

## REPORT

**United Board for Christian Higher Education in Asia sponsored  
National Training Programme on  
‘The Art of Mathematical Modeling as Teaching Pedagogy’  
9<sup>th</sup> - 10<sup>th</sup> February 2018**

A two day National Training Programme on ‘The Art of Mathematical Modeling as Teaching Pedagogy’ sponsored by United Board for Christian Higher Education in Asia was organized by Department of Mathematics, St. Aloysius College (Autonomous) on 9<sup>th</sup> and 10<sup>th</sup> February 2018.

**Day 1:** 9<sup>th</sup> February 2018

The first day of the National Training Programme commenced at 9:30 am with the **Inaugural Ceremony** which entailed the customary practice of lighting the lamp followed by a melodious prayer song by the Aloysian choir and welcome of the guests.

The dais was marked by the presence of Dr. B. Bharti, Registrar, Rani Durgawati Vishwavidyalaya, Jabalpur as Chief Guest, Dr. S. P. Yadav, Professor, Department of Mathematics, IIT, Roorkee, Dr. Sandip Banerjee, Associate Professor, Department of Mathematics, IIT, Roorkee, Prof. P.V. Jain, Head, Department of Mathematics and Computer Science, Rani Durgawati Vishwavidyalaya, Jabalpur as Guest of Honour, Dr. S.S. Rana, Professor, Department of Mathematics, Rani Durgawati Vishwavidyalaya, Jabalpur, Prof. A. Agrawal, Retired Professor, Department of Mathematics, Rani Durgawati Vishwavidyalaya, Jabalpur as Special Guest.

Dr. Mandira Kar, Head, Department of Mathematics, St. Aloysius (Auto) College, Jabalpur and Convener of this Training programme elucidated the **Objectives** of the programme. The welcome address was given by Rev. Dr. G Vazhan Arasu, Principal, St. Aloysius (Auto) College, Jabalpur. He formally welcomed the Chief Guest, Guest of Honour, Special Guest, dignitaries and participants. In his speech he said that in this Training Programme the primary beneficiaries will be the teachers and researchers of mathematics who shall acquire an improved pedagogy and in turn the students shall benefit, develop their mathematical proficiency and compete globally. Further, Dr. P.V. Jain, Professor and Head, Department of Mathematics and Computer Science, Rani Durgawati Vishwavidyalaya, Jabalpur shared her views on applicability of mathematics followed by Dr. S. P. Yadav, Professor, Department of Mathematics, IIT, Roorkee who spoke on use of mathematics in different fields of study. Lastly Dr. Bharti, Registrar, Rani Durgawati Vishwavidyalaya, Jabalpur and Chief Guest of the function addressed the assemblage. He spoke on wholesome education, need and use of mathematics in real world. As a gesture of reverence and gratitude, vote of thanks was delivered by Mrs. Pratibha Ricchariya, Department of Mathematics, St. Aloysius (Auto) College, Jabalpur.



**INAUGURAL CEREMONY**



**OBJECTIVES BY THE CONVENER**

The inaugural session was followed by the **Keynote Address** on the theme ‘**Mathematical Models in Applied Sciences**’. For this session, Dr. M. Darbari was the introducer, Dr. P. Chaitanya was the rapporteur and the session was chaired by Prof P. V. Jain Head Dept. of Mathematics and Computer Science, Rani Durgawati University, Jabalpur, M.P. The Resource Person was Dr. Sandip Banerjee, Associate Professor, Department of Mathematics, IIT, Roorkee. In his address Dr. Banerjee created receptiveness amongst the audience on the concepts involved in mathematical modeling. This laid the basic foundation of the Training Programme. He focused on mathematical techniques which were of particular interest to engineers, scientists and others who use models of discrete and continuous systems. In his address Dr. Banerjee also spoke on different types of mathematical models in biology like Prey-Predator, Rumor, Lazy-Student, Arm-Race, Epidemic, Cancer, Virus and Brain Tumor model and their practical applications.



**KEYNOTE ADDRESS**



**DR. S. BANERJEE, IIT, ROORKEE**

The keynote address was followed by the **First Technical Session** titled ‘**Data Envelopment Analysis and some Applications**’. Dr M. Kar, the convenor was the introducer for this session, which was chaired by Dr. N. Patel, Govt. College, Jobat, Alirajpur, M.P. and the rapporteur was Dr. A. Patel. The resource person was Dr. S. P. Yadav, Professor, Department of Mathematics, IIT, Roorkee. Prof. Yadav started with the importance and applications of Operations Research. He said Data Envelopment Analysis (DEA) is a linear programming based technique for measuring the performance efficiency of organizational units, called Decision Making Units (DMUs). With the help of examples he explained how DEA measures the efficient use of the resources available to generate a set of outputs by a DMU. He also gave the mathematical formulation of the same. Dr. Yadav also elucidated on various mathematical models like CCR model, CCR ratio model, CCR multiplier model, CCR Envelopment model and BCC model. He developed post DEA analysis and explained how to improve efficiency in various sectors like banking sector, health sector, education sector and transport sector.



**FIRST TECHNICAL SESSION**



**PROF. S. P. YADAV, IIT, ROORKEE**

The **Second Technical Session** started soon after lunch at 2:00 pm. The session comprised of two invited talks of 90 minutes each. The **first talk** was on ‘**Modeling and Agriculture**’ and it was delivered by Dr. Neeru Adlakha, Associate Professor, Departments of Applied Mathematics and Humanities, SVNIT, Surat. It was chaired by Dr. A. Babbar, Professor, Dept. of Plant Breeding & Genetics, JNKVV, Jabalpur. The introducer was Mrs. P. Richhariya and rapporteur Mrs. F. Sobin. Dr. Adlakha in her discourse spoke in details on macronutrients, micronutrients, mechanism of transport from soil to surface of the root. She also explicated her research work Two Dimensional Finite Element model, where she had developed mathematical model for nutrient uptake by root of plants. The chairperson concluded by saying that the talk was very informative and is an initiative for applying mathematical models in agricultural science.



**SECOND TECHNICAL SESSION-TALK- I**



**DR. NEERU ADLAKHA, SVNIT, SURAT**

The **second invited talk** commenced sharp at 3:30 pm. The theme was ‘**Current Trends and Challenges in Modeling and Simulation**’. It was chaired by Dr. S. Tiwari, Reader and Head, School of Studies in Mathematics, Vikram University, Ujjain, the introducer was the organizing secretary Mr. A. Pathak and rapporteur Mrs. S. Soni. The expert was Dr. K. R. Pardasani, Professor, Department of Mathematics, Bioinformatics & Computer Applications, MANIT, Bhopal. Prof. Pardasani said there are several threats in data mining like the velocity with which data comes into the data base, volume and variability in data obtained. However, the greatest challenge in data science today is uncertainty and vagueness which arises due to unreliable, inadequate, partially contradicting and defective data and these cannot be handled by traditional mathematical tools. The tools presently available to control these hazards are fuzzy sets, rough sets, vague sets, intuitionistic fuzzy sets, and soft sets. He dealt with each type of set and finally established that the most recent soft sets can be used to overcome uncertainty in modeling. He further introduced the concept soft fuzzy sets and fuzzy soft sets and revealed how they have been effectively used for real data set of air pollution obtained from Maharashtra pollution control board.

Day one concluded at 05: 00 pm with evening tea.



**SECOND TECHNICAL SESSION TALK- II**



**PROF. K. R. PARDASANI, MANIT, BHOPAL**

**Day 2:** 10<sup>th</sup> February 2018

The second day commenced with the **Third Technical Session** at 10 am. This session consisted of two invited talks. The theme of the **first invited talk** was ‘**Concepts of Soft Sets, Soft relation, Fuzzy Soft Relation and their Applications**’ and the resource person was Dr. Tanmoy Som, Professor, Department of Mathematical Sciences, IIT (BHU), Varanasi. The session was chaired by Dr. M. Kar, Head, Department of Mathematics, St. Aloysius (Auto) College, Jabalpur, introducer was Dr. K. Rajak, and rapporteur was Miss P. K. Haryal. Initially, Prof. Som illustrated Boolean algebra, partially ordered sets, fuzzy sets, fuzzy relation and their applications. He then provided a discourse on soft sets, soft relation, fuzzy soft relation and its application in decision making problems.



**THIRD TECHNICAL SESSION-TALK -I**



**PROF. T. SOM, IIT (BHU), VARANASI**

The **second talk** began at 11:30 am. It was delivered by Dr. Sandeep Tiwari, Reader and Head at School of Studies in Mathematics, Vikram University, Ujjain and the theme was '**Recent Developments in Mathematical Modeling**'. Dr. Tiwari focused his talk on the integrated approach for supplier selection and order allocation in Operations Research. Prof. M. Dubey, Department of Mathematics and Computer Science, Rani Durgawati Vishwavidyalaya, Jabalpur was the session chair, Mrs. S. Soni was the introducer and Dr. A. Patel was the rapporteur.



**THIRD TECHNICAL SESSION-TALK -II**



**DR. S. TIWARI, VIKRAM UNIV. UJJAIN**

The **Fourth Technical Session** had the theme '**Software Maintenance Modeling and Predictions**' and was held between 2:00 pm to 3:30 pm. The subject expert was Dr. Aparajita Ojha, Professor, Department of Computer Science and Engineering, PDPM, IIITDM, Jabalpur. Dr. M.K. Shukla, Head, Department of Mathematics, Institute of Excellence in Higher Education, Bhopal chaired the session, Mrs. A. Pasari and Mrs. S. K. Walia were respectively the introducer and rapporteur. Prof. Ojha began by introducing a 'game-go-game' and the working of neurons and human brain. She gave the importance of maintenance of software, types of maintenance, cost involved in maintenance, maintainability assessment, maintainability modeling and prediction, tools for maintainability assessment, discrimination of class hierarchies, correlation between maintainability and faults of class hierarchies, fault prediction models like Multivariate Linear Regression model, Multilayer Perceptron model, SVM Regression model and Regression Tree model. Prof Ojha further illuminated the participants on prediction error, performance evaluation, performance of prediction models and feature selection for model building- different methods and results obtained.



**FOURTH TECHNICAL SESSION**



**PROF. A. OJHA, PDPM, IIITDM, JABALPUR**

After the evening tea, the National Training Programme concluded with the **Valedictory Function** at 5:00 pm in 'Perna' the college auditorium. The dignitaries sharing the dais were Chief Guest, Prof. Prof. S. S. Thakur, Principal Govt. Engineering College, Jabalpur, Guest of Honor, Prof. A. Ojha, PDPM, IIITDM Jabalpur, Special Guests Prof M. Dubey, Department of Mathematics and Computer science RDVV, Jabalpur and Prof. M. K. Shukla, Head, Department of Mathematics, IEHE Bhopal, Rev. Dr. G. Vazhan Arasu, Principal, St. Aloysius College, Fr. Ben Anton Rose, Vice Principal, Dr. Mandira Kar, Head, Department of Mathematics and convener of the National Training Programme. The function began with a solemn prayer song by the Aloysian choir followed by welcome and felicitations of the guests. Mr. Akhilesh Pathak presented the **Report** of the two days National Training Programme. He enclosed all the events which took place in prior sessions of the training programme. This was followed by a brief feedback session from the participants of the training programme. On behalf of all the participants Mrs. Vinita Maheshwari, from Jabalpur and Dr. Lalitha, from Pandhurna expressed their appreciation for such a well-executed innovative progressive training programme. They were grateful to the institution for providing such learned experts from whom they had learnt a lot in such a short time. They were also thankful to the Department of Mathematics for their hospitality and overall efficient functioning. The participants felt the training programme was very enriching experience. Principal, Rev. Dr. G. Vazhan Arasu officially welcomed and thanked the guests. He acknowledged the resource persons and the participants for their presence. He made an appeal to the audience to imbibe what they learnt in this training programme and perform better as teachers, for that shall serve the purpose of the programme. Prof. Mridula Dubey said mathematics is vital for the growth of any nation. Prof. Thakur described various mathematical techniques that can be used in diverse research fields. Prof. Ojha said there is so much information available today that as teachers we need to redefine our role and change our pedagogy so that we build a better tomorrow by taking our

students in a unique way. As a gesture of reverence and gratitude a vote of thanks was proposed by Mrs. Archana Pasari.



**REPORT BY ORGANISING SECRETARY**



**PRINCIPAL'S ADDRESS**



**DELEGATES IN PRERNA AUDITORIUM**



**PROF. S. S. THAKUR, PRINCIPAL, JEC**

There were about 120 participants from various institutions around the country. They were introduced to the art of mathematical modeling as teaching pedagogy. They were given the requisite skill to analyze a problem and develop mathematical problems thereof. They also acquired the skill to train their students to think independently and intuitively on how to develop a mathematical model through various classroom activities, projects and



research. The delegates actively participated in all academic deliberations. Both academicians and students were the beneficiaries of this training program. With the hope that this training programme shall fulfill its purpose the event ended. The two days National Training Programme was a grand success.