



Mathematics is an essential part of nature. It is an indispensable tool in Science, Engineering, Technology and Management. To make most of the subjects that are taught in the undergraduate level need a very strong mathematical background. It has been assumed that the students' level of maturity possesses an introduction to elementary Calculus, Algebra and Differential Equations. Though lots of analytical methods have been developed for solving different types of problems, yet, most of the real life problems involve mathematical models that might not be solved by analytical methods. Due to these reasons, subjects like Numerical Analysis and Operation Research play a very important role in the field of Science, Engineering, Technology and Management. In the curriculum of West Bengal University of Technology, both the subjects are included in the theory and the laboratory classes for the B. Tech students. The Department of Mathematics of CIEM has self sufficient laboratories to train her students in these subjects for enhancing the skill set of her students with the tireless efforts of the faculty members of the department.

### *Numerical Analysis Laboratory*

The strength of Numerical Analysis lies in the fact that it can solve almost all real life mathematical problems. The invention of digital computers has made the computation process much faster. The use of numerical analysis hence has become an integral part in almost all types of researches. To put the right method in proper place one not only requires the knowledge the subject and the application area but also possess the grip over the computational techniques. The following computational procedures are taught in the laboratory classes of Numerical Analysis:

**Methods of Interpolation/ Methods of Numerical Differentiation/ Methods of Numerical Integration/ Methods of Numerical solution of Algebraic and Transcendental Equations/ Methods of Numerical Solution of System of Linear Algebraic Equations/ Methods of Numerical Solution of 1<sup>st</sup> Order Ordinary Differential Equation.**

### *Operation Research Laboratory*

“Operation Research is the application of scientific methods, techniques and tools to problem involving operations of system so as to provide those in control of operations with optimum solution of the problem.”

The subject of Operation Research was developed in military context during the 1<sup>st</sup> world war. After the invention of Electronic Data Processing methods the scopes for application of Operation Research have further enlarged.

Basic theories of Operation Research are discussed and the problems are worked out manually in the theory classes, while in the laboratory the same techniques are implemented using a high level programming language (C/C++/Java).

A brief list of some Operation Research techniques, implemented in the laboratory as per West Bengal University Technology curriculum is given here:

**Linear Programming with Transportation and Assignment problems/ Theory of Games/ Network Analysis/ Inventory Control and Planning/ Waiting Line or Queuing Theory/ Application of Operation Research in Graph Theory.**

The motivation of the department is to empower the students with programming skills so as to enable them to understand the algorithm, write the programs for execution of numerical methods and operation research techniques in solving different real life mathematical problems from diversified field.