**RESEARCH METHODOLOGY**

1. To enhance the single phase and two-phase operating regimes are heat flux through the channel wall and coolant flow rate with subjected to Primary parameters.
2. To improve the heat transfer system size - reduction.
3. To execute Fabrication and development of heat exchanger with case study requirement
4. Materials methods fin types are discussed
5. Fluids and performance analysis carried out in the research
6. two-phase flow pattern studies are required for the compact heat exchanger passages, especially for cross corrugated channels of plate heat exchangers
7. cost analysis

**Research flow chart**

Review on applications and need of S&T heat exchangers

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Performance analysis of S&T heat exchangers for present applications and need

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Performance analysis with comparison with present heat exchangers like fin &tube, compact

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Practical evaluation with blends (with water 6%, 8%) available

In present market at temperatures (40, 60, 80°C)

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Performance evaluation with NANO concentrations (2%, 5%, 8%) for Shell and tube as well as fin based compact heat exchanger for industrial applications.
Cost analysis in both types related to industrial applications and manufacturability

Results comparison for Validation of heat exchangers, advanced CFD simulation for future enhancements

Conclusions & Future scope

WORK PLAN

I Year

a) Completion of course work
b) Review of literature
c) Finding the problem statement
d) Creating the objectives
e) Synopsis preparation

II Year

a) Presentation of Synopsis
b) Review of related literature
c) Paper publications in reputed journals
d) Seminars to be attended
e) Data collection and analysis and chapterization
f) Preparation of summary and to be submitted in university

III Year

a) Finalize the thesis
b) Check for plagiarism
c) Pre thesis viva
d) Binding the thesis and submitted in university for evaluation