3-Day Workshop on
Open-Source AI-Powered
Motor, Inverter, Hardware, and Firmware Design Techniques for Permanent Magnet Brushless Motors –
A Next-Generation
System Approach

In-person at Pune, Maharashtra, India
Online via Zoom

Register at:
https://forms.gle/t3VkUXmxcWLJpyfg7

October 29, 30 and 31, 2025

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1.0 Introduction: The Open-Source AI Revolution in Motor Engineering

Innovation thrives when brilliant minds have access to powerful tools without barriers. This workshop represents a paradigm shift in motor engineering education, combining three decades of industry expertise with the democratizing power of open-source technology and artificial intelligence.

"**We believe the future of motor engineering belongs to those who can harness both human wisdom and machine intelligence. This workshop empowers you with cutting-edge AI tools and open-source solutions that cost nothing but deliver everything**."

This workshop emerges from 35 years of relentless innovation at Power Electronics Group, where we've witnessed the evolution from expensive proprietary tools to today's revolutionary open-source ecosystem. We've seen firsthand how artificial intelligence is transforming motor design, how open-source communities are outpacing traditional vendors, and how engineers armed with the right knowledge can achieve extraordinary results without massive software budgets.

From Rakesh's pioneering work with expert systems and fuzzy logic in the 1990s to today's deep learning breakthroughs, we've lived through every wave of technological advancement. The mistakes taught us resilience, the breakthroughs fueled our passion, and the open-source movement showed us that the best solutions emerge when knowledge flows freely.

The New Reality: Today's motor engineers can access Python libraries more powerful than million-dollar software packages, program STM32 controllers that outperform expensive industrial systems, and leverage AI algorithms that were once exclusive to tech giants. This workshop doesn't just teach you motor design – it liberates your potential by removing every technical and financial barrier between you and world-class engineering capabilities.

"**In the open-source AI era, your only limitation is your imagination. We're here to expand both**."

2.0 Lessons from the Trenches - The Open-Source AI Revolution

We believe that world-class motor systems emerge from the convergence of deep technical knowledge and intelligent automation. Engineering breakthrough brushless motor systems requires mastery of four synergistic domains, now amplified by AI and liberated through open-source tools:

1. AI-Enhanced Motor Design
2. Intelligent Inverter Systems

3. Smart Hardware Development
4. Adaptive Firmware Intelligence

The democratization of engineering excellence is here. What once required expensive software licenses and corporate R&D budgets can now be achieved by passionate engineers utilizing Python, open-source tools, and AI algorithms. Our journey from proprietary expert systems in the 1990s to today's accessible machine learning platforms has shown us that the barriers to innovation were artificial - created by licensing fees, not technical limitations.

From Scarcity to Abundance: The trenches taught us that when engineers have unrestricted access to powerful tools, they not only solve problems faster but also discover solutions that were previously unimaginable. We've watched open source communities outpace billion-dollar corporations, seen AI algorithms optimize designs beyond human intuition, and witnessed students create motors that challenge industry veterans.

"**The greatest engineering breakthroughs now come from those who combine human creativity with machine intelligence, unrestricted by corporate gatekeepers or software budgets**."

This workshop represents a fundamental shift in engineering education. Instead of teaching expensive, proprietary workflows, we empower you with:

- Python-powered design automation that never expires
- AI optimization techniques that continuously improve
- Open source simulation tools rivaling million-dollar packages
- Community-driven knowledge that evolves in real-time

The Systems Perspective Revolution: Modern AI tools naturally enforce systems thinking. When machine learning algorithms optimize your motor design, they simultaneously consider electromagnetic performance, thermal management, manufacturing constraints, and control algorithms. This holistic optimization was impossible with traditional siloed approaches.

True cost reduction emerges not from compromising performance, but from AI discovering optimal solutions across all four domains simultaneously. The machine identifies connections that humans miss, discovers efficiencies that traditional methods overlook, and continually learns from each design iteration.

"**In the open source AI era, your engineering potential is limited only by your curiosity and dedication - never again by your software budget.**"

3.0 Course Objectives: Empowering the Next Generation of Motor Engineers

This revolutionary workshop revolutionizes how engineers approach brushless permanent magnet motor development by combining decades of industry expertise with cutting-edge AI tools and open-source methodologies. Our objectives transcend traditional training to create motor engineering pioneers:

1. **Master AI-Powered Motor Design Excellence**

- Harness Python and machine learning for electromagnetic optimization beyond human intuition.
- Deploy open source FEA tools (FEMM, Elmer) for professional-grade simulation.
- Implement genetic algorithms to automatically discover optimal motor topologies.
- Build digital twins using free tools that outperform expensive proprietary software.

2. **Liberate Your Engineering Potential Through Open Source Mastery**

- Evaluate zero-cost tool ecosystems that eliminate licensing barriers once and for all.
- Compare community-driven solutions against traditional, expensive alternatives.
- Understand when AI optimization surpasses conventional design methods.
- Navigate the open source landscape to build world-class engineering capabilities.

3. **Develop Systems-Level AI Engineering Intuition**

- Learn to leverage machine intelligence for holistic motor system optimization.
- Master integrated design workflows where AI considers electromagnetic, thermal, and control aspects simultaneously.
- Assess real-time performance metrics through intelligent monitoring systems.
- Determine optimal AI-human collaboration strategies for maximum engineering impact.

4. **Transform Existing Designs Using Modern AI Methodologies**

- Reverse-engineer legacy systems using open source analysis tools.
- Apply machine learning techniques to improve existing motor performance.
- Implement predictive maintenance algorithms for operational excellence.
- Future-proof your designs with AI-enhanced adaptability.

5. **Create Production-Ready Systems Using Free Tools**

- Build complete motor control systems from STM32 firmware to Python optimization scripts.

- Demonstrate axial flux motor technology through hands-on implementation.
- Deploy AI-enhanced control algorithms for superior performance.
- Showcase open source hardware designs ready for manufacturing.

6. **Establish Your Open Source AI Motor Engineering Toolkit**

- Receive comprehensive Python libraries for motor design and optimization
- Access trained AI models for electromagnetic analysis and control
- Obtain STM32 firmware templates for advanced motor control
- Build community connections for continuous learning and collaboration

Ultimate Goal: Transform you from a traditional motor engineer into an AI-powered innovation catalyst who can create world-class motor systems using only free tools, open source software, and machine intelligence - forever liberating your engineering potential from corporate licensing constraints.

"We don't just teach motor design - we unleash engineering revolutionaries who will reshape the industry using democratized AI tools."

4.0 Course Advantages: Revolutionary Returns on Your Investment

Transform Your Engineering Capabilities Forever - Without Licensing Fees

1. **Achieve AI-Enhanced Motor Mastery**

- Master machine learning optimization techniques that discover designs beyond human imagination
- Gain lifetime access to evolving open source tools that improve continuously.
- Develop future-proof skills in AI-powered engineering methodologies.

2. **Unleash Breakthrough Innovation Potential**

- Create revolutionary motor topologies using genetic algorithms and neural networks.
- Pioneer next-generation designs through AI-discovered electromagnetic principles.
- Lead the open source motor revolution in your industry.

3. **Multiply Your Team's Engineering Impact by 10X**

- Eliminate software licensing bottlenecks that limit team growth
- Enable every engineer to access world-class simulation and design tools
- Build collaborative workflows using shared open source platforms

4. Revolutionize Project Management Through Intelligent Automation

- Deploy AI-powered project tracking with predictive timeline optimization
- Implement automated design validation, reducing human error
- Achieve data-driven decision-making through intelligent analytics

5. Accelerate Development Speed by 5-10X

- Leverage AI automation for rapid design iteration and optimization
- Eliminate proprietary software learning curves through intuitive Python workflows
- Deploy parallel processing on unlimited computing resources

6. Achieve Zero-Defect Design Through Predictive Intelligence

- Implement machine learning failure prediction before prototyping
- Use AI-enhanced simulation for comprehensive design validation
- Deploy digital twin technology for real-time performance monitoring

7. Deliver Unprecedented Quality and Reliability

- Harness AI optimization algorithms that consider millions of design variables
- Implement predictive maintenance systems using edge AI
- Achieve six-sigma quality through intelligent design methodologies

8. Pioneer Industry-Leading Innovation

- Access cutting-edge AI techniques typically reserved for tech giants
- Contribute to open source communities, shaping the future of motor technology
- Develop patentable innovations using AI-discovered design principles

9. Eliminate Software Costs While Maximizing Performance

- Zero licensing fees - all tools remain free forever
- Superior results compared to expensive proprietary solutions
- Unlimited scalability without per-seat software restrictions

10. Optimize Manufacturing Through AI Intelligence

- Deploy AI-driven design for manufacturing optimization.

- Implement predictive quality control using machine learning
- Achieve automated production planning through intelligent systems

11. Evaluate Infinite Design Alternatives Instantly

- Use AI parallel processing to compare thousands of design variations
- Implement multi-objective optimization for complex trade-off analysis
- Leverage cloud computing for unlimited computational resources

12. Build Sustainable Competitive Advantage

- Develop proprietary AI models trained on your specific applications
- Create moats around your engineering capabilities that competitors cannot replicate
- Establish technology leadership in the democratized AI era

ROI Guarantee: Within 6 months, the time savings from AI automation alone will exceed the workshop investment, while the elimination of software licensing costs provides ongoing value immediately. Most importantly, you'll possess capabilities that would have cost millions to develop just five years ago.

"This isn't just professional development - it's your gateway to engineering superpowers that were previously exclusive to billion-dollar corporations."

5.0 Who Should Attend: Engineers Ready to Embrace the AI Revolution

This transformative workshop is designed for forward-thinking professionals who want to master the future of motor engineering through open-source AI tools.

Technical Engineers & Specialists:

1. **Motor & Generator Engineers (All Levels)**

- Beginners ready to leapfrog traditional learning through AI-accelerated methodologies
- Advanced engineers seeking to amplify their expertise with machine learning optimization
- Design specialists wanting to create breakthrough motor topologies using genetic algorithms.

2. **Drive & Control Engineers**

- Motor control experts implementing AI-enhanced field-oriented control algorithms
- Power electronics designers leveraging machine learning for optimal PWM strategies.
- Control system architects building adaptive, self-tuning motor drives

3. **Embedded Systems Engineers**

- Firmware developers deploying AI algorithms on STM32 and low-cost microcontrollers
- Real-time system programmers optimizing performance through intelligent edge computing
- IoT engineers creating connected, self-diagnosing motor systems

4. **Power Electronics Engineers**

- Inverter designers using AI for thermal optimization and efficiency maximization.
- Switching circuit specialists implementing machine learning-enhanced gate drivers
- Power system engineers building intelligent grid-connected motor drives

5. **Application Engineers**

- System integrators solving complex motor applications through AI-powered design tools
- Field engineers implementing predictive maintenance using machine learning
- Customer solution architects delivering AI-enhanced motor systems

Leadership & Management:

6. **Engineering Directors**

- Technical leaders building AI-first engineering organizations
- Innovation executives establishing competitive advantages through open source mastery.
- Strategic planners are eliminating software licensing constraints while enhancing capabilities.

7. **Engineering & R&D Managers**

- Team leaders seeking to 10X their engineering productivity through AI automation
- Project managers implementing intelligent design workflows and predictive timelines
- Research directors pioneering AI applications in motor technology development

Core Engineering Disciplines:

8. **Electrical Engineers**

- Circuit designers optimizing electromagnetic systems using machine learning.
- Signal processing experts applying AI to motor control and diagnostics
- Power system engineers integrating intelligent motor drives into smart grids

9. System Engineers

- Multidisciplinary engineers leveraging AI for holistic motor system optimization
- Integration specialists building intelligent electromechanical systems
- Performance analysts using machine learning for system-level optimization

10. Product Development Engineers

- Innovation engineers creating next-generation motor-driven products
- Design engineers implementing AI-enhanced design-for-manufacturing principles
- Validation engineers deploying machine learning for accelerated testing and qualification

Academic & Learning Community:

11. Faculty & Students

- Professors integrating cutting-edge AI methodologies into motor engineering curriculum
- Graduate students conducting research at the intersection of AI and electromagnetic design
- Industry-academic collaborators bridging theoretical AI advances with practical motor applications

Emerging Professionals:

12. Software Engineers Entering Motor Domain

- AI/ML engineers seeking domain expertise in electromagnetic applications
- Python developers wanting to apply their skills to physical engineering systems
- Data scientists exploring motor performance optimization through machine learning

13. Startup Founders & Entrepreneurs

- Hardware entrepreneurs needing world-class motor capabilities without enterprise budgets
- Technology innovators building AI-powered motor-driven products
- Consulting engineers offering advanced design services using open source tools

Perfect Candidates:

- ✓ Engineers frustrated with expensive software limitations.
- ✓ Teams seeking rapid innovation through AI automation
- ✓ Professionals building future-ready engineering skills
- ✓ Organizations wanting sustainable competitive advantages

- ✓ Individuals ready to lead the democratized AI engineering revolution

"From seasoned veterans to ambitious newcomers - if you're ready to multiply your engineering capabilities through AI while eliminating software costs forever, this workshop transforms you into a motor engineering pioneer."

6.0 Day One: Open Source AI-Powered Motor Fundamentals

Breaking Free from Traditional Design Limitations Through Intelligent Automation
Morning Sessions:

- AI-Enhanced BLDC and PMSM Fundamentals - Machine learning insights into electromagnetic principles
- Open Source Motor Architecture Mastery - Python-powered analytical design using SciPy and NumPy
- Intelligent Power Transmission Analysis - AI-optimized motor selection and thermal modeling
- Dynamic Modeling Revolution - Advanced simulations using free tools (ngspice, QUCS, Python)

Day One transforms traditional motor theory into AI-accelerated understanding. We'll explore how machine learning algorithms discover optimal motor architectures, demonstrate Python-based analytical tools that surpass expensive software, and introduce space vector concepts through interactive visualizations.

Hands-On AI Implementation: Participants will use genetic algorithms for motor optimization, deploy neural networks for thermal analysis, and master open source FEA tools (FEMM) for professional-grade electromagnetic simulation. Real-world mechanical considerations including power transmission, mounting strategies, and failure mode prediction will be analyzed using predictive AI models.

Revolutionary Approach: Instead of memorizing equations, you'll understand how AI discovers design principles automatically, creating motor designs that exceed human intuition while using completely free tools.

7.0 Day Two: Intelligent Inverter & Open Source Hardware Mastery
Building World-Class Motor Drives Without Licensing Fees
Core Sessions:

- AI-Optimized Power Stage Design - Machine learning for switching strategy optimization
- Open Source Hardware Development - KiCad PCB design and STM32 microcontroller programming
- Intelligent Firmware Architecture - Real-time AI algorithms on embedded systems
- Complete System Integration - End-to-end motor control using free development tools

Day Two revolutionizes inverter design through open source excellence. We'll demonstrate how STM32 microcontrollers outperform expensive industrial controllers, showcase KiCad PCB designs rivaling commercial motor drives, and implement AI-enhanced control algorithms that adapt in real-time.

Practical Breakthroughs: Build complete motor control systems using Arduino IDE, PlatformIO, and FreeRTOS. Implement machine learning field-oriented control that optimizes efficiency automatically. Design professional inverter circuits using ngspice simulation and KiCad layout tools.

Live Development: Watch as we create a 5-phase motor controller from scratch using only open source tools, demonstrating firmware development with SimpleFOC library and TensorFlow Lite for edge AI implementation.

8.0 Day Three: Advanced AI Simulation & Digital Twin Creation
Mastering Professional-Grade Analysis Using Free Tools
Advanced Sessions:

- Open Source FEA Mastery - FEMM automation and Elmer FEM for complex 3D analysis
- AI-Enhanced Control Algorithms - Neural network-based sensor-less control implementation
- Digital Twin Development - Real-time motor monitoring using Python and InfluxDB
- Production-Ready Implementation - Complete motor system deployment strategies

Day Three achieves simulation excellence without expensive licenses. Master FEMM scripting for automated design optimization, implement AI-powered sensor-less control algorithms, and create digital twins that predict motor performance in real-time.

Cutting-Edge Applications: Deploy machine learning algorithms for predictive maintenance, use Jupyter notebooks for interactive motor analysis, and build cloud-connected motor systems using open source IoT platforms.

Capstone Project: Design, simulate, and virtually test a complete AI-optimized axial flux motor using only free tools - proving that open source methodologies deliver superior results at zero ongoing cost.

"Three days to transform from traditional motor engineer to AI-powered innovation catalyst - using tools that remain free forever."

9.0 Workshop Schedule

9.1 Day One: Open-Source Fundamentals, Dynamic Modeling, Mechanical Aspects, Simulations and AI-Enhanced Design

Table 1: Day One Schedule (Subject to Change)

Schedule - Day 1:		
Time	**Session**	**Open Source Tools Used**
9:30	**Open Source Motor Design Fundamentals**	FEMM, SciPy, NumPy
10:30	**Open Source FEA and Simulation**	FEMM, OpenFOAM, FreeCAD
11:00	Coffee Break	
11:15	**AI-Enhanced Motor Optimization**	Python, TensorFlow, scikit-learn
12:15	**Open Source Motor Architectures**	KiCad, FreeCAD, GNU Octave
13:00	Lunch	
14:00	**Space Vectors with Open Source Tools**	Python matplotlib, NumPy
15:00	**Open Source Thermal Analysis**	OpenFOAM, Salome-Meca
15:30	Coffee Break	
15:45	**Python-Based Motor Selection**	pandas, scipy.optimize
17:00	**Open Source Mechanical Design**	FreeCAD, OpenSCAD
17:30	End	

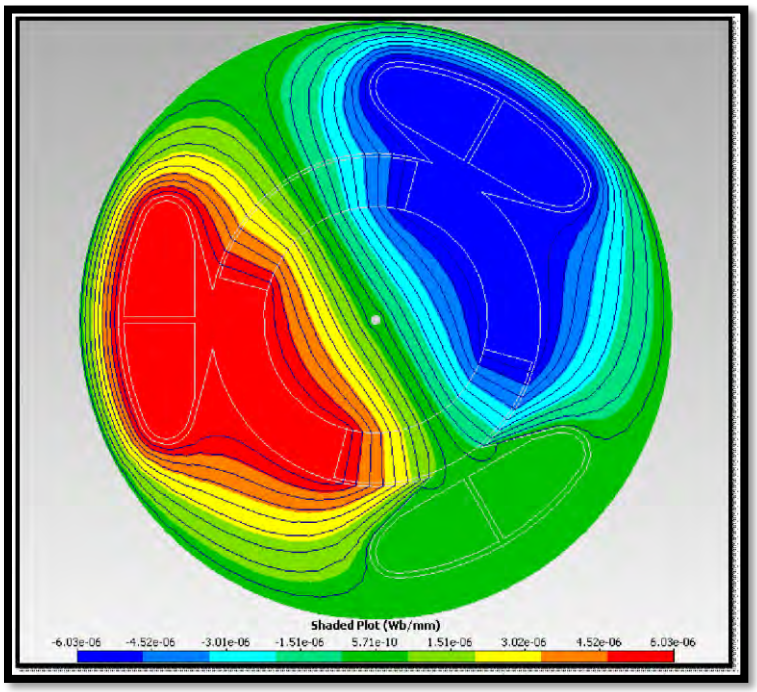


Figure 1: Use of FEA for Dynamic Modeling of PMSM: FEA can be used to estimate the Ld and Lq parameters and saliency of the machine, and consequently, these parameters can be used to simulate the complete system behavior and performance in LTSpice.

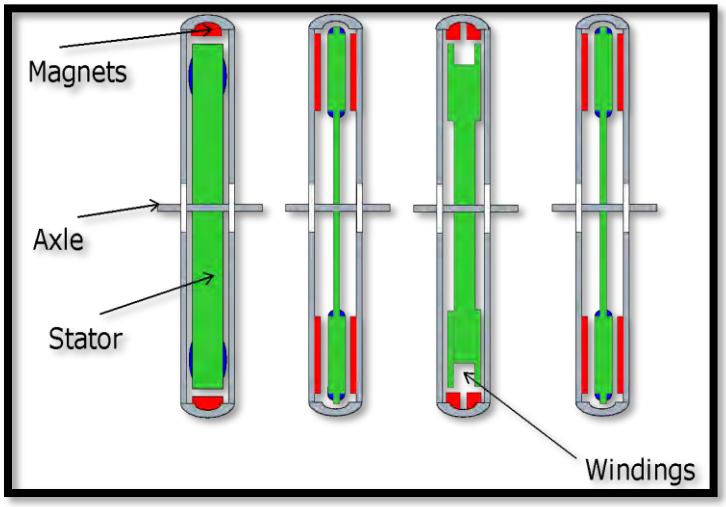


Figure 2: Motor Architectures: Day one will discuss various motor architectures. An example of external rotor motor architecture is shown in Figure 2.

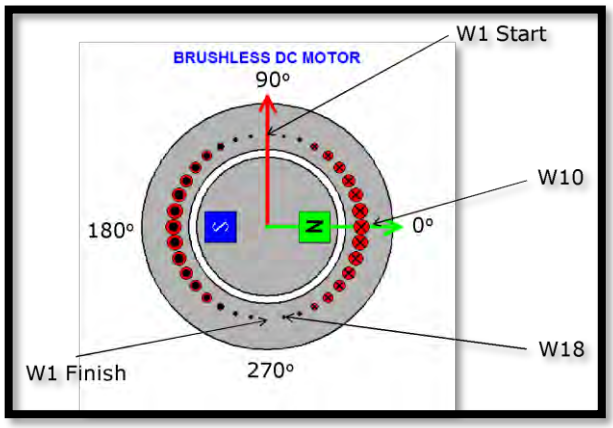


Figure 3: Understanding Space Vector Fundamentals: Day one will discuss space vector fundamentals and how the winding currents help generate the space vector fundamentals. Understanding the space vectors is critical in designing and optimizing motors and drives.

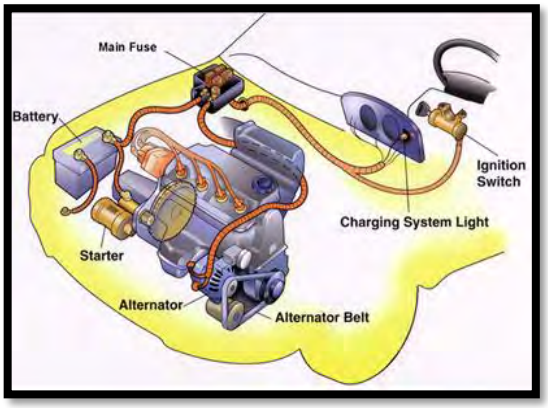


Figure 4: Starter Alternator Design Considerations

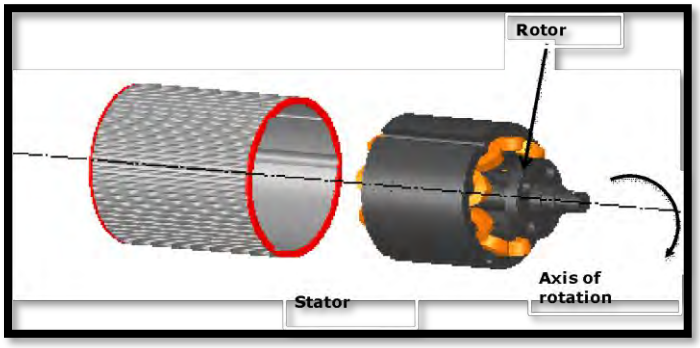


Figure 5: Mounting Considerations for Brushless PMSM

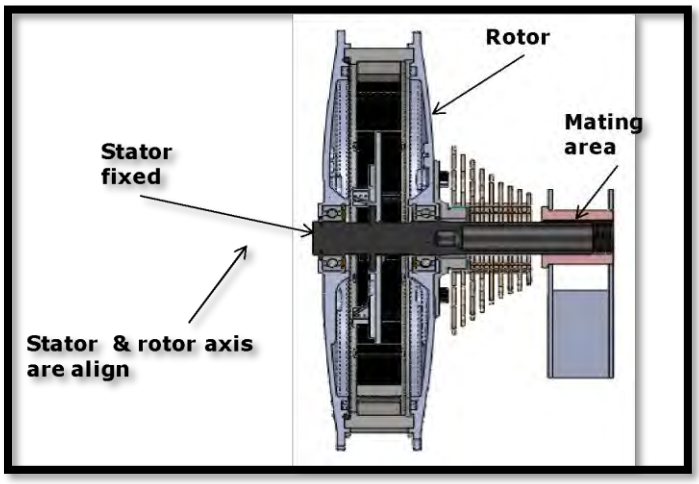


Figure 6: Illustration of Principles of Mounting

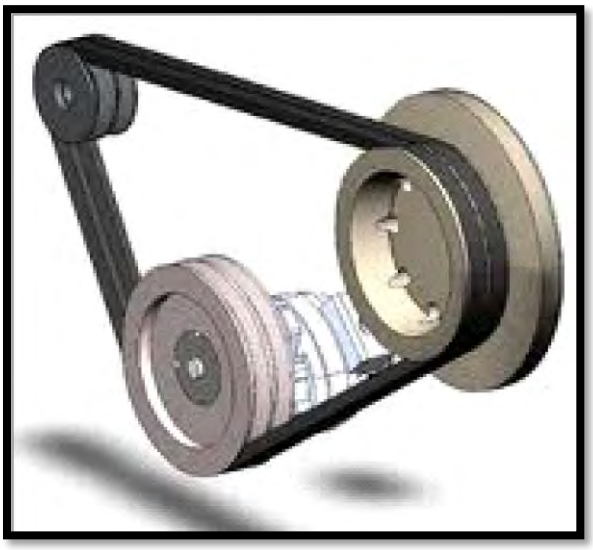


Figure 7: Power Transmission Basics

9.2 Day Two: Open-Source Inverter, Hardware and Firmware Design and Detailed Design Examples. Hardware and Firmware Design, Modeling and Simulation using LTSpice™.

Table 2: Day 2 Schedule (Subject to Change)

Schedule - Day 2:		
Time	**Session**	**Open Source Tools Used**
9:30	**Open Source Power Electronics**	LTspice (free), ngspice, QUCS
10:30	**Open Source Inverter Design**	KiCad, ngspice, Python
11:00	Coffee Break	
11:15	**STM32 Open Source Development**	STM32CubeIDE, GCC ARM
12:15	**Open Source Control Algorithms**	ChibiOS, FreeRTOS
13:00	Lunch	
14:00	**ESC32 & VESC Open Source Firmware**	VESC Project, ESC32
15:00	**Arduino & STM32 Motor Control**	Arduino IDE, PlatformIO
15:30	Coffee Break	
15:45	**Open Source Field-Oriented Control**	SimpleFOC Library
17:00	**Real-World Open Source Projects**	ODrive, VESC, BeamNG
17:30	End	

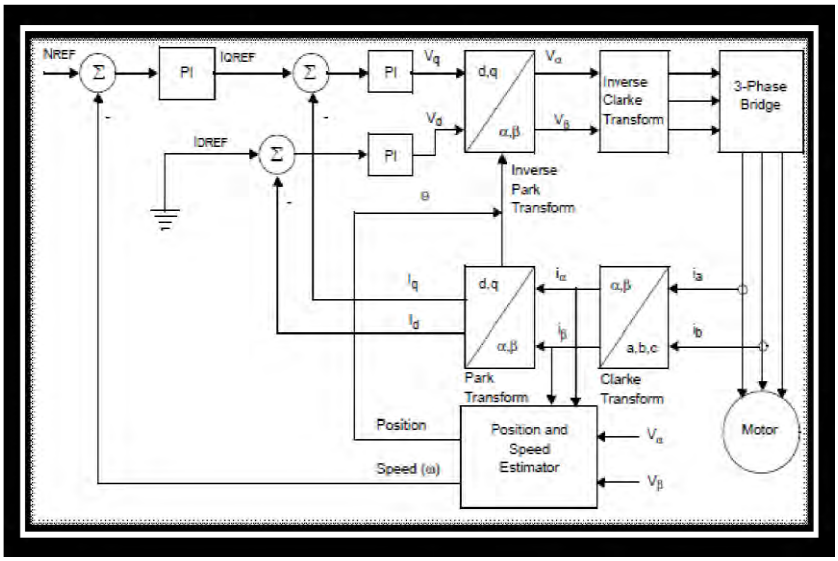


Figure 8: Fundamentals of Field Oriented Control are discussed in detail. A simulation model is built from the grounds up.

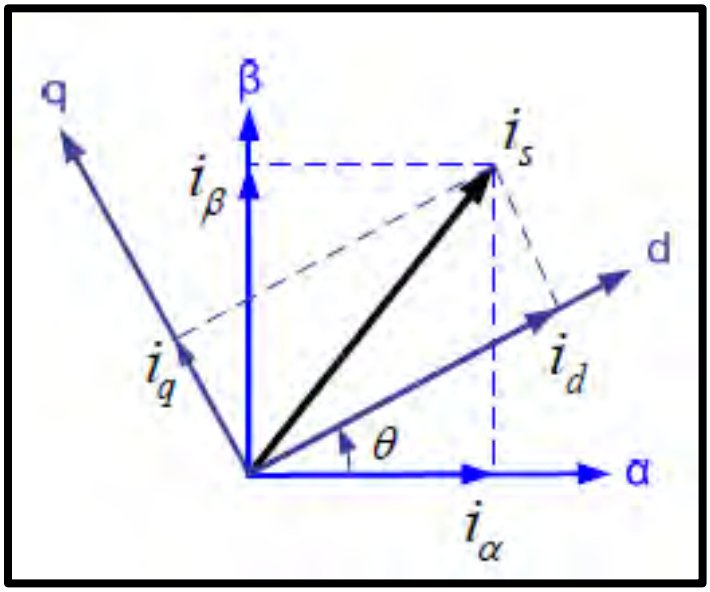


Figure 9: Transformations from Rotary Axis to Stationary Axis and Vice Versa

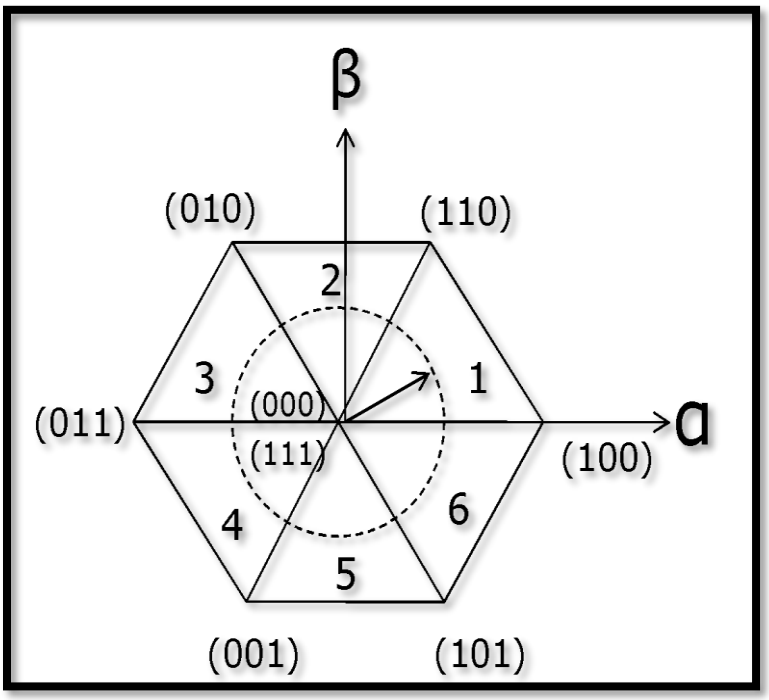


Figure 10: Deriving the Space Vector Model

9.3 Day Three: Open-Source Finite Element Analysis, System Simulations, and Detailed Design Examples, Advanced Open-Source AI and Digital Twins.

Table 3: Day 3 Schedule (Subject to Change)

Schedule - Day 3:		
Time	**Session**	**Open Source Tools Used**
9:30	**Open Source AI Motor Control**	TensorFlow Lite, Edge Impulse
10:30	**Machine Learning Optimization**	PyTorch, scikit-learn
11:00	Coffee Break	
11:15	**Open Source Sensor-less Control**	SimpleFOC, ODrive firmware
12:15	**Digital Twin Development**	Python, InfluxDB, Grafana
13:00	Lunch	
14:00	**Open Source FEA Deep Dive**	FEMM automation, Elmer FEM
15:00	**Jupyter Notebook Simulations**	Jupyter, matplotlib, scipy
15:30	Coffee Break	
15:45	**Open Source Motor Testing**	openDAQ, sigrok, PulseView
17:00	**Future: Open Hardware Motors**	OSHWA certified designs
17:30	End	

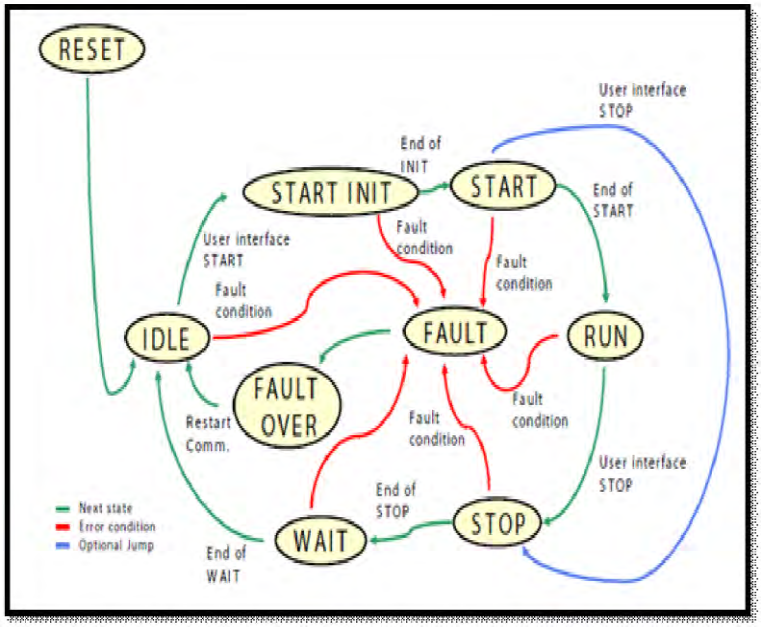


Figure 13: State Machine for Firmware Implementation and Execution

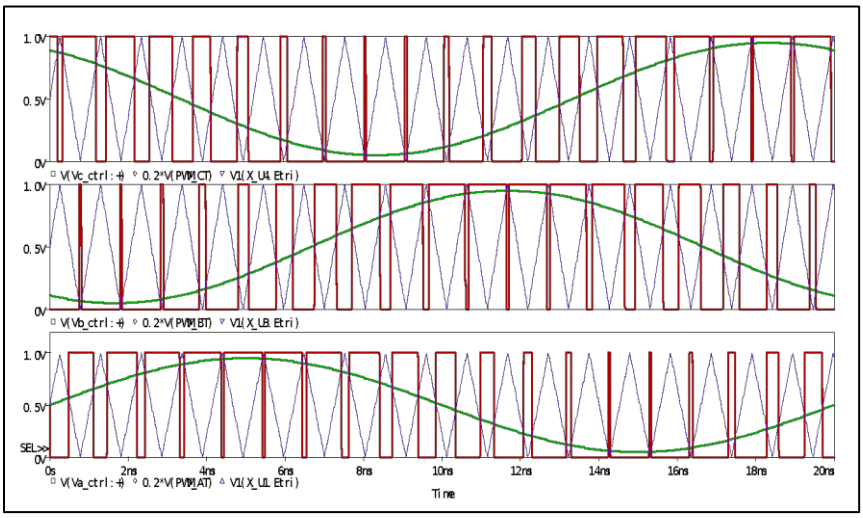


Figure 14: Sinusoidal Control Methods for Controlling PMSM

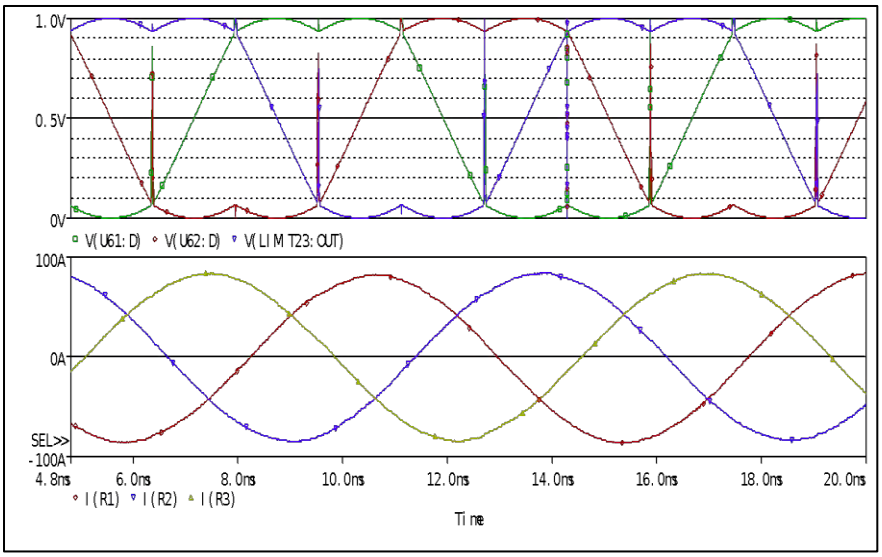


Figure 15: Space Vector Simulation and Implementation

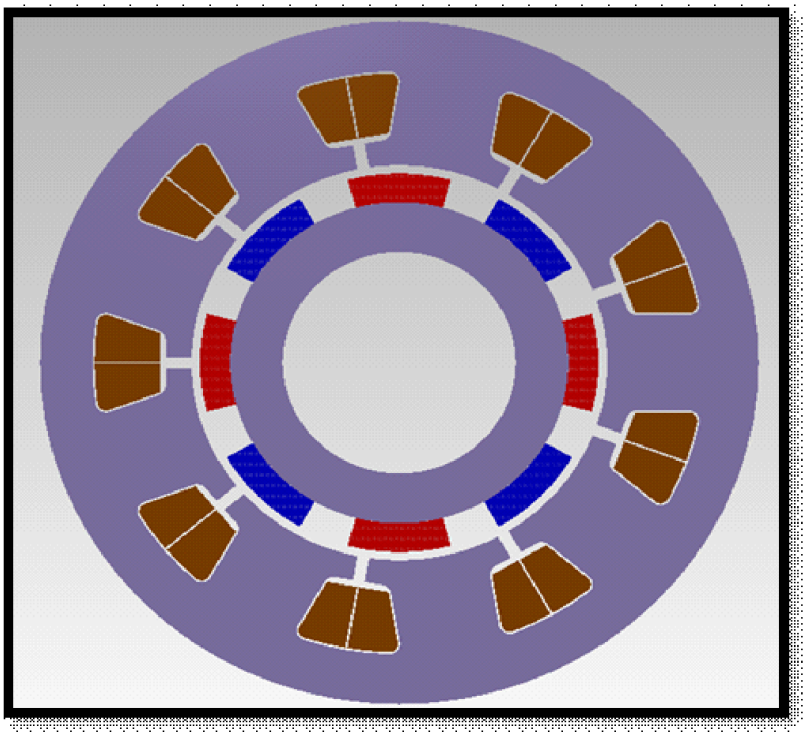


Figure 16: Finite Element Analysis using FEMM

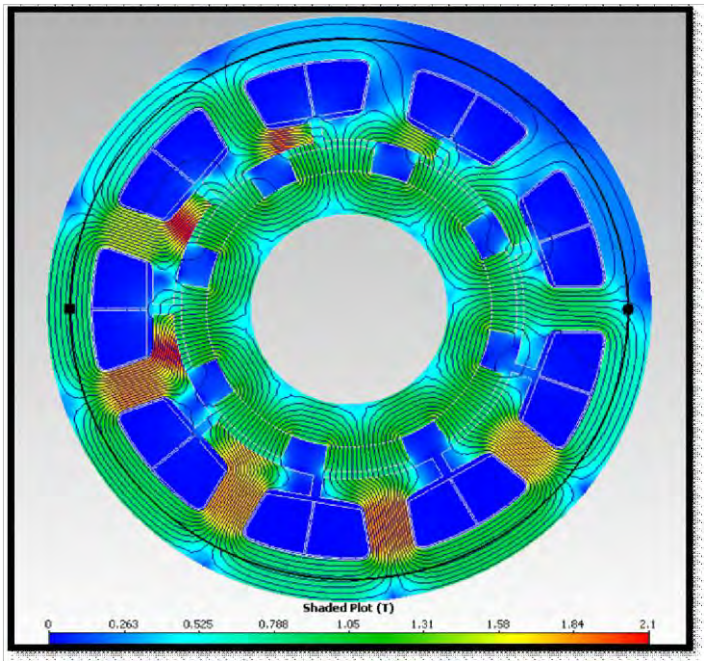


Figure 17: Flux and Flux Density Distribution using FEMM

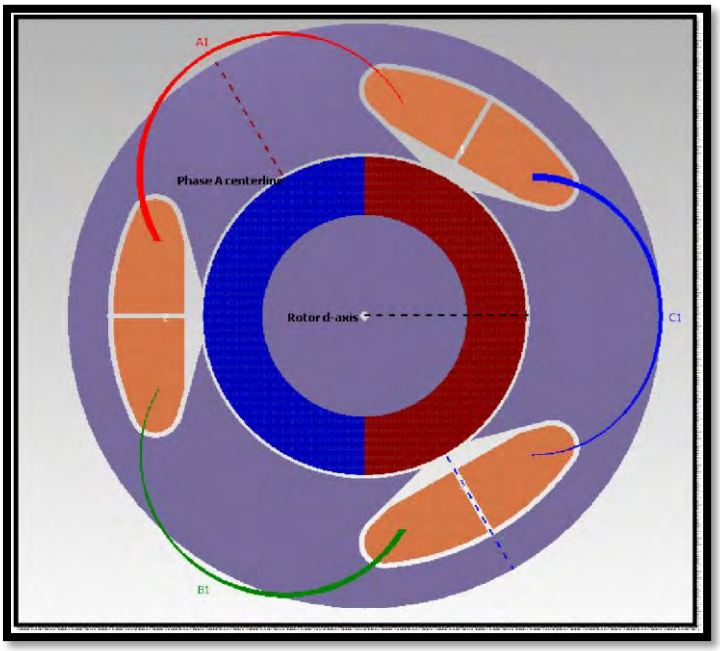


Figure 18: Understanding Winding Arrangements and Space Vectors

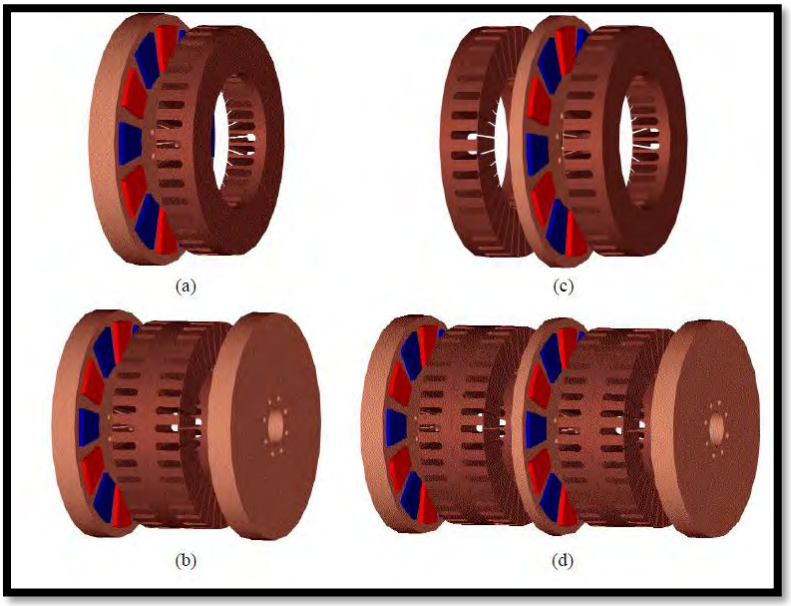


Figure 19: 3D Finite Element Analysis using Elmer FEM.

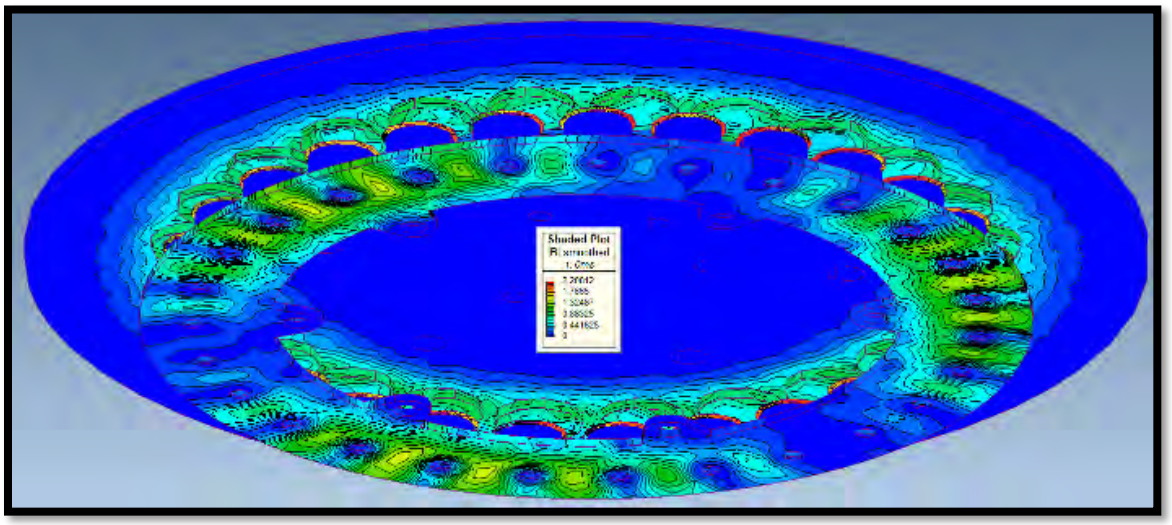


Figure 20: 2D Finite Element Analysis using FEMM.

10.0 About Us

Power Electronics Group (PEG) designs, develops and manufactures brushless permanent magnet/BLDC motors and motor drives for customer-specific applications. PEG also comprehensively analyzes motors, motion control and drive products, and systems. PEG helps customers with optimal design selection, sizing, and configuration of Motion Control Systems.

PEG's staff has developed a critical understanding and has published on a wide range of permanent magnet/BLDC motors, motor control, motor drives, high-frequency electromagnetic components, electric vehicles, and switch-mode power systems. PEG's staff has co-authored over 30 publications in various refereed journals and conference proceedings and filed for several issued or pending US patents.

PEG has significant skills in motor engineering, mechanical engineering, power electronics, analog and digital electronics, software engineering, test engineering, manufacturing engineering, system simulation, design, and integration.

PEG has successfully delivered permanent magnet motors, motor drives, and battery management systems in electric vehicles, bicycles, scooters, power wheelchairs, and washing machines. PEG has an in-depth understanding of consumer, medical, automotive, and industrial systems requirements.

PEG's staff has extensively pursued technology beyond the traditional three-phase motors by designing seven- and five-phase radial as well as axial flux permanent magnet brushless motors.

PEG is headquartered in the Shenandoah Valley and has significant research, development, and manufacturing capability in permanent magnet brushless motors, motor control, and motor drive systems. Currently, PEG has offices in the US and India. PEG's research, development, and manufacturing are in Pune, India.

PEG has developed a unique and highly successful approach called CARE™ to product development and project management for complex technology products involving embedded systems, electromagnetic and electromechanical components, and power electronics. Our CARE™ approach has four main elements –

- **C**learly defined customer requirements
- **A**mple focus on analysis, simulation, and modeling
- **R**apid prototyping
- **E**ffective project management techniques

We bring products to fruition in a short time. We combine the best practical, technical and academic knowledge to deliver our clients unique competitive advantages.

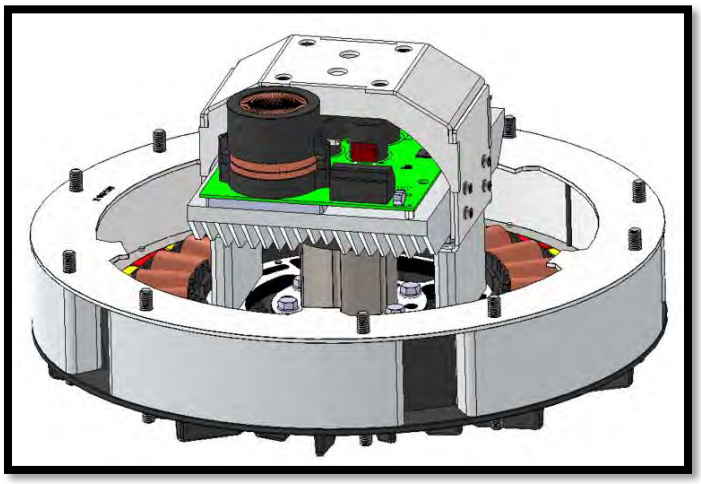


Figure 22: World's First 300Nm Fan HVLS (High Volume Low Speed) Platform launched in a record time.

Team at PEG

PEG has a talented and robust engineering team of

Motor engineers
specializing in the design of motors and high-frequency magnetic components using FEA (Finite Element Analysis) and analytical methods.

Electrical engineers
specializing in power electronics, analog, and digital circuit design.

Mechanical engineers
specializing in 3-D modeling and chassis design with diecast and CNC machined components using SolidWorks.

Software engineers
specializing in algorithm and programming for TI, ST, and Microchip DSPs and Micro-controllers.

Embedded engineers
specializing in digital circuit design, Network communication protocol implementation (CAN, RS232, RS485, I2C, MODBUS, SERCOS, Device Net, and Profibus), C and C++ programming.

Layout engineers
for designing printed circuit boards for harsh consumer, automotive, medical and industrial applications.

Test engineers
for designing customer-specific test stands with National Instrument's LABVIEW™ Software.

Project engineers
to ensure performance, schedule and cost objectives.

Research & Simulation engineers
to further the understanding of PWM techniques, fuzzy logic, field-oriented, space vector and sensor less control methods.

Manufacturing engineers
specializing in shorter production time with minimum risk.

11.0 Our Vision

To bring remarkable value to our customers by helping them create cutting-edge technology products in Permanent Magnet Motors, Motor Control, and Motor Drives and Systems.

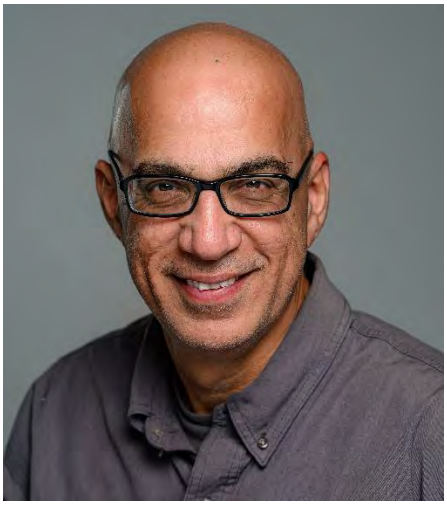
12.0 Our Mission

We are committed to acquiring and applying state-of-the-art knowledge, tools, methods, and processes to deliver the most exceptional value to our customers. We are committed to protecting our customers' interests with the highest level of integrity and ethics.

13.0 Our Core Values

Truth: Commitment to facts.
Promise: Commitment to promises made.
Honesty and Integrity: Commit to honesty and truth by promoting transparency.
Fairness and Justice: Commitment to fairness and justice inside and outside the company.
Excellence: Commitment to excellence to our customers.

14.0 About Rakesh



Rakesh Dhawan founded the Power Electronics Group (formerly Strategic Technology Group) in 2009. He is a thirty-four-year veteran of the motors and motor drive Industry. Rakesh has developed a critical understanding and has published on a wide range of motors, motor drives, high-frequency electromagnetic components, electric vehicles, and switch-mode power systems. He has co-authored over 25 publications in various refereed journals and conference proceedings and is an inventor of eleven issued or pending US patents. Rakesh has served on the Technical Committee of the Applied Power Electronics Conference (APEC). He received a B. Tech (Electrical Engineering) degree from Indian Institute of Technology (IIT), Kharagpur, India.

Rakesh received his MS degree from the University of Minnesota under the tutelage of Power Electronics pioneer Prof. Ned Mohan. He received his MBA from Old Dominion University.

He has been directly responsible for over twenty-five successful product launches in his career, many involving brushless permanent magnet motor systems. Rakesh has conducted several workshops in the field of motors and motor drives. His interests include brushless permanent magnet motor systems, light electric vehicles, electric bicycles, switch mode power supplies, solar inverters, simulation, statistics, project management, and new and ultra-fast product development methodologies. Rakesh is a high-energy individual with a difference; he combines technology excellence, leadership, and professional management skills with his inborn entrepreneurial instincts.

Rakesh is a senior member of IEEE is very keen on nurturing innovation and entrepreneurial talent in the field of technology development and management.

16.0 Some of our customers

17.0 Registration Details (In Person and Via Zoom)

Price exclusive of all taxes:

Early Bird Price:
Industry ₹ 39,995/- (USD 495),
Students: ₹ 14,995/- (USD 195),
Faculty: ₹ 24,995/- (USD 295) (until September 19)

Regular Price:
Industry: ₹ 44,995/- (USD 595),
Students: ₹ 19,995/- (USD 295),
Faculty: ₹ 29,995/- (USD 395) (after September 19)

How to Register

Visit: https://forms.gle/t3VkUXmxcWLJpyfg7

or Call Ms. Shweta Nalawade at **+91 93715 50809**
Email: **info@powerelectronicsgroup.com**
India Phone: +91 93715 50809
US Phone: +1 571 781 2453

Payments can be made via credit card, bank transfer, or PayPal. Seats will be confirmed upon payment.

18.0. Course Deliverables

- Course workbook (soft copy)
- Presentation slides, tools, and design methodologies
- Real-world case studies and project templates
- Certificate of Completion

19.0. Cancellation Policy

- Full refund (minus $50/₹4,000 administration fee) for cancellations made **20+ business days before the event**.

- No refunds for cancellations **less than 20 days before the event**, but participants may transfer their registration to another attendee.

Contact Information

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