



# AN INTRODUCTION TO CARDIOVASCULAR FLUID MECHANICS

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Department of Chemical Engineering  
IIT Guwahati

**TYPE OF COURSE** : Rerun | Elective | UG/PG

**COURSE DURATION** : 4 weeks (18 Jan' 21 - 12 Feb' 21)

**EXAM DATE** : 21 Mar 2021

**PRE-REQUISITES** : NIL

**INTENDED AUDIENCE** : UG and PG students of Chemical Engineering/Mechanical Engineering and Biomedical Engineering/Biotechnology

**INDUSTRIES APPLICABLE TO** : GE Healthcare, Johnson and Johnson and other biomedical companies

## **COURSE OUTLINE :**

This course aims to provide an overview of the important problems in human circulatory system. The course would provide introduction to cardiovascular systems and important fluid flow problems in large arteries. The goal is to provide students with the necessary background to apply the knowledge of fluid mechanics to analyse the flow behavior in biological systems in general and human circulatory system in particular. It is hoped that with this course, the students would be able to develop a perspective towards the design and development of diagnostics and medical device development.

## **ABOUT INSTRUCTOR :**

Dr. Raghvendra Gupta is an Associate Professor in the Department of Chemical Engineering at Indian Institute of Technology Guwahati. He teaches courses related transport processes and fluid mechanics at IIT Guwahati. His research interests are based around understanding complex transport processes in chemical and biological systems using a combination of theoretical, numerical and experimental techniques.

## **COURSE PLAN :**

**Week 1:** Introduction to Cardiovascular System, Fluid Mechanics, Solid Mechanics

**Week 2:** Basics of Rheology, Morphology and Rheology of Blood, Viscometers and Rheometers, Viscoelasticity

**Week 3:** Blood flow in a channel, Flow Bifurcation

**Week 4:** Pulsatile Flow, Flow in Elastic Tubes