YANTRIK - OYANTRIK

A bulletin published by the Mechanical Engineering Department

ASSAM ENGINEERING COLLEGE

2nd Issue, 2018

OUR VISION

To strive continuously in pursuit of excellence in Mechanical Engineering and to produce professionally competent and employable Mechanical Engineering Graduates who would be able to contribute towards the development and betterment of the society.

OUR MISSION

1. To offer state-of-the-art undergraduate, postgraduate (M.E.) and doctoral (Ph.D.) programmes in Mechanical Engineering.
2. To generate new knowledge in Mechanical Engineering by engaging in cutting-edge research.
3. To undertake collaborative projects with academia and industries in the field of Mechanical Engineering.
4. To develop human intellectual capability to its fullest potential.

Message from HOD

It is heartening to learn that the second edition of Yantrik-Ayantrik is being published with the assistance of all. It has been a hectic year in 2017 due to various academic matters and a number of new jobs are on the anvil for the New Year 2018. Recently, a new batch of young faculties has joined under the TEQIP scheme for assisting in academic activities of the department. The expectations are high in respect of exchange of ideas among the members of the department for a cultural change. The Industrial and Production (IPE) stream of undergraduate program, attached to Mechanical Engineering Department (MED), has got two faculties promoted from Mechanical Engineering, which is expected to pave the way for future aspirants, and more importantly for the benefits of the IPE students. Besides, the TEQIP activities under the mentorship of PSG College of Technology, Coimbatore and preparatory works for NBA accreditation are in full swing for reaching out to a new horizon. I wish to extend my best wishes to all and sundry for a commendable success to tide over any unprecedented turbulence of the future.

Dr. Ranjit Kumar Dutta
Professor & HOD, Mechanical

Message from Principal

I am pleased to know that Mechanical Engineering Department of Assam Engineering Department is coming up with the 2nd issue of their annual departmental Newsletter titled "Yantrik – Oyantrik'.

I sincerely hope that this issue of the newsletter would rightly portray the various aspects of the department and contribute to the sustained growth of the college in general.

I hereby extend my best wishes to all the members of Mechanical Engineering Family

Dr. Atul Bora
Principal
Assam Engineering College

Published by the Department of Mechanical Engineering, Assam Engineering College, Jalukbari, Guwahati-781013

Departmental Profile

The department of Mechanical Engineering was established way back in 1957. This was the second branch to be established in Assam Engineering College. The department has a long history of excellent service to the society. The alumni of this department are well placed in society at different corners of the globe. They are pride for the department and the college. Subsequently in 2007 the courses of PG and Ph.D. were introduced. The current intake at UG level is 60 and PG level is 18.

The UG course of Industrial & Production Engineering was introduced in the year 1998. The current intake is 20.

List of Faculty Members

Name	Designation	Area of Specialization
Dr. Ranjit Kumar Dutta	Professor & Head	Manufacturing
Dr. D. K. Mahanta	Professor	Energy, Thermal Engineering
Dr. Sudip Kumar Deb	Professor	Industrial Engineering & Management
Dr. Kalyan Kalita	Professor (IPE)	Computational Fluid Dynamics
Prof. Amar Jyoti Barthakur	Associate Professor	Fluid Mechanics
Dr. Plabon Kakoti	Associate Professor	Quality Engineering
Dr. Niharendu Saha	Associate Professor	Machine Design, Tribology, Composite Material
Dr. Anil Bora	Associate Professor	Advanced Manufacturing
Dr. Dilip Bora	Associate Professor	Alternative Fuels, IC Engines, Renewable Energy
Dr. Manjuri H. Goswami	Associate Professor	CIM, Green Manufacturing
Dr. Kalyan Kumar Das	Associate Professor (IPE)	Aerospace Engineering & Applied Mechanics
Prof. Baharul I. Borbhuyan	Associate Professor	Thermal Engineering, Environment
Mr. Kamal Brahma	Assistant Professor	Energy
Mr. Prasanta Choudhury	Assistant Professor	Thermal Engineering
Mr. Jitul Baruah	Assistant Professor	Thermal Engineering
Mr. Bashab Jyoti Phukan	Assistant Professor	Thermal Engineering
Miss Moushumi Gogoi	Assistant Professor	Manufacturing, Design
Mr. Manash Hazarika	Assistant Professor	Advanced Production Systems
Dr. Pradip Kumar Baishya	Assistant Professor	Solid Waste Management
Mr. Madhurjya Baruah	Assistant Professor	Machine Design, Vibration
Mr. Abhimanyu Kar	Assistant Professor (TEQIP)	Fluid & Thermal Engineering
Mr. Jyotish A.	Assistant Professor (TEQIP)	Fluid & Thermal Engineering
Mr. Mohammed Rafi A.	Assistant Professor (TEQIP)	Fluid & Thermal Engineering
Mr. Subhransu S. Mallick	Assistant Professor (TEQIP)	Fluid & Thermal Engineering
Dr. Mayuri Baruah	Assistant Professor (TEQIP)	Manufacturing
Mr. Devarshi Kashyap	Assistant Professor (TEQIP)	Manufacturing
Mr. Juan Choudhury	Assistant Professor (TEQIP)	CAD CAM
Mr. Piyush Singh	Assistant Professor (TEQIP)	Manufactirung
Mr. Anirban Saha	Assistant Professor (TEQIP)	CAM
Dr. Vimal Kumar	Assistant Professor (TEQIP)(IPE)	Production

বিভাগীয় সংগীত

সোণালী পুৱাৰ পখীয়ে আহি
জগালেহি আমাকে
নতুন আশা নতুন দিনৰ
শুভ আশিষ পালো জন্মদিনৰ।।

জন্মদিনৰ।

যান্ত্রিকতাৰ যুগৰ আমি
যন্ত্রই আমাৰ মন্ত্র।
হাতে কামে গঢ়ি তোলা
কর্মই আমাৰ ধর্ম।।

আমাৰ ধর্ম।

বিশ্বায়নৰ যুগত আজি
বিশ্বই আমাৰ ঘৰ
কল্যাণকামী বিশ্ব গঢ়াৰ
ই যে আমাৰ পণ।।

আমাৰ পণ।

কথা আৰু সুৰ -
প্রশান্ত চৌধুৰী
সহকাৰী অধ্যাপক

Published by the Department of Mechanical Engineering, Assam Engineering College, Jalukbari, Guwahati-781013

SCIENTIFIC & TECHNOLOGICAL REVOLUTION AND ENGINEERING EDUCATION

Prof. (Late) Debabarata Goswami
Member, S.A.E.
Former Principal Assam Engineering College
Former Professor & Mechanical Engineering

In the history of mankind we may trace three technological revolutions starting with Agricultural Revolution (including animal husbandry), about ten thousand years ago. Till then men lived in harmony with nature, gathering food and hunting with the arrival of agriculture men began to consciously alter nature by large scale agriculture, deforestration and grazing by animals. Agriculture produced the surplus wealth on which the ancient civilizations grew up giving rise to large nation states and great empires.

Agricultural revolution continued up to the 17th. century when the second technological revolution the Industrial Revolution, the Industrial Revolution took root with the arrival of steam power, cheap steel (blast furnace) etc. The Industrial revolution replaced the feudal society of the agricultural phase by capitalistic society giving rise to world wide colonialism in search of raw material and market.

It is technology, more any thing else that brings about changes in the way of life and social structure. During the agricultural phase and the first half of the industrial revolution of intellectual (scientific) and the artisans (technicians) lived in two separate strata of the society and it took many decades for a scientific idea to filter down to the level of artisans to find any practical use. Formal engineering education started only in the second half of the nineteenth century. Since then the gap between technology and science is getting narrower and the lag between scientific development and practical use is getting shorter.

The third revolution, through which we are passing may be called the Scientific and Technological revolution and took root during the 2nd World War. During this phase men has begun to cultivate science for practical use rather than as an academic pursuit purely for sake of knowledge. As a result the distinction between the sciences and technologies is getting blutrred and many researches and discoveries in basic science are being made by engineers and vice versa.

With the marriage of science and technology in the field of research and education an explosion of knowledge is taking place and the lead time between scientific development and its practical use getting shorter. How these developments eventually alter the ideas of nation hood, social structure and moral codes is not yet clear. But one thing in the field engineering education is getting clearer. That is no engineering college can hope to make a complete engineer out of young or women within the span of four years.

What a student learns today will get obsolete within a decade. As factual knowledge has become so short lived the best that an engineering college can aspire to do is to develop an analytical scientific attitude in the student and give a good grounding in the use of the tools of his profession. i e. mathematics, laws of nature and use of his intellectual and manual faculties. An engineering student may hope to remain up to date only through a process of continuous education, formal and informal, throughout his professional carer. I hope our students will keep this in mind. ❑

(Reprint from old AECIAN)

ENGINEERING EDUCATION IN 21ST CENTURY INDIA

Dr. Anil Borah
Associate Professor
Mechanical Engineering Department

History of Engineering Education in India

Technical education started in India in the form of centres of technical training for overseers engaged in the construction and maintenance of building, bridges, roads, ports etc. and also for the artisans and craftsmen for the use of instruments and apparatus used by the surveyors and security forces during the British rule. The requirement of more trained and efficient people led to the establishment of industrial schools attached to the ordnance factories and other industries. Such an industrial school was established at Guindy, Madras in the year 1794 attached to the Gun Carriage Factory. In the year 1847, the first engineering college was established at Roorkee for the training for civil engineers. The name of the college was Thomason College (now IIT Roorkee). By the year 1856, three more engineering colleges were set up—Calcutta College of Civil Engineering at the Writers Building, Overseer's School (now Pune College of Engineering) at Pune, Industrial School attached to the Gun Carriage Factory at Guindy, Madras (now Guindy College of Engineering).

At the time of independence, there was only 38 degree-level institutes with an intake capacity of 2500 and 52 diploma-level institutes with a total intake of 3670 students. In 1945, the Government of India appointed a committee under the chairmanship of late Sri Nalini Ranjan Sarkar to study Technical Education in India and to make definite and concrete recommendations in this respect. The committee observed that the existing facilities for technical education were inadequate; both in quantity and quality and recommended that four higher technical institutions in the pattern of Massachusetts Institute of Technology (MIT) should be set up as soon as possible, one each in the east, west, north and south. As per the recommendations of the committee five IITs were established at Kharagpur, Bombay, Kanpur, Madras and Delhi between 1951 and 1963. First five-year plan started in 1951 and India require human resources for industries and technical services to carryout developmental projects. With a view to human resource generation, Central and State Governments provided funds to increase the technical education facilities in the 1950s and early 1960s which resulted in the establishment of a large number of Government and Government-aided private institutions in the country. Table-1 shows the growth of undergraduate technical institutions and intake capacity in the country from 2006—07.

Table-1: Growth of undergraduate engineering Institutions with intake capacity
(Source: Report of AICTE Review Committee, 2015)

Year	Institutions	Intake capacity
2006—07	1511	659717
2007—08	1688	701214
2008—09	2388	753910
2009—10	2972	1093380
2010—11	3222	1219347
2011—12	3286	1379149
2012—13	3366	1538767
2013—14	3384	1620958
2014—15	3389	1693771

From Table-1 it is evident that there has been a high growth of technical institutions during the last 9 years. The number of engineering institutions has increased from 1511 in 2006-07 to 3389 in 2014-15. The intake capacity also increased from 6.59 lakh to 16.93 lakh.

According to HRD Ministry, around 1.5 million engineers are released into the job market every year.

Quality of Engineering Education

S. Radhakrishnan Commission (1948) advocated closer liaison between engineering colleges and universities so that the colleges would grow vigorously in an atmosphere of higher research in science. Wherever possible, the existing engineering and technical colleges should be upgraded for postgraduate training and research. The Commission further recommended higher technological institutes to produce much needed engineer-scientists, design and development engineers. The Commission advocated that engineering colleges be not controlled or dominated in their administration by the Government. The institute must have curriculum which includes general education, basic physical and engineering sciences and emphasised for a common first year undergraduate degree courses in all branches of engineering. At present above recommendations are followed in the engineering curriculum.

Growth & development of postgraduate (PG) engineering education and research in the country was significantly influenced by the recommendations of the Thacker Committee (1961). To attract students, the committee recommended for provision of scholarship for PG students. As there was limited number of qualified teachers, the committee recommended that the PG programme would be concentrated in a limited number of institutions.

M K Kaw Committee (2015) on the present status of AICTE identified the fundamental infirmities in the technical educational system of the country. The committee reported that the present technical education system has lack of direction, absence of trust, extremes of anarchy and over-regulation, multiplicity of agencies and vagueness in the drafting of legislation. The committee recommended for a provision for undergraduate students to undergo internships. AICTE should improve the functioning of the sub-standard technical institutions with the help of senior faculty drawn from higher technical institutions.

The MHRD has launched National Institutional Ranking Framework for Indian institutions to participate in the global ranking and create a significant impact national and internationally. Government of India has formulated a platform called SWAYAM in the year 2016, to deliver free of cost high quality Massive Open Online Courses (MOOCs) from the school level to higher education level, including the technical education. SWAYAM is based on three education principles viz., access, equity and quality. At present IITs and IISc Bangalore have started another online platform called National Programme on Technology Enhanced Learning (NPTEL) to deliver free of cost online engineering courses. NPTEL provides e-learning through online Web and Video courses in Engineering, Sciences, Technology, Management and Humanities.

Employability of Engineers

From the above discussions it is evident that there were continuous efforts from the government to improve the quality of the technical education. However, the present employment scenario for engineering graduates shows a dismal picture. There exists a demand and supply imbalance resulting in the increasing number of unemployed engineers every year. The intake capacity of engineering colleges is much higher as compared to the demand in the market. The survey carried out by the National Association of Software and Services Companies (NASSCOM) indicated that only 17.5% of total engineering students got employment in 2011. Aspiring Minds, a Delhi-based employment solutions company conducted an employability focussed study covering 150000 engineering graduates in 2013. As per the study, it was observed that 97 per cent of graduating engineers want jobs either in software engineering or core engineering. However, only 3 per cent have suitable skills to be employed in software or product market, and only 7 per cent can handle core engineering tasks. Though the intake capacity is increasing in the country day by day, the lack of quality education resulted in the production of engineering graduates without adequate employment skills. This large unemployment may lead to a serious instability in the economic and social conditions in the country. At present it is easier to get admitted into an engineering college than to get admitted into the science stream in Delhi University. This issue led to a serious thought process and AICTE has decided to cut its undergraduate seats by 40

percent to tackle the problem of degradation of engineering education. In the year 2015, the council has shut down 556 courses/departments of engineering colleges. India Today in Education in 2015 reported that when companies recruiting from various engineering colleges started complaining about the quality of students. Except for few top colleges like IITs and BITS-Pilani, students from other colleges suffered due to lack of poor infrastructure and faculty. Annual Report on national employability of engineers by Aspiring Minds in 2016 indicated that only 3.84% of engineers have quality for a startup technology role. The poor quality of education in these institutes creates many unemployable graduates every year. Though quantity of universities, colleges and programmes are increasing in the country, it is really unfortunate to have a continuously persisting poor quality education.

In this article an attempt has been made to find the underlying reasons for poor quality engineering education in India. There lies an urgent need for the improvement of the quality of engineering education rather than building new institutions.

Autonomy of Institution

The central message of in the Report of the AICTE Review Committee, 2015 is that the educational system must be freed from the tyranny of controls. Currently there are only four countries in the world viz., India, Pakistan, Bangladesh and Sri Lanka where colleges are affiliated to universities. The report emphasised that institutions must be free from interference in the day-to-day functioning. Radhakrishnan Commission clearly advocated that engineering colleges be not controlled or dominated in their administration by the government. Transformation to autonomy of institution is the present day need for better and quality education. Transformation of an affiliated institution to an autonomous institution cannot be done overnight. The institute has to earn the status of an autonomous institute. AICTE in its Review Committee report, 2015 has suggested the elements for an autonomous institution. The advantages are manifold starting from the faculty recruitment to course curriculum. The institute can design need-based programmes/courses specific to the country in general and the state in particular. However, in some instances, faculties are reluctant to adopt the autonomy. They have apprehension that their workload will increase once the institute becomes autonomous. They may lose the status of government servant which may ultimately result in the loss of retirement benefits. It is worth mentioning that the need of the hour is to identify the lacunae of the system and strive hard to minimise the gap with the role model institute and achieve the level of that institute. In the report of Aspiring Minds, it was mentioned that the companies generally prefer to recruit from top ranked colleges. This shows that the brand name of an institute plays an important role in the employability scenario.

Updated Syllabus and Course

Syllabus has to be updated regularly to keep pace with the changing science and technology and with demand of the society to make it sustainable. The course content must focus on the fields that will enhance the chance of employability of the graduate engineers. Syllabus must be updated with periodic gap analyses of the needs of the market. Syllabus must be flexible so that courses can be designed as per the requirement of local needs or the needs of the market.

One important parameter in the engineering syllabus is that it must provide skill-based education. Students must have opportunity to have of hands-on industrial training. AICTE's annual report 2015 also stressed for a provision for undergraduate students to undergo internships in their curriculum. Graduate engineers must undergo quality training and have essential efficiency to become productive. Sri Siddarth Bharwani, vice president, Jetkinn Infotain Limited commented that the fresh graduates have insufficient understanding of basic concepts. The lack of in-depth understanding of technical information, lack of client handing skills and insufficient knowledge across domains are the skill gap in the area. There is a greater need for improvement of the quality of education in colleges rather than building new institutes. Sri Arvind Panagariya, former vice chairman of NITI Ayog commented that more emphasis is given to science as compared to technology in engineering. As a result, the current education system is not innovative and found to be lacking when it comes to design and innovation of products. He mentioned that no Indian

have so far invented an alloy, an engine, a software code etc.

Students must be motivated to innovate and promote inquisitiveness. Students must be given the space and scope to think and innovate, to question and to come up with solutions. This applies not only in engineering but to both school education and higher education.

Communicative Skill

A study conducted by Aspiring Minds indicated that the lack of English communicative skills was one of the main reasons for 73.63 per cent of candidates for unemployment in addition to the lack of analytical and quantitative skills. Even the IT sector requires candidates with fluency in English so that they have the ability to communicate with international customers. One important quality for getting a job is the good communication skill. A student must get enough opportunity during his engineering career to develop communication and English proficiency skills. The ability to express one's views at the interview requires communication skill as well English proficiency skill. Hence, it is desirable that the institute must make efforts to ensure that the students develop these skills. AICTE also has special skill trainings and personality development programme for SC/ST students apart from regular study and to enhance the skills of communication, personality development and proficiency in English language. Presently, it is important for an institute to impart the communication skills and team-work skills in addition to the required job skills viz., managerial skills, entrepreneurial skills and leadership skills.

Infrastructure and Quality Teachers

There is a criticism that most of the graduate engineers join the teaching as a profession without any passion and some of the good professors prefer administrative positions because of lower intellectual demands and higher salary. One thing is clear that teaching profession demand commitment, dedication and passion for the job. However, quality of the teachers matters most and is an important factor for imparting quality education. Opportunities must be provided to the teachers for their upliftment in their quality in the form of higher education and research, attending short-term courses, national as well as international conferences etc. The requirement gap may be fulfilled adopting faculty exchange programme and thereby inviting experienced teachers from reputed institutes, expert engineers from industries. Students have different learning styles and abilities and therefore, the challenge before the teachers to impart knowledge to the weaker section of the students.

A well equipped library and internet facility are the must for continuous updating of knowledge not only for the teachers but also for the students as well. Smart classrooms concept must be introduced without delay. State-of-the-art laboratories in an institute promote research and consultancy. AICTE under different programmes provides funds for the development of laboratories. Institute can also approach industries for industry supported lab which can also enhance institute-industry relationship.

Concluding remarks

The above discussion may be summarised as follows:

a) There is an urgent need for the improvement of the quality of engineering education rather than building new institutions.

b) Autonomy must be granted to institutions for quality and need-based education.

c) The course content must focus on the fields that will enhance the chance of employability of the graduate engineers.

d) Engineering education system must be modified to make it more innovative and design oriented.

e) Opportunities must be provided to the students for improvement of their communicative and English speaking capability.

f) Faculties must have opportunities to improve their quality.

g) Good infrastructure, well equipped laboratories and library facilitate research and consultancy.

All the above points are to be satisfied to fulfil the vision of the Prime Minister to make India a hub of human resource. ❑

EMERGING TRENDS IN MECHANICAL ENGINEERING

Composed by- ***S. Sekhar Mallick***
and his team of Assistant Professors under TEQIP
Mechanical Engineering Department

Over the next two decades, engineers will be required to develop technologies that foster a cleaner, healthier, safer and sustainable global environment.Mechanical engineers will be at the forefront of developing new technologies in diverse fields like environmental remediation, farming and food production, housing, transportation, safety, security, healthcare and water resources. A few major areas of cutting edge research in Mechanical engineering are discussed below.

Green Energy Technology: As an energy deficient country on one hand and a densely populated country on the other, India needs to discover cheap sources of green energy with utmost urgency. Hence, a lot of effort is being put in tapping solar energy effectively and the conversion of waste to energy.

Tapping low grade energy could provide solutions to powering some portable devices, despite not being thermodynamically efficient. Wearable and portable electronic devices are becoming more common, but most of them need plugging in for some hours to recharge their batteries. Portable energy sources than can solve this include examples such as generating energy from the wasted components of walking by embedding generators in footwear.Care should be taken not to cause any extra discomfort to the user. Cooling of wearables is also another important area of research for thermal engineers. The heating of these devices not only cause discomfort, but have also been reported to cause serious health hazards.

Fuel cell:To overcome the limited efficiencies of heat engines, direct conversion from chemical energy from common fuels to electrical energy need to be made. Fuel Cellsare an attempt to this conversion. A fuel cell is a battery that runs as long as fuel and oxygen are supplied. Hydrogen fuel cells have been well-investigated but due to the difficulty in producing hydrogen from natural resources hydrocarbon fuel cells are also being developed that can use diesel, methanol and chemical hydrides. The energy efficiency of a fuel cell generally is in the range 40 to 60% however efficiency up to 85% can be achieved by capturing waste heat in a co-generation scheme. A few car models have also recently come into market that can run on alcohol fuel cells. Fuel cells are attracting a lot of attention of researchers with multi physics modelling and micro fluidics has establishingtheir strongholds.

Microfluidics:Fluid flow in micro-channels is opening up many new areas of technology. Development of more precise medical instruments, cooling of electronic devices and other uses of fluid flow in electronic devices are a few areas of applications. In recent years the development of amazing devices like Lab-on-a-chip and Painless microneedle (for blood sample collection) were achievements in this field from our country. To simulate fluids better in micro channels, where traditional fluid mechanics breaks down due to the scales being comparable to the scale of molecular dimensions, particle based methods are being used recently to similar these fluids.

Electric vehicles:The last decades have undoubtedly seen the proliferation of electric vehicles as it has broken all the stereotypes associated with it. As a replacement of the internal combustion engine it would eliminate smoke churning gasoline engines. Batteries of such vehicles can be high storage rechargeable batteries or fuel cells. Automotive electric motors are also of some interest to researchers, even from a mechanical engineering perspective. With the

advent of switched reluctance drives, magnetic bearings and bearing-less machines, the study of control systems to regulate the operation of the machine has grown exponentially.

Radiative heat exchanger:As human interest shifts to outer space, the need for thermal comfort in space becomes inevitable for the survival of astronauts. Any surface facing direct solar radiation in space gets severely heated up and the opposite surface in shade faces near absolute zero. Heat dissipation in such conditions is challenging due to the absence of convection which most terrestrial heat exchangers use. Though space vehicles and space suits are being designed for the last half century, the design of more sleek and efficient radiative heat exchangers is becoming more and more important in recent times.

Internet of things:The internet of things is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and network connectivity which enables these objects to connect and exchange data communicating among themselves using network.Despite being a new concept, many older devices can be classified as simple implementations of IoT. However, developing IoT as a dedicated interdisciplinary subject have brought up massive development in the field. Typically, IoT based mechanical systems gather data from sensors, lookup stored data in any other location to compare, take decisions and implement that using actuators even when all these components are not located physically close. IoT implementation has been widespread in the development of automated plants, patient monitoring in hospitals and smart HVAC systems.

Robotics and Automation: Robotics and automation are applied in various applications ranging from humanoid robots, Driverless Cars, robots for domestic use, robot arms for manufacturing automation etc. Automation improves productivity many folds with consistent process parameters and avoidstypical human mistakes.

In rapidly developing economies, mass production is the main motivation for applying process automation. The greatest demand for process automation is in the chemical industry, power generating industry, and petrochemical industry; the fastest growing demand for hardware, standard software and services of process automation is in the pharmaceutical industry. Another trend in industrial automation is virtualization on cloud based testing frameworks and digital transformation of manual testing to automated testing.

Additive Manufacturing: Additive Manufacturing encompasses technologies which fabricate 3D objects by adding successive layers.It can use a variety of materials like plastics, metals, concrete and even human tissue. The key benefits of additive manufacturing over traditional manufacturing are cost, speed and quality for the fabrication of niche products in small quantities and is being extensively used in rapid prototyping operations in fields like Aerospace, Automotive, Healthcare and Medical etc.

Advancement in the materials:Progress in material science has been the key to many new products.The full potential of some materials such as strength & toughness Computationally Designed Steel Alloys, Ultra-high temperature ceramics, smart materials such as shape memory alloys, piezoelectric materials, smart gels, electro strictive materials, magneto strictive materials, rheological fluids, electrochromic materials, conducting polymers, MEMS, optical fibers, pH-sensitive materials, etc. are yet to be tapped. Particulate materials or powders as starting material provides the advantage of formulating novel compositions and tailoring microstructures and thus powder metallurgy has gained great importance. Electronic materials for communication and information technology, biomaterials for better health care, sensors for intelligent environment, energy materials for renewable energy and environment, light alloys for better transportation, materials for strategic applications and more has always been the interest of study. ❑

EMERGING TRENDS IN PRODUCTION SYSTEMS

Dr. Vimal Kumar
Assistant Professor (TEQIP),IPE Department

Recent and emerging trends in the production system have been focused that covering the last 10 years of the impact of rapid advancement in technology in a production system. It includes the new methodologies, objectives, algorithms, and advanced optimization problem. Manufacturers have been faced with an "*evolve-or-die*" ultimatum as customers expect faster rates of innovation. New developments in emerging layout research provide a perspective on what the future of the field will be like. A trend toward concurrent engineering approaches to layout and production system design is observed. According to the previous reports, manufacturers' use 41% of sensor data frequency, 78% cited reduced shipping costs as the primary reason for restoring, 59% already use some sort of robotics technology, 80% expect to have digitized their value chain within five years. There are various emerging trends in productions system. Some of them are given the following:

1. Cybersecurity: This is a concept that manufacturers haven't had to worry about for so long. Industrial businesses were convinced that they would never need to invest in cybersecurity platforms as their business was generally handled in person, over the phone or on the shop floor. However, as manufacturers became more connected over that past couple years to improve operations, they unknowingly opened themselves up to new business risks. As more aspects of a manufacturing operation become controlled or monitored by connected digital systems that provide a security in a business. Cybersecurity will be absolutely critical in 2017 in order for manufacturers to continue benefiting from all this new technology while also keeping their business and employees safe.

2. Internet of Things: The Internet of Things (IoT) is having a major impact on manufacturing, giving manufacturers more visibility into their operations, enabling predictive maintenance on their machines and allowing them to provide remote support to their customers.

3. Advanced Materials: Material science continues to advance and manufacturers stand to benefit greatly. Carbon fiber was once thought to be the material on the 21st century. However, Carbon nanotube manufacturing is taking impressive strides forward and no one is certain what the future will hold. Graphene is still on the minds of manufacturers everywhere and it doesn't end there. New materials are even helping to improve high-tech batteries which could help manufacturers power their business, store energy for longer periods of time and make electric systems more efficient and effective. The aerospace industry is constantly looking for new materials to help cut weight while maintaining structural integrity and 2017 might be their year. As these materials make their way out of the lab, aerospace manufacturers are ready to jump at the opportunity to try them out.

4. 3D Printing: The use of 3D printing is the technology-driven trends for the upcoming year. Our previous prediction was correct in the sense that 3D printing continued to soar throughout 2016 and shows no shows no signs of slowing in 2017. New additive manufacturing systems and materials have made their way into manufacturers' facilities all around the world. As the selection of materials continues to expand and the accuracy of these machines improves, industrial

manufacturers are starting to realize the potential this incredible technology has to offer. 2017 may be the year where manufacturers start adopting 3D printing on a large scale. Aerospace manufacturers like NASA, Boeing, GE and Lockheed Martin are already producing system critical components with 3D printing for their engines and other systems. Before this, these manufacturers and others like them were manufacturing small, non-critical components to help cut down weight and produce more complex shapes to reduce the number of parts needed. But now, as the ability to 3D print metal materials improves, industrial manufacturers, large and small, are beginning to experiment with this technology to see how it can benefit their own business.

5. Predictive Analytics: This is a theme that was also mentioned in last year's article as well. Manufacturers are drooling over the idea of being able to know when their machines will break down when the market will pick up or how much inventory they need to buy next week. Predictive Analytics and the Big Data behind it is a prime example of how technology is moving the industry forward. Predictive Analytics is still in its infancy and the manufacturers that have implemented these systems find them hard to trust. These kinds of systems are still having a hard time taking off as many manufacturers are still in the beginning stages of their Big Data and IoT implementation process. 2017 could see a large uptick in regard to the number of manufacturers taking advantage of these systems.

6. Collaborative Robots: The uses of advanced robotics made a large impact on manufacturing. The prediction fared well as robotics technology continued to advance at an impressive pace this past year. However, one kind of robotic system made the largest impact on manufacturing and that were Collaborative robots. Manufacturers have jumped at the opportunity to purchase these affordable yet extremely useful robotic systems. Collaborative robots offer manufacturers the unique benefit of an automated system with the ability to work alongside human employees. These systems can assist a human with whatever task they're tackling as they can be easily programmed and pose no threat to the employee. New safety standards have been put in place in 2016 which could lead to an incredible 2017 for Co-Bots of all kinds and the manufacturers that use them. These technology trends have come so far this past year and this has put them in a position to soar in 2017. The foundation has been laid and manufacturers have become more comfortable with the idea of these digital and advanced systems controlling more aspects of their business. Manufacturers are learning to work with, instead of against them to help bring their business to the next level. We can't wait to see what 2017 has in store, but these are the manufacturing trends to keep a close eye on as the previous year's come to a close.

7. B2B TO B2B2C: Brands are trying to manage growing customer expectations by taking greater control over their value chain, from R&D to delivery. This is forcing manufacturers to shift from B2B to B2B2C businesses, placing a greater emphasis on the end user's needs and experience.

8. Evolving Value Chain: Manufacturers are evolving their value chain to provide a stronger focus on customer experience, better support, and more transparency.

9. Greater Visibility: With better data collection and cloud-enabled analytics platforms, manufacturers have greater visibility into their businesses and operations than ever before expectations.

10. Emerging Technology: Technology has always been a driver of innovation in manufacturing and today's emerging technologies are no different. From 3D printing to nanotechnology, these cutting-edge tools and techniques are changing how products are made.

11. Agile Manufacturing: Many manufacturers are moving towards an agile manufacturing approach to stay responsive to evolving customer demands and to meet the need for greater product customization.

12. Small is the New Big: Advancements in manufacturing technology, lower cost of entry, a need for speed and the demand for more customized products is leading to growth in smaller, more localized manufacturing. ❑

List of Students from Mechanical Engineering Department placed in different Companies through Training and Placement Cell, AEC in 2016-17

1. Name of the Company
Accenture Solutions Private Limited
Name of the Students
1. Samir Choudhury
2. Jaipyaloan Shyam Bailung
3. Karishma Mittal
4. Bibhuti Bikash Kagyung
5. Gourav Banik
6. Abinash Medhi
7. Nitiraj Sahariah
8. Jitumoni Hoque
9. Mahanubhav Borthakur
10. Shubham Dey
11. Madhurjya Pratim Baishya
12. Sumi Das
13. Akash Pratim Das
14. Parineeta Borpujari

2. Name of the Company
Berger Paints
Name of the Student
1. Prashant Kumar Parihar

3. Name of the Company
Cummins India Limited
Name of the Students
1. Mubaraque Ali
2. Nitiraj Sahariah

4. Name of the Company
Tata Advanced System Limited
Name of the Students
1. Jitumoni Hoque
2. Karishma Mittal
3. Jimpi Anan

5. Name of the Company
Oil India Limited
Name of the Students
1. Akashdeep Sharma
2. Vishal Goswami
3. Sanjeev Pandit
4. Jaipyaloan Shyam Bailung
5. Kaushik Das

6. Name of the Company
Indian Oil Corporation Limited
Name of the Students
1. Bitopan Sarma
2. Madhurjya Pratim Baishya
3. Abinash Medhi
4. Nilkamal Saha
5. Nitya Ranjan Mandal

7. Name of the Company
BYJUs
Name of the Students
1. Ratan Kumar Jha
2. Shahin Aktar

8. Name of the Company
Bharat Petroleum Corporation Limited
Name of the Students
1. Abhijit Paul
2. Abhinash Kumar Nath

9. Name of the Company
Hindustan Unilever Limited
Name of the Student
1. Paramjeet Singh

10. Name of the Company
Ashok Leyland
Name of the Students
1. Parineeta Borpujari
2. Sumi Das
3. Akash Pratim Das
4. Subham Dey

List of Students from Mechanical Engineering Department placed in different Companies through Training and Placement Cell, AEC in this session 2017-18 (till January 2018)

1. Name of the Company
Tata Advanced System Limited
Name of the Students
1. Sumanta Sarathi Borthakur
2. Shyamalim Saikia

2. Name of the Company
Bharat Petroleum Corporation Limited
Name of the Student
1. Ritusmita Baruah
2. Chayanika Borah
3. Binayak Laskar
4. Manas Pratim Doley

3. Name of the Company
Cummins India Limited
Name of the Students
1. Ananya Paul
2. Arindam Baishya
3. Jagriti Kakati
4. Uddipta Das

4. Name of the Company
Hindustan Unilever Limited
Name of the Student
1. Agradeep Dey

5. Name of the Company
Ashok Leyland
Name of the Students
1. Santanu Choudhury
2. Jisnu Shankar Bora
3. Mansmit Kalita

6. Name of the Company
Concept Educations
Name of the Student
1. Noor Ahmed

My Experience of Summer Overseas Internship Fellowship Program at Newcastle University, UK

Rishiraj Mazumdar
6th Semester B.E. (Mechanical)

The Summer Overseas Internship Fellowship Program was an initiative taken by the Directorate of Technical Education, Assam. The 1st of its kind in Assam, this program was launched with a view to engender an elevated predicament for research oriented study for the undergraduates of engineering colleges under Assam State Government. Being a part of this program was really very overwhelming, as it was like representing my place, my institution and my country as well in a different nation. The university where I was selected for the internship was Newcastle University, Newcastle upon Tyne, United Kingdom. And it was the 20th of July, 2017 that with a heart filled with elation and excitement level raised sky high that I began my journey from Delhi to London and finally to Newcastle. Completing this entire journey alone and landing on a foreign soil for the first time, it really took some time for me to believe that the things happening to me were real.

At the university, I worked under the guidance of Dr. Jinju Chen, professor of Mechanical and Systems Engineering department at Newcastle University. Nanobiomechanics being my subject of research, I along with Sam Charlton, a research scholar from the university worked on the project Design, Manufacture and Characterisation of patterns for polymer carrier materials. Work was really very interesting at the University as I was finally getting to apply the knowledge that I gained in three years of my graduation degree and I was learning to deal with new machines such as the laser cutter and profilometer. Dealing with such a new work environment could have been very difficult but with the support of my colleagues there, work was really fun. Our weekdays were very busy due to work but our weekends were very interesting. The Quayside of Newcastle, the Tynemouth beach, London and all that it offers, Scotland, Alnwick were our weekend adventures trying to make the most of this lifetime opportunity. And finally the 25th of August came when we had to bid farewell to this beautiful place. To sum it up it was a month of dream that we were living in and we came back with not only with some knowledge but also memories that would be cherished forever. ❑

My visit to HPAIR -2017 Asia Conference, Sydney, Australia

Monami Bhuyan
8th Semester B.E. (Mechanical)

The Harvard Project for Asian and International Relations- Asia Conference is the largest annual student connection in Asia- an annual event that creates a forum of exchange and facilitates discussion of the most important economic, political, and social issues relevant to the Asia-Pacific region. Since 1991, the annual HPAIR conferences have brought together students from the world's foremost universities and leaders in the fields of government, business, culture, and academia. I was selected as one of the delegates at HPAIR - 2017 Asia Conference held in Sydney, Australia, a one of a kind opportunity to represent my country and institution on an international platform. I was selected in the "Entrepreneurship and Technology" track- a five day extravagant educational event that made it possible to form an extensive and valuable network with students and erudite professionals from around the world. But the acme of the event for me would be the chance to be one of the keynote speakers at the "HPAIRX- the delegate talk series". After an audition I was selected as one of the five keynote delegate speakers to address the entire HPAIR contingency. It was indeed a moment of pride to have introduced myself from "The Land of Red Rivers and Blue Hills." My talk mostly concentrated on an incipient idea of "rice green roofs"- an idea inoculated by myself, Mr. Dhritiman Das and Mr. Jyotirmoy Pathak to study the possibilities of efficiently growing the indigenous Joha rice on rooftops. While rooftop farming is a fairly new concept and still asks for more research, and are mostly practiced for green and leafy vegetables, an attempt to grow a highly nutrient dense crop, especially one like Joha rice which is prone to lodging and is a highly photo sensitive plant might seem a little too ambitious. However, this is a small attempt to work towards a system where sustainable agricultural practices are engendered and one that collates state of the art technology with robust agricultural practices. Through my talk, I tried to communicate our vision to the audience to bring together a number of already existing technologies to profligate the production of Joha rice by incorporating green house technology with modern indoor farming and optimize the production and running costs. I also talked about how IoT (Internet of Things) could be used to generate a revenue model for the farmers as well for affordable marketing of crops towards the consumers within a particular range of peoples for example in city area. ❑

(NEQIP, AICTE scheme; AEC funded the entiire registration fee for Miss Monami Bhuyan to participate in the HPAIR -2017 Asia Conference, Sydney, Australia)

Publications of Faculty Members during the years 2016 and 2017

R K Dutta

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D K Mahanta

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3. Neelam Goswami, D K Mahanta, Waste to Energy (WTE) in Assam: Scope and Challenges; National Conference on Non- Conventional Energy: Harvesting Technology and Its Challenges, Nov 2017.
4. Banashri Gagoi, D K Mahanta, Thermoeconomic analysis of a power plant, National Conference on Non- Conventional Energy: Harvesting Technology and Its Challenges, Nov 2017.
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S K Deb

1. Sanchari Deb, S.K.Deb,"Comparative Analysis of Different Micro Energy Resources under Distributed Generation", Asian Journal of Electrical Sciences, ISSN: 2249 - 6297 Vol. 5 No. 1, pp.40-42, 2016.
2. Bashab J Phukan, S.K.Deb,"Assessment of Thermal Comfort and Indoor Air Quality in an Air Conditioned Room", National conference on Science, Technology & Environment: Prospects and Limitations in the 21st Century (NCSTEPL-2017), BBEC, Kokrajhar, 2017.
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6. Hazarika D P, Kakoti P, Deb S K; "Energy Recovery from the Waste Air Available in the Withering Trough under Tea Manufacturing Process"; Souvenir Cum Technical Volume, All India Seminar on Recent Trends in Mechanical Engineering, Organised by The Institution of Engineers (India) Assam State Centre, 21-22 October, 2016, Page 66—69
7. Dutta A.K., Kakoti P, Deb S K; "Identifying Cost Factors of Black Tea Manufacturing using Pareto and Ishikawa Diagram" "; Souvenir Cum Technical Volume, All India Seminar on Recent

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8. Kakoti P, Barua P B, Deb S K; "Development of a Performance Index for the Energy Management (SPIENG) of Tea Gardens using System Dynamics Causal Model", Souvenir, National conference on Non-conventional Energy: Harvesting Technology and its Challenges, Assam Engineering College, Guwahati, 17-18 October, 2017; , Page 6—17
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Niharendu Saha

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Anil Bora

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3. Authors: Nilav J. Sarma, Anil Borah, U.S. Dixit, Analytical and Experimental Investigations on Temperature Distribution I Laser Line Heating, Souvenir Cum Technical Volume, All India Seminar on Recent Trends in Mechanical Engineering, Organised by The Institution of Engineers (India) Assam State Centre, 21-22 October, Page 1—8, 2016.

Manjuri Hazarika

1. B. Sarma, K. Borah, B. Saikia, A. Dhar, M. Hazarika, 'An Experimental Study on Burr Formation in Miilling', All India Seminar on Recent Trends in Mechanical Engineering, pp. 22–26, The Institution of Engineers (India), Assam State Centre, Guwahati, 21–22 October, 2016.

2. N. Saha, D. Talukdar, K. Upadhaya, C. Barbhuiya, M. Hazarika, 'An Experimental Study on Burr Formation in Turning', International Journal of Innovative Research in Science, Engineering and Technology, Vol. 5, pp. 3215–3222, 2016.
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Dilip Bora

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Kalyan Kumar Das

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7. Das K.K., 2016, "Investigation of Damage Potential of Extreme Winds", International Conference on Civil Engineering for sustainable Development –Opportunities and Challenges (CESDOC2016)", Assam Engineering College, Guwahati-781013 from 19-21 December 2016 (Accepted).
8. Gogoi A, Das K.K., 2016, Wind related destructions in Eastern Part of India", Proceedings of the National Seminar of "Green Energy-Prospects and Challenges" organized by Assam Science and Technology University held on 26th - 27th April 2016 (ISBN:978-93-83588-11-4).
9. Das H.R, Das K.K., Ghosh A.K, 2016, "A Numerical Study of Wind induced external and internal flow fields on Prismatic building with wall openings", Proceedings of the National Seminar of "Green Energy- Prospects and Challenges" organized by Assam Science and Technology University held on 26th -27th April 2016 (ISBN:978-93-83588-11-4).
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- ***Kumar, Vimal,***& Sharma, R.R.K. (2017). "An Empirical Investigation of Critical Success Factors Influencing the Successful TQM Implementation for firms with different strategic Orientation". ***International Journal of Quality and Reliability Management***. Vol. 34, Issue 9, pp. 1530-1550. https://doi.org/10.1108/IJQRM-09-2016-0157.
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- ***Kumar, Vimal,***Verma, Pratima, Jauhar, Sunil Kumar, Muthukumaar, Vignaesh, & Sharma, Nagendra Kumar (2017). "Dynamics of a Medium Value Consumer Apparel supply chain: An Indian Industry Perspective". Second International Conference on Soft Computing: Theories and Applications (SoCTA 22-24 Dec. 2017) held at Bundelkhand University, Jhansi, India (Proceedings in Springer).
- (Oral) ***D. Kashyap*** and S Kanagaraj; 3D printed Shape memory polyurethane foam for endovascular embolization; 6th Asian Biomaterials Congress (ABMC6), October2017.
- Avinish Tiwari, ***Piyush Singh***, Pankaj Biswas and S D Kore, Effect of Traverse Speed on Friction Stir Welding of AISI 1006 Low Carbon Steel, International Congress 2017 of the International Institute of Welding (IIW-IC 2017), 7-9 December 2017, Chennai, Paper no. C086, pp. 340-345.
- Tiwari, ***P. Singh***, P. Biswas, S.D. Kore, Friction Stir Welding of AISI 1006 Low Carbon Steel, INCOM18: Proceedings of the 1st International Conference on Mechanical Engineering Jadavpur University Kolkata India January 4 – 6, 2018 Paper No. INCOM18-211, pp. 530-533.

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Verma P., Kumar, V., and Sharma, R.R.K. (2017). Conquering the Emerging Markets: Enhance Supply Chain and Diversified Firms Performance. Lambert Academic Publishing, Germany, ISBN: 978-620-2-053212-9.

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DevarshiKashyap, CharanMukundan, S Kanagaraj; Manufacturing and characterization of shape memory polymer and composites.; Primary and Secondary Manufacturing of Polymer Matrix Composites. Edited by Kishore Debnath, Inderdeep Singh.CRC press. 5 October 2017. ISBN978-1498799300. ❑

Ph.D. Awarded in 2017

1. Name of the Scholar : Mr. Pradip Baishya
   Thesis : A Study on Municipal Solid Waste Management : A Search for Techno-Economic Model for Segregation of Solid Waste in Guwahati
   Supervisor : Dr. D. K. Mahanta, Professor, MED

2. Name of the Scholar : Mr. Gautam Dutta
   Thesis : Estimation of Vehicular Emission Inventories of Assam and Quality Prediction along the N.H.37 in Kaziranga National Park due To Vehicular Traffic'
   Supervisor : Dr. Kalyan Kalita, Professor, IPE

3. Name of the Scholar : Mr. Manoj Bardalai
   Thesis : A Study on Production and Analysis of Pyrolysis Oil and Biochar from locally available Biomasses
   Supervisor : Dr. D. K. Mahanta, Professor, MED

Thesis Submitted (Viva awaited)

1. Name of the Scholar : Mr. Manoj Kumar Saud
   Thesis : Thermodynamic Analysis of Internal Combustion Engine fuelled with conventional Fuels and Alternative Fuels
   Supervisor : Dr. D. K. Mahanta, Professor, MED

2. Name of the Scholar : Mr. Kamal Brahma
   Thesis : Extraction of Bio Diesel from Pongamia Pinnata (L) Pierre and its Performance Analysis
   Supervisor : Dr. D. K. Mahanta, Professor, MED

Other Achievements

Dr. Pradip Baishya, Assistant Professor, represented Assam for All India Innovation Festival, 27th to 29th January, 2017 held in Science City, Kolkata, organised by Govt. of India, he was also invited as a key note speaker for a seminar on "Urban Waste Management for a smart city : Problems & Prospects of Guwahati City" on 12th September, 2017 at Assam Institute of Management, Guwahati. He was also selected as one of the jury members at national level for Clean Campus Award 2017 by All India Council for Technical Education (AICTE).

Dr. Prodip Baishya also visited University of Melbourne, Australia and developed three Courses for the proposed PG Programme on Construction Management to be started at Assam Engineering College as a part of AEC-University of Melbourne Collaborative Project.

A Report on the Two-day National Conference on Non-Conventional Energy: Harvesting Technology and Its Challenges held on 17 & 18 November, 2017 organised jointly by the Chemical and Mechanical Engineering Departments

Dr. Ashim Basumatary
Chemical Engineering Department

The departments of Chemical and Mechanical Engineering of Assam Engineering College organised a two-day National Conference on "Non Conventional Energy: Harvesting Technology and Its Challenges" with an objective of discussing and spreading awareness about harvesting technology and its challenging issues of Non conventional energy in view of growing energy crisis. The conference arranged some important lectures by invited guests, paper presentation by researchers and scholars. Delegates from industries and other participants highlighted their different fields of their research that included harvesting methods. The invitation was open for active participation to all academicians, research scholars, industry professionals, students and NGO's.

The themes of the conference were: Power Plant Technology, Waste heat recovery, Energy efficiency of HVAC, Energy conservation, Biofuel, Energy from Biomass, Energy Management, Wind Energy conversion system, Geothermal energy, Fuel Cells energy, Biomass gasification, Photo-voltaic system, Hydro-energy and its impact, Hybrid energy system, Solar energy, Electrochemical energy system, Clean energy technology, Energy storage, Waste to energy, Energy audit.

The Conference was inaugurated with lighting of the lamp by Mrinal Krishna Choudhury, Additional Director, AREDA, Guwhati along with Dr Atul Bora, Principal, Assam Engineering College, the working president of the conference Dr. Ranjit Dutta, President of NCEHTC Prof Ashok Baruah, NEQIP coordinator Dr. Sudip Kr Deb. A welcome address was given by the President NCEHTC-2017. Abstracts of research papers were published in book form and it was released by the Principal, Assam Engineering College. A brief on the theme of conference and vote of thanks were conveyed by organizing secretary of the National Conference.

Altogether 45 participants submitted abstracts of their papers and presented in the conference. They were from different institutions like IIT Guwhati, NIT Silchar, Jadavpur University, Tezpur University, Don Bosco University, Dibrugarh University, host College and many more colleges in Assam.

In First day of the conference, after the inaugural session, the key note lecture was delivered by Dr Ponkaj Kalita, Energy Department, IIT Guwhati. General Manager (Civil), NEEPCO, Shillong, delivered the lecture on hydro energy and its impact to the environment and society. Mr Dharanidhar Nath, Chief Manager of Numaligarh Refinery Limited presented the necessity of bio-refinary and the bio-ethanol produced from bamboo. The esteemed speakers from reputed institutions like Indian Institute of Technology, Guwhati, Tezpur Univerisity and Jadhavpur University delivered lectures in technical sessions on various themes of the conference. One of the faculties from Argentina, Dr. Edvardo Contow presented a lecture in the conference.

The oral paper presentation were divided into four sessions, two in each session and one best oral paper presentation was awarded in each session based on their novelty of the research work done and overall presentation. Mr. Gitu Das, research scholar of Electrical Department, Assam Engineering College was awarded the best oral presentation award on the topic of Design and Simulation of a Hybrid Solar Street Lighting and Water Pump System. Four students, Dhiman Kalita, Sourav Das, Dipankar Sarkar, Sishir Dutta, 7th semester, Department of Electrical Engineering, AEC, have been awarded on the topic of Performance analysis of different controllers with energy. Mr. Barnam Jyoti Sararia, one of the faculty members from the department of Energy, Tezpur University was awarded the best oral paper presentation on the topic of Control and energy management of a hybrid pv-microhydro power generation system - a conceptual framework. In one session, Mr. Arnab Ghosh, a faculty from Jadavpur University received the award on Wireless Sensor Network: A solution to Non-Conventional Energy based Applications.

With the full swing of lectures on various themes of the National Conference and oral presentation, the two-day national conference was concluded with valedictory functions, certificate distribution followed by high tea and snacks. The working president of the national conference, Dr Ranjit Dutta pointed out the importance of jointly working for the development and finding alternatives resources to meet the energy crisis. ❑

Some Photographs of the two day National Seminar On "Non Conventional Energy : Harvesting Technology and Its Challenges"

Miss Monami Bhuyan, a student of 8th Semester presenting her talk in the "HPAIRX-the delegate talk series".
She represented India as one of the delegates at HPAIR -2017 Asia Conference held in Sydney, Australia.

Mr. Rishiraj Mazumdar, a student of 6th Semester B.E. visited Newcastle University, UK under Summer Overseas Internship Fellowship Program

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