

Online Certificate Program in **Biomechanics of Joints and Implants**

Engineering the Science Behind Joints, Bones, and Implants

16 May to 14 June | Industry & Research-Oriented | Weekend Mode | Online Learning

INDIA: 7:30 PM | USA: 9:00 AM (ET) | UAE: 6:00 PM | KSA/ QATAR: 5:00 PM | OMAN: 6:00 PM | UK (LONDON): 2:00 PM | MALAYSIA: 10:00 PM

About the course

The Online Certificate Program in Biomechanics of Joints and Implants is a comprehensive, application-oriented training designed to bridge the gap between biomechanics theory, implant design, and clinical relevance. This course provides a strong foundation in musculoskeletal biomechanics, joint mechanics, bone behavior, and implant–bone interaction, with a focus on real-world orthopedic applications.

Course Objectives

- Build a strong foundation in musculoskeletal biomechanics, joint mechanics, and gait
- Understand bone mechanics, load transfer, and joint function
- Learn bone microstructure, adaptation, and remodeling concepts
- Gain insight into orthopedic implant materials, designs, and fixation systems
- Connect biomechanics theory with real-world implant design and clinical decisions
- Get hands-on exposure to hard tissue segmentation and basic implant design

Target Audience

UG & PG students | Research scholars | Biomedical, Biotech & Mechanical engineers | Early-career professionals | Orthopedic surgeons

Resource Person

Dr. Souptick Chanda, Fulbrighter
Department of Biosciences and
Bioengineering,
IIT Guwahati,

Organized & Certified by

Centre for Advanced Training and Research
(Govt. Registered & ISO-IAF Certified)
Sector 1, Vikas Nagar, Lucknow U.P. India

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Course Outcomes

Participants will be able to:

- Analyze joint mechanics, bone behavior, and musculoskeletal dynamics
- Evaluate bone properties and remodeling for implant performance
- Understand stress shielding and implant–bone interaction
- Select and compare orthopedic implant materials and designs (THA, TKR, fixation devices)
- Perform basic hard tissue segmentation and assist in implant design
- Skill upgradation for implant manufacturing, R&D, QA, and product roles
- Improved employability in biomedical and orthopedic device sectors
- Strong foundation for PhD research and funded projects

Apply biomechanical knowledge in:

- Orthopedic implant manufacturing companies
- Academic and industrial research projects
- Clinical decision-making for implant selection (for surgeons)

**REGISTER
NOW**

Fee of the Course

Indian Participants: INR 4500

Other Participants: US 160 \$



+91-8887565470



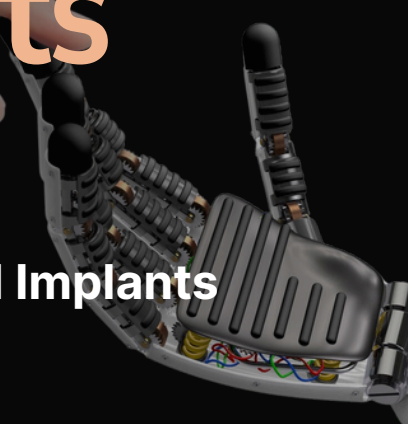
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Course Module

Week 1

Saturday (1.5 hrs)

- Fundamentals of Biomechanics: definition and spheres; musculoskeletal system; anatomical planes and directions; skeletal organization

Sunday (1.5 hrs)

- Bone, muscle, and connecting tissues; joint movements; human gait; musculoskeletal dynamics: forward and inverse dynamics, muscle models

Week 2

Saturday (1.5 hrs)

- Joints: classification and structure; synovial joints; joint disorders and treatments.

Sunday (1.5 hrs)

- Bone microstructure; mechanical behavior of bone; classification of bone tissue; mechanical properties of bone tissue; compact and cancellous bone

Week 3

Saturday (1.5 hrs)

- Bone adaptation; theory of adaptive bone remodeling; strain-adaptive remodeling

Sunday (1.5 hrs)

- Stress shielding; introduction to implant biomaterials; properties of biomaterials; metallic and non-metallic implants



Course Module

Week 4

Saturday (1.5 hrs)

- Bone-implant system; background in orthopedic surgery; popular implant materials; fracture fixation devices; fracture types

Sunday (1.5 hrs)

- Bone healing; Total Hip Arthroplasty (THA): cemented and uncemented designs; Total Knee Replacement (TKR): design philosophies

Week 5

Saturday (2 hrs)

- Workshop on segmentation of hard tissue and implant design

Sunday

- Reserved for interaction, discussion, and doubt-clearing session



**Enhance employability in
biomedical, orthopedic device,
and implant R&D sectors.**



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