Sr. no	Supervisor Name	Abstract
1	Dr. Deepak Sharma	Python and Machine Learning
2	Dr. Deepak Sharma	Python and Machine Learning
3	Dr. Deepak Sharma	Solid mechanics, machine design and CAD
4	Dr. Shubhadeep Mandal	Microswimmers are self-driven units in a fluid medium. They make use of the stored or ambient energy to perform systematic movement. Microswimmers can be categorized into two types: biological and artificial. The biological microswimmers (e.g. Escherichia coli, Chlamydomonas reinhardtii, etc.) move by performing non-time-reversible movement of their appendages (e.g. flagella or cilia), while the artificial microswimmers are miniaturized chemically-powered "engines" with no moving parts (e.g. catalytic Janus colloids). The reaction products released from the chemically-active particle surface create concentration gradients which further drives a net phoretic flow and subsequent locomotion of swimmer. Recently, artificial microswimmers have fascinated several researchers due to the potential applications of artificial microswimmers in targeted transport and delivery of cargo and drugs, wastewater management, nanosurgery, and lab-on-a-chip technologies. Additionally, understanding the motion of artificial microswimmers will help to understand more involved physical mechanisms associated with the biological microswimmers. Thus, the development and understanding of artificial microswimmers are of paramount importance. We are interested in a special type of artificial microswimmers which is referred to as "active droplets". Active droplets are self-propelled droplets composed of oil droplets dispersed in an aqueous surfactant solution. The experimental system consists of a droplet made of nematic liquid crystals (e.g. 4-pentyl-4′-cyanobiphenyl (5CB)) suspended in an aqueous solution with surfactants (e.g. tetradecyl-trimethylammonium bromide (TTAB)). When the surfactant concentration goes beyond the critical micelle concentration, the droplets show self-propulsion. The droplets propel on a timescale of hours with a cruising range of several thousand droplet diameters. As compared to biological microswimmers, these liquid-crystal-based swimmers are a very good choice for study because the active droplets can be produced in the desired size and numbers using a simple microfluidic chip. Our goal is to study the hydrodynamics of active nematic droplets. Towards this, we are interested to address the following key questions: Why the active nematic droplet shows curling and helical motion? What is the effect of domain confinement? How does the active droplet behave in the presence of external flow?
5	Dr. Nelson Muthu	In layered materials, often the interface is the weakest. During service loading conditions, the crack originate and propagate in the interface, which are captured by cohesive zone modelling technique. However, the extension of a crack with a fatigue cycle is not studied fully. In this project, you will use ABAQUS platform to develop numerical models that will enable crack growth with cycle.

6	Dr.Nelson Muthu	In this project, you will develop ML algorithms to predict the status of the battery charge and path planning for electric and autonomous vehicles respectively. You will also learn to generate synthetic data for model building purposes.
7	Dr. Nelson Muthu	You will use FEM tool to model a crack in the geometry using python and use the data to extract the hyperdimensional enriched function basis.
8	Dr. Karuna Kalita	
9	Dr.Karuna Kalita	
10	Dr.B S Reddy	The topic deals with the kinematics of an excavator mechanism
11	Dr.B S Reddy	This work deals with the design of a robotic hoist mechanism. Work is largely analytical/numerical
12	Dr.B S Reddy	This work involves analytical/numerical work. Experimental work may be done depending upon the student gr
13	Dr.Atul Kumar Soti	Second order accurate finite volume or finite difference methods are widely used for CFD applications. A higher-order method, on the other hand, can achieve the similar solution accuracy while using a relatively smaller number of mesh nodes/elements as compared to a second order method. Therefore, a spectral-element method-based solver can theoretically provide the solution of a flow problem significantly faster and save on electricity consumption of supercomputers. The final goal of the project is to develop a spectral-element method based CFD solver. We will start with the development of a serial Poisson equation solver that will be parallelized later. The focus will be on writing an optimized FORTRAN code for minimizing computational time.
14	Dr.Atul Kumar Soti	Fast solution of linear systems arising from discretization of partial differential equations is key factor in developing fast CFD solver. Parallelization is must for solving large scale problems in reasonable computer time. GPUs have been reported to provide significant acceleration in speeding up the solution process of linear systems due to the large number of available compute cores. The project will start with GPU based parallelization of the simplest linear solver: Jacobi method. Later we will move to more advance methods.
15	Dr.Atul Kumar Soti	Flow-induced vibrations (FIV) has many engineering applications, one of which is flow energy extraction. The work will focus on the numerical investigation of FIV based turbines for maximizing the power extraction efficiencies. The numerical simulations will be performed using open source CFD software OpenFOAM.
16	Dr.Prasenjit Khanikar	
17	Dr. Prasenjit Khanikar	
18	Dr.Prasenjit Khanikar	
19	Dr.S N Joshi	
20	Dr.S N Joshi	
21	Dr.S N Joshi	

22	Dr. Pranab K Mondal	
23	Dr.Pranab K Mondal	
24	Dr.Manas Das	
25	Dr.Manas Das	
26	Dr.Manas Das	
27	Dr.Rajiv Tiwari and Dr D J Bordoloi	Refer paper: Blockage and cavitation detection in centrifugal pumps from dynamic pressure signal using deep learning algorithm R Tiwari, DJ Bordoloi, A Dewangan Measurement 173, 108676
28	Dr.Rajiv Tiwari and Dr D J Bordoloi	Refer paper: Signal based condition monitoring techniques for fault detection and diagnosis of induction motors: A state-of-the-art review P Gangsar, R Tiwari Mechanical Systems and Signal Processing 144, 106908
29	Dr.Rajiv Tiwari and Dr D J Bordoloi	Refer paper: Nero-Fuzzy Based Multi-Fault Classification In Gearbox From Time Domain Vibration Data DJ Bordoloi, R Tiwari 13th International Conference on Vibration Problems (ICOVP-2017), 29th Nov …
30	Dr.S.Senthilvelan	A test rig to evaluate the fatigue performance of connecting rod to be developed in this proposed work. Connecting rod of two wheeler will be developed through power metallurgy process. Already hysteresis dynamometer is procured for this development
31	Dr.S.Senthilvelan	By designing and developing stone/wood crusher and by using slow speed drive it would be achieved
32	Dr.S.Senthilvelan	In the traditional south Indian musical instruments, most of the materials are made out of organic materials, from parts of the plants, trees, animals. There is lot of scope to understand the science behind these materials, treatment for sound generation. Other than material, there is a scope to understand the shape and geometry on the configuration design on the sound generation
33	Dr.Biranchi Panda	
34	Dr.Biranchi Panda	
35	Dr.Biranchi Panda	
36	Dr.Arup Nandy	In this project you will develop deep learning algorithm in Python. This algorithm will be used to analyse relative influence of different process parameters. In this project you also require to do simulation of electromagnetic forming in ANSYS. There will be weekly meeting where weekly progress will be monitored. In Python and ANSYS, sufficient guidance will be provided.

37	Dr.Arup Nandy	Electromagnetic crimping is a high strain rate joining process to join tube to r od, tube to tube. There are different parameters which significantly effect the quality of the joint. In this project we will study effect of different paramete rs in Electromagnetic Crimping through Deep Learning Algorithm in Python. In this project you also require to do simulation of electromagnetic crimping in ANSYS. There will be weekly meeting where weekly progress will be monitored. In Python and ANSYS, sufficient guidance will be provided.
38	Dr. Niranjan Sahoo	
39	Dr. Niranjan Sahoo	
40	Dr. Niranjan Sahoo	
41	Dr.Sajan Kapil	We have developed a robotic cell for Wire - Arc Additive Manufacturing system at IITG. In this project the s tudents will work on the toolpath planning for fabricating the large & complicated metallic components.
42	Dr. Sajan Kapil	This project will be focused on developing the algorithms and appropriate interface between the existing CAM packages (PowerMill/PowerShape) and platform such as visual studio/python. The developed system will be used for generating the G-codes for cyclic
43	Dr.Sajan Kapil	This project will be focused on developing a platform (Software & Hardware) for generating the CAD models by dipping the object into a tank of water.
44	Dr. U. S. Dixit	Bending of sheet by laser irradiation is well-established now. However, FEM modelling is still a challenging task. It is a transient thermo-elastic-plastic problem and there can be several mechanisms responsible for deformation including buckling. The group will simulate the process properly using DEFORM, ABAQUS, ANSYS or own code. Experimental validation will also be done. Later on machine learning may also be employed.
45	Dr. U. S. Dixit	Friction is dependent on several factors. It is very difficult to develop an analytical model to incorporate all the factors. This project aims to use machine learning techniques to achieve that goal. Good programming skill is needed. We may have to do some experiments.
46	Dr. U. S. Dixit	It is planned to design and fabricate a underwater vehicle that can be guided through web. It is a TIH sponsored project. Already one Ph.D. student is working on this problem. Group can collaborate with him or develop totally novel product. We need to use some solid modelling packages. Knowledge of sensors and internet technologies is needed.
47	Dr. S. Kanagaraj	

48	Dr. S. Kanagaraj	
49	Dr. S. Kanagaraj	
50	Dr.Sukhomay Pal	
51	Dr.Sukhomay Pal	
52	Dr.Sukhomay Pal	
53	Dr.Poonam Kumari	
54	Dr.Poonam Kumari	
55	Dr.Poonam Kumari	
56	Dr.Pankaj Biswas	
57	Dr.Pankaj Biswas	
58	Dr.Pankaj Biswas	
59	Dr.P. Muthukumar	
60	Dr.P. Muthukumar	
61	Dr.P. Muthukumar	
62	Dr.Sachin S. Gautam	In the present project the student group has to come up with machine learning algorithms to predict stresses from the finite element displacement solution. The group needs to undergo courses in linear and nonlinear finite element methods. The work requires deep understanding of mathematics of FEM (for contact algorithm understanding)and very good coding skills.
63	Dr.Shyamanta M Hazarika	Motor imagery (MI) is a mental process by which an individual rehearses or simulates a given action. MI is widespread in Brain-Computer-Interface (BCI) systems because it has naturally occurring discriminative properties and inexpensive signal acquisition based on non-invasive EEG. The key challenge of EEG MI BCI is to categorise human intents accurately, given the poor signal-to-noise ratio of the brain signals. Deep Learning would be exploited to automatically extract features and work towards collaborative BCI for a hand exoskeleton.
64	Dr.Shyamanta M Hazarika	Grasping of everyday objects without slip and deformation is a crucial task for prosthetic hands. Several methods have been proposed to generate suitable grasps for household objects. Nevertheless, each comes with its own limitations. We propose an approach based on human observation, to enable a prosthetic hand to grasp every kind of object. The method based on reinforcement learning will be evaluated using a five-fingered bionic prosthetic hand.
65	Dr.Amaresh Dalal	
66	Dr.Amaresh Dalal	
67	Dr.Satyajit Panda	
68	Dr.Satyajit Panda	

69	Dr.R GANESH NARAYANAN	FABRICATION OF SANDWICH STRUCTURES WILL BE ATTEMPTED AND THEIR MECHANICAL DEFORMATION WILL BE STU
70	Dr.R GANESH NARAYANAN	IN THIS PROJECT, 3D PRINTED TOOLS WILL BE USED FOR SHEET METAL DEFORMATION AND FORMING BEHAVIOR WILI
71	Dr.R GANESH NARAYANAN	
72	Dr. Tapan K. Mankodi	
73	Dr. Tapan K. Mankodi	

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