



Vel Tech
Rangarajan Dr. Sagunthala
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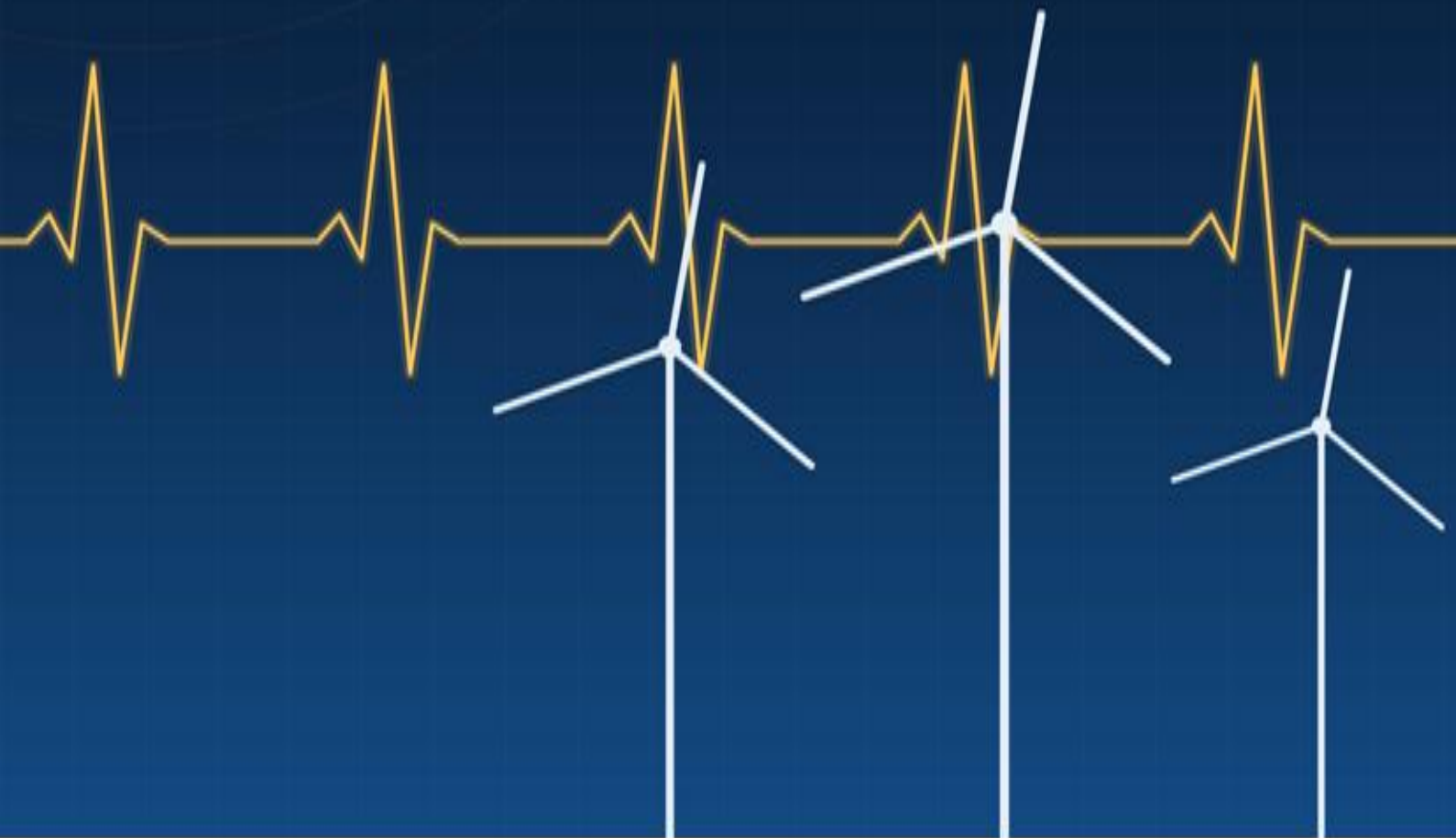
SCHOOL OF ELECTRICAL AND COMMUNICATION

**DEPARTMENT OF
ELECTRICAL AND ELECTRONICS ENGINEERING**

Spark Magazine

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Foreword



Col. Prof. Vel. Dr. R. Rangarajan
Founder President & Chancellor



Dr. Mrs. Sagunthala Rangarajan
Foundress President

We remain committed to building an educational environment that nurtures knowledge, character, innovation, and excellence. Our institution continues to encourage students and faculty to pursue meaningful academic, research, and technological endeavors, supported by modern infrastructure, well-equipped laboratories, and a dedicated faculty. The Department of Electrical and Electronics Engineering reflects this vision through its academic achievements, research initiatives, funded projects, industry collaborations, and the accomplishments of its students and faculty.

LEADERSHIP



Dr. Rangarajan Mahalakshmi Kishore
Chairperson & Managing Trustee

I am delighted to present this vibrant edition of SPARK, the magazine of the Department of Electrical and Electronics Engineering. This magazine reflects the department's academic excellence, student contributions, innovative initiatives, and technical achievements. As technology continues to evolve, I encourage students and faculty to embrace lifelong learning, explore emerging technologies, and apply their knowledge to address real-world challenges. I congratulate the editorial team and the entire EEE department for their dedicated efforts in bringing out this edition and showcasing the department's accomplishments and vision.

Wishing SPARK continued success in inspiring innovation, creativity, and excellence!



LEADERSHIP



Prof. S. Salivahanan
Vice Chancellor

I am delighted to present the latest edition of Spark, the flagship magazine of the EEE Department. This magazine reflects our continuous pursuit of research excellence, creativity, co-curricular activity and technical learning of our students. Kudos to the editorial team, faculty, and brilliant students whose hard work and contributions made this edition possible.



Prof. Dr. E. Kannan
Registrar

I warmly congratulate the EEE Department on launching this vibrant edition of Spark. This platform beautifully captures the dynamic activities, student achievements, and academic excellence of the department. I wish the EEE team continued success in inspiring our community through such creative and meaningful initiatives.



Message from Dean and Head of the Department

Dr. R. S. Valarmathi

Professor & Dean
School Of Electrical and Communication



The School continues to make remarkable progress, driven by the achievements of our faculty, students and staff in cutting-edge research, academic excellence, and industry collaboration. Spark, the magazine of EEE department serves as a wonderful window into this journey—reflecting our focus on innovation, hands-on learning, and community impact. I commend the entire team for shaping our students into future-ready professionals and bringing these milestones to light.

Dr. S. Ramesh

Professor & Head
Department of Electrical and Electronics Engineering



It is with great pleasure and a deep sense of pride that to present the SPARK-Magazine of the Department of EEE. I encourage you to delve into the pages of this magazine to gain a deeper understanding of the remarkable work that has taken place within our department. Together, we can look forward to an even brighter future filled with groundbreaking research, transformative education, and meaningful contributions to the field of electrical and Electronics engineering.

VISION OF THE DEPARTMENT

To provide intellectual curiosity in the field of Electrical and Electronics engineering that produces skilled interdisciplinary engineers to serve the society.

MISSION OF THE DEPARTMENT

M1: To inculcate knowledge among the students through comprehensive curriculum.

M2: To enrich the academic experience in terms of flexibility, teamwork, design skills, practice and industrial trainings.

M3: To produce competent graduates suitable for a successful career in Industry and Research.

PROGRAMME EDUCATIONAL OBJECTIVE

PEO1: Design and analyse electrical and electronic systems by applying the knowledge of mathematics and engineering.

PEO2: Provide practical solution to multidisciplinary societal problems through innovative ideas.

PEO3: Secure positions and continue as valued, creative and proficient employees in a wide variety of fields and industries for a rewarding career.



POWERING A CLEANER FUTURE RENEWABLE ENERGY REVOLUTION

Clean
Power
Rising



Renewable energy is transforming the electrical sector by replacing a growing share of conventional fossil-fuel generation with naturally replenished sources. Solar photovoltaic systems and wind farms are becoming important parts of modern power networks, while hydroelectricity and emerging technologies add further flexibility. For electrical engineers, this field combines power systems, electrical machines, power electronics, protection and control. Solar inverters convert DC electricity into grid-compatible AC power, while wind turbines use generators and power converters to deliver electricity efficiently. Digital monitoring also helps operators predict generation and maintain equipment. The next stage is the integration of renewable sources with smart grids and energy storage.

Clean power + smart grids = a more flexible energy future

VTU27012 P.VAMSIDHAR

Drive Electric

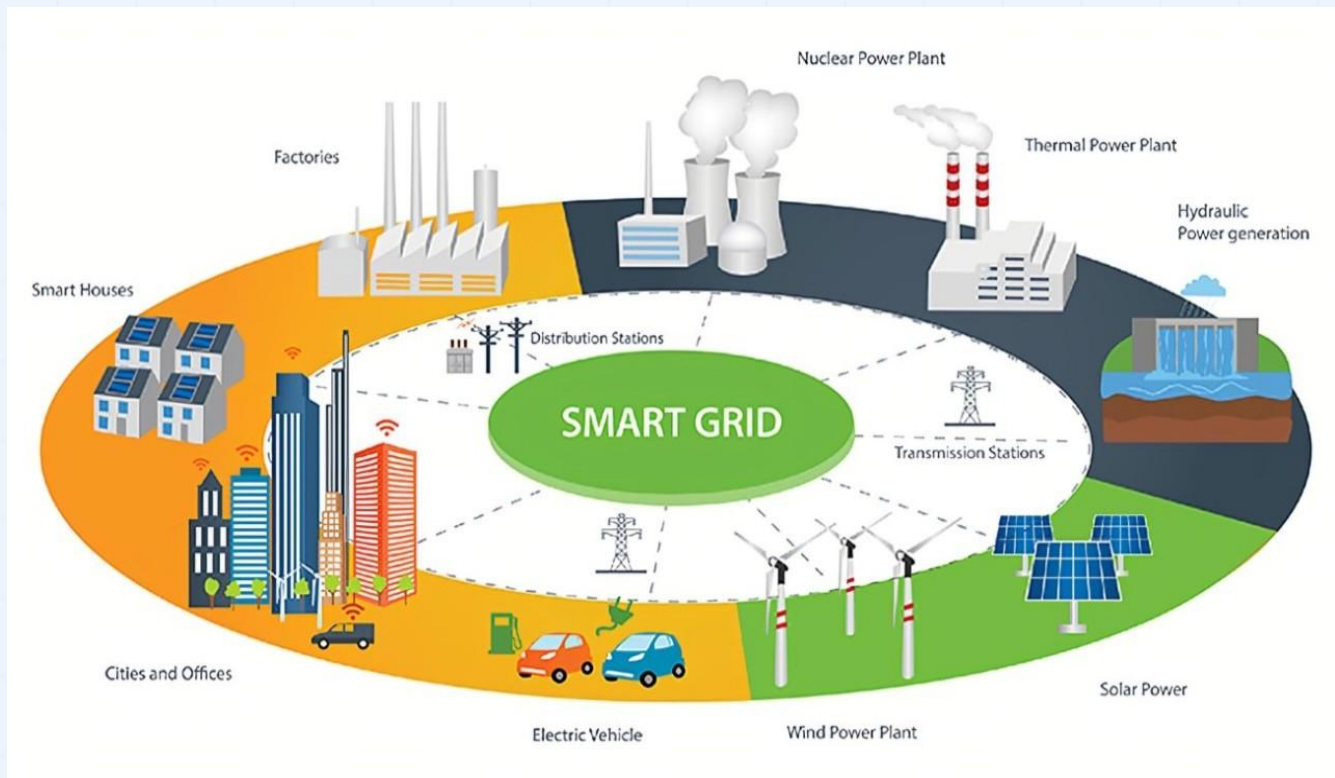


Electric vehicles are creating a rapidly expanding application area for electrical and electronics engineering. Instead of using an internal-combustion engine as the main source of propulsion, an EV uses electrical energy stored in a battery and converts it into mechanical power through an electric motor. An EV powertrain includes the battery pack, Battery Management System (BMS), inverter, motor, charging system and control electronics. Power electronics is especially important because the inverter controls the voltage, current and frequency supplied to the motor. Regenerative braking can also return part of the vehicle's kinetic energy to the battery. The development of EV charging infrastructure is equally important. Engineers are working on faster charging, safe charging systems, grid-connected chargers and efficient energy management. Battery research is also focused on improving energy density, lifetime, safety and charging performance.

“Electrification is bringing transport and the power sector closer together

VTU27012 P.VAMSIDHAR

FROM TRADITIONAL GRIDS TO INTELLIGENT NETWORKS SMART GRIDS & POWER SYSTEMS



The traditional electrical grid was designed mainly for one-way power flow: electricity moved from large generating stations through transmission and distribution networks to consumers. Modern power systems are becoming more flexible and digital through the development of smart grids. A smart grid combines electrical infrastructure with sensors, communication systems, automation and data analysis. Devices can measure voltage, current, frequency and power quality in near real time. Control systems can then help operators detect faults, manage demand and restore service more efficiently. Distributed energy resources such as rooftop solar, batteries and electric vehicles are adding new patterns of power flow. This makes protection, voltage regulation, forecasting and energy management increasingly important. For electrical engineers, smart grids create opportunities in power-system protection, SCADA, automation, communication, cybersecurity and grid analysis.

“Digital intelligence is becoming part of the electrical grid.”

VTU24218 A.SURYA

THE TECHNOLOGY BEHIND MODERN ELECTRIFICATION POWER ELECTRONICS



Power electronics is the technology used to control and convert electrical energy efficiently. It is now a foundation of many modern electrical systems, from renewable-energy plants and electric vehicles to industrial drives and consumer electronics. Power electronic converters are commonly grouped as rectifiers, DC-DC converters, inverters and AC controllers. Semiconductor devices such as MOSFETs and IGBTs allow electrical energy to be switched and controlled at high speed. Modern wide-bandgap devices, including silicon carbide and gallium nitride technologies, are enabling higher efficiency and faster switching in many applications. In an electric vehicle, the inverter controls motor operation. In a solar plant, a power converter connects the DC output of panels to the AC grid. In industry, variable-frequency drives control motor speed and improve energy efficiency.

“Efficient energy conversion is at the heart of modern electrification.”

VTU24218 A.SURYA

How Was the World Without Electricity?

Long ago, people lived without electricity. Their lives were much simpler than ours today. They used sunlight during the day and candles, oil lamps, and fire at night.

People travelled by walking, using animals, boats, and simple vehicles. Communication was also slow because there were no mobile phones, computers, or the internet. People depended on letters and messages carried from one place to another.

At home, people cooked with firewood and kept food fresh using traditional methods. There were no electric fans, refrigerators, washing machines, or televisions. Farmers used simple tools and depended greatly on nature for their work.

Although life without electricity was difficult, people were hardworking, creative, and closely connected with their communities. The invention and development of electricity changed the world greatly.

Today, electricity is an important part of our daily lives. It helps us study, work, communicate, travel, and receive medical care. Therefore, we should understand its importance and use energy carefully.

Electricity has changed our world, but its value reminds us that we must use energy wisely for a better future.



Wind of Change

Across the hills, across the plain,
The gentle wind begins again.
It turns the blades, it starts the flow,
And brings clean energy as they grow.
No smoke, no flame, no burning fire,
Just nature's breath to lift us higher.
A silent force, so strong and free,
Turning the wind into energy.
The turbines rise against the sky,
Their blades keep turning, passing by.
With every rotation, power is made,
A cleaner future slowly laid.
Engineers stand with dreams so bright,
Designing systems that use nature's might.
They study the wind, its speed and way,
To generate power night and day.

VTU21361 Gurunathan

Sun and Moon

The sun steps up to paint the morning sky,
And bathes the earth in gold and brilliant light,
While high above, as quiet hours pass by,
The silver moon prepares to rule the night.

They share the heavens in a timeless dance,
One brings the warmth, the other soft repose,
Though separated by a glowing glance,
Together they complete the world we know.

VTU21361 Gurunathan

Art: Shading Some Real Truth!

Arts'



VTU21325 Geetha

VTU19723 Adesh

Rangoli: Dots, Dust, Delight...

Rangolis'



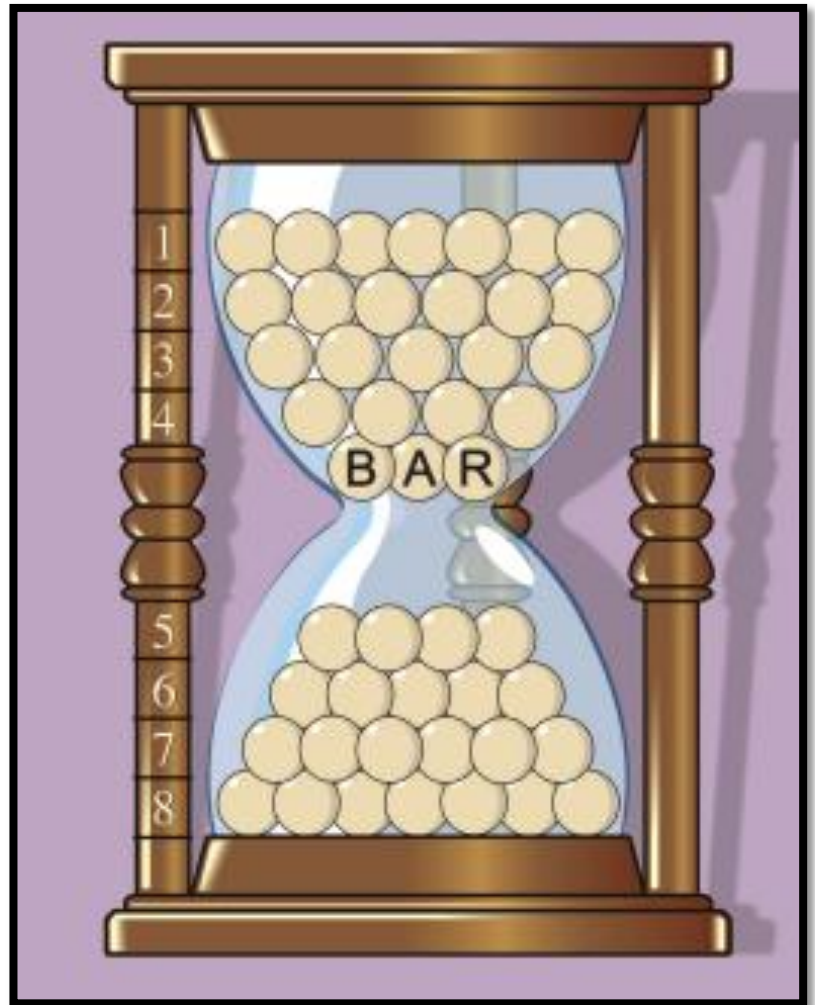
VTU21361 Gurunathan
VTU22378 Varshini

Brain Teaser: Hourglass.

Teaser

Starting in the middle, each word in the top-half has the letters of the word below it, plus a new letter and each word in the bottom half has the letters of the word above it, plus a new letter.

- (1)small army unit
- 2)tease
- (3)made from dough
- (4)lyric poet
- (5)short for Abraham
- (6)deep yellow color
- (7)sculpture rock
- (8)pedestrian



VTU21325 Geetha

VTU19723 Adesh



Quiz: Brain On Fire

■ What is the primary feature that distinguishes a closed-loop control system from an open-loop control system?

- A) Lower cost B) Feedback mechanism C) Absence of sensors D) Infinite gain

Answer: B) Feedback mechanism

■ Which control mode action is primarily responsible for completely eliminating steady-state error in a system?

- A) Proportional (P) B) Integral (I) C) Derivative (D) D) On-Off

Answer: B) Integral (I)

■ Which algebraic test allows you to determine the stability of a linear time-invariant system without having to solve for the exact roots of the characteristic equation?

- A) Bode analysis B) Nyquist plot C) Routh-Hurwitz criterion D) Root locus

Answer: C) Routh-Hurwitz criterion

■ Which device is used in instrumentation systems to convert non-electrical physical quantities, such as temperature, pressure, or displacement, into electrical signals?

- A) Actuator B) Transducer C) Rectifier D) Inverter

Answer: B) Transducer

■ What parameters does a standard Bode plot graphically display against frequency?

- A) Voltage and Current B) Magnitude and Phase C) Power and Time D) Resistance and Temperature

Answer: B) Magnitude and Phase

■ In an industrial process control loop, which component acts as the final control element to directly alter the process variable (such as a motorized valve)?

- A) Controller B) Sensor C) Actuator D) Transmitter

Answer: C) Actuator

■ What mathematical transformation is universally used in linear control systems to convert time-domain differential equations into algebraic equations in the complex s -domain?

- A) Fourier Transform B) Laplace Transform C) Z-Transform D) Wavelet Transform

Answer: B) Laplace Transform

◆ CREDITS

Editorial Team & Acknowledgements

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