Thermal Design of Electronic Equipment

Course Title	Thermal Design of Electronic Equipment
Course Category	Research Topics
Relevant Discipline(s)	Mechanical Engineering, Electrical Engineering
Duration of course in equivalent integer no. of days (min 3 days, 1 day = 6 hrs of lectures/hands on sessions)	3 days
Proposed dates	December 12, 13, 19, 20, 26, 27 (3 hours each)

Brief Course Description and Course Contents

We live in the information age where electronics technology is an integral part of our lives. In recent years, the electronics industry has grown exponentially, as evidenced by the intrinsic pervasiveness of electronic products in our lives. Ever-increasing demand in the speed and amount of information we need to transmit, communicate, and the process often results in increased heat dissipation from electronic devices. Temperature effects are felt from the transistor level to the packaged computing devices to the datacenters. To meet this growing demand, we have to continually seek methods to achieve the early adoption of new and emerging thermal technologies, improve quality and reliability, and reduce cost. It is now generally recognized that an electronic system's performance and price are ultimately limited, not so much by advancements in new device and chip technology, but by our ability to package these individual chips into modules, boards, subsystems, and systems.

Course Contents:

- Introduction, basic definitions, classification: electronic packages and self-heating
- Introduction, basic definitions, classification: thermal management of electronic packages and datacenters
- Contact resistance and spreading/constriction resistance
- Fin analysis, heat sink design: derivation of general thermal resistance network.
- Natural convection and radiation in electronics packaging
- Forced convection in electronics
- Introduction to heat pipes
- Phase change energy storage with PCMs

- Microchannel heat exchangers
- Thermoelectric modules
- Thermal design of smartphones and tablets
- Air-Cooled Data Center Design
- Photo-electro-thermal design of LEDs
- Acoustics
- ANSYS ICEPAK

Instructor Details

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