

Name of the programme	Webinar
Topic	“Modelling and Analysis of Blocked Coronary Artery How far are we from Mechanical Engineering?”
Date	23.07.2021
No. of Participants	53
Nature of participants	Final Year students and Faculty members of the Department of Mechanical Engineering.



Report on the Webinar

“Modelling and Analysis of Blocked Coronary Artery How far are we from Mechanical Engineering?”

Presented by **Dr. Mohammad Talha,**

Associate Professor, Department of Mechanical Engineering, IIT - Mandi, Himachal Pradesh.

23.07.2021

June 17, 2021, Time: 11 AM to 12.30 PM

Department of Mechanical Engineering, BSACIST

Organized a Webinar on

**“Modelling and Analysis of Blocked Coronary Artery
How far are we from Mechanical Engineering?”**

Coordinator: Dr. Serajul Haque, Asst Professor Department of Mechanical Engineering School of Mechanical Sciences, BSA Crescent Institute of Science & Technology	Speaker: Dr. Mohammad Talha Associate Professor, Department of Mechanical Engineering, IIT - Mandi, Himachal Pradesh.
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PREAMBLE

The online webinar on “Modelling and Analysis of Blocked Coronary Artery. How far are we from Mechanical Engineering?” was organized by the Department of Mechanical Engineering. The webinar was presided by Dr. H. Siddhi Jailani, Head of the Department of Mechanical Engineering. The presentation was delivered by Dr. Mohammad Talha, Associate Professor, Department of Mechanical Engineering, IIT - Mandi, Himachal Pradesh.

The webinar emphasized on the modeling and analysis concepts for real systems that students and researchers have to develop in order to excel in their career.

The presenter gave a brief view on the following concepts

- Basic modelling and analysis concepts for some real life systems, e.g. electric train locomotive arm, an airplane wings etc. are discussed in lecture
- How engineers solve any problem, step by step explained in the lecture.
- The strategies of modeling are well elaborated and illustrated.
- Mathematical Modelling and Analysis of Blocked Coronary Artery with mechanical concepts are explained by Professor in his lecture. Moreover, The presenter also explained the aspects of model validation as a part of his talk.

Around 36 participants, including 24 B.Tech Mechanical, 4th year students and faculty members participated in the webinar. Finally Dr. Serajul Haque concluded the webinar with a vote of thanks.



Coordinator



HOD (Mech)

Attendees

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Event Brochure

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B.S. Abdur Rahman

A webinar on

Modelling and Analysis of Blocked Coronary Artery
How far are we from Mechanical Engineering?

Organized by
Department of Mechanical Engineering


Dr. Mohammad Talha
Associate Professor
Department of Mechanical Engineering
IIT - Mandi, Himachal Pradesh

THURS DAY | JUNE 17 | 11 AM

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JOIN US NOW!
meet.google.com/gfp-ghak-rdc

Coordinator
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Screenshots of presentations

Modelling and Analysis of Blocked Coronary Artery:
How far are we from Mechanical Engineering?

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<https://www.mohammadtalha.com>
17 June 2021

Indian Institute of Technology Mandi



REC M Mohammad Talha is presenting

Computational Design Lab:

Research in our lab focuses on: **Computational Modelling and Simulation for Problems Ranging from Continuum to the Molecular Scales**

Research Directions: **Computational Solid Mechanics and Associated Area**

High Technology Materials & Structures (FGMs)

Bio-composite Scaffolds for Bone Tissue Engineering

Computational Solid Mechanics

Nano-composites Based on Nonlocal Elasticity

11:18 AM | Webinar on Modelling and Analy...

Mohammad Talha

Kishore Kumar

HOD Mechanical

Thirumurugan M

19 others

You

REC M Mohammad Talha is presenting

Real System

Idealized Model

11:31 AM | Webinar on Modelling and Analy...

Mohammad Tal...

Thirumurugan M

HOD Mechanical

32 others

You

People X

Mute all Add people Host controls

- Pradeep Kumar
- Ragul Raj
- Rajendran DR
- Rajesh Kumar G
- Ram Sam
- Ravikumar N

REC M Mohammad Talha is presenting

How Engineer Solves any Problem?

Participant avatars and names: Mohammad Talha, Kishore Kumar, HOD Mechanical, 23 others, You.

REC M Mohammad Talha is presenting

Modelling Strategies

For the **same system** we may develop different models depending upon the Purpose and Objective of Study.

For example: Consider an aircraft: which could be modelled as

- Interested in the trajectory of flight to find the fuel consumption, then the **Particle Model** of aircraft is good, simple, and sufficient.
- Flight stability, i.e., aircraft behaviour for small disturbances, then the aircraft is considered as a **Rigid Body** system.

- Particle
- System of rigid bodies
- System of deformable bodies

People

Mute all Add people Host controls

- SELVAKUMAR A.S
- Serajul Haque
- Sirajudeen N
- siva kumar c
- SYED ASHHAD AFNAN
- Syed Zubair

Participant avatars and names: Mohammad Talha, Kishore Kumar, HOD Mechanical, 20 others, You.

11:24 AM | Webinar on Modelling and Analy... [Mute] [Unmute] [Screen] [Hand] [Share] [More] [Call]

Step by Step Approach for Research

- **Simulation of isotropic material**
 - **Cantilever Beam**
 - **Cylinder with internal pressure**
- **Simulation of Orthotropic material (composite)**
 - **Cantilever Beam**
- **Simulation of Hyper-elastic material**
 - **Cantilever Beam**
 - **Cylinder with internal pressure**
- **Simulation of Blood Flow**
 - **Normal Blood flow**
 - **Blood flow with stenosis severity**
- **Experimental Setup**

Activate Windows
Go to Settings to activate Windows.



Analysis of Artery wall with plaque

Thickness = 0.8 mm Pressure = 13000 Pa (~100 mmHg) Inner diameter = 4 mm, $C_{20} = 3550$ Pa, Length = 8 mm, $C_{20} = 14492.5$ Pa

Boundary Conditions: Fixed at ends,
Pressure in radial direction in $1/5^{\text{th}}$ area

Meshed artery wall with plaque

Stress distribution in artery wall with plaque

Plaque is formed by fat, cholesterol, calcium and other substance found in blood

Image Source: Medline Plus & Bioprinting Institute Ltd

ANSYS Workbench

