A delegation of 11 students and 3 staffs from the Engineering and Information Technology Departments participated in the 2nd Gulf Programming Contest (GPC) held and hosted at Khalifa University for Science, Technology and Research, Abu Dhabi Campus, United Arab Emirates on March 14-15, 2012. All the GCC countries, except Bahrain were represented in this year’s contest. Historically, it was the first time that the Sultanate of Oman ICT Participates in GPC 2012 at UAE

“Bountiful research funds are available in Gulf Countries.” This was the theme of a guest lecture delivered by Dr. Ahmed Al-Naamany, incumbent chairman of the IEEE Oman section, at Ibra College of Technology on February 27, 2012. The guest lecture was organized by IEEE Oman Section in coordination with the ICT Engineering Department. It was well-attended by representatives from other colleges which included Al-Musanna College of Technology, Caledonian College

Areej Sulaiman Hamad Al-Ghunaimi and Ibrahim Saif Amer Al-Maawali, Higher Diploma Engineering students win a major award in the First Students Creativity Forum held at Oman International Exhibition Center in Muscat on May 8-10, 2012.

The forum was organized by the Ministry of Higher Education under the patronage of the Ministry of Information and sponsored by many leading companies in the Sultanate. It received an overwhelming 697 entries from 31 various government and private educational institutions all over the Sultanate. After the first cut made by a team of competent jury, 300 entries in various scientific,
A department is an institution built around a body of knowledge. In my view, a department flourishes only when this knowledge goes beyond textbooks and circulates from person to person. The exchange of ideas, information and insight helps the department make progress, measured in terms of outstanding graduates and their achievements. Equilibrium, the in house magazine of the Engineering Department at ICT, aims at endorsing the departmental activities as well as promoting the students’ literary skills and creative thinking.

On behalf of the administration I would like to appreciate the hard work and dedication displayed by the entire magazine committee, and I also congratulate them for their successful endeavor praying to Allah Al-Mighty that each year will bring more and more triumph to Equilibrium.

Wishing further and substantial success to Equilibrium!
I look forward to reading volume 2 issue 2.

Dr. Khalid Abdulaziz Khalid Ambusaidi

Dr. Faris Salman Al-Naimy

Lessons from the Geese: A Reminder

As I was contemplating on what to write for the editorial of this issue, I came across an article that caught my attention and find myself fascinated and deeply indulge in the timeless truths and lessons of an essay written by Dr. Robert McNeish, entitled "Lessons From Geese". Demonstrating the power of a good idea, his essay spread and has become a classic statement of the importance of teamwork. I am sharing this to everyone as a reminder.

**Fact 1:** As each goose flaps its wings, it creates "uplift" for the birds that follow. By flying in a "V" formation, the whole flock adds 71 percent greater flying range than if each bird flew alone.

**Lesson 1:** People who share a common direction and sense of community can get where they are going more quickly and easily because they are traveling on the thrust of one another.

**Fact 2:** When the lead goose tires, it rotates back into formation and another goose flies to the point position.

**Lesson 2:** It pays to take turns doing the hard tasks and sharing leadership. As with geese, people are interdependent on one another's skills, capabilities and unique arrangements of gifts, talents or resources.

**Fact 3:** The geese flying in formation honk to encourage those up front to keep up their speed.

**Lesson 3:** We need to make sure our honking is encouraging. In groups where there is encouragement, the production is much greater. The power of encouragement (to stand by one's heart or core values and encourage the heart and core of others) is the quality of honking we seek.

**Fact 4:** When a goose gets sick, wounded or shot down, two geese drop out of formation and follow it to help and protect it. They stay with it until it dies or is able to fly again. Then they launch out with another formation or catch up with the flock.

**Lesson 4:** If we have as much sense as a goose, we will stand by one another in difficult times as well as when we are strong.

**Fact 5:** When a goose falls out of formation, it suddenly feels the drag and resistance of flying alone. It quickly moves back into formation to take advantage of the lifting power of the bird immediately in front of it.

**Lesson 5:** If we have as much sense as a goose, we stay in formation with those headed where we want to go. We are willing to accept their help and give our help to others.

sent delegates to this prestigious contest, three teams from Ibra College of Technology and one team from Ibri College of Technology. A total of 42 teams from 16 colleges and universities all over GCC vie for this year’s trophy.

The tilt is an annual programming contest participated by many colleges and universities in GCC. It has been a continuing tradition for already 11 years ever since it was initiated by the Department of Computer Science of the University of Sharjah in 2001. The GPC was formerly known as the UAE National Programming Contest (NPC) until it was opened for the first time to all GCC countries last year.

The competition provides an excellent opportunity for students majoring in computer engineering, software engineering, computer science, management information systems, information technology, or any IT related specialization to demonstrate their programming and problem solving skills in addition to honing their teamwork skills. The contest provides a platform for ACM, industry and academia to encourage and focus public attention on the youth as they pursue excellence in computing.

Each competing team consisted of three students. During the grueling competition, the teams tried to outsmart each other by using a computer to solve ten problems in five hours. The team with the most number of problems solved correctly at the fastest time wins. The problems ranged from easy to complex, and included computer science and engineering applications and topics such as data structures, combinatorics, graph algorithms and computational methods.

The team from the American University of Sharjah emerged victorious and was declared champion by the board of judges at the end of the two-day event. Two other teams from the Carnegie Mellon University of Qatar, bagged the second and third spots. All winners received valuable prizes from the different event sponsors and shall have the chance to represent GCC in the Association for Computing Machinery (ACM) International Collegiate Programming Contest (ICPC) and World Programming Contests.

The Ibra-based programmers were too novice for their well-trained and much experienced counterparts. They may not have made it to the top or to the score board, but they bring home priceless experiences and memories that they will reminisce and cherish for the rest of their lives.

The ICT students were guided and accompanied by Mr. Arnold Santos, ICT IEEE Student Branch Counselor and HoS of Electrical & Electronics Engineering, Mr. Srinivas Valmekan, Information Technology lecturer and Ms. Blasminda Mayol, Computer Engineering Technical Instructor. The three teams are as follows:

**ICT-Computer Engineering**
1) Areej Sulaiman Hamad Al-Ghumaimi, Higher Diploma
2) Naeema Hamed Hamood Al-Sawafi, Diploma
3) Sara Salim Junah Al-Taahari, Diploma

**ICT-Information Technology Team 1**
1) Rayya Saeed Salim Al-Rashdi, Diploma
2) Iman Saeed Amir Al-Amri, HD-Information
3) Rahma Sulaiman Salim Al Salmi, Higher Diploma
4) Seneida Sa’eed Khamis Al Hashmi, Diploma

**ICT-Information Technology Team 2**
1) Ilham Said Ali Al Rawahi, Higher Diploma
2) Huda Aamir Hamad Al-Ruzaiqi, Diploma
3) Sara Zaher Mohammad Al Yazeedi, Higher Diploma
4) Amtal Gafil Obeid Al-Harti, Higher Diploma

The eleven engineering and IT students were very grateful to their coaches, to Dr. Faris S. Al-Naimy and Mr. Mohamad Osman, heads of Engineering and IT departments, respectively and most especially to Dr. Khalid Abdulazizs Ambusaidi, College dean for the help, support and most especially for the privilege of allowing them to be part of this once in a lifetime opportunity. They are all hopeful that this activity will motivate and inspire other ICT students to do their best and be serious with their studies to compete and stay at par with other GCC students.

*By Mr. Arnold Santos*
ICT Hosts IEEE Oman Executive Board Meeting

Ibra College of Technology hosted the monthly IEEE-Oman Section Executive Board meeting on February 27, 2012 at the new ELC building conference room.

Dr. Ahmed Al-Naamany, incumbent IEEE Oman section chairman, presided the meeting which was attended by other executive board officers and representatives from other member institutions that include Sultan Qaboos University, Caledonia College of Engineering and Ibra College of Technology.

At the end of the meeting, the board came up with a list of all the activities lined-up to be completed until the end of the current academic year.

Dr. Khalid Abdulazzis Ambusaidi, ICT College Dean, Mr. Hafedh Al-Rahbi, ICT Assistant Dean for Academic Affairs and Dr. Faris S. Al-Naimy, ICT Engineering department head, were also present and took an active participation in the meeting’s agenda.

New HoS, Mechanical Engineering Named

Mr. Syed Mohammad Saad, a lecturer from the Engineering Department has been appointed as the new head of the Mechanical Engineering section effective Spring of the current academic year 2011-2012. The appointment was formalized by the College dean, Dr. Khalid Abdulazzis Ambusaidi through Dr. Faris S. Al-Naimy, head of the Engineering Department. Mr. Saad assumes duties from Mr. Shylesha Chanapatana, who resigned from the College on December 31, 2011.

With almost 6 years of services to Ibra College, Mr. Saad is one of the longest-serving and most valued lecturers of the engineering department. Before this appointment, he was the On-the-Job Training (OJT) and Enhancement Practical Training (EPT) coordinator of the Mechanical Engineering section. Dr. Faris commented that “Saad's experiences in teaching, academic advising and patience in dealing with students will be a great benefit for the Engineering Department.”

“I consider this appointment as a wonderful, yet challenging opportunity to work more closely with stakeholders, particularly the Mechanical Engineering students in assuring the continued success of Ibra College of Technology,” Mr. Saad said. “This assignment will truly defy my leadership skills and professional dedication, and I look forward to meeting the challenges ahead.”

A native of Northern India, Mr. Saad received his bachelor's and master's degrees from Aligarh Muslim University, India in 1997 and 2001, respectively. He worked as a Mechanical Engineering lecturer in Ideal Institute of Technology (2001-2003) and at Greater Noida Institute of Technology (2003-2005). He joined Ibra College as a lecturer in August 2006. Mr. Saad's primary teaching and research interests have been in the field of thermal engineering.

New CNC Lab Ready in Fall 2012, Technical Staff Completed Training

The CNC (Computer Numerical Control) Laboratory in the engineering department will be ready in the next semester, Fall 2012. Two technical support staffs, Mr. Yaquob Khalid Al-Nafie and Mr. S. Vidhukumar has completed the 3 different phases of CNC training on Sinumerik Control and Training Esprit conducted by engineers from EMCO in Higher College of Technology. The 3rd and final leg of the training was conducted from January 21 until February 1, 2012.

The modern CNC design system has revolutionized the machining process. CNC is highly automated using computer-aided design (CAD) and computer-aided manufacturing (CAM) programs. The CNC machines in ICT engineering department are supplied by EMCO Group, one of Europe’s leading manufacturers, developers and producers of innovative high-tech machine tools for the metal-cutting industries.

The new laboratory equipment includes a CNC TurnMill EMCO Concept Turn250 and CNC Milling Machine EMCO Concept Mill155. Mechanical engineering students will get the benefit of having an actual work experience in these modern machines similar to those used in the industry. The skills that students will acquire from the CNC lab will give them an advantage in getting a high-paying job in various industries in Oman and even among the GCC countries.

...by Mr. Arnold Santos

... by Mr. Arnold N. Santos

...by Basil Blasco
Research Funds Bountiful in GCC... from page 1

of Engineering and Sultan Qaboos University. Guests from Mazoon Electricity Company, Bank Sohar and Ministry of Education, Sharqiya region, were also present. In his one-hour lecture, Dr. Al-Naamany outlined the important roles that the Arab people played relevant to the modern day advancements the world is currently enjoying. “Aside from these contributions, GCC is the world’s major supplier of the oil and natural gas,” he pointed out.

He cited, however, that if the Arab people, especially the Omani, will not envisage on doing researches, the future may be very “dark” for them. The bountiful funds from various GCC research funding institutions and organizations should be utilized to look for and investigate the possibilities of harnessing alternative energy sources as depletion of natural reserves may be inevitable very soon.

Dr. Ahmed Al-Naamany urged the students, lecturers and guests present during the lecture to do something right now to influence and muster a collective action to courageously and decisively meet the demands of globalization. “A collective research action powered by the spirit and virtues of coherence, cooperation and coordination is very much needed across the Sultanate,” he commented.

Dr. Ahmed Al-Naamany is an associate professor in Information and Communications Technology. He started his academic career at Sultan Qaboos University and later at Arab Open University, where he was the Vice Rector for Educational and Information Technology. Presently, he is the Managing Director of Global Computer Services. He attained a Ph.D. from University of Manchester, Institute of Science and Technology, UK in 1995; a M.Sc. EE in Computer Controls from Drexel University (United States) in 1990; a B.Sc. in Multi-Disciplinary Engineering from Widener University in 1986 and a B.Sc. EE, with Honors at Widener University in 1986. Dr. Al-Naamany has contributed more than 60 papers in various international conferences and journals. He was also a recipient of a Fulbright Scholarship and a very active member of IEEE Computer and Control Societies. He gives lectures on Computer Architecture, Computer Control, Computer Networks and Artificial Intelligence Applications.

ICT Engineering Students' Final ... From page 1

social, technical drawing, sculpture, photography and even literary, were selected to be displayed in the event exhibition gallery.

On the final day of the forum, Ibra College of Technology’s project entry “Electronic Water Softener” was announced as one of the three major winners in the scientific category. The other two awards were given to the project entries from Waljat College of Applied Sciences and Shinas College of Technology.

From the opening first day up to the last minute of the forum exhibition, spectators and visitors flocked to the ICT booth to inquire on the project design concepts, which the two students confidently explained. Their project stirred curiosities among the visitors who could easily identify with the problem that it seeks to address – water hardness.

According to Areej and Ibrahim, “hard water is not a health hazard. In fact, drinking hard water generally contributes a small amount towards the total calcium and magnesium in human dietary needs. But dealing with hard water in homes can be a nuisance as it interferes with almost every cleaning task, from washing clothes and dishes to bathing and personal grooming.”

Their project presents an alternative approach to the conventional methods of converting hard water to soft water. Unlike current standard methods, the system is non-invasive and non-chemical by design. It involves the use of a microcontroller to produce varying very low frequency (VLF) signals on induction coils wrapped around a galvanized iron pipe. When charged ions such as calcium and carbonate pass through the coils, they experience an induced pulsing electrical fields which provide the necessary molecular (ion) opposing redirection of the charged mineral ions, increasing the number of collisions such that, nucleation and precipitation occurs. The ions are converted to insoluble calcite crystals and the level of saturation of the water significantly decreases; thus, reducing the level of water hardness.

The two higher diploma students were very grateful to their supervisor, Mr. Arnold N. Santos, Head of Electrical and Electronics Engineering section, who provided the project idea, the materials and the technical know-how that led the way to the successful completion of the project. They are equally thankful to Ms. Blasminda Mayol, Computer Engineering laboratory instructor, for the assistance and motivation she gave during the developmental phase of the prototype. Over all, the two students wish to extend their heartfelt appreciation for the support and encouragement from the staffs of the Student Affairs Department, Dr. Faris Al-Naimy, head of Engineering Department, Mr. Hafedh Al-Rabhi, Assistant Dean for Academic Affairs and Dr. Khalid Abdulaziz Ambusaidi, the College Dean.
Staff Development Programs

Personality Development

On January 30, 2012, Dr. V. Raghuram, Lecturer from Business Studies department of Ibra College of Technology, delivered a very interesting seminar on "Personality Development".

Mr. M. Mohamed Syed Ibrahim welcomed and introduced the guest speaker. He expressed his heartfelt thanks to the guest speaker for sparing his valuable time with Engineering Department colleagues. Dr. Raghuram focused mainly on the ways to improve individual character. He motivated the participants by comparing positive and negative points of human life and expressed his ideas of learning good things from others.

He also pointed out the important aspects of life’s journey with a humorous story. Engineering department staffs fascinatedly participated in clarifying their doubts with Dr. Raghuram. Mr. Arnold Santos, Head of Electrical, Electronics and Computer Section presented a certificate of Appreciation to the guest speaker. He also thanked Dr. Raghuram for his ground-breaking lecture and invited him to give such presentations for the Engineering Department staffs in the future. The event was facilitated and assisted by Mr. Markandan.

Teaching and Learning in the 21st Century Setting

The Staff Development Committee organized a seminar entitled “Teaching and Learning in the 21st Century Setting” on March 26, 2012 at EE-101.

The seminar was presented by Mr. Arnold N. Santos, HoS-Electrical & Electronics. It was attended by engineering staffs and few invited lecturers from the Business Studies Department. The seminar discussed some of the most powerful tools for teaching and learning in the context of the 21st Century setting where the use social media and high-tech gadgets proliferate rapidly. As a result, the options for learning inside and outside the classrooms have broadened tremendously.

Advancements in Measurement Technologies and Applications

On March 10, 2012, HoD-Engineering, HoS-Electrical & Electronics and two other Engineering staffs attended a one day seminar in Advancements in Measurement Technologies and Applications at Holiday Inn Hotel in Al-Khuwair, Muscat.

The seminar was organized by IEEE Oman section and Oman Society of Engineers and was facilitated by product and application experts from IMTAC and Agilent Technologies. The seminar discussed the challenges and complexities brought about by the rapidly changing demands in measurement technologies faced by engineers working in the academe and R & D fields.

...By Mr. Arnold Santos

Character is doing the right thing when nobody's looking. There are too many people who think that the only thing that’s right is to get by, and the only thing that’s wrong is to get caught. ~ J.C. Watts

My grandfather once told me that there are two kinds of people: those who work and those who take the credit. He told me to try to be in the first group; there was less competition there. ~ Indira Gandhi
New Staff Induction

Specialization Choice Induction

IEEE Executive Board Meeting

Gulf Programming Contest

Physics Laboratory Training
Sports Fest 2012

**Basketball Team**
Romuel Firmalino
Donato Villaceran
Arnold Braza
Pol Antillo
Rodil Montillo
Amhad Al Harti
Syed Saad
Roy Luana
Robert Guntang
(Gold)

**Volleyball Team**
K.Shamganth (Captain)
Arnold Braza
Syed Moh’d Saad
Azad
Jayaprakasan
Ganesh Babu
G.Sivakumar
Annathurai
Deepak
(Gold)

**Dart Female**
Mofeeda Pangadil
(Gold)

**Chess Male**
Leopoldo Antillo
(Gold)
Roberto Villanueva
(Bronze)

**Table Tennis Female**
Mofeeda Pangadil
(Gold)

**Table Tennis Male**
Romuel Firmalino
(Silver)

**Table Tennis Double**
Ganesh Babu Yammen
Syad Mohammad Saad
(Gold)

**Billiards Female**
Mofeeda Pangadil
(Gold)

**Billiards Male**
Romuel Firmalino
(Silver)

**Badminton Male**
Shamganth
(Gold)

**Badminton Double Male**
Azad
Sivakumar
(Silver)

**Carrom Male**
R. Dhanaraj
(Gold)
CONVERTING HARD WATER TO SOFT WATER USING RF TECHNOLOGY
Arnold N. Santos, Areej Sulaiman Hamad Al-Ghunaimi and Ibrahim Saif Amer Al-Mawali, Engineering Department, Ibra College of Technology

Abstract
Hard water is not a health hazard. In fact, drinking hard water generally contributes a small amount towards the total calcium and magnesium in human dietary needs. But dealing with hard water in homes can be a nuisance as it interferes with almost every cleaning task, from washing clothes and dishes to bathing and personal grooming. This paper presents an alternative approach to the conventional methods of converting hard water to soft water by using radio frequency (RF) technology. Unlike current standard methods, this system is non-invasive and non-chemical by design. It involves the use of a microcontroller to produce varying low frequency (VLF) signals on induction coils wrapped around a galvanized iron pipe. Test conducted on water samples collected after treatment revealed a very significant reduction in the hardness level. Moreover, the device has been found to descale the water pipes as evidenced by the removal of lime and other particle deposits inside the pipes.


SOLVING THE COURSE SCHEDULING AND TEACHER ASSIGNMENT PROBLEM USING GENETIC ALGORITHM
Sajit Kumar Jha, and Pramod K Shahabudkarker Engineering Department, Ibra College of Technology

Abstract
Timetabling is a highly complex problem which is a part of the wider-field of scheduling. Scheduling is broadly defined as the problem of the allocation of resources over time to perform a set of tasks and is NP-hard problems. Scheduling class timetables for large modular courses is a complex problem which often has to be solved in departments of college/university. This is usually done by manually taking several days or weeks of iterative repair after feedback from staff and students complaining that the timetable is unfair to them in some way. Timetabling is divided into two sub-categories: examination timetable and class timetable. This paper proposed an algorithm to solve the problem of class timetabling. Being classified as NP-hard problem, no deterministic algorithm can be devised to generate a timetable within a reasonable time. This problem is a good candidate to generate a timetable using genetic algorithm (GA). In this paper, we detail the implementation of a computer program which employs GA for an optimal solution of solving a timetable problem and generate lecturer timetable. The problem combines both teacher assignment and course scheduling problems simultaneously and is presented as a mathematical programming model based on an integer programming approach.

National Conference on Artificial Intelligence Application in Engineering (NCAIAE-2012) on Jan 25, 2012, Al-Musannah College of Technology, Oman

SOFTWARE TRAINING THROUGH COOPERATIVE LEARNING-A CASE STUDY
Pramod K. Shahabudkarker Faculty-Mechanical Engineering Section- Ibra College of Technology, Ashwini Kulkarni, Faculty-Electronics & Telecommunications Engineering, K.J. Institute of Engineering and Management Research, Pune, India Dr. K. N. Nandurkar, Principal K.K.Wagh Institute of Engineering Education & Research-Nashik-India

Abstract
In this competitive world, teamwork, learning ability and soft skills along with academic excellence are prerequisites for the career growth of a student. In the global work culture, engineering students have to work in groups. It is the responsibility of the institute to restructure the learning situations in the changing scenario. A few changes in college teaching are required for bringing in the desired change in which students learn in groups. This paper is about structuring the appropriate Teaching - Learning environment for learning the soft skills. Herein, we describe the experiment conducted at K.K.Wagh Institute of Engineering Education & Research, Nashik- India for teaching the characteristics of master students and developing soft skills through Cooperative Learning. In cooperative learning, students work in groups to maximize their own and each other’s learning. An attempt has been done in this case study to demonstrate the use of cooperative learning for developing the soft skills through the Master student programme. A frame work for implementing cooperative learning in the engineering college is discussed.


AUTOMATED MECHANICAL CAN CRASHER
Devibala B., Rajalingham P., Abdul Nassir Salim Hamooda Al-Munji and Majid Sa’eed Mas’oud Al-Baaidri, Department of Engineering, Mechanical Section, Ibra College of Technology

Abstract
The aim of the project is to design and construct a small, low-cost, reliable and compact machine to crush juice cans and other cans of similar type and reduce the size for easy disposal and effective waste management along with a conveyor to carry the crushed cans which would sense the availability of can and then regulate the operation of the conveyor. The project also covers the design and fabrication of a hopper to feed the cans in a systematic way i.e., one can at a time, without causing any congestion to the point of entry. Also light sensor are provided to detect the availability of can in the hopper and the motor starts and stops accordingly. Hence, the project also ensures power saving.

National Conference on Technologies for Sustainable Food Production CONFOTECHII, Dec. 19, 2011, Coimbatore, INDIA
IET now at ICT

The Institution for Engineering and Technology (IET), a UK-based professional organization sharing and advancing knowledge throughout the global science, engineering and technology is now at Ibra College of Technology.

The formal inauguration of IET was held on February 20, 2012 at the T4 Function Hall. In attendance were Dr. Faris Salman Majeed Al-Naimy, HoD-Engineering, Mr. Arnold N. Santos, HoS-Electrical, Mr. Mohammed Syed Saad, HoS-Mechanical, Dr. L. Rajaji Co-chair of Department Societies & Organizations Committee, and Department Societies & Organizations Committee Members, Ms. Mofeeda Pangadil, Ms. Zaina Saleh Al-Habsi and Mr. Thaddeus D. Carreon. Majority of the IET student members were present as well.

The inauguration started with a video presentation prepared by Ms. Mofeeda Pangadil. It was a compilation of interviews and events from different IET Chapters and networks worldwide. Student members were all eyes and ears at the presentation proving its worth. After the video presentation, the head of department and sections delivered inspirational messages to all the inducted student members. The messages were very terse, insightful and encouraging students to be involved in extra-curricular activities and commitments geared towards technological excellence. The inauguration concluded with the distribution of membership certificates and picture taking.

ICT is the first and only higher institution of learning in the Sultanate of Oman to be inducted in this international organization.  

HD Electrical Engineering Students Visited a Solar Cell Manufacturing Company

As part of developing and building strong relationships between Ibra College of Technology and industrial companies, the Higher Diploma students who are taking the course Energy Conversion conducted a visit at Oman Solar Systems Company on February 13, 2012. This company specializes in the production, sale and installation of solar equipment. During this visit, the students were given real opportunities to validate their theoretical knowledge with regards to the above mentioned subject and to have access towards solar technology. As soon as the students reached the company, the officials delivered one lecture with demonstration of the different activities of the company, solar technology, system modeling and principle of operation of solar cells, the technological evolution in designing and producing solar cells, PV cells, array system solar cells and array system PV cells. The students gathered sufficient information regarding the control and storage of produced solar energy and the possible applications and maintenance of solar technology. Dr. Sami Al-Ghnimi, Lecturer of Engineering department accompanied the students. The visit was organized by Mr. Subhash Gupta, OJT and Industrial link committee coordinator.

Architectural Engineering Students First Field Surveying Experience

Engineering Survey (CELS2100) students had their first time experience in field surveying using the Dumpy Level instrument on March 6, 2012. The twelve Diploma Architecture students were divided into 3 groups in performing the surveying exercises in three different locations – college car parking lot, main store lot, and the new engineering laboratories. The students learned the basic handling of the leveling instrument.

This close traverse surveying exercise is a practical application of the theory they learned in the classroom. Students were given reference points by the teacher and were required to identify and coordinate these points through the use of the Level instrument. They applied various techniques and methods in quantity measurement.

Architecture is a new engineering specialization in Ibra College of Technology that was offered only in Fall 2010. The department has recently acquired new top-of-the-line surveying equipment like the Topcon GPT-
Architectural Engineering students attended a seminar on Green Campus Architecture on March 27, 2012. The 21 student participants were given orientation and detailed analysis on design and development of master plan of campus buildings, circulation, arrangement, landscape, and environmental matters. A case study Master Plan of different institutions was presented highlighting the basic planning and design principles like – urban design, land use, vehicular movement, pedestrian movement, landscape design, environment and sustainability.

The seminar likewise, presented a new approach that minimizes harmful effects on human health and the environment called the Green architecture or green design. The seminar gave highlights on design principles that "green" architects follows – to safeguard air, water, and earth by choosing eco-friendly building materials and construction practices that can meet the needs of present generations without compromising the ability of future generations to meet their needs. The design principles involve are - the efficient use of energy, water and other resources, reducing wastes, pollution and environmental degradation, minimal harm to the natural habitat, alternative power sources, use of non-synthetic/non-toxic materials and efficient use of spaces.

The seminar was ably facilitated by the two architecture lecturers; Ms. Rajack Jainul Arrifa who expounded on Green Architecture, and Ms. Nasreen Kauser who talked about Campus Architecture.

HD Student Project Paper Presented on National Symposium

The final project paper of two higher diploma engineering students, Areej Sulaiman Hamad Al-Ghunaimi and Ibrahim Saif Amer Al-Maawali, was accepted and presented in the 2nd National Symposium on Engineering Final Year Projects held at University of Nizwa on May 15, 2012.

Their paper entitled “Converting Hard Water to Soft Water Using RF Technology” presents an alternative solution to the hard water problems experienced by most households and industries in the Northern Sharqiya Region of the Sultanate. The non-conventional approach uses a microcontroller to produce varying very low frequencies on induction coils wrapped around a galvanized iron pipe of any water supply system. The electromagnetic field created in the coils causes ionization of the different molecules present in the water, which in turn results in reduction of hardness level.

A total of 41 papers from 9 colleges and universities conforming to the symposium's theme "Engineering Towards Sustainable Developments were selected and presented. In addition to the paper presentation, a career fair, sponsored by Petroleum Development Oman (PDO) and a number of other companies, was also part of the event.

...by Basil Blasco

Green Architecture Designs

Architectural Engineering students expressed their appreciation for the opportunity to do actual land surveying activity using these high precision instruments that would equipped them with the necessary skills.

...by Basil Blasco

Architectural Engineering .... From page 10

3102N Multi-Pulse Total Station and the Topcon AT-B2. The GPT-3102N is a laser system with multiple pulsed laser beams emitted at a constant frequency, to measure distance. It offers increased measurement performance with pin-point measurement beam, extended range, improved accuracy and lower power consumption. The AT-B2 is an automatic level utilizing a finely tuned magnetic damping system. This equipment levels quickly and stabilizes the line of sight. This precision instrument ensures reliable leveling even when working near heavy equipment or busy highways.

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...by Basil Blasco

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...by Basil Blasco

Architectural Engineering students expressed their appreciation for the opportunity to do actual land surveying activity using these high precision instruments that would equipped them with the necessary skills.

...by Basil Blasco

Architectural Engineering students attended a seminar on Green Campus Architecture on March 27, 2012. The 21 student participants were given orientation and detailed analysis on design and development of master plan of campus buildings, circulation, arrangement, landscape, and environmental matters. A case study Master Plan of different institutions was presented highlighting the basic planning and design principles like – urban design, land use, vehicular movement, pedestrian movement, landscape design, environment and sustainability.

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Space Elevator, A Cure to Global Warming

Space elevator is a kind of elevator which could make transportation to space without a rocket. A space elevator is essentially a long cable extending from the earth’s surface into space. Electromagnetic vehicles travelling along the cable could serve as a mass transportation system for moving people, payloads and power between earth and space.

To transport materials between earth and space, the space elevator would use climbers. These vehicles are the equivalent of elevator cars, rolling up and down the stationary ribbon. The climbers are equipped with a large photocell power receiver. The receiver operates much like a solar panel except that it is powered by laser beam shot from the earth station.

The laser beam comes into focus in space providing the climber’s photocell receiver with a beam ten times as intense as solar radiation. Early estimates predicted that photocell will have 80% efficiency in converting the laser light into usable electrical power.

The cost to send space shuttle into low earth’s orbit is about US $ 64,000/kg and if we use space elevator it would cost more like US $ 3,000/kg to send items into higher geo synchronous orbit. With the help of space elevator, companies could build large solar power forms in space to provide energy for people on earth. That could eliminate the need to burn fossil fuels and thus reduces global warming.

Now the question at hand is, if it is possible, then why space elevators are not yet built?

NASA estimates that the ribbon material needs a tensile strength of 100GPa. Unfortunately, there is no material which could withstand the tension created by the space elevator’s centripetal acceleration. The biggest problem has always been finding a material that is strong and lightweight enough to stretch tens of thousands of miles in space.

Steel has a tensile strength of 3GPa and Kevlar has just 3.7GPa. This isn’t going to happen probably for the next decade at least, but in theory this is now possible. With the discovery of carbon Nanotubes (CNT) in 1991, the outlandish concept became a real possibility.

The carbon Nanotubes (CNT), however, has a theoretical strength of roughly 300GPa. While the space elevator will be some 62,000 miles long, scientist have not been successful in producing CNT longer that than a millimetre. Hence, lot of possibilities rise with the outlandish concept of space elevator. Still it is science fiction!

Grip-type Finger Vein Authentication Technology

Grip-type finger vein authentication technology is used to verify the entrance of authorized personnel to a certain room or building. The system recognizes a person’s unique finger vein pattern upon grabbing the door’s handle, thus allowing entrance only to authorized personnel.

Until recently, the finger vein authentication method is operated by capturing and authenticating the image of the vein pattern by resting the fingertip on the authentication equipment. The disadvantage of this method is that the finger nees to be placed exactly above the sensor for the system to recognize the pattern. Also, doors and steering wheels do not provide enough space to embed a sensor in an ideal position.

This technology recognizes the finger vein pattern which can be obtained from the side of the finger, eliminating the need to place a sensor directly below the finger. Accordingly, the new design is compact and better suited for a variety of uses. Because the area scanned is no longer the finger’s surface, one simply places a finger between the light source and the camera.

When placed on a steering wheel, the new authentication system also enables an easier way to adjust and customize the car to the driver’s liking. Different functions can be controlled by each finger, creating a multi-function finger-controlled switch that adjusts the seat and mirror positions, operates the air conditioning or radio. Another advantage of this setup is that the driver doesn’t need to search for different switches and can concentrate solely on the road.

Superconductors for Whopping Wind Turbines

In September 2011, the Advanced Research Projects Agency for Energy (ARPA-E) awarded US $31.6 million in grants to groups looking for alternatives to rare earth materials, which are critical to energy technologies. Two of those groups are trying to develop next-generation superconducting wire that can replace rare earth permanent magnets in the rotors of wind turbines. This research could lead to smaller, lighter, and more-powerful rotors that could enable giant offshore wind turbines capable of generating 10 megawatts of power each. These rare earth elements are used to make powerful permanent magnets that generate magnetic fields inside turbine rotors. Generating the fields with coils of superconducting wire would let turbine makers do away with those large, heavy permanent magnets. That would allow wind companies to keep wind turbines at a reasonable size but get more power per tower.

...by M. NUSRATHULLA

...by M. Moh'd Syed Ibrahim
**Staff of the Month**

**JANUARY 2012**

Mohd. Syed Ibrahim  
Lecturer  
Electrical & Electronics Section

**FEBRUARY 2012**

Syed Mohd. Saad  
Head of Section  
Mechanical

**MARCH 2012**

Arnold Santos  
Head of Section  
Electrical & Electronics

**APRIL 2012**

Jayaprakasan A.  
Technical Support  
Electrical & Electronics

**MAY 2012**

Ganesh Babu Yannem  
Registrar  
Mechanical Section

**JUNE 2012**

Blasminda C. Mayol  
Technical Support  
Computer

**New Staff - Spring 2012**

**LECTURER**

Vijaya Kumar Sivasankhu  
PhD. Physics  
Indian

Vicknesh Kumar Y.  
M. E. Computer Integrated Manufacturing, Indian

**TECHNICAL SUPPORT**

Tariq Umar  
M. S. Civil Engineering  
Pakistani

Robert Guntang  
B. S. Electronics & Comm Eng’g  
Filipino

**Department Statistics**

**Spring 2012**

**Engineering Students Distribution By Level**

- Level 1: 62.86%
- Level 2: 20.90%
- Advanced: 16.24%

**Engineering Students Distribution By Specialization**

- Mechanical: 30.07%
- Computer: 16.51%
- Essential: 18.54%
- Electrical: 16.15%
- Architecture: 3.97%

**Engineering Staff Distribution by Nationality**

- Indian: 62%
- Filipino: 24%
- Omani: 11%
- Pakistani: 1%
- Iraqi: 1%
- Tunisian: 1%

**Anncouncements!**

**Staff Returns**

September 1, 2012

Deadline for submitting contributions for Equilibrium, Volume 3 - Issue 1 is on November 28, 2012.

**Happy Vacation to all!!!**
Chess World

Let's Play Sudoku

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Chess World

Chess Solution:
Black wins beautifully with 1...Bb7 2.Rg1 Ng4 3.f4 (if 3.dxc5 Nxh2 4.f4 Nf3+ 5.Kf2 Nxg1, followed by the advance of the h-pawn) 3...Nxe3 4.Qd2 Nbc2+ 5.Kf2 Ng4#. A very unique mate!

Word Puzzle

Find a series of words using the following clues:

1) The first word is an old British silver coin.
2) The second word is sound uttered in grief or pain. This word is formed by replacing a letter in the first word with another letter.
3) The third word means “advance in growth”. This word is formed by replacing a letter in the second word with another letter.
4) The fourth word is dark color. This word is formed by replacing a letter in the third word with another letter.

Find these four words.

Sports Cross word Puzzle

ARCHERY  CROQUET  JAI ALAI  SOCCER
BADMINTON  CYCLING  LACROSSE  SOFTBALL
BASEBALL  DARTS  POLO  SQUASH
BASKETBALL  FENCING  RACQUETBALL  SURFING
BILLIARDS  FISHING  RUGBY  SWIMMING
BOCCE  FOOTBALL  RUNNING  TENNIS
BOWLING  GOLF  SKATE  VOLLEYBALL
BOXING  HANDBALL  SKATING  WRESTLING
CRICKET  HOKEY  SKIING

Chess World

Black moves first