Module IV:

1. Make a flow chart for the solution of Navier-Stokes equations using the MacCormack method.

2. Write down the equations to be solved using the artificial compressibility method and make a flow chart for the calculation of flow through a two-dimensional sudden expansion using this scheme.

3. Derive the governing equations in the streamfunction-vorticity formulation.

4. Make a flow chart for the calculation of flow through a two-dimensional sudden expansion using the streamfunction-vorticity method.

5. Make a sketch of the staggered grid for use in cylindrical coordinates.

6. Derive the Poisson equation for pressure by taking divergence of the momentum equations.

7. Make flow charts for the solution of NS equations using (i) explicit pressure equation method and (ii) implicit pressure equation method.

8. Derive the pressure correction equation in Cartesian coordinates.

9. Make a flow chart for the calculation of the (i) steady and (ii) unsteady developing flow through a rectangular duct using the SIMPLE scheme.

10. Go through the relevant literature to study variants of the SIMPLE scheme and other alternatives to the solution of Navier-Stokes equations for incompressible flow.