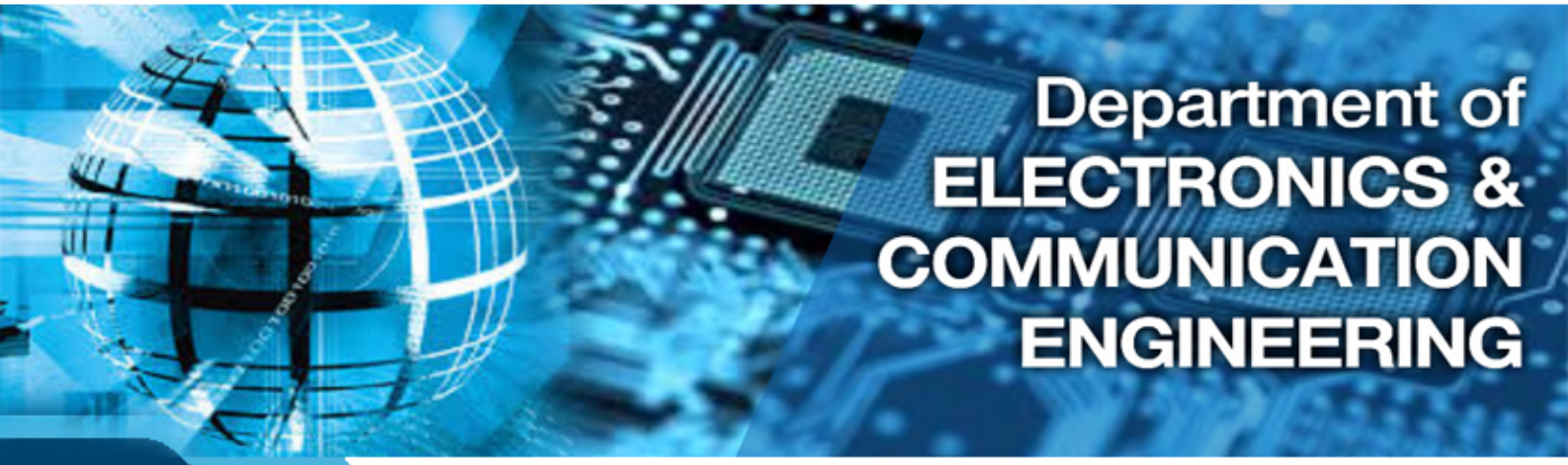
MANAKULA VINAYAGAR
INSTITUTE OF TECHNOLOGY
(Approved by AICTE , Affiliated to Pondicherry University and Accredited by NBA)
Kalitheerthalkuppam, Puducherry- 605107.



Department of ELECTRONICS & COMMUNICATION ENGINEERING

2018 -19

ELECTROMAG

Volume - 5

Vision and Mission

VISION

The department aspires to produce dexterous professionals, competent Researchers and entrepreneurial leaders for the benevolence of the society.

MISSION

Department of Electronics and Communication Engineering is committed.

Higher Order Thinking: To invoke higher order thinking among the students by means of comprehensive teaching and learning process.

Competency: To provide training on cutting-edge technologies to improve the competency of the students.

Continuous learning: To promote innovation through providing state of-art facilities and active industry institute interaction.

Entrepreneurship: To facilitate the students to improve their leadership and entrepreneurship skills with ethical values.

Programme Educational Objectives

PEO1: Employability: Our Graduates shall be suitably employed in allied industries/services with professional competency and knowledge of modern tools.

PEO2: Higher Education: Our Graduates shall be capable to pursue higher studies/research in the field of engineering and management.

PEO3: Entrepreneurship: Our Graduates shall be prepared for a successful career by meeting ever increasing demands required by Electronics and communication profession and enable them to become an entrepreneur.

PEO4: Ethical: Our Graduates cultivate professional and ethical attitudes with effective communication skills, team work and multidisciplinary approach related to engineering issues.

Program Outcomes

PO1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

Program Specific Outcomes

PSO1: Products Development: Use modern tools to design subsystems for simple applications in Embedded Systems and VLSI.

PSO2: Design Thinking: Apply engineering concepts to find solutions in the fields of Communications, Signal/Image Processing.

PO3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Program Specific Outcomes

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

ABOUT THE DEPARTMENT

Accredited by NBA

NATIONAL BOARD OF ACCREDITATION

The Department was established in the year 2008 focusing to develop the skills of modern youth in the field of Electronics and Communication Engineering. Adequate emphasis is given to electronic design using modern teaching methodologies. Emphasis is also given to the development of soft and hard skills. Utmost care is taken in the perspective of imparting more practical knowledge to the student's com-munity in the field of Electronics and Communication.

SWACHH SPACE!!!!

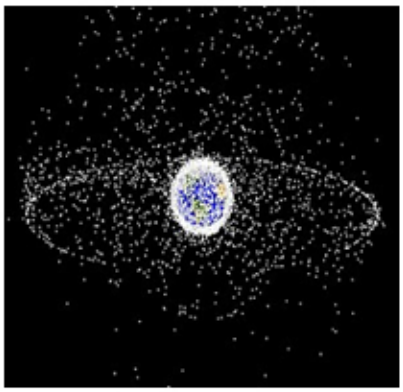
SWACHH SPACE!!!!

Space is everything in the universe beyond the top of the Earth's atmosphere. Space debris is any type of space object that is man- made, no longer in active use, and in Earth's orbit.

Reasons and origin of space debris:

Most space debris comes from breakup events caused by explosions, collisions and fragmentations, many of them deliberate. Three countries in particular are responsible for roughly 95% of the fragmentation debris currently in Earth's orbit, viz., China (42%), the United States (27.5%), and Russia (25.5%)2.The below table shows the number of debris present in the orbit with respect to their size:

SIZE (diameter)	NO. OF PIECES
>10 cm	13,000
1 – 10 cm	2,00,000
<1 cm	>1 million



This discovery is considerably different to existing solutions and will make a substantial contribution to future sustainable human activity in space.

SWACHH BHARATH!! SWACHH SPACE!!

COMPILED BY – S. KARPAGA SOUBHA VARSHINE
ECE – IV – B

IMPACT:

The amount of debris in space threatens both manned and unmanned spaceflight. The risk of a catastrophic collision of a space shuttle with a piece of space debris was 1 in 300. If there is a greater than a 1 in 100,000 chance of a known piece of debris colliding with the International Space Station (ISS), the astronauts perform a debris avoidance manoeuvre in which the ISS's orbit is raised to avoid collision.

TOP 5 WORST SATELLITE BREAKUPS

Common name	Owner	Debris in orbit*	Year of breakup	Altitude of breakup	Cause of breakup
Fengyun-1C	China	2989	2007	850km	Intentional collision
Cosmos 2251	Russia	1371	2009	790	Accidental collision
STEP 2 Rocket Body	USA	58	1996	625	Accidental collision
Iridium 33	USA	487	2009	790	Accidental collision
Cosmos 2421	Russia	0	2008	410	Unknown

SPACE DEBRIS MANAGEMENT METHODS

1. Preventive Measures

To design and operate launch vehicles and spacecraft so they have minimum potential for exploding or breaking up and also have resist environmental degradation from atomic oxygen and solar radiation and devising spacecraft and upper stage separation procedures that limit the spread of operational debris. Collision avoidance also mitigates the space debris.

2. Active Removal Procedures

- **Tethers**

Tether refers to using a momentum exchange tether, which acts like a swing top ullan object out of orbit; or using an electrodynamics tether, which causes a dragon the satellite due to the magnetic field of the Earth. Although this complex process has not yet been proven, removal of a large-mass piece of orbital debris may be achieved by using tethers.

- **Lasers**

This method is used to slowing objects using high powered lasers fired from Earth, so that they move out of orbit. Laser technologies could potentially remove a large quantity of small debris.

- **Space tugs**

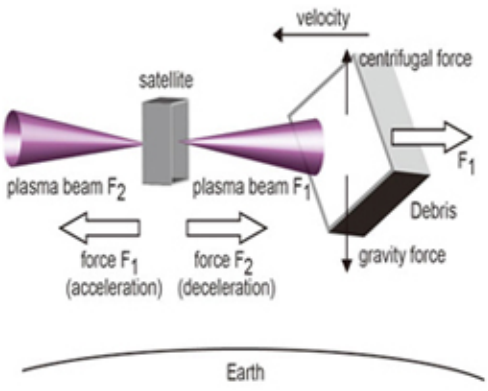
Space tugs refers to using a robotic grappling device on another spacecraft to tug an object to a new orbiter to cause it to re-enter the atmosphere destructively. A space tug is actually a spacecraft that is used to move multiple pieces of debris to disposal orbits in GEO. However, it is unproven, complex and costly to use.

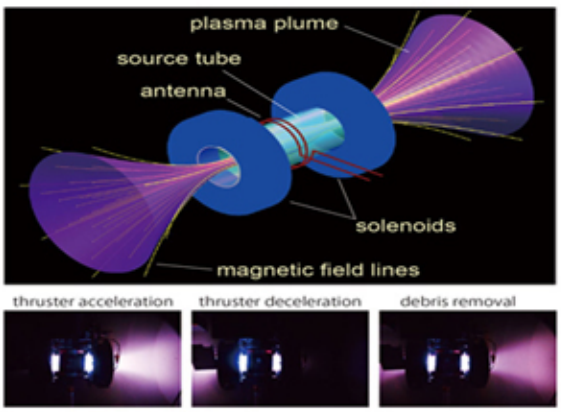
A New Solution:

Spacecraft with Plasma Beams to Force Space Junk to Burn Up

The Japanese-Australian team is developing a system that solves these problems with a unique bi-directional plasma beam arrangement. The two beams can counteract each other, with one keeping the shepherd satellite in position, and the other directing the junk toward Earth. A single power source powers the two beams, and the satellite aims the beams as required.

Lab tests have clearly demonstrated that a helicon plasma thrustercan remove space debris with a single propulsion system. The lab experiments, magnetic fields and gas injections control the plasma plumes from the single plasma thruster. Laboratory tests measured the force applied to the simulated space junk. The system applied the exact amount of counterforce to the satellite to keep it in position. The system operates in three different modes: satellite acceleration, satellite deceleration, and debris removal. Different modes: satellite acceleration, satellite deceleration, and debris removal.The helicon plasma thruster is an electrodeless system, which allows it to undertake long operations performed at a high power level.





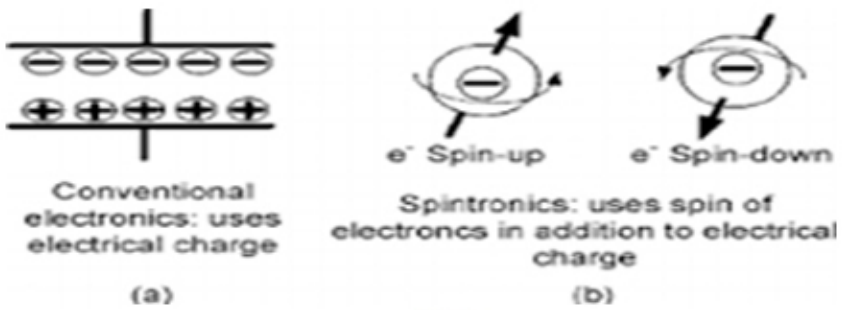
SPINTRONICS

Negative-positive- these are perfectly symmetric in physics. There is no reason whatever to prefer one to the other. Then why is the electron negative?. I thought for a long time and at last, all I could think was 'it won the fight'- ALBERT EINSTEIN

In our modern electronics world semiconductor is playing a vital role in storing, processing and even controlling the data. Due to their unique atomic structure, semiconductor contains controlled conductivity by electrical current, electromagnetic fields and even by light. It has a useful property such as passing current more easily in one direction than the other. This makes it possible to construct a device which amplifies, switch, convert sunlight to electricity or produce light from electricity. Then what is the reason behind the shift from electronics to ' spintronics'?... the expectations from electronics.

Lightening speed of operation and extremely low power consumption is expectations from the electronics which still a big question mark. If we start a personal computer, it'll take some delay (processing delay) to start and also we need frequent charging. Till date electronics didn't give the solution for such problems, but spintronics did.

Spintronics is a study deals with the spin of an electron, hence it is also known as spin-based electronics. It exploits the quantum property of electron to spin as well as making use of their charges. In electronics, the transfer of data is through the flow of electron, but in spintronics, the transfer of data is by the spin of the electron. While spinning, the electron generates a tiny ferromagnetic field around it, since spintronic got a name of magnetoelectronics.

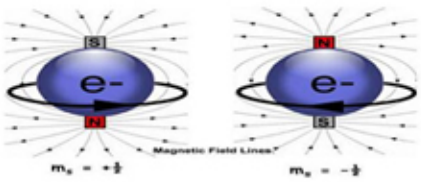


SPINTRONICS

In electronics, the data transfer is done by the flow of electron. To control the flow semiconductor with power supply is needed. Herecome the dissipation and powerloss. If the powersupply is off (cut off due to an external disturbance or even volunteer), the data carried by the electron will get erased. Hence the data transfer is volatile.

In spintronics, the data transfer is done by the spin of an electron. Just the metals like copper, aluminum, etc., is needed for a spin,not a semiconductor. Since no powerloss, dissipation and the data carried also is not disturbed because the spin is independent of the power supply(non-volatile).These advantage of the spintronics is satisfying the expectation from the electronics.

Some of the properties of the spintronics, there are two spins. Up spin (+1/2) in a clockwisedirection and down spin(-1/2) in an anticlockwise direction. For calculating the spin of the electron spin detector is used.



Jumping to the application of the spintronics, it is used as a mass storage device. The successive device of spintronics is MRAM. Then the recent research in the medical field about spintronics is cancer cell detection.

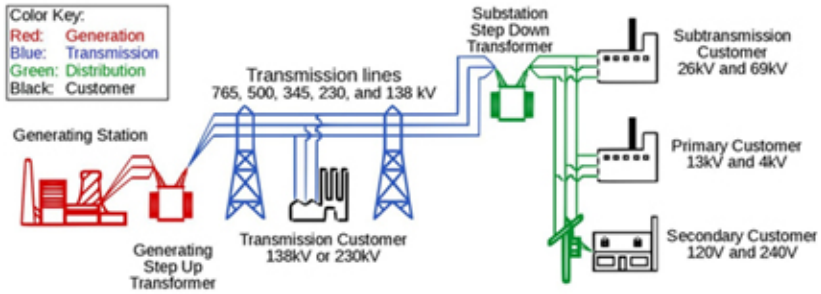
A cancer cell has a different electromagnetic pattern. In this project the detection of cancer cell after the surgery, which are less in number. The patient is exposed to strong magnetic field. Beam of polarised electron is introduced to part which undergone surgery. The change in the electron speed is analysed by a spin detector. This can give the detail of the presence of cancer cell which is present after the surgery.

Although there's still a long way to go to make this technology a commercial success, significant number of researchers and companies are currently working on this concept, which promises to solve the problem of cancer.

SMART GRID

Smart grid is also called electrical grid. Now a days is also a upcoming technology .An electric grid is a network of synchronized power providers and consumers that are connected by transmission and distribution lines and operated by one or more control centers.

Basic pictorial representation of Electrical grid :



Electrical Grid Components :

Generation :

- Thermal, Hydro, Nuclear, RES Transmission :
- HVAC
- HVDC Distribution :
- AC
- DC Consumers :
- Industrial
- Commercial
- Domestic

Impact of Electrical Grid

Global demand for energy is expected to climb about 25 percent by 2040. India contributes for about 45 percent of world energy demand growth to 2040.India and China has shown the highest demand growth with each reaching more than 1 billion middle-class citizens. India will grow strongly with its share of global GDP doubling.

Now we discuss about our Indian power scenario and some details.

SMART GRID

Duties of smart grid

More efficient transmission of electricity.
Quicker restoration of electricity after power disturbances.
Reduced operations and management costs for utilities, and ultimately lower power costs for consumers. Reduced peak demand, which will also help lower electricity rates
Increased integration of large-scale renewable energy systems.
Better integration of customer-owner power generation systems, including renewable energy systems. Improved security.

Smart Grid Components

Major components of smart grid are classified as follows

- Smart Infrastructure
- Smart Communication
- Smart Management
- Smart Protection

The smart infrastructure system is further divided into two parts

- Smart energy system
- Smart information system

Sensors

Sensor networks used as a monitoring and measurement unit for grid Need of sensors in the Smart Grid

- Quality-of-Service (QoS) requirements
- Resource constraints
- Remote maintenance and configuration
- High security requirements
- Harsh environmental conditions
- PMU measures the electrical waves on an electrical grid to determine the health of the system

NANDHINEE.K ECE-A[3'rd YEAR

RIDDLES

1. What goes up and down stairs without moving?
2. Give it food and it will live; give it water and it will die.
3. What can you catch but not throw?
4. I run, yet I have no legs. What am I?
5. Take one out and scratch my head, I am now black but once was red.
6. Remove the outside, cook the inside, eat the outside, throw away the inside.
7. What goes around the world and stays in a corner?
8. What gets wetter the more it dries?
9. The more there is, the less you see.
10. They come at night without being called and are lost in the day without being stolen.

Answers

1. Carpet 2. Fire 3. A cold 4. A nose 5. A match
6. Corn 7. A stamp 8. Towel 9. Darkness 10. Stars

SUDOKU

NANDHAKUMAR- IV-B

			4			2		
		2					1	8
5		6	9				3	
	6	9				3		
	5						2	1
8			1	5	7	6		9
				3		9	6	
9			6		2		5	
						7		2

SOLUTION

3	8	7	4	1	5	2	9	6
4	9	2	7	6	3	5	1	8
5	1	6	9	2	8	4	3	7
1	6	9	2	8	4	3	7	5
7	5	4	3	9	6	8	2	1
8	2	3	1	5	7	6	4	9
2	7	5	8	3	1	9	6	4
9	4	8	6	7	2	1	5	3
6	3	1	5	4	9	7	8	2

POEM - AMMA

Presented by

S. KARPAGA SOUBHA VARSHINE
ECE – IV – B

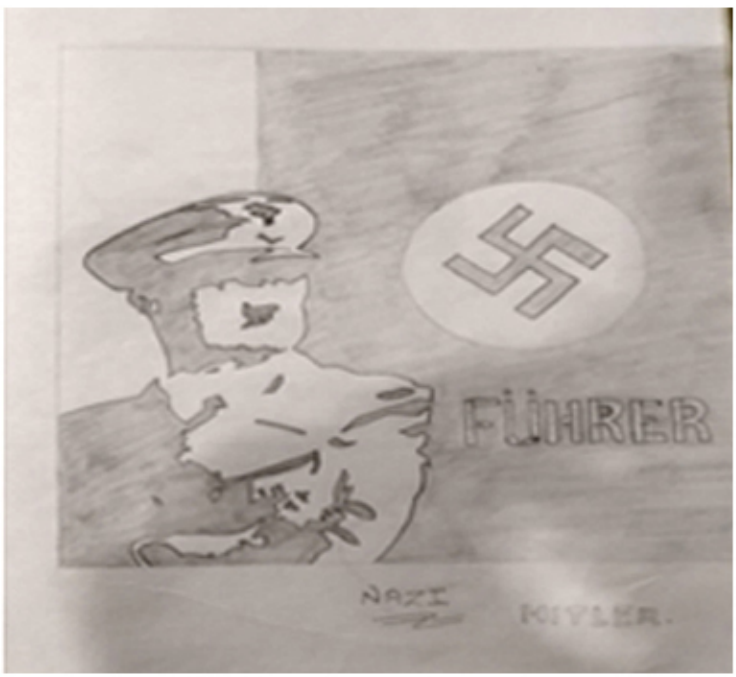
நம் தாய்

அன்பின் சிகரமாய் ;
ஆனந்த கடலாய் ;
இணக்கத்தின் இருப்பிடமாய் ;
ஈகையின் ஊற்றாய் ;
உண்மையின் உரையாய் ;
ஊரின் எல்லையாய் ;
என்றும் எளிமையாய் ;
ஏற்றத்தின் மேண்மையாய் ;
ஐக்கியத்தின் வளர்ச்சியாய் ;
ஒத்திசை கானமாய் ;
ஓதி பெட்டகமாய் ;
ஔதார்யம் நிறைந்ததாய் ;
திகழ்பவளே நம் தாய்!

TALENT CORNER

SHRUTHI.R IV-A

DHARANIDHARAN.S II-A



GLIMPSES OF YEAR

Galo-Fest

Internal Worshop

IV-Beta Technologies

IV-Doordarshan

Mitronce2k19

Mitronce-Event

SCIMIT-Winner

Smart India Hackathon

Sports-Championship

SRISTI-2k19

Stella-Throwball

Stellatropy

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EDITORS- IN –CHIEF

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ANAND LOORTHU RAJ A, III-A
A.NARESH KUMAR, II-B

DESIGN HEAD

S.ARIVUKKARASU, IV A

STAFF INCHARGE

G.SHARMILA, AP/ECE

CONTACT US

Mr.S.ARUNMOZHI
HEAD OF THE DEPARTMENT
ELECTRONICS AND COMMUNICATION ENGINEERING
Manakula Vinayagar Institute of Technology
Kalitheerthalkuppam,Puducherry – 605 107