



# Er. Perumal Manimekalai Polytechnic college Department of Electronics (Robotics) Engineering

*10<sup>th</sup> State level Technical symposium – **TECHCONNECT 2018***



**Held on 06-02-2018**



## Our Institution

“PMC TECH play influential role with Industries for providing meaningful impact on overall competency and skill levels of the students in relation to knowledge updating with practicality in learning and professionalizing them aiming at the developing scenario of current and future technologies.”

PMC TECH Group of Institutions, Hosur, Tamilnadu established in the year 1996 is run by “Er. Perumal Manimekalai Telugu Minority Educational and Charitable Trust” under the dynamic leadership of Shri. Er. P. Perumal, Founder Chairman. The Institutions comprise Matriculation School, ITI, Polytechnic, Engineering College and Research Studies providing quality education in the region.

Er. Perumal Manimekalai polytechnic college (established 1996) approved by AICTE and affiliated to DOTE Chennai, is an ISO 9001:2015 certified Institution. The Institute provide scholarly and professional environment with quality education & skill oriented training that help students becoming best employable for Industries and professional entrepreneurs for the Nation. The Institute supports students’ creativity/innovations by establishing Scientific and Industrial Research Organization (SIRO), Women Technology Park (WTP), Centre for IIT Bombay Employability Skill Trainings, Business Incubation Centre (MSME BI), Innovation & Entrepreneurship Development Centre (IEDC) etc., for research and developments.

### **Vision:**

PMC Tech -Polytechnic College shall emerge as a premier Institute for valued added technical education coupled with Innovation, Incubation, Ethics and Professional values.

### **Mission:**

1. To foster the professional competence through excellence in teaching and learning.
2. To nurture overall development of students by providing Quality Education & Training.
3. To provide innovative environment to learn, innovate and create new ideas for the betterment of oneself and society.

## About the Department

The Department of Diploma in Electronics (Robotics) Engineering was established in the academic year 2005-2006. It has well equipped laboratories with a state of art Computer Laboratory, Electronics Devices etc... Robotics, and Mechanical Related Labs Pneumatic, Hydraulic, Manufacturing, CNC, CAD Laboratories, Qualified and experienced faculty members have been involved in teaching and conducting various short term courses for the benefit of students.

### **Vision:**

To develop Electronics (Robotics) Engineering diploma holders to meet the Growing needs of Industry and Society.

### **Mission:**

- To foster the professional competence through excellence in teaching and learning.
- To nurture overall development of students by providing Quality Education & Training.
- To create conducive environment for students to learn, innovate and conceive for the betterment of oneself and society.

### **Program Educational Objectives (PEOs)**

**Core Competence:** Our students will exhibit the knowledge in Mathematics, fundamentals of Mechanical, Electrical, Electronics and Computer Engineering to solve Engineering problems.

**Breadth:** Our students will be able to design and create novel products and solutions for real life problems using the knowledge of Scientific, Mechanical, Electronics and Computer Engineering.

**Professionalism:** Our students exhibit professional and ethical attitude, effective communication skills and exhibit teamwork over multidisciplinary areas.

**Higher studies and Employability:** Our students succeed in industry / technical profession by creating an environment excellence and a high order of ethics and a zeal for lifelong learning.

### **Program Specific Outcomes (PSOs)**

**PSO1:** Ability to understand the integration of engineering applications such as electronic, Mechanical, electromechanical, control and computer systems that contain software And hardware components including sensors, actuators and controllers.

**PSO2:** An ability to exhibit the knowledge of electrical and electronic circuits, Hydraulic & Pneumatic control system, logic design and image processing using hardware and Soft programming for automation.



## About the Symposium

Most of the present day research are taking place with focus towards technology and education in this engineering the foremost leader. It plays a unique role in exploiting innovative technology

This Conference provides a real opportunity to bring together scientists, researchers and academicians of different disciplines to discuss new issues, tackle complex problems and find advanced solutions breeding new trends in Engineering.

## **Chairman's Message**

### **Organizing Committee Members**

#### **Chief Patrons**

**Er. P. Perumal, Chairman, PMC TECH – Group of Institutions**

**Shri. P. Kumar, Secretary, PMC TECH – Group of Institutions**

**Smt. P. Mallar, Trustee, PMC TECH – Group of Institutions**

#### **Patron**

**Mr. N. Balasubramaniam, Principal, PMC TECH – Polytechnic College**

#### **Convener**

**Mr. K. Arunkumar M.E., HOD/ E(Robotics)**

#### **Co-ordinators**

**Mr. M. Mohamed Jinna M.E., Lecturer /E(Robotics)**

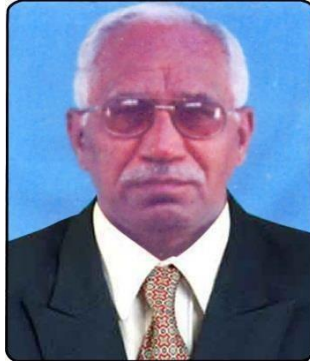
#### **Members**

**Mr. A. Ravikumar B.E., Lecturer/ E(Robotics)**

**Mr.Kumaran M.E., Lect / E(Robotics)**

**Mr. Muthukumar, M.E., Lect/ E(Robotics)**

## Chairman's Message



I feel immense pleasure to inscribe my message for the souvenir. It has been said that the mask of success contains many hidden faces behind it. **TECHCONNECT 2018 SYMPOSIUM** as well as this institution is an assertion of this fact.

Absolute teamwork and strong vision resulted in Digital Marketing (**TECHCONNECT 2018**)” a National level symposium organized by the Department of Electronics (Robotics) Engineering. Our Institution Strive to travel beyond the boundaries of Mere books. We have realized that our future is abstract and unknown but youth in our hands are real and can be molded. This souvenir gives us just the glimpses of the achievements be held by our institution. Brighter days are still to come. And my heartfelt wishes for that.

The diligent contribution made by our faculty members and elaborated endeavor done by our students are the foundations of **TECHCONNECT 2018** Conference.

“Be with wise people that make you wise”

My best wishes for the future!

**Er. P. Perumal** Chairman,  
**PMC TECH – Group of Institutions.**

## Secretary's Message



It gives me great pleasure to send the message for the souvenir, which is to be released at **TECHCONNECT 2018** Symposium. **TECHCONNECT 2018** Symposium is being organized on 7<sup>th</sup> Feb 2020 by Department of Electronics (Robotics), Hosur.

An Institution of Higher Education, where students and faculty members are busy in learning and research, organizes such co-curricular activities for giving an opportunity to the students to celebrate their competence in technology and to inculcate in them the qualities of confidence, innovative thinking and analytical abilities. Co-curricular activities are intimately connected with the inner-being of a person. On the one hand, these permit an individual to express oneself and understand oneself better.

We want PMC Tech to be a great Institution. While making every single classroom, laboratory and workshop interesting is important, while working to make our programs practice-oriented is PMC Tech's mission, development of the complete personality of every student in all the hues, which come together to create a great human being, is the objective of the Institution. Such programs contribute a great deal in achieving the PMC Tech's objectives.

I convey my Best Wishes for the success of **TECHCONNECT 2018**, organized by department of Electrical and Electronics Engineering.

**Shri. P. Kumar,**  
**Secretary,**

**PMC TECH – Group of Institutions.**



## Trustee's Message



A feeling of great pride and contentment rises to witness our event “**TECHCONNECT 2018**” and this souvenir is nothing else but the reflection of the success saga our institution has created.

It has always been a tradition of our institution of confer holistic education to the learners which not only gives the qualification but also intends to mold them into better human beings. And I wish the same tradition will be followed in future years. Being a constant witness of the progress of our institution, I can surely acclaim that in times to come, our institution will prove to be an epitome of excellence in imparting quality education.

The sincere work and strength put up by our faculties and dear students in materializing this conference is worth admiring. This souvenir reflects aspiring vision and inspiring insight of our students and faculties.

So, my good wishes are always with them.

Many congratulations to all!

**Smt. P. Mallar,**

**Trustee,**

**PMC TECH – Group of Institutions.**



## Principal's Message



Er. Perumal Manimekalai Polytechnic College has been the crest of jewels in the educational map of Tamilnadu. Its unrivalled excellence in conferring quality education of PMC Tech has played pivotal role in the technical development of the learners.

The sincere and meticulous work pattern has been the heritage given by our Institution. As a consequence, our institution has cultivated a tradition of bestowing learners with best quality academic education. Apart from that, to develop creative, conceptive and analytical skills as well as to furnish the learners with research and leadership skills technical festivals are essential. So the Department of Electronics (Robotics) Engineering has organized “**TECHCONNECT 2018**” a National level Symposium and it stands a class apart from all the events. And I dream our conference will provide a forum for all the students to exchange their learning experiences as well as their creativetechical knowledge. I am assured that our Symposium will represent the students both quantitatively and qualitatively.

My cordial felicitations to all!

Congratulation to all of the students. Yours efforts have not gone unnoticed!

Best wishes for this, **National Level Symposium – *TECHCONNECT 2018***.

**Mr. N. Balasubramaiam,**  
**Principal,**

### HoD's Message



This National conference on "**TECHCONNECT 2018**" organized by E(Robotics) department, to focus the attention of all concerned professionals to discuss at length concern with emerging trends in engineering and technology.

To seek solutions wherever possible and identify areas where further in research. Invited contributions from professional bodies for knowledge sharing. Enormous participants confirmed their registration and presentation in National level symposium.

PMC Tech is making strides towards evolving directions for the growth and dissemination of technical knowledge for the purpose of research and innovation. It is with these clear thoughts the department of Electronics (Robotics) Engineering has been organizing National level Symposium. This year the focus is on

Moreover, this whole event is a conclusion of synchronized efforts done by our faculty members and students. Congratulations to them for their sincere and earnest hard work. I, hope this conference will be a platform for all our energized students where they can explore their hidden potential.

Wish you best of luck in your endeavor.

**Mr. K. Arunkumar HOD/ E(Robotics)**

**PMC TECH – Polytechnic College.**

## **TABLE OF CONTENTS**

<b>S. No</b>	<b>PAPER TITLE</b>	<b>Page. No</b>
1.	ROBOTICS IN MANUFACTURING	12
2.	CAD/CAM/CNC	13
3.	RECENT TRENDS IN AUTOMATION	14
4.	AUTO ELECTRONICS	15

# ROBOTICS IN MANUFACTURING

## ABSTRACT

Manufacturing processes and industrial systems gradually change their traditional layouts and configurations, preparing to introduce novel integrated human-robot technologies as collaborative robots and exoskeletons. Whether mass customization of lot size and the production mix discourages the adoption of capital-intensive automation, collaborative robots become affordable and effective and a hotspot of the debate on manufacturing systems. This paper provides a novel support-design framework for the cooperative robot system in labor-intensive manufacturing processes to aid layout and task scheduling design. Through an iterative closed-loop methodology, this framework explores the impact of a cooperative robot in a labour-intensive manufacturing system like the production facility of a food service company. The framework leads the designer through the re-layout of the end-of-line, the economic and technical feasibility analyses, using simulation to estimate payback and ergonomics benefits for workers. Within the proposed layout, we state that adopting a cooperative cobot for the end-of-line is affordable and ergonomically convenient without representing a safety threat for workers. The testbed confirms the framework as an enabling tool for human-robot technologies integration in current manufacturing systems under budget and workers-driven constraints.

# CAD/CAM/CNC

## ABSTRACT

STEP-NC or ISO 14649 is the next generation of data models between CAD/CAM and CNC systems. After a decade of investigation, the STEP-NC technology is still under developed. The lack of a complete CAD/CAM/CNC prototype system with full bidirectional data flow hinders the improvement of STEP-NC. This paper proposes a complete CAD/CAM/CNC solution for STEP-compliant manufacturing, so as to explore the functionalities and emphases of STEP-NC technologies. Frameworks of individual CAD/CAM and CNC systems are illustrated in detail. Architectures of STEP-compliant CAD/CAM and CNC systems are studied and several criteria are summarized. Finally, this paper proposes a complete prototype STEP-compliant solution, which consists of a secondary developed STEP-compliant CAD/CAM system on the CATIA platform and an open structured STEP-compliant CNC system.

# RECENT TRENDS IN AUTOMATION

## ABSTRACT

In recent years, with the increase of large-scale and complex architecture projects, the architecture, engineering and construction (AEC) industries are changing rapidly towards intelligent and databased direction. As the by-product, 3D modeling event logs could provide quantitative and traceable data for early design stages that can produce butterfly-effect on the later construction stages. In this study, new data structure of command-object graph retrieved from 3D modeling event logs was proposed. It reflects the cause-and-effect relationship between commands and objects to accommodate 3D modeling process. A case study was conducted on 110 students' event logs generated from solving a well-defined façade model. As result: an average trial-and-error ratio was calculated at 0.3357 based on original and simplified graphs. Four main types of 'modeling bubble' were summarized base on unit-tag graphs. Key commands were found by graph centrality. Auto-prediction of same-group objects was developed with mis-group rate less than 0.9%.

# AUTO ELECTRONICS

## ABSTRACT

An auto-balancing transformer based on power electronics is designed and proposed to prevent voltage or/and current unbalances arising on the primary side system from infecting the secondary side system, or in reverse. The multilevel converters and interleaving parallel connection technology are adopted in the transformer design to match the demand of power automatically balancing and high-voltage and high-power application. The operating principle is analyzed in detail and an effective control scheme is developed. To verify the new features of the proposed design, a detailed computer simulation model is established using MATLAB\Simulink and typical simulations are carried out. And the experimental verification is also presented. All show satisfactory results.