1.1 Objective of the thesis.
1.2 Scope of the thesis.
1.3 Background.
1.4 Review of work on heat and mass transfer problems in porous media.
1.5 Review of laboratory experiments conducted in porous media.
1.6 Present work

CHAPTER II BASIC EQUATIONS, NON-DIMENSIONAL PARAMETERS, MATHEMATICAL METHODS AND BOUNDARY CONDITIONS.
2.1 Basic equations for an incompressible non conducting fluid in a porous medium.
2.2 Boundary conditions.
2.3 Approximations.
2.4 Non dimensional parameters.
2.5 Mathematical techniques.
CHAPTER III COMBINED FORCED AND NATURAL

CONVECTION IN A VERTICAL CHANNEL FILLED WITH SATURATED POROUS MEDIUM UNDER VARIOUS PHYSICAL CONDITIONS.

3.1 Mixed convection in the absence of dissipations.
   a) Mathematical formulation and boundary conditions.
   b) Solution Techniques.
   c) Discussion of the methods of solution.
   d) Results and discussions.

3.2 Mixed convection in the presence of Darcy and viscous dissipations.
   a) Mathematical formulation.
   b) Analysis.
   c) Results and discussions.

3.3 Unsteady laminar convection in the presence of dissipations and a heat generating source.
   a) Mathematical formulation.
   b) Analysis.
   c) Results and discussions.

3.4 Laminar convection in a vertical pipe filled with porous medium.
   a) Mathematical formulation.
b) Mathematical Analysis.

c) Results and discussions.

3.5 Existence of multiple solutions for natural convection.

a) Mathematical formulation.

b) Mathematical Analysis.

c) Results and discussions.

3.6 Refined analysis of mixed convection.

a) Mathematical Analysis.

b) Results and discussions.

CHAPTER IV INFLUENCE OF VARIABLE POROSITY ON COMBINED FORCED AND FREE CONVECTION IN A VERTICAL CHANNEL FILLED WITH POROUS MEDIUM.

4.1 Effects of variable porosity on steady laminar convection.

a) Formulation of the problem and boundary conditions.

b) Analysis.

c) Results and discussions.

4.2 Effects of variable porosity on unsteady laminar convection in the presence of inertial forces.

a) Formulation of the problem.

b) Analysis.
c) Results and discussions.

CHAPTER V EFFECTS OF VARIABLE POROSITY ON FLOW AND HEAT TRANSFER, BY NATURAL CONVECTION ADJACENT TO AN INFINITE VERTICAL PLATE.

5.1 Effects of surface mass transfer on buoyancy induced flow adjacent to an infinite vertical plate embedded in a variable porosity medium.

a) Formulation of the problem and boundary conditions.

b) Mathematical Analysis.

c) Results and discussions.

5.2 Effect of lateral mass flux on buoyancy induced flow in a variable porosity medium with variable heat flux.

a) Analysis.

b) Results and discussions.

CHAPTER VI INFLUENCE OF VARIABLE POROSITY ON HEAT AND MASS TRANSFER BY NATURAL CONVECTION IN A POROUS MEDIUM.

a) Mathematical formulation and boundary conditions.

b) Scale analysis for constant porosity medium.
c) Mathematical analysis.  
d) Results and discussions.  

CHAPTER VII  INFLUENCE OF VARIABLE POROSITY ON COMBINED FREE AND FORCED CONVECTION, BOUNDARY LAYER FLOW ALONG INCLINED SURFACES EMBEDDED IN POROUS MEDIA.  
a) Formulation of the problem and boundary conditions.  
b) Analysis.  
c) Results and discussions.  

CHAPTER VIII  RESULTS AND CONCLUSIONS.  

BIBLIOGRAPHY.  
PUBLICATIONS.  
CURRICULUM VITAE.