Bits and Bytes

COLLEGE OF SCIENCE AND TECHNOLOGY

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The 1st Intercollegiate Programming Contest at CST

The Intercollegiate Programming Contest (ICPC) 2019 was the first ever Programming Contest conducted in the nation organized by RUB ACM Student Chapter on 18 May, 2019.

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1. Gyelposhing College of IT (3 teams)
2. Jigme Namgyel Engineering College (1 team)
3. Royal Thimphu College (3 teams)
4. Sherubtse College (5 teams), and
5. College of Science and Technology (10 teams)

The event was graced by the Superintendent of Police, RBP, Phuentsholing as the Chief Guest, and guest speaker, Mr. Arpan Lepcha, Chief Technical Officer at SELISE Bhutan.

The event successfully ended with Team "No One" from CST winning the contest, followed by runner-up team "Code Assassin 2.0" again from CST. The second runner-up was team "Code Jedi" from Sherubtse College.

A rolling trophy was awarded to the winning college, along with cash prizes for the top three teams.

The ACM Chapter at CST aims to promote programming in the community with such events, and also, prepare the University Students to compete in Regional ICPCs, and ultimately at the global stage, the ACM-ICPC, in the coming years.

"The program is an effort to improve students' programming skills "

e-Yantra robotic competition- “A Robot from CST”.

A mail invitation to participate in an International Robotic competitions organized by the prestigious IIT Mumbai, India was directed by Mr Kamal Kumar Chapagai, a lecturer of ECE Department of the College of Science and Technology last year. E-yantra Robotics competition is a unique annual competition for undergraduate students in Engineering/ science/polytechnic colleges. Among many groups who took part in the selection round; a team of four young students from CST belonging to the different Departments of technology qualified for the final round as the only International team from Bhutan.

The dream team collaborated for an intensive period of five months of brainstorming, researching, self-learning and goggling online tutorials on developing Robotics mechanism. With support from The Royal University of Bhutan and the host organizer, the dream team left to represent the country for the final round on 26th of March, 2019 this year.

Despite copious of anomalies, the team from Bhutan earned their efforts as a 5th position in the overall competitions. It is an achievement to the individuals and the college at large; to be the experts or to be recognized in the worldwide. With only so much of knowledge, skills or no exposure, the dream team could execute and concretize their ideation with determination and perseverance.

Finalist from left to right in black: Tashi Dendup, Tenzin Chophel, Anith Ghalley & Pra-

Reliving about their nightmarish moments, the team recalls two days of Sleepless nights when their model suffered a technical fault.

Reliving their nightmarish moments, the team recalls two days of sleepless nights when their model suffered a technical fault. The sensor that guides the path of the robot started to malfunction due to the lights in the room. However, the team sorted out the solution and covered the sensors with chart papers. The Robot needed to be reprogrammed all over again. Back home, the team disappointed their friends who expected to see a sizeable Humanoid Robert as portrayed in most Science fiction movies. Instead, they saw a small box-like machine that had an arm extension capable of picking, carrying and dropping small objects and guiding through the shortest possible path to a designated position. For many, the correct definition of a robot was left unclear.

The team were asked to work on the theme "the thirsty Crow'; the classic fable of a crow that fills a vessel with stones and helps itself to drink. The Robot was programmed using the embedded programming software, blender (animation software), and augmented reality. The Robot was programmed to fully function on its own. Once the competition starts; no intervention or any kind of maneuvering was allowed. The Robot was also programmed to calculate and choose the shortest designated distance meant to signify the water vessel.

The story of the only international team in the Robotic competitions was featured in The Hindu newspaper of India. Everyone in the competition treated them with respect, reverence and inquisitiveness. One of the team members said that they could also create positive vibes on Bhutanese social etiquette, '*Driglam Namzha'*, in the minds of people. The hosts were impressed by the conduct and discipline maintained throughout; respect for elders, teachers and the fellow participants.

Official visit of Professors from Uppsala University

Uppsala University based in Sweden is the country's oldest Research University. The college of Science and Technology (CST) and Uppsala University applied for the Erasmus+ Project through the European Union. The project consists of staff and student mobility during the academic year 2019-2021.

Professors from the Swedish University visited CST as part of the program. Professor Anders Berglund stayed in the college for a duration of 2 weeks from 4th to 19th April, while Ms Anna Kristina Von Hausswolff stayed in the college for the duration of 1 week from April 5th to April 13th.

The visit was aimed at strengthening the collaboration, and to familiarize themselves in the field of academic and research activities in CST. A week-long lecture was held for the third-year students pursuing a Bachelors in Information and Technology. The lecture highlighted on the Introduction to Research specifying the procedural steps and its significance. Students who have attended the lectures declared it as informative and interactive sessions.

Portable Ground Station- "communicating with the satellites"

College of Science and Technology bought a portable ground station. With his farsighted initiative, the college president Dr.Cheki Dorji in consultation with the Electronics and Communication Engineering department faculty instantly purchased portable ground station worth $4500/- (USD) from Tsukuba University, Japan. He said, "Such tools and resources at this scenario shall help students and researchers nurture skills and develop research potential based on space engineering and satellites".

The portable ground station can be used to communicate with satellites in orbit and extract data for various purposes such as research and analysis. The ground station needs to be connected with a satellite and track by setting its mechanical zero and link it with the satellite to be traced using a free mobile application. The ground station starts preparing for tracking the satellite automatically two minutes before the Acquisition of Satellite (AOS). The antenna of the ground station tracks the motion of the satellite and keeps tracking until the loss of satellite (LOS) occurs. When LOS happens, the ground station completes auto-tracking and goes into an eco-standby mode for the next AOS.

"Such tools and resources at this scenario shall help students and researchers nurture skills and develop research potential based on space engineering and satellites" says the President.

The college aims to use this portable ground station to communicate with **BHUTAN-1**, Bhutan's first satellite that was launched last year. The satellite operates in low altitude of about 500Km to 1500Km. BHUTAN-1 passes around the country four-five times in a day for three-four minutes with high-end cameras fixed on the satellite. It takes high-quality photographs of the country, helps examine the conditions of the glaciers, lakes, forest cover, provide basic communication services and study the radiation effect on satellites. With assistance from Mr Damcho Thinley, a master student at Tsukuba University in Japan, from the Electronics and Communication Engineering Department is tracking BHUTAN-1 using the ground station.

There are a few other satellites that the ground station can track such as NEXUS, NOAA 15 and NOAA 18. This device uses an advanced information system for motor control and can be connected to the internet through a good internet environment. It has Wi-Fi and Bluetooth functions, which enables remote control of the motor to set its North and help align with the satellite. There are few other satellites that the ground station can track like NEXUS, NOAA 15 and NOAA 18.

GIS Training held at the College of Science and Technology

A training on Geographical Information System (GIS) was held at the College of Science and Technology by an exchange faculty Dr. Shahnawaz from the University of Salzburg, Austria. The five-day training was held from 8th April. Geographical Information System is a computer application that can be used to display, manipulate and analyze spatially varied information from multiple sources all in one place. The training covered the various concepts of geographical science covering topics on spatial information and tabular information, including the range of applications that GIS has in the practical field. Practical hands-on experience with professional GIS software called ArcGIS was also given to the participants. The training was attended by interested staff and final year students whose research project involved the use of GIS tool.

Employment Before Graduating

On the 5th of April, campus recruitment by SELISE, an international provider of digital innovation, software engineering and management consulting took place. The recruitment was open to all the final year students from any department passionate about pursuing a career as a programmer. Sixteen final year students from Bachelors of Engineering in Information Technology (B.E.I.T) appeared for campus recruitment.

The panel members were Tanisha Rai, Sujit Kumar Rai, Rewath Kafley and Sonam Choden who work in SELISE as senior software engineers. The recruitment was accomplished in two steps. First, a practical online interview test comprising of three questions set by SELISE was carried out on April 5th. The questions were similar to that of the Programming Contests our college hosts, that is, with sample input and sample output. The presentation introduced to the company details and working environment including the pay and other incentives prior to the test.

Out of 16, only nine shortlisted students could sit for an interview the next morning on April 6. The interview started with introductions followed by questions mostly based on core programming. Each interview lasted for about 40 minutes to an hour. The panel members also showed interest in the past projects that the candidates were part of.

Five students namely Ugyen Choden, Dechen Choden, Prakash Sanyasi, Tenzin Chophel and Khusant Chettri, all from B.E.I.T managed to impress them. The recruitment was made official with a welcome-mail to each of the selected candidates.

Second Fablab in the country to the College of Science and Technology

College of Science and Technology hosted a one-day seminar on familiarization of digital fabrication on 21st March 2019. College president Dr Cheki Dorji, addressing the crowd expressed his gratitude on behalf of the college to JICA Bhutan office and Fablab Bhutan for bringing the most important seminar to the college. The seminar was graced by chief JICA representative, sir Koji Yamada, other officials from JICA and Fablab Bhutan, lecturers and students from various departments. This seminar was organized to familiarise students on various Fablab tools and hands-on demonstration.

Addressing the opening remark, Koji Yamada, chief representative of JICA Bhutan (Japan International Cooperation Agency) states "I am honoured to announce the set -up of the second fabrication laboratory in the country at the College of Science and Technology". This was indeed a milestone and a dream come true for CST to achieve its motto "In pursuit of preparing tomorrow's technologists". Fablab is often hailed as a library of technology enabling invention by providing access to tools for digital fabrication. Equipped with tools such as three dimensional (3D) printers, LASER cutter, vinyl cutter, small computer numerically controlled (CNC) mills, big CNC mills and virtual reality (VR) machines that can create anything from simple to complex. The honourable chief also addressed the benefits of Fablab in Bhutan and the challenges. With its vision "THINK IT, MAKE IT, SHARE IT", Fablab crosscuts all scenarios in Bhutan states, sir. Tshewang Lhundup, founder of Fablab Bhutan. He also stated about the endorsement of fifteen Fablab in the country by the end of the 12th five-year plan.

This was indeed a milestone and a dream come true for CST to achieve its motto "In pursuit of preparing tomorrow's technologists"

Mr Kishore Sarvada, Sr. Manager at SOLIDWORKS early management program presented the basics of the engineering tool "SOLIDWORKS" used to design any sort of things. Hands-on SOLIDWORKS can enhance understanding of complex concepts in any discipline including science and technology. Alumni of the college, Mr Nanda Kumar Gurung, currently working with Fablab Bhutan and also a certified trainer of PI-TOP [4], demonstrated about PI-TOP and its various applications. The seminar ended with a hands-on demonstration of the Fablab tools by Fablab officials. Students in groups were engaged to design their own product using the tools after a demonstration. Students presented their designs by sharing their experiences and learning in the end.

Mr Pema Tenzin, the chief councillor thanked the delegates with closing remarks. In addition, Lecturer, Karma Kelzang Eudon, the coordinator of the event from the electronics and communication engineering department expressed the joy and gratitude on behalf of the college to JICA and Fablab Bhutan. Also, she acknowledged them for supporting to set up a fabrication laboratory in the college soon. Further, she expressed that the college will need the assistance and guidance of JICA and Fablab Bhutan for its future endeavours.

Introduction to Masters Program in Renewable Energy

The College of Science and Technology gets elevated with the introduction to the first master program in 2017. With the aim to provide meaningful education on the design, analysis and implementation of renewable energy, the Master of Engineering in Renewable energy program was introduced as validated by Royal University of Bhutan. It is also targeted to enhance technical and analytical competence of engineers who are working or intend to work in renewable energy and associated fields. The candidates must have pursued Bachelor in engineering/ bachelor of technology or a bachelor of science in engineering with minimum of 55% in a four-year degree program. The selection is carried out based on merit produced by an interview, academic performance (degree results), letter of motivation and recommendations by the superior or professors. Currently, there are four students studying in second year and three students in the first year. The duration of the program is one and half year comprising of three semesters.

The graduates of the program, Master of Engineering in Renewable Energy would be able to work as project engineer, energy specialist, energy engineer, energy analyst, energy manager, energy modeller, energy policy analyst, energy system maintenance engineer and researcher. The organization emphasizes on energy systems design or applications, solar photovoltaic, solar thermal technologies, hydropower, biomass, biofuels, wind energy system, emerging technologies would be the future workplace for the graduates of the program. They can also work as a private consultant and strategists. The successful completion of the program will establish students' abilities to analyze and evaluate environmental, social, and economic impacts of renewable energy infrastructure, initiate and develop new renewable energy infrastructure, innovate and start -up entrepreneurship in renewable energy. They will be also equipped with a competency to address any unexplored questions and problems related to the sustainability of renewable energy systems. As the program bears a paramount role in bringing the feasible renewable energy systems and many more, the college has already planned to provide it for the next three years.

Vice chancellor's visit to the college

On 31st of April, 2019, Dasho Nidup Dorji, the vice-chancellor of Royal University of Bhutan visited the college. He shared his words of wisdom to the first years. In nearly 3 hours of the session, he elucidated the students on the current challenges and future Panorama. He accentuated that it is crucial for us to be prepared and to adapt to the changes with time. He shared his aspirations for the technical graduates to meet the future requirements of the country and contribute to nation-building. He also addressed the unemployment issues faced by the graduates presently in relation to the scopes in the job market and the technical courses offered by RUB.

Honourable Dasho advised the students to think beyond the regular lectures and to equip with the skills and knowledge desired to adapt to future challenges. He also mentioned about the advancement in internet technology, particularly artificial intelligence and robotics. He especially recommended a book by Yuval Noah Harari, 21 Lessons for the 21st century. He then informed the students on the ideas portrayed in the book and the lessons to be taken relating to the apparent condition of Bhutan.

Visit of the Chairperson of the National Council

On 20th April 2019, His Excellency, Chairperson of the National Council visited CST. The Honorable Chairperson was received by the CST family comprising of the college president Dr Cheki Dorji, the staff and the students. At 10:10 a.m, his Excellency, the president and all the staff had Phebja (tea) in the GNH Hall as a welcome gesture. After the tea, everyone assembled in the teamwork hall for the Marchang Ceremony.

Following the marchang ceremony, the CST president extended his whole-hearted welcome to His Excellency and expressed how CST has been able to stand out throughout the years as one of the most vibrant colleges in the country. He also highlighted the new courses the college has implemented this term and how it can fulfil the wishes and requirements of the country. After the welcome speech, His Excellency's addressed the floor.

"The youth of the nation are the trustees of posterity "

His Excellency spoke to the students and staff about the importance of the National Council and National Assembly, their roles and their functions. In his presentation, His Excellency talked about the structure of the Parliament. The audience retrieved additional knowledge about the parliament such as making of laws, controlling of state finances, and the decisive role to check the actions of the government and the Ministries. His Excellency told the audience that the National Council is a political establishment of the parliament which ensures transparency of political processes and decisions.

Further he explained the criteria for the appointment of the eminent members and the campaign manifesto of the National Council candidates. This was mainly to create interest and active participation in the parliamentary front by the youth in the future. His Excellency shared that the main intention of the advocacy program was to interact with the younger generations of the country and to gather views in building a strong nation. "The youth of the nation are the trustees of posterity", he said.

After the address and presentation, His Excellency reminded the audience to clarify their doubts or pose questions to him. Issues related to current affairs in the country were discussed. Some of the important discussions made were on the removal of the cut-off point for the BCSE board examinations, ban of plastics and the overseas earn-and-learn schemes. His excellency gifted a 'kupar' (picture) of Their Majesties the Druk Gyalpo, Gyaltsuen and the Gyalsey to the college. The program came to an end with a vote of thanks by the Chief Councilor Pema Tenzin and followed by a photo session with His Excellency.

HomeTech brings home the best 4th business idea from the National Startup Weekend

HomeTech, a business idea from CST on home automation based on GSM and Bluetooth bagged the 4th position at National Startup Weekend held from 26th to 28th April this year at Thimphu. The man behind the HomeTech is Rinchen Penjor, an aspiring entrepreneur from the College of Science and Technology. His team was awarded Nu. 100,000 to start the business. Total of 180 new business ideas were pitched from 6 different colleges. 25 students from CST were selected to participate in the national level Startup Weekend. Likewise, 5 other different colleges also took part in the national level.

Before the main event, the participants were trained in Design Thinking workshop on 25th April where experts from different fields facilitated the Workshop. The main event started from 26th April led by four international facilitators from Techstars and other local mentors. The best 28 ideas were nominated for team formation to develop into a full-fledged business idea in the next two days with Minimum Viable Product (MVP) and customer validation. Out of 28 teams, 15 teams were selected for the final presentation to the panel of judges.

The winner for the National Startup Weekend was Urban Sprout, a bean sprout business idea. The team was awarded a sum of Nu. 600,000 to materialize their idea and will be given the space in Thimphu TechPark to work on heir idea. The idea was pitched by Kinley Namgay, a student from the College of Natural Resources (CNR).

"From the day I joined college, I decided that I won't appear for PE or RCSE exams. But I was mentally prepared to be an entrepreneur. I think, I will start with Urban Sprout project and at the same time I will build up my business idea called Uncle Dry which will be dealing with the dehydrated vegetables and fruits," he said.

A cultural-based mobile application called Dragon Treasure received the second position. The team was awarded a sum of Nu. 400,000 to proceed with their business idea and will be given space in TechPark to work upon their idea into business. Pema Yangzom, a 1st -year student from CLCS, Taktse represented the team to pitch the idea.

The third prize was won by Dragon Wine, 'Bangchang' better health-oriented alcohol, and also there was a special award called Honorable Mention and it was bagged by iSchool. It is a business idea based on electronic books; the textbooks will be in the soft copy where the students do not need to carry the books in the school.

The closing ceremony for the National Startup Weekend 2019 was graced by His Excellency Doctor Lotay Tshering, the Prime Minister of Bhutan, Dechen Wangmo, the health minister and Loknath Sharma, the minister for economic affairs and other senior officials.

"Entrepreneurship is important in our country and the graduates should focus on entrepreneurship as an opportunity. Instead of becoming employees, you should try to become your own boss and employers. The government will provide full support to the entrepreneurship and young aspiring entrepreneurs," said the Prime Minister of Bhutan.

This year's three-day National Startup Weekend event was focused on the five main themes: Fintech, IOT, Virtual Reality/ Augmented Reality, Edutech and Healthtech. The event was organized by the DITT under Ministry of Information Communications and Techstars with the support from global partners Google for Startups and dot CO.

Teacher's Day Celebration: The CST's Style

Every year, on the 2nd of May coinciding with the birth anniversary of His Majesty the Third Druk Gyalpo Jigme Dorji Wangchuck, the institutions and schools in Bhutan celebrate and express their gratitude to the Teachers. The College of Science and Technology also joined the nation in celebrating the teachers' day, unlike the previous years, the celebration of this year was much more elaborative and uniquely presented in a traditional way.

The reception of the beloved staff happened in **Chhibdrel** (ཆེབས་གྲལ།) and the celebration formally began with Marchhang (མར་ཆང་།).

Subsequently after the **Marchhang,** the college president Dr Cheki Dorji lit the butter lamp and cut the cake along with Professor Mr Om Kafley while students happily sang and cheered in the background. A welcome speech was then delivered by the Chief Councillor, Pema Tenzin after which the President shared few words of wisdom to the crowd.

After the speech, the cultural program started with **boedra** dance. As the day progressed, many pleasing programs were presented by the students accompanied by the giddy delights of the two **Atsara**(མཛ་རོ་བ།).

Halfway through the programs, the former councillors were awarded the certificate of appreciation for a year of their services while the newly elected batch of councillors was awarded **Khadhars** (ཁ་དར།)

Then afterwards, the student team organized by the Chief Councillor performed the long -awaited **Chham** (འཆམ་ mask dance). The students were surprised by Madam Karma Kelzang Yudon and her group's exhilarating dance.

The cultural program lasted till noon. It ended with vote of thanks by one of the literary club members. All staff and students gathered and performed graceful Trashi Lebay. The remarkable event ended with special Bhutanese cuisines served at the college dining hall.

"To catch the reader's attention, place an interesting sentence or quote from the story here."

The former Councilors from the fourth year

The newly elected councilors from the third year with the President

Contemplation on Education

The seminar held on 26th April 2019 by CST yoga group under the supervision of Dr Martin Elborg mainly focused on the topic "Why are you being educated?" The seminar was open to both students and staff. The title chosen for the seminar was based on a book by J.Krishnamurti which consists of six different talks given by him at different universities.

There were a total of 28 attendees consisting of 6 lecturers and 22 students. The main input of the session was a talk by J.Krishnamurti through a short video clip and yoga. The session also brought the lecturers and the students to think together and interact with each other. It began with some simple yoga exercises mainly focused on breathing, like *Kapalbati*. The attendees were then given a brief introduction to who J.Krishnamurti was followed by his inspirational talk.

In the video, J.Krishnamurti in his unique style highlighted why they are being educated, although, he does not really answer the question. Throughout his session, it was noticed that the texture of his talk often became difficult to drive over. He used plain language to drive us through his answers, but as we rode with smooth effect, his talk made us stop, reverse and drive again slowly. The talk, in the video, came to an end with the attendees doing a few minutes of mindfulness and were told to collect their lingering thoughts and questions.

Following the video, the attendees of the seminar were divided into 5 groups of 5 members each one lecturer each. They were then allowed to select a pamphlet consisting of thoughts and questions of J.Krishnamurti. After around 30 minutes of discussion over tea, the program concluded with a sharing session of ideas and thoughts from each group member.

The session did not end with concrete answers to why we are being educated, but left us with self-developed thoughts with facts that catered more than what we believe in. The participants in the seminar left with a heightened sense of responsibility on why we are really being educated by using the tools to obtain the answer eventually.

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Preliminary programming contest

College of Science and Technology aims to infuse the programming skills to the students, so that they can embrace the modernity of technology in an easier way in the near future. In bygone years, the college has created platform only for the college students to contest for the programmes' competency. This year, the college has invited other colleges for the competition. Indeed, the ACM chapter under the supervision of Sir Tandin Wangchuk and ACM chairman Kushant Chhetri, this club remains in awe and inspiration for every student in the college.

Apart from focussing on building the skills of programming, it also helps in the maintenance of electronic devices and addresses the issues of the software confronted by the students. They have been working hard and finally, are able to get many sponsorships from different companies for the inter college-level competition. These harbingers are the true hardship of ACM chapter members as a team to make productive and competent citizens of this nation. There were around thirty registered teams that sat for the preliminary program contest on Saturday, 11/5/2019.

On their own comforts, the participants are made to use any programming language. Each team comprises a minimum of three candidates. The contest began at 8 am and for three hours duration. The top ten students were selected based on the merits of the marks scored within this stipulated time for inter-level college competition.

The College of Science and Technology (CST) is the first institute in the country to offer undergraduate degree programmes in engineering under the Royal University of Bhutan. The college aspires to be a centre of excellence in the field of science and technology-enriched with GNH values by offering quality programmes that are relevant to the need of the job market both within and outside the country.

Our Vision

"A centre of excellence in science and technology enriched with GNH values. "

Our Mission

1. **To offer internationally recognized programs in science and technology.**
2. **To generate new knowledge through research and innovation to fulfill the needs of the society**
3. **To collaborate with stakeholders and provide expert services**
4. **To provide community services to enhance GNH based society**