

Programme schedule of short term course on
Computer Aided Engineering: Applied CFD and FEM

9-15 October 2016

College of Engineering, Pallipuram, Alleppey Dist., Kerala

Day↓ Time→	9.30-10.00	10.00-11.00		11.30-1.00		2.00-3.00	3.00-4.00		4.10-5.00	5.00-5.30
DAY 1: Sunday (9th Oct)	Registration			Introduction		CFD theory	Scaling laws		Scaling laws for internal & external flows	
				Computer Aided Engineering (CAE): FEM, CFD		Differential equations and concept of boundary layer	Rules for scaling analysis of differential equations		Order of magnitude method	
DAY 2: Monday (10th Oct)	Review of overnight assignment		T E A	Meshing strategies	L U N C H	Concept of internal and external flows		T E A	How to decide?	Overnight assignments
				Geometric features and pre-processing techniques for CAE		Mesh refinement, quality checks and improvements	Fluid and solid volume extraction techniques		Boundary layer mesh generation techniques	
DAY 3: Tuesday (11th Oct)	Reverse Engineering 1: Why and how with CAE			Reverse Engineering 2: Geometry from Mesh		Automotive/ Aerospace	Turbomachinery application		Concept of interface modelling	
	Review of overnight assignment	3D, Tetra Meshing, face extraction		Reverse Engineering		Raw scanned data to perfect feature based geometry	Wind tunnel CFD technique		From 3D to 2D blade aerodynamic design and CFD model	
DAY 4: Wednesday (12th October)	Finite Element Method (FEM)			Weak (Variational) form type method		Fluid Structure Interaction (FSI)			FSI	
	Introduction			Subdomain, Galerkin, Petrov-Galerkin, Least square, Collocation		Rayleigh-Ritz Method, Global matrix	Background and applications		Case studies on FSI	

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DAY 5: Thursday (13th Oct)	Design for vibration and thermal		T E A	Design for vibration 1: Dynamic response	L U N C H	Design for vibration 2: Harmonic response	FEM vs. FVM	T E A	FEM vs. FVM	Overnight assignments	
	Review of overnight assignment	Industry case study: a multidisciplinary problem		Structural design based on natural dynamic response		Structural design based on forced harmonic response	Finite Volume Method for CFD and FEM problems		Solving same structural problem using FEM and FVM: Which gives better result?		
DAY 6: Friday (14th Oct)	How to shoot 2D still images?			2D Image-based 3D modelling		Stresses in critical region			How to decide?		
	Review of overnight assignments	Best practices for taking still images		Handling geometry, data loss, Developing CFD/FEM models, Project to participants		Solution strategies: Quad, tria or higher order element?	Abrupt geometry: plate with a hole, Effect of mesh density		1D, 2D or 3D FEM: Same result, different method?		
DAY 7: Saturday (15th October)	CFD/FEM project			Closing ceremony							
	Project Evaluation			Valedictory function							