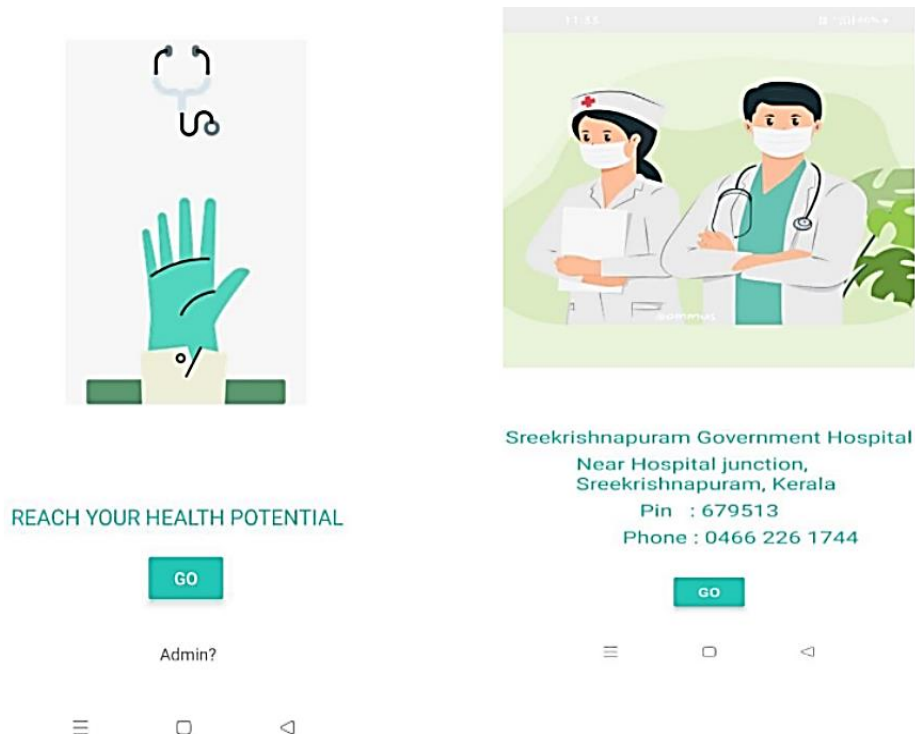
At Kerala Development and Innovation Strategic Council's (K-DISC) Kerala Innovation Day (KID) on 23rd January 2020, the batch of Young Innovators' Programme (YIP) 2019 with the Hon'ble Chief Minister of Kerala, Shri Pinarayi Vijayan, Chairman, K-DISC, Dr K. M. Abraham, Strategic Advisor, K-DISC, Dr P. V. Unnikrishnan and CEO, Kerala Startup Mission (KSUM), Dr Saji Gopinath

5.4 Unnat Bharat Abhiyan (UBA)

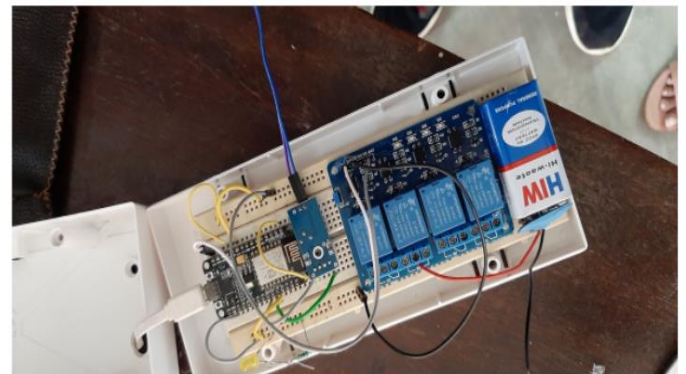
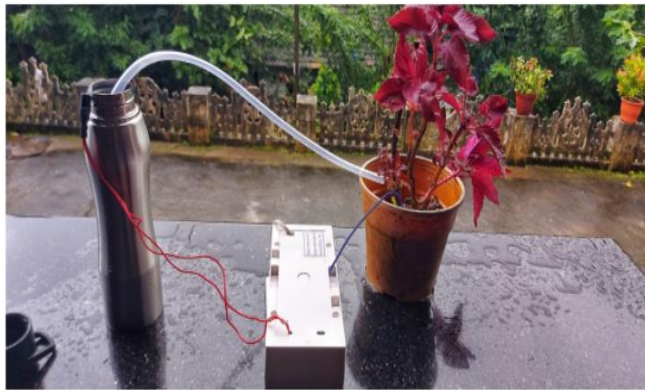
Unnat Bharat Abhiyan (UBA) a flagship programme of Ministry of Education (MoE), is inspired by the vision of transformational change in rural development processes by leveraging knowledge institutions to help build the architecture of an inclusive India. It aims to create a vibrant relationship between society and higher educational institutions, with the latter providing scientific knowledge and technology support to improve livelihoods & lives in rural areas and to enable faculty and students of higher educational institutions to work with the people of rural India in identifying development challenges and evolving appropriate solutions for accelerating sustainable growth of villages.

As a part of UBA five wards of Sreekrishnapuram Gramapanchayath (Ward – 4,5,6,7,8) are adopted by GEC Palakkad. The following activities were carried out by GEC Palakkad.

Activity 1: Designed and implemented the information system for Sreekrishnapuram Government Hospital. *Medcave* mobile application, to access the details about doctors, available vaccines and other services. The most attractive feature of the application is it focuses on a particular hospital and its details. The perspective of this product is to provide an advanced and customized service which helps the daily life of public. By using this application, we get the day-by-day details of a hospital such as doctor's duty within a touch. It consumes very less time to operate. So, it's user friendly, efficient and so easy to use. The figure given below shows the front page of the app developed.



Activity 2: Implementation of water management system for irrigation. Sreekrishnapuram Grama Panchayat has many farmers. Water scarcity is an issue in some area of the Village. Hence proper water management of water for irrigation aid the village people to reduce the water conception for irrigation. Hydrosense is an efficient and ready to use automated irrigation system which can be controlled from a smartphone. This device can be used in residential areas as well as in farm land. It can be integrated to existing irrigation system in farm land. Installation cost is minimal. The figure given below shows the hydrosense working product.



Chapter 6

CONCLUSION

For any education, and technical education in particular, the basic model of a ‘teaching – only’ institution is inadequate to ensure quality education. In all disciplines of technical education, knowledge is dynamic with new technologies being introduced very frequently. In this scenario, it is not possible for the teachers to deliver good quality instructions without being tuned to the current developments in the subjects, for which they must constantly update their knowledge. A well-recognized way to deal with this paradigm is for the teachers to be active researchers in the areas in which they teach and exhibit a very high correlation between quality teaching and R & D activities. GEC Palakkad recognized the importance of R & D in the vertical growth of the institution and committed to focus on the scientific and industrial research in the various disciplines of Engineering. The R & D committee of GEC Palakkad encourages the students and faculty to undertake the research in newly emerging frontier areas of Engineering and Technology. This enhances the general research capability of budding technocrats. Students are motivated to undertake both in-house and industry-based projects. R & D committee of GEC Palakkad is successful in enhancing the quality publications of faculty and students in peer reviewed journals and conferences and successfully implemented innovative products developed by students to meet societal challenges. R & D committee GEC Palakkad is committed to foster *Atma Nirbhar Bharat*, and **Make in INDIA** through Industry partnerships.