

Synergy

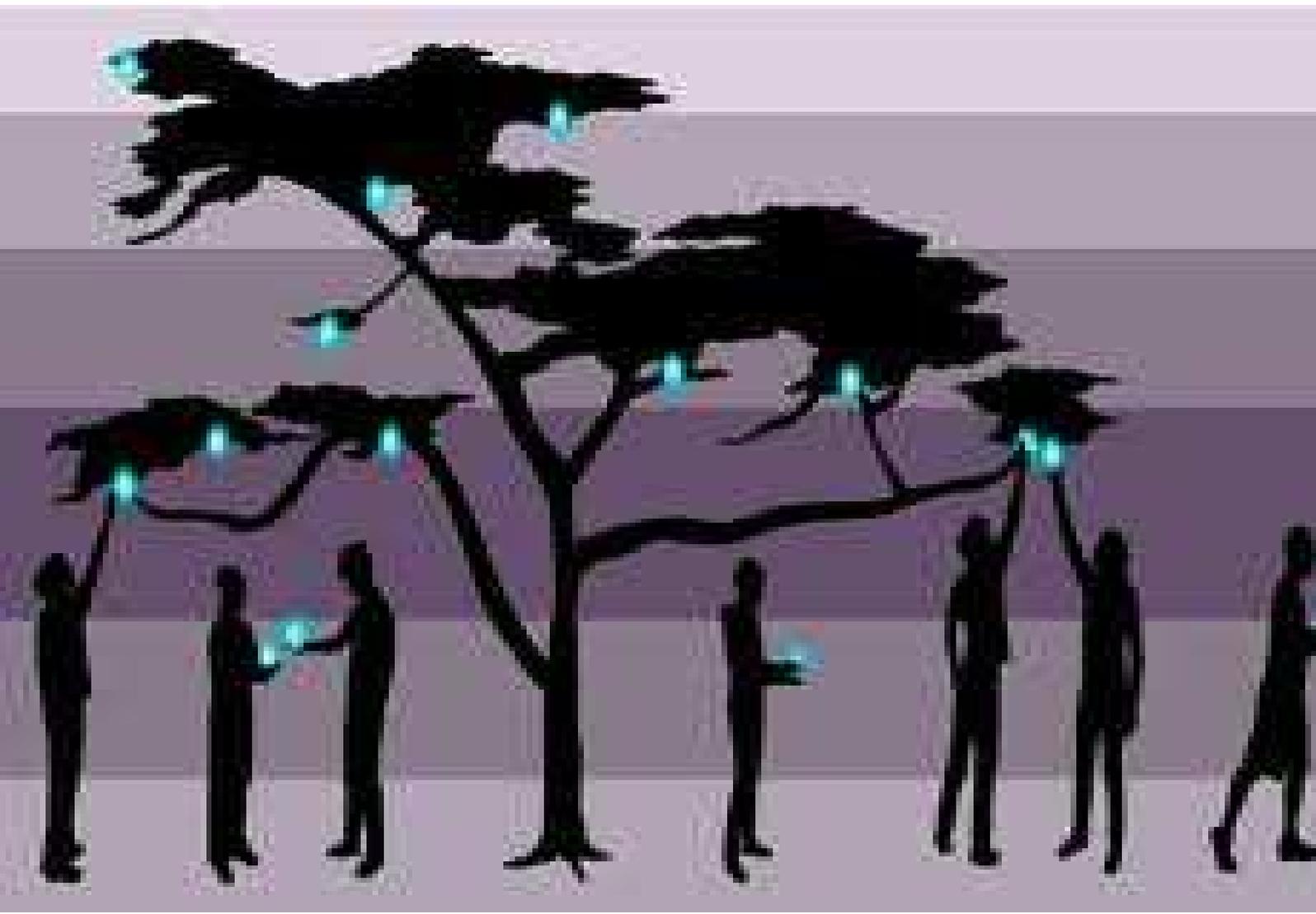


Department of BioMedical Engineering

SSN College of Engineering

Department quarterly magazine

April-May-June 2013



EDITORIAL

An inspirational start is always a refresher; it always promotes greater aspirations. Keeping this in mind, we bring to you this edition of Synergy at the start of yet another academic year.

Covering the happenings in the department from the months of April-June, 2013: this edition comes with the hope of being a motivator and giving people a reason to celebrate yet another set of accomplishments of the department. We've also included a set of intriguing articles to take you into the astonishing world of BME.

The past is a stimulator but it is the future we look at to take us to newer and greater heights. We take this opportunity to welcome budding biomedical engineers into the department to take a splendid journey of learning and progress.

Cheers to more success, ideas and innovation!

- the Newsletter team

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The department has been abuzz with diverse activities with the zealous contribution of the faculty and the students.

PAPER PUBLICATION

- ✓ A paper on “Deaf-Mute Communication Interpreter” by Anbarasi Rajamohan, Hemavathy Rajasekaran, **M.Dhanalakshmi**, published in the International Journal of Scientific Engineering and Technology, Vol 2 issue 5, May 2013.
- ✓ A paper on “BRCA1/2 Mutation Genetic Screening” by **Dr. Mallika Jainu** and E. Priya was published in the proceedings of International conference on Bioinformatics and Biotechnology, Karnataka University, India on 28th June, 2013.
- ✓ A paper on ‘Quantitative Analysis of Digitized Mammograms Using Nonsampled Contourlets and Evolutionary Extreme Learning Machine’ was published by **Dr. A. Kavitha**, Janani Sivasankar Babu and Lakshmi Bhavani Sukumar Journal of Medical Imaging and Health Informatics. Volume 3, No.2 (June 2013) pp. 206-213.

AWARDS/RECOGNITION

- ✓ “Phytochemical Screening, Antimicrobial Activity and In Vitro Antioxidant Investigation of Methanolic Extract of Seeds from Helianthus annus L” published in Chemical Science Review and Letters Vol 1(1), 30-34 by **Rajakannu Subashini (AP)** and Sritharan Umamaheswari Rakshitha selected for **Best research paper award**.
- ✓ ‘Protective role of ascorbic acid isolated from Cissus quadrangularis on NSAID induced toxicity through immunomodulating response and growth factors expression published in International Immunopharmacology journal, Elsevier publication by **Mallika Jainu (AP) and Mohan KV** was selected as an article topper by BioMedLib, USA.

WORKSHOPS/CONFERENCE**PARTICIPATED**

- ✓ **Dr.Mallika Jainu, AP** attended the 4th Annual Clinical Diagnostics BioConference Live, Yorba Linda, CA
- ✓ **Mr.R.Sivaramakrishnan, AP** chaired a session in the Second National Conference on Recent Advancements in Signal Processing and Communication, NCRASPC - 2013 held at R.M.K COLLEGE OF ENGINEERING AND TECHNOLOGY on the 1st of April, 2013.
- ✓ **Dr.S.Pravinkumar (AP)** and **Mr.R.Sivaramakrishnan (AP)** , participated in a two day workshop on Research Methodology and LATEX, conducted by the Department of Mathematics, SSNCE on the 19th and 20th of April, 2013.
- ✓ **Mrs.M.Dhanalakshmi (AP)** attended a three days Faculty Development Programme on “Advanced Digital Signal Processing Algorithms” organized by School of Electronics Engineering, VIT university, Vellore from the 10th to the 12th of May 2013.
- ✓ **Mr.P.ManojNiranjan (AP)** attended a workshop during the 17th to 21st of June 2013,on "Statistical Analysis For Engineers-SAFE 2013" conducted by the Mathematics and Statistics Department, IIT KANPUR

WORKSHOPS/CONFERENCE**ORGANISED**

- ✓ The department conducted, on the 9th of April, 2013, a one day workshop on “Digital Signal Processors” for the III year students. Mr.R.Suresh, Assistant Professor, School of Electronics Engineering, VIT, Vellore gave demonstrations on DSP processors and processor based experiments. The programme was co-ordinated by Mrs.M.Dhanalakshmi(AP) and Ms.R.Nithya(AP)
- ✓ The Department conducted an AICTE sponsored Project Exhibition to display all final year projects. Mr.Puhazhendi, Director for New products and Regulatory, Perfint Healthcare Pvt Ltd, Chennai, who adjudged the projects gave away cash awards to the winners. The Programme was co-ordinated by Dr.A.Kavitha, HOD and Mrs.M.Dhanalakshmi,AP.

STUDENT'S CORNER

PROJECTS

“It is not that I’m so smart. But I stay with the questions much longer”

-Albert Einstein

Arun Srinivas P, Navathej G, Vignesh SM, of the 2009-2013 batch, presented a project titled ‘Computer based Communication Aid for Paralytic Patients using EEG’ at the final round of ‘**Next Big Idea 2013**’ (a business plan competition sponsored by Intel, Indian Institute of Management - Bangalore and the Department of Science and Technology- Govt. of India). The project is shortlisted among 30 projects from all over India.

Tech top, Kerala conducted an engineering application designing based competition for undergraduate students all over India.

Gunasekaran, Guru Prashanth, Riyaz, Rajesh, Suryakumar from the final year have participated and got selected to the next round.

Priyadharshini.B, Vishnupriya K and Praveen of Biomedical Engineering won the first place in AICTE sponsored Project exhibition held on 24.04.2013.

HOSPITAL TRAINING

- ✓ Ahbbinaya V and Sruthi S of final year went to Apollo hospitals for training during the period June 17-22, 2013.



- ✓ Students of the third year have interned at various hospitals including Apollo, Fortis Malar, Meenakshi Mission, Global Hospitals and Shri Ramachandra Medical centre.

PrOjEcT ExPo

The Department of Biomedical Engineering organized a project exhibition on April 24th 2013 exhibiting the projects done by the final year students. The function was presided over by the Chief Guest K.Puhazhendi, Co-founder and Director, Perfint Healthcare, Chennai. A total number of 22 projects were displayed in the form of posters. In the morning first 11 teams explained their projects followed by the next 11 teams in the afternoon.

The Chief Guest judged all the projects displayed and the staffs from other department also showed their interest in visiting our project expo. The results were announced in the afternoon and the cash prizes along with the memento were given.

The project titled “Impact Analysis and Stress Study on Finite Element Modeled Human Head” by Vishnu Priya.K, Priyadharshini.B and Praveen Richard.C got first prize.

The project titled “Measurement and Analysis of Heart Rate Coherence” by Ashwin Varadarajan, Jeyaprakash.P.S and Karthikeyan.G got second prize.

The third prize was shared by two teams. Anjana Venkataesan and Akshaya.H paper “Design of Thermal Biofeedback System for the Treatment of Digital Ischemia”.



The paper titled “Deaf – Mute Communication Interpreter” by Anbarasi.R, Ashapriyadharshini.S and Hemavathy.R shared the third prize.

Finally the vote of thanks was presented by Dr.A.Kavitha,Head of the Department,Department of Biomedical Engineering and as a token of respect a memento was given to K.Puhazhendi.

- ✓ Aarthy B,P, Vardhini, Poongavanam.P, Keerthana.D, Hemavar-Dhini.R, Akshaydevi.R, Third years, attended an inplant training at Sri Ramachandra University in June 2013.
- ✓ Bhavani J and RasikhaR, Final years, visited AMS Solutions Private Ltd in the month of June 2013.
- ✓ Deepika.S, Divyalakshmi. S,Swathi.S, Third years, interned at Fyrsta Solutions, Madipakkam, an innovative start-up by hardcore engineers from various disciplines , in the Product Design and Development domain. They worked as trainees and built several electronic circuits.
- ✓ Srinidhi.G, Third year, interned at GE Healthcare, Bangalore in the department of sourcing during the month of June. She was given the task of designing a “Hall-Effect Current Sensor using INA129” which is used in MRI machines for simulating the nuclei in the human body cells. She says “ It was a nurturing experience to work in an industry where the precision and accuracy played a major role in designing the device as opposed to what we generally perform in academia.”
- ✓ PrasannaBharatiR, Third year, was selected by Studentstory from the Biomedical Department, to intern and train at www.studentstory.in, recognized by the Times Of India. She honed her professional writing skills under the guidance of seasoned writers.
- ✓ Rajashree Jayabalan and Sailaja.N, Final years, interned at Philips medical Systems between the first and twelfth of July 2013. During their stay there, they got to work closely with different medical equipments, with a special focus on the dos and don'ts of equipment handling.
- ✓ Vaishali.R, Third year, worked as an In-plant Trainee at Diabetik Footcare India Pvt Ltd, Thiruvanniyur, a company that manufactures and distributes various diagnostic and therapeutic products used to quantify and treat diabetes. Through this training, she got a hands-on experience to build a Vibrometer.
- ✓ Over 20 students from the final year took part in the workshop conducted by Maastech during February – June 2013. They got to learn the nuances of Embedded System Programming.



PHILIPS

sense and simplicity



SSN

Extracurricular

- ✓ Sruthy. S, a student of the 2009-2013 batch, won the second place in Ignite '2k13 organized by Loyola College, Chennai. She also grabbed the 3rd position in the 'Choreonite' conducted during Sarang, the cultural festival of the IITM, Chennai
- ✓ Vishali, Third year, participated in Arena '13, a table tennis tournament.
- ✓ Divya M , Final year, bagged the second prize in the Carom contest conducted as a part of the SSN Trophy 2012-2013.
- ✓ Abigail from 4th year and her team was runner up in Volley Ball held at SSN during the Annual Sports Meet titled 'SSN Trophy'.
- ✓ Sruthi S , Final year,a basketball player, was a part of the winning team, during the Annual Sports Meet for the academic year 2012-2013.
- ✓ Vennila V, final year, won the 'Kavithai Poti', conducted by the Saral Tamil Mandram, SSNCE.
- ✓ The students of the 2009-2013 batch have actively involved themselves with ***Karunaivilla, a NGO*** that helps specially abled people. Apart from visiting the place regularly, they have donate in cash and kind, the most recent being, few kilos of rice and Rs.40,000 cash.
- ✓ Student volunteers of both the third and final year took part in the NSS and YRC camps that took part this year during the last week of January. They adopted a local village and tried to improve the living conditions of the place.



Smart Phones as Integrated Biosensors

-Santhosh.G, Final year, BME

A chance conversation some two years ago about augmented reality game apps got Brian Cunningham thinking about how the computing and imaging power of smart phones might be used for something near and dear to his heart. Dr. Cunningham, professor of bioengineering and of electrical and computer engineering at the University of Illinois, was meeting with an alumnus who related how the games he developed had been downloaded by millions.

“I started thinking that there must be something you could do with a smart phone for medical use,” says Cunningham, whose area of research is biosensors.

With little or no funding available, Cunningham proposed his idea to engineering students looking for a required senior project, and five volunteered. Work since then has produced a first generation device using a smart phone that promises to offer a wide range of biosensing capabilities on-location, outside of a laboratory.



Led by Cunningham, the student team came up with a way to use the camera in a smart phone as a high-resolution spectrophotometer for performing some of the most important and common tests in biochemistry and molecular biology. The project is so promising that it received a grant from the [National Science Foundation](#), and work now has started on the next generation device.

In addition to having sensing capabilities for the medical field, such as detecting toxins, proteins, bacteria, viruses, and the like, the device could also be used in the environmental and food safety areas for tests such as on-location identification and tracking of groundwater contamination and quality control for food and food ingredients. The device consists of an app and an attachment to the phone that the team calls a “cradle.” This wedge-shaped attachment that fits on the back of the phone contains optical components, lenses and filters, and a compartment where a sample is placed. It is

positioned to allow the phone's camera to measure the spectrum of light coming through the sample and into the camera and provides a result in just a few minutes.

According to the university's website, the cradle, holding about \$200 worth of optical components, provides a result as accurate as that from a \$50,000 lab spectrophotometer. Cunningham says there were times when things didn't work, and the team had to back up a step and try again. For example, the team tried to make the cradle out of plastic, but it wasn't accurate enough to hold all of the lenses and other components in place to get a good spectrum. So the team went to a machine shop and had one made out of aluminum. "That worked really well, and now I think we could make a plastic one since we know how all the components come together," says Cunningham.

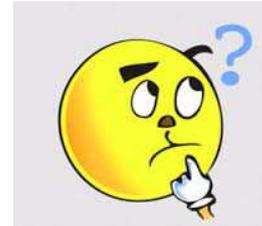
Personal Diagnostics

The prototype works for the most commonly used biosensor tests for personal diagnostics: the ELISA, or enzyme-linked immunosorbent assay, that identifies the presence of a substance by a color change. The team, now with new members because the first team graduated, is focusing on showing how the smart phone works with a representative number of the various ELISA tests, for example, for HIV, for cancer and others. With the NSF funding, the team is building a next generation device that will include an app and cradle capable of doing other types of tests, such as those that involve shining a laser at the sample and detecting light given off by the sample.

Some of the tests we want to do involve detecting DNA, for example, detecting DNA that's present from a virus or DNA that would tell you whether a certain strain of bacteria is resistant to antibiotics, Cunningham says. "There are certain tests where you want to detect a DNA sequence and the output of that is fluorescent. Our new system incorporates a green laser pointer and the ability to shine a laser at the sample." The first device had to be held up to a light bulb or the sun to get the light to come through a pin hole. With the next one, the idea is to use an internal LED of the phone itself as the light source, he explains. "It's more self-contained." Cunningham says he hopes, perhaps a year from now, there may be something commercially available that could be used for tests other than medical testing, which will take longer for regulatory approval.



DID YOU KNOW?



NO! Infinity is not a "really really big number"

Have you ever wondered about the largest number you could possibly think of? No, infinity is not a number. Most of you would have heard of 'googol'. It's a pretty big number, equal to 10^{100} . But it's the tiniest large number. The mathematicians didn't stop there. Milton Sirotta came up with 'googolplex', which is 10^{googol} . That's one followed by a googol zeroes. Truly, the mind boggles! In fact, it's so big that if we assign each atom in the observable universe to a digit of googolplex, we would run out of atoms, since the number of atoms itself is only about 2.5×10^{89} . This makes the googolplex impossible to write down. The time it would take to write it down also makes the task an absurd idea since it would take about 1.51×10^{92} years, which is about 1.1×10^{82} times the age of the universe.

Find it hard to believe that such a number exists? Well, there are infinitely larger numbers like the Graham's number which if you even try to imagine, you will probably end with a cranial crash!!

-Srinidhi.G, 3rd year

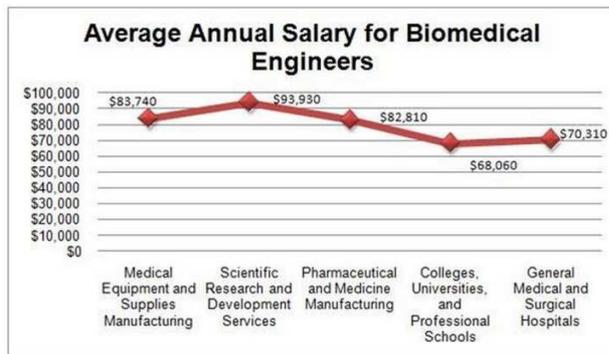


Table 1. Forecast for the fastest-growing occupations by percentage, 2008-2018

Occupation, May 2008	New jobs	% chg.	Median wage
Biomedical engineer	11,600	72%	\$77,400
Network/data system analysts	155,800	53%	\$71,100
Home health aides	460,900	50%	\$20,460
Personal and home care aides	375,800	46%	\$19,180
Financial examiners	11,100	41%	\$70,930
Medical scientists ¹	44,200	40%	\$72,590
Physician assistants	29,200	39%	\$81,230
Skin-care specialists	14,700	38%	\$28,730
Biochemists/ biophysicists	8,700	37%	\$82,840
Athletic trainers	6,000	37%	\$39,640

BEST JOBS IN AMERICA

1. Biomedical Engineer

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Median pay: \$79,500
Top pay: \$124,000
10-year job growth: 61.7%
Total jobs: 15,700

What they do all day? Science fiction is a little less fictional in the day-to-day work of biomedical engineers, who design prosthetic limbs and artificial organs or regenerate tissue. They also create drug formulations, develop pharmaceuticals or collect and analyze biological data, among other work. In this field lies the intersection of biology and engineering skills, which helps crack tough problems in medicine and health.



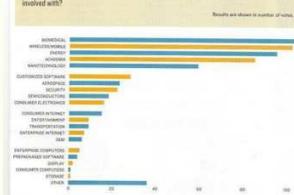
How to get the job? A bachelor's, master's or Ph.D. in biological engineering will get prospects in the door, but engineers with more traditional degrees -- such as electrical, mechanical and chemical -- are also a good fit.

What makes it great? Not only is it one of the highest-paid engineering jobs, it's a career that gives back to society by helping to improve world health. It's also highly flexible, with positions in universities, hospitals, labs, industry and regulatory agencies.

The Ten Fastest-Growing Jobs You Should Go to School For Today

+72% Biomedical Engineers	+98% Skin Care Specialists
+63% Network Systems and Data Communications Analysts	+91% Biochemists & Biophysicists
+41% Financial Examiners	+37% Athletic Trainers
+40% Medical Scientists	+36% Physical Therapist Aides
+39% Physician's Assistants	+36% Dental Hygienists

Your Best Bet for the Future



UNLOCK YOUR INNER GENIUS

-R.S.Gayathri, 3rd year

UNLOCK YOUR INNER GENIUS

"It took me four years to paint like Raphael, but a lifetime to paint like a child"

-Pablo Picasso

Remember how you'd spend endless hours scribbling over walls, singing at the top of your lungs and dancing to every tune that you'd hear, back when you were a child? I'm sure you'll look back at all those fond memories of childhood, smile to yourself and wish that things were the same. If it weren't for that small part we call "growing up", we'd all be Picassos and Rahmans and what not.

By growing up, I mean, realizing the need to fit in- to be socially acceptable. As we grow up, the things we do focuses on pleasing people. Anything that doesn't is thrown in a dark closet, never to be opened again. And somewhere in this process of doing and throwing things, we lose our original selves-the creative, artistic selves we used to be as kids. It is due to this that we find it difficult to think of out-of-the-box solutions to our problems and often find ourselves distraught over the monotony of life.

What is so great about those squiggles, that yelling and those barely coordinated movements, you ask? Well, the fact that they are driven by the intention of pleasing *oneself* rather than others is what makes them special. The child doesn't care if his parents would have to get the entire house painted again- the wall IS his canvas and if he finds something bigger, then that would be one too.

Also, when you think about it, those squiggles would not make any sense to us grown-ups because that's the *kid's* version of the universe. And there lies the beauty of art- with a canvas in front of you, you can paint a whole universe not bound by the laws of this world. All you have to do is explore the infinite possibilities that your imagination can offer.

Now, I know we can't just go back to being kids, but it's always possible to let go off of ourselves sometimes-just sometimes to listen to the creative genius inside us.

FORTHCOMING EVENTS

The inaugural of The association of Biomedical Engineers will be organized on 31st July,2013. The Inaugural will be followed by a workshop on Arduino and Matlab at 11 AM in the Mini auditorium.

- Srishti, a national level symposium of the Biomedical Department will be conducted on 3rd September,2013.



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