

RESEARCH AREAS AVAILABLE FOR PH D PROGRAMS (Jan 2012)

MECHANICAL ENGINEERING

- **COMPUTATIONAL FLUID DYNAMICS (CFD)**

Development of CFD code to study flow and heat transfer characteristics for simple and complex flow configurations

- **STEP-NC (AP-238) BASED FREE FORM SURFACE MACHINING**

This work deals with the aspect of integrating the process planning details required for free form surfaces in STEP-NC AP238 format and proceeding with its implementation. Code generation is based on UG/UFUNC package / programming and testing is through ST-Developer /ST-Machine software.

Note: Knowledge of C/C++/JAVA/VC++ and UG NX 7.5 / Pro-E is mandatory

- **STEP-NC (AP-238) BASED SHEET METAL PROCESSING**

This work deals with the aspect of integrating the process planning details for sheet metal processing in STEP-NC AP238 format and proceeding with its implementation. Code generation is based on UG/UFUNC package / programming and testing is through ST-Developer /ST-Machine software.

Note: Knowledge of C/C++/JAVA/VC++ and UG NX 7.5 / Pro-E is mandatory

- **DEVELOPMENT OF MACHINING METHOD FOR TITANIUM ALLOY (Ti-6AL-4V)**

This work focuses on development of a new machining method for Titanium alloy Ti-6AL-4V by combining traditional and nontraditional processes. By developing this method, we can overcome various problems faced during traditional and nontraditional machining processes and to get better surface finish / tolerance by reducing the total machining time.

Note: Knowledge of C/C++/JAVA/VC++ and UG NX 7.5 / Pro-E is mandatory

- **INTEGRATION AND TESTING OF GEOMETRIC DIMENSIONING AND TOLERANCING INFORMATION IN 3D CAD MODELS**

This work deals with the aspect of integrating the GD&T information with the 3D CAD model and developing an automated GD&T system that can extract these details to pass on to the CAPP output. Code generation is based on UG/UFUNC package / programming. Experimentation will be done in a precision lathe/milling machine and the same information will be inspected in a CMM machine.

Note: Knowledge of C/C++/JAVA/VC++ and UG NX 7.5 / Pro-E is mandatory

- **MINIATURIZED THERMAL MEASUREMENT DEVICES:**

The research involves designing, development, experimentation and testing of miniaturized measurement devices, to measure thermo-physical properties of fluids.

- **ELECTRONIC COOLING SYSTEM:**

The research involves design, experimentation and testing of innovative cooling systems and coolants (nanofluids and ionic fluids) for high heat flux electronic devices. Further, it also involves heat transfer characteristics of the coolants.

- **VAPOR ABSORPTION SYSTEM:**

The research involves design, experimentation and testing of novel vapor absorption system/cycles and combined power cycles.

COMPUTER ENGINEERING

Broad Area - Digital VLSI Design:

- **Reconfigurable Computing:**
Investigation and design of Reconfigurable fabrics, Hardware based Compiler Design
- **Network on Chip:**
Routing Issues
- **Fault Tolerant Reconfigurable Architectures:**
SEU Tolerant Hardware design, Investigation of SEU mitigation on reconfigurable hardware at Algorithmic level and architectural levels
- **Evolvable Hardware:**
Cryptography, Software Defined Radio
- **Software for VLSI Design:**
Placement and Routing, Digital System Testing
- **High Performance DSP/Processor Blocks Design**
Issues at Cache, Arithmetic Circuits

ELECTRONICS ENGINEERING

- **Alternate substrates and high- κ dielectrics for VLSI MOS**
- **MIS and MOS devices with SiC**
- **MEMS, RF MEMS and Bio-MEMS**

MATHEMATICS

- **Graph Theory:** To explore the structural properties of special class of graphs and design efficient or approximate algorithms for hard problems like maximum independent set problem, dominating set problem and coloring problem.