GALGOTIAS COLLEGE OF ENGINEERING AND TECHNOLOGY

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Department of Electronics & Communication Engineering

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About ECE Department

The Department of ECE offers B.Tech and M.Tech course in Electronics and Communication Engineering from Dr. A.P.J. Abdul Kalam Technical University, (formerly Uttar Pradesh Technical University / Gautam Buddh Technical University) Lucknow. Electronics & Communication Engineering deals with the electronic devices, circuits, communication equipments like transmitter, receiver, integrated circuits (IC). microprocessors, satellite communication, microwave engineering, antenna and wave progression. The department aims to impart high quality education in ECE and conduct top notch research in ECE related fields.

The department provides state-of-art infrastructure and computing facilities to students and faculty. The faculty members are actively involved in different domains of research with special focus in four thrust areas: (i) Wireless Communication and Networks (ii) Microwave and Antennas, (iii) VLSI Design (iv) Communication Systems (v) Signal and Image Processing. The department has a regular hardware and software labs as well as the state-of-art research labs in microwave and antennas, where faculty and students are working on funding projects and offering consultancy services. Some of the available softwares in ECE department are MATLAB, HFSS, ns-2, ns-3, Riverbed Academic edition, OrCAD PSPICE, eSim, SCILAB, OR-Tools, Expeyes, etc. The Department follows a well proven pedagogy of sharing knowledge with the young and vibrant minds of the college. As we are affiliated to AKTU University, Lucknow, the curriculum and subjects are prescribed by AKTU University. In addition to instruction in core ECE subjects, we also teach elective subjects in advanced topics such as Voice over Internet Protocol, Filter Design, Digital Image Processing, Digital System Design using VHDL, Speech Processing, Advance Digital Design using Verilog, Microcontroller for Embedded Systems, etc.

The department imparts world class training and research besides promoting active industry-institute collaboration by identifying current trends and taking part in sponsored research projects and consultancy services. The department also has a worldwide reach with its vibrant alumni network. Working shoulder with shoulder with the institution, it is constantly aiming towards reaching greater heights to serve the needs of the society and meet the aspirations of the student community.

Vision of Department:

To be recognized as a center of excellence in Electronics and Communication Engineering for the quality and global education, interdisciplinary research and innovation, to produce committed graduates who can apply knowledge and skills for the benefit of society.

Mission of Department:

DM1: To provide quality education by providing state of the art facility and solutions for global challenges.

DM2: To provide a framework for promoting the industry-institution collaboration and empower the students in interdisciplinary research.

DM3: To transform students into socially responsible, ethical and technically proficient engineers with innovative skills and usage of modern tools.

DM4: To make the students corporate ready with spirit and necessary interpersonal skills.

Program Edu. Objectives:

PEOs of the B.Tech in Electronics and Communication Engineering are:

PEO1: Graduates will excel in their career by acquiring knowledge in the field of Electronics and Communication Engineering with the usage of modern tools and emerging technologies.

PEO2: Graduates will have the capability to analyze real life problems of the society and produce innovative solutions.

PEO3: Graduates exhibit professionalism, ethical attitude, communication skills and team work in core engineering, academia and research organizations through professional development and lifelong learning.

Program Specific Outcomes:

By the completion of Electronics & Communication Engineering program the student will have following Program specific outcomes:

PSO1: Design and develop models for analog &digital electronic circuits and systems.

PSO2: Design, develop and test electronic and communication systems for applications with real time constraints.

List of Faculty

Faculty name	Designation	Qualification
Dr. Praydot kala	Professor, HOD	Ph.D.
Dr. R.L. Yadava	Professor	Ph.D.
Dr. Jaspreet Kour	Associate Professor	Ph.D.
Mr. Atul Kumar	Associate Professor	ME/M.Tech
Mr. Shahid Eqbal	Associate Professor	ME/M.Tech
Mr. Amanpreet Singh	Assistant Professor	ME/M.Tech
Mr. Saurabh Katiyar	Assistant Professor	ME/M.Tech
Mr. P. C. Joshi	Assistant Professor	ME/M.Tech
Mr. S.P. Singh	Assistant Professor	ME/M.Tech
Mr. Kuldeep Singh	Assistant Professor	ME/M.Tech
Mr. Amit Gupta	Assistant Professor	ME/M.Tech
Ms. Ranjana Kumari	Assistant Professor	ME/M.Tech
Ms. Ruchi Agrawal	Assistant Professor	ME/M.Tech
Mr. Deependra Sinha	Assistant Professor	ME/M.Tech
Mr. Madan Sharma	Assistant Professor	ME/M.Tech
Mr. Satya Prakash	Assistant Professor	ME/M.Tech
Mr. Deepak Gangwar	Assistant Professor	ME/M.Tech
Mr. Vinay Singh	Assistant Professor	ME/M.Tech
Mr. Gaurav Mehra	Assistant Professor	ME/M.Tech
Mr. Sachin Kumar	Assistant Professor	ME/M.Tech
Mr. Ankit Sharma	Assistant Professor	ME/M.Tech
Mr. Vipin Sharma	Assistant Professor	ME/M.Tech
Mr. Gaurav Saxena	Assistant Professor	ME/M.Tech
Mr. Sarvesh Kumar	Assistant Professor	ME/M.Tech
Ms. Bhawna Ahuja	Assistant Professor	ME/M.Tech
Mr. Amit Kumar	Assistant Professor	ME/M.Tech
Mr. Sachin kumar pal	Assistant Professor	ME/M.Tech
Dr. Arti Vaish	Assistant Professor	Ph.D.
Mr. Aditya Kumar	Assistant Professor	ME/M.Tech
Mr. Ashwini Kumar Mishra	Assistant Professor	ME/M.Tech
Mr. Sugandh Kumar	Assistant Professor	ME/M.Tech
Mr. Amit Gupta	Assistant Professor	ME/M.Tech

Faculty Articles

ARTICLE: Can Smart phones Adversely Affect Cognitive Development in Teens?

With the widespread use of mobile technology the question is still unanswered whether the use of this technology found in smartphones has an effect on brain development in children and teens? In addition, whether the use of such phones can lead to long term cognitive effects that impact language development skills, memory capability and maintaining focus on tasks at hand.

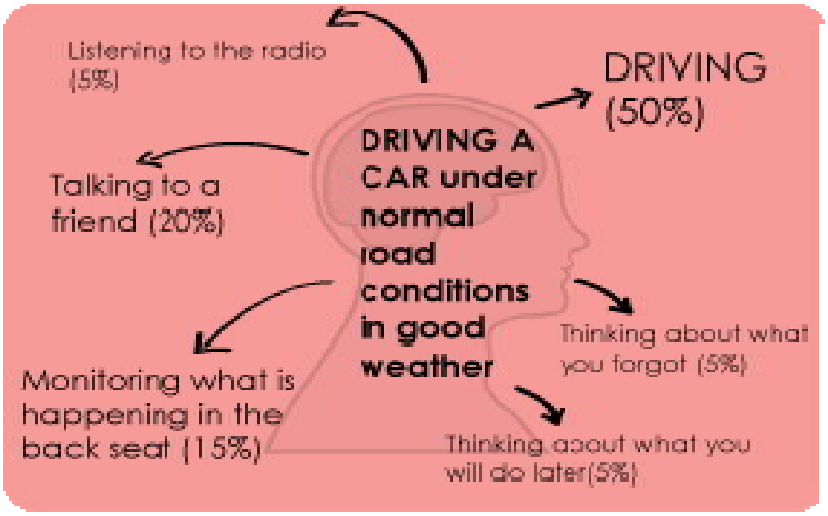
It has been suggested that the developing brain and central system may in fact be more vulnerable to radio frequency exposures.

Interestingly, although there is no concrete proof that mobile or smartphone technology is linked to adverse outcomes, health officials in the UK currently recommend that teens under the age of 16 only use mobile phones only for emergency or critical needs. Texting or use of an earpiece is advised along with keeping all calls to a minimum. There are two ongoing trials evaluating the effect of mobile phone use on development of cancer in children. First one has revealed no link to cancer, and the other study is in progress. Hopefully this study will produce tangible evidence to guide parents and teens about whether smartphones adversely affect cognitive development during early teenage years. This may then allow us to make educated decisions about when to introduce these devices for regular use in developing children and teens.

Prepared By:
Dr. R.L. Yadav
Professor, ECE

ARTICLE: Concept of Cognitive Capacity

Cognitive capacity is the total amount of information the brain is capable of retaining at any particular moment. This amount is finite, so we can say our total capacity is only ever 100%. How much of one's cognitive capacity is being used towards a particular task at any given time is called the **cognitive load**. Doing activities that are habitual does not create a heavy cognitive load, so you can do several of these tasks at once. **For an example,** driving a car while talking to a passenger and listening to music on the radio doesn't create a heavy cognitive load. Distribution of attention of a car driver shows, that is only 50% of the attention is paid in normal case, remaining 50% are given in various activities such as listening, talking, monitoring …etc .



Distribution of attention of a car driver

However, the high attention makes the cognitive load much heavier hence takes up more of our attention space. So a car driver in the snow requires much more attention, and all of a sudden he can't carry on a conversation or listen to music. This is because all of their cognitive capacity is being taken up by the task of maneuvering the car in the snow.

Things that increase the cognitive load	-increased stress and anxiety -hunger, fatigue -a large amount of information being processed
Things that decrease the cognitive load	-automaticity, planning, routinization -distance from task/material

Your smartphone makes you stupid, study shows

The word "smartphone" may be a misnomer, the phone may be smart, however it's presence around makes us dumber. Researchers at the University of Texas after conducting studied on nearly 800 phone users, have reported that the "*mere presence*" of a phone reduces our ability to think and concentrate -- even when it's off. Researchers have found just having a phone within view or easy reach reduces a person's ability to focus and perform tasks, because our brain's are actively working to ***not*** pick up the phone. "The mere presence of their smartphones was enough to reduce their cognitive capacity,"

Prepared By:
Mr. Atul Kumar
Assoc. Professor, ECE

ARTICLE: Graphene

If you've ever drawn with a pencil, you've probably made graphene. The world's thinnest material is set to revolutionize almost every part of everyday life. Fascination with this material stems from its remarkable physical properties and the potential applications these properties offer for the future. Although scientists knew one atom thick, two-dimensional crystal graphene existed, no-one had worked out how to extract it from graphite.

That was until it was isolated in 2004 by two researchers at The University of Manchester, Prof Andre Geim and Prof Kostya Novoselov. This is the story of how that stunning scientific feat came about and why Andre and Kostya won the Nobel Prize in Physics for their pioneering work. Graphene is 200 times stronger than steel. Graphene is 1 million times thinner than human hair. It is word's most conductive element

What can graphene do????

Graphene: the world's first 2D material. Since graphene's isolation in 2004 it has captured the attention of scientists, researchers and industry worldwide.

- It is ultra-light yet immensely tough.
- It is 200 times stronger than steel, but it is incredibly flexible.
- It is the thinnest material possible as well as being transparent.
- It is a superb conductor and can act as a perfect barrier - not even helium can pass through it.

Current Applications : At The University of Manchester, graphene research is focused on the following applications: Energy; Membranes; Composites and Coatings; Biomedical; Sensors; Electronics. This is only the start. These are only the first steps. The potential of graphene is limited only by imagination.

Future Technology : So where will graphene take us? How will it change our world? What benefits will it bring to mankind? What applications will we see in the near future and decades to come?

Clean drinking water for millions. Graphene membranes could see huge progress in water purification technology in developing countries and provide more efficient desalination plants. Electronics and energy storage could also be revolutionised by graphene. Flexible, durable, semi-transparent mobile phones. Wearable technology, clothing that communicates. Electric sports cars. Lightweight planes. These are the future technologies which are becoming realistic in our present.

Prepared By:
Mr. Amit Gupta
Asst. Professor, ECE

ARTICLE: High performance DRAMs

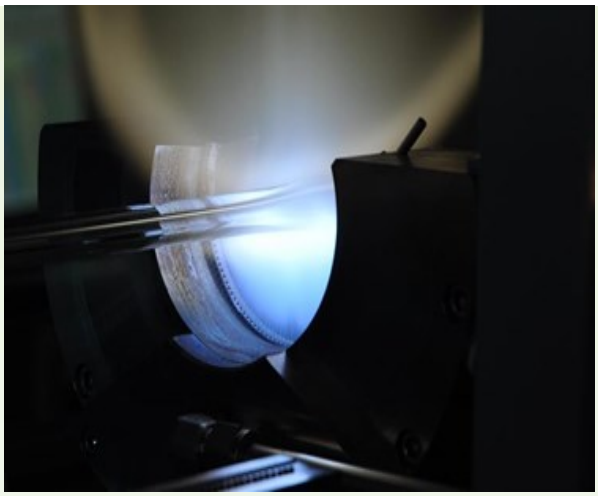
DRAM (Dynamic Random Access Memory) is a volatile memory technology nowadays only consisting of one capacitor and one access transistor, while the gate of the access transistor is connected to a word-line, and source/drain to a data-line. The signal in the cell is stored as charge, and due to the fact that the capacitor leaks and therefore loses charge the cell has to be periodically refreshed. Therefore, a large cell capacitance is essential for reducing the DRAMs activity. Unfortunately a large cell capacitance is also either increasing the cells area (measured in F2, where F is the minimum feature size in a technology), or is requiring a more complex cell structure with either higher leakage or lower production yield. Typically nowadays cell capacitors larger than 20fF (typically up to 30fF) are considered fair compromises between economical and technical targets. One technical direction has been to increase the cell capacitance by employing high-k dielectrics, such as Ta2O5, Al2O3/HfO, ZrO2/AbO3and $SrTiO_3$.

A second major trend towards low power DRAMs is, as in all CMOS based circuits, the reduction of the power supply voltage down to 1.2V. The reduction of the internal DRAM voltage goes along with requirements for low power sense amplifiers, and also high-speed DLL (Delay locked loop) or PLL (Phase locked loop). As we will see, one fundamental challenge for new DRAM interface technologies is that the package becomes the fundamental bottleneck for a further increase of the bandwidth, especially because of the pin limitations, but also of the parasitics associated with the connection of the package pin with the landing pad on the silicon chip surface. Due to the fact that the further increase of the processor core number (as also here the thermal budget of a processor prohibits an increase of the clock frequency) is currently the only mean to further increase the computing power, new processors with many cores require a higher data bandwidth from or to the DRAM. At the moment TSVs (Through Silicon Vias) are a technically mature technology to stack chips onto each other and connect hundreds of data pins between two or more stacked chips with each other. For server applications that require high density DRAM chips and modules, this has immediately become the major trend to follow, also since the stacking of “same value” chips and the associated technical and economic challenges could be successfully mastered.

However, for the connectivity of a processor directly with several DRAM chips, currently no commercially successful scenario is known. The reasons for this are manifold: partly technical (the implementation of large cache portions on each core is still the key for high performing processors), but also economical (such as too complex production test and also lower system yield).

Prepared By:
Mr. P. C. Joshi
Asst. Professor, ECE

ARTICLE: New optical amplifiers and fibre technologies are needed to support 400Gbit/s data rates and beyond….



Over the last seven years or so, the European Union has been developing a closer technological relationship with Japan. Part of this relationship has focused on the technologies needed to support next generation communication networks.
As part of this, a joint workshop was held in 2013 to discuss cooperation in the field of networked technologies and systems. Stream D of this workshop discussed technologies needed to realise high speed and large capacity broadband networks. On the agenda was how optical networks could be key enablers of high speed and large capacity networks, as well as the management of those networks. The technologies discussed included optical transmitters and receivers, with a focus on low power consumption and high efficiency, as well as ways of controlling and managing optical networks.

Since 2013, the EU and the Japanese government have announced four communications research projects backed by €12million and involving more than 40 partner institutions. RAPID will use innovative radio network architectures to advance 5G technology, while iKaaS will develop a smart and secure platform for smart cities based on big data resources. FESTIVAL, meanwhile, will provide joint EU-Japan IoT experimentation platforms, where experimenters can validate their smart ICT service developments

The final project – SAFARI, with €1.5m of funding – will develop programmable optical hardware that can support data transmission rates of at least 400Gbit/s per channel. ORC scientists are working with Coriant and the Technical University of Denmark and with NTT and Fujikura in Japan. The project will look to build high speed networks that feature multicore optical fibres with space division multiplexing to produce scalable and flexible optical transport networks.

MODE-GAP was looking at adventurous transmission technologies and its partners did some leading demonstrations of multimode transmissions over fibre. Now, in the SAFARI project, ORC is delighted to be working with Coriant and some of the largest Japanese companies, such as NTT and Fujikura."

He said there are two aspects to SAFARI. "One is to develop the optical transport technology needed to transmit data at rates in excess of 400Gbit/s, along with way of providing networking flexibility and of controlling these high speed networks using software defined networking (SDN).

"On top of that, there's interworking between SDN and the physical layer. We want to combine SDN with ultrahigh capacity fibre links using fibres containing multiple cores, each core running at close to the full capacity of current single mode fibre systems." The Japanese partners have already developed high performance multicore fibre technology, demonstrating aggregate capacities as high as 1Pbit/s in point-to-point transmission experiments in 12 core fibres."

Prepared By:
Mrs. Ranjana Kumari
Asst. Professor, ECE

ARTICLE: We'll Control Devices via Microchips Implanted in our Brains

The human brain remains biology's great, unconquered wilderness, and while the idea of meshing the raw power of the human mind with electronic stimulus and responsiveness has long existed in both science fiction and — to some degree — in reality, we likely won't be controlling our devices with a thought in 2020 as Intel has predicted. While it's currently possible to implant a chip in the brain and even get one to respond to or stimulate gross neural activity, we simply don't understand the brain's nuance well enough to create the kind of interface that would let you channel surf by simply thinking about it.

"Neural communications are both chemical and electrical," Liebhold says. "And we have no idea about how that works, particularly in the semantics of neural communication. So yeah, somebody might be able to put electronics inside somebody's cranium, but I personally believe it's only going to be nominally useful for very, very narrow therapeutic applications."

PopSci Predicts: We might have chips in the brain by 2020, but they won't be doing much.

Prepared By:
Mr. Kuldeep Singh
Asst. Professor, ECE

ARTICLE: Wireless Communication (Massive MIMO)

Multi-input multiple-output (MIMO) systems are a natural extension of developments in antenna array communication. While the advantages of multiple receive antennas, such as gain and spatial diversity, have been known and exploited for some time , the use of transmit diversity has only been investigated recently . The advantages of MIMO communication, which exploits the physical channel between many transmit and receive antennas, are currently receiving significant attention. While the channel can be so nonstationary that it cannot be estimated in any useful sense. If assume the channel is quasistatic the MIMO systems provide a number of advantages over single-antenna-to-single-antenna communication. Sensitivity to fading is reduced by the spatial diversity provided by multiple spatial paths. Under certain environmental conditions, the power requirements associated with high spectral-efficiency communication can be significantly reduced by avoiding the compressive region of the information-theoretic capacity bound. Here, spectral efficiency is defined as the total number of information bits per second per Hertz transmitted from one array to the other.

Prepared By:
Mr. Madan Sharma
Asst. Professor, ECE

ARTICLE: AGILE-100: The first mass produced Graphene biosensor

Nanomedical Diagnostics, a biotech company located in California, has become pioneer to develop an investigative procedure that is usually used in pharmacology and molecular biology to assess or measure the presence of a particular entity. Such processes currently are based on advanced informatics systems with multiple computer terminals, central servers, autoanalyser instruments making the overall process both costly and complex. On the other hand, the newly designed technology named Field Effect Biosensing (FEB) characterise biomolecules quickly and easily. This technology provides more informed decisions in drug discovery processes that can be easily processed by even a smartphone. This technology is not only relevant to research and diagnostics but also to implantable health monitoring devices. The main features of this technology are high reproducibility, quality, and throughput providing better data and lower costs. Being two dimensional, every graphene atom is in direct contact with its environment due to which it finds its applications in sensing and measurement. Due to excellent electrical conductivity, a high surface area, highest room temperature mobility, and carbon based unique biocompatibility, graphene now-a-days is considered as the world's most versatile material.

Prepared By:
Ms. Bhawna Ahuja
Asst. Professor, ECE

ARTICLE: Six Techniques for Measuring Dielectric Properties

If you think about dielectric properties at all, it is probably in the context of school physics experiments on charge storage, or perhaps the way in which the choice of dielectric materials influences the characteristics of a capacitor you're working with. It turns out, though, that the dielectric properties of materials matter to all sorts of industries for different reasons. Measuring those properties accurately, therefore, is important in many contexts. This article looks at some key techniques for measuring dielectric properties, and some of the application areas for each of them.

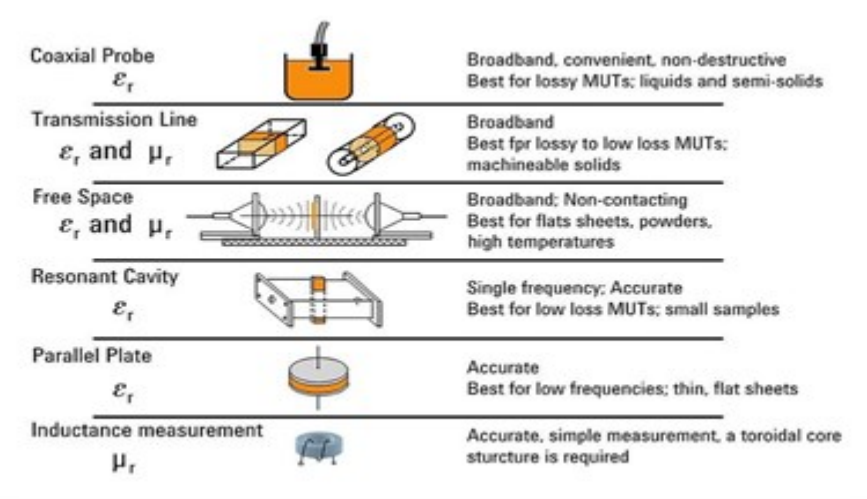


Figure 1: Materials measurement techniques (Source: Keysight Technologies)

Measurement Techniques: There are several techniques for measuring dielectric properties, using a combination of precise instruments, test fixtures to hold the material under test (MUT), and software that makes it easier to measure complex permittivity and permeability factors and display the results.

Keysight Technologies, for example, has instruments such as network analysers, impedance analysers and LCR meters that can provide accurate results at applied frequencies of up to 1.5THz. It also offers fixtures that apply the coaxial probe, parallel plate, coaxial/waveguide transmission lines, free-space and resonant-cavity measurement techniques shown in Figure

Coaxial Probe Method: The coaxial probe method is best for liquids and semi-solid (powder) materials. It is simple, convenient, non-destructive and only involves taking a single measurement. A typical measurement system consists of a network analyser or impedance analyser, a coaxial probe and software.

The choice of probe and analyser depends on the measuring frequency, but the overall range is from 10MHz to 50GHz. There are high temperature probes that withstand –40 to 200° C, and these can be made with a large flange so they can measure flat-surfaced solid materials as well as liquids and semi-solids. Slim probes are useful for measuring in fermentation tanks, chemical reaction chambers, and other equipment with small apertures, while high performance probes combine many of these characteristics in a device that can be sterilised in an autoclave – useful for the food, medical, and chemical industries.

Transmission line method: The transmission line method is a broadband technique for machineable solids, which puts the MUT inside an enclosed transmission line. The frequency coverage is limited mainly by the sample holder size.

Free space method: Free space approaches use antennas to focus microwave energy on or through a slab of material. This non-contact method can be applied to materials at high temperatures, and is especially useful at millimetre-wave frequencies.

Resonant cavity method: Resonant cavities are high Q structures that resonate at certain frequencies. A sample of the material affects the centre frequency and Q factor of the cavity, which in turn enables its permittivity to be calculated. For example, Keysight offers the 85072A 10GHz split-cylinder resonator for this purpose, as well as split-post dielectric resonators.

Parallel-plate capacitor method: The parallel-plate capacitor method involves sandwiching a thin sheet of material between two electrodes to form a capacitor. The method works best for accurate, low frequency measurements of thin sheets or liquids.

A typical measurement system using the parallel-plate method consists of an LCR meter or impedance analyser.

Inductance measurement method*:* This approach derives the permeability of a material by measuring its inductance as if it were a toroidal core. Wire is wrapped around the MUT and its inductance is evaluated with respect to the ends of the wire. Keysight offers the 16454A magnetic-material test fixture, which forms an ideal structure for single-turn inductors, since it doesn't leak flux when a toroidal core is put in it.

Software

The results of some dielectric measurements can be complex to interpret as permittivity and permeability measurements. Software such as the Keysight N1500A materials measurement suite can make it easier to work with a network analyser, by guiding users through test setup and measurement stages, and then converting the resultant S-parameter data it outputs into your choice of formats. The software supports a variety of measurement methods and mathematical models, to meet most application needs. The software may also be required to model any interaction between the fixture and MUT to allow the extraction of the bulk material properties.

A technique called de-embedding allows a sample to be backed with a dielectric backing on one or both sides. It mathematically removes the effects of the backing, so the electromagnetic properties of just the sample are reported. This is useful when a sample is not stiff or thick enough to stand up by itself, or it cannot be removed from a substrate.

Prepared By:
Mr. Ankit Sharma
Asst. Professor, ECE

Students Articles

ARTICLE: UWB Communication & Advantages

Ultra-wideband (also known as UWB, ultra-wide band and ultra band) is a radio technology that can use a very low energy level for short-range, high-bandwidth communications over a large portion of the radio spectrum. UWB has traditional applications in non-cooperative radar imaging. Most recent applications target sensor data collection, precision locating and tracking applications.

Unlike spread spectrum, UWB transmits in a manner that does not interfere with conventional narrowband and carrier wave transmission in the same frequency band.

Ultra-wideband is a technology for transmitting information spread over a large bandwidth (>500 MHz); this should, in theory and under the right circumstances, be able to share spectrum with other users. Regulatory settings by the Federal Communications Commission (FCC) in the United States intend to provide an efficient use of radio bandwidth while enabling high-data-rate personal area network (PAN) wireless connectivity; longer-range, low-data-rate applications; and radar and imaging systems.

Ultra wideband was formerly known as pulse radio, but the FCC and the International Telecommunication Union Radio communication Sector (ITU-R) currently define UWB as an antenna transmission for which emitted signal bandwidth exceeds the lesser of 500 MHz or 20% of the arithmetic center frequency. Thus, pulse-based systems—where each transmitted pulse occupies the UWB bandwidth (or an aggregate of at least 500 MHz of narrow-band carrier; for example, orthogonal frequency-division multiplexing (OFDM)—can access the UWB spectrum under the rules. Pulse repetition rates may be either low or very high. Pulse-based UWB radars and imaging systems tend to use low repetition rates (typically in the range of 1 to 100 mega pulses per second). On the other hand, communications systems favor high repetition rates (typically in the range of one to two giga pulses per second), thus enabling short-range gigabit-per-second communications systems. Each pulse in a pulse-based UWB system occupies the entire UWB bandwidth. This allows UWB to reap the benefits of relative immunity to multipath fading, unlike carrier-based systems which are subject to deep fading and inter symbol interference. However, both systems are susceptible to inter symbol interference.

Prepared By:
Abhishek Dwivedi
Student Editor
1309731005

ARTICLE : Collaborative robots : COBOTS

At EFY Conferences in March this year, there was a talk about integration of a new generation of robot workers in the labour workforce in order to increase productivity and efficiency. Known as 'Cobots,' short for Collaborative Robots, these robots are a combination of industrial robotics and automation. Pradeep David, general manager, India & Sri Lanka, Universal Robots, speaks to DilinAnand from EFY about the role of cobots in production floors and the impact on human workforce.

Cobots: Collaborative robots are lightweight, cost-effective, safe and easy to operate. The human-robot collaboration is different from that between traditional robots. With cobots, the days of hiring an expensive external consulting team every time a robot has to be programmed are over. The new reality is that even operators with no programming experience can quickly program the cobot arms (using intuitive, 3D visualisation).

Unmanned manufacturing: The idea is for humans and robots to be inter-dependent and achieve what each of them does best, safely. There are a few things requiring human ingenuity that are best done manually, whereas accuracy, precision and repetitive mass production at higher efficiency are best taken care of by robots. Cobots provide an added incentive to the workforce as consistent quality production is possible with human supervision.

Applications:

Production setups today often need to be flexible and agile in order to meet changing market demands and stay competitive. The lightweight cobot arms can be easily moved and re-deployed to new processes, enabling users to automate virtually any manual task, including those with small batches or fast changeovers. They can work right next to humans without any safety guard, thus making robotics technology accessible to all levels of the industry. Cobots are ideally suited for jobs that human operators find repetitive and dull.

Conventional industrial and robotic arms: Industrial robots are caged to keep humans protected. Service robots are meant to safely leave the cage while doing tasks for humans. Collaborative robots, on the other hand, are 'force limited' robots—their built-in technology allows them to work safely alongside humans (subject to safety assessments of the application). So these work more as a 'worker's assistant' in the form of a 'portable tool,' unlike traditional industrial robots. Collaborative robots come in all sizes and shapes, and have integrated sensors and soft and rounded surface to ensure safety of human workforce and reduce the risk of damage due to impact, pinching and crushing.

Future:

Instead of replacing human workforce and causing job losses, collaborative robots help companies expand operations, thereby creating jobs and many more opportunities at supervision level. A human-machine study conducted by MIT researchers at a BMW factory has found that teams comprising humans and robots collaborating efficiently can be around 85 per cent more productive than teams having either humans or robots alone.

Prepared By:
Kushagra Agarwal
Student Editor
1309731043

ARTICLE : Wearable technology has potential in medical applications and healthcare

Bainisha's ultra thin skin patches allows back motion to be measured with high accuracy

The medical and healthcare sector, primarily characterized as ‘digital health’, represents the single largest opportunity for the wearable technology industry. Patients want it, some physicians are embracing it, insurance companies are starting to fund some of it, regulators are approving some of it and companies - big and small - all want to be involved. The healthcare sector presents some of the largest and most fundamental problems that society faces. IDTechEx forecasts that the healthcare, medical, fitness and wellness sectors of wearable technology will be worth $30billion by 2025.

Healthcare is, by far, the most complicated of the areas that wearable technology will impact. Back health applications, including issues related to posture, pain and growth, are a particular area where wearables may have an impact. From developing and maintaining posture as a preventative measure against back pain, to training exercises in the form of therapy, to spinal motion characterisation, many solutions are already, or will soon be, available. This is one of several prominent areas to broadly adopt many different wearable technology solutions.

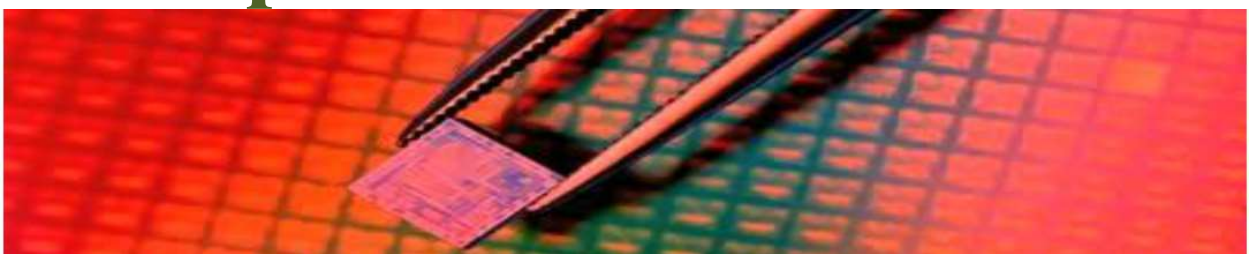
These examples illustrate three differing product strategies that address the same sector. While the sensors (inertial motion units and stretch sensors) remain very similar in each product, the time to market, required investment, margins, regulatory process and target markets differ for each.

Consumer products have lead times of three to six months, whereas medical devices can take up to 10 years to go from idea to product. Solutions for the broad healthcare space span that whole range, so product developers need to understand the lead times and investment models in order to achieve sustainable success. It will soon be spun out under new holding company Alphabet. Qualcomm launched its Tricorder XPrize, which has seen entries from more than 39 countries and will conclude in March 2016.

Novartis is working with companies developing new sensors and digital health platforms, investing heavily in companies including Proteus Digital Health. GSK is assessing potential opportunities, with its UK based Innovation Platform Technology and Science (iPTS) division working to use wearable technology to support clinical trials. Even manufacturing giants like Flextronics and Jabil have weighed in, via acquisitions and active development programmes. The pie is large and everyone wants a slice. Add regulatory processes that are not only challenging, but also evolving, lead times that require significant investment, a seemingly inevitable ‘technology push’ overlooking the ‘clinical pull’ and the complex funding structures ? and this area is quite far from an easy win. However, the sector is large enough for there to be multiple winners. Healthcare expenditure currently represents 10% of global GDP and this figure is only likely to rise as the population grows and ages. The global healthcare system requires constant and significant investment to stay ahead and wearable technology is a crucial part of the solution.

Prepared By:
HIMANSHU SRIVASTAVA
1209731045

Departmental Activities



Seminar/ Workshop conducted:

SNo.	Topic	Date	Expert Name/ Organization
1.	Seminar on Design Techniques using Verilog & Xilinx	02/04/15	Mr. Devendra Khari Director, DKOP Lab, Noida
2.	Seminar on ATMEL Microcontroller	02/04/15	Dr. M.A. Khan, My Research Labs Ltd., Noida
3.	Workshop on Introduction to MATLAB	01/04/15	Mr. Rahul Kumar, 3ST Technologies Pvt. Limited, Noida
4.	Workshop on PCB designing using PSpice Simulation	01/04/15	Mr. Rahul Kumar, 3ST Technologies Pvt. Limited, Noida
5.	Two days Seminar on Recent Advances in Metamaterial Antennas for Biomedical, Optical and Sensing Applications	13/02/15 & 14/02/15	Dr. Sushil Kumar, NPL, New Delhi
6.	Workshop on Introduction to MATLAB programming and Simulink	19/09/14	Mr. Sandeep Gupta, Director 3ST Technologies Pvt. Ltd., Noida

Conferences Organized:

Two days national level conference on **Recent Advances in Metamaterial Antennas for Biomedical, Optical and Sensing Applications** was sponsored by DST was held on 13-14th February 2015.

Expert Lectures:

Topic	Date	Expert Name	Description
Lecture on Data / Computer Networking (CCNA)	01/04/2015	Mr. Lokender Bhatia, DuCAT, Noida	Hardware description language (Verilog)
Lecture on VLSI Design	19/11/14	Mr. Prashant Dubey, ST Micro Electronics, Greater Noida	Electronics
Lecture on Semiconductor Industry Trends	13/11/14	Mr. Devendra Khari Director, DKOP Lab, Noida	Antenna Design tools

GNIX (An official club of Department of ECE, GCET)

Galgotias College of Engineering & Technology

GNIX TEAM

S.NO.	ROLL NO.	STUDENT NAME	GNIX DEPARTMENT
1	1209731099	SAURABH RASTOGI	GEN. SEC.
2	1209731020	ANKUR RAJ SINGH	JOINT SEC.
3	1209731097	SATYENDRA KUMAR PATEL	Technical
4	1209731018	ANKIT PANDEY	Technical
5	1209731012	AMIT KUMAR VERMA	Creative
6	1209731095	SANCHIT GOEL	Creative
7	1209731096	SANTOSH KUMAR	Creative
8	1309731911	POOJA SINGH	Marketing
9	1209731107	SUMIT MISHRA	Marketing
10	1209731100	SAURABH VIKRAM SINGH	Marketing
11	1209731010	AKSHI BHARDWAJ	Literary
12	1209731030	BHUMIKA GUPTA	Literary
13	1209731036	Deepanshu Bajaj	Office
14	1209731046	IRINA UPADHYAY	Office
15	1209731011	AMIT KUMAR	G-Care
16	1209731055	KRITIKA VERMA	G-Care

Students extra curriculum activities:

Name of Student	Event	Position
Sanchit Goel	Dance events at GQuasar	Winner
Palak Singh	Nukkad natak at GCET	Participated
Ankur Raj Singh	CHIEF POST in NRC at BIC	Participated
Ankur Raj Singh	In JK tyre racing at BIC	Work as a INTERVENTION OFFICER
Ankur Raj Singh	ADB MEET at INDIAN EXPO MART	Volunteer
Shubham Bhambey	Group Dance competition at ANTARANI'14, IIT Kanpur. 2014	Participated

Shubham Bhambey	Group dance competition at MOSAIC'14 at IILM, Gr. Noida	1 Rank

ZEST - A Technical & Cultural Event:

GNIX student forum organized a two days technical fest ZEST- 2015, which includes various fascinating events (like code cracker, Spot the bug, Circuit debugging, Poster presentation, Treasure Hunt, Wire loop, Debate, Rangoli, X-factor, General Quiz, Math Quiz, Digital Quiz etc) during 12th and 13th February 2015.

Faculty Research Papers/ Books:

List of Publications in Journals:

S. No.	Name of Author	Title of Paper	Name of Journal
1.	Bhawna Ahuja, et al	Adaptive Double Threshold based Spectrum Sensing for Cognitive Radio Networks	International Journal of Energy, Information and Communications, vol. 5
2.	Satya P. Singh et al	Localized Radon Polar Harmonic Transform (LRPHT) Based Rotation Invariant Analysis of Textured Images	International Journal of System Dynamics Applications, vol. 4, issue 2
3.	Satya P. Singh et al	Wavelets: Biomedical Applications	International Journal

			Biomedical Engineering and Technology, vol. 19
4.	Satya P. Singh et al	Combined Rotation- and Scale-Invariant Texture Analysis Using Radon- Based Polar Complex Exponential Transform	Research Article - Computer Engineering and Computer Science
5.	Eqbal, Shahid et al	Medical Image Feature Extraction for Computer Aided Diagnosis of Lung Cancer	International Journal of Advanced Research in Computer Science and Software Engineering

List of Publications in Conferences:

S. No.	Name of Author	Title of Paper	Name of Conference
1.	S.P. Singh et al	A Review on Decade of Multi-rate Filters	IEEE Sponsored 2nd Conference on Electronics and Communication System (ICECS)
2.	S.P. Singh et al	Simulation of Various Adaptive Techniques in Wireless: A Comprehensive View	IEEE Sponsored 2nd Conference on Electronics and Communication System (ICECS)
3.	S. P. Singh et al	Novel Closed form Expression for Multi Cell Cooperation using MHCP to Reduce Interference	18th International Symposium on Wireless Personal Multimedia Communications
4.	Satya P. Singh et al	Wavelet Packets Based Spectral Estimation of Textured Images	IEEE International Conference on Computational Intelligence & Communication Technology (CICT)
5.	Madan Kumar Sharma, et al	UWB-MIMO Antenna with enhanced Isolation for Breast cancer Detection	IEEE 2nd International Conference on Computing for Sustainable Global Development (INDIACom)
6.	Deepak Gangwar, R.L. Yadava et al	Miniaturized Inverted Multiband Stacked Trangular Fractal Patch Antenna for Wireless Communication	international Conference on Signal Processing and Integrated Networks(SPIN)
7.	Satya P. Singh, et al	Rotation Invariant Texture Analysis Using Radon and Polar Complex Exponential Transform	3rd International Conference on Frontiers of the Intelligent Computing: Theory and Applications (FICTA), vol. 1

8.	S. P. Singh, et al	Mathematical Analysis of Blackmann Window function in Fractional Fourier Transform Domain	International Conference of Medical Imaging, m-Health and Emerging Communication Systems (MedCom)
9.	S.P. Singh et al	A Closed Form Expression for BER over "Alpha-Mu" Fading Based on Novel MGF	3rd IEEE International Conference of Reliability, Infocom Technologies and Optimization (ICRITO) (Trends and Future Directions)
10.	S. P. Singh et al	A Novel MGF Based Capacity over "Alpha-Mu" Fading Distribution	International Conference of Medical Imaging, m-Health and Emerging Communication System (MedCom)
11.	S.P. Singh et al	MGF Based Solution for Channel Capacity Over Generlized G- Fading Under MRC Diversity Combining	International Conference of Computational Intelligence and Communication Networks (CICN)
12.	S.P. Singh et al	MGF Based Solution for Channel Capacity Over Generlized G- Fading Under EGC Diversity Combining	International Conference of Medical Imaging, m-Health and Emerging Communication System (MedCom)

Industrial Visit:

1. Around 40 students from UG visited Advance Technology Limited, Chandigarh on 22/8/2014.
2. On 30/10/2014 Students of 3rd year Electronics and Communication Engineering visited Aryabhatta Research Institute of Observational Sciences, Nainital, Uttarakhand.

Placements:

Company Name	No. of Students placed
Broadcom	1
Cognizant	8
Ericsson	6
Dive-in Technologies	1
E & Y	2
Mindtree	1
JKT	4

HCL Tech	3
IBM	1
Infosys	11
TCS	4
Samsung R &D	1
Rawelcom Group.	14
Tech Mahindra	11
Wipro Technologies	13

Eminent Recruiters: