FMPE504 SYSTEM SIMULATION ANDCOMPUTERAIDED PROBLEM SOLVING INENGINEERING 1+1

Objective

To acquaint and equip with the concept of dimensional analysis, mathematical modeling, software development process and the use of CAD software and in solving the engineering problems related to design of farm machinery

Theory

UNIT I

Concept, advantages and limitation of dimensional analysis, dimensions and units, fundamental and derived units, systems of units, conversion of units of measurement, conversion of dimensional constants, conversion of equations in different units, complete set of dimensionless products and their formulation methods- the Rayleigh's method, Buckingham's Pi theorem and othermethods.

UNIT II

Mathematical modeling and engineering problem solving. UNIT III

Computers and softwares – software development process – Algorithm design, – program composition- quality control- documentation and maintenance – software strategy.

UNIT IV

Approximation- round off errors- truncation errors. Nature of simulation- systems models and simulation- discreet event simulation- time advance mechanisms- components of discreet event simulation model. Simulation of singular server que- programme organization and logic- development of algorithm.

UNIT V

Solving differential equation on computers- modeling engineering systems with ordinary differential equations- solution techniques using computers.

Suggested Readings

Averill M. Law & W David Kelton.2000. *Simulation Modeling and Analysis*. McGraw Hill.

Balagurusamy E. 2000. *Numerical Methods*. Tata McGraw Hill. Buckingham E. 1914. *On Physical Similar System*. Physical Reviews 4: 345.

Langhar H. 1951. *Dimensional Analysis and Theory of Models*. John Wiley & Sons.

Murphy J. 1950. *Similitude in Engineering*. The Roland Press Co.

Robert J Schilling & Sandra L Harries. 2002. *Applied Numerical Methods for Engineers Using MATLAB and C*. Thomson Asia.

Simpson OJ. 2000. *Basic Statistics*. Oxford & IBH.

Singh RP. 2000. *Computer Application in Food Technology*. Academic Press.

Steven Chopra & Raywond Canale. 1989. *Introduction to Computing for Engineers*. McGraw Hill.

Veerarajan T & Ramachnadran T. 2004. *Numerical Methods with Programmes in C and C++*. Tata McGraw Hill.

Wilks SS. 1962. *Mathematical Statistics*. John Wiley & Sons.

FMPE505 APPLIED INSTRUMENTATION IN FARM MACHINERY 2+1 AND STRESSANALYSIS

Objective

To acquaint and equip with the concept of instrumentation used in farm power & machinery and measuring devices for force, torque and other parameters.

Theory

UNIT I

Strain and stress, strain relationship, strain gauges. Mechanical, optical, electrical acoustical and pneumatic etc. and their use. Various methods of determining strain/stresses experimentally. Measuring devices for displacement (linear and